INTRODUCTION

The compendium in your hands appears *in lieu* of a long awaited book on *Port Economics and Policy*, suitable for graduate study in this fast expanding field. By no means comprehensive, the book, if one could call it this in its present form, is, I believe, representative of my own interests as well as those of my collaborators who have coauthored parts of it. More on MEL work in this area can be downloaded from the MEL website and, hopefully, given time, this output could end up as a formally published book, revamped and updated with current developments and new research.

Parts of the book have already seen the light of publication, while others consist of contract research output for external organizations, most notable among them the European Commission and the International Labor Organization (ILO). The first work in the book, *Ports in the Framework of EU Transport Policy*, constituted the background study out of which the European Commission produced its seminal *Green Paper on Ports and Maritime Infrastructure*; working for Neil Kinnock, the then Transport Commissioner, was one the most rewarding experiences ever. The work for ILO culminated in a number of publications (and an international Convention) that are adequately summarized in *Worldwide Experiences of Port Reform*. In the two years this research took, we looked into more than 100 ports around the world and came up with guidelines on port reform that remain intact to the present day.

The book includes extensive bibliography which I hope students will find useful in taking their argument further. Together with this, however, the book also suffers from a certain degree of overlapping coverage which, honestly, I never bothered to fix as this would defeat the purpose of the book in its current status. I hope this *Collected Papers* volume will be of value to the student of Port Economics and Policy, an area of research Erasmus University has distinguished itself over many years.

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PORTS IN THE FRAMEWORK OF EU TRANSPORT POLICY[1]

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General

1. European ports, with the overwhelming predominance of those located in the North Sea, handle approximately 2.5 billion tons of cargo per year. Around 70 % of this consists of deep-sea traffic and 30 % of intra-European trade. In addition, ferries carry more than 100 million passengers each year[2], providing essential connections to peripheral countries and islands and contributing to the development of the tourism industry.

Table 1: Port Traffic and Short Sea Shipping in the EU

(million tons)

	1985	1990	1992
Goods Loaded			
▪ Intra-EU	203.8	230.3	241.8
▪ Total	517.6	536.3	564.8
Goods Unloaded			
▪ Intra-EU	209.9	233.1	272.2
▪ Total	1,131.4	1,316.1	1,360.9
Total	**1,649.0**	**1,852**.4	**1,925.7**

Source: Erasmus University Rotterdam

2. Profound trends in trade liberalisation and globalisation of the world economy are having significant impacts on international seaborne transport and ports, with long term effects not easily predictable. These trends have drastically weakened the link between manufacturing and the location of factors of production and have stimulated a most noticeable shift in manufacturing activities towards countries with a comparative advantage.

3. In their turn, too, developments in international transport and communication technologies have been instrumental in shaping these processes. Containerisation and multimodal integrated transport have revolutionised trading arrangements of value-added goods and have given manufacturers and shippers more control and choice over the "production-transport-distribution" chain. In addition, the increased reliability and accuracy of international transport enables manufacturing industries to adopt flexible *Just-in-Time* and *Make-to-Order* production technologies that i*nter alia*, allow them to cope with the vagaries and unpredictability of the seasonal, business and trade cycles and plan business development in a more cost effective way. Transport efficiency becomes also necessary due to the very same nature of value-added goods whose increasing sophistication requires fast transit times from origin to destination in order to increase traders' turnover and minimise inventory costs.

[1] This is an earlier and expanded version of the European Commission's *Green Paper on Ports and Maritime Infrastructure*, prepared by the author as a member of Commissioner Kinnock's Group, with input from all members of the Group. The paper does not commit the European Commission and readers are advised to refer to the final version of the Green Paper as published by the EC.

[2] According to estimates of the European Community Shipowners' Associations

4. The capital-intensity of modern shipping –as a result of the need to achieve economies of scale- and the need to offer a service of higher frequency have led to considerable capital concentration in the industry. Carriers are forming new alliances and logistics companies, often linked to European distribution services. Such rationalisation of service requires carriers to limit their ports of call on a few large hubs. However, concentration of cargo in a limited number of "mega-ports" might entail loss of flexibility and competition while, at the same time, it could lead to an increase in the use of road transport and thus be counterproductive to a policy of shifting freight transport from road to sea.

5. Undoubtedly, further trade liberalisation will create new and stronger trade flows and demand for shipping services. The "type" of shipping, however, is not unambiguously foreseen by industry observers. Despite conventional wisdom that sees a continuing increase in ship sizes, a number of external long term trends point to the direction of a possible increase in the market share of smaller ships targeting more immediate hinterlands. These trends include world-wide port development (making direct port calls financially attractive), regionalisation of trade (involving shorter distances) and diseconomies of scale in major ports. Two additional trends pointing to this direction are the development of transport infrastructure in peripheral Europe and a future road pricing policy not favouring long-distance haulage. Their effect could be a more balanced traffic flow and port development in Europe.

6. Whatever the likely future scenario, one thing remains: Europe's export competitiveness in a global economy increasingly depends on efficient and cost effective transport and port systems. Furthermore, the substantial emphasis the Union attributes to the development of trans-European transport networks, aiming at closer economic and social integration, creation of employment, growth, and sustainable mobility, charges ports with an additional role and responsibility. Indeed, the development of the Union's multimodal network would be incomplete without including its interconnection points.

7. The European Union has certain obligations under the Treaties, that have special relevance to the port sector. Firstly, the Treaty of Rome determines the rules governing competition, State aid, freedom to provide services and the right of establishment. Furthermore, the Maastricht Treaty has laid down the rules governing the development of a trans-European transport network, aimed at serving the objectives of the single market, i.e. to strengthen economic and social cohesion and to link island, landlocked and peripheral regions of the Union with its more central areas.

8. The Commission, therefore, finds it important to promote the port sector through a number of positive measures and actions aimed at improving its overall performance. These include actions to improve port efficiency, remove harmful obstacles to trade and promote improvements in port and related infrastructure so that port efficiency reaches a high standard throughout the Community.

The Role of Ports in Trans-European Transport Networks

9. The Treaty on the European Union governs the EU's work in developing the trans-European transport networks. It requires the EU to promote the interconnection and interoperability of national networks and access to them, taking into account the need to link island, landlocked and peripheral regions of the Union with its more central areas. The aim is to enable citizens of the Union, economic operators and regional and local communities to derive full benefit from the internal market.

10. However, interconnection, interoperability and TETN optimisation in general cannot be achieved if ports are not included in the equation as the crucial links of a closed (i.e.

total) European transport system. Considering European ports as a whole and as the international interface of the European logistical network is consistent with the approach taken by the Commission in its White Book on the future development of the common transport policy.[3] In fact, while taking note of existing inefficiencies and discordances, the White Book provides for a global approach to the problem. It aims at a more balanced modal development of transport, allowing users a greater freedom of choice; at a more balanced distribution among regions of benefits resulting from infrastructure development; at improving the efficiency of companies operating in this sector; at increased safety and attention to the problems of environmental protection. All this, while taking social problems related to the sector's employment levels into account.

11. In brief, the objectives of including ports in the TENs strategy can be summarised as:

◊ Encourage growth of inter/intra EU trade and more specifically trade with the Community's nearest neighbours (EFTA, Central and Eastern Europe, Mediterranean and North Africa);
◊ Overcome congestion of the main land-corridors and minimise the external costs of European transport by contributing to the development of combined transport;
◊ Improve the accessibility of peripheral regions and strengthen the economic and social cohesion within the Community by enhancing the Community's internal maritime links, paying particular attention to island and peripheral regions.

Connections to neighbouring third countries

12. The Treaty and the TEN Guidelines permit cooperation with neighbouring countries in order to promote projects of mutual interest and ensure the interoperability of networks at a pan-European level. One of the aims is to connect TENs with networks outside the Union, particularly with Central and Eastern Europe and the Mediterranean area.

13. Given the opportunities and initiatives for increased trade between the EU and neighbouring third countries, it is a desirable objective to seek standards in these ports, particularly those involved in major trade flows with the EU, which are comparable to standards found in the Union. In general, this means continuing the process of rehabilitation and modernisation, the implementation of basic standards concerning safety and environmental protection and, where necessary, improving security, monitoring and registration arrangements for cargo.

14. The EU has also been trying to ensure that the increased trade prospects with the Baltic Sea countries would not be hampered by logistic restrictions in ports. It is cooperating with these countries in maritime and port projects and it is actively encouraging cooperation between the countries themselves. A specialised working group meets regularly to monitor progress. Equally, the MEDA programme recently adopted by the EU allows for cooperation and project financing in Mediterranean countries. Practical work has already started with maritime issues being at the forefront of cooperation.

15. Furthermore, in the framework of the Uruguay Round, the Community has been instrumental, at an early stage of the negotiations, in ensuring that talks on the liberalisation of maritime transport included, as an integral part, rules on the use of ports.

16. The GATS negotiations were suspended without conclusion[4] to be resumed in the year 2000. However, it is now accepted that a liberalised maritime transport régime will have

[3] *The Future Development of the Common Transport Policy: A Global Approach to the Construction of the Community Framework for Sustainable Mobility*. COM(92)494 final.
[4] The WTO Negotiating Group on Maritime Transport Services suspended its work on 28/6/1996. It nevertheless adopted a so-called "peace" clause under which countries agree not to apply any measures affecting trade in maritime transport services except in response to measures applied by other countries. This "peace" clause covers

to guarantee national treatment of non-national operators in ports, in particular with regard to the use of port infrastructure, fees and charges, use of facilities, the assignment of berths as well as the non-discriminatory use of auxiliary services.

17. Although the EU will continue to seek agreement on further liberalisation in the context of the WTO, it must in the meantime pursue its interests, where necessary. It may thus prove appropriate to do so bilaterally in contacts with third countries, as was done in the past where bilateral contacts resulted in a number of changes in third countries' port practices.

The Nodes of Intermodality

18. Intermodality is an essential component of the European Union's Common Transport Policy for sustainable mobility. Its objective is to develop a framework for an optimal integration of different modes and utilisation of their capacities, so as to enable an efficient and cost-effective use of the transport system through seamless, customer-oriented door-to-door services whilst favouring innovation and competition between transport operators.[5]

19. Ports are crucial connecting points in intermodal transport, transferring goods and passengers between maritime and land-based modes of transport. Higher port efficiency thus contributes to the integration of modes in a single system, allowing better use of rail, inland and sea transport; modes that by themselves do not always allow door-to-door delivery.

20. Seamless transport systems necessitate open access to (port) infrastructure to all licensed operators. The Commission proposed the creation of trans-European Rail Freight Freeways, characterised by open access and the removal of a wide range of obstacles to international traffic.[6] The idea is being implemented by railway companies, Member States and shippers and the first freeways are expected to become operational before the end of 1997. As the freeways are likely to become an important element in intermodal transport, the Commission will give priority to their development.[7]

21. One of the main requirements of intermodality, and objective in the development of the TENs, is that transport modes are physically linked. However, successful intermodality is dependent on a number of equally important factors and difficulties that have to be identified and addressed in the future. For example, the use of more than one transport modes can result in additional transfer costs, reduced reliability and more complex administrative procedures. The use of modern information systems is crucial in this respect. Such systems are already in use in the larger European ports but are still an important missing link in other parts of the Union. The Commission is supporting the development of such systems in the framework of its Research and Development Programme (MARTRANS, BOPCOM). The aim for future projects in this field will be to ensure interoperability and interconnectivity between such systems. There might also be a need to integrate EDI (electronic data interchange), AEI (automatic equipment identification) and a terminal monitoring and guiding system in one common information system in order to optimise communication between the port and its customers, reduce paper requirements and improve the service and management of ports.

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maritime transport as it was negotiated; it therefore covers access to and use of port and auxiliary services.

[5] *Intermodality and Intermodal Freight Transport in the European Union; A Systems Approach to Freight Transport*. Commission Communication, COM(97)243 final. Brussels, 29.05.97.

[6] *A Strategy for Revitalising the Community's Railways.* European Commission White Paper, COM(96)421 final, 30.07.96 and COM(96)421/2 final, June 1996.

[7] T*rans-European Rail Freight Freeways*, Commission Communication, COM(97)242 final, 29.05.97.

Ports and Development of Short Sea Shipping in Europe

22. The promotion of environmentally friendly modes of transport –Short Sea Shipping in particular- and their effective integration in multimodal transport chains and networks is a central objective in the Union's transport policy. However, despite the increasing turnover of European ports, intra-European maritime traffic has not as yet been able to demonstrate a distinctive increase in its market share *vis a vis* that of the road transport sector. A number of factors can account for this including terminal costs and turnaround times, lack of appropriate infrastructure, institutional rigidities in ports, adaptability to multimodal transport systems and lack of information to shippers.

23. In its Communication on Short Sea Shipping[8], the Commission set out a framework of initiatives necessary to promote short sea services in Europe, stressing the need for improved port efficiency. An important issue in this respect has been the complexity of documentary and procedural requirements in ports, given that a number of cumbersome procedures and practices still exist, mostly beyond the port's own control, that impose significant costs on commercial operators and put maritime transport at a disadvantage compared to other modes.

24. The Commission is currently undertaking a fact-finding study to identify requirements in ports that affect maritime trade in Europe and compare them with those prevailing in inland transport. Customs requirements and the efficiency of customs authorities in processing documentation are particularly being addressed. In this context, implementation of EDI is seen as an important tool to improve the flow of information between custom authorities and the other parties in the transport chain. If needed, the Commission will recommend actions aimed at the streamlining of procedures in maritime transport.

25. To evaluate the market potential and competitiveness of Short Sea Shipping in certain specific trade corridors, the Commission is considering ways of compiling relevant information, that will also be to the benefit of ports and maritime industries in general. Action in this area is already being undertaken in the framework of the *concerted action on Short Sea Shipping* R&D programme, sponsored by the Commission, and it is also the basis of the PACT projects currently underway.

26. Co-operation among all parties in the transport chain is necessary if short sea operators are to be effectively and competitively engaged in door-to-door transport solutions. Notwithstanding commercial considerations, co-operation among ports should be encouraged, particularly in the area of telematics, the streamlining of procedures and the exchange of know-how. For that reason, and in the context of TENs, priority will be given to projects which entail co-operation between two or more ports.

27. Ports should also be encouraged to play an active role in the promotion of Short Sea Shipping and participate actively in maritime roundtables, such as those established in the framework of the Maritime Industries Forum.

28. Moreover, as port costs are essential to the development of Short Sea Shipping, port authorities should be encouraged to consider the granting of rebates to vessels according to frequency, volume of cargo and type of service rendered. In a similar manner, and to the extent possible, charges for port services should in principle be open to negotiation on a local level.

[8] *The Development of Short Sea Shipping in Europe: Prospects and Challenges*. COM(95)317, 05.06.95.

29. However, a factor that could be instrumental in boosting Short Sea Shipping in Europe is a cost recovery pricing policy in road transport that would *inter alia* internalize its external costs. Such a policy, already suggested by the Commission in its Green Paper *Towards a Fair and Efficient Pricing in Transport*[9], is expected to make competition among ports and transport systems fairer and more efficient, leading to a more balanced distribution of traffic across Europe. However, the Green Paper takes a differentiated approach to road-pricing with respect to peripheral regions, as road haulage there is the predominant mode of transport and pricing policies aimed at shifting cargo from roads may have adverse effects on development prospects.[10]

The EU Regional and Cohesion Policies with Respect to Ports

30. The Commission's White Paper on the future development of the common transport policy[11] laid down a new vision for transport policy following the principle of sustainable mobility, i.e. a strategy that acknowledges the need for a more balanced transport system that would fulfil its economic and social role while, at the same time, containing its effect on the environment. The overall objective of such an approach, as clearly described by the European Parliament[12], is to …*promote sustainable, efficient transport systems which meet the economic, social, environmental and safety needs of European citizens, help reduce regional disparities and enable European business to compete effectively in world markets*…

31. Also, Article 130 of the Treaty refers to the role of the networks in promoting harmonious development and in strengthening economic and social cohesion. This is so as optimization of TENs is likely to reduce transport costs and the perception of "distance", at least in the long-run, and thus lead to important location decisions causing production to relocate to peripheral regions.[13] For those reasons, the Treaty provides for the establishment of a Cohesion Fund, to support transport and environmental projects, in Member States that qualify. In addition, as all Cohesion Fund countries and virtually all areas covered by the Structural Fund provisions are on the periphery of the EU, having substantial coastlines and often many islands, a well-integrated maritime sector will contribute fully to the development of the single market and the further steps envisaged in the Treaty.

32. However, ports in these regions have to be adequately prepared to take on the challenge. Otherwise, the economic and social benefits of greater cohesion can be easily withered away by peripheral ports that are generally characterised by lower levels of efficiency, mainly as a result of under-investment. Efficiency improvements will be necessary to ensure that existing and future facilities are used as effectively as possible, enable ports take their share in the increased traffic of the single market and allow them to play their proper part in a more balanced distribution of traffic. It should be kept in mind that the lack of facilities at one end of the maritime chain can eventually damage the overall efficiency and image of maritime transport. The aim is thus to bring ports at both "ends" up to the highest possible standards, to the benefit of the overall port system.

33. An approach as the one envisaged above should take into account the significant role of ports as *nuclei* of regional development in the less developed regions of the Union, the

[9] *Towards Fair and Efficient Pricing in Transport: Policy Options for Internalising the External Costs of Transport in the European Union.* COM(95)691, final.
[10] see also *First Report on Economic and Social Cohesion*. European Commission, Luxembourg, 1996 (Preliminary Edition).
[11] op. cit. 3
[12] *Towards a European Wide Transport Policy; A Set of Common Principles.* European Parliament, Third Pan-European Transport Conference, Helsinki, 23-25 June 1997, p.5 (Annex).
[13] op. cit. 10

strong commitment of the latter to greater economic and social cohesion, and the importance of adequate PSO[14] provisions. Indeed, PSOs are essential in order to help reconcile the highly desirable, but often long-term, effects of liberalisation and competition with the inevitably uncertain and, therefore, risky nature of investment in ports. Cohesion-oriented policies, which have a long-term time-horizon, demand continuity and the existence of regular services over an extended period of time which is not always guaranteed in low volume, highly seasonal markets. Public provision in the poorer, less developed regions can, therefore, help balance the desirable effects of liberalisation on efficiency with the need for adequate services to be provided to all areas at an affordable price.[15]

34. The Community has provided considerable support to port development in the form of grants from Community funds especially through the Cohesion and Structural funds. In the case of Structural Funds, the relevant instrument for ports is the European Regional Development Fund (ERDF). A number of objectives have been established for purposes of fund distribution: Those pertinent to transport infrastructure development are the structural adjustment of less developed regions (Objective I); development of regions affected by industrial decline (Objective 2); and development of rural areas (Objective 5b). Transport related resources of the ERDF amount to <?> billion ECU in the current programming period (1994-99). The Objective 1 areas, which received <?>, are the most significant recipient of funds as regards ports. In addition to the ERDF, structural funds are also available to ports in eligible areas under the INTERREG II C, which promotes cooperation between and within EU regions.

35. The second major funding instrument of the Community is the Cohesion Fund. In the period 1993-96, a total of 2.1 billion ECU was allocated to the transport sector, 3.4% (74.4 million ECU) of which funded port infrastructure projects. Finally, the European Investment Bank provides loans to finance infrastructure that contributes to regional development; the bulk of its lending activity in the 1991-95 period –that is 44 billion ECU- went to the eligible areas (i.e. Objectives I, 2 and 5b). Most of the loans from the EIB have been allocated to infrastructure projects including the trans-European Transport Network.

36. From a transport perspective, these funds should serve such priorities as: better integration of ports into TENs; improving access to port hinterland; and refurbishing the infrastructure inside the port area. Exceptionally, projects may include investment in superstructure and mobile assets (e.g. terminals buildings, cranes), provided these remain an integral part of a larger infrastructure project and increase the overall benefit of the investment.

The Role of Ports in Maritime Safety and the Protection of the Environment

37. Ports are the most obvious points where compliance to international or EC maritime safety regulations can best be checked and uniformly enforced. The Community's maritime safety policy, aimed at the elimination of sub-standard shipping through the proper enforcement of international legislation, is primarily focused on ships. However, the policy has also a direct impact on ports, as it requires them to co-operate in the implementation or enforcement of the legislation[16] and ensure a high level of port services (such as pilotage, mooring and towage) that are intrinsically related to the safety of ships. Equally importantly, the absence

[14] Public Service Obligations
[15] op. cit. 10, p.78
[16] The uniform enforcement of international rules to all ships operating in Community waters is the purpose of Directive 95/21/EC on Port State Control (PSC). The Directive requests port authorities and pilotage services to co-operate by providing relevant information and assist PSC inspectors in detecting and targeting sub-standard ships for priority inspections.

of uniform application of safety rules among ports can lead to distortions of competition and this is an important consideration to be taken into account when examining possible new initiatives in the field of maritime safety.

38. In the area of environmental protection, and in addition to the requirements of international Conventions (particularly MARPOL 73/78), a number of non-mandatory Codes and Resolutions have been issued by IMO. The Community has already started to take measures towards the convergent implementation of these international rules and legislation[17] and port authorities will have to play an essential role.

Environmental impact of port development and operations

39. Infrastructure projects have a negative impact on the environment that has always to be considered through appropriate environmental impact assessment. Ports are often in proximity to populated areas, or areas where particular attention must be given to endangered species. As a result, port development, particularly in densely populated areas, is confronted with special circumstances and constraints. Several Directives are already in place to address this problem and promote environmentally friendly solutions. Among them are Directives on environmental impact assessment and the Wild Birds and Habitats Directive. With assistance from the Commission, the European Seaports Organisation (ESPO) has published a *Code of Conduct*, providing a quality framework for programming action with respect to the protection of the environment within port areas.

40. New technology and more efficient operations should be seen as better options for making the best use of existing facilities instead of providing new ones. In areas with a large number of ports, better co-ordination and specialisation among them could also reduce the demand for new port development. Finally, demand driven decisions and higher competition between and within ports can also help in this direction, as it will reduce the risk of overcapacity and foster efficiency in ports.

FINANCING OF INFRASTRUCTURE AND COST RECOVERY IN PORTS

General

41. The administration and financing of ports in Europe -as of course in other parts of the world- principally falls under two philosophies: that which sees ports indiscriminately as business undertakings that ought to recover their costs from port users that benefit directly, and the philosophy that sees ports as trade facilitators and growth-poles to regional and national development, and thus as sectors producing a service of general economic interest that ought to be provided by the public sector and principally paid for by the general taxpayer. The arguments for and against each approach abound, often giving ground to intensive debate, while the overall picture is far from being conclusive.

42. Furthermore, certain port infrastructures, such for example breakwaters and navigational aids, have traditionally been regarded as public goods[18], while a number of port services (mainly the nautical-technical ones described below) may carry important public service obligations, due to their relation with the safety of ports.

[17] Legislation has been adopted for notification requirements for ships carrying dangerous or polluting goods, (ii) promotion of environmentally friendly oil tankers (SBT Regulation) and (iii) the Commission services are developing a draft Directive on the use of reception facilities in European ports.

[18] in the sense that (i) no particular user can be excluded from their use if he/she is not prepared to share in the costs of their production; (ii) the consumption of user A does not affect that of user B; and (iii) the cost of their production does not vary with use.

43. Thus, as regards ownership and organisation, ports may be state-owned, municipal, private or owned and run in some other way; they may be government bodies, have close links with the local public authorities or be autonomous. Whatever the case, however, ports are subject to considerable regulation and supervision by either national or local authorities.

44. The same diversity of norms exists, as a result, with regard to the financing of port infrastructure: it can be wholly funded by the State, the private sector or by a mix of both sources of finance at varying degrees of participation. A distinctive trend, however, has emerged whereby port activities of a predominantly commercial nature –such as cargo handling and the financing of port superstructure- are increasingly becoming the concern of the private sector, while ports tend to restrict themselves to their "landlord" role and be involved in the operation and finance of those facilities and services that are essential for the safe and efficient operation of the port. The "comprehensive" or "service" model of port organisation, where the port authority functions also as port operator and employer of port workers, is becoming uncommon.

Historical Perspective on the Changing Role of Ports

45. In Europe as in many other parts in the world, ports have traditionally been seen by governments as growth-poles and fulcrums of national and regional development.[19] As a matter of fact, ports were often used as instruments of regional planning. Many Member States have done so by steering state investment, through regional policies, towards ports and port-related infrastructure, in order to encourage national development.[20] In this role, ports generate substantial employment and numerous benefits, for the country as a whole, some of them not necessarily producing visible financial rewards for the ports concerned. However, as government policies usually go beyond considerations of short-term financial profitability and towards the maximisation of long-term *economic benefit* and general welfare, state intervention has often been justified on the grounds of these "not solely commercial" objectives of ports.

46. Port capacity and its spatial characteristics are thus often determined by national priorities aiming at the spatial reorganisation of the entire national economy and investments in port and related infrastructure, such as new terminals, docks, deep-water quays, major locks access channels, etc. is still centrally funded in many Member States, considered to be serving the collective benefit of the nation. It is perhaps worth mentioning at this point that, for instance in Japan, apart from the direct financial returns of port operations, port development is appraised on the basis of its contribution to the social and economic development of the region and the nation. Port development plans are, thus, adjusted to and included in the country's regional development plans, while ports are managed and administered by public sector bodies.

[19] characteristic examples of this approach can be found in the Maritime Industrial Development Areas (MIDA) of Rotterdam and Antwerp.

[20] A classic example of such as policy was the Mezzogiorno in Italy, considered by many as a model of spatial reorganisation of economic development. In the United Kingdom, this task was the responsibility of the National Ports Council, established in 1964 and abolished in 1981.

Table 2: Direct and Indirect Employment in Selected Ports in the EU

(Number of employees)

	Direct	*Indirect*	*Total*
Hamburg	95,100	47,500	142,600
Flemish Ports	22,300	22,500	44,800
Rotterdam	63,000	35,000	98,000

Source: Erasmus University Rotterdam

Port Competition

47. However relevant such a national approach to port development may have been in the earlier stages of economic development in Europe –or for some Member States even now– the continuing adherence to it nowadays may give rise to legitimate concerns. Indeed, during earlier periods, general cargo traffic was less containerized, regional port competition less of an issue, and ports were comprising a lot of labour intensive activities generating considerable direct added-value.

48. However, the completion of the internal market and the existence and further development of superior inland transport networks across Europe has intensified competition among ports significantly, particularly competition aimed at attracting unitised transshipment cargo. Especially the latter type of competition, combined with automated labour-saving cargo handling systems reduces the direct added-value of port activities, while the benefits of port investments and their impacts can be easily dissipated from the country in question to the final consignor/consignee. This issue causes considerable concern to governments contemplating the continuation of public funding of port projects, as it deprives them of the basic *rationale* of doing so, namely, that the port provides a service of general economic interest.

49. At the same time, disappearing national (captive) hinterlands mean that the pricing, port development and financing decisions of a particular port may have marked effects on its neighbours, nationally and internationally. This raises the relevance and desirability of a more coordinated approach to port development at pan-European level aimed, *inter alia*, at ensuring that ports compete on sound commercial grounds, both for existing and new trade, and at the same time highlighting the crucial role of ports in the optimisation of trans-European transport networks.

50. However, as ports are nodes in an increasingly door-to-door transport system, competition and the desirability of a more coordinated approach to port development at a pan-European level[21] cannot be *a priori* ascertained without due regard to the investment and pricing policies of other modes and infrastructure, particularly those of direct impact on the operation of ports. For example, presently, inter-port competition is affected by road transport pricing policies favouring long-hauls and not internalising the external (social) costs of transport. A "user pays" policy for road transport, as suggested by the Commission[22], could re-direct traffic and lead to a different distribution of cargo flows among European ports. Such considerations necessitate a phased step-by-step approach to policy, taking into account existing equilibria.

[21] e.g. through the identification and funding of projects of common interest.
[22] op. cit. 9

Identification of Projects of Common Interest and Maps of Ports

51. Among others, the Treaty of the European Union requires the establishment of guidelines which cover objectives and broad lines of measures and which identify "projects of common interest". The EU may provide support to such projects from the TEN budget line (mainly for feasibility studies) and from the Cohesion Fund (to countries that are eligible). The underlying philosophy of TENs is to provide the framework of an optimized pan-European transport system to be used by Member States as a guide for the development of their infrastructure. Funding for the latter, however, has to be found by Member States themselves, either centrally or through public/private partnerships.

52. The Commission is well aware of the fact that port development in many Member States is driven by demand and the whatever assistance it thus provides in the framework of TENs is by no means meant to superimpose a centrally determined system of port development in Europe, or allocate roles to specific ports. Such assistance is only meant to ensure a "natural" flow of traffic across Europe –to the benefit of the consumer- and to contribute so that the present situation in European transport, largely the result of past investments that were not market driven, does not continue to proliferate road transport congestion. The aim is to promote physical and managerial improvements so that transfers between land and maritime transport are seamless, and to establish efficient intermodal transport chains which facilitate trade, promote Short Sea Shipping and strengthen economic and social cohesion. Thus, projects enhancing the functionality and optimization of TENs as well as ones aiming at diverting traffic from road to sea, and thus remove bottlenecks and provide missing links, could be considered as serving the "common (European) interest".

53. The same philosophy applies to the requirement for the preparation of a map of ports. The Guidelines for the development of TENs, setting out the priorities of the EU's transport infrastructure policy, did not, in the first place, include a map of ports. However, the port element is now being revised, following a request from the Parliament and the Council, in order to include a map of ports and a revision of the criteria for identifying projects of common interest.

54. Again, the aim of a map of ports is by no means to allocate roles among ports but to present port traffic in relation to the served industrial, consumption and population centres. Something like this would undoubtedly demonstrate the significant gains and rewards of extended hinterlands for ports that have achieved a high level of efficiency. This can definitely set an effective example for others to follow (The success of the Port of Rotterdam, not an uncharacteristic one in this respect among North Sea ports, can be evidenced from Table 3).

Table 3: Road Freight Traffic from/to the Port of Rotterdam

(selected countries, in 1000 tons, 1995)

	A	*DK*	*E*	*GR*	*I*	*S*
Incoming	71	11	52	1	147	35
Outgoing	117	26	130	18	184	58

Source: Erasmus University Rotterdam

55. When drawing up a map of ports special attention should be given to possible distortion of competition between ports. A map of ports should therefore be based on objective criteria. Furthermore, it must take into account that one of the aims of EU transport policy is to promote Short Sea Shipping and that the maritime element of the network often ensures important links to peripheral areas and islands. This would imply including a

wide range of ports in all parts of the Union. Additionally, it is important to ensure that justified port projects, even in smaller ports in remote areas of the Union, not identified in the maps, are not excluded from funding (see map in annex x). In the future, the Commission will consider if it would be appropriate to introduce additional criteria for the identification of ports, such as a classification of ports, that could add value to the multimodal approach.

Finance and Charging of Port Infrastructure

56. The trend towards greater private sector participation in ports can be explained by both actual economic considerations and by a noticeable shift in attitude regarding the function and role of ports. Firstly, the need for projects to be economically viable is seen as a necessary discipline in circumstances where resources for infrastructure development have proved to be scarce and when the involvement of the private sector, either on its own or in the form of public/private partnerships, is accepted as a growing and desirable development, recognised also in the TEN Guidelines.

57. Second, the fact that ports are used mostly for commercial ends, the often scant diversification of users they serve and the typically private organisational structures they adopt differentiates them from the pure public goods to which they had often been likened. [23] Thus, the port industry is increasingly viewed as one moving from a situation where predominantly public capital was used to provide common user facilities to one where capital is being used to provide terminals which are designed to serve the logistics requirements of more narrowly defined groups of users. Indeed, they may be designed to serve the needs of a few firms or even just one. In such a way, the "general economic interest" argument loses weight, leading to a more commercial attitude towards pricing and infrastructure funding.

58. These pragmatic developments have also led the European Parliament to assert that, while acknowledging that there are different financing arrangements (i.e. public/private, to varying degrees) in individual ports which need to be respected, there is no substantial difference between investments in port infrastructure and other capital intensive investments in industrial complexes. Therefore, there is no reason for adopting a completely different approach to port investments, and consequently no justification why the direct users should not bear the costs of such investments.[24] As a matter of fact, the European Parliament goes even further to point out that the introduction of market principles in infrastructure works would be the most effective remedy to the risk of creating wasteful overcapacity and possible distortions of trade flows between Member States.

59. The general view of the Commission in the past has been that public investment in port infrastructure, including land and maritime access, does not normally constitute State aid in the meaning of Article 92 of the Treaty in so far as the infrastructure is accessible to all on a normal, non-discriminatory basis.[25] This investment has been considered by the Commission as comprising general measures and expenses incurred by the State in the framework of its responsibilities in physical planning that favours the nation by and large.

60. However, European integration and the resulting intensified competition among ports in different Member States does not always allow this view to be unquestionably accepted as a universal rule. This is the more so given that the public funding of port infrastructure

[23] such as defence, education, justice, environmental protection, etc.
[24] *European Sea Port Policy*. European Parliament, Directorate General for Research, Transport Series E-1, 1993.
[25] However, also in cases where particular investments may benefit only certain users, exemptions are possible, e.g. for regional development purposes under Article 92.3 of the EC Treaty.

and the cost recovery of port services are two different things. Although in certain instances infrastructure can and perhaps should be funded by public money due to a variety of legal, economic and administrative reasons, this does not mean that this investment should be forgiven and not attempted to be at least partially recovered from users who directly benefit, regardless of how the investment was funded.

61. In this respect, reference can be made to the EC's position that, as a general rule and in order to avoid distortions of competition and choice within and between modes, … *all transport users should pay the full cost, internal and external, of the transport services they consume, even if these costs are in some cases paid by society to assist those in need*…This, in addition to the above views of the European Parliament, reaffirms the Commission's earlier assertion[26] that … *it would be desirable port charges to reflect the commercial cost of capital invested in infrastructure in order to approximate the competition conditions of ports*…Finally, the Commission Green Paper on Fair and Efficient Pricing[27] maintained that infrastructure charges should (i) be linked as much as possible to actual costs at the level of the individual user; (ii) be recovered in full; and (iii) be transparent.

62. All the above tendencies in Community thought point to the emergence of a new approach for the pricing of port infrastructure. Broadly speaking, port infrastructure should be priced in such a way as to make investments economically viable[28] and, implicit to this, users should bear the real costs of the port services they consume.

63. Although the application of this principle to the port industry is of particular significance in terms of higher efficiency, rationalization of investments and examination of State aid measures, it may at the same time have a number of far-reaching ramifications that have to be carefully studied and monitored. They may include such issues as the effect of the policy on port charges and final consumer prices; ocean freight rates and short-sea-shipping; spatial decisions of companies; re-distribution of existing traffic among ports, etc.

64. In addition, it should be also kept in mind that a great number of European ports are located in less developed and peripheral areas or on islands. Often, these ports represent the only link to the rest of the Union and constitute the fulcrum of significant economic activity in their region. They may thus be important parameters in the Union's Cohesion policies and the application of the cost recovery principle in such cases, if at all desirable, could create considerable difficulties.

65. In any case, the interdependence of transport modes and related infrastructure–some of them falling under their own legal regimes and policies- necessitates not only a consistent step-by-step approach to the pricing of port infrastructure –starting from investments within the port- but also the provision of ample time for ports to adjust. The method of cost recovery, in that case, should be left to Member States, on the basis of the principle of subsidiarity. The effect of this charging regime on two specific types of port infrastructure –maritime access and navigational aids- is of particular interest in this context and it is thus briefly examined in the following paragraphs.

[26] *General Study of State aid in the Port Sector*. No VII/103/89.
[27] Op. cit. 9
[28] Economic viability is, however, to be distinguished from financial viability of private investment, as the former usually entails considerations such as creation of employment, income distribution, regional disparities, etc. Given the diversity of port financing regimes across the Union as well as the different conceptions as regards the role, functions and institutional framework of ports, the future development of a consistent set of criteria for the evaluation of the economic viability of port investments would be desirable.

Maritime access

66. A number of European ports, mainly those of the North Sea, are located on river estuaries or are river ports subject to considerable siltation. The provision of adequate maritime access in these ports requires substantial yearly outlays for dredging, which presently are in most cases publicly funded. Although there is no *a priori* reason why maritime access should be treated any different than other port infrastructure[29], the unqualified and untimely application of the user-pays principle in this case would gravely disadvantage a number of ports, some of which important gateways to European trade.

Navigational Aids

67. Aids to navigation have traditionally been used in economic theory as the most characteristic examples of a public good.[30] Apart from the typical lighthouses, buoys, etc., modern navigational aids in busy seaways and along dangerous or environmentally sensitive coasts include the development of radio-navigation systems (e.g. LORAN-C, GNSS), the physical infrastructure needed to support VTS or VTMIS, and systems of mandatory ship-routing and ship-reporting (e.g. EUROREP Directive).

68. In several cases, the safety or commercial interests of both local and transiting traffic are better served by systems that transcend national boundaries and, ideally, could be developed on a regional basis.[31] The more so when the importance of several European seaways to world trade and the increasing sophistication and capital intensity of such systems would make it unfair to leave the expense of their implementation solely to the coastal states concerned, since all transiting traffic and regional users (e.g. fishing vessels) would eventually benefit. The risk of doing so is that some necessary aids might not be provided or that states providing them may try to recover costs in a non-optimal way. Obviously, coastal aids to navigation benefit a traffic which, for cost recovery purposes, is "captive" only if systems are viewed on a large regional (e.g. European) basis.

69. The need for the development of a Commission proposal laying down both the principles for a charging system(s), aimed at the recovery of the development and investment costs of such aids, and a mechanism to equitably share the financial burden with users, was clearly identified in the Commission Communication "*A common Policy on safe seas*" (points 101 to 114). <ref, in footnote>

70. As far as local aids to navigation are concerned, particularly those associated with the approaches to ports, the principal beneficiaries are local port users. The development and implementation of navigational aids in port areas is therefore closely related to investments in or near the port and, to a large extent, they may be regarded as the responsibility of the competent (port) authority. Cost recovery of such infrastructure could thus continue to be dealt with by national or local bodies, viewed either as a charge to be fully met by the competent authority or, as in most Member States, to be included in port dues. At any rate, here too, the "user-pays" principle will have to be considered in the framework of EC legislation.

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[29] particularly when approach channels are provided at such water depth that, although open to all, are really meant for a small number of easily identifiable users.

[30] for a definition see footnote 18.

[31] in the context of the development of a trans-European network of vessel traffic management and information system (VTMIS), the Community has already granted financial support to a number of port or coastal vessel traffic services in the peripheral regions of the Community. In addition, with the European Permanent Traffic Observatory (EPTO) project, a tool has been made available by the Commission to any port or VTS in the Community for the systematic analysis of local traffic conditions in the port area and their improvement. The extension of EPTO to a larger number of ports would greatly enhance its potential positive effects. Finally, the Commission is examining harmonisation measures for VTSs, concentrating on minimum performance requirements for VTS equipment (interfaces between VTS) and harmonised procedures to improve ship-shore communication.

Application of the State Aid Provisions of the EC Treaty to the Port Sector

71. In the highly competitive environment of an integrated Europe, state-aids can have far-reaching ramifications and are increasingly becoming one of the central issues in the industrial and competition policies of the EU. Among others, the issue has also been addressed in the White Book on the future development of the common transport policy[32], according to which …*the opening up of transport markets to more competition as a result of the 1992 programme means that greater attention has to be paid to subsidies which could unfairly advantage particular operators*…

72. Obviously, if a port receives public financial support, it might be in a position to offer actual or potential users more favourable conditions than its competitors, thus leading to a situation where the natural flow of trade is distorted. As ports play a vital linking role between land-based and maritime transport, the effect of such a distortion may be very far-reaching.

73. State aid to ports can take different forms, some of them easily recognizable some not. State aid is easily recognizable when granted as direct subsidies, such as the offsetting of operating losses, but it may also be indirect, and thus less explicit, when, for example, it takes the form of leasing land areas or provision of government loans under special conditions.

74. Article 92.1 of the EC Treaty provides that aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition, by favouring certain undertakings or the production of certain goods, is incompatible with the common market in so far as it affects trade between Member States.

75. In order to assess whether a State measure involves aid elements in general, the Commission has established, *inter alia*, the principle that no State aid is involved where public authorities contribute to a company on a basis that would be acceptable to a private investor operating under normal market economy conditions.[33] If the private market investor principle does not apply, the measure may be considered as aid and its compatibility with Article 92.2 or 92.3 of the Treaty has to be examined by the Commission. At first sight, the assessment of aid in the port sector appears to present no particular difficulty as far as social, restructuring, operating and rescue aids are concerned. However, given the widespread practices of State involvement in the sector and the sometimes unclear allocation of responsibilities therein, the assessment of State measures in the light of the State aid provisions of the Treaty is not always without problems.

76. A good example of such a problem is the public financing of superstructure, intended to be operated by private companies. In such cases, i.e. when a public (port) authority decides to contract out public investments to private operators, the process should be based on open and transparent public tendering procedures, with the successful bidder obliged to maintain independent accounts separate from those of the port. This seems to be the current practice in a number of ports.

77. If the cost recovery approach becomes a generally accepted standard, and in the sake of ensuring transparency and fair competition among ports, the *market investor principle* could eventually be extended to include investments in infrastructure. *Inter alia*,

[32] op. cit. 3, paragraph 351.
[33] Commission, Application of Articles 92 and 93 of the EEC Treaty to public authorities' holdings, Bulletin EC 9-1984.

something like this would eliminate the often complex and confusing need to distinguish between public investments in infrastructure and superstructure.

Transparency of Port Accounts

78. An effective and fair implementation of the cost recovery approach, the evaluation of State aid measures and meaningful comparisons among ports undoubtedly require the financial transparency of port accounts. This is the more so when ports include a number of commercial activities, carried out by private operators, that should, according to Community law, be seen as separate undertakings with separate accounts. Currently, however, due to differences in the institutional framework, financing and charging regimes in ports and related infrastructure in Europe, the financial relationships between the public sector and the ports are often not clear.

79. The Commission Directive 80/723 on the transparency of financial relations between Member States and public undertakings[34] applies in principle also to the port sector. In general, the Directive applies to public undertakings whose turnover is at least 40 MECU during the two financial years preceding that in which public funds are made available. Member States are obliged to provide information at the request of the Commission, notwithstanding the fact that, occasionally, economic activities of an industrial or commercial nature may be integrated into the State administration.

PORT SERVICES – MARKET ACCESS AND ORGANIZATION

General

80. Ports are principally service industries having as their main function the transfer of passengers and cargo from sea to land transport and vice versa. To achieve this, the port provides a miscellany of services and facilities, often distinguished between those pertaining to the ship (such as pilotage, towage and mooring) and those related to cargo (mainly cargo-handling and storage). In addition, a number of ancillary services are also provided by the port, facilitating its orderly operation. The latter include communications, port security, fire-fighting, bunkering, water supply and waste reception facilities. Depending on the organization, legal status and objectives of a port, port services can be provided either as a comprehensive package or separately, and on a compulsory or voluntary basis.

81. The efficiency, cost effectiveness and quality of a service are, in general, concepts more difficult to establish and value than in the case of merchandised goods. Port services are no exemption to this. However, their smooth and coordinated functioning remains crucial in determining overall port performance and competitiveness, and the efficiency of investments in port infrastructure and superstructure.

82. In several cases, the port services sector still maintains significant rigidities and restrictive practices, often in variance with the economic and structural evolutions sweeping across Europe. It is true that as a result of new technologies, port services require a high level of professional competency in order to avoid accidents in the port area. To this end, and also to prevent possible detrimental effects of liberalization on the level of safety, the establishment of minimum qualification requirements for pilots, mooring personnel and VTS operators is being examined. However, exclusive rights and

[34] Commission Directive 80/723/EEC (OJ L 195 of 29 July 1980), as amended by Directive 85/413/EEC (OJ L 229 of 28 August 1985) in order to cover, *inter alia*, the transport sector.

legal or *de facto* monopolies are often unconvincingly (let alone unnecessarily) explained on grounds of safety, public service obligations, minimum company size, historical factors and local particularities.

Services Related to the Cargo

83. These services consist of stevedoring, i.e. the loading, stowage and discharging of cargo, storage (short term), warehousing (long term – open, closed or refrigerated) and, possibly, cargo-processing, customs clearance, etc.

84. Among all port services, cargo-handling has been the one most profoundly affected by technological development and intensified inter-port competition, the latter mainly as a result of the completion of the internal market. Containerization and the capital-intensive nature of shipping have increased pressures on ports for further improvements in labour productivity and operational efficiency. In its efforts to adjust to the new demand requirements, the port industry itself has also been progressively transformed in a capital-intensive one, requiring massive investments in sophisticated cargo handling equipment and commensurate reductions in direct port employment (again, the not untypical example of Rotterdam is shown in Table 4). These developments are shaping new tendencies in the market, characterised by capital concentration, specialization and vertical integration.

Table 4: General Cargo Productivity at the Port of Rotterdam

	Cargo Handling Employees (x 1000)	*General Cargo (million tons)*
1985	14	49
1990	11	58
1995	9	71

Source: Erasmus University Rotterdam

85. In the majority of Member States no formal restrictions exist for firms wishing to establish themselves as stevedoring companies in an EU port. However, the particular market structure of the stevedoring industry, the size of required investments, lease contracts, minimum company size and scarcity of land may pose effective barriers to new entrants and offer significant advantages to existing ones. In addition, although stevedoring companies are in principle free to apply for port sites, such application may be subject to different evaluation criteria, applied by the competent Authorities, such as economic and environmental impact, job creation, etc.

86. At the same time, inflexibility in the supply of port labour has often been contested as not corresponding to the new technological requirements of modern port operations. Several Member States have thus recently introduced legislative reforms aimed at adjusting the structure of the port labour market to technological and structural changes, while at the same time taking into account the associated social problems.

87. Port labour rigidities are mainly attributable to the registration of port workers and the existence of labour pools. In several Member States port work is restricted to registered port workers; a practice encouraged by *ILO Dock Work Convention* of 1973. The underlying principle behind this practice is to limit casual work and the degradation of social protection standards this sometimes entails and to ensure that only properly trained

and qualified workers are given the responsibility to operate advanced and expensive equipment.

88. However, limitations in the supply of labour can be a hindrance to new investment in the port area and can severely affect port efficiency and competitiveness. Furthermore, in some Member States, registers are kept at unjustifiably high levels, while the relatively protected position of port workers enables them to enjoy salaries and other conditions of employment that are considerably higher than those paid for comparable jobs elsewhere in the economy. Some observers[35] argue that this privileged position has finally resulted in a negative attitude of the general public and other unions towards port workers.

89. Labour pools exist in a number of EU ports. They have their origin in the past, at times when port work was highly irregular, mainly due to the (then) erratic and unpredictable pattern of ship arrivals. Their aim was to enable port workers share, as equitably as possible, the "peaks and troughs" of port work. Among others, this had helped to de-casualise labour and provide some form of income and employment stability to port workers.

90. Nowadays, pools constitute the bridge between the former labour-oriented type of port organization, based on casual employment, and the present capital-intensive one where direct and long-term employment relationship with the operator becomes the rule. Thus, for the industry, pools constitute a practical solution to work irregularity, worth participatory financing by operators in the port. Pools may be founded on a legal provision, imposing the participation or control of public Authorities, or on a voluntary basis following agreements between employers and the workforce. They may take the form of a public or commercial enterprise, State agency or cooperative.

Services Related to the Ship

91. In general, public sector involvement in the provision of these services is considerable in most EU ports. The nature of ship-related port services is considered by several Member States to be intrinsically related to the safety of vessels, people, cargo and the port community as a whole. Thus, the service is often modeled around the "public service" approach, enjoying considerable immunity from competition law[36], with dues determined or controlled by the competent national administration. Of all ship-related services, pilotage, towage and mooring are considered to be the most important.

Pilotage

92. Pilotage is the act, carried out by a qualified person known as a pilot, of assisting the master of a ship in navigation when entering or leaving a port or an area of confined waters. It is a characteristic example of a compulsory nautical service, particularly for vessels exceeding a certain tonnage or length and for vessels carrying dangerous goods. Exemption certificates for frequently calling masters and vessels (usually ferries) may be issued, albeit on the basis of complex and diversified rules. Exemptions from mandatory as well as greater use of shore-based pilotage are practices that should be encouraged as they converge to the EU's objective of promoting Short Sea Shipping. Such practices should, however, be adopted as long as they do not jeopardize the safety of navigation or the discharge of entrusted public service obligations, something largely depending on the local circumstances.

[35] see A.S. Harding (1990) *Restrictive labour practices in seaports*. The World Bank, Washington (WPS 514).

[36] The Court has recently held in the "Calì case" (*CJEC 18/3/97, aff. C-343/95, Diego Calì & Figli Srl/ Servici ecologici porto di Genova SpA (SPEG), unpublished*), that article 86 of the Treaty does not apply to the legal monopoly of anti-pollution control on the ground that this activity is inherent to the essential prerogatives of the State responsible for the protection of the marine environment.

93. The degree of public sector involvement in the provision of the service varies widely across Europe. In some Member States, the service is entrusted to national or port authorities and pilots are, in this case, civil servants. In other Member States, pilots are self-employed in partnership associations or collectives, which can be financially or a operationally autonomous. Even in this case, however, public sector involvement still remains predominant: pilot associations are appointed by the competent Authority who holds the overall control and responsibility for pilots' licenses, training, tariffs and quality. The regulatory framework that governs the provision of the service affords pilot associations *de jure* exclusive rights, often associated with public service obligations, and it limits pilot liability in case of accident. Exclusive rights are usually limited to a single port.

Towage

94. The service consists of towing or pushing ships with small powerful vessels (tugs) and in particular of assisting ships' maneuvres in port or in access channels, as well as of providing assistance in mooring, docking, lightening and bunkering operations.

95. Although information at the disposal of the Commission is fragmented and rudimentary, it seems that a significant diversity of organizational structures exists in Europe. Here, too, the service is provided either by the public or private sector, on a voluntary or mandatory basis. Public sector provision may involve the local port authority or licensed operators under exclusive rights. In this case, rates are fixed and controlled by the competent national, local or port authority. Where the service is provided by private operators, no formal restrictions to market access exist and public sector involvement is generally limited to ensuring compliance to safety and environmental standards. Rates are in principle freely negotiated.

Mooring

96. Berthing, unberthing and mooring refers to the service of securing the ship at berth by ropes. A similar lack of systematic information exists and the same variety of legal regimes seems to prevail: the service is provided directly by port Authorities, by licensed companies or cooperatives operating under exclusive rights, or by a number of private companies. In certain cases, licensed operators are charged legally or contractually with public service obligations, ensuring their participation in emergency situations. The licensing system implies also the involvement of Port Authorities, and eventually of professional organizations, in the fixing of rates.

Port Services under the Rules of the Treaty

97. It appears that despite structural and economic evolution and trends towards new organizational forms, the port services sector in Europe continues to adopt (by choice or necessity) institutional rigidities often not conducive to greater port efficiency and competitiveness. By and large, restrictive practices in the sector usually derive from employment conditions, due to historical, political and economic factors, that several Member States have recently undertaken to remedy.

98. According to the principle of neutrality, guaranteed by art. 222 of the EC Treaty, the Commission is neutral with regard to the private or public status of port operators. Moreover, the Commission respects, on the basis of the subsidiarity, the right of Member States to define the regimes of the services provided in their ports according to their particular geographical, administrative, social, technical and historical circumstances.

99. However, and although ports have remained for more than thirty years outside Community action, as a gray-area between sea and land transport, the European Court and the European Commission have repeatedly made it clear that the rules of the Treaty, mainly those pertaining to competition, also apply to ports. This legal tendency is consistent with the European Union's policy to encourage modernization and efficiency, taking into account structural developments in worldwide competition and the need of companies to seek out better quality at reasonable prices.

100. The legal context of the application of the rules of the Treaty to the port services sector has recently become clearer on the basis of the principles confirmed by the Court jurisprudence and the Commission's decisions. At a first instance, the Court of Justice has condemned a particular case of a regime of stevedoring services, based on the dual monopoly of port operators and dock work companies, purported to have led to abuse of dominant position. Subsequently, the discriminatory tariffs charged by pilot corporations in a certain port were held to be incompatible with EC competition rules.[37] In addition, the Commission has also adopted Decisions applying competition rules to the port sector, condemning port undertakings, acting both as port Authorities and shipping companies, for having refused their competitors access to essential port facilities.[38]

101. In enforcing the Treaty rules to the port services sector, the Commission will examine each complaint on a case by case basis, giving due regard to the following considerations:

102. In principle, the general rules of the Treaty with respect to competition and discrimination on grounds of nationality also apply to port services, as long as this does not obstruct, in law or in fact, the execution of the assigned tasks. The European Union is particularly sensitive to the issue of safety of maritime transport and well aware of the fact that safety considerations often bring some port services under the ambit of Article 90 of the Treaty which can restrict market access by legitimizing exclusive rights of public undertakings entrusted with the operation of services of general economic interest or with public service obligations.

103. In this context, however, the Commission has to examine, on the basis of the principle of proportionality, if the same objectives could not be achieved by less restrictive practices or even without restrictions at all. The challenge, therefore, is to combine safety imperatives with a structure compatible with competitive patterns. This is of particular relevance in cases where a single undertaking is operating both services falling under the scope of Article 90 and ones of purely commercial nature.[39] In such a situation, and also in the sake of fair and transparent pricing, port operators should be encouraged to maintain separate accounts.

104. In some ports and under certain conditions of demand, exclusive rights can be justified by the fact that only one operator can economically provide the service. However, when the national system is based on a concession or a license, it would be desirable to effectuate the selection of the supplier(s) on the basis of a transparent, objective and non-discriminatory public tender procedure, granting exploitation rights for a (limited) period that would, *inter alia*, allow normal recovery of investments. This last

[37] *CJEC 17/5/94, aff. C-18/93, Corsica Ferries Italia Srl/Corpo dei piloti del porto di Genova, [1994] ECR-I-1824.* Actually the Court is considering a recent preliminary issue concerning the legality of the compulsory provision of mooring services in two ports and of the tariffs applied, alleged not to reflect the real cost (*aff. C-266/96, Corsica Ferries France S.A./ Ormeggiatori*).

[38] i.e. *Decision 21/12/93, Port de Rødby, 94/119/EC, OJEC L 55/52, 26-2-94; Decision 21/12/93, IV/34.689, Sea Containers/Sealink, OJEC L 15/8, 18-1-94*

[39] in case *179/90 Merci Convenzionali di Porto di Genova v. Gabrielli [1991] ECR-I-5923, CJEC 10/12/91* the Court explicitly held that the stevedoring services could not qualify as services of general economic interest.

point emphasizes the significance of adequate monitoring by the national authorities responsible for the approval or fixing of prices, aimed at ensuring that prices are fair, transparent and reflect the costs incurred in the provision of the service.

World-wide Experiences of Port Reform[1]

H.E. Haralambides[2], S. Ma[3] and A.W. Veenstra[2]

Global Forces Driving Port Reform

During the last meeting of the UNCTAD Intergovernmental Group of Experts on Ports, port commercialization and privatization were subjects that evoked exceptional interest, enthusiasm, but also concern among delegates. Such discussions would have been unimaginable 20 years ago when most governments were considering their port sector as one requiring massive public investment for port development, of strategic interest to the nation, or a service sector crucial to the "common interest". In some former colonial countries, it was only natural and logical that the government took over all port activities at the end of colonisation.

However, during the last decade, there has been a world-wide trend of institutional restructuring of the public sector. In some developed and developing countries this has taken the form of commercialization or privatization of public enterprises. In the former USSR and socialist countries in Eastern Europe and Asia, the objective of the reforms has been to transform centrally planned economies into a market economy system. Globalisation of economies and fierce national and international competition have been major motors for such changes.

Globalisation could be described as the increase in cross-boarder interdependence and, more profoundly, integration, which has resulted from the greater mobility of the factors of production and of goods and services.[4] This increased mobility can be attributed to three major factors:

- Tele-communications, mass media, advertising, secularism and the abolition of national barriers have all led to a substantial convergence of world cultures and consumption patterns, resulting in larger international markets and intensified competition.

- Although not as yet confirmed by factual developments[5], most governments are rather convinced that economic integration, promoted by the globalisation of capital markets and the virtual abolition of exchange controls in industrial countries, will lead to more efficient resource allocation and hence stimulate growth and economic development.

- The significant advances in transport and communications technologies have increased the speed and efficiency of transport and lowered the costs of communication. These developments have lowered the barriers of time and distance and give the impression of a "shrinking world".[6]

In this way, globalisation and trade liberalisation, helped by the significant developments in transport, logistics and communication technologies, have drastically weakened the link between manufacturing and the location of the factors of production; they have expanded internal markets for goods and services, and have led to a most noticeable shift in manufacturing activities towards countries with a comparative economic advantage. As an example, by the end of the 1980s, more than half of the employees of Sweden's 30 largest manufacturing companies (ranked

by employment) were working in foreign subsidiaries.[7] Furthermore, it is estimated that within the next two decades or so, long distance communication costs will have been reduced to almost nil. This, together with the liberalisation of communications networks and their simultaneous use by telephone, television and computer companies will undoubtedly bring about changes in societal structures as radical and unpredictable now as Manhattan and Hong Kong would have been to Thomas Edison when the discovery of electricity made possible the use of the elevator.

The need for reform in developing countries' economies is as much the result of their own precarious economic and social situation as of the fact that -without having been adequately prepared- developing countries have been exposed to the relentless forces of globalisation and intensified international competition. This exposure has been taking place simultaneously with the opening-up of their internal markets so that they can take advantage of the recent developments in the liberalisation of international trade and particularly the many favourable "developing country provisions" of the GATT. Most developing countries are now well aware of the tremendous potential benefits from the opening-up of their internal markets and the liberalisation of their external trade. These benefits are, of course, the result of their comparative advantage, due to their still low-basis growth in industrialisation (and thus their potential of achieving significant economies of scale) and their inexpensive labour force.

Apart from the rather obvious direct benefits from an export-led growth strategy, trade liberalisation and the opening of internal markets is also helping developing countries to acquire all the necessary technology, know-how and foreign expertise that, together with the subsequent increased levels of Foreign Direct Investment (FDI), would allow them to accelerate the process of their economic development.

In many cases, a dynamic growth strategy, based on liberalisation and economic reform, provides solutions to the severe problems of overpopulation that plague the economic and natural environment of many developing countries. Policies to promote growth and personal freedom are considered by many countries as the only safe way to curb the growth of population. As incomes and standards of living rise, fertility rates in developing countries are bound to drop, as they have already done in the industrialised ones.

An export-led growth strategy, however, necessitates the adjustment of the economic, commercial and, many times, social characteristics of a nation to the business ethics and practices that are being employed in the game of international competition. In the rapidly changing world of technological innovation and of sophisticated demand requirements, the transition of many economies to market-oriented business practices, developed primarily in the capitalist world, cannot be always smooth. Furthermore, the time required for the gradual assimilation of these practices into economic and social conscience is not always available. Finally, the necessary processes of economic and social reform will be many times resisted by various pressure groups who, sometimes very justifiably, aim at safeguarding the country’s environment, ethics, traditions, culture and religious values.

It has often been argued that high port and transport costs hurt developing countries' exports that are already little diversified and over-dependent on the very volatile international commodity prices. For that reason, developing countries have often refuted the principle of comparative advantage as one that leads to a worsening in their terms of trade, creates balance of payments bottlenecks and thus hinders their efforts to grow through diversification. Nowadays, there is

another equally important factor that compounds this problem. This factor, or rather series of factors, consists of the complex developments in multimodal integrated transport, logistics networks and electronic data interchange.

Preferential trading relationships between North and South, inherited from colonial business practices, assume a far less important role today than they did in the past. Today, independent trading houses and multimodal transport operators have the possibility, at a keystroke, to scan the world commodity and product markets and select routes, methods of shipment and carriers in such an integrated manner that ensures quality, expediency and reliability while at the same time optimises generalised costs as well as cost-time trade-offs.

This situation makes the demand for developing countries' exports much more vulnerable now than it used to be in the past. This vulnerability is not only a function of export prices but also a function of the developing countries' ability to comply with modern business and trading practices that are not inflicted upon them in a Machiavellian way, as some could argue, but are rather consumer and technology driven and oriented.

In such an environment, any factor, however small, that can blunt a country's export competitiveness is bound to have much graver repercussions nowadays than in the past. Governments are increasingly realising that the poor services provided by their national ports and their high costs are hampering trade development and the national economy. This is especially true in most developing countries. The proportion of port charges in the final delivered cost of the traded product varies significantly from 0.2%, for cargo of high value per ton, to over 20% for low value cargoes. The trade structure of most developing countries shows that their export products are mainly of the latter type and consequently port performance plays a bigger role for them than for developed market economies. Although more and more developing countries enter the world market with manufactured goods, they have in fact been providing low-end products, competing through price rather than quality.

The high elasticity of demand for developing countries' exports and the low short-run elasticity of supply of most agricultural and primary produce often leave developing countries with very slim profit margins that can be easily swallowed by increased transport and port costs. The exports of soybeans can serve as a good example. In 1991, the international FOB price for soybeans was $230 per ton. However, loading the cargo on board a ship cost $65 per ton in the port of a South American country, while it cost only $20 per ton in a North American port. Although the production cost of soybeans per ton was $165 in South America, $30 cheaper than in North America, the result was that by selling soybeans at the international market, the South American producers made no profit at all, while their North American rivals were realising a $15 per ton profit. Poor port services were thus not only taking profits away from the national exporters, but in fact they were squeezing the country out of the world market.

It is many times being said that unitization and particularly containerisation has revolutionised the national and international transport and port industries. Such an emphatic characterisation could be quite acceptable if one considers the enormous impact that this originally purely technical solution in cargo-handling methods had on the design and sizes of general cargo ships, the lay-out, equipment, development, operations and employment in ports, on inland transport requirements, land use, human skills and shippers' perception regarding the functioning of the overall transport chain.

This system of transport had a number of significant advantages over the conventional, labour-intensive methods of handling general cargo. Apart from the remarkable improvements in port safety and the limitation of pilferage, damages and cargo claims, the system's major breakthrough -particularly in the U.S. where it was first introduced- was in cutting down on expensive labour and reducing ship turnaround time.

Due to costly, largely ineffective and time-consuming cargo-handling prior to the advent of containerisation, general cargo ships were known to spend most of their operational time in ports, waiting, loading or unloading. In many instances and whenever that was possible, shippers were trying to avoid ports and shift towards road and rail transport for long distance carriage.

Furthermore, expediency in cargo-handling was necessitated by the very same nature of general cargo goods whose increasing sophistication and value-added content required fast transit times from origin to destination in order to increase shippers' turnover and minimise high inventory costs. The latter costs were, thus, brought down significantly by the use of logistical concepts and methods and also by the increased reliability and accuracy of liner shipping operations that allowed manufacturing industries to adopt flexible *Just-in-Time* and *Make-to-Order* production technologies. Among a host of other benefits, these technologies enabled companies to cope with the vagaries and unpredictability of the seasonal, business and trade cycles. Many shippers in industrialised countries were, thus, more than happy to bear the increased initial costs involved in the introduction of the new transport system, given that these costs were only a fraction of the benefits enjoyed by faster transit times and the higher predictability of cargo movements.

The dramatic improvements in cargo handling operations that were brought about by the introduction of containerisation have enabled general cargo ships to spend hours or days now in ports rather than weeks or months that was customary before. The reduction of port time and the corresponding increase in time at sea have eventually led to the substitution of the previous multipurpose general cargo ships with specialised high-speed container vessels of substantially (and ever increasing) larger dimensions that can take advantage of the economies of scale afforded by the shorter turnaround times.

Liner shipping has thus become an extremely capital-intensive industry. Many modern deep-sea cellular containerships have capacity to carry more than 4,000 TEUs, developing speeds in excess of 25 knots. At today's shipbuilding prices, the construction of such a ship may well exceed 100 million USD. Already in 1972, a 3,000 TEU vessel appeared in the big consortium Europe-Far East[8] and during the same year the world's container port league enlisted 82 main ports in the starting phases of the race towards container traffic growth.[9]

However economically justified investments in containerisation might have been in the industrialised countries facing the north Atlantic and Pacific oceans (where the bulk of general cargo traffic is concentrated), some developing countries have reacted to the necessity of this type of investments with varying degrees of scepticism. Their legitimate worries concerned the suitability of capital-intensive techniques in countries with abundant and inexpensive labour, their lack of financial resources together with other pressing investment priorities in the country, and also the fact that the vast majority of their exports (primarily raw materials and agricultural produce) were not "containerisable".

Furthermore, the capital-intensive nature of liner shipping and the consequent "operational arrangements" within this industry in the form of consortia and similar types of co-operation, frustrated many developing countries' plans to get actively involved in liner shipping, despite their cargo-sharing entitlements secured mainly through the provisions of the UNCTAD Code of Conduct of Liner Conferences. For many developing countries, the result of this situation was that they were often seen to be played off against each other by major liner operators who had been convincingly arguing that if adequate port investments in container-handling facilities and equipment were not timely made, ports would be by-passed by major lines and thus become "backwaters".

In many cases, this argument was driven home very successfully for a number of reasons:

- No developing country would fail to see the importance of efficient national ports as facilitators to trade and as crucial elements in their process of economic development.
- The increase in sizes, sophistication and capital-intensity of modern container ships in deep-sea liner trades, has limited the number of ports of call to only a selected few transhipment ports or load centres. These very important ports have become the *foci* of international shipping and goods are moved by land (road and rail) and water (barge) from inland centres and feeder ports to these global hubs.[10]
- Many developing countries have, thus, taken up the challenge to develop their ports, hopefully into load centres, under keen competition with other regional ports having similar ambitions. These decisions were taken not only because of fear that ports would be by-passed if they did not do so, but also on the grounds of some other more pro-active considerations.
- It was, thus, thought that the development of container-handling facilities in excess of national traffic demand requirements might have the positive spin-off effects of an *unbalanced growth* approach to development. According to this, basic infrastructural facilities (such as ports) are built up far ahead of existing demand, on the part of the industry, agriculture and commerce, in the hope that the latter activities will expand by the wake of the former.
- Apart from considerations of trade facilitation, a number of countries particularly in Asia saw port containerisation as an export industry in its own right. It was, thus, considered that, additionally to their direct financial benefits, the export of transhipment services to neighbouring countries would enable ports to grow and achieve significant economies of scale (not otherwise warranted by the country's limited cargo traffic) that would finally benefit the country's external trade itself.
- Finally, transhipment traffic would allow the development of feeder service networks for the regional distribution of containers and this would enable the country in question to get profitably involved in shipping (at least the short-sea type of) and value-added distribution activities that would otherwise be lost to competing regional ports. Feeder services and inland transport and distribution possibilities were major considerations by countries that were seriously contemplating investment in containerisation. This was so given that most countries were realising that if such possibilities did not exist, the likelihood of them being selected as major “hubs” would be rather thin, no matter how efficiently they might like to develop their ports.

Government Involvement in the Port Industry

Government involvement in ports can take various forms ranging from the mere ownership of the land and basic infrastructure (landlord ports) to the provision of all port-related services (service ports).

Research undertaken for the International Labour Organisation[11], through a worldwide questionnaire of which 75 were fully filled in and returned, indicated that in most ports around the world, wet areas (63%) and quays (76%) are in public ownership without competition, while the operation of quays is fairly evenly distributed between the public and the private sector.

Table 1: Ownership and Control of Ports

	Public, no Competition %	Public, Competition %	Private, no Competition %	Private, Competition %	Mixed %	Other %
Infrastructure						
• Quays						
· Ownership	63	9	7	1	12	8
· Operation	32	8	8	20	23	9
• Wet area						
· Ownership	76	5	7	-	1	11
· Operation	55	4	7	8	8	18
Superstructure/equipment						
• Container cranes						
· Ownership	28	5	7	24	13	23
· Operation	24	4	9	28	12	23
• Container equipment						
· Ownership	28	4	9	33	9	17
· Operation	23	4	11	36	12	14
• Bulk equipment						
· Ownership	19	4	11	31	20	15
· Operation	16	3	12	35	17	17
• Sheds and warehouses						
· Ownership	44	7	4	8	31	6
· Operation	24	5	7	21	35	8
Facilities and services						
• Pilotage	52	3	28	11	1	5
• Towage	29	4	20	31	4	12
• Mooring	35	3	23	29	5	5
• Ship-repair	7	5	8	51	11	18
• Bunkering	13	3	7	60	4	13
• Adm. Services	44	4	4	19	17	12
• Other services	31	5	5	20	27	12

Source: ILO

The State may determine port strategy, management and operations, but it can also intervene in more indirect ways, e.g., by coordinating port development, and in financing investments, or determining the port's regulatory framework.

Table 2 affords some insight into the methods of controlling port authorities used by governments. As can be seen, "budgets" and "investment plans" are the most common means of control globally. In South East Asia, governments often resort to "expense reports", while profit targets are also in use. Profit targets are not used to any major extent in Latin and Central America.

Table 2: Government Control in Port Authorities

	Global (%)	Europe (%)	South and Central America (%)	South East Asia (%)
Expense reports	32	32	25	55
Budgets	47	47	37	50
Profit targets	28	21	-	40
Investment plans	44	37	12	45
Others	8	5	12	10

Source: ILO

(Percentages may not tally due to multiple answers)

Several reasons can be put forward for the public sector's involvement in ports:

Military protection
Many major seaports are located close to a country's borders and are especially vulnerable to attacks from the sea. In older times most ports were, thus, military protected areas. Nowadays, most commercial ports have no direct military protection, but their strategic importance is still apparent.

Expropriation of Sites
In many cases, ports have to extend into the water where, usually, there is no provision for the expropriation of sites. In most countries, people can acquire legal rights to territory or land and can subsequently exclude others from its use. This is never the case for water or aquatory the more so when most countries recognise a general right for free navigation to which unauthorized port structures could be considered as obstructions.[12]

Economic Protection
As major ports are usually the gates to international trade, they may afford to governments a convenient means to implement import restricting policies, aimed at protecting domestic markets. Import restrictions can be effected by the erection of tariff and/or non-tariff barriers. The latter can take many forms and are usually more difficult to detect and quantify. High port tariffs, long turnaround times and inefficient ports in general could be seen as constituting effective non-tariff barriers to trade. It has sometimes been argued that import-competing domestic producers have strong vested interests in the continuing existence of inefficient ports, as this offers them effective protection. These producers could also be effective lobbyists and influential members of pressure groups that resist port reform.

Natural monopoly
Ports are often referred to as a classic example of the so-called natural monopoly case, in which

possible market failures can justify government intervention.[13] Under certain conditions (a given level of demand, cost structures and technological factors), a market with two or more firms can produce sub-optimal economic outcomes, whereas a single firm might produce the required output more efficiently.[14] For this reason, governments may, at times, decide to move from a multiple-firm competitive environment towards a monopolistic situation. This can be achieved either by explicit legislation, allowing only one operator, or by discriminatory subsidies, finally resulting in the withdrawal of potential competitors.

Public Goods

Among the many functions of public port authorities, whether regional or centralized, is the provision and maintenance of the ports' basic infrastructure, such as breakwaters, approach channels, turning basins, rail/road facilities within the port, navigational aids, towage and pilotage. Apart from the general public's interest in the safety of ports, many of the port services can clearly be considered as falling within the domain of "public goods" in the sense that no particular user can be excluded from their use if he/she is not agreeable to share in the cost of their production;[15] a situation often referred to as *the free rider problem.* Furthermore, services such as those provided by, say, breakwaters and navigational aids can be considered as *collective consumption goods*[16] in which case, and up to a point, the total cost of production does not vary in relation to the number of users. Finally, a number of port services can be considered as *non-rival in consumption*[17], given that user A's demand does not reduce (compete) that of user B. Those port services that qualify as "public goods" ought to be provided by some public authority, although *provision* should not be confused with *production*; the latter could be entrusted either to the public or private sector depending on considerations of economic efficiency.

Financing

The rapidly changing cargo handling technologies, the increase in the size of modern container vessels, the limitation of the number of direct port calls - coupled with the expansion of main-line/feeder networks - and the growth of international trade have resulted in numerous port expansion/modernization programmes, generally requiring substantial capital outlays and invariably leading to regional over-capacity. These investments often exceed the financial resources of the private sector and, thus, make the case for governmental involvement. Apart from a possible lack of financial resources, the private sector may also be reluctant to invest in ports, particularly when capital outlays have to be made within institutional and regulatory frameworks that cannot guarantee positive financial returns. However, as government policies usually extend beyond considerations of short-term financial profitability and towards the maximization of long-term *economic* profitability and general welfare, a number of infrastructural projects (such as ports) that might be deemed unprofitable by the private sector can be of cardinal importance to the government. It should be added, however, that the expansion of international trade and the growth potential of many countries around the world are contributing more and more towards making port operations a commercially profitable activity. Furthermore, the globalization and liberalization of capital markets and the emergence of powerful corporate investors, building international portfolios,[18] ease substantially the heavy financing requirements of port development in many countries that are faced with scarce capital resources and/or other pressing investment priorities.

National/regional economic development

In addition to their main functions as interface, storage and distribution points, efficient ports also function as growth poles attracting new industries and stimulating trade.[19] In this way, and

apart for their obvious direct contribution to GNP growth and regional development, the indirect contribution of ports to the economy is also substantial, given their importance to the competitiveness of the country's export industries. State intervention is thus often justified on the grounds of these "not solely commercial" objectives of ports. For instance in Japan, apart from the direct financial returns of port operations, port development is appraised on the basis of its contribution to the social and economic development of the region and the nation. Port development plans are thus adjusted to and included in the country's regional development plans, while ports are managed and administered by public sector bodies.[20] Among other advantages, this approach helps in rationalising port investment, avoids duplication and the wasting of scarce resources due to excessive competition in an industry predominantly described by *sunk costs* and, finally, it helps in optimising the locational aspects of port investments, so that they can tie-in meaningfully with the rest of the country's infrastructure. Despite this, the realization of the above-mentioned indirect objectives may generate numerous benefits for the country as a whole that do not necessarily produce visible financial rewards for the ports concerned. Thus, the efficiency and productivity of the latter might, at first sight, be considered as disappointing and inferior to that of comparable privately owned enterprises with clear-cut financial objectives.

Government Retrenchment and Major Issues of Concern in the Port Industry

Government Retrenchment

It is sometimes argued that policies of public sector retrenchment, together with the encouragement of more private sector initiative, are rooted in ideological origins. However, regardless of how true this opinion may have been in the past, current economic and political developments world-wide can no longer support its validity. Real reasons for explaining the widespread popularity of the various divestiture programmes are to be found, among others, in the increasing economic interdependency among nations and the trend towards the globalisation of all forms of economic activity.

Regardless of ideological postures and doctrines, an increasing number of governments (and ordinary citizens) realise that they can no longer isolate their economies or insulate them from external economic influences and shocks. Even if this was still possible, such a policy's effectiveness towards increasing growth and industrialisation would be more than doubtful, at least today.

In many countries, governments have become painfully aware of the inadequacy of their state owned enterprises-(SOE)-policies in an environment of increasing international interdependence and global competition. Market-oriented policies are becoming more and more popular in order to realise the benefits of higher efficiency and productivity, and a reduction of the financial and administrative burden that SOEs often impose on their owner, the State.

The low productivity of the public sector is one of the major driving forces behind the various divestiture programmes throughout the world. Employment in most state-owned ports, and to that effect in the wider public sector by and large, is usually characterised by high levels of over-manning. Many times, this is not only the result of the government's employment creation policy -particularly in developing countries with rapidly growing populations- but also of the fact that, through its permanency of employment, fringe benefits and stability of income, employment in the public sector is often an arduously sought after objective, many times attained through

systems of 'political clientelism'.

However, large scale employment in the public sector creates also inelastic government expenditures, increases the Public Sector's Borrowing Requirements (PSBR) and it may lead to inflation and high interest rates. In their turn, the latter can hinder the private (domestic and foreign) sector's propensity to invest and subsequently result in less output, employment and growth. Additionally, inelastic government expenditures can reduce the effectiveness of fiscal policy as a tool of economic stabilisation. The latter is (at least nowadays) almost invariably a pre-condition for the successful implementation of structural adjustment programmes and too often the reason for the divestiture plans of the government.

Management Issues

The capital-intensive nature of liner shipping and the need for maximum capacity utilisation in order to achieve adequate rates of return on investment, have increased pressures on ports for further improvements in labour productivity and operational efficiency. In its efforts to adjust to the new demand requirements, the port industry itself has become also a capital-intensive one, requiring massive investments in port infrastructure and sophisticated cargo handling equipment. In this way, containerisation and the induced cargo-handling techniques have had an equally profound impact on port employment. As with all other capital-intensive innovations, containerisation substituted capital for labour and thus resulted in considerable reductions in port employment, simultaneously accompanied by substantial increases in labour productivity.

However, port performance and labour productivity measures obtained from various ports around the world still demonstrate substantial differences from one port to another, even within the same region. With regard to container traffic, for example, the container handling productivity among western European ports in 1991 varied from 30 moves per hour/crane down to 14 moves per hour/crane. In an Asian port in 1992, 458 containers were handled in 3 hours and 15 minutes to and from a containership and the vessel stayed at berth for less than half a day, while in another port in the same region, to handle the same number of containers the ship had to spend 2 to 3 days in port. The gap in labour productivity between ports can also be substantial. In a major far-eastern port in 1992, about 200 million tons of cargo were handled with a total of 7,200 employees, while in another port of a developing country in the same region, 52,000 people were employed with a total throughput of about 150 million tons of cargo.

High costs, poor services and low efficiency and productivity appear however to be only the symptoms of the problem. A recent UNCTAD survey carried out in four African countries (Ivory Coast, Ethiopia, Kenya and Senegal) showed that port problems were not of a technical nature and that investment in modern port facilities had been universally good; apart from minor omissions there were no cases of serious infrastructure defects.

It was thus evidenced that although many ports are in possession of the right infrastructure and necessary equipment, what they lack is effective management or modern management know-how. In many instances, basic management principles such as those of clear description of objectives and area of authority and responsibility, accountability and control, adequate rules and regulations, good statistical and information systems, analytical accounting and cost control, quality control, human resource development, etc., appear to be amiss.

Yet, the management ability of port managers, including those in developing countries, should not be underestimated. A cursory look into the management techniques of most ports today will immediately show that the above mentioned managerial skills are rather well known to most port managers and many of them have already been in place. Modern port management knowledge has in fact been well spread in many developing countries through various training activities during the last decades and it is not uncommon today to find many port managers in developing countries that have been trained abroad in modern management techniques. In many ports, the problem seems not to be the lack of modern management techniques but rather the lack of its effective implementation. Managerial measures do not thus touch the roots of the problem which, in most cases, seems to be institutional.

Often, the interface between the government and the port has been too heavy. As a result of unnecessary bureaucracy and state intervention, ports have many times been prevented from carrying out their management streamlining efforts and react to the needs of the market. Furthermore, the lack of competition often results in a negative service attitude within the port. Because of the "soft budget constraint" and the frequent low interest government loans or subsidies, the "opportunity cost of capital" is a principle virtually unknown to many port managers. This may explain why *cost control* is often a low ranked priority in many public ports. Besides, port tariffs are often state-controlled and do not correspond to market prices, which adversely affects the management's motivation to seek cost reductions.[21]

Thus, investments are not always made in time and when they do they are not market-oriented or cost-effective. Decision makers may be more responsible for political or administrative priorities rather than commercial ones. The difficulties connected with the quality of port decision-making are often due to the excessive distance between the place where the problem arises and the place where the solution is worked out. Centralised public port administrators rarely make decisions without consultation at a ministerial level and they often have a very relaxed attitude regarding commercial matters. In the UNCTAD study mentioned above, it was shown that good intentions to improve port performance had, in most cases, run into problems of implementation or were over-laden with subsequent controls combined with a distinctive unwillingness of the middle ranks of central government to delegate authority.

Labour Issues

The introduction of new cargo handling techniques in ports (containerisation) has provided an important stimulus for the registration of port workers. The new technologies have resulted in an increase in capital intensity, which creates the need for a more intensive capacity utilisation. This is mainly achieved through an extension of working hours, which in many ports has been done through the introduction of shifts. As the new technology requires a skilled workforce, the need for the regularisation of employment relations becomes apparent. Regularisation is needed as there is no way that casual labour can provide the adequate, responsible and skilled manpower, necessary to move cargo efficiently through a modern port using advanced equipment.[22] Regularisation of employment also provides casual workers with some form of guaranteed employment or income and it is thus strongly supported by unions, who often make it an explicit objective in their negotiations concerning the social effects of the introduction of new cargo handling methods.

Adjustment of manning levels however has often been prevented or postponed due to pressure from the affected labour, often represented by powerful trade unions. On the one hand, port

workers have an interest in the introduction of modern cargo handling techniques, as this reduces the hard physical work. Besides, unions realise that the introduction of new techniques is necessary to secure the competitive position of the port, which directly affects their long-term employment prospects. On the other hand, however, workers fear that new technologies lead to a considerable reduction in employment (in which they are right), and this has brought many of them to resist technological change. Already in 1969, there were refusals to operate new types of equipment and shift systems and gang sizes were not reduced in line with the changed needs.[23] As management needed the co-operation of port workers to implement new technology successfully, certain promises regarding job security and financial compensation in case of labour force reductions had thus to be made.

An additional reason for the resistance of port labour to change relates to the "through-transport" concept and the door-to-door possibilities that containerisation now affords; a considerable part of what was previously considered as "dock work" today shifts to areas outside the port domain. This development has especially to do with the stuffing and stripping of containers that can now be performed at the consignor's/consignee's premises by the latter's own staff. Even when this is not the case, containerisation often allows the detachment of staffing and stripping activities away from the usually congested "waterfront" and its "rigid" and strongly unionised labour, towards *Inland Container Depots*, where ample and cheaper space is available, often conveniently located close to main road junctions.

The high levels of over-manning, together with the absence of risk in economic activity, the lack of accountability for economic performance, the impersonality of operational structures and a missing sense of belonging and achievement can very effectively remove workers' natural drive for more initiative, innovation and higher efficiency, consequently resulting in very low (and sometimes perhaps negative) labour productivity in ports.

This situation can be further accentuated by the fact that the general macroeconomic benefits of the public sector's involvement in port activities are dispersed throughout the regional/national Economy and, thus, are not immediately visible or directly beneficial to the workers who contributed to their accomplishment.

However, it would be fundamentally wrong to believe that the above are the only factors accounting for the low labour productivity of the public sector. Comparisons between different countries or between different sectors of the same Economy should, therefore, be contemplated with extreme care. Labour productivity ought not to be measured only as "output per man/hour" or "tonnes handled per gang-shift", as it is sometimes the practice in many ports, but as "output per man/hour produced with a certain stock of fixed capital of a given technology and operational characteristics". Thus, differences in labour productivity between the private and the public sector could be explained equally well by the fact that the level of fixed capital investment in the latter sector is frequently inadequate or obsolete, due to the scarcity of financial resources, the budgetary constraints and the economic priorities of the government.

In many countries, all work falling under a certain definition of "dock work" and taking place within a certain defined "port area" is restricted to registered workers who sometimes have the sole legal right to carry it out even when they do not have the necessary skills. This situation often leads to 'ghosting', where non-registered dock workers carry out whatever work is necessary, while registered dock workers are paid in effect to watch the non-registered

employees with the necessary know-how actually carrying out the work.[24] For example in one Asian port, a gang of 57 people is deployed to pack and unpack containers, although this is actually performed by four casual workers while the remainder looks on. The failure to adjust workforce levels to changed employment needs disadvantages many ports in (low wage) developing countries with total labour costs well above those in developed ones. The handling costs in Indian ports, for example, are almost 40-50% above those in Singapore and Sri Lanka.[25]

This relatively protected position of registered port workers can be seen as one of the reasons why port workers often enjoy higher wages than those paid for comparable jobs elsewhere in the Economy. Some observers argue that this privileged position has finally resulted in a negative attitude of the general public and other unions towards port workers.[26]

Sometimes, pressure to maintain old fashioned manning levels comes also indirectly from the government, which is reluctant to face the financial and political consequences of labour force reductions that can lead to substantial compensation payments to those leaving the industry, or even disruptions to foreign trade. Furthermore, and contrary to most developed countries where one of the prime objectives of management is to improve port efficiency, many developing countries see port 'efficiency' as a matter of only secondary importance; in the absence of social safety nets, keeping people 'working' is considered to be at least of equal importance.

This often leads to an additional labour problem facing many ports, which is the age structure of the workforce. The continuous surplus in the number of registered dock workers and the 'job for life' basis on which they are in practice employed can discourage employers from recruiting new, younger manpower. That was the case in the UK where the average age of registered dock workers increased from 44.2 years in 1980 to 47.1 years in 1988.[27] In the same year, the percentage of those over 50 years of age amounted to 42.5% and that of those under 35 years to 6.5%. Subsequently, after the abolition of the Dock Labour Scheme, the former Scheme ports sought not only to reduce the size of their cargo handling manpower, but also to reduce its average age and to improve its age profile.

Regularisation of port employment has also created large numbers of different job categories. Often, strict demarcation lines between different jobs and different activities exist, a fact that severely limits, and in many cases totally prohibits, the transferability of workers from one activity (job category) to another. The above labour rigidities often lead to large gang sizes, excessive over-manning, little labour mobility and high port user costs. In many ports around the world, the inflexible and monopolistic supply of port labour has effectively discouraged intended private sector activities around the port and has, thus, deprived the latter from one of its main functions, that of being a "growth pole" for the region and the country.

Measures of Port Reform

Port reform does not necessarily require the disengagement of the public sector from port activities, but it can also take place through improvements in the existing institutional framework. Most port reforms, however, tend to introduce private sector characteristics in port operations. There are many ways of doing this, ranging from changing port administration and improving competitive conditions up to the more drastic and complex divestiture programmes.

Several contiguous processes can be involved *en route* towards the stage of "privatization". In these processes, the scope of private sector involvement is gradually broadened, which might eventually result in a complete transfer of ownership from the public to the private sector. The challenge for port policy-makers engaged in structural adjustment is to find a proper mix and time-path for the various intermediate processes on the way to privatization.

In what follows, the "stages of privatization" are discussed in order of increasing need for change, compared to the traditional situation of a publicly owned port which serves as a starting point.

Table 3: Types of Port Reform Programmes

	Global (%)	Europe (%)	South and Central America (%)	South East Asia (%)
Improving port administration	43	37	25	85
Liberalization	28	11	37	40
Commercialization	45	37	37	25
Corporatization	17	21	37	30
Privatization	16	11	37	45
Other	19	21	-	30

Source: ILO

(Percentages may not tally due to multiple answers)

Improving port administration

The improvement of port management and administration within the current organizational structure and without changes in law or national policy can be seen as a first option of port reform. As can be seen from table 3, the need for such improvements is widely felt in most ports. Surprisingly, however, carried away by the well publicized merits of radical port reform, ports and governments tend to neglect the some times substantial benefits that can be reaped by improving the port's organizational structure, better managerial techniques, training and the development of a corporate culture; attributes that could be considered as prerequisites to successful privatization anyway.

Ports that intend to embark on institutional reforms have, in most cases, undergone some kind of managerial restructuring. Taking appropriate measures to introduce a modern port management approach is of a twofold importance. First, without going into institutional restructuring which may lead to important social changes, managerial measures can bring quite positive results to port performance. In the port of Casablanca, for example, work was streamlined by setting clear objectives for each department and working team. Also, the introduction of a new statistical system could now allow port managers to have a more efficient control. The second advantage of applying managerial measures is that these efforts can constitute a favourable basis for further institutional steps. As the deputy general manager of the port of Odessa, Russia, said "... we have no experience of planning and pricing, only of obedience...". Although the port is the showcase of the country's container shipping, the port's operation manager said "...I have never seen a foreign container terminal...". It would thus be difficult, if not impossible, to upgrade a port's services through institutional measures when basic management skills are not adequately developed and modernised.

Liberalization/deregulation
Under liberalization, the private sector is allowed to provide port services in competition with the public sector. Liberalization includes the removal of statutory restrictions limiting entrance of the private sector to the port services market, and of discriminatory rules discouraging competition. Eventually, these restrictions are replaced by regulations that encourage or even require competition. For some countries, the advantage of liberalization is that the introduction of some form of competition in port services leads to efficiency improvements, while the overall control over the (strategically important) port remains completely in the hands of a government department.

Obviously decentralisation is an effective method to restore freedom of port managers. However, decentralisation alone cannot solve the problem of incentives, and having the power does not mean using it; in many cases doing nothing is considered much safer than doing something. For instance, reformers in China, and in many other countries as well, were caught in the decentralisation/re-centralisation cycle: Once decentralised, power and authority were quickly abused, disorder occurred, control was called for, power and authority were taken back by the centre and the situation was back to its original state. Then another cycle starts with re-decentralisation and the old scenario repeats itself. This is quite a common situation in many developing countries where not only the necessary legislation has been inadequate but the mechanisms of a market economy have not been established. Old control has been given up while new control has not been created.

In Chile on the other hand, the government ended stevedoring and land-side cargo handling monopolies, as well as the distinction between those activities, in 1981 (by the enactment of Law 18032). Port employment was opened to all workers meeting minimum age and physical requirements. Private stevedoring companies were allowed to operate and were free to negotiate with individual trade unions on manning levels and salaries. It was estimated by the country's Maritime Chamber that deregulation benefited exporters and importers of the country by $96 million in 1990 alone.

A possible disadvantage of liberalization/deregulation is the potential danger of "cream skimming". The private sector will only be interested to provide *those* port services that have the potential to be profitable, e.g. container, general cargo, or bulk terminal operations. In a statutory monopoly port, the sometimes unprofitable (but required) port services can be cross-subsidised by the profitable ones. However, as a result of liberalization, the public sector may be losing revenues from profitable port activities, having at the same time little possibilities for cross-subsidization. This issue should be seriously considered when leasing out port facilities to private operators: If the port authority is to continue providing commercially unprofitable services, and in the absence of central/regional government support, the lease should be determined at a level that would allow the efficient provision of the various port services entrusted to the port authority/company. Such an arrangement is also in the interest of the private operators, given that their efficiency improvements in cargo-handling can be easily nullified by inefficient dredging, mooring, pilotage, towage, engineering, security, fire protection and similar operations.

Furthermore, ports in many countries have been run for a long time as administrative entities with both infrastructure and superstructure belonging to and often operated by the port authority. In such cases, deregulation does not automatically bring in new competition because competition

is restricted not only by regulations or market size, but also by a lack of competitors (private or not) due to financial incapability or lack of management know-how. It may well be then that after deregulation measures have been put in place and efforts made to restore competition, no reliable new entrant may be found to complement and compete with the old monopoly and force it to change. It could thus be easily realised that the old organisation is too strong to be changed by market forces alone and some more active reforms may be required together with deregulation.

Commercialization
Commercialization implies the introduction of a commercial, business-like environment, in which the port management is accountable for its decisions and performance. In the previous stages, ports still retain their status as quasi-government departments. In the commercialization stage, the status of a "state-owned enterprise" is justified, as the previous "government department" now changes into a public company.

The main objective of commercialization is to increase management autonomy and accountability.[28] If port managers in bureaucratic port organizations are not held responsible for port performance, they will not always take all the necessary steps for securing cost reductions or improvements in productivity. Furthermore, as the management of commercialised ports is still public, it often hesitates to consider in time possible reductions in employment. Port labour contracts are usually not governed by regular labour law, but they have a civil service status.[29] Solutions to the above situations could be found in an increased accountability for port managers and workers, or in the contracting out of certain port functions to the private sector. Several approaches are in use to achieve this:

- *Performance agreements:* These agreements clarify performance expectations and the functions, responsibilities and rewards of all parties concerned. All decisions still remain in the hands of the public sector.
- *Management contracts*: Under this arrangement, the management of an operation is transferred to a private unit. The latter offers managerial expertise, but the government retains ownership and control.
- *Service contract/contracting out*: This method consists mainly of the contractually specified transfer of responsibilities to a private entity for the provision of a certain service. A service contract is usually described in more detail than a *concession* (see below).
- *Lease*: Under this agreement, assets are leased for a fixed period to private lessees. The ownership remains with the (public) lessor. Among the many different types of leases that exist, the following two types are frequently used in the port industry:
  - A *flat rate lease* where a fixed amount is agreed and eventually adjusted for inflation. The amount is based on a fair return on the value of the property.
  - A *mini-max lease*, where the lease amount is variable and it is determined in relation to the actual throughput. The lease increases by steps within a minimum-maximum scale. In contrast with the *flat rate lease* method, there is no maximum level of compensation included in this option. The upper limit is determined by, for example, terminal capacity.
- *Concession*: A concession is an agreement similar to a lease in that the use of facilities is transferred for a predetermined period by the owner to a potential user, but with a substantial amount of control retained by the owner (the public port authority) on the *concessionaire*'s use of the rights. Upon expiry, the facilities have to be returned to the

owner in good condition and free of charge.

In New Zealand, a Port Companies Act was enacted in 1988 which required every Harbour Board to form a share company under the country's general companies legislation. All commercial port operations were thus transferred to these companies and months only after their establishment the workforce fell by almost 40% and vessel turnaround times were cut by 30-50%. The whole structure of the industry changed and shipping lines now negotiate individually with terminal operators. Although still a 100% public entity, the port of Auckland claims a typical throughput rate of 34-37 TEU/net crane hour and a productivity improvement from 6,600 tonnes per employee in 1989 to 13,900 tonnes per employee in 1992. For this port, containership average turnaround time was cut from 38.4 hours to 15.7 hours and from 3.4 days to 20 hours for other ships.

Commercialization has been a satisfactory alternative in a number of developing counties as well. In 1984, Morocco adopted a port policy which consisted of entrusting the ports' administration with tasks that fell in the sphere of the authorities, while at the same time establishing a public sector agency (ODEP - Port Operating Board) responsible for commercial activities. Management authority was thus decentralised from the Ministry, market-oriented objectives were set and effective control mechanisms put in place. During the years following the port commercialization reform, notable improvements started to be seen in Moroccan ports: since 1989, cargo handling productivity has increased by 50% in all sectors. In the country's major port, Casablanca, productivity improvement reached 150% in 1993. Vessel waiting time has been reduced to almost zero in all ports and the image of Moroccan ports to clients in now completely changed.

Port commercialization works simply because it allows the port to fix its paramount objective on market needs and customer satisfaction. However, the most difficult part is not to introduce changes successfully, but to maintain a permanent mobilisation and a continuous dynamism. In Morocco, ODEP adopted two methods in order to maintain the positive results after commercialization. One was to promote and use a "private type of management", and the other to create "fictitious competition". The so-called "private type" management means a series of modern port management tools being put in place such as cost control, financial audit, rigorous personnel policy and more discipline. Most importantly, a management contract was concluded between ODEP and the government, enabling the former to have clear objectives, responsibility and a high level of freedom and autonomy in its management. The creation of fictitious competition in a natural monopoly situation is not easy. For doing this, ODEP is involved in regular benchmarking with different ports on their productivity, relationship with clients and management level. Furthermore, comparisons of "competition" are also made within the same port, among various production centres, which have been created as autonomous entities. Evaluation is undertaken by the general manager's office, with standards based on market requirements. Reward and sanction measures are also exercised.

Corporatization

Corporatization requires the transformation of public sector organizations (SOEs) into public companies, the shares of which are held by the government. Although enterprises in the commercialization stage are introducing more private sector characteristics in their operations, they still lack the legal corporate independence often needed to ensure efficient operations. Corporatization affords the enterprise a status of independence and subjects it to the same legal

requirements with those of a private firm. A whole new company is thus established, enjoying administrative and financial flexibility that enables it to close agreements without continuous reference to the government. All land, moveable and fixed assets are transferred to the new company as paid up capital.[30]

A significant advantage of corporatization is to be found in its commercial accounting procedures, which make financial cost more transparent, facilitating the identification of sources of inefficiency. As the government does not exercise direct control over port management, corporatization is in general a more attractive alternative to foreign investors than the other stages of port reform discussed above.

Privatization

Privatization is the most radical and possibly most complex exercise in structural adjustment programmes in ports. It could be defined as the transfer of port ownership from the public sector to the private sector. However, although this definition serves a methodological purpose, "pure" privatization such as this is rarely found in practice. In many cases, the increasing private sector participation in the management, operations and development of ports (described above as commercialization/corporatization) would also be often defined as "privatization". Privatization can take various forms:

- *Public offer*: In those cases where the shares of the port company are quoted on the stock exchange and can be freely traded, the government may decide on a public offering. It may also decide to retain a major part of the stock in order to exercise some influence in future port activities.
- *Management/employee buy-out*: In this situation, the government decides to divest its shares to the employees, so that the latter assume ownership of the company. A buy-out would be more appropriate whenever the employees are highly motivated and keen on buying the company. Demand prospects have to be stable and the size of the company should be rather limited.
- *Private placement*: Through a process of competitive tendering, various potential private investors can submit a quotation. By negotiation the government can then decide which offer is the most attractive. It is possible that offers are made by a consortium of companies, banks or even a group of employees.

- *BOO/BOT*: In this case, a private company *B*uilds, (*O*wns) and *O*perates an asset for a certain period. Under a BOT arrangement, at the end of the period the asset is *T*ransferred back to the government. If privatization takes place in this way, the private sector is given an exclusive concession to operate an infrastructural project, such as a bridge or a port, and it assumes the risk of completing it. BOO/BOT is a form of non-debt financing of public sector activities, in which the private sector finances the construction and the costs are recovered through user fees. Depending on the project, incentives may include guaranteed purchase of output, tariff support in the early years, concessionary rates of income tax, free repatriation of dividends and capital, and exemption from customs duties, turnover tax and excise duties. An example of the application of a BOT-like structure in ports can be found in the conversion of the East Wharf in the port of Karachi (Pakistan) into a modern container terminal and the development of the port of Galle in the south of Sri Lanka.
- *Sale of assets*: This alternative can be considered when private investors are not interested in acquiring the whole of the company, or when better results can be expected through a

partial rather than an outright sale. (Seychelles)

- *Joint venture*: A joint venture represents an enterprise in which two or more private companies, or a SOE and private investor(s), jointly own the equity of the port company.

Most countries actually experiencing port privatization have adopted public-private joint venture options. Port joint ventures are often attractive to both government and the private sector. The former can thus reduce administrative and financial burdens, improve efficiency and promote competition. The private sector views this arrangement favourably whenever the magnitude of the investment and associated commercial risks are beyond its capabilities or when complete ownership of assets and operational control are not allowed.

In the port of Bremen, most of cargo handling operations are carried out by a joint venture company (BLG) of the city of Bremen (51%) and the private sector. The same formula can be found in many other developing countries, such as the port of Cochin in India (container terminals with foreign private partner) the port of Shanghai in China (50% private ownership of the container terminal, 50-year joint venture), the port of Saigon in Vietnam, the port of Szczecin in Poland, the Free Port of Malta, etc.

However, one of the most notable examples is Port Klang in Malaysia. The operational services of the container terminal were privatised in 1986. Tenders were invited from interested local parties, based on well specified terms of reference, and the container operations were awarded to Klang Container Terminal (KCT), the first port operating company in Malaysia, set up as a joint venture between the Klang Port Authority (49%) and Konnas Terminal Klang (51%). The latter was a joint venture between the state-owned container haulage firm Kontena Nasional (80%) and P&O Australia Ltd. (20%). The new company (KCT) bought the non-fixed assets such as cranes and equipment, while fixed assets, such as quays and buildings, were leased for a period of 21 years. A condition of KCT's privatization was that the company would eventually be listed on the stock exchange. As a result, KPA's share was reduced to 20%, that of KTK's to 40%, and the general public held the remaining 40%.

Interim port reform authority

The structural adjustment of ports is a complex process, with many interests involved and a significant impact on port management and workers. The fact that many ports are natural monopolies makes such adjustment even more complex. The existence of an *interim authority*, which controls and directs the structural adjustment process, can facilitate the smooth and effective implementation of this process. Several recent port privatization efforts have made use of such an arrangement. The "Steering Committee" in Thailand and the "Waterfront Industry Reform Authority" (WIRA) in Australia are two examples.

The interim port authority ought to comprise representatives of the relevant government departments, often supported by a team of experts. The latter is usually multi-disciplinary in nature and it includes representatives of the private sector. An interim authority has several tasks, the most important of which is the selection of an appropriate strategy for privatization. Thus, the evaluation of the suitability and/or desirability of the different privatization alternatives would be one of this authority's main challenges. Another important task is related to the establishment and control of a *tendering procedure*, discussed below. The interim authority can further assist with the negotiation process and the evaluation of the various offers.

Tendering procedures

Usually several private companies will be engaged in competitive bidding for the provision of port services. As there are many interests at stake, the selection of the most attractive bid is an exercise that requires powerful skills, transparency and objectiveness. Among others, the experience from the privatization process of the Songkhla and Phuket ports in Thailand pointed out that:[31]

- All potential bidders should be provided with the clear objectives of the contemplated port privatization, together with ample information on the basis of which they can determine their commercial interest. Requirements that bidders have to meet should be stated in as much detail as possible in order to ensure that only those qualifying are encouraged to tender, and
- A standard format should be adopted regarding the information that should be submitted by the bidder (company profile and structure, financial performance, capabilities, etc.).
- Tenders should include a detailed business plan on the envisaged operations, encompassing the inevitable market research and a comprehensive appraisal of business prospects. Surprisingly enough, given the amounts of investment required, this is not often the case. Investors may thus belatedly realise that if they are to make an acceptable return on their capital, they must also raise port charges: a generally unacceptable solution that contradicts the main argument favouring privatization, i.e. reduced transport costs through higher efficiency.

To ensure the objective appraisal of all competing bids, the evaluation should rely on several clearly defined, significant criteria. However, a completely objective judgement is extremely difficult, as the assignment of weights to the various evaluation criteria is always subjective. Since the case of one bidder clearly dominating all others at all points occurs rather seldom, an *a priori* consensus, and possibly quantification, on the weights to be attributed to the various evaluation criteria is a *sine qua non.* Agreement on this can substantially ease the onerous task of the evaluation team, it adds transparency and shortens the decision time.

Related to the above considerations is the issue of the *correct valuation* of the to-be-privatized port assets and services. If privatization is contemplated primarily on ideological grounds and without a reasonably defendable *national master plan*, governments may be tempted to undervalue port assets in an effort to make them more commercially attractive to the private sector. The United Kingdom has recently seen the publication of a *House of Commons Select Committee Report* criticising the way the first five trust ports were undervalued and undersold by the Government.

In the case of Medway, the port was sold through a MEBO. The 250 employees obtained a 51% share in the equity of the new port company, with the remaining 49% shared among five persons. The shares could be bought at a price of £1 per piece, during the privatization, but two years later the port was sold to a new owner for almost eight times the amount the government had originally received, making the share worth over £37 each.[32]

A similar rise in share prices has occurred in the case of Forth Ports. There, the privatized ports are in fact "estuarial monopolies". Next to owning the port's assets, the port companies have also assumed regulatory functions, including inland navigation, previously assigned to the port authority. It has been alleged that the port company has actually used these powers to effectively

stop a competitor from building new harbour facilities in the area of the former trust port.[33]

Concluding Considerations

It has already been noted that, nowadays, the increased internationalisation of all forms of economic activity, mass media, foreign experts and modern telecommunications intrigue developing countries to attempt comparisons with other nations, western ones included, many of them at a completely different stage of economic and social development, having institutional frameworks that were set up years ago. If superficially attempted, such comparisons can be extremely dangerous and misleading, particularly when successful economic reforms in other countries are taken *prima facie*, without a thorough understanding of all their implications and without adequate comprehension of the simple fact that, if proper *institutions* are not in place, the future of privatization, and to this effect the country's economic development by and large, cannot be taken for granted.

To give a simple example, the listing of a privatised port's shares in the country's stock exchange would be next to pointless, if the latter is not functioning properly, the volume of transactions and its liquidity are low, the dissemination of market information inadequate and if capital markets, in general, are inefficient. In situations such as these, the real value of the port will be far from being reflected in the nominal value of its shares and, thus, domestic and foreign investors' interest could not be expected to be significant.

To enhance the possibilities of survival in a competitive environment, the government can improve the institutional environment of the firm, thereby enhancing ports' ability to respond adequately and promptly to the changing market conditions. Several well documented divestiture experiences show that certain prerequisites regarding the firm's economic environment have to be met, if the full benefits from divestiture are to be realised. A hospitable and efficient business environment has, thus, to exist[34], distortions that hinder domestic and international competition eliminated and an efficient capital market with considerable absorptive capacity developed.[35] [36]

In addition, the retrenchment of the economic role of the State and the encouragement of greater private sector participation should constitute a careful long-term social cost-benefit analysis, undertaken by the government. The results of this analysis should form the government's basis for designing and implementing programmes of economic reform. Its strategy, once decided, should be firm, with clear and transparent objectives, and it should be widely explained through a process of extensive consultation, particularly with those parties that are adversely affected by the proposed reforms. The importance of consultation in structural adjustment could not be over-emphasised, not only in securing labour's co-operation, but also in convincing the latter that the attempted reforms aim at enhancing the country's general economic welfare, which should be every government's utmost objective. This strong message has to be successfully and timely conveyed to trade unions and employees.

As it has already been mentioned, the problem here is that the wider, long-term benefits of economic transformation are not immediately and directly visible by all those, whose short-term well-being is adversely affected by the reforms, and it is only with the co-operation and consent of the latter that the reform process can be concluded in a frictionless and socially acceptable way. Employees have to be firmly convinced that retrenchment and economic austerity measures

serve the nobler objectives of raising future incomes and standards of living as well of the eventual elimination of poverty.

The co-operation of trade unions should also be secured by convincingly arguing that, instead of their fruitless, short-run, pursuit of job-preservation in a rapidly changing technological environment, it would be to their members' best interest if they were to embrace more positive attitudes aiming at future job-creation. However, such arguments are bound to be more difficult to handle, particularly whenever it becomes evident that the new jobs are intended to be in the private sector, through enterprise-based labour agreements that tend to reduce union density and, thus, unions' influence in formulating labour policies.

Upon adopting a consistent, nation-wide, strategy on privatization -or its variants-, governments of developing countries should not fail to *internalise* all the social costs incurred as a result of their divestiture programmes. The economic and social costs of redundancies should, thus, figure rather prominently among them. Assuming that, through privatization, the government's objective is to raise the general economic welfare in the long-run, it would make sense to argue that workers who are made redundant due to the requirements of economic reform should be adequately compensated by those who are -or will be- benefiting from it. However difficult to achieve, in a 'win-win' situation, redundancy compensation should somehow be related to the discounted cash flow of redundant workers' future earnings, had they remained employed.

For example in the case of the Malaysian reforms, the government introduced a clause whereby employees opting to go to the privatised/corporatised port were guaranteed employment for a minimum of five years at terms and conditions "no less favourable". In France, a compensation programme was used by which redundant workers would either be retrained or receive financial compensation of about FFr 450,000 each. In New Zealand, a similar compensation system was put in place when the country's ports were corporatised in 1998-89. Such policy has also been used in the UK following the abolition of the National Dock Labour Scheme.

However, the experience of Malaysia may be specific or even exceptional because the country has been enjoying high economic and trade growth which has helped in avoiding layoffs or expensive retraining. Other countries without a favourable economic climate can hardly impose such mandatory conditions, because the existence of such redundancy costs would undoubtedly reduce the financial attractiveness of the to-be-privatised ports, it could dilute private sector interest and it might, thus, prolong the timely completion of the reform process.

The government has again a strong role to play in these deliberations: The various redundancy costs should not be contrasted only with the short-term financial prospects of the privatised port -which of course is the prime concern of the private investor- but with the long-term economic benefits of divestiture for the Economy as a whole. If this is the prevailing principle, the government should bear itself the costs of redundancies and it should finance them centrally. This approach would then constitute a form of income re-distribution towards those who had to lose their jobs, so that others could maintain theirs presently and in the future.

Another method, suitable for countries that are particularly concerned with issues of income distribution and accumulation of wealth, is the financing of redundancy costs by those who directly benefit from the economic reform. Employers of privatised companies are here called upon to assume a significant part of the redundancy costs themselves and these costs should be a

clear and quantifiable element in their investment appraisal exercises regarding the evaluation of the financial attractiveness of the to-be-privatised port. Given the long-term macroeconomic benefits of privatization, the government can -and normally should- share a part of these costs. Finding an optimum allocation of redundancy costs between the private and the public sector should, thus, be one of the main issues in the design of a port reform programme.

The above method makes a lot of economic sense, particularly in the port privatization attempts of developing countries. It can be very defensibly argued that although the economic and social costs of port reform are borne by the country itself, the benefits from the increased port productivity and lower charges -as a result of privatization- can very well accrue to the foreign shipping operators servicing the country's external trade. In this way, and in the absence of adequate competition in international shipping (or perhaps in the absence of a protected national shipping industry, however condemnable this might be), reduced port charges are not necessarily reflected in lower transport costs, but perhaps in increased profits for the foreign transport operators. If that would be the case, it would be reasonable to argue that the latter operators should bear themselves the costs involved in increasing port productivity.

Again, in the absence of adequate competition in international shipping, levying shipping operators in order to recover redundancy costs may result in higher transport costs that could be easily passed-on to the final consumer. This would be particularly true if domestic commodity and product markets are either not developed, monopolistic or, in general, uncompetitive. However, given that redundancy costs are once-off or time-limited expenditures, the redistributional effects of such a situation would also be limited, and thus innocuous, as long as cargo levies are not becoming a permanent element in the port's cost structure.

Furthermore, the ability to levy foreign operators depends on the port's competitive position, nationally and internationally. If additional levies -for redundancy payments or for any other purpose- are not accompanied by commensurate reductions in port charges as a result of the increased port productivity, and provided that adequate port competition prevails, the additional costs to the shipowner may influence his decisions on port selection. In this case too, however, the short-lived character of redundancy payments is not very likely to have a marked effect on such decisions.

Finally, the 'user pays' principle should also be very welcome to the foreign ship-operators servicing developing countries' external trade, given the latter's interest in the existence of efficient ports in their trading areas. This interest can be immediately understood: the benefits accruing to ship-operators from their investments in large ships and integrated transport systems can be easily withered by inefficient port operations at their ports of call.

Another important consideration regarding the effectiveness of increased port productivity, and the distribution of benefits from it, concerns the port's role within the overall transport chain. The efficiency of a port and the desirability of government divestiture and other port reform plans cannot be judged in isolation but only within the economic framework the port operates. More and more ports in a large number of countries are losing their traditional function as merely interface points between land and sea and are assuming the much wider function of a crucial link in the production-transport-distribution chain. In this way, inefficiencies in the other parts of the chain can easily nullify all benefits derived from improved port efficiency.

For example, many otherwise efficient ports have been known to be faced with extremely bureaucratic and time-consuming customs regulations resulting in unacceptably high dwelling times. In others, where handling rates of 20 TEUs per crane-hour are boasted, it may take three hours from the gate to the motorway (1 km) due to excessive road congestion and to the fact that trucks have to transverse the city centre. In a number of ferry ports, passenger/drivers have been known to be queuing for as much as 12 hours, under extreme weather conditions, in the middle of the city, without access to even elementary sanitary facilities, only because an advance-booking system is not considered by the shipping agents -operating in a cartel- as a good idea.

Bottlenecks and inefficiencies such as these in the port's operating environment can easily choke-off and annihilate any potential benefits from introducing commercial principles and practices in cargo-handling and/or other direct port services. If these issues are not seriously taken into consideration, port unions would be quite justified in arguing that, in cases like the above, their members would have to bear the consequences of divestiture, while the benefits are used to cross-subsidise other inefficient economic activities (such as the provision of inadequate road and rail capacity) where no reform is being planned in the near future.

The above notes are by no means meant be taken as making the case against the introduction of commercial principles in port operations. The only point that is made here is that the successful implementation of port reform plans -if they aim at ensuring general support in democratic societies- must fit within a general strategy of economic reform, where all its implications and consequences are thoroughly debated through honest and sincere dialogue. Piece-meal, *ad hoc,* or unsubstantiated attempts to privatization are not likely to gain the support of unions and of the general public.

The economic reforms in Malaysia can serve as a very good example of a correct way to privatization. In 1985, the beginning of the reforms, the government's Economic Planning Unit issued the 'Guidelines on Privatization' for the purpose of *...elaborating and clarifying the government's policy on privatization to both the public and the private sectors ... and also to enlighten the employee and the general public on this subject...*

The 'guidelines' were subsequently thoroughly debated at all levels, with the active participation of the country's prime minister, and most people were convinced that privatization and economic efficiency are the only road to the '2020 vision', meaning the transformation of Malaysia into a fully developed economy by the year 2020. However, in order to put things in their proper perspective, it should be mentioned that due to the country's fast economic growth, privatization did not cost jobs and those employees that had decided to leave under an early retirement scheme were more than adequately compensated. Further, the country proclaims a rising puritanical and meritocratic new middle class with an appetite for political freedoms, and it is ruled by a strong coalition government which, over its long period in office, has attracted most of the opposition into its orbit.

An important final point that could be made regarding the distribution of benefits from port divestiture programmes concerns the very distinct possibility of creating private monopolies in the place of the former public ones. The effects of government divestiture without adequate competition are rather doubtful and private monopolies -apart from reducing general economic welfare- may be socially undesirable too. Their existence does not necessarily reduce bureaucracy, as new regulatory bodies will have to be created, to supervise their operations, so

that they do not enjoy monopolistic profits to the detriment of the final consumer. In this respect and in cases of port privatization, one of the advisable policies might be the licensing of a number of private stevedoring companies, operating the same port facilities under competitive terms. According to Kikeri (1992), 'successful privatisation of natural monopolies requires a regulatory framework that separates out potentially competitive activities, establishes the tariff regime, clarifies service goals, develops cost-minimisation targets and creates or strengthens an agency to supervise the process. This regulatory framework ensures that divestiture leads to increased efficiency without harming consumer interests'.[37]

Endnotes

[1] A slightly different version appeared as a chapter in: H. Meersman and E. v.d. Voorde (eds.) *Transforming the Port and Transportation Business*. Acco, Leuven (Belgium). The paper is based considerably on work the authors have undertaken for the United Nations (Professor Haralambides for ILO and Professor Ma for UNCTAD). All views and opinions expressed here are of the authors only and in no way commit the United Nations or any of its Agencies.

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[8] Couper (1986).

[9] Beplat (1989).

[10] Slack *et al*. (1994, p. 185).

[11] ILO (unpublished).

[12] see R.O. Goss (1993).

[13] Shirley *et al*. (1991, p. 1).

[14] Adam *et al*. (1992, pp. 17-18).

[15] Although “exclusion” is in many cases technically feasible, it can be proven that it gives rise to suboptimal economic solutions.

[16] see for example Shoup (1969).

[17] see Musgrave (1969).

[18] such as Hutchinson International Port Holdings (HPH); P&O Ports; International Container Terminal Services Inc. (ICTSI); and Stevedoring Services of America (SSA).

[19] Rimmer (1984, p. 120-129).

[20] Ports and Harbours Bureau of Japan, Ministry of Transport (1993, p. 13).

[21] Shirley *et al*. (1991, pp. 7-15).

[22] Couper (1986, p. 53).

[23] Couper (1986, p. 2).

[24] The White Paper 'Employment in the ports: the Dock Labour Scheme' gives a clear example of this.

[25] Kotwal (1992).

[26] Harding (1990, p. 14). The Watersiders' strike in New Zealand lasted only for two weeks, with very little general public support.

[27] As a measure of comparison, before the Australian Waterfront Reforms came into force, the average age of the workforce was over 50 years.

[28] World Bank (1994), p. 9.

[29] World Bank (1994), pp. 40-43.

[30] Port Development International (December/January 1993), pp. 33-53.

[31] Port Development International (November 1988), pp. 16-21.

[32] Baird, (1994).

[33] ibid.

[34] OECD-DAC (1993, p. 39).

[35] Persaud, in: Adam *et al*. (1992) .

[36] Also in: Kikeri *et al*. (1992, pp. 41-42).

[37] Kikeri, *et al*. (1992, p. 6).

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Ports and Regional Development in Europe: a Historical Perspective[1]

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After WW II, the importance of, and reliance on, oil led to the construction of huge tankers that minimised unit transport costs and allowed a shift of refining/petrochemical industry from the politically sensitive regions of exporting countries to Europe. Advances in shipbuilding technology have had a similar effect on the iron ore and steel industries, through the construction of large bulk carriers.

Heavy industry such as this attracted other heavy industry in port areas and the result has been high concentration of industrial activity and employment. This was facilitated by the growing economies of Europe of the pre-1970 recession that allowed production with considerable economies of scale. To a certain extent, concentration of industrial activity in the port vicinity was also necessitated by the lack of adequate inland infrastructure that was also being developed in parallel.

However, port development did not take place evenly across Europe: By 1965, the reconstruction of many coastal works in France, following the destruction during the war, had not been completed, whereas it was put right in Rotterdam by 1955. Antwerp had experienced little damage. In addition, western Europe's natural system of waterways and superior hinterland links also favoured Benelux ports. The lack of investment and modernisation in south European ports; trade liberalisation and the consolidation of North European ports' market position made things even more difficult for the South, necessitating government involvement for levelling the playing field. It was considered that the more powerful a foreign competitor becomes, the more able he is to invest and thus divert traffic away from national ports. It should also be remembered that the battle for containerised cargo in the 1960s was fought at the north-western ports for geographical reasons (north Atlantic) and also because these ports were already prepared, possessing a favourable inland transport network that gave them the possibility to further consolidate their market position.

During this period, general cargo traffic was less containerisable, regional port competition was less of an issue, and ports were comprising a lot of labour intensive activities, generating considerable value-added and a multitude of direct and indirect impacts on the national economy including, of course, the facilitation of international trade. They were thus seen by governments as growth-poles of regional and national development and, as a matter of fact, they were often used as instruments of regional planning. Many member States have done so by steering state investment, through regional policies, towards ports, in order to encourage national development. A

[1]This paper was never meant to be made widely available. It rather consists of a 'collection of thoughts', some of them 'borrowed' from EC documents and other sources without proper referencing. It was prepared, at an early stage, as supportive documentation to the European Commission's *Green Paper on Ports and Maritime Infrastructure*. However, many of the ideas I have developed here have since become the mainstay of European Port Policy and have found their way in every subsequent Commission publication. I have thus decided to make the paper available, mainly for the benefit of my students.

classic example of such a policy was the Mezzogiorno in Italy, considered by many as a model of spatial reorganisation of economic development. In the United Kingdom, this task was the responsibility of the National Ports Council, established in 1964 and abolished in 1981. It is perhaps worth mentioning at this point that, for instance in Japan, apart from the direct financial returns of port operations, port development is appraised on the basis of its contribution to the social and economic development of the region and the nation. Port development plans are, thus, adjusted to and included in the country's regional development plans, while ports are managed and administered by public sector bodies.

Thus, in Europe and in many other parts in the world, ports have become -and still are- instruments of national development. In that role, they generate numerous benefits, for the country as a whole, that do not necessarily produce visible financial rewards for the ports concerned. However, as government policies usually go beyond considerations of short-term financial profitability and towards the maximisation of long-term *economic benefit* and general welfare, state intervention is often justified on the grounds of the "not solely commercial" objectives of ports.

To make the best use of ports in this role still remains the basis of a policy of regional development in many member States, particularly in southern Europe. Port capacity and its spatial characteristics are determined by national priorities aiming at the spatial reorganisation of the entire national economy. Investments in port infrastructure, such as new terminals, docks, deep-water quays, major locks, etc. is thus centrally funded, considered to be serving the collective benefit of the nation. It is clear that individual port administrations benefit from the growing traffic which results from regional policies and, in this respect, they have to take part in the establishment of major works. However, it is often thought that it is in the national interest to have State initiatives in decision-making, as the individual port authority cannot appreciate the full extent of regional impacts or the diversity of the interests involved.

Such public investment is not necessarily in conflict with the provisions of the Treaty: For example, Article 93 considers such intervention permissible when:

- it encourages the development of areas with a low standard of living and high unemployment;
- it facilitates recovery after periods of economic depression;
- it promotes the development of certain key economic activities.

The Impact of Technology: Containerisation

The advent of containerisation in the 1960s started to change the situation quite dramatically, especially in northern Europe. The capital-intensive nature of liner shipping and the need for maximum capacity utilisation in order to achieve adequate rates of return on investment, increased pressures on ports for further improvements in labour productivity and operational efficiency. In its efforts to adjust to the new demand requirements, the port industry itself became also a capital-intensive one, requiring massive investments in port infrastructure and sophisticated cargo handling equipment. In this way, containerisation and the induced cargo-handling techniques have had an

equally profound impact on port employment. As with all other capital-intensive innovations, containerisation substituted capital for labour and, thus, resulted in substantial reductions in port employment, simultaneously accompanied by enormous increases in labour productivity.

In addition, through the use of modern and expensive cargo-handling equipment, containers transit the port domain in a matter of hours while, at the same time, sophisticated and highly efficient transport networks, space limitations and sometimes labour rigidities, have taken a considerable part of what was previously considered as "port work" outside the port domain. This development has particularly to do with the staffing and stripping of containers that can now be performed at the consignor's/consignee's premises by own staff or at Inland Container Depots (ICDs) where ample and cheaper space if available, often conveniently located close to main road junctions.

Even more importantly nowadays, globalisation and the international division of labour; environmental pressures and similar concerns, drive away heavy industry from European ports towards developing countries. Light industry is instead taking their place together with the new role of ports as transhipment points serving hinterlands that extend far beyond national boundaries. These activities and functions, however, are increasingly commercial in nature; they benefit an increasingly narrower group of port users, and thus they cannot easily justify central funding. Thus, many north-European ports have lost a considerable part of their role as "growth poles", deserving regional development considerations, especially in regions (countries) that have reached an advanced stage of regional development, and are increasingly viewed as commercial entities that have to fund their investments and price their services accordingly. This is especially the view of the UK where, after their privatisation, ports are treated indiscriminately as any other business enterprise.

Reduced profits, as a result of intensified port competition, and labour-saving cargo-handling techniques have led to a considerable loss in direct value-added from port activities, mainly in northern Europe. This has intensified -sometimes rather unsuccessfully- those ports' efforts to attract new value-added activities, such as assembling, labelling, etc., in the port domain. Often, these efforts carry strategic rather than tactical profitability considerations: In other words, profits from such value-added activities are not so important as the need to convince governments that ports still remain growth-poles and thus deserve a share of taxpayers money that, *inter alia*, would give them a comparative advantage over other regional ports who see themselves as commercially viable enterprises.

In the meantime, however, new logistical concepts have evolved as a result of globalisation of production and the demands this has posed for efficient transport systems. Globalisation and trade liberalisation, helped by the remarkable developments in transport, logistics and communication technologies, have drastically weakened the link between manufacturing and the location of factors of production and have stimulated a most noticeable shift in manufacturing activities towards countries with a comparative advantage.

Developments in international transport have been instrumental in shaping these processes. Containerisation and multimodal integrated transport have revolutionised trading arrangements of value-added goods and have given traders and global managers more control and choice over their "production-transport-distribution" chain. Furthermore, transport efficiency is necessitated by the very same nature of value-added goods whose increasing sophistication requires fast transit times from origin to destination in order to increase traders' turnover and minimise high inventory costs. Today, these costs are brought down significantly by the use of logistical concepts and methods and also by the increased reliability and accuracy of international transport that allow manufacturing industries to adopt flexible *Just-in-Time* and *Make-to-Order* production technologies. *Inter alia*, these technologies enable companies to cope with the vagaries and unpredictability of the seasonal, business and trade cycles and plan business development in a more cost effective way.

The North-South Traffic Imbalance Question

The high degree of efficiency and productivity of north-European ports, coupled with the existence of sophisticated inland transport networks, has allowed them to capture in full the benefits of the new logistical developments described above. Thus, approximately 50% of Europe's external trade (i.e. 1.2 billion tons) is channelled through what has come to be known as the Hamburg-Le Havre port range. To a considerable extent, Mediterranean ports are by-passed in the Europe-Far East trades, with goods destined for the South being transhipped in the North and then carried over land.

As a consequence, the heavy demand on road use, compounded by the under-priced, fixed-cost-based, supply of road infrastructure, and the increasing unwillingness of many governments to invest in new road capacity (0.8% of Community GDP in 1995, compared to 1.5% twenty years ago) create a number of significant problems, particularly with regard to congestion, safety and environment. Some often quoted illustrative figures could further highlight this point. Thus:

- The death toll in road transport amounts to 55,000 people per year (1.5 million injured);
- Every day, 4,000 km of Community motorway are totally congested;
- Yearly congestion costs amount to 120 billion ECU, or 2% of Community GDP;
- The external costs of accidents, air[2] and noise pollution have escalated to 130 billion ECU/year;
- In total, transport externalities represent roughly 4% of Community GDP.

Externalities such as these, however, are rarely internalised in the pricing of road infrastructure, the more so when the latter has lost most of its "public interest" character and is increasingly becoming a private consumption good. A different road pricing policy, as suggested in the Commission's Green Paper "*Towards a Fair and Efficient Pricing in Transport*" is expected to make competition among ports and transport systems fairer and more efficient, leading to a more balanced distribution of traffic across Europe. Correctly, however, the Green Paper takes a differentiated

[2]Excluding global warming.

approach to road-pricing with respect to peripheral regions, as road haulage there is the predominant mode of transport and pricing policies aimed at shifting cargo from roads may have adverse effects on development prospects.

Current trends may, however, change this picture in favour of smaller ships targeting more immediate hinterlands through an increased number of direct calls, particularly in the Baltic and Mediterranean regions. A number of market signals indicate to this direction, at least in the long-run:

1. Up to now, developments in ports (hub-and-spoke) have been dictated by developments in shipping rather than the other way around. Developments in liner shipping in particular have been necessitated by the drive to cut unit costs through increases in the size of ships. The capital-intensity of modern containerships, however, requires very fast turnaround times and thus appropriate investments in ports. At the same time, shippers require a certain frequency of service that befits their *just-in-time* and *flexible-production* technologies. The combination of "large ship size" and "adequate frequency of service" can easily lead to low load factors and under-utilisation of capacity, for operators intending to "go it alone" without a secure cargo basis. Under today's circumstances, and with few notable exceptions (Evergreen), such an operation would be unprofitable, meaning that liner shipping starts to realise diseconomies of scale. Until recently, containership sizes were able to increase and operators able to go-it-alone due to the antitrust protection afforded to liner conferences. With the imminent demise of the latter, however, alternative solutions had to be found, mainly in the face of consortia, aimed at rationalisation of service by combining tonnage, routes and equipment. Of course, both conferences and consortia are, so far, exempted from competition law provisions albeit amidst heated debate and criticism. If liner shipping is thus liberalised further in the future, ship sizes are bound to decrease together with an increase in the number of ports of call. Low prices would then be achieved through higher competition rather than big ship sizes.

   If deregulation and competition in liner shipping intensifies, shipping companies will be forced to provide the services their customers want, rather than the ones they find it convenient to offer. This argumentation is vindicated by the strategic importance that, for example, North Sea ports attribute to short-sea-shipping (i.e. main-porting/feedering), logistics/distribution and EDI. The importance now will be on *global logistics* instead.

   Reduction in ship size and more direct calls could follow the example of the air-transport industry. The most common jet flying across the Atlantic is not the 420-seat 747 jumbo but the 200 plus-seat Boeing 767. Eight out of 10 transatlantic planes are twin-engined craft such as the 767, its bigger brother the 777, or the various airbuses. This taste for smaller international jets reflects the fact that travellers now like to shun big international hubs such as London and New York and fly directly to their destinations. This is changing the international market into a web of direct intercontinental flights rather than one big air-bridge between London and New York.

2. The present hub-and-spoke or mainporting system is likely to be under attack for an additional reason: all over the world, ports are being spectacularly developed in tandem with their countries' general economic growth, development and trade requirements. The Hirshman-Myrdall effect is little taken into account, as countries are not convinced that they should not develop their ports just because they can be equally well feedered by neighbouring hubs.

   Given the existence of the significant economies of scale involved in port development, once the need for port development is realised it is usually also understood that the development of container-handling facilities in excess of national requirements might have the positive spin-off effects of an *unbalanced growth* approach to development. According to this, basic infrastructural facilities (such as ports) are built up far ahead of existing demand, on the part of the industry, agriculture and commerce, in the hope that the latter activities will expand by the wake of the former (a.o. see for example north American railways, particularly those of Canada). Thus, global port development along these lines, combined with further deregulation in liner shipping, is bound to make "diversion-smaller ships" a much more attractive alternative than "mainporting/feedering".

3. The trend towards smaller ships and direct calls/diversion will also be facilitated by the growth of intra-regional trade in Asia: It is estimated that by the year 2005, 50% of international trade will be taking place within Asia. The consequent development of Asian ports and fleets to serve this trade -with ships of smaller sizes obviously- and the increased profitability of these trades, will perhaps make it more economical for Asian operators to deploy an increasing number of this type of ships to Europe-Far East instead of building dedicated large containerships to serve Europe, as is currently the case under the hub-end-spoke system.

4. Another factor challenging the present mainporting system is a different future road pricing policy in Europe. A full cost recovery pricing policy (including the external costs of road transport[3]) based on variable costs (the user pays principle) is expected to make competition among ports and transport systems fairer and more efficient. It will also make long-haul road transport considerably more expensive thus boosting not only alternative modes (e.g. short-sea-shipping and IWT) but also southern European ports that could equally well target Asian cargoes destined for the hinterlands of France, southern Germany, Switzerland, Austria, the countries facing the Black Sea and a considerable part of Central and Eastern Europe. The competitive position of South-European ports and short-sea-shipping in this region can further improve along with progress in the integration of non-member Mediterranean countries and the eventual formation of a Customs Union and a Free Trade Area with them. However, the process of modernisation and management re-engineering of South-European ports will require substantial regional development funds.

   The development of TENs coupled with a different road pricing policy will also have an effect on the *price equalisation* policies of most maritime conferences; policies that, however well justified under the present circumstances, affect both port competition and encourage long-haul road transport. Liner shipping

[3] already emphasised in the Commission's green paper "Towards a Fair and Efficient Pricing in Transport".

companies incur substantial fixed costs due to their need to provide regular and frequent services to their customers. As a result, they require increased port reliability and quick turnaround times, sometimes achieved through the use of their own dedicated terminals. Furthermore, the inherent overcapacity in liner shipping, again as a result of the need for regular and frequent services, oblige liner companies to try and extend their catchment areas far beyond the immediate hinterland of their port(s) of call. This need explains their price equalisation policy according to which short-haul cargoes cross-subsidise long-haul ones. Long-haul cargo may, thus, pay less than its full direct costs of transportation, the difference accounted for by either the relatively higher price of short distance haul, and/or lower sea-leg tariffs that, incidentally, are immune to antitrust legislation. Arrangements such as these encourage haulage over long distances and, from a Common Transport Policy (CTP) point of view, cannot be unquestionably acceptable, especially when shorter distances/other modes are available/under-utilised.

Having said that, however, this policy of liner shipping companies is not necessarily the result of the particular market structure of liner shipping. Even with higher competition prevailing, a liner company/conference would still have the incentive to cross-subsidise long-hauls as long as the marginal costs incurred are less than the costs of having to sail with less than optimal load factors. The latter costs have of course to do with the economies of scale of large vessels that are, however, only realised if high capacity utilisation is achieved.

Ports in Trans-European Transport Networks: the Crucial Link

The Treaty on the European Union requires the EU to promote the interconnection and interoperability of national networks and access to them, taking into account the need to link island, landlocked and peripheral regions of the Union with its more central areas. The aim is to enable citizens of the Union, economic operators and regional and local communities to derive full benefit from the internal market.

Article 130 in particular refers to the role of the networks in promoting harmonious development and in strengthening economic and social cohesion. For that purpose, it provides for the establishment of a Cohesion Fund to support projects in member States which qualify. The Treaty also permits cooperation with neighbouring countries in order to promote projects of mutual interest and to ensure the interoperability of networks at a pan-European level. One of the aims of this provision is the connection of TENs with networks outside the Union, in particular with Central and Eastern Europe and the Mediterranean area.

In this context, ports provide access to the land elements of the transport network from the rest of the world and services and facilities which enable maritime transport to connect different parts of the land networks, to join them to comparable networks in third countries and to reach islands and peripheral regions.

The substantial commitment, resources and emphasis the Union attributes to the development of trans-European transport networks, aiming at closer economic and

social integration, creation of employment, growth, and sustainable mobility, charges ports with a crucial role and responsibility. The development of the Union's multimodal network would be incomplete without including the interconnection points which connect the different transport modes and lines. This consideration comes to complement the fact that 90% of the Union's external trade is carried by sea. Thus, Europe's export competitiveness in a global economy increasingly depends on an efficient and cost effective port sector.

Optimisation of TENs is likely to reduce transport costs and the perception of "distance", at least in the long-run, and thus lead to important locational decisions causing production to relocate to peripheral regions. This is why "transport" plays such an important role in the Union's cohesion philosophy. Ports in these regions have to be adequately prepared to take on the challenge. Otherwise, the economic and social benefits of greater cohesion can be easily withered by peripheral ports that are generally characterised by lower levels of efficiency, mainly as a result of under-investment.

In the same way, if short sea shipping is going to offer an attractive alternative to shippers, and thus relieve Europe's congested motorways, it will also require efficient and cost effective ports optimally integrated in multimodal transport networks. The importance of short sea shipping and southern European ports is also attracting increasing attention in view of the rapid economic development of non-member Mediterranean countries, their increasing economic links with the Union and the eventual creation of a Mediterranean Free Trade Area.

The basic aim of integrating ports in TENs is to promote physical and management improvements so that transfers between maritime and land transport are seamless and efficient, and efficient intermodal transport chains are established which facilitate trade, promote short-sea-shipping and strengthen economic and social cohesion. In brief, the objectives of including ports in the TENs strategy can be summarised as:

- ◊ Encourage growth of inter/intra EU trade and more specifically trade with the Community's nearest neighbours (EFTA, Central and Eastern Europe, Mediterranean and North Africa);
- ◊ Overcome congestion of the main land-corridors and minimise the external costs of European transport by contributing to the development of combined transport;
- ◊ Improve the accessibility of peripheral regions and strengthen the economic and social cohesion within the Community by enhancing the Community's internal maritime links, paying particular attention to island and peripheral regions.

Among others, the Treaty requires the establishment of guidelines which cover objectives and broad lines of measures and which identify "projects of common interest". The EU may support such projects from the TEN budget line or from the Cohesion Fund. Support to port and related infrastructure projects aiming at diverting traffic from "road" to "sea", and thus reduce bottlenecks and missing links, can be considered as serving the "common (European) interest". In the same light, support to projects enhancing the "functionality" and optimisation of TENs can also be seen as such.

Since the TEN guidelines do not identify "ports of common interest", port and port related projects of common interest can be located in any port of a member State, as long as the project meets the criteria set down in the Guidelines. However, as these criteria include the 'facilitation of community trade' and 'short-sea-shipping', care should be taken not to promote projects of a purely commercial nature that, although indeed may incrementally facilitate trade, their 'societal' gains are small, compared to the required funding, and, at any rate, much smaller than the societal *European* gains achieved by promoting projects that connect peripheral regions; achieve cohesion; and allow access to the internal market of regions that happen to be geographically and historically disadvantaged.

European ports should be considered as a "closed system" and as infrastructural and functional elements of a wider European logistical system. Considering European ports as a whole and as the international interface of the European logistical network is consistent with the approach taken by the Commission in its *white book* on the Future Development of the Common Transport Policy. In fact, while taking note of existing inefficiencies and discordances, the *white book* provides for a global approach to the problem. It aims at a more balanced modal development of transport, allowing users a greater freedom of choice; at a more balanced distribution among regions of benefits resulting from infrastructural development; at improving the efficiency of companies operating in this sector; at increased safety and attention to the problems of environmental protection. All this, while taking social problems related to the sector's employment levels into account.

Port Competition, Funding of Infrastructure and the Pricing of Port Services

The administration and financing of ports in Europe -as of course in other parts of the world- principally falls under two philosophies: that which sees ports indiscriminately as business undertakings that ought to recover their costs from port users that benefit directly; and the philosophy that sees ports as trade facilitators and growth-poles to regional and national development; as integral parts in national industrial and regional planning; and thus as economic activities offering a "public good" that ought to be paid for by the general taxpayer. The arguments for and against each philosophy abound, often giving ground to heated debate if not friction, while the overall picture is far from being conclusive.

Notwithstanding this, however, the completion of the internal market and the existence and further development of superior inland transport networks across Europe intensifies competition among ports significantly, particularly competition aimed at attracting unitised transhipment cargo. Disappearing national hinterlands mean that the pricing, port development and financing decisions of a particular port may have marked effects on its neighbours, nationally or internationally. This raises the relevance and desirability of a more coordinated approach to port development at pan-European level aimed, among others, at highlighting the crucial role of ports in the optimisation of trans-European transport networks. Such an approach should take into account the significant role of ports as *nuclei* of regional development in the less developed regions of the Union; the strong commitment of the latter to greater economic and social cohesion; and the importance of adequate Public Service

Obligations (PSO) provisions. Indeed, PSOs are essential in order to help reconcile the highly desirable, but often long-term, effects of liberalisation and competition with the inevitably uncertain and, therefore, risky nature of investment in ports. Cohesion-oriented policies, which have a long-term time-horizon, require continuity and the supply of regular services over an extended period of time, something that cannot be always guaranteed in low volume and highly seasonal markets. Public provision in the poorer, less developed, regions can therefore help balance the desirable effects of liberalisation on efficiency with the need for adequate services to be provided to all areas at an affordable price.

In addition, and especially in the case of the containerised transhipment traffic of northern Europe, intensified inter-port competition, combined with automated labour-saving cargo handling systems, reduces the value-added of port activities, while the whatever benefits of port investments and their impacts can be easily dissipated from the country in question to the final consignor/consignee. This issue causes considerable concern to governments contemplating the continuation of public funding of port projects, as it deprives them of the basic *rationale* of doing so, namely, that the port provides a public service to the benefit of the whole nation. From a European port policy perspective, the uncontrolled (public) funding of port investment projects, for the often overestimated regional development or economic impact effects, can create excess capacity whose substantial sunk costs may encourage the proliferation of over-investment, hindering the development plans of other ports where regional development considerations may be of real significance.

Among the many functions of a port, is indeed the provision and maintenance of the port’s basic infrastructure, such as breakwaters, approach channels, turning basins, rail/road facilities within the port, navigational aids, towage and pilotage. Apart from the general public's interest in the safety of ports, many of the port services can clearly be considered as falling within the domain of "public goods" in the sense that no particular user can be excluded from their use if he/she is not agreeable to share in the cost of their production; a situation often referred to as *the free rider problem*. Furthermore, services such as those provided by, say, breakwaters and navigational aids can be considered as *collective consumption goods* in which case, and up to a point, the total cost of production does not vary in relation to the number of users. Finally, a number of port services can be considered as *non-rival in consumption*, given that user A's demand does not reduce (compete) that of user B. It is thus argued that those port services that qualify as "public goods" ought to be provided by some public authority, although *provision* should not be confused with *production*; the latter could be entrusted either to the public or private sector depending on considerations of economic efficiency.

However, ports, being used mostly for commercial ends, are entirely different in nature from the other public goods to which they have been likened. They are characterised by such peculiarities as the scant diversification of users they serve; the typically private organisational modes they adopt; and objectives greatly differing from the general ends pursued by the so-called pure public goods such as defence; education; justice; environmental protection, etc. For example, port users can be excluded from the use of the port if they do not agree to pay for the services of, say, lighthouses; the cost of dredging varies in relation to the number and size of ships; and the “non-rivalry in consumption” argument cannot stand true in congested ports.

Furthermore, the notion that the port is a public asset which should be used in the national interest has no useful meaning in practice without a criterion for determining how and when that interest is being served. Especially in today's economically integrated Europe, this "public interest" has to be redefined and measured. To take an extreme example for the sake of argument, if port X, situated in a densely populated and highly developed area, were to be scrapped and the port area redeveloped to its alternative uses, while the whole traffic were to be served by other European ports Y and Z, this might indeed lead to an increase in overall economic welfare in the country of port X. Or, to put it differently, with the availability of inland transport infrastructure in western Europe, if a certain country is prepared to use taxpayer money to subsidise its ports, why shouldn't a neighbouring country take advantage of this instead of subsidising its own ports to the benefit of others? Wouldn't it be better to spend the money instead on efficient inland transport systems which, on the other hand, could well be considered as public goods?

An additional important trend nowadays has to do with the fact that the port industry has moved from one in which predominantly public capital was used to provide common user facilities, to one in which capital is being used to provide terminals which are designed to serve the logistics requirements of more narrowly defined groups of users. Indeed, they may be designed to serve the needs of a few firms or even one firm. In such a way, the "common interest" argument loses weight, leading to a more commercial attitude towards pricing and infrastructure funding.

Many times, public works in the port industry are classed as "public" only because they are in practice publicly financed. The management of infrastructure -which is a component of a "public good" as defined by welfare economics- is consequently one of the activities carried out by public agencies called upon to warrant indiscriminate supply on the market, check monopolistic behaviour within ports and provide adequate allocation of funds to schemes aiming at improving and modernising the existing infrastructure network. Often, however, strong arguments are voiced regarding conspicuous public resources allocated to support "trade", while the ensuing benefits accrue predominantly to narrow groups of transport operators, occasionally to the manufacturers of the traded commodities, and to the public agencies engaged in the management of port operations. Furthermore, "benefits" often accrue to operators in countries other than the nation in which the relevant port is located and this often results in a substantial decrease in resources available to the various domestic communities involved. Thus, the alleged "social" and "employment" issues often put forward to justify public intervention in ports are being increasingly questioned.

Port Subsidies and Infrastructure Pricing

It is often argued that the EU funding of port projects distorts competition. In principle, however, EU funds should be aimed at correcting existing distortions to competition. For example, a Member State opposes any industrial policy approach which would allocate roles to specific ports in the EU. This is indeed right. However, the EU has to see to it so that port development and traffic are more equitably

balanced, reflecting the increasing traffic and general economic development of European regions, and that the present "main-porting" situation (largely created through public investment) does not continue to proliferate road congestion. The Same member State also maintains that public investment in "general infrastructure", i.e. dredging, breakwaters, VTS, road/rail/canal connections, should reflect commercial decisions and there should be no place for "central planning" of any type. However, this preposition is contradictory by nature: if public investment should reflect commercial decisions, why does it have to be public in the first place? And if it does, why couldn't investment costs be recovered, also under commercial terms, from direct users? Furthermore, how can port investment reflect only commercial decisions when the rest of the transport infrastructure in which ports belong is publicly funded and/or subsidised, giving the ports in question a definitive comparative advantage *vis a vis* their foreign competitors?

Assistance to ports cannot be ascertained if generalised transport infrastructure costs and related pricing are not taken into account. For example, the fixed-cost pricing of a country's road usage; the subsidisation of its railways, shuttle services or maritime access can easily favour national ports in their efforts to attract foreign transhipment traffic. Thus, although ports, from their own narrow commercial perspective, may claim that they operate under competitive conditions -and even demand that others do so too- and no need for a policy at any level is necessary, from a pan-European perspective the picture can be quite different. Indeed, even if port operations are conducted under purely commercial terms, the provision of subsidised inputs necessary to the production of the port service (such as road and rail capacity and maritime access) does not have any different overall effect from that of a direct operational subsidy.

Port capacity could indeed by determined on the basis of commercial criteria, but then transparency in port accounts should prevail; the financial flows between the port and the government should be clear; and the costs of general infrastructure investments be reflected in port tariffs, regardless who is funding these investments. To take a simple but also crucial example, presently port competition is distorted as a result of inappropriate road transport pricing policies favouring long-hauls and not internalising the external (social) costs of transport. A different pricing policy for road transport, as suggested by the Commission in its Green Paper on road pricing, could improve the alleged north-south imbalance and give a substantial stimulus to southern European ports that could also serve the central European hinterland.

Many would argue that, presently, subsidies are given to many European ports not because they are considered necessary or because of "public good" arguments, but because other neighbouring countries do so (under different circumstances, ports should normally detest government subsidies as these are concurrent with government interference to port decisions that is not always welcomed). Common European guidelines on subsidies would thus make a lot of sense, if not absolutely necessary.

Port subsidies can be indirect and thus not easily detectable. In its effort to attract industrial activity to the port or to increase the competitive position of the port with regard to its various port charges, the port administration can afford land to companies, operators, stevedores, etc. at very concessionary terms not reflecting the

opportunity cost of land, particularly in densely populated areas. Existing government land thus priced loses its second-best alternative use and rent, whereas reclaimed new land often provided through taxpayers' money cross-subsidises many times foreign beneficiaries (e.g. refineries, car manufacturers, etc.) who leave comparatively limited value-added to the regional/national economy.

Furthermore, although in many ports it is claimed that operations such as cargo-handling, stevedoring, warehousing, etc. are in the hands of the private sector and thus adequate competition exists, licensing policies and the allocation of land (and its pricing) remains grossly in the power of the port administration which often cares less about intra-port competition and more about the creation of an appropriate mix of companies in the port domain. In short, port land is rarely liable to the forces of demand and supply and thus its pricing is often far from representing opportunity costs.

Thus, in a number of cases, port charges do not reflect the opportunity cost of land used to provide the port service. In densely populated areas this cost is substantially high (e.g. demand for office/residential space or recreation) and ports have been known to relocate just for that reason.

From the national economy's point of view, not accounting for the opportunity cost of land in port operations leads to inefficient resource allocation, at least in economies that proclaim adherence to market principles. Furthermore, such a situation can be considered as a hidden subsidy to ports *vis a vis* different policies in competing ports where land is privately owned by port operators.

A number of studies have shown that port dues constitute a rather insignificant percentage of overall transport costs and thus they have little impact on port competition. Much higher are the cargo-handling costs, charged for the services of private stevedoring companies. Thus, instead of reducing public support to ports, it could make more sense to increase competition in cargo-handling operations. This can be done by licensing more stevedores; make the acquisition of land a matter of market forces; etc. Still, however, the mere fact that port charges are in general only a small percentage of the final price of goods is not a valid argument for neglecting their impact on competition; however small, public funds allow the port to continue operating and it is this operation that may distort competition in a multitude of ways; not the subsidy itself.

It is quite legitimate for any government to see ports as growth-poles serving the national interest -to the extent that they do-, and thus subsidise them from national or, provided they qualify, European (e.g. structural) funds. Particularly as the latter funds aim to even out regional disparities and, in the case of Cohesion Funds, achieve greater cohesion through transport. However, in a number of cases, the provision of structural funds has to be looked at and evaluated very carefully in view of the need to integrate ports in efficient and seamless transport networks, eventually extended beyond the confines of the Union.

It has often been argued that if the legal, logistical and organisational systems of a port are globally more effective than those of another, this should not be a reason to

justify aid measures in favour of the second port. However, although this argument is in principle true, it should also be kept in mind that the above systems may have been purposely developed (often also with public money) in order to consolidate market power and/or increase/maintain market share.

It is likely that state aid to ports for reasons of regional/national development may cause traffic shifts unfavourable to neighbouring ports. In principle this is not acceptable unless the investment (and the subsequent shift) leads to network optimisation; relieves congestion; and accrues benefits to the final consumer through lower prices. From an EU point of view, especially when the affected port(s) does not apply full cost pricing of its services (i.e. infrastructure costs and transport externalities are not included in port charges), the new investment could well be seen as intervention aimed at correcting market failure.

State aid is given to ports mainly on grounds of regional development and is thus allowed by the Treaty through Articles 92-94. From the viewpoint of European port policy, state aid should be examined only as far as it contributes to distortions of competition *vis a vis* ports in other, neighbouring, member States. A good case in point regards the provision of state aid that lowers port operating costs, for example by not attributing opportunity costs to the value of land. Thus, the port can lease land to port operators/stevedores at prices below the economic value of land. Such an arrangement offers private stevedores, etc., a comparative advantage over their foreign competitors, which makes this type of (hidden) state aid incompatible with the Treaty.

In general, public investment has a "crowding-out" effect on private investment, particularly if funded through borrowing, and as such it may lead to non-optimal allocation of resources in the economy. It can be justified in the case of the production of public goods -although increasingly port services are not seen as such- and also whenever it carries regional development and similar considerations (Article 92 of the Treaty). Even in this case, however, the benefits to society from public intervention should be compared not only to the costs involved in the production of the public good in question but also with the foregone benefits in other sectors of the economy where the committed public money could alternatively have been invested.

Cost Recovery in Ports

The lumpy nature of many port capital investments, such as breakwaters and major infrastructure, and the long period required until fully utilised, i.e. until the planned number of berths etc. is in place, is often used as an argument for central funding. Otherwise, it is argued, the commercial pricing of initial infrastructure would be unfeasible, harshly penalising particularly smaller ports (until sufficient traffic is built up). The argument is in principle false: these investments can be funded by long-term redemption bonds, or central government loans of very long maturity, with significant grace periods, but afforded at more or less commercial terms. In the USA, low interest rate tax free bonds could indeed be considered as a subsidy to ports: the return on capital required by the port is below its opportunity cost. However, as these bonds are usually attractive to high income classes, ports are subsidised not by the average

taxpayer -in higher need of “social infrastructure” like hospitals and welfare- but by the top echelons of income classes; some would consider this acceptable.

Apart from cases where regional development considerations are prevalent, the public funding of ports can create overcapacity which is unacceptable in an era of squeezed budgets and Maastricht convergence criteria. It is indeed increasingly difficult to justify policies subsidising principally commercial port activities when, at the same time, welfare systems and general government budgets are under scrutiny. In a sense, a port located in a relatively underdeveloped region can indeed contribute to trade and prosperity and thus be subsidised. But the same is not always true for commercial ports that mainly offer transhipment services to neighbouring countries. The elimination of subsidies in predominantly commercial port activities would lead to a market approach to port investment, necessitating adequate rates of return on capital: something that would lead to investment justified by the existence of adequate traffic volumes that would be redirected anyway as a result of different pricing and competition, but also as a result of progress towards optimisation of TENs, Central and Eastern Europe integration, etc.

There is thus a need for a harmonised approach to port development based on the financial viability of ports. This would largely remove the current difficulty of ports being the victims of other ports’ uneconomic investment practices. A more competitive environment is also consistent with more local decisions and a greater role for private enterprise. The evolution of more competitive conditions among ports has increased the relevance of public port policy in the allocation of traffic among ports. The potential effects of public subsidies on the routing of traffic are greater now that traffic is more able to move through alternate gateways. Also, the distorting effects of differential subsidies are much more likely to extend across national boundaries as the size of hinterlands is increased.

Whenever commercial criteria for infrastructure investment are deemed appropriate, the probability of excessive social investment in port capacity will be less than before. Under such a regime, ports are masters of their own destiny and they are not at the mercy of shipping lines that have the ability to move, because the lines would only find it attractive to move if another port could offer lower costs. If it can do so, and it is not subsidised, the move is desirable and it should take place. If it takes place because an alternative port is subsidised, the incumbent port is not at the mercy of the shipping line as much as the victim of the other port’s policy. Ports and terminals have thus more to fear in port policy than they have in the strategy of shipping lines.

It has often been argued that the costs of providing a permanent structure (breakwater, approach channel) do not have to be recovered, as there is no depreciation (deterioration) of the asset, which is owned by the State. That was the argument used for forgiving the 50-year loan by the U.S. government for dredging the U.S. part of the St. Lawrence Seaway System.

However, the public funding of port infrastructure and the cost recovery of port services are two different things. Infrastructure can and perhaps should be funded by public money due to a variety of legal, economic and administrative reasons. This does not mean, however, that this investment should be forgiven and not attempted to

be at least partially recovered from users who directly benefit, regardless of how the investment is funded. In this respect, reference can be made to the EC's position according to which … *as a general rule, all transport users pay the full cost, internal and external, of the transport services they consume, even if these costs are in some cases paid by society to assist those in need*…

In this particular case, the problem could be solved if, for example, depreciation of port infrastructure was included as a cost in the port's pricing system. Something like this would undoubtedly raise the level of port prices, but even this should not be a problem if this policy were to be applied across the board to all competing regional ports. The overall result on society could then be ascertained by comparing the loss in consumer surplus, as a result of higher port prices, to the welfare gains had the public funds in question been invested in other sectors of the economy or led to lower taxes in general. The effect and importance of higher port prices to the consumer have also to be established statistically; i.e., export and import price elasticities in European regions have to be estimated, as well as the percentage of port costs in the final price of goods. It could well be argued that higher port prices are not necessarily passed on to consumers but are instead absorbed in lower profits for transport operators.

Such cost recovery would probably require the corporatization of ports and the funding of port infrastructure through the issuance of the appropriate instruments of senior debt. This approach could also go a long way towards eliminating overcapacity, as investments now would be made under commercial market criteria. The problem of distortions to competition would also be simultaneously reduced.

Investment Appraisal Considerations in Ports

It has often been argued that port development projects should comply with the criterion of a positive internal rate of return.[4] The usefulness of this criterion, however, cannot be accepted indisputably. First, the returns of any port investment have to be seen in the context of the network in which the port belongs (roads and highways, railways, IWT, distribution centres, ICDs, etc.). The productivity of any part of the network (and thus this of the port) depends on the extent and configuration of the entire network and the returns to the port will be greater or lesser as other links are added (e.g. shuttle services). The empirical studies linking infrastructure investment and economic performance fail to capture the complexity of this relationship which is that "the economic impact of additional investment depends on the size and configuration of the existing network and on the degree of congestion at each point in the network[5]". These factors may imply that two equal amounts of investment expenditure on ports can yield different amounts of port services or, alternatively, the same port services may be generated by different amounts of port investment. The productive value of a given increment to port capacity depends critically on the efficiency with which the overall facility or network is operated and the patterns of demand by all users.

[4] See also European Parliament (1993) "*European sea port policy*".
[5] See: C.H. Hulten and R.M. Schwab (1991) "Is there too little public capital?".

Secondly, the expression "*a positive internal rate of return*" is basically inconclusive: the rate of return has to be higher than the investor's cost of capital, however the latter is defined. In public investment, this is usually the *social opportunity cost of capital* which tends to be significantly lower than the commercial (market) discount rates. This is so given that public investment intends to capture also other benefits to society (e.g. generation of employment, income distribution, etc.) that are irrelevant to the private investor. Thus, the lower the discount rate used (i.e. the greater the importance that society attributes to the specific project) the higher the likelihood that the project in question will be accepted.

In addition, the economic return on a project, such as that of developing a port which is meant to run for decades, depends critically on the forecast of future operating costs and revenues. Two important questions can be raised here with regard to port competition and the attractiveness of the internal rate of return as a project selection criterion: 1) is maintenance dredging intended to be included as an operating cost? 2) do forecasts of future revenue (i.e. traffic) assume that the port will be able to attract traffic from competing ports? The answer to both questions is far from obvious, particularly that to the second one. It could perhaps suffice to say that *social cost-benefit analysis*, however useful, cannot be the only criterion for comparing similar projects in different countries, as it entails factors such as employment, income distribution, environment, regional development, etc., to which different governments attribute varying degrees of importance, even within the European Union.

Port Profitability and Transparency of Port Accounts

Many times, the cost structure of a port is not completely under its control: A number of mandatory costs can be imposed on it, constituting in essence negative subsidies, such as the requirement to maintain an excessive and permanent labour force; wages; fringe benefits; allowances, etc., that do not generally prevail in other sectors of the economy. For example in France, the port of Marseilles has to finance all the costs of fire prevention in town and Le Havre must manage a costly airport. In certain countries, ports have to provide free housing for the customs and police officers. This unfavourable cost structure, compared to the relatively fixed by international competition port dues, reduces the profitability of the port. Operational deficits may thus result from such impositions of restrictive conditions on port operations, based on macroeconomic considerations. Meeting such deficits may be acceptable as long as the port is seen by the government as a growth-pole befitting the country's regional/national development plans.

If financial management and full cost recovery are to become the responsibility of the port, it would be only reasonable to argue that the latter should be also given more autonomy with regard to labour costs and other impositions that affect its cost structure. Transferring power to the local level (e.g. port authority) is an expression of regional development in the sense that local authorities are nearer to reality and in a better position to gauge public reaction.

In addition, as mentioned above, if port capacity is to be determined on the basis of commercial criteria, transparency in port accounts and the financial flows between the

port and the government should be clear. In the present administrative system of many ports, any attempt at verifying the economic/financial situation of a port proves to be a complex undertaking, since only a few ports have specific balance sheets and accounts. As to the rest, the only thing one can do is to peruse the overall financial statements of the ministry or local government responsible for the administration of the sector.

Imposed Services

A service can be considered as imposed whenever: a) the user could carry out the operations on his own but he is not allowed to; b) the user deems that the service is not required and/or desirable.

Such cases may concern pilotage, towage and mooring. A typical example, taking place until some time ago in Italy, concerned the provision (imposition) of cargo-lashing services by "Compagnie Portuali" irrespective of the crews' availability and ability to carry it out autonomously. In Italy, shipowners sometimes challenge the real necessity of such services or at least they deny the need to use them to the extent provided by local regulations (e.g. need to use a certain number of tug-boats).

An extreme case can be whenever the service is not used but paid for nevertheless. Until recently, such cases were common in Italy (ships discharged by means of mechanical equipment only but which had to call a whole gang of dockworkers; luggage-carrying service that was charged per person to travellers (ferry-boat) irrespective of the fact that the service was never rendered. At present, this is the situation with pilotage in France where the shipowner can refuse the service under certain circumstances, but has always to pay a fee to the organisation (this fee is justified as a contribution to a service of general interest).

However, cases like these do not signify the existence of monopoly abuse but just the necessity to comply with existing law. Particularly in cases of comprehensive state-owned/controlled port administrations, the port can counter-argue that the services in question are just part and parcel of a comprehensive service -called port service- that includes pilotage, towage, etc., and they cannot be separately priced any more than a consumer can refuse to pay for the central-locking of a car that comes as standard equipment. As a matter of fact, the port administration does not even have to describe, list or price the service (e.g. pilotage) individually; it can simply include its costs in an overall port charge that it can levy to ships on the basis of their tonnage. If the port administration feels that the port should provide a comprehensive, all-encompassing service, cross-subsidisation of different activities can also be allowed through the design of an appropriate tariff structure. This would allow the continuance of the provision of certain otherwise unprofitable activities which, however, are deemed important and thus necessary for, say, the safe operation of the port.

Price Discrimination

The importance of first defining what is a port, and thus port subsidy, can be exemplified by the fact that a port which specialises in bulk trades (i.e. a port enjoying a natural monopoly in this respect) is able to cross-subsidise its general cargo traffic to the detriment of neighbouring general cargo ports. Sometimes, the existence of a large inland waterway; an oil or gas pipeline; can attract very profitable bulk traffic and thus enables the port to cross-subsidise other traffic. In other ports, valuable container transhipment traffic can be lost to foreign competitors as a result of high prices meant to cross-subsidise port charges applicable to local coastal shipping monopolies.

Sometimes, ports are in a position to discriminate among cargoes and customers. If a port wants to attract competitive transhipment traffic, it would be reasonable to charge a lower price for it and at the same time charge a higher tariff to captive cargo or customers, e.g. coastal shipping. This will always be the case given that, despite the sometimes intense regional competition, a port will always have *some* monopoly power, either in the case of certain local cargo or due to other physical/geographical reasons. From the port's point of view, price discrimination is the rational decision as it maximises profits (assuming some monopoly power). Thus, price discrimination cannot be condemned *ipso facto*; it only shows that the port is in possession of some monopoly power and this is the level at which the problem should be addressed by competition authorities.

PORT STRUCTURAL ADJUSTMENT AND LABOUR REFORM[1]

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1. INTRODUCTION

Meaningful discussions on the issue of port reform are of great importance not only in finding ways to manage the reform process itself in the short-run but also in highlighting that the need for reform and increased efficiency may diverge significantly from the desire to safeguard port labour standards and other social objectives that might be adversely affected by the reform.

Development agencies have many times been criticised that their economic reform recommendations and austerity programmes are too often excessively preoccupied with stabilisation and structural adjustment without paying adequate attention to the social and labour consequences of economic reform. On the other hand, the International Labour Organisation (ILO) has also been criticised that its policies and Conventions are not flexible enough to allow the effective implementation of reform programmes which are seen by many as the only way to raise living standards and alleviate poverty in developing countries. Although considerable progress has already been made towards an improved dialogue between these bodies, it is felt that there is still some way to go towards a closer convergence of approaches.

2. THE FORCE OF GLOBALISATION

A major contemporary trend that has precipitated many countries' thrust towards economic reform is "globalisation". The latter could be described as the increase in cross-boarder interdependence and, more profoundly, integration, which has resulted from the greater mobility of the factors of production and of goods and services.[2] This increased mobility can be attributed to three major factors:

- Tele-communications, mass media, advertising, secularism and the abolition of national barriers have all led to a substantial convergence of world cultures and consumption patterns, resulting in larger international markets and intensified competition.
- Although not as yet confirmed by factual developments[3], most governments are rather convinced that economic integration, promoted by the globalisation of capital markets and the virtual abolition of exchange controls in industrial countries, will lead to more efficient resource allocation and hence stimulate growth and economic development.
- The significant advances in transport and communications technologies have increased the speed and efficiency of transport and lowered the costs of communication. These developments have lowered the barriers of time and distance and give the impression of a "shrinking world".[4]

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[1]Proceedings of the 7th World Conference on Transport Research, Sydney, Australia, 1995.
[2]Campbell (1994)
[3]Singh (1994) and Cash, Hughes and Singh (1992)
[4]Dicken (1992, pp. 103-110)

In this way, globalisation and trade liberalisation, helped by the significant developments in transport, logistics and communication technologies, have drastically weakened the link between manufacturing and the location of the factors of production, they have expanded internal markets for goods and services, and have led to a most noticeable shift in manufacturing activities towards countries with a comparative economic advantage. As an example, by the end of the 1980s, more than half of the employees of Sweden's 30 largest manufacturing companies (ranked by employment) were working in foreign subsidiaries.[5]

Particularly in developing countries, the need for reform is as much the result of their precarious economic and social situation as of the fact that -without having been adequately prepared- developing countries have been exposed to the relentless forces of globalisation and intensified international competition. This exposure has been taking place simultaneously with the opening-up of developing countries' internal markets so that they can take advantage of the recent developments in the liberalisation of international trade and particularly the many favourable "developing country provisions" of the GATT.

However, many developing countries' exports are little diversified and very precariously dependent on volatile commodity prices. Nowadays, there is another equally important factor that compounds this problem. This factor, or rather series of factors, consists of the complex developments in multimodal integrated transport, logistics networks and Electronic Data Interchange.

Preferential trading relationships, many times inherited from colonial business practices, assume a far less important role today than they did in the past. Today, independent trading Houses and multimodal transport operators have the possibility to scan instantly the world commodity and product markets, at the push of a button, and select shippers, ports, routes, methods of shipment and carriers in such an integrated manner that ensures quality, expediency and reliability while at the same time optimises generalised costs as well as cost-time trade-offs.

This situation makes the demand for developing countries' exports much more vulnerable now than what it used to be in the past. This vulnerability is not only a function of export prices but it also depends on developing countries' ability to comply with modern business and trading practices that have little to do with "neo-colonialism" but are rather consumer and technology driven and oriented. In such and environment, any factor that can blunt developing countries' export competitiveness is bound to have much graver repercussions nowadays than it had in the past. Obviously, an inefficient port sector, in its role as trade facilitator, can well be such a factor.

The exposure of developing countries to the forces of international competition has been taking place at a pace which, for many of them, has been difficult to keep up with. Understandably, this has been the result of both developing countries' limited capacity to rapidly absorb modern technological advances, and of the fact that the scarcity of their capital resources has, many times, forced them to adopt technologies on a piece-meal and uncoordinated basis, having had rather negative effects on optimum resource allocation and distribution of income. The developing world is full of badly designed and implemented projects and it would not be far from truth to say that governments' divestiture programmes of the 1980s and beginning of 1990s

[5]The Economist, November 5th 1994

may have been the result of the same governments' indebtedness in the 1970s.

The effects of rapid technological change on social structures and institutions has been the subject of substantial sociological research in both developed and developing countries. Particularly in the case of the latter, rapid change is not always considered a good thing, not only because many times it cannot be managed efficiently, but also because it may increase uncertainty and loosen people's control over things and situations. Change has to be given the benefit of time in order to be assimilated into economic and social conscience. Unfortunately, "time" is not always available in today's stampeding technology and, more importantly, assimilation periods will tend to be much longer in countries where proper economic and social institutions are not in place.

Developing countries are, thus, confronted with the dilemma of either introducing expensive, state-of-the-art technologies, in the hope that they will last longer and thence induce growth, or opt for the more labour-using intermediate technologies that sometimes may become obsolete before they are even implemented. However, economic obsolescence in developing countries should not be decided on the basis of comparisons with similar technologies in other countries but in terms of the specific technology's ability to efficiently serve the country's development requirements.

3. THE IMPACT OF CONTAINERISATION

It is many times being said that unitisation and particularly containerisation have revolutionised the national and international transport and port industries. Such an emphatic characterisation could be quite acceptable if one considers the enormous impact that this originally purely technical solution in cargo-handling methods had on the design and sizes of general cargo ships, the lay-out, equipment, development, operations and employment in ports, on inland transport requirements, land use, human skills and shippers' perception regarding the functioning of the overall transport chain.

This system of transport had a number of significant advantages over the conventional, labour-intensive, methods of handling general cargo. Apart from the remarkable improvements in port safety and the limitation of pilferage, damages and cargo claims, the system's major breakthrough -particularly in the U.S. where it was first introduced- was in cutting down on expensive labour and reducing ship turnaround time.

Due to costly, largely ineffective and time-consuming cargo-handling prior to the advent of containerisation, general cargo ships were known to spend most of their operational time in ports, waiting, loading or unloading. In many instances and whenever that was possible, shippers were trying to avoid ports and shift towards road and rail transport for long distance carriage.

Furthermore, expediency in cargo-handling was necessitated by the very same nature of general cargo goods whose increasing sophistication and value-added content required fast transit times from origin to destination in order to increase shippers' turnover and minimise high inventory costs. The latter costs were, thus, brought down significantly by the use of logistical concepts and methods and also by the increased reliability and accuracy of liner shipping operations that

allowed manufacturing industries to adopt flexible *Just-in-Time* and *Make-to-Order* production technologies. Among a host of other benefits, these technologies enabled companies to cope with the vagaries and unpredictability of the seasonal, business and trade cycles. Many shippers in industrialised countries were, thus, more than happy to bear the increased initial costs involved in the introduction of the new transport system, given that these costs were only a fraction of the benefits enjoyed by faster transit times and the higher predictability of cargo movements.

The dramatic improvements in cargo handling operations that were brought about by the introduction of containerisation enabled general cargo ships to spend hours or days now in ports rather than weeks or months that was customary before. The reduction of idle port time and the corresponding increase in the income-generating time at sea eventually led to the substitution of the previous multipurpose general cargo ships with specialised high-speed container vessels of substantially (and ever increasing) larger dimensions that could take advantage of the economies of scale afforded by the shorter turnaround times.

However economically justified investments in containerisation might have been in the industrialised countries facing the north Atlantic and Pacific oceans (where the bulk of general cargo traffic is concentrated), developing countries responded to the necessity of this type of investments with varying degrees of scepticism. Their legitimate worries concerned the suitability of capital-intensive techniques in countries with abundant and inexpensive labour, their lack of financial resources together with other pressing investment priorities in the country, and also the fact that the vast majority of their exports (primarily raw materials and agricultural produce) were not "containerisable".

Furthermore, the capital-intensive nature of liner shipping and the consequent "operational arrangements" within this industry in the form of consortia and similar types of co-operation, frustrated many developing countries' plans to get actively involved in liner shipping, despite their cargo-sharing entitlements secured mainly through the provisions of the UNCTAD Code of Conduct of Liner Conferences. Major liner operators argued that if adequate port investments in container-handling facilities and equipment were not timely made, many ports in developing countries would be bypassed by major lines and thus become "backwaters". In many cases, this argument was driven home very successfully for a number of reasons:

- Developing countries would fail to see the importance of efficient national ports as facilitators to trade and as crucial elements in their process of economic development.
- The increase in sizes, sophistication and capital-intensity of modern container ships in deep-sea liner trades, has limited the number of ports of call to only a selected few transshipment ports or load centres. These very important ports have become the *foci* of international shipping and goods are moved by land (road and rail) and water (barge) from inland centres and feeder ports to these global hubs.[6]
- Many developing countries have, thus, taken up the challenge to develop their ports, hopefully into load centres, under keen competition with other regional ports having similar ambitions. These decisions were taken not only because of fear that ports would be bypassed if they did not do so, but also due to other more proactive considerations.
- It was thus thought that the development of container-handling facilities in excess of

[6]Slack et al. (1994, p. 185).

national traffic demand requirements might have the positive spin-off effects of an *unbalanced growth* approach to development. According to this, basic infrastructural facilities (such as ports) are built up far ahead of existing demand, on the part of the industry, agriculture and commerce, in the hope that the latter activities will expand by the wake of the former.[7]

- Apart from considerations of trade facilitation, a number of countries (particularly in Asia) saw port containerisation as an export industry in its own right. It was thus considered that, additionally to their direct financial benefits, the export of transshipment services to neighbouring countries would enable ports to grow and achieve significant economies of scale (not otherwise warranted by the country's limited cargo traffic) that would finally benefit the country's external trade.
- Finally, transshipment traffic would allow the development of feeder service networks for the regional distribution of containers and this would enable the country in question to get profitably involved in shipping (at least of the short-sea type) and value-added distribution activities that would otherwise be lost to competing regional ports. Feeder services and inland transport and distribution possibilities were major considerations by countries that were seriously contemplating investment in containerisation. This was considered so crucial that most countries were realising that if such possibilities did not exist, the likelihood of their being selected as major "hubs" would be rather slight, no matter how efficiently they might like to develop their ports.

4. DEVELOPMENTS IN PORT EMPLOYMENT

The capital-intensive nature of liner shipping and the need for maximum capacity utilisation in order to achieve adequate rates of return on investment, increased pressures on ports for further improvements in labour productivity and operational efficiency. In its efforts to adjust to the new demand requirements, the port industry itself also became a capital-intensive one, requiring massive investments in port infrastructure and sophisticated cargo handling equipment. In this way, containerisation and the induced cargo-handling techniques had an equally profound impact on port employment.

As with other capital-intensive innovations, containerisation substituted capital for labour and thus resulted in substantial reductions in port employment, simultaneously accompanied by enormous increases in labour productivity. These developments can be observed in an illustrative way in Table 1.

As was to be expected, reductions in port employment forced many labour unions all over the world to strongly resist the introduction of the new techniques. But there was also an additional reason for this: The "through-transport" concept and the door-to-door possibilities that the new system afforded, shifted a considerable part of what was previously considered as "dock work" to areas outside the port domain. This development particularly had to do with the stuffing and stripping of containers that could now be performed at the consignor's/consignee's premises by their own staff. Even when that was not the case, containerisation allowed the detachment of staffing and stripping activities from the usually congested "waterfront" and its "rigid" and

[7] see for example Rosenstein-Rodan (1943).

strongly unionised labour, towards *Inland Container Depots*, where ample and cheaper space was available, often conveniently located close to main road junctions.

Table 1 Port work-hours and tons handled in the US west coast

Year	Work-hours [Million]	Tons cargo [Million]
1960	29	29
1980	18	114
1987	16	158

Source: Cuadernos de la Cepal 1989 (taken from International Longshoremen and Warehousemen Union)

Another significant development that came together with containerisation was the remarkably enhanced accuracy in ship sailing schedules that almost completely eliminated the previous unpredictability and irregularity of employment, which had been a chronic phenomenon in ports since the invention of sail. This development has much reduced the use of casual labour and inefficient and costly labour pooling arrangements, and allowed progress towards the registration of dockworkers. Such a registration was often a condition stipulated by the unions for them to accept the introduction of the new cargo-handling techniques. The need for registration was also emphasised by the fact that dockworkers had to be adequately trained and experienced in order to be able to handle safely and efficiently the very expensive cargo-handling equipment. Training of casual labour was of course an uneconomic alternative even when this was feasible.

Undoubtedly, the registration of dockworkers, the permanency of their employment and stability of income were all positive developments that improved working conditions in ports and raised economic and social standards sometimes well above those prevailing in other sectors of the economy. The supply of port labour, however, became "rigid", at times expensive, occasionally "politically sensitive" and at any rate unable to adjust to the changing demand requirements.

Furthermore, the above labour rigidities often led to strict, and sometimes quite unjustified, job demarcation and large gang sizes that resulted in excessive overmanning, little labour mobility and high port user costs. In many ports around the world, the inflexible and monopolistic supply of port labour has effectively discouraged intended private sector activities around the port and has thus deprived the latter from one of its main functions, that of being a "growth pole" for the region and the country.

These problems, compounded by a "civil servant" mentality by many port workers, in an era of trade liberalisation and intense interport competition, have led governments to seriously consider their retrenchment from the port sector and the introduction of private enterprise characteristics and practices in port operations.

Containerisation has also considerably affected the working methods in ports. As already stated above, the high capital-intensity of the modern container vessels requires extremely short turnaround times. This need has been intensified by the increasing competition in liner shipping, its inherent overcapacity and the need to rationalise the provision of shipping services so that the

required regularity and frequency of sailings is achieved with as little physical capacity as possible. Nowadays, rationalisation of liner services has become even more imperative as a result of the intertwining of liner networks within the mushrooming liner shipping consortia, or even between the various consortia themselves.

This trend, together with the increasing competition between regional ports and their endeavours to provide a service of higher quality, has driven many ports to provide services around the clock, seven days a week. As far as port labour is concerned, this development was achieved through the extension of working hours and the use of shifts, which although welcomed by trade unions, has affected the social life of port workers, particularly in ports that due to reform were faced with significant labour shortages.

5 PUBLIC SECTOR INVOLVEMENT IN PORTS

Government involvement in ports can take various forms ranging from the mere ownership of the land to the provision of all port-related services. The State may determine port strategy, management and operations, but it can also interfere in a more indirect way, e.g., by assisting in port development, financing investments, or determining the port's regulatory framework. Several reasons can be put forward for the public sector's involvement in ports:

5.1. Military protection

Many major seaports are located close to a country's borders and are especially vulnerable to attacks from the sea. In former times most ports were thus also military protected areas. Most commercial ports have no direct military protection nowadays, but their strategic importance is still apparent.

5.2. Economic protection

As major ports are usually the gates to international trade, they may afford governments a convenient means to implement import-restricting policies aimed at protecting domestic markets. Import restrictions can be effected by the erection of tariff and/or non-tariff barriers. The latter can take many forms and are usually more difficult to detect and quantify. High port tariffs, long turn-round times and inefficient ports in general are often seen as constituting effective non-tariff barriers to trade. It has often been argued that import-competing domestic producers have strong vested interests in the continuing existence of inefficient ports, as this offers them effective protection. Evidence also exists that these producers can also be effective lobbyists and influential members of pressure groups that resist port reform.

5.3. Natural monopoly

Ports are often referred to as classic examples of the so-called natural monopoly case, in which possible market failures can justify government intervention.[8] Under certain conditions (a given level of demand, cost structures and technological factors), a market with two or more firms can produce sub-optimal economic outcomes, whereas a single firm might produce the required output more efficiently.[9] For this reason, governments may, at times, decide to move from a

[8]Shirley et al. (1991, p. 1).

[9]Adam et. al. (1992, p. 17-18).

multiple-firm competitive environment towards a monopolistic situation. This can be achieved either by explicit legislation, allowing only one operator, or by discriminatory subsidies, finally resulting in the withdrawal of potential competitors.

5.4. Financing

The rapidly changing cargo-handling technologies and the growth of trade have resulted in numerous port expansion/modernisation programmes, generally requiring substantial capital outlays. An example of this can be the construction of a new container terminal, but even the adjustment of berths and their superstructure to the increased ship sizes would require considerable capital resources. These investments often exceed the financial resources of the private sector and thus make the case for governmental involvement. Apart from a possible lack of financial resources, the private sector may also be reluctant to invest in ports, particularly when capital outlays have to be made within institutional and regulatory frameworks that cannot guarantee positive financial returns. Private interest is, thus, frequently expressed for activities such as ship-repair, bunkering, mechanical engineering and container, general and bulk cargo equipment. However, as government policies usually extend beyond considerations of short-term financial profitability and towards the maximisation of long-term *economic* profitability and general welfare, a number of infrastructural projects (such as ports) that might be deemed unprofitable by the private sector can be of cardinal importance to the government.

It should be added, however, that the expansion of international trade and the growth potential of many countries around the world are contributing more and more towards making port operations a commercially profitable activity. Furthermore, the globalisation and liberalisation of capital markets and the emergence of powerful corporate investors, building international portfolios, ease substantially the heavy financing requirements of port development in many countries that are faced with scarce capital resources and/or other pressing investment priorities.

5.5. National/regional economic development

In addition to their main function as interface, storage and distribution points, efficient ports also function as growth poles attracting new industries and stimulating trade.[10] In this way, and apart for their obvious direct contribution to GNP growth and regional development, the indirect contribution of ports to the economy is also substantial, given their importance to the competitiveness of the country's export industries. State intervention is thus often justified on the grounds of these "not solely commercial" objectives of ports.

For example in Japan, apart from the direct financial returns of port operations, port development is appraised on the basis of its contribution to the social and economic development of the region and the nation. Port development plans are thus adjusted to and included in the country's regional development plans, while ports are managed and administered by public sector bodies.[11] Among other advantages, this approach helps in rationalising port investment, avoids duplication and the wasting of scarce resources due to excessive competition in an industry predominantly described by *sunk costs* and, finally, it helps in optimising the locational aspects of port investments, so that

[10]Rimmer et al. (1984, p. 120-129).

[11]Ports and Harbours Bureau/Ministry of Transport/Government of Japan, 'Ports and harbours in Japan'.

they can tie-in meaningfully with the rest of the country's infrastructure.

Despite this, the realisation of the above-mentioned indirect objectives may generate numerous benefits for the country as a whole that do not necessarily produce visible financial rewards for the ports concerned. Thus, the efficiency and productivity of the latter might, at first sight, be considered as disappointing and inferior to that of comparable privately owned enterprises with clear-cut financial objectives.

5.6. Public goods

Among the many functions of public port authorities, whether regional or centralized, is the provision and maintenance of the ports' basic infrastructure, such as breakwaters, approach channels, turning basins, rail/road facilities within the port, navigational aids, towage and pilotage.

Apart from the general public's interest in the safety of ports, many of these services can clearly be considered as falling within the domain of "public goods" in the sense that no particular user can be excluded from their use if he/she is not agreeable to share in the cost of their production; a situation often referred to as *the free rider problem*. Furthermore, services such as those provided by, say, breakwaters and navigational aids can be considered as *collective consumption goods*[12] in which case, and up to a point, the total cost of production does not vary in relation to the number of users. Finally, a number of port services can be considered as *non-rival in consumption*[13], given that user A's demand does not reduce (compete) that of user B.

Those port services that qualify as "public goods" ought to be provided by some public authority, although *provision* should not be confused with *production*; the latter could be entrusted either to the public or private sector depending on considerations of economic efficiency.

6. GOVERNMENT DIVESTITURE PROGRAMMES

The reasons for government divestiture from economic activity vary from country to country and have a mixture of economic and ideological origins. Divestiture was believed to be essential in the transformation of the former socialist countries from command to market economies. In mixed economies, divestiture can be used as a tool to improve efficiency and lessen the financial burden that many State Owned Enterprises lay on the national budget.[14]

An increasing number of port development plans contain sections on privatisation, suggesting that the performance of many public ports may not be satisfactory by today's standards. This, however, may or may not be so. Ownership is not the key determinant of enterprise performance or of the efficiency of resource allocation.[15] In principle, a public port can perform just as well as

[12]see for example Shoup (1969).

[13]see Musgrave (1969).

[14]Kikeri et. al. (1992, p. 13).

[15]Adam et.al. (1992, p. 33).

a privately owned one, provided that both operate in the same competitive environment.[16]

The fact that many public ports incur heavy financial losses has led many governments to further limit or even eliminate competition and increase financial support. This policy response, however, could result in further deterioration of port performance, which is mainly caused by the lack of competition in the ports' protective environment.

More often than not, the lack of competition has resulted in a negative service attitude within the port. Because of the "soft budget constraint" and the frequent low interest government loans or subsidies, the *opportunity cost of capital* is a principle virtually unknown to many port managers. This may explain why *cost control* is often a low ranked priority in many public ports. Besides, port tariffs are often state-controlled and do not correspond to market prices, which adversely affects the management's motivation to seek cost reductions.[17] Finally, many public port employees enjoy a high degree of protection and relatively high wages. As a consequence, over-manning is common phenomenon.

In many countries, governments have become painfully aware of the inadequacy of their public sector policies in an environment of increasing international interdependences and global competition. Market-oriented policies are becoming more and more popular in order to realise the benefits of higher efficiency and productivity, and a reduction of the financial and administrative burden that SOEs often impose on the State.
Recent divestiture experiences show that, in many cases, the process should be implemented gradually. Unless considerable operational improvements are first realised, public ports will be unable to operate in a competitive environment. A divestiture programme with a short planning horizon will suddenly put the former public ports under the influence of competitive forces, in which case their position might deteriorate even further.[18]

To enhance the possibilities of survival in a competitive environment, the government can improve the institutional environment of the firm, thereby enhancing the ability of a port to respond adequately and promptly to changing market conditions. Several well-documented divestiture experiences show that certain prerequisites regarding the firm's economic environment have to be met if the full benefits from divestiture are to be realised. A hospitable and efficient business environment has thus to exist[19], distortions that hinder domestic and international competition must be eliminated, and an efficient capital market with considerable absorptive capacity need to be developed.[20] [21]

Care should be taken in introducing divestiture programmes so that public monopolies are not simply transformed into private ones. The effects of government divestiture without adequate competition are rather doubtful, and private monopolies, apart form reducing general economic

[16]Kikeri et. al. (1992, p. 16).

[17]Shirley et. al. (1992, p. 7-15).

[18]Shirley et.al. (1991, p. 7).

[19]OECD-DAC (1993, p. 39).

[20]Persaud, in: Adam et. al. (1992)

[21]Also in: Kikeri et.al. (1992, p. 41-42).

welfare, may also be socially undesirable. Furthermore, their existence does not necessarily reduce bureaucracy, as new regulatory bodies have to be created to ensure that they do not enjoy monopolistic profits to the detriment of the consumer.

It has been stated that "successful privatisation of natural monopolies requires a regulatory framework that separates out potentially competitive activities, establishes the tariff regime, clarifies service goals, develops cost-minimisation targets and creates or strengthens an agency to supervise the process.... This regulatory framework ensures that divestiture leads to increased efficiency without harming consumer interests".[22]

Port reform does not necessarily require the disengagement of the public sector from port activities, but it can also take place through improvements in the existing institutional framework. Most port reforms, however, tend to introduce private sector characteristics in port operations. There are many ways of doing this, ranging from changing port administration and improving competitive conditions up to the more drastic and complex divestiture programmes.

7. THE ROAD TO PRIVATISATION

Several contiguous processes can be involved *en route* towards the final stage of "privatisation". In these processes, the scope of private sector involvement is gradually broadened, which might eventually result in a complete transfer of ownership from the public to the private sector. The challenge for port policy-makers engaged in structural adjustment is to find a proper mix and time-path for the various intermediate processes on the way to privatisation. In what follows, the "stages of privatisation" are discussed in order of increasing need for change, compared to the traditional situation of a publicly owned port which serves as a starting point.

7.1. Improving port administration

The improvement of port administration within the current organisational structure and without changes in law or national policy, can be seen as a first stage of port reform. The consequences of this type of reform for port labour are minimal. Port services are still being provided exclusively by the public sector. Possible improvements could be realised by, for example, better career planning and the introduction of EDI.

7.2. Liberalisation/deregulation

Under liberalisation the private sector is allowed to provide port services in competition with the public sector. Liberalisation includes the removal of statutory restrictions limiting entrance of the private sector to the port services market, and of any discriminatory rules discouraging competition. Eventually, these restrictions are replaced by regulations that encourage or even require competition. For some countries, the advantage of liberalisation is that the introduction of some form of competition in port services leads to efficiency improvements, while the overall control over the (strategically important) port remains completely in the hands of a government department.

A possible disadvantage of liberalisation/deregulation is the potential danger of 'cream

[22]Kikeri *et. al*. (1992).

skimming'. The private sector will only be interested to provide port services that have the potential to be profitable, e.g. container, general cargo, or bulk terminal operations. In a statutory monopoly port, the unprofitable (but required) port services can be cross-subsidised by the profitable ones. However, as a result of liberalisation, the public sector may be losing revenues from profitable port activities, having at the same time little possibilities for cross-subsidisation. This issue should be seriously considered when leasing out port facilities to private operators: if the port authority is to continue providing commercially unprofitable services, and in the absence of central/regional government support, the lease should be determined at a level that would allow the efficient provision of the various port services entrusted to the port authority/company. Something like this is also in the interest of the private operators, given that their efficiency improvements in cargo-handling can be easily nullified by inefficient dredging, mooring, pilotage, towage, engineering, security, fire protection and similar operations.

7.3. Commercialisation

Commercialisation implies the introduction of a commercial, business-like environment, in which port management is accountable for its decisions and performance. In the previous stages, ports still retain their status as quasi-government departments. In the commercialisation stage, the status of a "state-owned enterprise" is justified, as the previous "government department" now changes into a public company.

The main objective of commercialisation is to increase management autonomy and accountability.[23] If port managers in bureaucratic port organisations are not held responsible for port performance, they in many cases have little incentive for securing cost reductions or improvements in productivity. Furthermore, as the management of commercialised ports is still public, it often hesitates to consider in time possible reductions in employment. Port labour contracts are usually not governed by regular labour law, but they have a civil service status.[24] Solutions to the above situations could be found in an increased accountability for port managers and workers, or by the contracting out of certain port functions to the private sector. Several approaches are used to achieve this:

Performance agreements: These agreements clarify performance expectations and the functions, responsibilities and rewards of all parties concerned. All decisions still remain in the hands of the public sector.

Management contracts: Under this arrangement, the management of an operation is transferred to a private unit. The latter offers management expertise, but the government retains ownership and control.

Service contract/contracting out: This method consists mainly of the contractually specified transfer of responsibilities to a private entity, for the provision of a specific service. A service contract is usually described in more detail than a *concession* (see below).

Lease: Under this agreement, assets are leased for a fixed period to private lessees. The ownership remains with the (public) lessor. Among the many different types of leases that exist,

[23]World Bank (1994, p. 9).

[24]World Bank (1994, p. 40-43).

the following two are frequently used in the port industry:

- A *flat rate lease* where a fixed amount is agreed and eventually adjusted for inflation. The amount is based on a fair return on the value of the property.

- A *mini-max lease*, where the lease amount is variable and it is determined in relation to the actual throughput. The lease increases by steps within a mini-max scale. In contrast with the *flat rate lease* method, there is no maximum level of compensation included in this option. The upper limit is determined by, for example, terminal capacity.

Concession: A concession is an agreement similar to a lease in that the use of facilities is transferred for a predetermined period by the owner to a potential user, but with a substantial amount of control retained by the owner (the public port authority) on the *concessionaire's* use of the rights.[25] Upon expiry, the facilities have to be returned to the owner in good condition and free of charge. Examples of this case can be found in the port of Vera Cruz (Mexico) and Bristol (UK).

7.4. Corporatisation

Corporatisation requires the transformation of public sector organisations into private sector companies, the shares of which are held by the government. Enterprises in the commercialisation stage are given more autonomy, but still do not have the legal corporate independence needed to ensure efficient operation. Corporatisation provides the enterprise with a status of independence and subjects it to the same legal requirements as a private firm. A whole new company is thus established, which enjoys administrative and financial flexibility, enabling it to close agreements without continuous reference to the government. All land, moveable and fixed assets are transferred to the new company in the form paid up capital.[26]

A significant advantage of corporatisation is to be found in its commercial accounting procedures, which make financial cost and benefit structures more transparent, facilitating the identification of sources of inefficiency. As the government does not directly control port management, corporatisation generally attracts more foreign investors than is the case with other stages of port reform discussed above.

The main disadvantage of corporatisation is that, despite the new organisational structure, the official governance of the State remains and this may negatively affect efficiency. Managers still have limited autonomy, compared with their private sector counterparts, and dockworkers may not be sufficiently motivated due to the relatively limited prospects of pay increases based on merit. Market solutions to these problems might include the encouragement of more competition or instructing managers to optimise profits. However, if these solutions cannot be implemented, because of non-commercial goals or monopoly power, alternative approaches may be considered. Options, already discussed above, are the introduction of management or service contracts and performance agreements. Finally, as corporatised ports are still public entities, the arguments regarding port employment, which were reviewed in the context of commercialisation, are also valid here. In many corporatised ports, overmanning and expensive port labour still remain key

[25]Thomas (1993, p. 15).

[26]Port Development International (December/January 1993, p. 33-53).

issues.

7.5. Privatisation

Privatisation is the most radical and possibly most complex exercise in government divesture. It is defined as the transfer of ownership from the public to the private sector and several methods can be used to realise this objective:

Public offer: In those cases where the shares of the port company are quoted on the stock exchange and can be freely traded, the government may decide on a public offering. It may also decide to retain a major part of the stock in order to exercise some influence in future port activities.

Management/employee buy-out: In this situation the government decides to divest its shares to the employees, so that the latter assume ownership of the company. A buy-out would be more appropriate whenever the employees are highly motivated and keen on buying the company. Demand prospects have to be stable and the size of the company should be rather limited.

Private placement: Through a process of competitive tendering, various potential private investors can submit a quotation. By negotiation the government can then decide which offer is the most attractive. It is possible that offers are made by a consortium of companies, banks or even by a group of employees.

BOOT/BOT: In this case, a private company *B*uilds, (*O*wns) and *O*perates an asset for a certain period. At the end of the period the asset is *T*ransferred back to the government. If privatisation takes place in this way, the private sector is given an exclusive concession to operate an infrastructural project, such as a bridge or a port and it assumes the risk of completing it. BO(O)T is a form of non-debt financing of public sector activities, in which the private sector finances the construction and the costs are recovered through user fees. An example of the application of a BOT-like structure in ports can be found in the conversion of the East Wharf in the port of Karachi (Pakistan) into a modern container terminal.[27]

Sale of assets: This alternative can be considered when private investors are not interested in acquiring the whole of the company, or when better results can be expected through a partial rather than outright sale.

Joint venture: A joint venture represents an enterprise in which two or more private companies, or a SOE and private investor(s), jointly own the equity of the port company.

8. PORT PRIVATISATION AND LABOUR REFORM IN LDCs

It has already been noted that, nowadays, the increased internationalisation of all forms of economic activity, mass media, foreign experts and modern tele-communications intrigue developing countries to attempt comparisons with other nations, western ones included, many of them at a completely different stage of economic and social development, having institutional

[27]Thomas (1993, p. 16).

frameworks that were set up years ago. If superficially attempted, such comparisons can be extremely dangerous and misleading, particularly when successful economic reforms in other countries are taken *prima facie*, without a thorough understanding of all their implications and without adequate comprehension of the simple fact that, if proper *institutions* are not in place, the future of privatisation, and to this effect the country's economic development by and large, cannot be taken for granted.

The low labour productivity of the public sector is one of the major driving forces behind the various divestiture programmes throughout the world. Employment in most state-owned ports, and to that effect in the wider public sector by and large, is usually characterised by high levels of overmanning. Many times this is not only the result of the government's employment creation policy -particularly in developing countries with rapidly growing populations- but also of the fact that, through its permanency of employment, fringe benefits and stability of income, employment in the public sector is often an arduously sought after objective, many times attained through systems of 'political clientelism'.

The high levels of overmanning, together with the absence of risk in economic activity, the lack of accountability for economic performance, the impersonality of operational structures and a missing sense of belonging and achievement can very effectively remove workers' natural drive for more initiative, innovation and higher efficiency, consequently resulting in very low (and sometimes perhaps negative) labour productivity in ports.

The situation can be further accentuated by the fact that the general macroeconomic benefits of the public sector's involvement in port activities are dispersed throughout the regional/national Economy and thus are not immediately visible or directly beneficial to the workers who contributed to their accomplishment.

However, it would be fundamentally wrong to believe that the above are the only factors accounting for the low labour productivity of the public sector. Comparisons between different countries or between different sectors of the same Economy should therefore be contemplated with extreme care. Labour productivity ought not to be measured only as "output per man/hour" or "tonnes handled per gang-shift", as it is sometimes the practice in many ports, but as *output per man/hour produced with a certain stock of fixed capital of a given technology and operational characteristics*. Thus, differences in labour productivity between the private and the public sector could be explained equally well by the fact that the level of fixed capital investment in the latter sector is frequently inadequate or obsolete, due to the scarcity of financial resources, the budgetary constraints and the economic priorities of the government. Accordingly, any unconditional comparisons of labour productivity between, say, the ports of Rotterdam and Bombay should not be allowed.

Understandably, however, large scale employment in the public sector creates also inelastic government expenditures, increases the Public Sector's Borrowing Requirements (PSBR) and it may lead to inflation and high interest rates. In their turn, the latter can hinder the private (domestic and foreign) sector's propensity to invest and, subsequently, result in less output, employment and growth. Additionally, inelastic government expenditures can reduce the effectiveness of fiscal policy as a tool of economic stabilisation. The latter is (at least nowadays) almost invariably a pre-condition for the successful implementation of structural adjustment

programmes and too often the reason for the divestiture plans of the government.

It is sometimes argued that policies of public sector retrenchment, together with the encouragement of more private sector initiative, are rooted in ideological origins. However, regardless of how true this opinion may have been in the past, current economic and political developments world-wide can no longer support its validity. The real reasons for explaining the widespread popularity of the various divestiture programmes are to be found in the increasing economic interdependence among nations and the trend towards the globalisation of all forms of economic activity.

Regardless of ideological postures and doctrines, an increasing number of governments (and ordinary citizens) realise that they can no longer isolate their Economies or insulate them from external economic influences and shocks. Even if that were still possible, such a policy's effectiveness towards improving standards of living and increasing the general economic welfare of the country would be more than doubtful, at least today.

Current developments towards further liberalisation of international trade have been strongly supported by developing and Newly Industrialising Countries. For the first time in economic history, the impetus to trade liberalisation is not coming from industrial countries, which profess to accept liberal norms, but rather from countries whose past tradition has been to reject them. Most developing countries are now well aware of the tremendous potential benefits from the opening-up of their internal markets and the liberalisation of their external trade. These benefits are, of course, the result of their comparative advantage, due to their still low-basis growth in industrialisation (and, thus, their potential of achieving significant economies of scale), their inexpensive labour force and, in many cases, their rich endowment in scarce natural resources.

Apart from the rather obvious direct benefits from an export-led growth strategy, trade liberalisation and the opening of internal markets can also help developing countries to acquire all the necessary technology, know-how and foreign expertise that, together with the subsequent increased levels of Fixed Direct Investment (FDI), would allow them to accelerate the process of their economic development.

An export-led growth strategy, however, necessitates the adjustment of the economic, commercial and, many times, social characteristics of a nation to the business ethics and practices that are being employed in the game of international competition. In the rapidly changing world of technological innovation and of sophisticated demand requirements, the transition of many economies to market-oriented business practices, developed primarily in the capitalist world, cannot be always smooth. Furthermore, the time required for the gradual assimilation of these practices into economic and social conscience is not always available. Finally, the necessary processes of economic and social reform will be many times resisted by various pressure groups who, sometimes very justifiably, aim at safeguarding the country's environment, ethics, traditions, culture and religious values.

The retrenchment of the economic role of the State and the encouragement of greater private sector participation should constitute a careful long-term social cost-benefit analysis, undertaken by the government. The results of this analysis should form the government's basis for designing and implementing programmes of economic reform. Its strategy, once decided, should be firm,

with clear and transparent objectives, and it should be widely explained through a process of extensive consultation, particularly with those parties that are adversely affected by the proposed reforms. The importance of consultation in structural adjustment could not be over-emphasised, not only in securing labour's co-operation, but also in convincing the latter that the attempted reforms aim at enhancing the country's general economic welfare, which should be every government's utmost objective. This strong message has to be successfully and timely conveyed to trade unions and employees.

As it has already been mentioned, the problem here is that the wider, long-term benefits of economic transformation are not immediately and directly visible by all those, whose short-term well-being is adversely affected by the reforms, and it is only with the co-operation and consent of the latter that the reform process can be concluded in a frictionless and socially acceptable way. Employees have to be firmly convinced that retrenchment and economic austerity measures serve the nobler objectives of raising future incomes and standards of living as well of the eventual elimination of poverty.

The co-operation of trade unions should also be secured by convincingly arguing that, instead of their fruitless, short-run, pursuit of job-preservation in a rapidly changing technological environment, it would be to their members' best interest if they were to embrace more positive attitudes aiming at future job-creation. However, such arguments are bound to be more difficult to handle, particularly whenever it becomes evident that the new jobs are intended to be in the private sector, through enterprise-based labour agreements that tend to reduce union density and, thus, unions' influence in formulating labour policies.

Upon adopting a consistent, nation-wide, strategy on privatisation -or its variants-, governments of developing countries should not fail to *internalise* all the social costs incurred as a result of their divestiture programmes. The economic and social costs of redundancies should, thus, figure rather prominently among them. Assuming that, through privatisation, the government's objective is to raise the general economic welfare in the long-run, it would make sense to argue that workers who are made redundant due to the requirements of economic reform, should be adequately compensated by those who are -or will be- benefiting from it.

The existence of redundancy costs would undoubtedly reduce the financial attractiveness of the to-be-privatised ports, it could dilute private sector interest and it might, thus, prolong the timely completion of the reform process. The same would probably happen if the private investors who contemplate undertaking the previously state-owned ports, are obliged by law to also take over the existing labour force and keep it for a specified period.

The government has again a strong role to play in these deliberations: The various redundancy costs should not be contrasted only with the short-term financial prospects of the privatised port -which of course is the prime concern of the private investor- but with the long-term economic benefits of divestiture for the Economy as a whole. If this is the prevailing principle, the government should bear itself the costs of redundancies and it should finance them centrally. This approach would then constitute a form of income re-distribution towards those who had to lose their jobs, so that others could maintain theirs presently and in the future.

The re-distributional effects of such a policy, being cross-sectoral and multiplicative in nature,

are difficult to calculate, particularly if divestiture takes place in periods of economic recession when the government may find it difficult -if not impossible- to raise additional taxes. One of the reasons for the success of port privatisation in Malaysia, for example, was that it was designed and implemented at the right time, when the Economy was growing at an average annual rate of 8%, with apparent labour shortages and importation of foreign labour.

An additional problem with the central funding of redundancy payments is that it reinforces the general public's impression that divestiture often takes place merely in order to fill the Treasury's empty vaults and that the proceeds from privatisation are uneconomically dispersed to expenditures of dubious usefulness. Public support of divestiture programmes can, thus, be significantly reduced and the whole process prolonged or endangered.

Another method of financing redundancies that is likely to gain wider support from unions and workers is the direct financing through the proceeds from privatisation. In the port of Melbourne, a considerable part of the proceeds from the Port Authority's divestiture of major port superstructure and equipment were used for this purpose. This method's wider acceptability by unions and employees is based on its ability to promote an image of "fairness", to make directly and immediately clear and evident that workers' interests are not neglected or lightly discounted and, perhaps more importantly, to convince those negatively affected that the objective of divestiture is not to solve short-term budgetary difficulties of the government but rather to promote efficiency, growth and additional future employment.

A third method, rather suitable for countries that are particularly concerned with issues of income distribution and accumulation of wealth, is the financing of redundancy costs by those who directly benefit from the economic reform. Employers of privatised companies are here called upon to assume a significant part of the redundancy costs themselves and these costs should be a clear and quantifiable element in their investment appraisal exercises concerned with the evaluation of the financial attractiveness of the to-be-privatised port. Given the long-term macroeconomic benefits of privatisation, the government can -and normally should- share a part of these costs. Finding an optimum allocation of redundancy costs between the private and the public sector should thus be one of the main issues in the design of a port reform programme.

In the case of the Australian Waterfront Reforms, the government provided assistance on a "dollar-to-dollar" basis while, in New Zealand, there was no public funding of redundancies and the latter costs were recovered through levies imposed on port users, being the ones finally benefiting from the ports' improved efficiency.

The above method makes a lot of economic sense, particularly in the port privatisation attempts of developing countries. It can be very defensibly argued that although the economic and social costs of port reform are borne by the country itself, the benefits from the increased port productivity and lower charges -as a result of privatisation- can very well accrue to the foreign shipping operators servicing the country's external trade. In this way, and in the absence of adequate competition in international shipping (or perhaps in the absence of a protected national shipping industry, however condemnable this might be), reduced port charges are not necessarily reflected in lower transport costs, but perhaps in increased profits for the foreign transport operators. If that would be the case, it would be reasonable to argue that the latter operators should bear themselves the costs involved in increasing port productivity.

Again, in the absence of adequate competition in international shipping, levying shipping operators in order to recover redundancy costs may result in higher transport costs that could be easily passed-on to the final consumer. This would be particularly true if domestic commodity and product markets are either not developed, monopolistic or, in general, uncompetitive. However, given that redundancy costs are once-off or time-limited expenditures, the redistributional effects of such a situation would also be limited, and thus innocuous, as long as cargo levies are not becoming a permanent element in the port's cost structure.

Furthermore, the ability to levy foreign operators depends on the port's competitive position, nationally and internationally. If additional levies -for redundancy payments or for any other purpose- are not accompanied by commensurate reductions in port charges as a result of the increased port productivity, and provided that adequate port competition prevails, the additional costs to the shipowner may influence his decisions on port selection. In this case too, however, the short-lived character of redundancy payments is not very likely to have a marked effect on such decisions.

Finally, the "user pays" principle should also be very welcomed to the foreign ship-operators servicing developing countries' external trade, given their interest in the existence of efficient ports in their trading areas. This interest is immediately understandable from the mere fact that, the whatever benefits might potentially accrue to them from their investments in large ships and integrated transport systems, could be easily withered away by inefficient port operations at their ports of call.

The dissemination of benefits from increased port efficiency, however, deserves some further elaboration. This is important given that, during consultation and in order to secure workers' co-operation in the implementation of the reform process, the benefits from the public sector's divestiture must be as tangible and clear as possible. In this context, and having assumed that private sector economic operations are, as a rule, more efficient than those of the State, the question that still remains to be answered concerns the economic effectiveness of the private sector's higher efficiency and the distribution of the benefits of this efficiency among the citizens of the region or country.

A good starting point in this discussion is the port's economic significance within the overall transport chain and its role as a trade facilitator and as a crucial instrument in an export-led growth strategy. It has often been argued that inefficient and expensive ports can severely disadvantage a country's export competitiveness and, thus, hinder economic growth. Although, in theory, this argument holds true, the overall effect on export competitiveness can only be evaluated after having first examined the commodity structure of exports, and also after having estimated the price elasticities of exports in the countries of their final destination.

Even this approach, however, could be inadequate, given that export competitiveness is not only a function of price, but it also depends on attributes such as quality, reliability, packaging, marketing etc. Relevant but of minor long-term importance in this respect is also the fact that domestic exporting industries should have the adequate capacity and flexibility in order to be able to comply with the increased demand for exports without creating bottlenecks, inflation and, thus, further unemployment of productive resources.

It has already been mentioned above that, in the absence of adequate competition in international shipping, the benefits from increased port productivity and lower port charges may well result in higher shipping profits rather than be transmitted to the country's final consumers through lower product prices. Inefficient domestic product markets can further accentuate this result.

Another important consideration regarding the effectiveness of increased port productivity, and the distribution of benefits from it, concerns the port's role within the overall transport chain. The efficiency of a port and the desirability of government divestiture and other port reform plans cannot be judged in isolation but only within the economic framework the port operates. More and more ports in a large number of countries are losing their traditional function as merely interface points between land and sea and are assuming the much wider function of a crucial link in the production-transport-distribution chain. In this way, inefficiencies in the other parts of the chain can easily nullify all benefits derived from improved port efficiency.

For example, many otherwise efficient ports have been known to be faced with extremely bureaucratic and time-consuming customs regulations resulting in unacceptably high dwelling times. In others, where handling rates of 20 TEUs per crane-hour are boasted, it may take three hours from the gate to the motorway (1 km) due to excessive road congestion and to the fact that trucks have to transverse the city centre. In a number of ferry ports, passenger/drivers have been known to be queuing for as much as 12 hours, under extreme weather conditions, in the middle of the city, without access to even elementary sanitary facilities, only because an advance-booking system is not considered by the shipping agents -operating in a cartel- as a good idea.

Bottlenecks and inefficiencies such as these in the port's operating environment can easily choke-off and annihilate any potential benefits from introducing commercial principles and practices in cargo-handling and/or other direct port services. If these issues are not seriously taken into consideration, port unions would be quite justified in arguing that, in cases like the above, their members would have to bear the consequences of divestiture, while the benefits are used to cross-subsidise other inefficient economic activities (such as the provision of inadequate road and rail capacity) where no reform is being planned in the near future.

The above notes are by no means meant be taken as making the case against the introduction of commercial principles in port operations. On the contrary, the benefits from such a policy permeate the whole of this paper. The only point that is made here is that the successful implementation of port reform plans -if they aim at ensuring general support in democratic societies- must fit within a general strategy of economic reform, where all its implications and consequences are thoroughly debated through honest and sincere dialogue. Piece-meal, *ad hoc*, or unsubstantiated attempts to privatisation are not likely to gain the support of unions and of the general public.

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GATT and its Effects on Shipping and Ports[1]

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Introduction

The title of this paper is more ambitious than what its contents justify. The agreement signed in Marrakesh in April 1994 consists of twenty thousand pages that, at a rate of twenty pages per night, could make interesting bed time reading for many of us, for 1001 (Arabian) nights. Although this paper tries to speculate on the effects on shipping and ports of the most important GATT principles, such as those of *Most Favoured Nation, National Treatment, Market Access* and *Subsidies and Anti-dumping*, it does not touch the equally important issues of *Trade Related Investment Measures (TRIMs), Rules of Origin, Pre-shipment Inspection (PSI), Customs Unions* and *Free Trade Areas*.

Peter Sutherland, Secretary General of GATT, described the conclusion of the Uruguay Round as a *defining moment in modern history*. This may indeed be so but GATT was not signed because people were convinced of its positive effects but because they were rather brainwashed about the "disastrous" consequences of not reaching an agreement. Ironically, the reasons for excluding Maritime Transport from the agreement on trade in services were rather the opposite. The sector was not excluded because people failed to see the advantages but because they feared the potential disadvantages that could result from clauses favouring protectionism.

Against popular belief, the philosophy of GATT is not about trade liberalisation but about non-discrimination. The two things are not necessarily the same and the one does not necessarily lead to the other. GATT allows for protectionism - through tariffs or otherwise - provided that Parties are not treated differently and, on the other hand, the commitment of countries to reduce or eliminate their trade barriers does not exclude their ability to discriminate through a myriad of ways that they have at their disposal.

Europe's role in these discussions has been rather ambivalent. With more than thirty million people structurally unemployed (a situation reaching the limits of a social crisis in countries like Finland, Sweden and Spain) and with its infamous welfare systems at shambles, policies of “day by day survival” are becoming the norm and Europe’s pursuit of the holly grail of a “level playing field” assumes surrealistic dimensions.

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The General Agreement on Tariffs and Trade

The GATT System operates in three ways:

- as a set of multilaterally-agreed rules governing the trade behaviour of countries providing, in essence, the “rules of the road” for trade;

- as a forum for trade negotiations in which the trade environment is liberalized and made more predictable either through the opening of national markets or through the reinforcement and extension of the rules themselves;

- as an international "court" in which governments can resolve disputes with other GATT members.

The basis of the GATT has always been its rules and procedures: the most basic commitment is not to liberalise trade, but to maintain equal treatment of trading partners, "*Most Favoured Nation*" (MFN) treatment for all fellow members, and to avoid disruptive changes in policies affecting trade, most notably by the "binding" of tariffs.

GATT does not prohibit protection for domestic industries. However, a second basic principle is that where such protection is given, it should be extended essentially through tariffs and not through other commercial measures. Among other things, the aim of this rule is to make the extent of protection clear and to minimize the trade distortion caused.

The method of GATT negotiations has embodied a mercantilist approach to trade, offering reductions in trade barriers as a "concession" rather than viewing them as a gain to those making them, combined with the requirement that all such concessions be extended to all other members. A *concession* is defined as a reduction in restrictions on imports whereby concessions from other countries are won at the "cost" of relaxations in one's own import regime.

GATT comprises a set of trading rules that apply generally across commodities and contracting parties. There are exceptions both for countries (developing countries in particular) and commodities (e.g. agricultural products). One of the main exceptions to the general GATT rules against quantitative restrictions concerns cases of balance-of-payments difficulties (article XII). Even then, restrictions must not be applied beyond the extent necessary to protect the balance-of-payments and must be progressively reduced and eliminated when they are no longer required. This exception is broadened for developing countries, by the recognition (article XVIII) that they may impose quantitative restrictions to prevent an excessive drain on their foreign exchange reserves caused by the demand for imports generated by development, or because they are establishing or extending their domestic production. Where quantitative restrictions are allowed, they should be applied without discrimination (Article XIII).

There are also "waiver" procedures (article XXV) under which a country may, when its economic or trade circumstances so warrant, seek a derogation from particular GATT obligations. *Customs Unions* and *Free Trade Agreements* (FTA) are allowed (article XXIV) as an exception to the general MFN rule, provided that certain conditions are met. In a nutshell,

article XXIV requires that (a) all trade within the "Area" be liberalized and (b) tariffs applicable to countries outside the "Area" should not be more restrictive than those in existence before the creation of the FTA.

GATT's two principal pillars are non-discrimination and reciprocity. Non-discrimination has two dimensions: the Most Favoured Nation clause requires that, subject to identified exceptions, imports from all sources should face identical barriers, while *National Treatment*, (NT), requires that, once through customs, foreign goods are not subject to taxes or regulations more onerous than those on equivalent domestic goods. On the other hand, "reciprocity" was never defined in detail. The means to achieve it were developed informally and have changed over time, but its centrality has never been -nor could ever be- challenged in the context of voluntary agreements between sovereign nations. An obvious tension, however, exists between "reciprocity" and MFN, making the combination of bilateral reciprocity and MFN rather difficult to manage due to the resulting "free-rider" problem (see below).

Services in the GATT Negotiations

In 1982, the United States submitted a document to the GATT that placed great emphasis on the importance of services to the world economy and on the GATT as a "solid basis" for a framework for *trade in services*. In all previous Rounds, the major issues were tariffs; agriculture was excluded and the major bargains were among the industrial countries. Four main regional clusters became apparent in the period just preceding the *Punta del Este* meeting:

1. the United States and some OECD countries that favoured the original proposal;

2. the European Union, some OECD members and some developing countries that were working towards an overall compromise;

3. the G10 group of ten developing countries, led by Brazil and India, which strongly opposed the U.S. initiative;

4. a group of twenty developing countries (G20) that were prepared to accept the U.S. proposal depending on the terms.

Negotiations on trade in services were launched through part II of the *Punta del Este* declaration of September 1986. Following the adoption of the *Punta del Este* declaration, the *Group of Negotiations on Services* (GNS) was established, with a program for the initial phase of the negotiations that, in broad terms, aimed at addressing underlying issues that were not resolved in the ministerial declaration while, at the same time, shedding some light on how to satisfy the guidelines and objectives agreed upon in *Punta del Este*. The work program of the GNS that was agreed in February 1987 consisted of five agenda items:

- definitions and statistics;
- concepts;
- sectoral coverage;
- existing sectoral arrangements and disciplines (the GNS extended invitations to participate in the relevant GNS discussions to, among others, UNCTAD);

- measures and practices contributing to or limiting the expansion of trade in services.

Services were included in the Uruguay Round in a rather semi-formal way that resulted in questions as to whether they were part of the GATT system or not. For many services, particularly transport and finance, there were already international agreements or regulatory frameworks in existence, so that the principle of international intervention was not the issue. However, such agreements were normally collections of bilateral arrangements or unilateral concessions, with no provision for MFN-type extension to all participants. The reasons for bringing them under the GATT included the taking of advantage of their enforcement mechanisms and the use of multilateral frameworks both to accelerate negotiations, which otherwise had to be country by country, and to permit the striking of deals across services and merchandise trade.

The General Agreement on Trade in Services (GATS)

The concept of *Market Access* played a central role in the discussions on services, reflecting the interests of export-oriented multinational service industries and government agencies seeking liberalisation and/or deregulation of domestic service markets. Services (particularly direct ones) differ from merchandise goods in that international transactions frequently require consumers and suppliers to be at the same place at the same time (something, however, that is changing fast with the advances in telecommunications). As a result, market access restrictions for services may involve not only barriers to the cross-border exchange of services, but also policies affecting the physical entry of service producers into markets where consumers are located.

The final draft of the General Agreement on Trade in Services (GATS) was presented on December 20, 1991. Article I distinguishes four *modes of supply* to which the Agreement applies. These are (a) the cross-border supply of a service (i.e. not requiring the physical movement of supplier or consumer); (b) the provision implying movement of the consumer to the location of the supplier; (c) services sold in the territory of a Party by (legal) entities that have established a *commercial presence* there but originate in the territory of another Party; and (d) the provision of services requiring the *temporary* movement of *natural* persons (service suppliers or persons employed by them who are nationals of a country that is Party to the Agreement).

A core general obligation of the GATS is the *unconditional* MFN treatment. Other general obligations deal with transparency; economic integration; recognition of licenses and certification; domestic regulation; behaviour of public monopolies and behaviour of private operators.

National Treatment is defined as treatment no less favourable than that accorded to "like" domestic services and service providers. However, such treatment may or may not be identical to that applying to domestic firms, in recognition of the fact that identical treatment may actually worsen the conditions of competition for foreign-based firms (e.g. a requirement for insurance firms that reserves be held locally). Although quite similar in wording to GATT's NT provision, it implies significantly different obligations in an operational sense, given that NT is not a general obligation in GATS: Once access to a market has been achieved through one or more of the *modes of supply*, the NT commitments of the relevant party specify the conditions

under which the foreign service providers can compete in the domestic market for each of the modes concerned.

Although, conceptually, the distinction made in GATS between *Market Access* and *National Treatment* is relatively clear, the distinction may be difficult to draw in practice. This is because market access restrictions in the form of limitations or conditions on *modes of supply* are likely to violate NT for these modes as well. The articles are not integrated, because the market access obligation also pertains to quantitative limitations that are applied on a non-discriminatory basis. An example of such a non-discriminatory quantitative restriction is a requirement that only a given number of firms -whether of foreign or domestic origin- may provide a specific service. Such policies are in principle prohibited under article XVI. Any such measures that countries might desire to maintain for services that are included in their *Schedules* must be listed. While the use of separate *Market Access* and *National Treatment* provisions partly reflects a desire to maintain the GATT distinction between measures that are applied at the border (market access restrictions) and measures that are applied inside the border (national treatment), it also reflects one of the distinguishing characteristics of service markets: the fact that the contestability of such markets is frequently restricted by non-discriminatory regulations.

The Principles of GATT

Most Favoured Nation (MFN)

Non-discrimination in the GATT is expressed in the *Most Favoured Nation* concept in its unconditional form. Article I of the GATT provides:

> *...with respect to customs duties and charges of any kind imposed on ... importation or exportation ... any advantage, favour, privilege, or immunity granted by any contracting party to any product originating in or destined for any country shall be accorded immediately and unconditionally to the like product originating in or destined for the territories of all other contracting parties.*

There are exceptions to this rule relating to customs unions and free trade areas that were part of the GATT from its inception, and preferences for developing countries that were added later.

The requirement of article I that a *concession given* to one has to be given to all could actually discourage negotiations on the reduction of barriers. Each country could drag its feet in negotiations knowing that it would get the benefit from reductions in other countries' barriers whether it reduced any of its own or not: it could "free-ride" on the negotiations of others. Free-riding has been curtailed in the successive rounds of GATT talks by negotiating concessions between principal suppliers on narrowly defined products while at the same time covering a wide range of products in the negotiations as a whole. During the Tokyo Round, a *formula reduction* in barriers (with exceptions) was adopted, and this also helped to curtail the problem of "free-riding".

It appears, however, that unconditional MFN is being eroded in the trade of goods, as many countries focus more on the bilateral rather than on the multilateral and systematic aspects of trade policies. In recent years, the main players in GATT have shown considerable reluctance to extend the benefits of the new Agreements to all members, even when these Agreements had been interpretations of the GATT articles. Many signatories have extended the benefits only to the co-signatories of the particular Agreement. With such attitudes prevalent, there might be little chance that the benefits of the Agreements on services would be extended to any, except the signatories to the relevant Agreements.

By its very nature, MFN is weighted in favour of the developed countries and it may hamper the development process of LDCs and their efforts to achieve growth through trade. In a global economic climate which remains ever more uneven and lopsided, it is unrealistic to assume absolute equality among Contracting Parties. In recognition of the inequity occasioned by the MFN-principle, the GATT Part IV on Trade and Development (Art. XXXVI-XXXVIII) introduced the *Differential* and *More Favourable Treatment* for LDCs, which provides the recognition of tariff and non-tariff preferential treatment in their favour as a permanent legal feature of the global trading system.

National Treatment

National Treatment is to be distinguished from MFN; it refers to the treatment of foreign products (or suppliers) not with respect to each other but with respect to national products (or suppliers). Article III of the GATT requires that internal taxes, regulations and the like should not be applied to imported or domestic products so as to afford protection to domestic production. It has sometimes been implied that, for some services, NT means equality of treatment of foreigners and nationals.

In certain cases, GATT may authorize or legitimize certain forms of discrimination against goods produced by foreigners. The generally authorized form of discrimination according to source is an import tariff, although in some circumstances quantitative restrictions on imports are also permitted. NT then implies that once the authorized form of discrimination has been imposed on a product, there should be no further discrimination according to national source. When one views *national treatment* in this manner, the way in which it could be extended to services is readily apparent. A general agreement on services could include a provision for specifying particular means of discrimination against foreign-produced services. Sector-specific agreements could then identify the particular form or forms of authorized discrimination for the services in that sector, and particular levels of these forms of discrimination could be bound among the parties to that agreement. *National treatment* would then imply that in all other respects domestic and foreign producers should be treated equally.

Dumping and Safeguard

Dumping is traditionally defined as selling at a lower price in one national market than in another. Accordingly, Viner, in his classic study of dumping, concluded that dumping should be confined to "price discrimination between national markets". The classic dumping case is that in which a country sells goods abroad at a price lower than the price prevailing in its home market. The *rationale* for dumping products in a foreign market is analogous to that for price

discrimination within a domestic market: the discriminating firm can maximize its profits by charging different customers different prices for essentially the same products.

Abuse is central to the negotiations on anti-dumping. These actions are meant to protect domestic producers against predatorily priced imports, but they may now have become a preferred protective instrument in some countries. For example, since 1980, the four leading users of anti-dumping measures (Australia, Canada, the EC, and the United States) have initiated over 1,000 investigations, of which some 50 percent have led to action. As a result, the countries that are often subject to such actions -led by Japan and other Asian exporters- want clear rules to prevent unpredictability; they suggest an agreed methodology for calculating dumping margins and strict limits for the period between initiation and definitive findings of anti-dumping actions. On the other side, the EC and the United States want the rules to cover circumvention (e.g. assembly of dumped inputs in the domestic or third markets). However, the framing of rules to determine "intent" in investment decisions is difficult in the face of the internationalization of production that can make exporting via third countries, or moving assembly operations into markets, an economically sensible undertaking.

The definition of dumping, as described in GATT and elsewhere, is often expressed as the sale of products for exports at a price less than *normal value*, where the latter is roughly defined as the price for which those same products are sold in the "home" or exporting market. The difference is called the "margin of dumping". It is often very difficult to determine the correct prices which have to be compared in order to determine whether dumping is present or not. Things become even more complicated in cases of countries where a "home" price does not exist due to barter trading arrangements (former Soviet Block) or when the inconvertibility of national currencies makes price comparisons meaningless.

The opportunities for profits from dumping will depend upon the interaction of three variables:

(1) *the demand for the dumping firm's product in its own country and abroad*: the firm will be more likely to profit from dumping if the home demand for the dumped goods is inelastic while the foreign demand for the same goods shows a high price elasticity.

(2) *the barriers to re-entry into the exporting market*: a condition for a successful dumping scheme is, therefore, the effective insulation of the home market from the world market for dumped goods.

(3) *the nature of the firm's cost structure*: in general, a firm will not dump unless the marginal revenue that it derives from abroad is substantially greater than its marginal costs of production for dumped goods. Generally, this can be achieved at a lower foreign price only when the cost curve is descending at the margin, i.e. when there is a declining cost industry involving economies of scale.

Given the long history of national and international concern on dumping, it is not surprising that when the GATT was negotiated in 1947, special attention was given to such cases. Article VI of GATT allows Contracting Parties to utilize anti-dumping duties in order to offset the margin of dumping, provided that it can be shown that such dumping is causing or threatens to cause "material injury" to competing domestic industries.

As time passed, however, some countries in GATT began to feel that other countries were applying their anti-dumping laws in such a way as to raise new barriers to trade. Thus, during the Kennedy Round of GATT trade negotiations (1962-1967), the GATT contracting parties negotiated an "Anti-Dumping" (AD) Code, which set forth a series of procedural and substantive rules regarding the application of anti-dumping duties, partly due to the desire to limit anti-dumping duty practices and procedures of governments which were damaging international trade. During the Tokyo Round (in 1973), a new anti-dumping code was negotiated whose official title was "Agreement on the Implementation of Article VI of the General Agreement on Tariffs and Trade". The code came into effect in 1979. Although GATT reports that as many as twelve countries have used anti-dumping laws from time to time, it is commonly understood that four traders are the principal users of anti-dumping laws, sometimes allegedly in order to inhibit imports: the United States, the EU, Canada, and Australia.

The original GATT (Article VI) called for the *material injury* test in anti-dumping and subsidy cases, and the language of this test has been carried over in the three codes concerning anti-dumping and countervailing duties, namely the two anti-dumping codes (1967 and 1979) and the subsidies countervailing code of 1979. Not surprisingly, the US law concerning the *material injury* test for both the anti-dumping and the countervailing duty cases has not always been completely consistent with the GATT rules. Since these laws preceded GATT, the United States benefited from *grandfather* rights with respect to injury test matters.

In order to find "dumping", the rules compare the export price with some "fair" benchmark. At some time this was essentially a price discrimination test - a comparison of the price for export with the price in the home (exporting) market. However, there was always allowance for the case where the "home" price was not comparable, either because there were no home market sales, or for other reasons. The traditional approach in such cases has been to turn to comparisons with sales to third markets, or to a "constructed cost" method of arriving at a "fair" home price. During recent decades, however, more attention has been focused on the "cost" of goods produced abroad and there has been a shift from exploring potential "price discrimination" to a determination of whether the exported goods have been sold at a price which is "below cost".

Both anti-dumping and countervailing duties require, under international rules, fulfilment of the "material injury" test. The basic idea is that in the case of imported dumped or subsidized goods, the importing country is not authorized to respond with anti-dumping or countervailing duties (as an exception to other obligations in GATT), unless it can be established that the imported goods have caused "material injury" to the competing industry of the "like" product in the importing country. Further, in GATT 1994, no complaints are investigated unless they are lodged by at least the 25% of those adversely affected; when the price movement represents less than 2%; and/or when the change in the volume of imports is less than 3%. Exporters threatened with an anti-dumping investigation can either negotiate an *Export Restrain Agreement*, aimed at reducing the volume of imports, or relocate production to the country threatening with anti-dumping action.

The potential for proliferation of anti-dumping measures has increased considerably as many developing countries are combining the liberalization of their import regimes with the adoption of national legislation incorporating anti-dumping measures. With the objective of reducing the possible abuse of anti-dumping measures, efforts were undertaken in the Uruguay

Round to establish more precise and stringent multilateral disciplines aimed at introducing more predictability and reducing arbitrariness in the application of anti-dumping duties. The revised draft Agreement on Implementation of Article VI of the GATT (Anti-dumping Code) was one of the major components of the rule-making area.

Compared to the Tokyo Round, the Agreement contains more details on the "determination of dumping" and the "determination of injury"; something that could be generally considered as a positive outcome for those countries that are subject to anti-dumping investigations. In particular, the new specifications aim at making the determination of dumping less arbitrary for exporters. New provisions concerning a) the examination of additional factors (other than dumped imports) for ascertaining causality between dumping and injury and b) the more precise factors pertaining to the determination of *threat of material injury*, could be also considered as improvements to the Tokyo Round Code. For the first time in any GATT anti-dumping code, this Agreement also specifies that any definitive anti-dumping duty is to be terminated on a date not later than five years from its imposition (or from the date of latest review), unless the authorities determine otherwise, in a new review initiated before that date.

GATT and the Developing Countries

The share of developing countries in total trade has increased from 21% in 1973, the beginning of the Tokyo Round, to 26% in 1986 when the Uruguay Round opened. As many of them are now significant markets for the exports of most industrial countries, access to their markets and regulation of their trade policies have become the objectives of the traditional participants of the Round. It could be argued that, in the period since 1973, developed countries have increased their protection while developing countries, by choice and because of pressure from the international financial organizations, have liberalised their trade. Interestingly, for the first time in economic history, the impetus to trade liberalisation is not coming from industrial countries which profess to accept liberal norms, but rather from countries whose past tradition has been to reject them. A comprehensive passage in the *Montreal Declaration*, titled "*Increasing Participation of Developing Countries*", could be of special relevance here. It directly linked greater participation in world trade in services and expanded services' exports by developing countries to the strengthening of the capacity, efficiency, and competitiveness of the domestic services' sectors of their economies.

In the Uruguay Round of GATT trade negotiations, changes in policy towards, and by, developing countries have been central objectives and concerns for both industrial and developing countries. In the July 1991 review of progress (GATT, 1991b), the spokesman of the developing countries (the Brazilian ambassador, Rubens Ricupero) pointed out that *...without awaiting the conclusion of the Round, we have opened our markets, we have given away our non-tariff measures, our exceptions for balance-of-payment-protection....having put aside our weapons, having placed our faith in the system, we cannot afford to wait any longer. We cannot allow the Round to drag on indefinitely...*

Although developing countries had not played an important part in previous Rounds, demands on, and by, them had always been on the table, in all the major "negotiating groups" into which the discussions were divided. The reasons for this include:

- the increasing economic importance of developing countries;
- the attempts to extend the role of GATT into new areas, in some of which developing countries have a crucial role to play;
- the significant changes in the nature of trade policy on both sides.

Exceptions for Developing Countries

A constant stream of developing countries is seeking accession to GATT. As a consequence, in 1965, a new chapter -Part IV- was added to the General Agreement. Industrial countries also accepted that they would not expect reciprocity for commitments they made to reduce or remove tariffs and other barriers to trade. The only agreed exception to non-discriminatory treatment, introduced in 1971 by amendment to the original treaty of 1948, was for developing countries: they may receive special preferences, for example the Generalised System of Preferences (GSP), or they may introduce "exceptional" import controls. In practice, however, and in the past, developing countries were allowed further special treatment, through indefinite postponement of their obligation to bind tariffs. At the same time, developed countries also enjoyed special privileges, which worked against developing countries: GSP preferences were not "bound" or contractual, and the agricultural, textiles and clothing sectors were largely outside the normal GATT rules.

GATT and Maritime Transport

As it has been mentioned above, the aim of GATT is to liberalize world trade and place it on a secure basis. With the reduction of tariff and non-tariff barriers achieved in various rounds of negotiations, GATT is expected to increase substantially the volume of international trade which in turn should increase the demand for maritime transport services.

Quantifying the overall effect of GATT 1994 on both world trade and world GDP is hard because many of the most significant gains will come from outside the traditional areas of merchandise trade. Despite this, a number of studies have made the attempt. The studies carried out by the OECD, the World Bank and the GATT broadly agree that the boost to world GDP will be between $213bn and $274bn after ten years, or roughly 1.0-1.2% of world GDP as a step-gain. The joint World Bank/OECD study, with the lower estimate, does not include non-tariff barriers on industrial products, while the follow-up OECD study does [EIU 1994]. If this increased volume of trade is realised, together with the other dynamic effects of trade liberalisation, it could generate the equivalent amount of sea transport demand which could help the shipping industry exit from its current structural depression.

GATT could affect shipping and ports in another way, namely in the furtherance of liberalization of the maritime transport sector and its inclusion in the GATS framework. As the Uruguay Round concluded without adopting an agreed position for maritime transport (shipping is loosely included within a wider GATT framework but excluded from the specific round settlement), the prospects of the industry, with regard to further liberalization, become somewhat vague. However, a strong appeal for further liberalization in shipping comes from both traditional maritime nations and developing countries, though the understanding of *liberalization in shipping* remains different.

Notwithstanding shipping's exclusion from GATT 1994, it is believed in this paper that the discussion is still open and relevant, on issues such as the applicability of the various GATS principles in the shipping industry, the possible effects of GATS on shipping and ports, the principles on which the liberalization of shipping should be based and the way in which the GATS principles should be implemented in the maritime transport sector.

Objectives of Further Liberalisation in Shipping

Based on the liberal spirit of GATS and the present situation in the shipping industry, the following objectives could be considered as relevant within the context of a GATS framework for the liberalization of the industry.

- *The immediate or gradual removal of all restrictive measures.* This may mean that each country would now have the possibility to participate, on a competitive basis, in international seaborne trade. There should be no discriminatory treatment in any areas such as ports, agency operations and freight forwarding. All arrangements with regard to cargo reservation, preference and cargo sharing should be immediately or gradually removed. Governmental financial and non-financial incentives towards the domestic shipping and shipbuilding industries should be immediately or gradually abandoned.

- *The achievement of a more competitive environment in shipping markets*. As free competition has been hampered by various commercial and institutional arrangements, further liberalization in shipping, by being included in the GATS framework, should aim to remove the obstacles which prevent free competition. In this sense, the conference system, consortia and stabilization agreements should be re-examined under a 'different' light.

- *Liberalization in maritime transport should aim at a closer cooperation between the Traditional Maritime Nations (TMN) and LDCs*. The cooperation areas are wide, ranging from technical cooperation, training of crews and management staff and policy consultation, to commercial cooperation and even joint venture. Cooperation between TMNs and LDCs can promote the development of international trade and the industrialization of the developing countries while it could also contribute to further liberalization in the sense that LDCs might give up their cargo reservation and sharing systems, in exchange for a higher participation in shipping. This cooperation could extend to environmental protection and to a better implementation of international safety regulations.

Possible Effects of GATS on Shipping and Ports

The issue immediately arising with respect to the MFN principle is that of *cargo sharing* through bilateral and multilateral agreements. Unconditional application of the MFN clause in maritime transport could mean that all countries who exercise cargo sharing should immediately or gradually phase out all or some of their practices, or otherwise extend cargo reservation and/or sharing privileges to other Parties. The following effects might result from the implementation of this clause:

- Insufficient demand for the LDCs' fleets caused by the removal of cargo reservation practices, which may shrink their maritime industries.

- If MFN is binding, LDC governments may seek other protectionist measures, in order to establish and develop their national fleets. These measures may include governmental financial assistance or other forms of cargo reservation such as *government cargoes*.

- As the UN Code of Conduct for Liner Conferences appears not to be in conformity with the MFN clause, the strict implementation of this clause may mean the end of the Code. Since the Code is expected to prevent unilateral cargo reservation by LDCs, its end, or withdrawal from it, may cause new or greater cargo reservation.

- Since the loss to LDCs from a strict implementation of MFN to shipping could be rather heavy, LDCs may seek the partial or complete non-application of the MFN clause. As MFN is the most important clause in the GATS framework, if LDCs can successfully derogate from this commitment and, without standstill and roll-back provisions, they could be encouraged to continue, or introduce new, restrictive cargo reservation measures. If so, the inclusion of maritime transport into GATS will have very little effect on the promotion of liberalization in the shipping industry.

- If all kinds of cargo reservation are phased out immediately, it will be difficult, if not impossible, for LDCs to participate in maritime transport. This is contrary to the principle of *increasing participation of developing countries*. A compromise may be the gradual phasing out of cargo reservation, i.e. LDCs may demand a time-limited derogation from MFN. During this period of derogation, LDC governments can strengthen their national fleets by promoting improvements in management know-how and by seeking technical and commercial cooperation from developed countries while at the same time diminishing the extent of their dependence on cargo reservation or other restrictive measures.

As far as the EU and some OECD countries are concerned, the 1992 Regulation on the implementation of Regulation (EU) 4055/86 has shown that there still exist some bilateral agreements concerning cargo sharing cases which have not yet been phased out or adjusted. However, examples of cargo reservation arrangements between EU Member States are not so often seen as in the case of the developing world. Since there are only *some* cargo sharing practices with third countries under the UN Liner Code, the MFN clause would have only limited effect on EU shipping. EU countries may benefit from the implementation of this clause in the following aspects:

- The immediate or gradual phasing out of cargo reservation and cargo sharing will increase the total cargo tonnages available to them in the sense that they can provide high quality services, compared with those of LDCs. This tonnage increase, however, will depend on the comparative advantage of their fleet and, of course, on the extent to which restrictive measures will be relaxed.

- If the phasing out of cargo reservation and cargo sharing arrangements could adequately increase the cargo volumes available to EU fleets, this might also help them to walk out of the current depression. In this case, and with freight rates returning to normal levels,

governments may consider reducing some of their various assistance schemes, which are both a burden to them and a target for LDCs.

National Treatment and Maritime Transport

NT, if binding, can be the most important principle applicable to maritime transport. As the GATS states, ...*Parties shall accord to other Parties no less than that accorded to domestic services or domestic service providers*... Equality of treatment between foreigners and nationals imply that protectionist measures, such as cargo reservation and preference for national shipping, discriminatory taxes and charges towards foreign flag ships etc., are contrary to this principle.

Cargo reservation may be arranged by national legislation. For example, in Ecuador, the Export Facilitation Law still stipulates that all exported oil products, which along with their derivatives account for approximately 52 per cent of total Ecuadorian exports, have to be transported by national ships. In South Korea, the cargo reservation law which confined the carriage of many bulk imports to the country's ships is now to be relaxed. In mid-1992, the Nigerian National Maritime Authority announced its intention to bring into force legislation, dating from 1987, requiring shippers to notify it of intended cargoes, in order to allow it to allocate them to domestic conference lines.

In the United States, cargo reservation is exercised through the various definitions of *government cargoes* such as government-financed cargoes, foreign aid cargoes, surplus agricultural commodities and relief aid, itemised or designated cargoes, energy transport, defence and security transportation, government supplies etc.

The implementation of the *National Treatment* clause may bring about at least the following effects.

- Under a strict implementation of NT, any restrictive measures in favour of domestic shipping should either be removed or extended to foreign shipping companies. For LDCs, this would mean a further reduction of the demand for their national fleets, if they are not competitive enough. Concerning US shipping, the effects would be similar but less destructive.

- The implementation of *National Treatment* would also mean the removal of any discriminatory charges and taxes levied against foreign flag ships by, mainly, LDCs. In Nigerian ports for example, national carriers are allowed to pay charges in Naira (the local currency), while foreign lines must pay in U.S. dollars. A similar situation exists in China where foreign lines are asked to pay in US dollars, according to a particular tariff, while domestic shipping companies are allowed to pay in RMB (the local currency). Thus, although the effects could be negative for many LDCs, TMNs would benefit as they are the victims of discriminatory charges and taxes.

- Although the above restrictive measures provide less effective protectionism than cargo reservation and similar arrangements, their removal may reduce national tax income, the income of stevedoring and other companies and the income of the Port Authority. Port conditions in LDCs are inferior to those of TMNs and port charges constitute an

important source of foreign currency, which is a commodity in scarce supply in these countries. The reduction of port income might reduce investment in port infrastructure and maintenance and the implementation of NT may cause further deterioration of port conditions in LDCs. Of course, the extent of the deterioration will depend on the level of discrimination that individual ports exercise. The alternative may be that LDCs increase the tax and charges levied on domestic carriers to the same level as that of foreign flags. China is now in a process of making domestic shipping companies pay the same amount as the foreign ones. This will increase the revenue of the ports which in turn could improve the port facilities. Obviously, all ships calling at the port would benefit but the national fleet would now be less protected than before.

- The implementation of *National Treatment* (and *Market Access*) may also mean the entitlement of foreign ships to access and use the port infrastructure and facilities. These may include the physical port infrastructure, like anchorage, berths, lightering, garbage collection etc. as well as services related to navigation and cargo handling, like pilotage, towing and tug assistance, stevedoring and terminal services and communications. It may also include customs, maritime agency, freight forwarding and so on. With respect to all these facilities or services, foreign ships should be treated in the same way as domestic ones and the priority of the latter in using port facilities should be lifted. In cases of port congestion, domestic ships could suffer more than before. On the other hand, for ports with under-utilised facilities (and low marginal costs), increased market access could mean higher port revenues, operational improvements, lower turnaround times and transport costs, and an increase in overall consumer welfare.

- Another implication of this article may relate to the ability of foreign companies to own and operate the port infrastructure and installations, i.e. to allow shipping companies or other organizations to establish and run terminals and related installations in other countries. In many developed countries port investment is treated as investment in any other sector and foreign companies are allowed to invest in port and related infrastructure without too many restrictions. In LDCs, however, there are still some legal procedures that prevent this kind of investments, mainly due to considerations of sovereignty and the perceived importance of transport infrastructure in international trade. Port facilities built by foreign companies can be either exclusive or public. If they are meant for public use, the benefits accrued to LDCs would be substantial, especially in those countries that lack port facilities or money to invest in port improvements. But if these facilities are for private use only, they may not directly contribute to LDC shipping. However, they may generate taxes and other contributions, such as employment and increased consumption of domestic goods and services. The P&O Group investments in terminals in two Chinese ports (Shekou and Zhangjiagang) are expected to contribute both to the improvement of port capacity, especially the container handling capacity, and to employment, tax revenue and management know-how.

- The last important effect of the implementation of NT to shipping and ports concerns cabotage restrictions. The lifting of cabotage is an important step towards the integration of coastal and international shipping and the efficiency of multimodal transport. The opening of this area to outsiders, even conditionally, i.e. only when coastal shipping is an extension of international transport, might affect significantly the industry as whole, particularly in developing countries. The real effect will depend on the competitiveness

of the domestic shipping companies which, due to the near-monopolistic structures prevailing in cabotage arrangements, appears to be doubtful in many cases.

Market Access

Together with MFN and NT, *Market Access* (MA) is the third most important clause for implementing the principle of non-discrimination. MA implies that Parties shall grant treatment to services and service providers of other Parties no less favourable than that provided for under the terms of their *Schedule*. Where access to more than one *mode of supply* is provided for in a Party's *Schedule*, other Parties shall be free to choose the preferred mode.

Two issues immediately arise with regard to MA: the establishment of *commercial presence* in foreign countries and the right to provide services.

Regarding the establishment of commercial presence, the effect could differ considerably among different countries. Commercial presence could take various forms and could be in charge of different activities. These activities may be the marketing and sale of maritime transport services; the purchase and use of any transport and related services; transport documentation; customs and other activities; provision of business information and agency services and related activities.

- In LDCs, these activities are mostly performed by local companies in a relatively rather inefficient way. The establishment of *commercial presences* may cause severe competition between local and foreign firms. In certain cases this may mean -at least in the beginning- the complete loss of business for local companies (or agencies) since they lack extensive international business networks and experience, and they operate less efficiently. Understandably, therefore, the allowance of foreign shipping companies to set up various commercial presences in the domestic markets of LDCs might at least harm the business of ship agency and forwarding which are a part of the shipping industry. A further consideration, which is more critical to domestic shipping, has to do with the fact that commercial presences may compete for national cargoes on behalf of the shipping companies they represent.

- In the above context, inland transport can also be an objective of further liberalization. As international transport becomes more integrated, and considering the advantages of multimodal transport, many shipping companies, or their subsidiaries, are trying to start their business in inland transport, particularly in trucking. As a first step, the possibility of freely contracting with any local transport service providers should be granted to foreign shipping companies, especially those in liner shipping. This free choice of local transport suppliers will surely increase the competitiveness of the local transport market. Secondly, foreign shipping companies may wish to provide local transport services themselves, i.e. to provide origin and/or destination related port and associated services. In many countries, the trucking services of foreign shipping companies are confined within port regions. However, it seems possible that, in the future, trucking services could be extended beyond the port, as foreign shipping companies may wish to provide door-to-door services to their customers. In China, Sea-Land cooperates with the local trucking companies (Guangdong Sinotrans) in order to start its trucking services between HongKong and the Guangdong province.

It has been mentioned already that the provisions of *National Treatment* and *Market Access* are binding only in so far as Parties' Schedules specify. If they are strictly implemented, LDC shipping may suffer significantly, provided all protectionist measures are abolished completely. This is not in conformity with the other articles of the GATS framework, notably with the principle of *increasing participation of developing countries*. A *standstill* commitment which would prevent the introduction of new restrictive measures, within a given period of time, may be the acceptable compromise. During that time LDC shipping will have to strength itself and adjust in order to be able to compete with others under terms of free and fair competition.

The Impact of Articles Favouring Protectionism

Although the aim of the inclusion of MTS into the GATS framework is to liberalize international shipping and to remove or restrict business practices which hinder its development, some articles and/or provisions give countries who exercise such measures the tacit consent to continue or even introduce additional ones or leave some "loopholes" through which they may continue their protectionism and interventionism.

Increasing Participation of Developing Countries

Article IV of the GATS is specially created for developing countries. As stated, the GATS is to

> *... facilitate developing countries to strengthen domestic services, improve access to distribution channels and information networks and liberalize market access in areas of export of interest to them by providing information on their respective markets...*

This article effectively recognizes the *infant industry* principle and the right of developing countries not only to participate in maritime transport, but also to have the privilege of getting help from developed countries, in order to strengthen their maritime transport industries, and to get access to the shipping markets of the developed world without much obligation or commitment for reciprocation.

Understandably, this is one of the most criticised principles of GATT. Whilst recognising the aspirations of developing countries to develop and increase the size of their fleets and their share in world shipping under competitive conditions, OECD countries have not accepted that a less developed status confers a right to promote increasing participation in maritime transport services via discriminatory flag measures. This argument sounds very reasonable notwithstanding the fact that the LDC fleet is still relatively small compared with their increasing share in world trade.

Domestic Regulation and Transparency

Domestic regulation affords Parties the right to require, from foreign shipowners and operators, the adherence to domestic regulations, standards or qualifications, in conformity

with *national policy objectives*. Some countries, LDCs in particular, may use this loophole to implement their policy of protecting their domestic fleets. As OECD argues, this article may be used by individual signatories to either disguise restrictions on international trade or to exclude the whole MTS sector. Some governments may even use it in order to retain the right of refusing the establishment of commercial presences and it might be used even in the absence of *national policy objectives*, which need to be clearly defined. Ambiguity and lack of *transparency* with regard to national and local laws, regulations, prices, fees and their alteration etc. may also have similar effects.

Restrictions to Safeguard the Balance of Payments and Public Procurement

Concerning exemptions aiming to safeguard the balance of payments, the relevant articles acknowledge that *a Party in the process of economic development is more vulnerable to difficulties and that it may need to ensure the maintenance of a level of external financial reserves for the implementation of its programme of economic development*. Developing countries have often used these provisions in order to withdraw MFN rights in cases of a balance of payments crisis. A number of them, however, including Brazil and Korea, have waived their right to appeal to these provisions. As developing countries are by definition in a process of economic development and as shipping is considered by most of them as a prime foreign exchange earner, the balance of payments considerations of GATT can constitute a very strong argument for the continuation of protectionist practices.

With respect to Government and Public Procurement, the relevant article implies that, within two years after the entry into force of the Agreement, multilateral negotiations may still be used and in the meantime Market Access and National Treatment shall not apply. This article provides another loophole with which some Parties may enjoy the advantage of sharing cargoes through multilateral negotiations without being obliged to commit themselves to the Market Access and National Treatment clauses. OECD argues that the allowance of a blanket non-application of MFN, National Treatment and Market Access to such procurement would restrict Parties' access to cargoes in a number of countries. In order to reduce government protectionism to the minimum, it should be clearly stated what kind of public and government procurement may be allowed and in what sense the MFN, NT and MA clauses may not be applied. The EU argues that cargo reservation and preference for government cargoes or for public procurement, except for military goods, is not in conformity with the Agreement.

Subsidies and Anti-dumping

One way or the other, a number of governments today afford their domestic shipping and shipbuilding industries some of the following subsidies or other financial support: operational subsidies; construction subsidies; modernization subsidies; actual depreciation subsidies; loan and interest subsidies; investment allowances and grants; investment guarantees and deferred credits; tax benefits; construction deposits; customs exemptions; compensatory subsidies; inflation and insurance subsidies; seamen's welfare benefits and ship research grants.

For example in South Korea since 1962, the government has used considerable public funds for the expansion of the major ports of Incheon and Pusan and the construction of

industrial ports, container and bulk terminals. According to Korean experts, this investment in infrastructure has indirectly stimulated the growth of Korean shipping. In Africa, Zaire and Nigeria, among others, give financial incentives, such as rebates, tax credits, low interest rates and waivers of import duties to their domestic shipping industries. In its 1993 budget, Malaysia decided to establish a M$800 million shipping fund. Of the total, M$500 million were planned to be allocated to new investments, to encourage entrepreneurs into shipping, and M$300 million was earmarked as help to existing owners to fund new building and second-hand ship acquisitions.

Various types of financial aid are used in the developed countries too. In the United States, a certain amount of tonnage is required to be built under the Jones Act. *Counter-measures* are accepted only in case these limits are surpassed. The Home Credit Scheme of Japan is considered by other countries as indirect assistance to domestic shipbuilding. Restructuring aid is considered to be in compliance with EU rules provided it does not involve an increase in shipbuilding capacity.

The article on subsidies stresses their distortive effects and the need for the establishment of disciplines to eliminate them. However, a special provision is made which recognizes the role of subsidies in developing countries, in relation to their development programmes. This article is very favourable to LDCs, as it recognises that the LDC shipping industry is an infant one and special assistance from governments may help to develop its potential efficiency. Subsidies are simply an effective way to protect the domestic fleet and if their aim is primarily promotional, i.e. to develop merchant marines in developing countries, then direct government subsidies are more efficient.

As far as the liberalization of shipping is concerned, the implementation of this Article may increase the extent of protectionism in the industry. Since subsidies to shipping may result in unfair pricing, many countries, especially TMNs, have suggested that criteria and procedures for dealing with unfair pricing should be established on a coordinated basis and the rights of Parties to introduce or apply legislation aimed at dealing with unfair pricing should be retained. To this effect, the United States have reinstated their "famous" "Super 301" clause of their Trade Law which permits unilateral action against unfair traders [EIU 1994].

The only anti-dumping case known in shipping is the judgement against the Korean Hyundai Merchant Marine (HMM), after a complaint by the European Conference carriers (plus the Belgian independent ABC Container Line). The European liner operators claimed that the South Korean service was charging uneconomic and unfair freight rates on the southbound trip from North Europe to Australia. HMM, however, argued that their route was a lot slower, consisted of a different cargo mix and it called at different ports than those of the complainants. This case has helped to stress how difficult and thorny the anti-dumping issues can be, particularly in the case of (intangible) services, and how elusive and subjective is the definition of a *fair price* or *normal value*.

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PORT RESTRUCTURING IN A GLOBAL ECONOMY: AN INDIAN PERSPECTIVE[1]

By

H.E. Haralambides and R. Behrens[2]

ABSTRACT

In 1991-92, India embarked on an ambitious economic reform programme aimed at transforming its inward looking, centrally planned economy into a market-driven economic system based on export-led growth. Since then, economic performance and international competitiveness have improved markedly. The country's external trade, currently in excess of 250 million tons of cargo (exports and imports), is projected to nearly double by the year 2001. This confronts the port sector, on average already operating beyond capacity, with the significant challenge to sustain this growth in a seamless, cost effective and efficient way. Undoubtedly, this paramount pre-condition to Indian economic development will require significant effort towards port modernisation and coordinated port development. Currently, Indian ports are characterised by the existence of obsolete and poorly maintained equipment, hierarchical and bureaucratic management structures, excessive labour and, in general, an institutional framework that is considerably in variance with the Government's overall economic objectives. In the current 5-year plan, the Government of India has earmarked significant resources to port development which, however, fall short of requirements. Greater participation of the private sector is thus sought together with the accompanying institutional reforms. The latter should clearly define the "parameters" of port restructuring in a way that makes port investment in India an attractive business alternative to both national and international capital. (JEL: 121, 615, 731).

INTRODUCTION: A HISTORICAL PERSPECTIVE ON INDIAN DEVELOPMENT

At the time research on this paper started, India was grandiosely celebrating its 50-year independence anniversary from British rule in 15 August 1947. Unquestionably, the country's progress and economic and social evolution during this period cannot go unnoticed. Especially since the 1991 reforms, the country has achieved a steady rate of growth, expected to consolidate around 7%; it has managed to check inflation and foreign debt at affordable levels; it claims dynamic industrial and export sectors and, although still at its initial stages of economic transformation, it has managed to attract respectable levels of foreign direct investment. The country's key economic indicators appear in Table 1.

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[1]Haralambides, H.E. and Behrens, R. (2000) 'Port Restructuring in a Global Economy: An Indian Perspective'. *International Journal of Transport Economics*, Vol. XXVII, No 1, 19-39.

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Table 1 INDIA'S KEY ECONOMIC INDICATORS

	1993-94	1994-95	1995-96
GNP (bln. IRP)	7195	8433	9678
Average Exchange Rate (IRP/USD)	30.49	31.4	33.45
GNP (bln. USD)	236	269	289
GNP Growth (IRP basis, %)	16.2	17.2	14.8
GNP Growth (USD basis, %)	5.3	13.8	7.7
Population (millions)	898	915.9	925
Income per Capita (USD)	262.8	293.2	312.8
Wholesale Price Inflation (%)	10.8	10.2	4.4
External Debt (bln. USD)	92.7	99	92.2
Reserves (bln. USD, excluding gold)	15.1	20.8	17
Foreign Investment (mil. USD)	4,110	4,895	3,973

Source: Economic Survey, 1996-97

However, depending on how one is interpreting statistics, the country appears to be poorer now, in comparison to its Asian neighbours, than it was 50 years ago (Table 2). A first indicative, albeit unqualified, comparison with the Peoples Republic of China demonstrates that both gross domestic investment and exports per unit of output (GDP) in India are half those of China (24.8 and 11.9 respectively, compared to 43.1 and 24.9).

Table 2 INDIA'S COMPARATIVE ECONOMIC PERFORMANCE (1960-1990)

	GDP Growth (%)	Industrial Output Growth (%)
India	4	6
Pakistan	5	8
Indonesia	6	9
Thailand	7	9
Taiwan	8	12
S. Korea	9	10

Source IBRD

A long period of colonial rule had left an impoverished country with more than half of its population illiterate and living below poverty line. Jawaharlal Nehru, the independent country's first prime minister, took office with the mission to "…*end poverty and ignorance and disease and inequality of opportunity…*" and to restore India to its pre-industrial revolution eminence as one of the world's great economic powers and major manufacturers. The means to achieve this was a policy of rapid industrialisation based on central planning, public investment, subsidies and import tariffs that were the highest in the world and, until recently, the government's main source of income. Import substitution, and the protection this afforded to domestic industry, was a policy deeply rooted, at that time, in Indian belief that export-led growth strategies were nothing but a colonial contrivance to dump British manufactures on the country and thus deprive it of valuable capital necessary for its industrialisation.

In the closed economies of the post-world war II period, central planning was able to demonstrate reasonable success, adopted by such anti-Soviet countries as South Korea and Taiwan, many times under the blessing of the World Bank. It enabled India to sustain a yearly growth of 4% (Table 2) –the Hindu rate of growth as it came to be known- that was much higher than that of its ex-colonial master; a growth rate that made many western economists hail India as a country that had nothing to learn from the free-marketeers of the west.

India's Soviet type "5-year plan" central planning was based on a strict licensing system of production, prices and employment. Without the benefit of present day computers and advances in mathematical programming, the State would thus determine what should be produced, how and by whom in an effort to rationalise scarce economic resources according to national priorities, avoid wasteful duplication of activity, and control –through price policy- income distribution and the inequitable accumulation of wealth.

Nehru's preoccupation with rapid industrialisation obscured his vision as to the importance of agriculture and the development of human capital. Neglect of agriculture, combined with severe droughts, had often led to mass starvation despite the substantial food aid from America that, incidentally, was at the time seen by many as a humiliating development on top of India's military defeat by China in 1962. It was Nehru's daughter, Indira Gandhi, that reversed the neglect of agriculture, successfully introducing the green revolution that conquered mass starvation and made the country self-sufficient in food. Mass starvation was conquered not only through increases in farm productivity but more importantly through better distribution, stockpiling of adequate grain reserves and provision of the necessary distress-relief infrastructure.

Apart from higher education that has been consistently rated among the highest in the world, investment in elementary and secondary education was never considered as of strategic importance in India's development. Even at present, and despite a number of prestigious reports to the contrary, the educational record of India is being described by Amartya Sen, perhaps India's most accomplished economist, as abysmal.[3] As a result, 50 years after its independence, one in two Indians are still illiterate. This is the real stumbling block in India's future development and not the often alleged scarcity or disinterest of private capital. As the current Asian crisis has amply demonstrated, "injections" of capital alone are not sufficient to guarantee sustainable economic development unless stable institutions are in place –developed through a long process involving education and democratic governance - able to assimilate technological innovation and seamlessly diffuse it in the economy in the form of productive capacity, output and welfare.

The massive nationalisations of the Gandhi period, public investment and industrial subsidies eventually took their toll on India amidst the relentless demands of the global economy. Financed by a borrowing spree, internal and external, public spending had grown explosively while subsidies grew from 8.2% of GDP in 1977-78 to almost 15% in 1987-88. As a result, the general budget and trade deficits reached unsustainable levels, foreign debt quadrupled in the 1980s and the country was at the brink of a liquidity crisis when the reformist government of Narasimha Rao took office in 1991.[4]

The economic reforms of 1991-92 started to dismantle the licensing system, giving more leeway to the private sector. Licenses for the importation of capital goods and

[3] Amartya Sen and Jean Dreze "*Economic Development and Social Opportunity*" Oxford University Press, 1996.
[4] *The Economist*, August 16th 1997.

goods used as inputs to production were largely removed while the weighted average tariff was brought down from 87% to 27%. Similarly, the maximum tariff was reduced from 400% (the highest in the world) to 50%. Apart from their favourable effect on production costs, the reduction in tariffs exposed Indian products to world competition and, in addition, by squeezing domestic margins, it forced Indian producers to re-orient their production with emphasis on exports.

At the same time, the Rupee was devaluated and made convertible for trade, government borrowing was curtailed, financial services partly liberalised and the taxation system simplified. An economic shake-up such as this had its long-awaited impact on the inflow of Foreign Direct Investment (FDI) that in 1995 exceeded 2 billion USD (5.6‰ of worldwide FDI) from a meagre 150 million in 1991 (0.9 ‰). Energy and telecommunications have been the two most favoured sectors (Table 3). However, in the same year (1995), China managed to attract more than 20 times that amount in foreign investment (approximately 40 billion USD), a fact which demonstrates that, somehow, India has not as yet been able to fully tap the vast international financial resources awaiting for attractive investment opportunities mainly in the country's lagging infrastructure.

Table 3 SECTORAL FDI (1991-1996)

Sector	Approved FDI (mil. ECU)	Share in Total FDI (%)
Telecommunications	4,718.1	24.9
Power Supply	2,008.5	10.6
Refinery	1,800.1	9.5
Services	1,326.4	7.0
Automobiles and Transportation	1,250.6	6.6
Food Processing	1,250.6	6.6
Metallurgical Industries	1,212.7	6.4
Chemicals	1,155.8	6.1
Electronic, Software & Electrical Equipment	1,023.2	5.4
Hotels and Tourism	473.7	2.5
Industrial and other Machinery	454.8	2.4
Textiles	397.9	2.1
Others	1,875.9	9.9
Total	**18,948**	**100**

Source: Economic Survey 1996/97

The 1991 reforms and the opening of the Indian economy has led to a booming external trade sector with both exports and imports growing at an average annual rate exceeding 20%. However, the country's rapid industrialisation and its consequent reliance on mineral oil products and capital goods –two categories that account for more than 50% of total Indian imports- have resulted in a persistent trade balance deficit that in 1995/96 reached the alarming, for Indian magnitudes, level of 5 billion dollars (Table 4).

Table 4 INDIA'S TRADE BALANCE (Billion IRP)

	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96
Exports	325.53	440.42	533.51	695.47	823.38	1063.5
Imports	431.93	478.51	629.23	728.06	887.05	1226.8
Trade Balance	**-106.4**	**-38.09**	**-95.72**	**-32.59**	**-63.67**	**-163.3**

Source: Ministry of Commerce

To tackle this problem, the government has introduced a number of export promotion packages including free of income tax export profits; royalty payments and commissions on export sales; exemptions from customs duties of imported goods intended for use as inputs in the export sector and special incentives to export-oriented enterprises within export processing zones. These and other export promotion incentives, however, still entail cumbersome administrative procedures and a multitude of licenses, permissions and exemptions that necessitate continuous and close contact with government authorities.

In addition, apart from major exporters that are in a position to deal directly with overseas carriers, the thousands of smaller exporters, thinly scattered in the vast expanse of the country, have not been able to achieve efficient consolidation of cargo, an activity that is often in the hands of a small number of oligopolistically organised agents and freight forwarders. Equally, India has not, so far, been able to effectively penetrate foreign markets with its products, something that, at this stage of economic development, would require a concerted effort perhaps along the rather successful lines of the Chinese Foreign Trade Corporations. With the envisaged further liberalisation of shipping and transport arrangements, however, export promotion could partly become the responsibility of foreign carriers, following the successful example of Latin America where carriers, having positioned themselves well ahead of current demand, have been instrumental in the promotion of the region’s trade.

THE INDIAN PORT SECTOR: A STUMBLING BLOCK TO DEVELOPMENT?

India’s coastline of approximately 6,000 km enfolds 192 ports. Of these, Calcutta, Paradip, Visakhapatnam, Chennai (Madras), Tuticorin, Cochin, New Mangalore, Mormugao, Mumbai (Bombay), JNPT and Kandla are categorized as Major Ports, accounting for 92% of the country’s total port traffic. Six of them are located in the west coast of India, handling trade mainly with Europe, America, Africa and the Middle East, and 5 are east coast ports, involved in trade mainly with Asia and the Pacific (Figure 1). Major ports fall under the direct jurisdiction of the Ministry of Surface Transport (MoST) and are governed by the 1963 Major Ports Trust Act (MPTA). Port Trusts are administered by a Board of Trustees of wide representation comprising members from government, labour and industry. The Board is appointed by the government for a period of two years and it is entrusted with the day-to-day management of the port and the operation of many of its services. The Chairman of the Board, often the Chairman also of the Dock Labour Board (DLB), is usually a member of the Indian Administrative Service (IAS).

An additional 181 minor and intermediate ports are governed by the Indian Ports Act (IPA) of 1908 and come under the jurisdiction of the different State governments. The difference between minor and intermediate ports lies only in their throughput, the dividing line being 150,000 tons. In general, both minor and intermediate ports are known as “minor” ports and their cargo turnover accounts for approximately 8% of total seaborne trade. This mainly consists of fertilisers, fertiliser raw materials, foodgrains,

salt, building materials, iron ores and other ores. In 1990-91, minor ports handled 10.44 million tons; this throughput increased to 18.56 million tons in 1994-95, exceeding 24 million tons in 1995-96.

With the thrust towards economic reform in India and the capacity limitations of major ports (see below), State governments are increasingly paying more attention to the development of their minor ports, whenever possible through private capital. The States of Gujarat, Maharashtra and Andra Pradesh, for example, have launched active campaigns to attract investors and real estate developers to their ports, often combining industrial site development projects with port investment and vice versa. In addition, Gujarat and Maharashtra have established Maritime Boards to administer the various minor ports in their territory. Undoubtedly, these developments will pose a significant challenge to the central government as soon as the development of minor ports exceeds their, so far, limited local scope and assumes strategic dimensions for India's trade.

Developments in Port Throughput

The cargo handled by the country's major ports has seen a steady rise of roughly 2 million tons a year, from a meagre 20 million tons in 1950 to 81 million tons in 1980. Since then, port traffic has been rising at an accelerating rate to reach 215 million tons in 1995-96. Current growth projections more than double this last figure by the year 2001. Visakhapatnam, Madras, Bombay and Kandla alone handled more than 60% of total traffic in 1995-96. The turnover of the major ports for the last two financial years for which data is available appears in Table 5.

Table 5 THROUGHPUT OF MAJOR PORTS

	1994-1995 (x1000 tons)	1995-1996 (x1000 tons)	Growth (%)	Market Share (%)
Calcutta/Haldia	20,535	21,515	4.8	10.0
Paradip	10,121	11,259	4.5	5.2
Visakhapatnam	30,029	32,817	11.2	15.3
Madras	29,463	30,720	4.3	14.3
Tuticorin	8,040	9,286	15.5	4.3
Cochin	8,631	11,491	33.1	5.3
New Mangalore	8,005	8,884	11.0	4.1
Mormugao	18,881	18,095	-4.2	8.4
Bombay	32,047	34,048	6.2	15.8
JNPT	5,008	6,873	37.2	3.2
Kandla	26,502	30,338	14.5	14.1
TOTAL	**197,262**	**215,326**	**9.2**	**100.0**

Source: Indian Ports Association, Major Ports of India 1995-96

The relative share of the different major ports has changed significantly since independence. In 1950, Bombay and Calcutta were by far the most important ports, together handling more than 70% of the country's port traffic. Over the years, however, west coast ports improved their position at the cost of east coast ones, with the exception of Visakhapatnam. Although starting from a low base, Jawaharlal Nehru, India's most modern port, inaugurated in 1989, is showing the most remarkable growth (37.2%), followed by Cochin (33.1%) and Kandla (14.5%).

Apart from JNPT, all major ports handle significant volumes of liquid cargo, with the predominance of Bombay and Kandla which together handle more than half of the country's POL (Petroleum Oil Liquids) trade, currently at 89 million tons (1995-96).

Other important ports for liquid cargo operations are Calcutta/Haldia (12.8%), Madras (11.5%) and Cochin (11%). The majority of POL and other liquid bulk is carried by Indian ships (54%) mainly due to the government's cargo guarantees in favour of national shipping.

Dry bulk cargo movements consist mainly of iron ore and coal. The first is India's major export (34 million tons in 1995-96) bought by Japan, S. Korea, China and the EU. Coal, the main input of electricity generation, is both imported and exported in large quantities (33.7 million tons in 1995-96) and it is the major product shipped under cabotage arrangements. Visakhapatnam, Madras and Mormugao are the principal dry bulk ports handling both commodities. Table 6 presents the throughput of major ports by type of cargo for the year 1995-96.

Table 6 PORT THROUGHPUT BY TYPE OF CARGO

	Liquid Cargo	Dry Bulk	General Cargo	
			Conventional	Containerised
Calcutta/Haldia	11,426	6,380	1,844	1,864
Paradip	1,653	8,678	924	-
Visakhapatnam	8,178	16,375	3,137	94
Madras	10,232	14,540	1,921	2,308
Tuticorin	891	6,391	1,246	758
Cochin	9,823	563	321	784
New Mangalore	1,310	6,896	678	1
Mormugao	1,288	15,694	223	19
Bombay	20,853	907	5,173	6,748
JNPT	140	2,610	54	4,069
Kandla	23,168	3,269	1,726	961
TOTAL	88,962	82,303	17,247	17,606

Source: Indian Ports Association, Major Ports of India 1995-96

Containerisation

The most important container ports of the country are Bombay, JNPT and Madras, handling amongst them three quarters of total containerised cargo. As can be seen in Table 6, the containerization rate of general cargo in India is still rather low (51% compared to 34% in 1991-92), with exports of textiles, clothing and engineering products having substantial potential for further containerisation (Table 7). According to the World Bank, the containerisation rate in other Asian countries is estimated at: Colombo (55%); Kaohsiung (47%); Brisbane (78%); Kelang (75%) and Freemantle (75%).[5] These numbers, however, conceal the fact that, as a result of the country's rapid industrialisation in the period 1991-1996, the actual number of containers handled by Indian ports has more than doubled in this period, currently standing at 1.5 million TEUs. It is worth noting here that, as a result of the country's external trade characteristics, the number of import containers is larger than that of export containers. A better containerisation rate of Indian exports would thus also help reduce the inbound/outbound container movement imbalance, thus reducing significantly overall transport costs.

[5] *India Port Sector Strategy Report*. World Bank, March 1995.

Table 7 CONTAINERISATION POTENTIAL OF INDIA'S EXTERNAL TRADE

Category	Share in Exports (%)	Potential Container-isation (%)	Category	Share in Imports (%)	Potential Container-isation (%)
Gems & Jewelry	19.3	(air) 0	Capital Goods	24.9	75
Textiles	12.4	100	Oil (products)	17.6	0
Engineering Prod.	11.8	100	Gems & Jewelry	12.2	(air) 0
Clothing	11.8	100	Chemicals	10.2	25
Chemicals	8.1	25	Iron & Steel	6.3	10
Others	36.6	80	Others	28.8	60
Total	**100.0**	**67.3**	**Total**	**100**	**39.1**

Source: World in Figures, The Economist 1994

Since its inception in the 1980s, containerisation in India has faced considerable constraints in terms of port congestion and damages to cargo. As a consequence, the government has pursued a policy of developing a number of Inland Container Depots (ICD) and Container Freight Stations (CFS) in order to facilitate modal interchange and the consolidation and distribution of cargo, as well as to remove cumbersome customs procedures from the waterfront. In parallel, Indian Railways opted for the establishment of a separate body responsible for the management of the infrastructure necessary for the transportation of containers. The Container Corporation of India Ltd. (Concor) was thus established in 1988, to promote containerisation and to boost India's domestic and external trade and commerce by organising multimodal logistics support. Concor is responsible for the establishment and operation of ICDs and CFSs, currently running 40 facilities. The major problem of the Organisation is a shortage of rolling-stock. It has received a loan of 94 million USD from the World Bank to be invested in 1,725 wagons. Later this should be followed by an additional investment of another 1,500 wagons. The rising number of ICDs and CFSs has expanded considerably the hinterland of such ports as Bombay and JNPT. The greater accessibility of these two ports has resulted in a shift of cargo previously handled through Kandla.

Table 8 DEDICATED BLOCK TRAIN SERVICES BY CONCOR

ORIGIN	DESTINATION	FREQUENCY (days per week)
Delhi	Bombay	7
Delhi	JNPT	7
Delhi	Madras	2
Ludhiana	Bombay/JNPT	4
Hyderabad	Bombay/JNPT	1
Ahmedabad	Bombay/JNPT	2
Bangalore	Madras	3
Coimbatore	Cochin	3

Source: Container Corporation of India Ltd., 1997

Maritime Traffic and the Merchant Shipping Act of 1958

Under the Merchant Shipping Act of 1958, foreign flag vessels cannot engage in the coastal trade of India except under license granted by the Director General for Shipping. The Government of India has partially relaxed the cabotage law for liner vessels, in view of the fact that Indian liners do not have sufficient feedering capacity, and also in

order to encourage foreign shipping lines to bring the main-line vessels to Indian ports. This partial relaxation is applicable to foreign main-line and feeder vessels only for the purpose of aggregating containers at Indian ports. Thus, foreign vessels can carry export containers from an Indian port of origin to the Indian port of aggregation provided such containers are to be shipped directly to the port of destination without any further transshipment *en route*. Similarly, import containers can be shipped by a foreign vessel from the port of aggregation to an Indian port of destination only if the import containers have reached the Indian port of aggregation from the foreign port of origin without any transshipment *en route*.

In 1995-96, more than 12,200 cargo vessels called at major Indian ports, 80% of which carrying bulk and conventional general cargo and 20% being container vessels or vessels mainly carrying containers (Table 9). Bulk and general cargo vessel calls concentrate on Mumbai (18.1%), Calcutta/Haldia (13.5%), Kandla (12.6%) and Madras (12.5%), while the 2,510 container vessel calls in the same year were reported from Mumbai (30.4%), JNPT (15.5%) and Madras (15.2%). To a limited extent, Mumbai and JNPT also served direct containership calls but, as also evidenced from the large differences in average and maximum size of containerships calling at Indian ports (Table 9), the country still relies heavily on feedering, mainly from the hubs of Singapore, Colombo and Dubai.

Table 9 VESSEL TRAFFIC IN MAJOR PORTS (1995/96)

Port	Total No of Cargo Vessels	Bulk and G/C Vessels	Containerships		
			No. of Vessels	Avg. dwt (1,000)	Max. dwt (1,000)
Calcutta/Haldia	1,600	1,312	288	6.9	20
Paradip	523	523	-	-	-
Visakhapatnam	1,310	1,270	40	8.8	20
Madras	1,598	1,217	381	9.9	40
Tuticorin	939	758	181	5.8	20
Cochin	749	484	265	8.5	30
New Mangalore	505	505	-	-	-
Mormugao	707	609	98	7.9	20
Mumbai	2,515	1,752	763	14.7	50
JNPT	462	74	388	N/A	N/A
Kandla	1,305	1,199	106	10.6	30
Total	**12,213**	**9,703**	**2,510**		

Source: Indian Ports Association, Major Ports of India 1995-96

PORT PRIVATIZATION IN INDIA: A CASE OF RESERVED OPTIMISM?

As already mentioned above, the 9th five-year plan working group has estimated the traffic through major ports to grow to 430 million tons by the year 2001. The completion of the port projects that started in the 8th five-year plan is expected to raise the present port capacity of 217 million tons to 252. This would still leave a capacity shortage of 174 million tons that will have to be created through projects in the 9th five-year plan. The plan envisages IRP 175 billion (US$ 5 billion) worth of projects in the port sector in the following 5 years. Of these, public sector investment will amount to

IRP 105 billion (US$ 3 billion), while the remaining 2 billion dollars will have to be found through private sector participation. However, assuming full implementation and execution of all planned projects, there will still remain a capacity gap of 65 million tons that will also have to be met by private sector investments. It thus becomes evident that, mainly due to lack of capital resources and other pressing national priorities, the government of India has taken a very conservative approach to port development, merely adjusting capacity to demand, while it is well established that economies of scale and capital indivisibility in the port sector require capacity to be planned well ahead of demand, if minimum cost operations are to be achieved.[6] As a result, Indian ports are currently faced with severe capacity limitations, particularly in coal and container terminals (Table 10), leading to long turnaround times of ships and cargo (Table 11) and increased unpredictability of port performance. This situation has discouraged costly main-line vessels from calling at Indian ports and it constitutes a major bottleneck to the country's further trade expansion.

Table 10 CAPACITY UTILISATION IN MAJOR PORTS
(1994-95, million tons)

Commodity	Cargo Handled	Port Capacity	Capacity Util.(%)
POL	82.18	78.0	105
Iron Ore	34.91	41.5	84
Fertilisers & Raw Materials	8.46	7.90	107
Coal	30.1	8.00	376
Foodgrains	0.86	N/A	N/A
Containers	15.13	9.00	168
Other Cargoes	25.57	29.6	86
Total	**197.21**	**174**	**113**

Source: Indian Shipping

Table 11 MAJOR PORTS: PORT PERFORMANCE INDICATORS

	1984-85	1988-89	1991-92	1993-94	1995-96
Pre-berthing time (days)	3.6	2.8	1.4	1.8	3.3
Turnaround time (days)	11.9	8.9	6.5	6.9	8.3
Output per ship/berth/day[a]	2,314	3,549	4,668	3,963	N/A
Output per ship/berth/day[b]	N/A	1,310	1,430	1,571	N/A
Output per ship/berth/day[c]	N/A	600	623	660	N/A
Idle time at berth (%)	39	40	42.3	42.8	N/A

NOTES (a) in tons, all ships and types of cargo; (b) in tons, containerised cargo; (c) in tons, break-bulk general cargo.
Source: IBRD

The port capacity figures of Table 10 are calculated on the basis of the existing physical assets and the working and management practices in ports. Labour productivity standards in India are set rather low, especially in the case of containerised cargo where they are often still based on the general cargo handling norms of the past. Often, payment of "speed money" to port labour by carriers has resulted in the doubling of productivity, and the same result has been achieved by the leasing out of berths to

[6] These capacity gaps assume the current management styles and port organisational structures to remain unaltered in the future. This is an unsustained assumption given the Government's intentions.

shipping lines.[7] It thus becomes clear that labour and management restructuring in Indian ports –e.g. through the introduction of EDI, the streamlining of customs procedures, the adoption of planned maintenance schemes and an improved interface among all players in the "port community" can be factors equally important to the need for physical expansion of port infrastructure.[8]

So far, Indian ports have followed the "service" or "comprehensive" port model whereby all operations, services and facilities are provided by the port authority. With the exception of JNPT, stevedoring operations are conducted by private licensed companies on equipment and facilities supplied by the port authority. The government has stated its intention to transform the existing service ports into "landlord" ones whereby the port authority will only be responsible for regulatory functions and infrastructure, the latter to be leased out to private companies for a certain period of time. According to the Parliamentary Standing Committee, the goals of privatisation are the introduction of new management styles; new technologies; increased efficiency and productivity; the elimination of bureaucratic barriers; and greater customer satisfaction. The new role envisaged for port authorities will enable them to assume more responsibility in investment decisions and accountability for port performance. The commercialisation of Port Trusts may thus be necessary for such a role while, in the future, the government might also consider the corporatisation of major ports. To put meat on the bone of its intentions, the government has raised the investment limit for which sanction is not required from IRP 2.5 million to 150 million.

In its 1996 *Infrastructure Report*, the MoST recommended the adoption of privatisation schemes based on the Build-Operate-Transfer (BOT) approach, probably along the lines of the rather successful example of the Philippines. Thus, recently issued BOT project proposals for the development of new berths/terminals envisage a maximum contract duration of 30 years including the construction period. Upon expiry of the lease/license period, the assets have to be transferred back to the port without costs.

The qualification process for private sector participation is based on open competitive tendering. The relevant feasibility study will be carried out by the port itself, with costs to be recovered from the successful bidder. The latter has to provide separate technical and financial offers including the up-front fee for the lease/license; royalties per ton of cargo handled; guarantees on minimum cargo volume; the lease/rent per unit area; and other financial parameters depending on the scope of the project. The main criterion for the selection of the successful bidder is the Net Present Value of the investment. Finally, in an effort to safeguard fair competition and check the abuse of monopoly power, the 1997 amendment to the MPTA has stipulated that port tariffs are to continue being set centrally by a statutory regulatory agency, the so-called Tariff Authority for Major Ports (TAMP).

In the same year (1996), in an attempt to clarify and modify the legal and administrative framework of ports, MoST issued its Guidelines to be followed by major port trusts. The Guidelines invite private sector interest in the leasing of existing or construction of new port assets such as container terminals; bulk, break-bulk, multipurpose and specialised berths; warehousing, CFSs, storage facilities and tank farms; cranage, handling equipment and floating craft; dedicated power plants; dry-docking and ship-repair facilities; and dedicated cargo-handling facilities for port-based industries.

[7] This was the case in Bombay where one berth is leased out to X-Press line.
[8] The European Commission has recently put forward a Technical Assistance Facility targeting these aspects of Indian ports.

Although a number of privatisation contracts have been –and still are- under consideration, the only one that has actually commenced, albeit still under the final approval of various ministries, is the BOT contract awarded to P&O Australia for the development of a new container terminal at JNPT.

As a result of greater flexibility in decision-making and commitment of State governments to public/private partnerships, the process of privatisation has reached a more advanced stage in the case of minor ports. In Gujarat, the Gujarat Maritime Board aims at developing ten additional "green sites", six of which as joint-ventures and four to be built and operated exclusively by private companies. Pipavav port is the first public/private joint-venture operated by the Gujarat Pipavav Port Ltd.

Similar developments are witnessed in the State of Maharashtra. P&O has been awarded the BOT contract to develop the port of Vadhavan. At its final stage, the port will consist of 29 berths able to handle up to 250 million tons of cargo per year. The Mumbai-based Shahi Shipping Company, in a joint-venture with the UK Kier Group, is to develop the port of Dighi in a facility able to handle 4 million tons of liquid cargo per year. In both cases, the State of Maharashtra will hold no more than 11% of the equity of the port developing and operating company.

CONCLUSIONS: PORTS IN AN ECONOMIC POLICY PERSPECTIVE

The paper has hopefully demonstrated that the Indian port sector is in dire need of operational restructuring and foreign capital inflow if it is not going to stifle the country's trade and economic development. A number of reasons have, at times, been put forward by prospective investors to justify their, so far, lukewarm interest. Among them, ambiguous privatisation guidelines, government sanctioning, never-ending questions and requests for additional information by the authorities, overlapping jurisdictions, unreasonable delays and similar bureaucratic hindrances score the highest. However, it is believed here that these are just the symptoms of a more serious consideration India has to come to terms with: given the poor state of the country's infrastructure and the latter's importance to economic development, the shadow price of foreign investment should be seen by the government as substantially higher than the commercial return required by the private sector. This is not only due to the multiplicative effects that such investment has on the rest of the economy but also to the important role played by the transfer of technology and know-how. Realisation of this fact would allow India to be in a position to offer foreign investors terms of privatisation at least as attractive as they could secure in alternative investments outside the country, while herself would benefit from the knock-on multiplicative impacts of foreign investment.

An exemplary manifestation of India's licensing system is reflected in its Major Ports Trust Act (MPTA). The Act entails tariff controls, aimed at limiting the abuse of monopoly power in an industry that, even in today's competitive environment, has traditionally been described as a "natural monopoly", and investment sanctioning, aimed at avoiding wasteful duplication of scarce resources and at integrating the port sector as a crucial element in the country's overall economic planning. To many, rigidities such as these are not squarely compatible with the rules of the "global game" that India committed itself to play in 1991. The Act has thus often been criticised as the main stumbling block to the introduction of successful port privatisation in India.

However, this rather shortsighted view on public policy needs further qualification if it is ever going to instill its ramifications in Indian conventional wisdom. Price control –

let alone collusion- is also exercised by many of the otherwise most liberal ports of Western Europe and North America not through government sanctioning but as a result of intense regional port competition that does not allow the full cost recovery of port investments much of which is financed by public money. Investment planning is also carefully exercised in these countries not in order to avoid wastage of the, there plentiful, resources but as a result of alternative demands on land use, urban planning, environmental pressure and an increasing realisation of the fact that intensified regional port competition, combined with automated labour-saving cargo handling systems, reduces the direct added-value of port activities, while the benefits of port investments and their impacts can be easily dissipated from the country in question to the final consignor/consignee. This issue causes considerable concern to governments contemplating the continuation of public funding of port projects, as it deprives them of the basic *rationale* of doing so, namely, that the port provides a service of general economic interest.[9] Notwithstanding one's philosophical inclinations or the compelling necessities of modern economic life, one thing is becoming abundantly clear to all, interestingly enough even among port consultants and interested investors: in today's economic realities, ports as well as the development of infrastructure in general are at considerable variance with Adam Smith's pin-maker.

[9] see for example the heated discussion on the desirability of the second Maasvlakte in Rotterdam.

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Competition, Excess Capacity, and the Pricing of Port Infrastructure

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The pricing of infrastructure, such as this of commercially competing ports, is one of the most controversial aspects of the global economy of the 21st century. The controversy arises from the need to reconcile the economic development impacts of infrastructure investments with the, under commercial terms, recovery of investment costs. In developed countries and regions, the role of 'public investment' is thus re-evaluated, while the concept of 'competition on infrastructure' is increasingly challenged by the need to establish a level playing field among competing ports. The paper shows how Marginal Cost Pricing of port infrastructure can be a powerful 'pricing discipline' towards achieving cost recovery and fair competition among ports. To succeed in this, the paper advocates for stronger policy intervention in order to ensure greater transparency of port accounting systems, better and more harmonised port statistics, a meaningful set of state aid guidelines, and stricter application of Competition Law in port infrastructure investments.
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INTRODUCTION

In ports, as in many other industries, prices – port dues and cargo-handling charges as they are often called – can 'make' or 'break' a port. The right prices can lead a port to prosperity and growth; the wrong ones can guide it to extinction or to the proliferation of subsidies and inefficiency. High prices would normally

deprive a port of part of its patronage (vessels and cargo owners) and thus reduce demand for port services. Since, once a port is built, it has few alternative uses if any, ie its investments are largely sunk[1], excess capacity will ensue as a result and resources and infrastructure will become underutilised. Even when ports have some degree of monopoly power over their customers, and thus demand for port services is not reduced much, high port prices would still hurt the very trade the port is supposed to serve.

Low port prices, on the other hand, may bring clientele to the port but congestion could ensue, investment costs may not be recovered in the long-run and the port's competitors may grudge about unfair competition, particularly when low prices are the result of subsidies.

In competitive industries, a producer has no influence on the price he sells his product or service; he either adjusts his costs to the externally determined price or he vanishes. A port, however, operates in an oligopolistic industry where pricing refers to 'strategic pricing', ie the ability of the producer to influence or set prices in order to achieve certain objectives. Such objectives, many of which simultaneously pursued albeit in conflict, include profit maximisation; throughput maximisation; generation of employment and economic activity; regional development; minimisation of ship time in port; and, last but not least, the promotion of trade.

However, the pricing strategy of a port is dependent on the way the port is financed and, ultimately, on the ownership status of the port: should, thus, a publicly owned and financed port be allowed to compete on price, for the same custom, with a privately owned port that has to charge higher prices in an effort to recover its investments? What if these ports are in the same, economically interdependent[2], geographic area? What if the effects of strategic pricing of different ports are, at the end of the day, felt by the same consumers or taxpayers? Should ports primarily engaged in commercial operations, such as container terminals, be publicly financed or should the port user pay in full for the port services he buys? Do ports need to recover infrastructure costs through pricing? And what happens if some do and others don't while all have to compete for the same hinterland? Is there such a thing as 'efficient port pricing' and is there scope for policy intervention to ensure a level playing field? These are some of the pertinent questions in port pricing that this paper aims to address with special emphasis on container ports.

THE PRODUCTION OF THE PORT SERVICE

There is no such single thing that could be adequately described by the mere word 'port' and no two ports are alike. A port could be from a small sheltered patch of

sea that protects fishermen from the roughness of the sea, allowing them to moor their boats and trade their wares in safety somewhere in the south pacific, to the huge industrial complex of the city-port of Rotterdam, embracing in its expanse hundreds of companies, roads, railway lines, distribution centres, refineries and other industrial and manufacturing activity.

Regardless of how it is developed and organised, however, a port's main function is to enable, hopefully in a safe and cost effective manner, the transfer of goods from sea to shore and *vice versa*. As such, a port is an interface between sea and land; a node in a transport chain; a point where goods change mode of transport. Cargo-handling is thus a port's core business. In order to do this, a port has to organise a large array of other services, all equally important in the facilitation of cargo transfers: it has to provide (dredge) sea channels and turning basins of adequate depth (draft) to enable the approach and manoeuvres of vessels; navigational aids, breakwaters, pilots, tugs and linesmen to allow vessels to moor and unload safely; equipment to handle goods in port and move them around; warehouses to store them until they are picked up by their owners; electricity; water; security; customs; administrative offices and many more.

The paramount good a port has to provide, however, in order to facilitate all this is *land*. A port is a land-intensive industry. Here is the first issue where *port pricing* encounters its major stumbling block: what is the value of land? What is its opportunity cost? Under what terms should port land be made available to private port operators, stevedoring companies and others?

In many places in the world, land, particularly land close to the sea, is a scarce good with high opportunity cost and many potential claimants. Cities can use it for residential and office space; offshore industries have to be located in its proximity; tourism and recreation industries would naturally consider it as prime location; fishermen would also value it highly, while nature lovers would tend to preserve it, and its ecosystem, at all costs. This is why port management, or the supervision of port activities and expansion, is often entrusted to municipal authorities who strive to steer a balanced course and reconcile harmoniously the various interests at stake.

More important than the land itself, however, is how, and by whom, land is developed to become ready to provide the port service. Often, land has to be reclaimed from the sea, it has to be paved, reinforced, roads and rail trucks have to be constructed on it, while to extend a port, even by just a few hundred metres of quayside, would require massive investments. The way these investments are financed, ie publicly or privately, in other words the ownership status of a port, bears the most upon the way port services are priced. Simply, a publicly owned port infrastructure does not have to recover (through prices) investment costs and thus its prices could be quite low and competitive *vis a vis* a privately owned port that has to recover investment costs and, other things

being equal, would thus be at a competitive disadvantage had it to compete with a public port.

PORT COMPETITION

In the past, particularly after WWII, the development and provision of infrastructure was largely in the hands of the State. Often, infrastructure was considered as a public good, serving the collective interest of the nation by increasing social cohesion as well as by expanding markets for inputs and output, ie bringing people to work and goods to consumers. This allowed for mass production, low unit costs and international competitiveness. With the exception of some developing countries, infrastructure was thus invariably developed ahead of existing demand – on the part of the industry, agriculture and commerce – in the hope that the latter activities would expand in the wake of the former (infrastructure) (Rosenstein-Rodan, 1943). A notable example of this was the case of the North American railways, particularly those of Canada. Furthermore, large capital indivisibilities in infrastructure development, coupled with substantial financial requirements and long gestation periods until demand picked up, had made infrastructure development the prerogative of the public sector.

With regard to ports in particular, in the past, general cargo traffic was less containerisable, regional port competition was less of an issue, and ports were comprising a lot of labour intensive activities, generating considerable value-added and a multitude of direct and indirect impacts on the national economy, including of course the facilitation of international trade. They were thus seen by governments as growth-poles of regional and national development and, as a matter of fact, they were often used as instruments of regional planning. Around the world, countries have done so by steering public investment, through regional policies, towards ports, in order to encourage national development. Thus, investment costs did not have to be recovered, being financed by the taxpayer through the general government budget or similar local or municipal sources.

Ports were fairly insulated from competitive forces, each serving its own, more or less captive, hinterland. This was due to trade barriers, national borders and inadequate land transport infrastructure. No matter how inefficient the port, the ship would still have to go there. Most ports were badly run, disorganised, bureaucratic, inefficient and expensive; a shipowner's nightmare and worst enemy!

Nowadays, however, the picture is considerably different. Trade liberalisation, helped by the remarkable developments in transport, logistics and communication technologies, have drastically weakened the link between

manufacturing and the location of factors of production and have stimulated a most noticeable shift in manufacturing activities towards countries with a comparative advantage.

Developments in international transport have been instrumental in shaping these processes. Containerisation and multimodal integrated transport have revolutionised trading arrangements of value-added goods and have given traders and global managers more control and choice over their 'production – transport – distribution' chain. Furthermore, transport efficiency is necessitated by the very same nature of value-added goods whose increasing sophistication requires fast transit times from origin to destination in order to increase traders' turnover and minimise high inventory costs. Today, these costs have been brought down significantly by the use of logistical concepts and methods and also by the increased reliability and accuracy of international transport that allow manufacturing industries to adopt flexible *Just-in-Time* and *Make-to-Order* production technologies. *Inter alia*, these technologies enable companies to cope with the vagaries and unpredictability of the seasonal, business and trade cycles and plan business development in a more cost effective way.

Trade liberalisation, land infrastructure development, and new logistical concepts in the organisation of international transport of containers have had an equally profound effect on the port industry. Port hinterlands have ceased to be captive and have extended beyond national boundaries. Governments are increasingly realising that, from mere interface points between land and sea, ports have become the most dynamic link in international transport networks and, as a result, inefficient ports can easily wither gains from trade liberalisation and export performance. Convinced about this, governments have often taken drastic steps to improve the performance of their ports: new capacity and labour-saving cargo-handling equipment have replaced outdated facilities; port workers training intensified; customs procedures simplified; information technology widely adopted; and management structures commercialised.

In addition, the port industry is moving noticeably from one in which predominantly public funds were used to provide common user facilities, to one where capital – public and private – is being used to provide terminals which are designed to serve the logistical requirements of a more narrowly defined group of users. Indeed, they may be designed to serve the needs of a few or even one firm (Dedicated Container Terminals).

At the same time, economies of scale in liner shipping and the sophistication and capital-intensity of modern containerships have limited the number of ports of call to only a selected few transshipment ports or load centres. These very important ports (such as Rotterdam, Hong Kong and Singapore) have become the *foci* of international trade and goods are moved by land (road and rail) and water

(barge) from inland centres and feeder ports to these global hubs. The hub-and-spoke system that has ensued in this way has made transshipment traffic lucrative business to be had at all costs.

The 'mobility' of the transshipment container, however, together with intertwined land transport networks and extended hinterlands, have intensified competition among container ports immensely. Today, it makes little difference if a Hong Kong container destined for Paris will pass through the port of Rotterdam, Antwerp or Hamburg. This container has little 'loyalty' to any given port and it switches between ports with relative ease. The price elasticity of demand for container handling services has thus become rather high[3] (Table 1).

In this way, each port's development, financing and pricing decisions can have marked effects on its neighbours, nationally and (most importantly) internationally. Often, this raises strong voices for 'market driven' investments, a more harmonised approach in the financing of port infrastructure, as well as pricing policies that will have to allow for full cost recovery.

These are most complex and often political issues that, as a result, have not allowed much progress to be made in terms of port policy formulation in economically interdependent areas. In all our discussions with port managers (see below), no one would question the importance of 'market driven' investments and pricing for cost recovery. However, in all such discussions, there has always been an implicit 'from now on' assumption and no port would seriously consider that pricing for cost recovery should reflect the costs of past (public) investment.

However, in the past, investments were not always market driven. Massive amounts of public monies have in the past been funnelled into port development, enabling many ports to consolidate such a strong market position that makes it rather easy for them, now, to advocate for the need for market driven investments. This should be kept in mind and the market-driven investments argument should not become a 'limit pricing[4]' policy of incumbent ports, deterring market entry of smaller and peripheral ports who also aspire to develop and serve *themselves* their rapidly growing regions.

Table 1: Price elasticities in selected north European container ports

Port	Elasticity
Hamburg	3.1
Bremen Ports	4.4
Rotterdam	1.5
Antwerp	4.1
Le Havre	1.1

Source: *ATENCO*

Cost recovery and limit pricing

The above point can be brought out more clearly with the following simplified example (Figure 1). Port A (incumbent) of country X has a dominant market position. This has been established over many years of public expenditure both in the port itself and its related infrastructure (roads, maritime access, etc). As such, the port is able to meet a substantial part of the trade of country Y through transshipment. Port A is a strong proponent of cost recovery policies in port development in general but, at the same time, it is allowed to consider 'bygones as bygones' and thus its prices, current and future, do not have to include the recovery of its past investments. The demand for its services is given by DD′.

Port B (entrant) in country Y is much smaller. Although in a favourable geographic position, the port never developed its own container facilities, as a result of both lack of funds and because it was adequately served (feedered) by port A. The trade of country Y, however, is rapidly increasing and port B feels that it is now time to develop its own facilities and 'claim back' its traffic – and all that comes with it – from port A. The government of Y sees the importance of such an action and it is prepared to fund the required investments.

Once developed, the demand for port B services is expected to be dd′; dMR gives its marginal revenue line. Its average cost (without recovery of infrastructure costs) and marginal cost curves are given by AC_0 and MC, respectively. The port maximises economic surplus (ABCP) by serving OQ′ level of throughput at a price of OP. Only Q′Q of total traffic is now left to port A.

Naturally, port A is rather unhappy with these plans. Its port policy department mounts a very strong campaign, together with other ports in the same

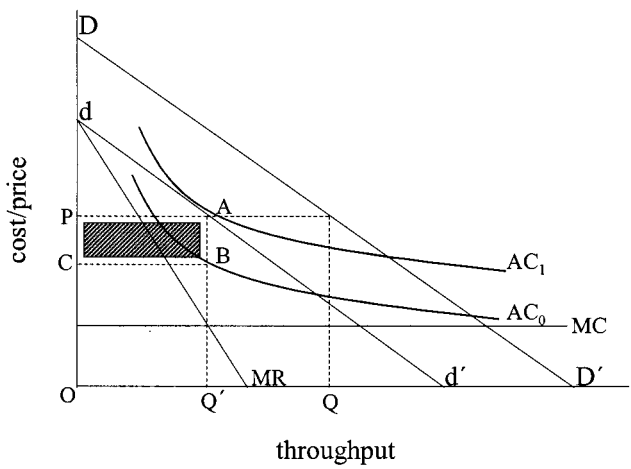

Figure 1: Cost recovery and limiting pricing

predicament, lobbying regulatory authorities on unfair competition from a to-be-subsidised port that, if it materialises, would deprive it of much of its traffic. It claims that, by not charging for infrastructure costs, port B will be producing at prices below costs and thus antidumping and competition laws should be applicable.

Were port A to succeed in demanding full cost recovery pricing, port B's average cost curve would shift upwards to a new position AC_1 or even further. At this level, there is no single price that would enable port B to break-even, let alone realise a positive surplus. In such a situation, port B wouldn't even consider expanding, leaving the whole market to port A. By insisting and achieving a policy of full cost recovery, port A has been successful in maintaining its dominant market position.

THE PRICING OF PORT INFRASTRUCTURE

As it was mentioned above, strategic pricing can pursue a multitude of objectives and can take various forms such as marginal cost pricing (MCP), average cost pricing (ACP), Ramsey Pricing (Ramsey, 1927) and two-way tariffs. Whatever the pricing method, or combination thereof, it is becoming more and more apparent among competing ports and those who fund them that prices should be cost-related and, in the long-run, they should allow for cost recovery, including infrastructure development costs.

There are cases however of ports that face, or pose, little competition. They serve local industries and are important centres of regional development. Often, the port is the only major economic activity and employer in the area. Such peripheral ports could still be considered as 'public investment', without a need to recover infrastructure development costs. In this case, the public sector should assess, through *social cost-benefit analysis*, the relative merits from regional development impacts *vis a vis* the costs – and alternative uses – of public resources required to develop and maintain the port. If the former exceed the latter, prices could be set below costs in order to promote regional development. Ensuing deficits could then be seen as the 'cost of regional development'.

In all other cases, particularly in the case of container ports amidst intense regional competition, the setting of prices below costs, in order to attract traffic from competitors, is not an advisable strategy.

First, this would lead to a misallocation of resources (and taxpayer money). Intensified inter-port competition, combined with automated labour-saving cargo handling systems, reduces the local economic impacts of port investments and the value-added of port activities. In such a situation, the beneficial impacts of low port prices are not localised but are dissipated from the country in question to the

foreign consignor/consignee. This issue causes considerable concern to governments contemplating the continuation of their public investment programmes, as it deprives them of the basic *rationale* of doing so, namely, that the port provides a public service to the benefit of the whole nation[5]. Such concerns have become noticeably 'loud' nowadays when governments have to reduce in size, cut down on spending and taxes and allow for more private sector participation in some 'strategic' sectors that, until recently, were jealously guarded as government prerogative.

Second, in economically interdependent regions, such as for instance the EU, such pricing would lead to complaints for unfair competition and competition law would in principle be applicable, particularly as deficits would have to be covered from public funds, often seen as State Aid.

Cost-relatedness of prices and full cost recovery are things, however, easier said than done. A port is a multi-product firm and prices for many of its services are often bundled in port dues. Cross-subsidisation is also common. For instance, in order to attract transshipment cargo, a port may cross-subsidise feedering operations by trunk line charges. The *joint cost* problem in economics is therefore present here too, together with the difficulty, if not inability, to allocate such costs to different port services.

The difficulty of this problem is often accentuated by our inability to accurately measure port costs, especially marginal costs. Reliable and comparable port statistics do not exist, port accounting systems diverge and, finally, the financial flows between the port and its institutional owner (municipality, State) are not always known or transparent.

Many of the above difficulties, however, are often exaggerated. What follows is an attempt to demonstrate how the consistent application of *marginal cost pricing* (MCP) in ports could eventually eliminate deficits and the need for public funding, lead to an efficient allocation of scarce resources and achieve a level playing field among competing ports.

The issue of excess capacity

As a result of substantial excess capacity, container ports are declining cost industries or, in economic terms, industries with *increasing returns to scale* (liner shipping is another good example of such an industry, familiar to the student of maritime economics). In such industries, short-run marginal cost pricing (SRMC) results in deficits, for marginal costs are always below average total costs.

Excess capacity in competing container ports has a number of causes. As a matter of fact it could be shown (Haralambides *et al*, 2002a) that the higher the competition, the higher the need for excess capacity.

First, as already mentioned above, ports are often seen as pivots of regional development and, thus, infrastructure is built far ahead of demand in order to

promote economic development. Second, managerial 'ego-boosting' is often not innocent of its responsibilities for the creation of excess capacity. However, the real economic culprits of excess capacity ought to be found in capital indivisibilities (lumpiness of investments), economies of scale in port construction, and over-optimistic demand forecasts.

In competing container terminals, furthermore, excess capacity is also an 'operational necessity', being the only way to provide quick turnaround times to ships and thus maintain or increase patronage. It can be easily shown through simple single-channel-multiserver queuing theory (Haralambides *et al*, 2002a) that once a port reaches 70% capacity utilisation, congestion ensues in terms of unacceptable waiting times in today's organisation of liner shipping. With this in mind, 'operational' excess capacity ought to be seen as another unavoidable cost rather than an indication of inefficiency and wastage of resources. However, in their appeals to public funding agencies, port managers have not been very convincing in bringing this point out and, as a result, governments have been reluctant to see excess capacity in this light.

The problem of 'operational' excess capacity is exacerbated with the increasing deployment of ever larger containerships. As has been shown earlier (Cariou and Haralambides, 1999; Cariou, 2000a), in general, the cost per TEU of ship-time in port is an increasing function of ship size. This has mainly to do with the limited availability of cargo-handling equipment (cranes) that can be put to work on a ship, and the problem of course intensifies at higher levels of terminal capacity utilisation. Still, four and sometimes five crane operations are standard today in many major ports for post-Panamax ships. One cannot envision however eight or ten cranes working a concurrent sustained operation on a 10,000 TEU vessel in Hong Kong, Singapore, Rotterdam or Los Angeles any time in the near future (Haralambides *et al*, 2002b). Thus, other things being equal, the utilisation of larger vessels requires more excess capacity in ports.

Finally, creation of excess capacity can also be seen as a form of *limit pricing* (see above) and this often explains the reluctance of both governments and regulatory authorities (eg the European Commission) to sanction and finance ambitious port development plans that go beyond what would normally be regarded as 'realistic' demand forecasts. Here, hub-port strategies and port investments that encourage the construction of larger and larger containerships increase the sunk costs of new entrants to the competitive port arena, consolidating the incumbent ports' market power on the one hand, and making new entry unprofitable on the other.

Competition and excess capacity mix an 'explosive cocktail'. Competition pushes prices down to marginal costs, not allowing full cost recovery (and often survival). In liner shipping, this problem has been solved – at least so far –

through self-regulation and the organisation of carriers in conferences and similar forms of cooperation (including shipping alliances).

Short- and Long-run Marginal Costs

Let us try to see the above through the use of a simple graph (Figure 2) that will also be our vehicle for showing how MCP can have the positive effects mentioned above. In order to do this, a brief elaboration on the concepts of short- and long-run marginal costs is necessary; particularly of the latter which is a most crucial, albeit misunderstood, concept in maritime economics.

In the short-run, the size of the port is considered as constant. Fixed capital assets, such as quays, yards and rest of infrastructure, are invariant to output, and variable costs mainly relate to those of cargo-handling and nautical services (eg pilotage). In the short-run, marginal costs (SRMC) consist of the increment in variable costs required to produce an extra unit of port service, eg the handling of an additional container, when all other costs are kept constant.

In the long-run, all costs are considered variable. The concept of long-run marginal cost (LRMC) is similar to before with the difference that, now, LRMC is the increment in *total* costs required to produce an extra unit of port service. By considering total costs, ie by including infrastructure costs as variable ones, LRMC becomes a planning concept. In principle, it gives the *long-run equilibrium* (LRE)

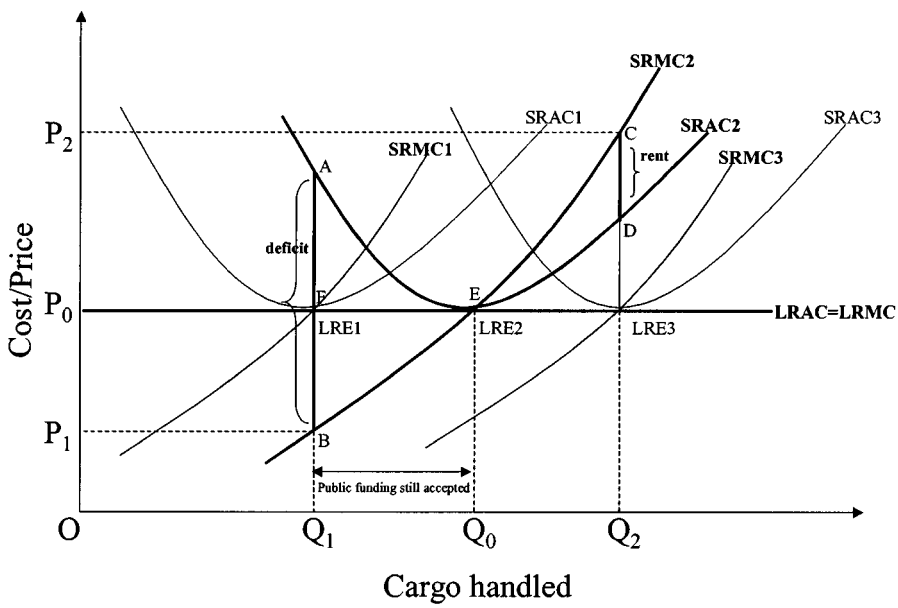

Figure 2: Marginal cost pricing in ports

port size, able to satisfy a given level of demand at minimum average total cost, without incurring deficits or realising *economic rent* (ie supernormal or monopoly profit). In the absence of rapid technological change, we often assume that LRMC = LRAC = Constant (Figure 2).

Increasing returns to scale

The above could be better grasped by looking at Figure 2. Assume that the size, organisational structure and 'operational' excess capacity of our port can be adequately described by its short-run average total cost curve SRAC2. The port faces intense regional competition from neighbouring ports, its investments are publicly funded and, at present, the level of demand it has to satisfy is Q_1. Increasing returns to scale are thus present.

As a result of competition and the lack of a need to recover (publicly funded) infrastructure development costs, our port will be tempted – if not forced – to set prices equal to marginal costs, ie P_1. (SRMC2 is our port's short-run marginal cost curve). A deficit of the order of AB is thus created and MCP does not allow the port to recover its costs in full. Apparently, our port is too large for that level of throughput (Q_1).

Unless demand picks up considerably far beyond Q_1, such a situation is not sustainable in the long-run without continuing public support. Taxpayers, however, will become increasingly sceptical and competitors abundantly vociferous, in whichever way they can, on unfair competition. In long-run equilibrium (LRE), that level of throughput (Q_1) ought really to be produced by a much smaller port (LRE1/SRAC1) whereby SRMC pricing would allow the recovery of full costs. At that size, the port would exhibit *constant returns to scale* and it would be able to produce its services at minimum average cost.

Diminishing returns to scale

Let us now see what would happen if our port was faced with a situation where demand for its services was substantially higher, say Q_2. Here, the port exhibits *diminishing returns to scale* (diseconomies of scale) and although State coffers cannot complain in terms of revenues, congestion is a chronic problem and ship waiting times unacceptably long. Port capacity is over-utilised, accidents in cargo-handling very likely, and carriers impose surcharges on shippers. Demurrages are claimed. Such a situation, common in many ports during the pre-containerisation era, can still be found in some general cargo ports in developing countries.

Here, MCP is not only appropriate but recommended as a pricing strategy that rationalises demand and allocates scarce port capacity according to carriers' willingness to pay. Apparently, balking (carriers refusing to call at the port) and reneging (existing carriers leaving the port) are at this point the least of our port's concerns.

Setting price equal to marginal cost in this case means that our port charges a price of P_2 for the last ton of cargo it handles and this price is over and above (line CD) what on average costs the port to handle a ton of cargo when the total amount of cargo handled in a certain period of time is Q_2 tons. Now, the port realises *economic rent*, or supernormal profit, ie an economic surplus after all factors of production have been paid for, including entrepreneurship as well as a normal return on capital. Total economic rent accrued to the port beyond the minimum cost production level Q_0 is thus equal to the area ECD.

Here too, the situation is not sustainable in the long-run. Clearly, the port is too small for that level of throughput. Eventually it will have to expand to its long-run equilibrium position LRE3/SRAC3 where it will only earn normal profit, producing and charging at minimum average cost. The port will be helped in this by its competitors who will also invest and expand in an effort to capture part of the economic rent.

Constant returns to scale

However, port development and contraction are dynamic processes and rarely, or by accident, would a port be found on its LRE position. As said earlier, lumpiness of investments, economies of scale in port construction and wrong demand forecasts would see to it. This is why we stressed above that LRMC is a planning, ie normative, concept; a snapshot of a dynamic process. At any point in time, a port could diverge markedly from the idealised situation of LRE.

Having said that, however, if all competing ports within a certain economically interdependent geographical region were to be taken together, it would be reasonable to assume that the industry as a whole demonstrates constant returns to scale and, therefore, LRMC pricing, if ever achievable, would lead to efficient resource allocation, maximisation of social welfare and a level playing field among competing ports. This was the spirit and philosophy of the European Commission's White Paper on *fair payment for infrastructure use* which ascertained that '*the entire infrastructure complex of the EU as a whole may not exhibit economies of scale*'. This means that, at least at an aggregate level, it should be possible to recover total costs.

Cost recovery through MCP

But let us, for the time being, return to our example of Figure 2 and the case where our port faces the limited demand of Q_1. The port management remains optimistic that their plans and forecasts will eventually materialise and demand will pick up to the level of Q_0, if not further. However, costs have now to be recovered through port charges. If at the level of Q_1 the port charges a price of P_1, equal to its long-run average and marginal cost, there would still be a deficit but now reduced from AB to AF.

In so doing, ie by consistently charging at LRMC = LRAC, and as demand picks up, the port will eventually reach its LRE level of throughput where costs will be fully recovered. In the range of output Q_1 to Q_0, public funds are gradually and increasingly recovered until the deficit is phased out completely at point E.

Such public funding is and should be allowed given its digressiveness (temporary and declining) and the private sector's frequent reluctance to finance chunky investments of long gestation periods. The understanding now however is that these funds will have to be eventually recovered, irrespective of whether they are ploughed back to the public sector or used for further development by the port itself. In an era of reduced public spending, such an understanding may also help in enticing private funds to the port sector, as well as in giving an answer to the important question as to whether the pricing of port expansions should also reflect the cost of past (public) investments.

Despite the elegance and desirability of MCP, a lot of questions still remain open. Could this be done in practice? Could a port voluntarily and single-handedly charge prices higher than its competitors? Is there scope for policy intervention in pricing matters? Can we measure LRMC? Is MCP economically efficient when applied by some ports only, while the rest of the infrastructure connected to these ports (eg roads and railways) does not follow suit? Let us take these questions in turn.

Measuring marginal costs

With a given level of technology and organisation, fairly standard aspects in modern ports today, the measurement of long-run average or marginal costs simply boils down to forecasting future demand for port services (Figure 2). Once this is established, the LRE size of the port can be established too and the only cost element required for the measurement of LRMC is the construction cost of an additional metre of quayside and all that comes with it (aprons, yards and possibly organisational costs as a result of bigger size). Port engineers have fairly accurate data on these.

Forecasting port throughput

But can demand for port services be forecasted with any degree of confidence? This is one of the trickiest and most complex questions in maritime economics and one that can only be treated rudimentarily in an introductory chapter such as this.

In a closed economy, forecasting port demand is straightforward: observe population, agglomeration, consumption, personal income and international trade trends and translate them – mostly through regression analysis – into required port capacity; a popular exercise for students of maritime economics.

In an open and economically interdependent economy, however, things are very different. As a result of intertwined and extended hinterlands; abundant land infrastructure and short-sea feedering networks; continuously evolving liner

shipping networks; and the infamous 'mobility' of the container, demand is very volatile and unpredictable. Port market shares are unstable; investments in one region or country have an impact on another (eg a dedicated railroad line connecting Rotterdam with the Ruhr area in Germany will impact north sea German ports; new container capacity in Antwerp will take away traffic from Rotterdam; the port of Tanjung Pelepas in Malaysia has stolen Maersk from Singapore; Korea invests tremendously in order to compete, as a hub, with both Japan and China); carriers are diverting traffic to their own dedicated container terminals.

In such a 'fluid' environment, how could one forecast port demand with any degree of credibility? Should ports, regions and countries compete or cooperate when it comes to infrastructure? In principle, cooperation among producers is not to the benefit of the consumer but, on the other hand, does the latter benefit when he pays taxes to develop 'competing' infrastructure while knowing that he is due for reprisals in a never-ending vicious circle of public spending? Shouldn't such public spending be also liable to the same international anti-dumping laws as with other goods and services? In terms of trade policy, is there a difference between a subsidised shipyard and a subsidised port? If not, why do we shout about the former but turn a blind eye to the latter?

Answers to such questions belong to the realm of public rather than maritime economics. One could however start fathoming the answers by looking at the role of *public investment*; a concept that, surely, globalisation will redefine before too long. A road that connects a container terminal to the national motorway system is in principle open to all citizens and as such the road is a public good. In practice, however, the road is only used by the operator who exploits the terminal. The access channel to a port is dredged down to 15 metres. In principle, every floating craft can go through the channel but, surely, the channel wasn't dredged to that depth with the fisherman in mind! Are such investments public or private? And should their costs be paid for by the taxpayer or those who directly benefit from them?

The kinked demand for port services

Another question we posed above was whether a port would, voluntarily and single-handedly, charge a price higher than that of its competitors. The answer here is '*no, unless it has to*', ie unless it has to recover costs. As we have mentioned above, ports operate in an oligopolistic market and individual upward price moves tend not to be matched by competitors who will maintain prices in an effort to benefit by capturing a larger market share. A port's demand curve is thus a *kinked* demand curve such as dD′, depicted in Figure 3.

Assume that, originally, the demand for the services of our port is given by DD′. The port is at equilibrium, charging a price of P per ton of cargo for a total

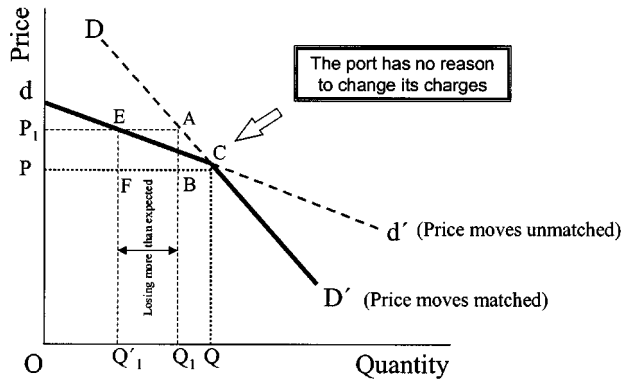

Figure 3: The kinked demand for port services

throughput of Q. The port, believing that its competitors will follow suit, plans to raise prices to P_1. Knowing its price elasticity of demand, the port calculates that the increase in revenue as a result of higher prices ($ABPP_1$) will more than compensate the loss in revenue due to lower (Q_1) throughput ($BCQQ_1$); that is $ABPP_1 - BCQQ_1 > 0$.

To its bad luck, however, the competitors of our port maintain prices at the same level hoping to capture a greater market share. This does of course happen and our port's demand curve flattens to dd′. At the higher price of P_1, our port is only able to serve a Q'_1 level of throughput. It loses revenue much more than what it was expecting ($FBQ_1Q'_1$ more), while its extra revenue due to the price increase is only $EFPP_1$, less by ABFE from what it was originally anticipating. Had our port known, as it should, that its competitors would not follow suit in raising their prices, it would have no good reason to raise its price single-handedly, as this would make it worse-off in the end. This is the more so when ports and governments are aware that LRMC pricing can lead to allocative efficiency only as long as other markets are also efficient (Pareto optimality). If the latter condition is not satisfied because of institutional restrictions, then, according to the *Theory of Second Best* (Lipsey and Lancaster, 1956), '*it is in general neither necessary nor sufficient to satisfy the remaining conditions*', ie to endorse MCP in ports when roads, railways and the rest of the infrastructure do not do the same.

In the context of the European Union, a voice is often loudly raised, by both the Commission and the port industry, arguing that MCP in ports only will make port services 'unilaterally' more expensive thus penalising the Union's efforts to check road traffic and promote short sea shipping; a most valid argument indeed. Under this light, efficient port pricing cannot be seen in isolation but only through

a general equilibrium approach where the rest of the port related infrastructure and its pricing are also being considered simultaneously.

POLICY INTERVENTION

If ports are not, naturally, individually prepared to disadvantage themselves by charging higher prices, in order to recover costs, is there scope for *policy intervention*? Could a 'pricing discipline' be imposed on competing ports in economically interdependent regions that would alleviate their own misgivings about unfair competition?

In the European Union, this was the objective of the Commission's *Green paper on ports and maritime infrastructure*[6]. The paper set out the broader context of Community port policy, with a focus on the issue of state aids and infrastructure charging. The main question was whether, and how, an efficient pricing system leading to cost recovery could be implemented in practice in the port sector, taking into account a variety of relevant objectives and constraints including higher market based efficiency; increased cohesion; distributive goals; the development of short sea shipping; the improvement of safety and environmental protection, etc. Other, more recent policy documents at the European level have also addressed this issue; *cf* Final Report by the high level group on transport infrastructure and charging concerning options for charging users directly for transport infrastructure operating costs.

The Green Paper attracted growing industry attention on the desirability and scope of a more harmonised European seaport financing and pricing strategy. A large scale, pan-European research study for the European Commission (DG Transport and Energy), known under the acronym 'ATENCO' (***A***nalysis of the main ***T***rans-***E***uropean ***N***etwork ports' ***CO***st structures), was subsequently carried out[7], with the main goal to provide input for an in-depth reflection at the European level on (a) the design of a strategy to achieve efficient pricing and (b) the possible impacts of a cost recovery approach on the functioning of ports.

The study came up with a number of conclusions, the most important of which were: (a) The high sensitivity of demand for port services to changes in prices (Table 1). As an example, the study calculated that if the port of Hamburg were to recover the dredging costs of river Elbe from user charges, this would add Euro10 (or roughly 5%) to its terminal handling charges per TEU. According to Table 1, such a price increase would lead to a 15.3% (roughly half a million TEU) reduction in container traffic[8]. (b) No policy intervention on pricing matters would ever be acceptable by the industry, who strongly felt that pricing policies are solely for the firms themselves to decide (the argument here was that even

when full cost recovery is sought as an overall objective, ports apply a variety of pricing principles simultaneously in order to achieve managerial effectiveness at the micro-level). (c) However, it was unanimously agreed, by every port management team interviewed, that *cost recovery* – regardless of how this was to be achieved by each individual port – should be pursued and, for that purpose, better port statistics, accounting systems and transparency of port accounts are required[9].

Following the ATENCO results, the Commission came up with what has become known as its 'port package' (European Commission, 2001a and 2001b). In this, the EC, convinced now about the desirability of cost recovery in ports, takes a fresh look at two most important issues: (a) the need for greater transparency in the efficient allocation (leases/concessions) of port land to service providers on an equal opportunity basis and in a way by which leases reflect better the opportunity cost of port investments; and (b) the no longer indiscriminate treatment of port infrastructure investments as 'public investment'. Particularly with regard to the latter, although the Commission continues to remain neutral on the public or private ownership status of a port, and it does not dispute in any way the fact that public investments are the prerogative of Member States, it nevertheless attempted to have a say in whether a certain investment, that in theory is open to all users indiscriminately but in practice it is intended for a few or even one user, could, in the spirit of the Treaty, be considered as 'public investment'.

CONCLUSIONS

Cost recovery and the pricing of port services are complex and controversial issues, both technically and conceptually. This is so because they deal with the development and provision of infrastructure; economic development; public investment; fiscal policy and the role of the State in economic activity. Before too long, economic analysis of this type takes one into the realm of *moral philosophy*. Indeed, the type of *economics* we accept as valid reflects nothing more than our philosophical inclinations as regards the evolution of society, the desirability of equity, and the importance of production.

The issue of port pricing in maritime economics has not arisen only out of academic interest but as a response to the need felt in the port industry itself for a self-discipline mechanism that, if consistently applied, would eventually lead to the recovery of port investments and to future investments that are largely demand driven. This requirement has been the result of the recognition that, in the intensified regional port competition of today and the increasingly tightened fiscal constraints, it is no longer acceptable to indiscriminately and without a

formal economic *rationale*, spend taxpayer money on port investments, often aimed at increasing market share at the expense of other ports, particularly within the same economically interdependent area.

Naturally, pricing for cost recovery looks at the 'user' rather than the 'taxpayer'. This is just as well, given that ports (at least container terminals) are being transformed from public to private enterprises. The allocative and income distribution effects of such a switch in direction are obvious: investments are recovered, and port revenues generated, from the user of a (private) facility, who will have to somehow pass these costs on to the final consumer. The latter will in all likelihood have to pay higher prices for the goods he consumes but, at least in efficient markets, he is compensated by correspondingly paying less taxes (for infrastructure investments). Obviously, such issues are highly complex and have yet to be researched.

In principle, pricing for cost recovery should mean that depreciation of port infrastructure is included as a cost in the port's pricing system. Something like this would undoubtedly raise the level of port prices, but the overall effect of this on consumer prices and traffic diversion may not be as large as some might at first sight expect. This effect depends on the percentage of port costs in final consumer prices; the import and export elasticities of traded goods; the level of competition in transport markets (especially liner shipping) as well as all other markets along the door-to-door chain (ie distribution, wholesaling, etc). It could well be argued that higher port prices are not necessarily passed on to consumers but are instead absorbed by transport operators and other market intermediaries.

But even if higher port prices are, to some extent, passed on to consumers, the overall effect on society could be ascertained by comparing the loss in consumer surplus, as a result of higher port prices, to the welfare gains had the public funds in question been invested in other sectors of the economy or led to lower taxes in general.

This chapter has argued in favour of pricing for cost recovery among competing commercial ports and it has shown how long-run marginal cost pricing can be a powerful pricing discipline that can eliminate subsidies and establish a level playing field among ports.

However, a 'pricing discipline' imposed on ports through policy intervention would be unacceptable. The objectives often pursued by ports are so divergent that any uniform approach to pricing becomes meaningless and politically unfeasible. Pricing matters on the other hand, at least in a liberal economic environment, ought to be, ideally, left to the producers (ports) themselves.

The ATENCO study has demonstrated that, however controversial the issue of port pricing itself may be, there is general consensus on the importance of cost recovery. And this was an important development and step forward. Indeed, as long as this objective is respected, the specific pricing policy of the individual port

becomes of secondary importance and only in so far as crowding out effects and efficient allocation of resources are concerned.

Once cost recovery is generally accepted as a guiding principle in port investment and pricing, the way forward is much simpler. It involves the compilation of better and more harmonised statistics on port costs, adoption of standardised port accounting systems, greater transparency of port accounts and of financial flows between the port and its institutional master and, perhaps, a common glossary of terms. And these are objectives not so difficult to achieve.

In conclusion, therefore, port policy is reorienting its attention from the idea of adopting uniform cost based pricing principles, towards: (a) more indirect incentives promoting cost based thinking in ports (eg by defining more clearly what constitutes acceptable public support in port infrastructure); and (b) rethinking how conventional competition rules (related, *inter alia*, to market access; abuse of dominant position; collusive behaviour, etc) should be applied to the port sector.

Acknowledgement
Many of the ideas developed in this paper have benefitted from numerous discussions with staff of the European Commission over the period of my involvement in the preparation of its Green Paper on Ports and Maritime Infrastructure. I am particularly indebted to Rodolphos Papaioannou, Fernando Aragon, Maj Theander, Lenita Lindström, Lia Athanasiou, Anne Bergenfelt and of course to Neil Kinnock himself for his remarkable insights. The usual disclaimer applies.

ENDNOTES

[1] Often there is some confusion between the concepts of 'sunk' and 'fixed' costs. The former are costs that cannot be recovered once the firm decides to leave the market; a breakwater could be a good point in case here. Fixed costs, naturally, are those that do not vary with output. A sunk cost could thus well be variable, eg marketing and advertising expenses, while a fixed cost, such as that of a gantry crane, does not necessarily have to be sunk, as the asset could be sold to another port.

[2] The concept of an economically interdependent geographic area or region, as employed here, has both a spatial and an economic dimension. It refers to a spatially delineated geographic area in which 'binding' arrangements (laws) of direct economic impact are 'jointly and institutionally' put in place – such as for instance competition, labour and fiscal laws – with the aim of maximising collective welfare. Apart from an individual country (with its constituencies, States, etc) that would obviously qualify under such a definition, a good example of such an area is the European Union as well as other regional blocs depending on the strength of their institutional ties over and above trade policy.

[3] Whether the absolute level of the elasticities in Table 1 is correct is a much less important issue than the observation of a very substantial divergence of the elasticities among the various ports. Hence, variation in prices, as a result of the adoption of alternative pricing systems, would, at least in the case of containers, lead to fundamentally different impacts on individual ports, even when engaging in similar price increases.

[4] In industrial economics, 'limit pricing' refers to strategic behaviour by which incumbent firms raise costs, through a multitude of ways, to a level that makes new entry unprofitable.

[5] This was in broad terms the position of the Dutch government on the issue of Maasvlakte II terminal in Rotterdam.

[6] The author had the privilege of being member of the then EU Transport Commissioner, Neil Kinnock's group of experts that drafted the Paper. The Commissioner opened the first meeting of the group with a statement that took everyone aback: '*if countries want to spend public money to develop their ports, so be it and there is nothing we can do about it*'. A lot has changed since then.

[7] The author was involved in this exercise as Chairman of the Academic Group of Experts.

[8] Such estimates have to be viewed with utmost caution and full understanding of the assumptions underlying them. For instance, this impressive percentage assumes that other ports in the region would be able to absorb smoothly the extra traffic without difficulty or additional cost. It is also assumed that no changes take place in the pricing of the rest of the infrastructure (roads, etc).

[9] Surprisingly, most port authorities expected that the adoption of full cost recovery pricing would have little impact on pricing levels. It is believed here that, although in private ports such as those of the UK this may well be the case, this is far from true in all others, and this conviction of many port managers can only be explained by their inability to grasp in full the notion and implications of long-run marginal costs.

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Port Financing and Pricing in the European Union: Theory, Politics and Reality

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The issue of financing and pricing of port infrastructure has recently been the subject of widespread debate in Europe and it is now high on the political agenda of the European Union. This is the result of globalisation and the changing operational environment of ports, as well as of the increased port competition brought about by the completion of the internal market. Greater private sector interest in the port industry, as well as in the rest of Europe's infrastructure, necessitates some form of cost-based pricing that would allow the recovery of port investments. This could, however, disturb the existing 'equilibrium' among ports that has been established over the years as a result of each port's particular characteristics such as geographical location, proximity to markets, navigational constraints, subsidies and types of financing. Among competing container ports, like those of western Europe, such 'disturbances' can have marked impacts on ports' market shares, as a result of the easiness carriers can nowadays switch between ports. Furthermore, efficient pricing in the port sector could not bring about the expected welfare effects if the rest of the related infrastructure is not priced accordingly. The issue thus appears to be reaching a standstill, particularly in view of the fact that in most countries ports are considered as part of the country's infrastructure and thus State investment in ports is considered as 'public investment' outside the reach and mandate of the European Commission. The paper argues that the prime goal to be pursued at a European level is to achieve a level playing field among competing commercial seaports. It also reviews the past and present efforts of the European Commission in this area, the difficulties and challenges these efforts are faced with and, finally, it attempts to indicate the way forward; a way consistent with Europe's political thinking, priorities and realities.
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INTRODUCTION

A growing amount of attention in Europe is currently being focused on the desirability and scope of a more harmonised approach to port financing and pricing. A large scale, pan-European research project for the European Commission (DG Transport and Energy), known under the acronym 'ATENCO' (Analysis of the main Trans-European Network ports' COst structures)[1] has been recently finalised. The project's main goal was to provide input for an in-depth reflection on (a) the implications of a strategy to achieve efficient pricing; and (b) the possible impacts of a cost recovery approach on the functioning and competitive position of ports.

Two recent European policy orientations were crucial as starting points of this research. First, the extension of Trans-European Networks (TEN) to include, *inter alia*, seaports (see eg the Proposal for a European Parliament and Council Decision N° 1692/96 EC as regards seaports, inland ports and intermodal terminals, as well as project N° 8 in Annex III; COM (97), 681 final, 10 December 1997). The inclusion of ports, as interconnection points, is critical to the performance of intermodal transport within a multimodal infrastructure network. The TENs will increase the options available to transport providers and users in terms of alternative door-to-door intermodal logistics chains. In the more competitive environment now provided by alternative logistics chains, distortions of trade flows between Member States – resulting from different systems of financing and charging for port (related) infrastructure and services – could become or appear more important.

Second, the Commission's Green Paper on Seaports and Maritime Infrastructure has set out the broader context of Community port policy, with a focus on the issue of state aid and infrastructure charging (Green paper on seaports and maritime infrastructure, COM (97) 678 final, 10 December 1997). Here, the main question was whether and how an efficient pricing system, leading to cost recovery, could be implemented in practice in the port sector, taking into account a variety of relevant objectives and constraints including: higher market based efficiency; increased cohesion; distributive goals; the development of short sea shipping; the improvement of safety and environmental performance, etc. Other more recent EU policy documents have also addressed this issue (see eg the Final Report by the High Level Group on Transport Infrastructure and Charging, concerning *options for charging users directly for transport infrastructure operating costs*).

At the time of writing, the Commission came up with its 'port package' (European Commission 2001a, and 2001b). Although the full implications of those

two most important documents have yet to be fathomed, it could nevertheless be said at this point that the EC takes a fresh look at two (among others) recurring issues: (a) the need for greater transparency in the efficient allocation of port land to service providers on an equal opportunity basis and in a way whereby leases and concessions reflect better the opportunity cost of port investments; and (b) the no longer indiscriminate treatment of port infrastructure investments as 'public investments'. Particularly with regard to the latter, although the Commission continues to remain neutral on the public or private ownership status of a port, and it does not dispute in any way the fact that public investments are the prerogative of Member States, it nevertheless attempts to have a say in whether a certain investment, that in theory is indiscriminately open to all users but in practice is intended for a few or even one user, could, in the spirit of the Treaty, be considered as a 'public investment'.

Given the two European policy directions described above, which could both be strengthened by a pan-European implementation of a coherent framework regarding port financing and pricing, the question arises whether the adoption of any financing or pricing system, or set of pricing principles at the European level, would be a valid policy option.

IMPLICATIONS OF THE ACADEMIC LITERATURE ON PORT PRICING FOR THE ADOPTION OF A EUROPEAN PORT PRICING STRATEGY

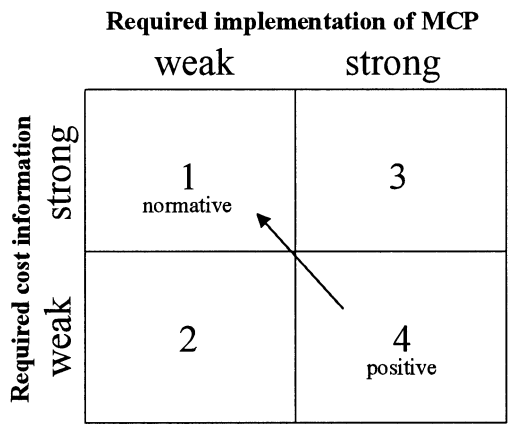
The main conclusion of a comprehensive academic literature review on port pricing (undertaken in the context of the ATENCO project) was that pricing in ports can and should be based on costs (Button, 1979). The determination of which costs should be reflected in prices largely depends on the type of port organisation (Voorhamme and Winkelmans, 1980; Pollock, 1980; Suykens and Van de Voorde, 1998; Van Niekerk, 1996). Prices in service or comprehensive ports reflect a multitude of different costs – many of them joint costs, difficult to allocate in a way that is not largely arbitrary – compared to prices in landlord ports where more clear lines of responsibility and accountability exist (Thomas, 1978; Jansson and Shneerson, 1982; Verhoeff, 1991; Dowd and Fleming, 1994).

From a theoretical perspective, and assuming that a number of boundary conditions are fulfilled, long-run marginal costs represent the most appropriate basis for efficient pricing (Walters, 1974; Bennathan and Walters, 1979). Alternatively, more sophisticated pricing arrangements, such as Ramsey pricing or two-part tariffs, have also been considered as appropriate in the context of cost recovery in seaports (Ramsey, 1927; UNCTAD, 1975; Bennathan and Walters, 1979; Zachcial and Hautau, 1998). In practice, and in the absence of 'measurable' marginal costs, approaches based on average costs also appear to perform

reasonably well in approximating marginal costs (Robinson, 1991), despite the problem of joint cost allocation and the inadequacy of port accounting systems (Gardner, 1977). In fact, differences between average cost pricing and marginal cost pricing are sometimes difficult to identify in practice (Talley, 1994; Coppejans and Bergantino, 1998) and, as a consequence, the discussion on the choice of an 'optimal' cost basis, although of academic interest, may in reality be of lesser practical significance.

Irrespective of the cost basis chosen, the principle that prices should accurately reflect (not to say recover) social opportunity costs[2] is crucial. Some of the things needed to achieve this are: the collection of high quality cost information by ports (UNCTAD, 1976; Thomas, 1978); greater transparency in port accounts and in the financial flows between the port and its institutional master; harmonisation of accounting systems; and the adoption of a common glossary. Whether these data are subsequently interpreted as average cost data or as some approximation of marginal costs is a matter of little practical relevance, particularly in view of the fact that MC pricing is neither a necessary nor a sufficient condition for welfare maximisation, as long as other related sectors (eg road/rail transport), impacting the port, are not priced similarly. In this particular context, a voice that is often loudly raised, by both the Commission (recently) and the port industry, argues that MC pricing applied in ports only, will make port services 'unilaterally' more expensive thus penalising the Union's efforts to check road traffic and promote short sea shipping. A most valid argument indeed.

The policy implications of the above analysis are depicted in Figure 1. Here, the horizontal axis measures the (normative) requirement to apply marginal cost



pricing as a precondition for welfare maximisation: this requirement can be viewed as weak or strong. The vertical axis reflects the requirement to collect, process and effectively interpret complex, high quality cost information as a precondition to achieve cost recovery: here again, the requirement can be weak or strong.

A careful analysis of European policy documents on efficient port pricing, especially of the Green Paper on Ports and Maritime Infrastructure, largely suggests the adoption of a quadrant 4 perspective. The implementation of marginal cost pricing is indeed viewed as a key requirement to achieve efficient pricing in ports, albeit subject to a number of exogenous policy considerations, mainly of a distributive nature. Less attention is paid to the administrative problem of collecting, processing and interpreting complex, high quality cost information, most likely because this is viewed as an operational issue rather than a strategic policy one.

The above analysis suggests, however, that a quadrant 1 perspective should be adopted. As was already mentioned, there is no strong requirement to apply marginal cost pricing as a precondition to achieve efficient pricing in seaports. However, any policy proposal at European level aimed to foster the systematic application of cost recovery rules should – and this is a strong requirement – focus on the condition of high quality cost information availability, which obviously implies uniform definitions of cost and income components as well as balance sheet items, and transparent accounting rules.

In addition to the principle of cost recovery, the increasing transformation of ports (at least of competing regional container terminals) from public to private enterprises raises the issue of the desirability and fairness of pricing methods focusing on the 'user' rather than the 'general taxpayer' (EU COM (97) 678 final). Despite the persisting importance of the joint cost allocation problem here too (particularly here too one might say), the allocative and income distribution effects of such a switch in direction are obvious: investments are recovered and port revenues generated from the user of a (private) facility, who will have to somehow pass these costs on to the final consumer. The latter will in all likelihood have to pay higher prices for the goods he consumes but, at least in efficient markets, he is compensated by correspondingly paying less taxes (for infrastructure investments). Obviously, such issues are highly complex and have yet to be researched.

EUROPEAN PRACTICES ON PORT PRICING

The analysis of present pricing policies in European ports, conducted as part of the ATENCO study, demonstrated the substantial diversity prevailing among

European Union ports with regard to their financing and charging practices. This diversity is deeply rooted in various judicial and cultural traditions, as well as in the divergent port management styles, related responsibilities and degree of autonomy. These observations are fully consistent with the conclusions of previous fact-finding reports of the European Seaports Organisation (ESPO) and many academic studies (Heggie, 1974; Pollock, 1980; Suykens, 1986).

Such diversity makes the requirement of uniform methods of cost recovery and related pricing a very complex issue and it suggests a gradual, step-by-step, approach. Undoubtedly, such an approach should consider, at least in the short-run, national perceptions on the appropriate role of public investment, still the prerogative of Member States.

However, considerable progress could be made through efforts aimed at harmonising definitions and classifications of port infrastructure. Current classifications (eg investments inside or outside the port area) often lack an economic *rationale* and are instead based on technical or geographical considerations aimed at determining whether investment costs should be allocated directly to users or to society at large.

Giving ports greater financial autonomy could substantially contribute towards achieving cost recovery through whatever pricing might be deemed appropriate by the ports themselves. However, obtaining such autonomy usually depends upon a political decision making process. Furthermore, in order to avoid the conventional drawbacks of monopolistic situations, such autonomy should be accompanied by efforts to ensure adequate intra-port competition, either at the operational level or through rent/lease policies.

Finally, as far as nautical services are concerned (pilotage, mooring and towage), MC pricing is still a pertinent issue albeit in a different perspective, this being the retention of economic rent for society, public service obligations (PSO) notwithstanding. As a result of the very nature of the services involved, the often limited size of the market (and thus sometimes the (im)possibility to increase competition) and port safety considerations, nautical services are often either carried out by public agencies or by private parties with exclusive rights. The potential of abuse of dominant position is thus real and this problem can be addressed either through encouraging competition or through more effective price control. Here, successful MC pricing is able to establish 'cost-relatedness' at the same time.

The real challenge of any policy attempt to foster some type of EU-wide cost recovery discipline, however, is to come to grips with the dependency of port financing and pricing routines on both (sub)national institutional settings, external to ports, and (sub)national political decision making which, *ad passim*, may use ports as a lever to achieve broader policy goals. The former parameter includes elements related to the judicial, cultural, organisational and managerial

heritage of a seaport, including traditions related to the allocation of responsibility and authority to the various actors operating in the seaport system. The latter parameter refers to broader policy goals, often pursued by public policy makers, such as growth pole effects, employment, regional value added, distributive equity, etc. In the highly sensitive European port environment, such parameters and pursuant policies are strong enough to negate any radical centralised policy initiatives, however appropriate these may be in an increasingly integrated Europe.

Both parameters imply that, to make some headway in formulating institutional change, substantial attention should be devoted to historical trajectories and path dependencies associated with specific (sub)national port financing and pricing routines. If not, the danger exists that substantial unintended policy effects might arise. If the key goal of a European policy initiative in the cost recovery area is the establishment of a 'level playing field' among competing European ports, it should be recognised that any assessment of potential improvements cannot be solely undertaken in terms of purely market based considerations, in contrast to many other sectors where liberalisation and market based rules have been widely credited as instrumental to the creation of better and best practices.

In the seaport sector, where several actors may be involved in the vertical port activities chain and the horizontal port activity clusters, the situation may be very different, precisely because of the potential of unintended policy impacts. For instance, a different financing and pricing discipline externally imposed on ports may disturb the effective horizontal and vertical linkages among the various port actors.

The Green Paper, in spite of its normative emphasis on efficient pricing, did not fail to demonstrate a deep awareness of port 'dependencies' and broad economic policy objectives. Unfortunately, the recognition of such complexities was not equally apparent in the approach of the so-called *High-Level Group on Transport Infrastructure and Charging* in its final report on Options for Charging Users Directly for Transport Infrastructure Operating Costs (EU, 1998).

Clearly, however, considerations such as the above do not stand strong to the 'surgical' test of economic rationality from the point of view of an impartial and uninvolved onlooker, the more so when it becomes apparent that such arguments, apart from being often inadequately defended, are at times used as pretexts and conscientious impediments against making more headway in establishing a level playing field among competing ports. The challenge of any policy (and this is propounded in a forthcoming paper) is to reconcile, in a win – win situation, two things: (a) the public with the private interest; and (b) the pursuance of wider socio-economic objectives with the nowadays paramount need to allocate (European) resources effectively.

A STRATEGIC FRAMEWORK FOR THE ANALYSIS OF FINANCING AND PRICING PRACTICES IN EU PORTS AND THE EXPECTED 'VALUE ADDED' OF AN EU-LEVEL APPROACH IN THESE MATTERS

The objective of the ATENCO study was to explore the impacts of various pricing scenarios on the competitive position of seaports, with a view to hopefully identify generally accepted pricing strategies that could lead, in the long-run, to the efficient allocation of scarce resources and, consequently, to the establishment of a level playing field among competing European ports.

Hence, it appeared reasonable to attempt to define, from a conceptual perspective, only two extreme generic types of ports. First, the type that could relatively easily implement a charging framework aimed at full cost recovery (but perhaps one with a pricing system that would already be largely in line with such a goal). Second, the type that would, for a variety of reasons, encounter major difficulties in doing so.

Based on extensive and in-depth analyses of the operations of several European ports, the authors identified five parameters critical in distinguishing between Generic Type I and Generic Type II ports.[3]

1. *Ownership*
If the public sector has an ownership stake in the port authority, this usually implies that some form of political input enters the prevailing decision making process of the port, including decisions on investments, wage structures and thereby (even if only implicitly) also decisions on pricing. Even if the public sector involvement only aims at reducing or eliminating market failure, such considerations may make microeconomic decision making in the pricing area more complex. A higher number of public institutions as owners is likely to increase this problem even further.

2. *Objectives*
Irrespective of the ownership structure, the question arises whether the port's key goals are centred on microeconomic issues such as profitability and market share considerations or whether broader macroeconomic and societal goals such as regional economic development or the international competitiveness of domestic industries are being pursued. In the latter case, important effects can again be expected from the pricing decisions of the port.

3. *Autonomy*
Irrespective of the port's ownership structure and key objectives, autonomy reflects the extent to which the port can perform port related activities independently, without being unduly constrained by boundary conditions

imposed by external actors (national or regional regulations, municipal constraints, etc), beyond those applicable to conventional commercial undertakings. Again, the existence of external constraints may greatly influence pricing schemes and decisions.

4. *Scope of activities*
Here, the question arises as to what extent the port is responsible for simultaneously carrying out activities that can be run according to conventional commercial principles, and activities that either entail an important regulatory component (eg because they include health and safety considerations or aim to eliminate potential negative impacts of monopoly power) or are difficult to perform on a commercial basis for other reasons (eg overall port strategic planning and dredging work). It is precisely when a port engages in both types of activities simultaneously that pricing effects may occur in those activities that can (should), in principle, be commercially run. For example, cross-subsidisation may then occur between the non-commercially run and commercially run activities.

5. *Public support* à fonds perdus
Finally, perhaps the most critical parameter that could potentially affect a port's pricing behaviour is whether public funds are allocated *à fonds perdus*, ie without any formal *ex post* performance requirements or systematic performance evaluation. The ATENCO study identified the sources of investments for several types of infrastructure as well as superstructure in various EU ports. It appeared that public investment (as well as other types of support) is still important and can be found in many EU countries. Obviously, the involvement of public funds, of whatever nature, does not necessarily imply that port users get free or low-priced access to these infrastructures and superstructures. It does imply, however, that the incentive to engage in some type of cost-based pricing becomes blunted to say the least.

The two generic types of port authority are described in Table 1. Ownership, autonomy, scope of activities and the allocation of public resources *à fonds perdus* can be viewed as the key components of a (sub)national port system's institutional setting.

If important deviations are observed in practice from some form of cost-based pricing of infrastructure and superstructure, the question is which of the five parameters, or what configuration of parameters (closer to Type II), may be most relevant to explain specific pricing practices.

Table 1: Generic types of port authority

Parameter	Type I	Type II
1. Ownership	Private	Public involvement
2. Objectives	Profitability/market share	Broader societal goals
3. Autonomy	Strong	Weak
4. Scope of activities	Mainly commercially run	Mixed (commercial and non-commercial)
5. Public resources allocation *à fonds perdus*	None/low	High

Perhaps more importantly, the above analysis suggests that if the introduction of a cost-based pricing framework at European level were to be contemplated, it should first be determined which of the above five parameters would need to be changed at the level of a port and national port system, and what the implications would be for a port's (and port system's) functioning. This would precisely allow the identification of likely unintended policy impacts.

PRELIMINARY EMPIRICAL ASSESSMENT OF THE IMPLICATIONS OF A EUROPEAN PORT PRICING STRATEGY

In the context of the ATENCO study, a survey questionnaire was developed, with the help of the European Commission services, aimed to gather information on both present pricing principles and strategies, and the likely impact of introducing new pricing systems. In fact, two questionnaires were developed: the first, to be completed by port authorities and the second by port users. The results of the survey are briefly discussed below.

Port authorities and port users in 13 European TEN-T ports were interviewed on their pricing practices and their economic performance. Their views were also solicited on competition and on a common framework of 'user pays' principles in the financing of port infrastructure.

These ports constitute a key sample of the largest ports in European countries. Not all ports were able to answer all questions. For many ports the reasons for failing to answer a specific question were related to a lack of knowledge or information within the port.

The ports included in the survey were: Aarhus, Denmark; Antwerp, Belgium; Barcelona, Spain; Dover, United Kingdom; Dublin, Ireland; Felixstowe, United Kingdom; Genoa, Italy; Göteborg, Sweden; Hamburg, Germany; Lisbon, Portugal; Piraeus, Greece; Rotterdam, The Netherlands; and Venezia, Italy.

The following four conclusions appear particularly important:

1 All port authorities supported the adoption of overall full cost recovery within the port sector and considered it to be at least of some importance. Five ports even considered full cost recovery to be of critical importance for individual activities. The majority of the ports supported the adoption of 'user pays' principles in ports. Surprisingly, most port authorities expected that the adoption of full cost recovery pricing would have little impact on pricing levels. It is believed here that, although in private ports such as those of the UK this may well be the case, this is far from true in all others, and this conviction of many port managers can only be explained by their inability to grasp the notion and implications of long-run marginal costs;
2 Port authorities did not consider the markets for liquid and dry bulk cargoes to be influenced by public support schemes. The markets for general cargo were considered by some ports to be influenced by such schemes, while most of the ports considered that the markets for containerised and Ro – Ro cargo were influenced by such schemes. Most of the ports believe that a more rigorous adherence to cost recovery would be beneficial to the port sector. Seven of them were even in favour of the uniform adoption of general pricing principles to the extent, however, that adherence to these principles would still allow flexibility and that hinterland transport pricing should be subject to similar principles;
3 Port users were generally aware of some impact or distortion caused by public support schemes in European ports. The users considered that impact to be of limited relevance in relation to prices charged, and of some importance in relation to the overall port user costs. The interviewed users stated that the market for liquid bulks is inelastic to port user costs even for large variations in price (up to $\pm 50\%$). Dry bulk cargoes were assessed as inelastic for small changes and elastic for large changes (± 15 to 50%). General cargoes were assessed as elastic even for relatively small changes in port user costs. The container market was considered to be inelastic for small changes and elastic for large changes. Finally, the Ro – Ro market was deemed more inelastic to small changes than the container market, but elastic to large changes (± 15 to 50%)[4]; and
4 Port users disagreed about the impact of public support schemes on the markets of liquid and dry bulk, whereas they all believed that the markets for general cargo, containers and Ro – Ro cargo were subject to some degree of influence from public support schemes. Users were not satisfied with present port pricing policies and they believed that a more rigorous adherence to cost recovery principles would most likely be beneficial to the European ports. The adoption of specific cost recovery rules was viewed as likely to be beneficial.

Almost all users were, however, opposed to uniform pricing that would be imposed by governments, if that were to ever be the case.

The above observations allow one to conclude that the generalised adoption of full cost recovery principles at the level of a port's entire set of activities, under its control, is viewed as desirable by all port authorities surveyed. A corresponding pricing policy could therefore be used, in principle, as a starting point in discussions between the European Commission and (sub)national agencies responsible for port policy. In addition, all port authorities and port users viewed clear and transparent linkages between costs and pricing as important and even necessary. Hence, policy efforts at the European level aimed to increase this clarity and transparency will be welcomed, in principle, by the port sector.

The concept of 'flexibility' signifies the preference of many ports and port users for new pricing principles aiming at the elimination of present distortions to competition, where such distortions are non-trivial. Here, two keys to success will be the ability of the Commission to distinguish between the presence of such non-trivial distortions to competition on the one hand, and the existence of widely diverging pricing practices among ports, not associated with such distortions, on the other hand. Equivalent treatment would imply the simultaneous introduction of exactly the same pricing principles in the hinterland modes as in the port sector.

If the above two conditions cannot be satisfied in practice, it may be desirable to shift European policy initiatives from designing a charging framework to (*i*) defining acceptable public financing practices for port infrastructure, superstructure and services (*ex ante* prevention of distortions) and (*ii*) rethinking how conventional competition rules (related, *inter alia*, to market access, abuse of dominant position, collusive behaviour, etc.) should be applied in the port sector (*ex post* sanctioning of distortions).

The survey described above was complemented with a quantitative simulation exercise building upon proprietary modelling tools of the Bremen Institute of Shipping and Logistics (ISL) and with a special focus on container flows in Europe. The analysis was based on ISL's model 'A simulation and forecasting model of world container shipping including port hinterland traffic' (Bremen, 1997).

Here, it was analysed how different pricing schemes would affect traffic volumes in individual ports. Container traffic *via* the North Range ports was chosen as the core case because of the availability of the necessary data and the fact that ISL, having already performed several simulation projects for container transport in Europe, had already developed a database with origin/destination points of European container flows, as well as the related transport costs. The simulation led to three important conclusions.

Table 2: Price elasticities for selected North Range container ports (10% price increase; simulation results)

Port	Elasticity
Hamburg	3,1
Bremen Ports	4,4
Rotterdam	1,5
Antwerp	4,1
Le Havre	1,1

Source: ATENCO

First, the price elasticities for container traffic diverge substantially among European ports, as illustrated in Table 2.

Whether or not the absolute level of these elasticities is accurate is a matter of less importance than the observation of a very substantial divergence of elasticities among the various ports. Hence, variation in prices, as a result of the adoption of alternative pricing systems, would, at least in the case of containers, lead to fundamentally different impacts on individual ports, even when engaging in similar price increases.

Second, the price elasticities appear – and this is not a surprise – to vary considerably among cargo categories. More specifically, price elasticities are in general much lower for liquid and dry bulk cargoes than for containers, general cargo and Ro – Ro. Given that government support schemes and distortions to competition are perceived as relatively unimportant for the former cargo categories but rather important for the latter, the introduction of cost-based pricing is likely to affect precisely those traffic categories that are the most price sensitive.

Third, if the introduction of new pricing principles were to focus on overall full cost recovery at the level of the individual port, those ports with a substantial share of bulk cargo and significant incomes from land rentals would be able to largely compensate for any resulting price increases in the container, general cargo and Ro – Ro areas through cross-subsidisation.

The above analysis implies that an across the board adherence to a specific pricing discipline may be expected to bring equality to the European port scene in the long-run. In practice, however, the short-term implications for the market share and the income of individual ports will vary substantially, depending upon factors not solely related to the magnitude of present government support levels or observed distortions to competition.

The empirical research concluded with two sets of case studies on the impact of adopting a cost recovery approach in port financing and charging. The first set consisted of case studies of ports where cost recovery principles are already

largely implemented. The second set included case studies of ports where the adoption of cost recovery principles is not viewed as crucial.

In the first set, three ports were examined where charges are determined on the basis of full cost recovery: two in the UK and one in the Republic of Ireland. The ports were Felixstowe, Dover and Dublin. The review of these case studies led to the following five conclusions:

1 Although, in principle, each port seeks full cost recovery both at the level of overall financial performance and the performance of specific profit niches, several other pricing principles are applied in practice, including pricing in view of competition, pricing according to 'what the traffic can bear', pricing as a function of capacity utilisation, etc. This is an important observation as it suggests that even ports seeking overall full cost recovery apply a variety of pricing principles simultaneously, in order to achieve managerial effectiveness at the micro-level;
2 Major differences in pricing strategy existed among the three ports, as a result of their institutional heritage and managerial objectives. This suggests that, even when the presence of various pricing principles is taken into account, the actual mix of pricing principles adopted in pricing strategy implementation may vary widely, even when full cost recovery is pursued, as a result of managerial discretion;
3 In contrast to the widely held belief that UK and Irish ports engage in conventional full cost recovery, the study found that users in fact do not pay for past capital investments in terms of their replacement value;
4 The inclusion of external costs in prices appears to be a very complex issue. All three port authorities shared the view that the costs they incur in their compliance to EU, national and international legislation on safety, health and environmental standards and their commitment to various related voluntary codes or practices, have resulted, to some extent, in internalising the external costs that their business activities impose upon society and these are therefore reflected in their present charges. There is a wide divergence of opinion, though, on the extent to which ports consider present charges to reflect the internalisation of *all* external costs. This divergence of opinion may be explained partly by subjective perceptions regarding the port authority's responsibility for the external costs imposed on society by port related activities and the scope of activities to be included. One of the issues here was whether or not port charges should reflect the external cost of (road) congestion to which port related traffic undoubtedly contributes and how this should be done to reflect the polluter pays principle; and
5 The case studies demonstrate that the hypothetical introduction of government financial support, similar to support mechanisms that exist in

continental ports, would lead to very different effects on: (a) the various ports; (b) the various types of port operations depending, *inter alia*, upon their traffic mix, cargo volumes and stevedoring costs; and (c) the various shipping companies, depending on the number of calls made in UK and Irish ports, the size and type of the vessels involved, the share of total cargo loaded/unloaded in the UK and Irish ports and the share of cargo handling costs in overall port user costs. In any case, the hypothetical introduction of government support would be unlikely to greatly improve the various ports' competitive position and, perhaps more importantly, it would not alter their marketing strategy.

In conclusion, the three case studies show the presence of a wide variety of pricing principles used in practice. The pricing strategies of the three ports exhibit substantial managerial discretion that cannot be fully captured by textbook definitions of pricing. Apparently, a best practice port pricing formula does not exist, even among ports pursuing full cost recovery as a primary objective.

The second set of case studies involved ports that do not focus on cost recovery as a primary objective. These included the North Sea container ports, the Mediterranean transshipment ports, and the Ro – Ro trade between the Iberian peninsula and North-West Europe.

The case studies led to the following three conclusions:

1 The case study on the North Sea container ports focused on the likely impact of full cost recovery of maintenance dredging in the ports of Rotterdam, Antwerp, Hamburg and Bremen. Here, the ports of Rotterdam and Antwerp appeared to come out as winners with an expected gain in traffic, whereas the German ports would lose traffic. A more general approach, which assessed the impact of a price increase in one port on the three others, showed very different effects in each case. For example, a price increase in Rotterdam would clearly benefit primarily Antwerp (and *vice versa*), whereas a price increase in one of the German ports would benefit primarily the second German port;
2 The possibility of cost recovery in the Mediterranean transshipment hubs is a very complex issue for several reasons. First, the structure of trade in the region is changing very rapidly. The domination of shipping companies with a home base in the Mediterranean is being replaced by the entry of global carriers, especially in the Europe-Far East trade. As a result, shipping costs per unit are decreasing and more attention is being paid to scale economies and to calling at new container hubs rather than at ports that were historically significant in the region. Second, the new transshipment hubs are viewed as instrumental to the economic development of the less favoured regions in

which they are located. As a result, the development of some of them (eg Gioia Tauro) has been assisted by Community funding. Third, although a long-term balance between demand for and supply of container handling capacity is expected, substantial overcapacity exists at present, which contributes to a high volatility of market shares of individual ports and port operators. The introduction of (full) cost recovery in the short-run is thus viewed as non-feasible because strong rivalry among ports puts tremendous pressure on prices; and

3 The case study of Ro – Ro services linking the Iberian peninsula with North-West Europe suggests that, in the long-run, additional port costs resulting from cost-based pricing are unlikely to have much impact on the viability of Ro – Ro services. However, in the short-run, when starting up new operations, port price increases could reduce the competitiveness of short sea shipping *vis-à-vis* road transport. In more general terms, the policy objective of full cost recovery in ports appears to be in conflict with the goal of promoting short sea shipping *vis-à-vis* road haulage and with improving the accessibility of peripheral areas.

In conclusion, the number of parameters critical to the assessment of the impact of cost-based pricing in European seaports is large to such an extent that only an in-depth analysis of all relevant case studies in terms of single traffic categories in individual ports can lead to a correct and comprehensive overview. Given the practical difficulties associated with such a bottom-up approach, bounded rationality constraints suggest that it may be sensible to shift policy attention from emphasising the importance of adopting uniform cost-based pricing principles (the so called charging framework) towards focusing on the more indirect incentives promoting cost-based thinking in ports (eg by more clearly defining what constitutes acceptable public support of port infrastructure and superstructure).

CONCLUSIONS

The issue of infrastructure pricing, of ports in particular, is highly complex. In Europe, the socio-economic objectives often pursued by ports are so divergent that any uniform approach to pricing becomes meaningless and politically unfeasible. Pricing matters on the other hand, at least in a liberal economic environment such as that of the EU, ought to be, ideally, left to the producers (ports) themselves.

The issue of port pricing – and the Commission's involvement in it – has not arisen out of academic curiosity but as a response to the need felt in the

port industry itself for a self-discipline mechanism that, if consistently applied, would eventually lead to the recovery of port investments and to future investments that are largely demand driven. This requirement has been the result of the recognition that, in the intensified regional port competition of today and the increasingly tightened fiscal constraints of an integrated Europe, it is no longer acceptable to indiscriminately and without a formal economic *rationale* spend taxpayer money on port investments, often aimed at increasing market share at the expense of other ports, particularly those in neighbouring Member States.

The ATENCO study has demonstrated that, however controversial the issue of port pricing itself may be, there is general consensus on the importance of cost recovery. And this was an important development and step forward. Indeed, as long as this objective is respected, the specific pricing policy of the individual port becomes of secondary importance and only in so far as crowding out effects and efficient allocation of resources are concerned. But these, so far, are matters of national rather than European economic policy.

Once cost recovery is generally accepted as a guiding principle in port investment and pricing, the way forward is much simpler. It involves the compilation of better and more harmonised statistics on port costs, adoption of standardised port accounting systems, greater transparency of port accounts and of financial flows between the port and its institutional master and, perhaps, a common glossary of terms. And these are objectives not so difficult to achieve.

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ENDNOTES

[1] The authors have been involved in various capacities in this project and one of the purposes of this paper is dissemination, according to EU requirements. Members of the consortium that undertook the project were: Consultrans (E); Erasmus University Rotterdam (NL); Institute of Shipping Economics & Logistics (D); Marconsult (I); Netherlands Economic Institute (NL); PLS Consult (DK); SETEC Economie (F); TECHNUM (B); Cardiff University (UK).

[2] Defined here as the costs of the factors of production (exclusive of possible economic rent) required to produce the port service. This definition, particularly the word 'social' does not have to necessarily include external costs of production, something that has often been a cause of confusion.

[3] A sixth relevant parameter – namely port networking – is not taken into account here, given that it may be largely driven by forces other than the port authority or the public agencies responsible for port policy.

[4] Until further economic analysis is carried out, such conclusions have to be viewed with a lot of caution and an understanding for the fact that many port managers do not have formal training in economics. The notion of 'price elasticity' is not always easy to grasp in full, particularly the fact that the elasticity of demand for a good or service is not, in principle, a function of how large or small the change in price is. Perhaps the questionnaires could have been different, or clearer, on this point as well as on the point of long-run marginal costs.

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Costs, Benefits and Pricing of Dedicated Container Terminals

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This paper analyses some of the implications of the emergence of dedicated container terminals (DCT) in the past 10 years. It presents a general overview of DCTs and stresses, through the use of a generalised port cost function, that one of the main factors that could explain this development is the increasing gap between the objectives of ports and those of shipping lines. The main implications of a DCT, from a port viewpoint, are analysed next through the employment of a simple queuing model. It is shown that under certain assumptions, a carrier with exclusive access to facilities and the port providing them could both benefit through such a strategy. At the same time, the model underlines that eventual losses would be born mainly by those carriers who, as a result, can now use only a restricted number of servers (berths). The paper shows that such losses could be even higher in the presence of direct (club effect) or indirect (hardware/software paradigm) externalities and that the choice of DCT is similar to the access pricing of a bottleneck in a network industry. Finally, the paper develops a hypothetical pricing rule (Efficient Component Pricing Rule) that could be used to internalise such external effects.
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Keywords: Port; liner shipping; dedicated container terminals; interconnection pricing.

INTRODUCTION

The first section of the paper focuses on the implications, for ports, of horizontal integration in liner shipping; a most noticeable trend indeed nowadays taking the form of alliances and mergers and acquisitions. The paper suggests that the exploitation of economies of density in ocean routes and the development of Hub-and-Spoke systems place more pressure on ports and sometimes justify the need for a DCT.

The second section analyses the consequences of the existence of DCTs in port areas. Through the use of a queuing model, it is shown that, under certain assumptions, DCTs can pose significant barriers to entry to new competition in liner shipping. Carriers' investments in DCTs may thus entail a strategic element that goes well beyond the often proclaimed technical efficiency gains in global supply chain management. The paper argues that such barriers could be reinforced if direct and/or indirect externalities exist in the production of port services. Port pricing should therefore be considered as a case of *interconnection pricing* in network bottlenecks and, ideally, it ought to internalise the technical and economic gains and losses of *all* port users.

THE EMERGENCE OF DEDICATED CONTAINER TERMINALS

Specialised terminals are not something new. The need for dedicated infrastructure, many times for reasons of safety, has often led to the segmentation of port areas between liquid, bulk and container terminals. Within the latter, the emergence of DCTs is a more recent trend that started in Asia and North America. In Europe, it was introduced by Maersk in the early nineties, in the transhipment facility of Algeciras (Figure 1).

As a rule, DCTs are interconnecting points in the East–west and North–south trades, offering carriers greater flexibility, reliability, short turnaround times, and enhanced efficiency in the management of global supply chains. They emerged amidst a general trend of worldwide port development, privatisation, and reduction of public investment in ports. In many cases, new terminal concessions required generation of substantial new traffic by port operators, thus in a way obliging them to develop stronger links with carriers.

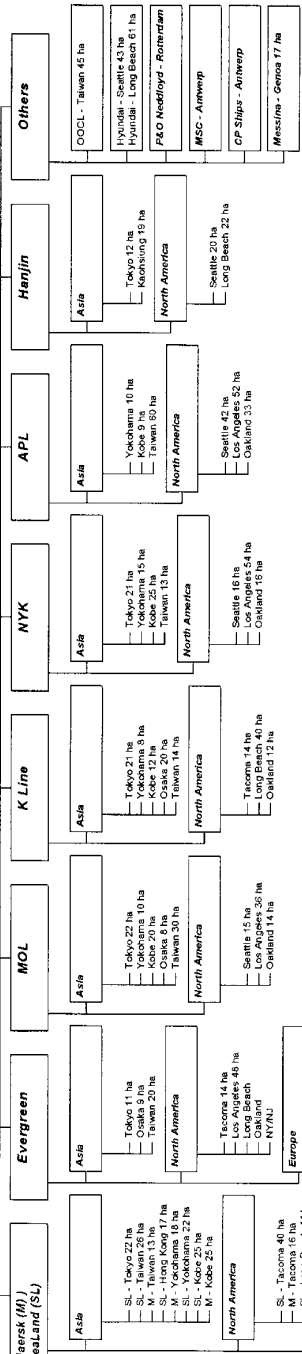

Figure 1: Main dedicated container terminals in Northern America, Asia and Europe (in hectares).
Source: Bank of Japan, Containerisation International, Lloyd's List

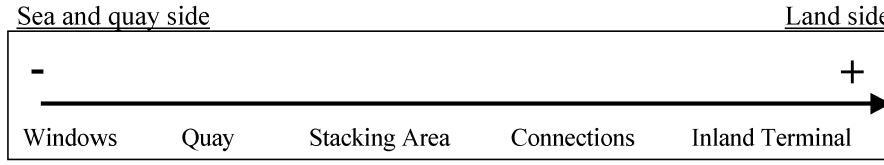

Figure 2: Scope of Dedicated Container Terminals

The level and scope of accessibility to a DCT is determined by private agreement between one or more carriers and a port operator or authority. The deal usually involves exclusivity in the use of a berth, but this can be extended to include other parts of the terminal such as stacking areas and railway connections (Figure 2). A carrier can have direct control on the stevedoring company, through a joint-company such as that of Maersk with Maersk España in Algeciras, or indirect control of terminal operations, ie allowing the stevedoring company to run the terminal, as in the case of MSC and CP Ships with Hessenatie in Antwerp. Finally, DCTs entail both a spatial dimension – the use of facilities in a defined part of the terminal – and a temporal one, ie the use of facilities for a certain period of time.

DEDICATED CONTAINER TERMINALS AND VERTICAL INTEGRATION

Dedicated Terminals have also been seen, however, as the consequence of strategic behaviour of carriers that *inter alia* has taken the form of mergers, joint-ventures and alliances (Clarke, 1997; Hoffman, 1998; Ryoo and Thanopoulou, 1999; Meersman *et al.*, 1999 and 2000; Midoro and Pitto, 2000; Gilman, 1999; Cullinane *et al.*, 1999; Cariou and Haralambides, 1999; Haralambides *et al.*, 2000). Allegedly, these developments have followed shipper requirements for higher geographic coverage and better 'supply chain management' (Slack *et al.*, 1996; Heaver, 1994 and 1996; Evangelista and Morvillo, 2000; Caves *et al.*, 1984; Bittlingmayer, 1989; Trethway and Oum, 1992; Brueckner and Spiller, 1991 and 1994; Oum *et al.*, 1995).

In contrast to the above however, DCTs are a form of *vertical integration* that can create substantial sunk costs and thus make liner shipping a less contestable market. In addition, investment in DCTs could well be seen as a form of *limit pricing* whereby the operating costs of potential entrants are raised to such a level that entry is no longer profitable. Both strategies can be particularly effective as long as shippers are 'convinced' that this is the one and only way of organising international ocean transport and global supply chain management.

GENERALISED COSTS: PORT EXCESS CAPACITY AND VESSEL SIZE

The responsiveness of ports is of crucial importance for the success of carrier consolidation strategies (Cariou, 2000a). *Ceteris paribus*, whenever increasing returns to scale are present, a port should normally opt for a common user arrangement in order to maximise capacity utilisation and thus minimise unit costs. High levels of terminal capacity utilisation however can quickly lead to longer turnaround times, something not acceptable nowadays by carriers in their finely tuned logistical systems. Obviously, the organisation of liner services in indirect hub-and-spoke networks can only succeed if the economies of density achieved at sea are not negated by diseconomies of scale in ports.

The problem is exacerbated with the increasing deployment of ever larger containerships. As has been shown earlier (Cariou and Haralambides, 1999; Cariou, 2000; see also Figure 3), in general, the cost per TEU of ship-time in port is an increasing function of ship size. This has mainly to do with the availability of cargo-handling equipment (cranes) that can be put to work on a ship, and the problem of course intensifies at higher levels of terminal capacity utilisation (Figure 4). Still, four and sometimes five crane operations are standard today in many major ports for post-Panamax ships. One cannot envision however eight or 10 cranes working a concurrent sustained operation

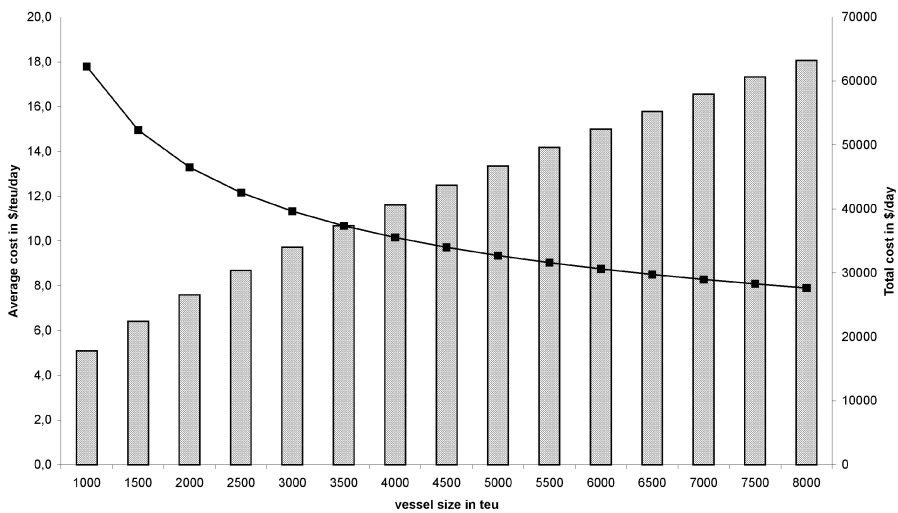

Figure 3: Increase in total costs (histogram) and decrease in average costs (line) per day as a function of containership size in 1997
Source: Cariou and Haralambides (1999), Cariou (2000)

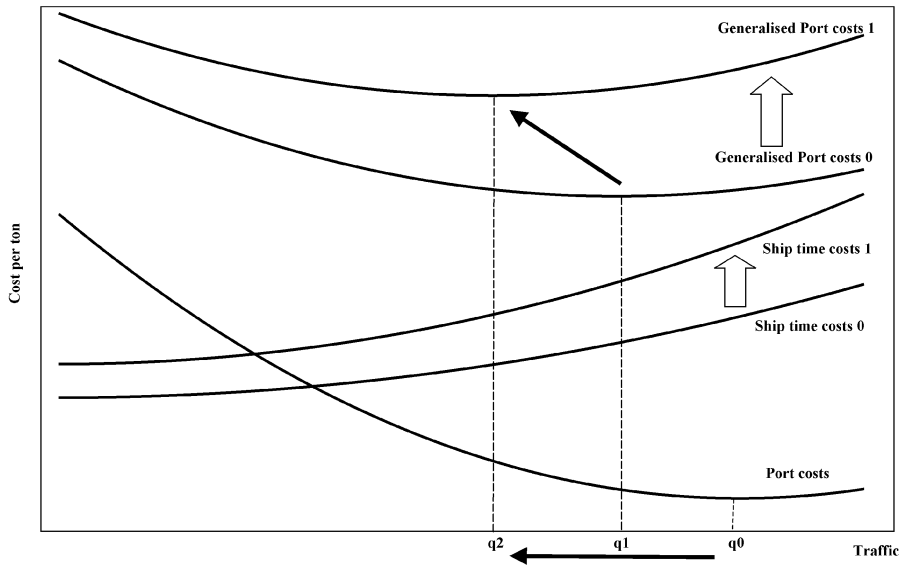

Figure 4: Impact of an increase in vessel size on the generalised port cost function

on a 10,000 TEU vessel in Hong Kong, Singapore, Rotterdam or Los Angeles any time in this decade (Haralambides *et al.*, 2002). Thus, other things being equal, the utilisation of larger vessels requires more excess capacity in ports (Figure 4).

The generalised cost idea of Figure 4 illustrates the by now classical conflict of interest between ports and carriers (UNCTAD, 1975; Jansson and Shneerson, 1982; Musso *et al.*, 1999), augmented in a way that also highlights the impact of ship size on excess port capacity.

Due to high fixed costs in port production, port costs per ton decrease up to the point (q_0) where congestion starts to set in. For the carrier, after a certain point,[1] ship-time costs per unit increase with port traffic (ship time costs 0 curve) (De Langen, 2000). The vertical summation of the port cost and ship-time curve gives the generalised cost curve (generalised port costs 0 curve) which determines the optimum level of port production at q_1. However, increase in ship sizes has the effect of shifting the ship-time curve upwards to a new position (ship time costs 1). The result is a new optimum level of port production at q_2, necessitating a lower level of terminal utilisation (q_1-q_2).

Clearly, other things being equal, efficient servicing of larger vessels involves higher port costs, in terms of excess port capacity and availability of cargo-handling equipment. This should be kept in mind when setting port

charges, negotiating concessions or DCTs, as well as when considering the financing of port infrastructure, particularly when an appeal for public funding is being made.

EFFECTS OF DEDICATED CONTAINER TERMINALS ON PORTS

In the queuing model employed here, the *occupancy rate* is determined by the ship arrival rate λ and *service time* μ (Poisson and negative exponential distributions respectively) (Saaty, 1961; De Monie, 1988; Jansson and Shneerson, 1982; Evans and Marlow, 1990). The lay out of the terminal is assumed to be a one stage process and the length of the queue is infinite with a First In First Out ruling. The question of a port is under what conditions it is beneficial to maintain a multi-user terminal in its initial configuration with m servers, or to split it in (d) dedicated servers and (m-d) multi-user servers (Figure 5).

From the port's point of view, the effect of moving from the first (pure multi-user) to the second situation (multi-user and dedicated) can be assessed by comparing the respective occupancy rates (ϕ_1) and (ϕ_2):

$$\phi_1 = \frac{\lambda_m}{\mathrm{m}\mu_m} \text{ and } \phi_2 = \left(\frac{\lambda_{m-d}}{(\mathrm{m}-\mathrm{d})\mu_{m-d}}\,\frac{\mathrm{m}-\mathrm{d}}{\mathrm{m}}\right) + \left(\frac{\lambda_d}{\mathrm{d}\mu_d}\,\frac{\mathrm{d}}{\mathrm{m}}\right) = \frac{1}{\mathrm{m}}\left(\frac{\lambda_{m-d}}{\mu_{m-d}} + \frac{\lambda_d}{\mu_d}\right) \quad (1)$$

assuming that:

$$\begin{cases} \lambda_{m-d} = \theta_{m-d}\lambda_m \\ \mu_{m-d} = \sigma_{m-d}\mu_m \end{cases} \quad and \quad \begin{cases} \lambda_d = \theta_d\lambda_m \\ \mu_d = \sigma_d\mu_m \end{cases} \quad (2)$$

with:

θ: arrival rate change for a server from the first to the second situation;
σ: service rate change for a server from the first to the second situation,

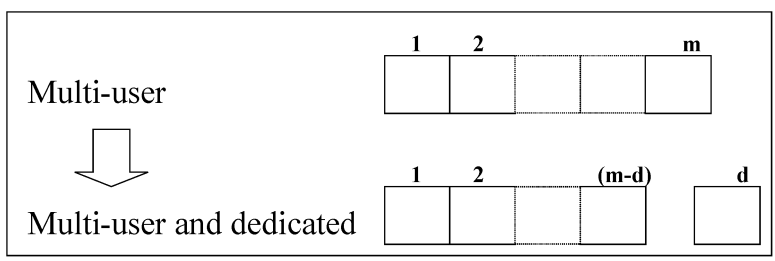

Figure 5: A hypothetical choice of DCT in a port

the occupancy rate will:

1. decrease $(\phi_1 > \phi_2)$ if $\left(\frac{\theta_{m-d}}{\sigma_{m-d}} + \frac{\theta_d}{\sigma_d}\right) < 1$;
2. remain the same $(\phi_1 = \phi_2)$ if $\left(\frac{\theta_{m-d}}{\sigma_{m-d}} + \frac{\theta_d}{\sigma_d}\right) = 1$;
3. increase $(\phi_1 < \phi_2)$ if $\left(\frac{\theta_{m-d}}{\sigma_{m-d}} + \frac{\theta_d}{\sigma_d}\right) > 1$.

Ceteris paribus, the third situation is generally assumed optimal (increase in port occupancy rate) from a port perspective, as long as it involves a higher utilisation of capacities. The first situation (decrease in global port occupancy rate) could also be acceptable as long as the decrease is matched by extra traffic.

The choice between the three alternatives is often difficult. According to a case study on 16 multi-user and six dedicated terminals in Seattle (Turner, 2000), the arrival rate remains unchanged ($\theta = 1$), while some increasing returns exist with the number of servers ($\sigma < 1$). It can thus be assumed that the splitting of servers would imply an increase in the global occupancy rate of the port (case 3), but the problem is that this increase is mainly the result of a poorer level of service rather than an increase in port traffic. It could thus be interesting to analyse the assumptions under which the previous case is not relevant ($\theta \neq 1$and $\sigma \gtrless 1$).

To do so we first consider the DCT case and the assumption of increasing returns in port production ($\sigma_d < 1$). In a pure transhipment terminal, for instance, increasing returns could be achieved through a reduction in the variance of service time (Jansson and Shneerson, 1982).

In general, for any arbitrary distribution of the service time s, the mean queuing time, q, can be expressed as a function of the mean and the variance of the service time and the arrival rate (Saaty, 1961):

$$q = \frac{\lambda(s^2 + \mathrm{var}(s))}{2(1 - \lambda s)} \tag{3}$$

substituting ϕ for λs, equation (3) becomes:

$$q = \frac{\phi(s + Var(s)/s)}{2(1 - \phi)}. \tag{4}$$

If s is distributed according to the negative exponential distribution, its variance is equal to s^2 and the mean queuing time becomes:

$$q = \frac{s\phi}{(1 - \phi)}. \tag{5}$$

Now, if the variance of service time could be reduced significantly as a result of, say, better coordination between mother and feeder vessels and harmonisation of ship calls (learning capacity), a case of constant service time becomes applicable. The variability of service time is eliminated and the mean queuing time is reduced by half. The attractiveness of a DCT is thus obvious. Simply, when $\mathrm{Var(s)} \rightarrow 0$, equation (4) becomes:

$$q = \frac{s\phi}{2(1-\phi)}. \tag{6}$$

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OVERALL EFFECT AND INTERCONNECTION PRICING IN DEDICATED CONTAINER TERMINALS

From the point of view of *all* users in the system, the desirability (overall effect) of a DCT can be derived from the value of queuing time with ($W_d V_d + W_{m\text{-}d} V_{m\text{-}d}$) and without ($W_m V_m$) a DCT (where: W_i is queuing time and V_i its value per unit of time).

$$\phi_m = \frac{\lambda_m}{m\mu_m} \qquad \phi_d = \frac{\lambda_d}{d\mu_d} = \frac{\theta_d \lambda_m}{d\sigma_d \mu_m} \qquad \phi_{m-d} = \frac{\lambda_{m-d}}{(m-d)\mu_{m-d}} = \frac{\theta_{m-d}\lambda_m}{d\sigma_{m-d}\mu_m} \tag{7}$$

$$\begin{aligned} W_m V_m &= \frac{1}{\mu_m} \frac{\phi_m}{(1-\phi_m)} V_m \qquad W_d V_d = \frac{1}{\mu_d} \frac{\phi_d}{(1-\phi_d)} V_d \\ W_{m-d} V_{m-d} &= \frac{1}{\mu_{m-d}} \frac{\phi_{m-d}}{(1-\phi_{m-d})} V_{m-d} \end{aligned} \tag{8}$$

Three cases can be considered for carriers choosing for a DCT:

1. if $\frac{W_m}{W_d} < \frac{V_d}{V_m}$ the DCT implies an increase in the value of queuing time;
2. if $\frac{W_m}{W_d} = \frac{V_d}{V_m}$ the DCT implies no change in the value of queuing time;
3. if $\frac{W_m}{W_d} > \frac{V_d}{V_m}$ the DCT implies a decrease in the value of queuing time.

In cases where $\mathrm{d} < (\mathrm{m\text{-}d}) < \mathrm{m}$, and assuming no change in the arrival rate ($\theta_d = 1$), as well as economies of scale in port production ($\sigma_d < \sigma_{m-d} < 1$), the final effect of a DCT would be to increase the value of queuing time for carriers. In the previous section it has been shown that this assumption can be challenged by certain properties of the service time variance. However, for carriers not using the DCT, this assumption holds and, therefore, it will be they who will bear the

consequences of the DCT. For as long as DCTs are afforded to some carriers at a 'price' less than social opportunity costs[2], something quite common in port authorities' eagerness to privatise and build up traffic of new facilities, other carriers not using the DCT are placed at a competitive disadvantage. This can be measured by the increase in operating costs (longer waiting times) as a result of having to switch from a multi-user system of m servers to one of only (m-d) servers. From a different viewpoint, such a situation could be construed as a barrier to entry (or exit) due to the exclusivity on an essential facility.

To internalise such costs, the price a DCT carrier will have to pay must also include the potential 'losses' born by all other carriers calling at the port due to increase in waiting time. This internalisation process is similar to that of other network industries, such as railways, aviation and telecommunications (Baumol, 1983; Baumol and Sidak, 1994; Economides and White, 1995; Armstrong *et al.*, 1996; Armstrong and Vickers, 1998; Laffont, 1994; Enacoua *et al.*, 1996).

The main issue of *access* or *interconnection pricing* in network industries is the existence of direct and indirect externalities. Usually, two types of network externalities are considered (Katz and Shapiro, 1986, 1995, and 1998; Economides and Salop, 1992; Economides, 1994):

1. direct externalities, or 'club effect', are demand-side effects indicating that the utility of a consumer depends on the number of consumers connected to the network. For instance, in the case of port activities, it can be safely assumed that if there are many carriers calling at a server, the cost of port services will decrease, or the number of value-added services offered by the port (eg inland connections) will increase; and
2. indirect externalities, or 'Hardware-Software Paradigm', are supply-side effects indicating that the utility derived from the consumption of a good depends on the availability of complementary goods. For example, in the case of port activities, it can be argued that shippers and freight forwarders will choose a certain port because they know that many carriers call at this port.

In the case of ports with DCTs, it is thus possible that both the port and non-DCT carriers 'lose' due to a reduction in some potential externalities such as those described above. Those factors are actually difficult to quantify. The Efficient Component Pricing Rule (ECPR) is one of the most commonly applied rules in access pricing. The rule states that the price to charge for an exclusivity to an essential facility has to consider both Direct Access Costs (DAC) and Opportunity Costs (OC). Direct access costs (DAC_d) are the costs of providing a DCT to a carrier (inland connection, dredging, land costs, etc.). Opportunity costs (OC) can be

surmised by the sum of potential losses and gains born by the port and the carriers.

$$\textit{Optimal Access Price}_d = [\mathrm{DAC_d}] + \left[\frac{\mathrm{CT}_{port}}{\phi_1 - \phi_2}\right] + \left[\frac{1}{\mu_1}\,\frac{\phi_1}{1-\phi_1} - \frac{1}{\mu_2}\,\frac{\phi_2}{1-\phi_2}\right] \times \mathrm{VT_{users}} \quad (9)$$

with:

$\mathrm{DAC_d}$: direct cost of providing exclusive access;
$\mathrm{CT_{port}}$: total cost for the port;
ϕ_1: initial occupancy rate of the port;
ϕ_2: occupancy rate of the port following the choice of DCT;
μ_1: initial global service rate of the port ;
μ_2: service rate of the port following the choice of DCT; and
$\mathrm{VT_{users}}$: value of time of users.

The second term in the right hand side of equation (9) gives the losses or gains born by the port, and the third term, the losses or gains for all port users.

Although the access pricing rule is still in its early stages of development, at least in port pricing, it has a clear bearing on the pricing of DCTs. It stresses, for instance, that the pertinent question is not whether a DCT is a good or a bad thing for a port, but whether its pricing is done in a way that does not lead to barriers to entry (or exit).

CONCLUSIONS

For carriers large and powerful enough to own and/or operate a dedicated container terminal, the benefits are rather obvious and, at any rate, for them only to assess. For the port, its financiers, and the rest of its users, however, the picture is not equally clear. The implications of DCTs in terms of occupancy rates, efficiency and carriers' waiting times are yet to be examined, mainly by those who provide finance for general port development. From a societal and collective welfare perspective, the gains to carriers through vertical integration (higher service rate and smaller service variance) must be contrasted with potential losses from the reduction of competition and from the presence of negative externalities. The determinants of the bargaining power (in DCT deals) of certain carriers has yet to be analysed, as well as the extent to which such power may lead to a DCT 'price' not reflecting overall impacts and social opportunity costs of dedicated container terminals. The role of port and regulatory authorities in this process is still an open issue.

Aviation provides lucid examples of potential effects of DCTs in terms of market distortions. Barnard (2000) reports in the Journal of Commerce: '*... access to airport is becoming more and more important. As large hub airports are regarded as being among an airline's most valuable assets, established carriers enjoy a long-standing right to retain them under the so-called 'grandfather' system. Airlines often hold on to slots, even though they are not using them, to protect their market share and prevent rivals from launching competing services ...* '.

ENDNOTES

[1] In practice, up to a certain point, the ship-time in port curves should be parallel to the horizontal axis. Their rising curvature here is introduced for expository purposes and for highlighting the impact of ship size.

[2] Defined here as the costs of the factors of production (exclusive of possible economic rent) required to produce the port service. This definition, particularly the word 'social' does not have to necessarily include external costs of production, something that has often been a cause of confusion.

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A Mixed Integer Programming Model on the Location of a Hub Port in the East Coast of South America

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The paper introduces a mixed integer programming model on the selection of a hub port in the East Coast of South America, among a set of 11 ports that are servicing the regional demand for container transportation. Ports in Brazil, Argentina and Uruguay are considered, together with several origin/destination ports in the world. The model minimises total system costs, taking into account both port costs (dues and terminal handling charges) and shipping costs (feedering and mainline). In total, the model consists of 3,883 decision variables and 4,225 constraints. It turns up the port of Santos (Brazil) as the optimal single-hub solution, with the port of Buenos Aires (Argentina) as a close runner up. In addition, the model provides tentative estimates of improvements in demand and costs necessary to bring a certain port up to hub status. Despite some bold assumptions and limitations – mainly due to data availability – the model offers a straightforward decision tool to all ports in the world aspiring to achieve hub status and all that comes with it.
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Keywords: Hub port; feeder services; container shipping; p-hub median problem; MILP.

INTRODUCTION

The competitive nature of liner shipping and the need to cut costs through economies of scale have led to a form organisation of container transportation known as the *hub-and-spoke* system. The size and capital intensity of modern containerships obliges them to limit their ports of call at each end to a minimum of 'hub' ports or 'load centres' such as Singapore, Hong Kong and Rotterdam, from where huge surges of containers are further forwarded (feedered) with smaller vessels to regional and local ports. Complex networks have thus developed whose fine-tuning and optimisation bears directly on trade and on consume welfare (Haralambides and Veenstra, 2000; Robinson, 1998; Zachcial, 1993). Schematically, such a (simplified) network can be seen in Figure 1.

MODELLING

According to Campbell (1994), hubs are facilities that serve as transhipment or switching points (eg in telecommunications), functioning as connection centres among several origins and destinations. A non-negative flow is associated to each origin–destination pair, together with its respective analysis attribute like, for instance, distance, time, or cost associated to the movement.

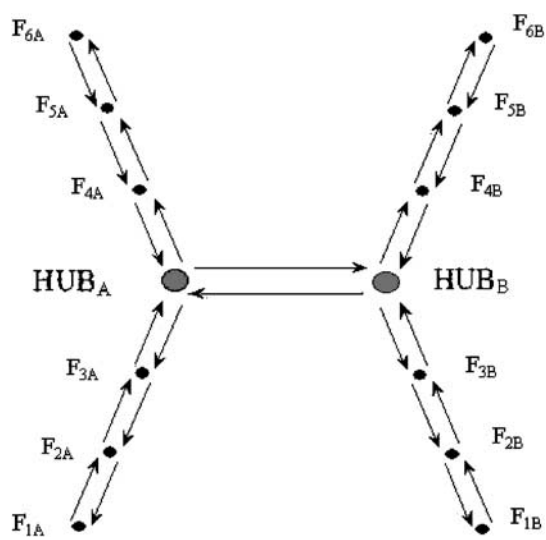

Figure 1: A hub-and-spoke network

Campbell (1994) discusses five types of discrete problems regarding the location of a hub:

- *P-hub median problem (P-HM)*
- *Uncapacitated hub location problem (UHLP)*
- *Capacitated hub location problem (CHLP)*
- *P-hub center problem (P-HC)*
- *Hub covering problem (HCV)*

It is worth mentioning that, in all five models, every direct movement from one origin to one destination is possible; or, in other words, every origin-destination movement is necessarily achieved by at least one hub.

The advantage of the Campbell formulations, in the context of classical transhipment models, is that they permit the tracking of containers by network; that is, origin and route for each final destination.

The UHLP differs from the P-HM in only two aspects: it does not define the number of hubs; it considers the total cost of the hub facility. The CHLP is an UHLP variation to which the capacity restriction of each hub is added. The objective of P-HC is to minimise *time* between origin-destination. HCV requires that the allocated hub covers an origin-destination pair only if the cost does not exceed a specified amount.

Table 1 shows the applicability of model classes. P-HM, UHLP and CHLP are applicable to terminal location problems, while P-HC and HCV are applicable to location problems of emergency service facilities (eg fire fighting department, police station) or vehicle location problems (eg ambulances).

Table 1: Model applicability

Model	Application
P-HM P-HM-TS UHLP UHLP-T CHLP	Location of transhipment terminal Focus: transportation and transhipment costs
P-HC1 P-HC2 P-HC1-T HCV HCV-P HMCV HMCV-T	 Location of emergency service facilities or vehicles base Focus: service time

Table 2: Model characteristics

Model	Number of hubs	Hub fixed cost	Fixed cost of feeder line	Minimum flow of feeder line
P-HM	X			
P-HM-TS	X		X	X
UHLP		X		
UHLP-T		X		X
CHLP		X		
P-HC1	X			
P-HC2	X			
P-HC1-T	X			X
HCV		X		
HCV-P		X		
HMCV	X	X		
HMCV-T	X			X

Table 2 presents a summary of the main considerations in the above models, thus indicating at the same time their main differences. In general, the parameters of the 'fixed cost of feeder line' and the 'minimum flow of feeder line' cannot be easily quantified as they depend on operational (vessel dimensions) and market characteristics, respectively.

The P-HM model has been chosen from Campbell (1994). The model has been used earlier by O'Kelly (1986, 1987); Klincewicz (1991); and Aykin (1990). The original P-HM problem derives form the p-median problem, which was first presented by Hakimi (1964, 1965).

APPROACH TO THE PROBLEM OF HUB PORT LOCATION

According to Zan (1999), there are three 'stakeholders' to be taken into account in container shipping: port administration; carriers (ocean liner companies) and domestic shippers.

Zan's considerations can be depicted in Figure 2 where several interactions among the stakeholders can be observed. Therefore, model development must draw up the objective function from the perspective of a decision agent, that is, port, carrier or shipper.

However, as Figure 2 also shows, operational decisions, that is, route and frequency, are made by the carrier who, based on his shipping costs, port charges and demand from an origin port to a destination port, tries to maximise his income.

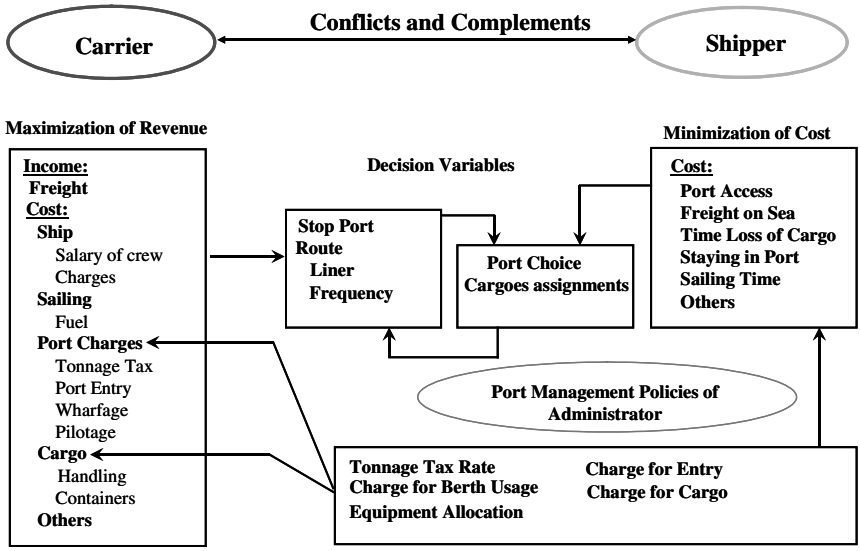

Figure 2: Relationships between port administration, carrier and shipper
Source: Zan (1999)

DEFINITION OF THE LOCATION MODEL

As mentioned above, the present model is based on the P-HM model by Campbell (1994). It attempts to provide better insights into hub-and-spoke (ie system) costs, as well as to study separately the import and export flows among feeder and destination ports, *via* one or more hub ports in the east coast of South America.

To limit the scope of analysis and the data requirements, which are heavy enough as it is, foreign origins/destinations have been aggregated in four world regions (see below).

Another aspect that had to be addressed is the differentiation of shipping and port costs between full or empty containers, and between 20 (TEU) and 40 (FEU) feet units. It is assumed that the unit cost of a maritime movement of one FEU is twice as high as this of one TEU, as the former occupies two slots on the vessel. On the other hand, port costs, in general, are moderately differentiated by container size, but *are* differentiated by container status; that is, full or empty. The following conventions have been used to denote the four types of containers: FCL_20: full TEU; EMP_20: empty TEU; FCL_40: full FEU; EMP_40: empty FEU.

The following section defines the model, from a carrier's perspective, laying out the parameters; constraints; decision variables; and objective function.

Indices:

f: indicates the feeder ports in the East Coast of South America, with $f = 1, 2, \ldots, F$;
m: indicates the area in the world that aggregates certain destination ports, with $m = 1, 2, \ldots, M$;
k: indicates the candidates to hub port status, with $k = 1, 2, \ldots, K$;
c: type of container (as described above), with $c = 1, 2, 3$ and 4;
s: container flow direction (import or export), with $s = 1$ or 2.

Parameters:

N: number of hub ports that must be allocated;
W_{fmcs}: import or export(s) of an f feeder port, to an m destination, of a type c container;
Δ_f: multiplication factor allowing for a W_{fmcs} flow variation of an f feeder port;
Q_{fmcs}: is the W_{fmcs} multiplication factor taking into account only the integer parcel, as can be seen in the following equation:

$$Q_{fmcs} = \text{int}(\Delta_f * W_{fmcs}) \tag{1}$$

$\beta\_C\_F_f$: parameter that allows changing terminal handling charges (THC) at port f;
$CP\_C\_F_{fc}$: THC per unit of type c container at port f;
$\beta\_N\_F_f$: parameter that allows changing port dues per unit of type c container at port f;
$CP\_N\_F_{fc}$: port dues per unit of type c container at port f;
CP_F_{fc}: port costs of f per unit of type c container as defined in the equation below:

$$CP\_F_{fc} = \beta\_C\_F_f * CP\_C\_F_{fc} + \beta\_N\_F_f * CP\_N\_F_{fc} \tag{2}$$

$\beta\_C\_H_k$: parameter that allows varying THC at the k hub port;
$CP\_C\_H_{kc}$: THC per unit of type c container at the k hub port;

$\beta\_N\_H_k$: parameter that allows varying port dues at the k hub port;
$CP\_N\_H_{kc}$: port dues per unit of type c container at the k hub port;
CP_H_{kc}: port costs of the k hub port per unit of type c container as defined in the following equation:

$$CP\_H_{kc} = \beta\_C\_H_k * CP\_C\_H_{kc} + \beta\_N\_H_k * CP\_N\_H_{kc} \quad (3)$$

$\beta\_C\_W_m$: parameter that allows varying THC in the m region of the world;
$CP\_C\_W_{mc}$: THC per unit of type c container in region m;
$\beta\_N\_W_m$: parameter that allows varying port dues in region m;
$CP\_N\_W_{mc}$: port dues per unit of type c container in region m;
CP_W_{mc}: port costs in region m per unit of type c container as defined in below:

$$CP\_W_{mc} = \beta\_C\_W_m * CP\_C\_W_{mc} + \beta\_N\_W_m * CP\_N\_W_{mc} \quad (4)$$

$\alpha\_F\_H\_M$: economies of scale in the route between feeder port and hub port;
$CVU\_F\_H\_M_c$: vessel daily costs per unit of type c container between feeder and hub port;
$SPPED\_F\_H$: vessel speed (knots) between feeder- and hub port;
$DIST\_F\_H\_M_{fk}$: distance (nautical miles) between the f feeder port and the k hub port;
$CV\_F\_H\_M_{fkc}$: sea costs between f and k for type c container as defined in below:

$$CV\_F\_H\_M_{fkc} = \alpha\_F\_H\_M * CVU\_F\_H\_M_c * \left(\frac{DIST\_F\_H\_M_{fk}}{24 * SPEED\_F\_H}\right) \quad (5)$$

$CO\_F\_H\_M_{fkc}$: total costs (ie port costs and sea costs) between f and k for type c container as defined bellow;

$$CO\_F\_H\_M_{fkc} = CP\_F_{fc} + CV\_F\_H\_M_{fkc} + CP\_H_{kc} \quad (6)$$

$\alpha\_F\_H\_R$: economies of scale in road trasport between feeder and hub port;
$CVU\_F\_H\_R_c$: cost per kilometre per unit of type c container shipped by road between feeder and hub port;

$DIST\_F\_H\_R_{fk}$; road distance (in kilometres) between f and k;

$CV\_F\_H\_R_{fkc}$: road transport cost between f and k, for type c container as defined in the following equation:

$$CV\_F\_H\_R_{fkc} = \alpha\_F\_H\_R * CVU\_F\_H\_R_c * DIST\_F\_H\_R_{fk} \tag{7}$$

$CO\_F\_H_{fkc}$: minimum cost operation between f and k, for type c container (between maritime and road transport), as defined in the equation below:

$$CO\_F\_H_{fkc} = \min(CO\_F\_H\_M_{fkc}, CV\_F\_H\_R_{fkc}) \tag{8}$$

α_H_W: economies of scale in the route between hub ports and destination regions;

$CVU\_H\_W_c$: vessel daily costs per unit of type c container between hub ports and destination regions;

$SPEED\_H\_W$: vessel speed (knots) between hub ports and destination regions;

$DIST\_H\_W_{km}$: distance between the k hub port and the m destination area;

$CV\_H\_W_{kmc}$: sea costs between k hub and m destination, for type c container, as defined in the following equation:

$$CV\_H\_W_{kmc} = \alpha\_H\_W * CVU\_H\_W_c * \left(\frac{DIST\_H\_W_{km}}{24 * SPEED\_H\_W}\right) \tag{9}$$

$CO\_H\_W_{kmc}$: total costs (ie port costs and sea costs) between k hub and m destination, for type c container, as defined in below:

$$CO\_H\_W_{kmc} = CP\_H_{kc} + CV\_H\_W_{kmc} + CP\_W_{mc} \tag{10}$$

TCO_{fkmc}: total 'network' cost from f feeder port, through k hub port, to m destination area, for type c container, as shown in below:

$$TCO_{fkmc} = CO\_F\_H_{fkc} + CO\_H\_W_{kmc} \tag{11}$$

Decision variables:

Y_k: binary variable that shows location or non-location for k hub port;

X_{fkmcs}: flow fraction from the f feeder port to the m destination area, through the k hub port, and for type c container with s direction.

Objective function:
Total cost (TC) minimization

$$TC = \sum_{f=1}^{F} \sum_{k=1}^{K} \sum_{m=1}^{M} \sum_{c=1}^{C} \sum_{s=1}^{S} TCO_{fkmc} * X_{fkmcs} * Q_{fmcs} \tag{12}$$

Subject to:

$$\sum_{k=1}^{K} Y_k = N \text{ (N defines the exact number of hub ports that must be open)} \tag{13}$$

$$Y_k = \begin{cases} 1 & \text{if location } k \text{ is a } \textit{hub port} \\ 0 & \text{otherwise} \end{cases} \quad \text{for all } k \tag{14}$$

$$0 \leq X_{fkmcs} \leq 1 \quad \text{for all } f, k, m, c, s \tag{15}$$

$$\sum_{k=1}^{K} X_{fkmcs} = 1 \quad \text{for all } f, m, c, s \text{ (ie each } f \text{ to } m \text{ flow passes through a } k \text{ hub)} \tag{16}$$

$$X_{fkmcs} \leq Y_k \quad \text{for all } f,\ k,\ m,\ c,\ s \tag{17}$$

Entry data
Feeder ports and hub port candidates are assumed to constitute a single set. This expands the level of analysis. Detailed analysis has been carried out earlier by Aversa (2001) and Costa (2001) on the differences among South American East Coast ports, in terms of handling capacity (comparisons of the number and type of equipment (transtainers; portainers; toploaders; and reachstackers) and the number and extension of berths available at containers terminals).

Tables 3 and 4 present container flows and costs, at the ports considered in this analysis. Port costs of empty containers have been assumed to be half of those full. It is also assumed (which is close to reality) that Brazilian ports do not differentiate between TEU and FEU costs.

Road and shipping costs
Another defined parameter was road transport costs (*CVU_F_H_R*) per container between feeder and hub ports. From earlier studies (see also

Haralambides and Londoño-Kent, 2004), an average of US$1 per kilometre has been assumed. No differentiation was made between TEU and FEU (as it is the same road vehicles that carry both).

The parameters of vessel daily operating costs per container (including fuel costs) between feeder- and hub port (*CVU_F_H_M*), and between hub port and world region (*CVU_H_W*) were taken from data reported in Decker and Hamburg (2001). On the basis of these data, Figure 3 depicts economies of scale achieved in liner shipping for geared and gearless vessels up to 4,000 TEU.

Both geared (smaller) and gearless (larger) vessels are deployed in the East Coast of South America: the former – vessels from 800 to 1,500 TEUs- are used in the coastal trades of the Brazilian coast, where onboard gear is often necessary in operations. Vessels larger than 1,500 TEUs can be used in international long-distance shipping. An average speed of 18 knots is assumed for the former vessels (*SPEED_F_H*), and 20 knots for the latter (*SPEED_F_H*).

Table 5 shows the parameters of daily operating costs of vessels considered in this study. The cost of carrying one FEU is assumed to be double that of one TEU, while no distinction is made between the cost of transporting full or empty containers (as they both occupy one slot).

Table 3: Container flows at ports in the East Coast of South America

	Import				Export						
Units	FCL_20	FCL_40	EMP_20	EMP_40	FCL_20	FCL_40	EMP_20	EMP_40	Full TEU	Empty TEU	Total TEU
SSZ	41.021	26.037	1.678	1.661	40.371	20.175	2.328	7.523	173.816	22.374	196.190
BUE	24.885	22.058	1.531	773	20.041	13.948	6.375	8.883	116.938	27.218	144.156
SFS	5.304	1.958	4.094	8.438	9.394	10.392	4	4	39.398	20.982	60.380
RIG	3.960	2.005	338	8.317	3.964	10.318	334	4	32.570	17.314	49.884
PNG	3.635	7.668	152	221	2.345	5.358	1.442	2.531	32.032	7.098	39.130
RIO	8.517	4.047	2.592	149	10.981	2.155	128	2.041	31.902	7.100	39.002
SUA	3.779	2.770	328	566	2.802	3.272	1.305	64	18.665	2.893	21.558
SSA	1.826	1.452	2.300	1.091	4.122	2.539	4	4	13.930	4.494	18.424
FOR	405	275	1.843	948	2.202	1.145	46	78	5.447	3.941	9.388
MVD	1.791	1.274	4	4	887	615	908	663	6.456	2.246	8.702
SEP	4	4	4	4	4	4	4	4	24	24	48
Total	95.127	69.548	14.864	22.172	97.113	69.921	12.878	21.799	471.178	115.684	586.862

Source: Costa (2001).
EUR: Northern European ports (the Port of Rotterdam in The Netherlands is selected for distance calculation purposes). MED: Mediterranean ports (the Port of Genoa in Italy is selected for distance calculation purposes). AMN: Canada and US ports (except Gulf of Mexico. The Port of New York is selected for distance calculation purposes). CAR: Central America and Gulf of Mexico ports (the Port of Kingston in Jamaica is selected for distance calculation purposes. FOR: Port of Fortaleza. SUA: Port of Suape. SSA: Port of Salvador. RIO: Port of Rio de Janeiro. SEP: Port of Sepetiba. SSZ: Port of Santos. PNG: Port of Paranaguá. SFS: Port of São Francisco do Sul. RIG: Port of Rio Grande. MVD: Port of Montevideo. BUE: Port of Buenos Aires. FCL_20: full TEU. FCL_40: full FEU. EMP_20: empty TEU. EMP_40: empty FEU.

Table 4: Port costs in US$/unit

US$/unit	Terminal handling charges				Port dues			
Port code	FCL_20	FCL_40	EMP_20	EMP_40	FCL_20	FCL_40	EMP_20	EMP_40
EUR	96.00	120.00	48.00	60.00	5.00	5.00	2.50	2.50
MED	125.00	155.00	62.50	77.50	5.00	5.00	2.50	2.50
AMN	415.00	550.00	207.50	275.00	75.00	100.00	37.50	50.00
CAR	100.00	125.00	50.00	62.50	5.00	5.00	2.50	2.50
FOR	135.91	135.91	67.96	67.96	47.11	47.11	23.56	23.56
SUA	108.94	108.94	54.47	54.47	47.57	47.57	23.79	23.79
SSA	138.40	138.40	69.20	69.20	52.35	52.35	26.18	26.18
RIO	143.67	143.67	71.84	71.84	28.79	28.79	14.40	14.40
SEP	124.93	124.93	62.47	62.47	20.57	20.57	10.29	10.29
SSZ	166.57	166.57	83.29	83.29	27.43	27.43	13.72	13.72
PNG	127.23	127.23	63.62	63.62	52.38	52.38	26.19	26.19
SFS	109.07	109.07	54.54	54.54	40.85	40.85	20.43	20.43
RIG	146.52	146.52	73.26	73.26	37.77	37.77	18.89	18.89
MVD	130.00	150.00	65.00	75.00	15.00	15.00	7.50	7.50
BUE	120.00	140.00	60.00	70.00	15.00	15.00	7.50	7.50

Source: GEIPOT (2000).
See footnote in Table 3.

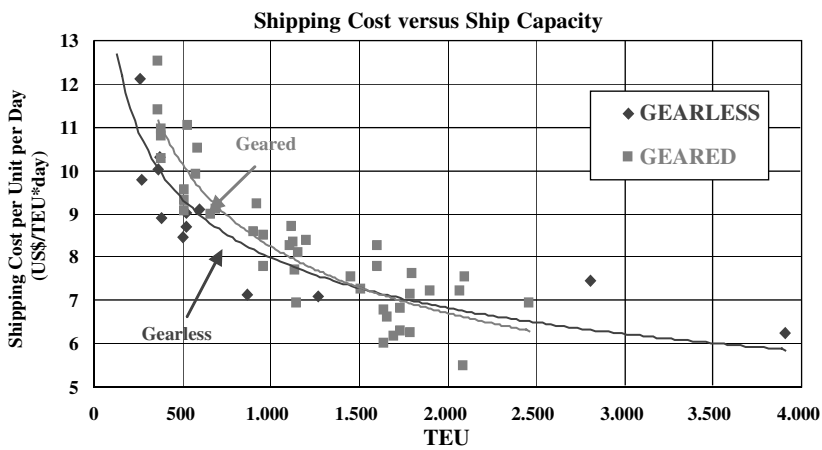

Figure 3: Economies of scale in liner shipping

RESULTS

The model was run with the General Algebraic Modelling System (GAMS) program (Brooke, Kendrik and Meeraus, 1997), with the CPLEX and the OSL

Table 5: Vessel daily operating costs (including fuel costs)

US$/unit day	Shipping unit costs				Vessel capacity
Parameter	FCL_20	FCL_40	EMP_20	EMP_40	TEU
CVU_F_H_M	8.5	17.0	8.5	17.0	800-*Geared*
CVU_H_W	7.5	15.0	7.5	15.0	1.500-*Geared*

resolution algorithms. These algorithms are appropriate for linear, integer, and mixed linear programming problems, while other algorithms, like ZOOM and MINOS, are applicable for non-linear models.

The model includes 11 feeder ports (FOR, SUA, SSA, RIO, SEP, SSZ, PNG, SFS, RIG, MVD, BUE) which, as mentioned above, are also hub port candidates. Also, four world regions are considered (EUR, MED, AMN and CAR); four types of containers (FCL_20, FCL_40, EMP_20 and EMP_40); and two flow directions (import and export). As a result, the model contains 3,883 decision variables and 4,225 constraints. *The port of Santos was selected as the optimal solution, with a total cost of US$ 295 million*.

A number of interesting observations can be made from Table 6 and the derived Figure 4. in all, 30% of total costs are related to feeder costs, that is, shipping and port costs in the port system of the East Coast of South America. The remaining 70% refers to 'mainline costs', that is, ocean transportation to world regions and related port costs at both ends. Total 'hub costs', that is, feeder plus mainline, add up to 39%, making this the single most important cost item of the system. The greatest part of the latter costs (see also Table 4) regards THC and this explains carriers' keen interest in dedicated container terminals (Haralambides *et al*, 2002). These figures come also in stark contrast to the often 'politically proclaimed' arguments that port costs in general represent only a small portion of overall transport costs: Total port costs, that is, hub and world port costs, amount to 82% of total system costs, with shipping costs representing 18% only.

Scenarios and sensitivity analysis

Next, the constraint $N=1$ is relaxed and the model is allowed to allocate an increasing number of hubs, up to 11, which is the total number of feeder ports considered in this study. The objective is to investigate the impact of such allocations on total system costs, as well as the sensitivity of such allocations to changes in shipping and port costs.

Table 6: Cost break down of optimal solution: Port of Santos

	Costs	10^6 US$	%
Feeder	Feeder port costs	37.3	13
	Shipping costs (feeder- to hub port)	5.1	2
	Hub port costs	45.3	15
	Total feeder costs	87.7	30
Main line	Hub port costs	71.3	24
	Shipping costs (hub to world region)	48.1	16
	World region port costs	87.9	30
	Total main line costs	207.3	70
	Total costs	295.0	100

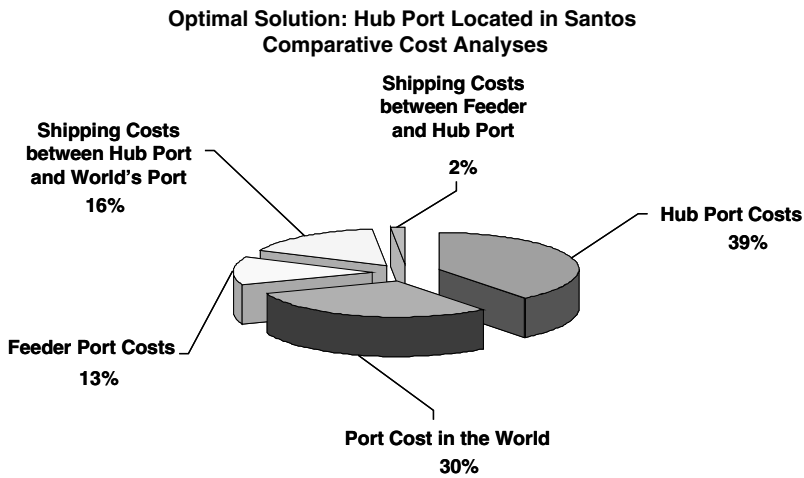

Figure 4: Cost break down of optimal solution: Port of Santos

Figure 5 and Table 7 show that, as the number of hub ports gradually increases to 11, total system costs decrease. Apparently, as we move towards multi-porting, feeder costs decline while mainline costs remain fairly constant. The single hub configuration is thus shown to be 46% more costly than the reference case scenario of no hub ($N11 = 100$) (Table 7). In the margin, that is, when $N = 11$, there is no transhipment hub and all cargoes are shipped to final destination directly *via* the 'own' origin port.

Table 7 also shows the order of increasing the number of hubs: $N = 1$ (Santos); $N = 2$ (Santos and Buenos Aires); $N = 3$ (Santos, Buenos Aires and Sao Francisco do Sul); and so on. Comparing this ordering with that of Table 3,

where ports are ordered only on the basis of container flows, one can observe that, as of the fourth position, the ordering is different (note particularly the importance of Rio de Janeiro, as a hub, despite its comparatively low traffic volume). Apparently, and this is the added value of our model, other parameters (ie shipping and port costs) play a role equally important to that of container flows in the attractiveness of a port as a hub.

Consequently, an attempt is made to establish the required decreases in shipping and port costs, necessary in order to achieve total system cost down to the level of reference case scenario ($N=11$). This is done for two cases: (a) optimum solution ($N=1$, Santos); (b) $N=2$ (Santos and Buenos Aires). Four scenarios were considered in each case (Table 8) and the results appear in Table 9.

Case (a): As was to expected, a modest (12–13%) decrease in shipping costs alone has a very small impact on total system costs (2.3%). This result remains fairly the same even when the decrease in shipping costs almost doubles (20%), although, interestingly enough, Buenos Aires now becomes the optimal solution (single hub). In both instances, port costs have to be reduced by roughly 35% to achieve overall system savings down to the level of reference case scenario (202 millions; $N=11$).

The results of case (b) are fairly similar. A two-hub configuration, however, achieves a total saving (compared to $N=1$) of 14.8% by itself. Thus, although here also shipping costs have a small impact, only a 20% reduction in port costs is required to bring down overall system costs to the level of reference case.

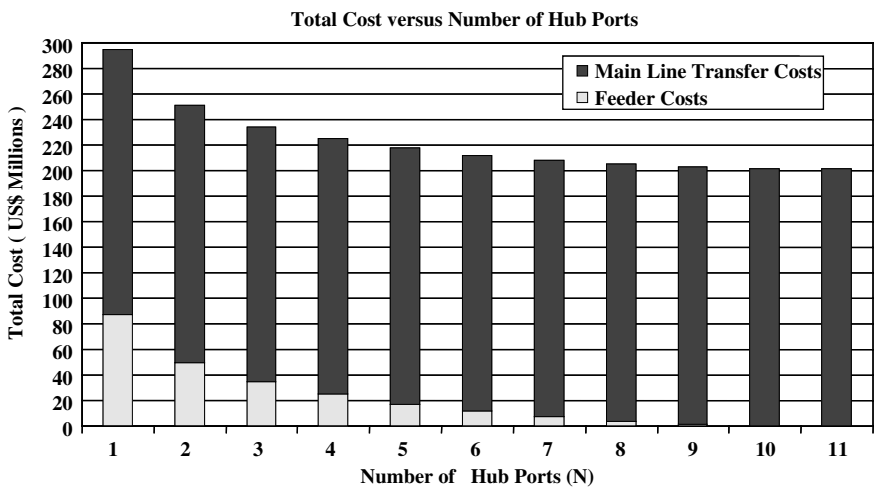

Figure 5: Total cost *versus* number of hub ports

Table 7: Model results

No. of hubs	Total costs 10^6 US$	% (base: $N = 11$)	Feeder costs 10^6 US$	Transshipment costs 10^6 US$	% of feeder costs %	% of Trans-shipment costs %	Hub ports										
							FOR	SUA	SSA	RIO	SEP	SSZ	PNG	SFS	RIG	MVD	BUE
1	295	146	88	207	30	70						X					
2	251	125	50	201	20	80						X					X
3	234	116	35	199	15	85						X		X			X
4	225	112	25	200	11	89				X		X		X			X
5	218	108	17	201	8	92				X		X		X	X		X
6	212	105	12	200	5	95		X		X		X		X	X		X
7	208	103	7	201	4	96		X	X	X		X		X	X		X
8	205	102	4	201	2	98		X	X	X		X	X	X	X		X
9	203	101	2	201	1	99	X	X	X	X		X	X	X	X		X
10	202	100	0	202	0	100	X	X	X	X		X	X	X	X	X	X
11	202	100	0	202	0	100	X	X	X	X	X	X	X	X	X	X	X

Table 8: Scenario description

Scenario	Description
S_*_I	Decrease of around 10% in feeder and mainline costs
S_*_II	Decrease of around 20% in feeder and mainline costs
SP_*_I	Decrease of around 10% in feeder and mainline costs and, simultaneously, decrease port costs to achieve reference value (202 million; $N = 11$)
SP_*_II	Decrease of around 20% in feeder and mainline costs and, simultaneously, decrease port costs to achieve reference value (202 million; $N = 11$)

* = 1, 2.

Table 9: Scenario results

		Decrease in shipping costs					
Scenario	Number of hub ports	Mainline (%)	Feeder (%)	Decrease in total port costs %	Total cost US$ millions	Decision Hub port(s)	Savings %
Actual_1	$N = 1$	—	—	—	295	Santos	—
S_1_I	$N = 1$	12	13	—	288	Santos	2.3
SP_1_I	$N = 1$	12	13	36	201	Santos	31.8
S_1_II	$N = 1$	21	20	—	283	Buenos Aires	3.9
SP_1_II	$N = 1$	21	20	34	202	Santos	31.5
	$N = 2$	—	—	—	251	Santos Buenos Aires	14.8
S_2_I	$N = 2$	12	13	—	244	Santos Buenos Aires	17.3
SP_2_I	$N = 2$	12	13	22	201	Santos Buenos Aires	31.8
S_2_II	$N = 2$	21	20	—	240	Santos Buenos Aires	18.7
SP_2_II	$N = 2$	21	20	20	201	Santos Buenos Aires	31.9
	$N = 11$	—	—	—	202	all	31.7

Finally, this last section of the paper presents the minimum independent (ie *Ceteris paribus*) improvements in traffic flows and port costs that are necessary if the ports of Buenos Aires, Sepetiba, and Suape were to achieve single-hub status. For Buenos Aires, this can be achieved by: a 5% increase in demand (151,000 TEUs) or a 2% decrease in port dues or a 3% decrease in THC. In the case of Sepetiba single-hub status can be achieved by: increasing full container traffic (imports and exports) to 41,000 TEUs (70%) or decreasing port dues by 11% or decreasing THC by 13%. With regard to the port of Suape, the required increase in container flows (all types) reaches 350%; alternatively, single-hub status could be achieved by a 20% decrease in port dues or a 28% decrease in THC.

CONCLUSIONS

Centrality, high volumes of domestic (ie captive) traffic, good hinterland connections, adequate feedering networks, good infrastructure and competitive port pricing have often been considered as the most important factors if a port is to achieve hub status, that is, to be able to handle a significant volume of transhipment containers over and above its local base.

Centrality in particular, in other words minimisation of transport costs, is often given unwarranted significance, usually by 'awkward' river ports, such as Antwerp and Hamburg, while the importance of port costs, in these ports, is at the same time purposely downplayed. This paper has refuted both perceptions: With due regard and caution to the model's assumptions, limitations and need for further refinement, we have shown that shipping costs represent only 18% of total system costs, with the remainder consisting of port costs, predominantly THC. Among others, this explains the carriers' keen interest in developing or controlling dedicated terminal facilities.

Amidst intensified port competition and in view of the 'footloose' nature of the 'container', a port's hub status cannot be taken for granted, as the Santos-Buenos Aires example has demonstrated. Continuous efforts are thus required on behalf of port management to offer efficient and competitive services in a multitude of areas comprising the overall 'port service'.

By assessing simultaneously the impact of traffic flows; port and shipping costs on a port's hub status, this paper offers the basis for a decision tool suitable for the analysis of any port aspiring to hub status. Refinements are, of course, necessary to calibrate the model to local circumstances, while other parameters, not dealt with here, such as the increasing need to recover infrastructure costs; structural shifts in trade flows; and bigger ship sizes, could be easily accommodated.

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