



# Port Financing and Pricing in the European Union: Theory, Politics and Reality

HE HARALAMBIDES<sup>1</sup>, A VERBEKE<sup>2</sup>, E MUSSO<sup>3</sup> & M BENACCHIO<sup>3</sup>

<sup>1</sup>Erasmus University Rotterdam, The Netherlands, E-mail: haralambides@few.eur.nl; <sup>2</sup>University of Brussels, Belgium;

<sup>3</sup>University of Genoa, Italy

*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.*

International Journal of Maritime Economics (2001) 3, 368-386.

**Keywords:** Port pricing; cost recovery; European integration.

## 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)<sup>1</sup> 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**

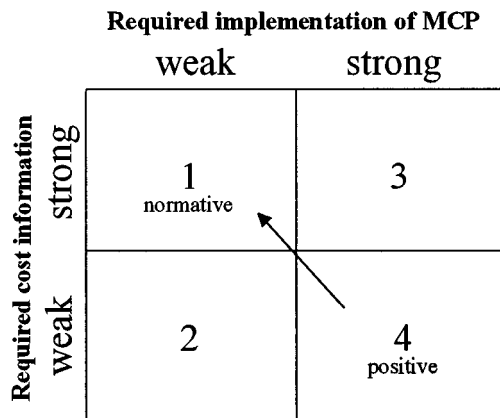
The main conclusion of a comprehensive academic literature review on port pricing (undertaken in the context of the ATENCO project) was that pricing in ports can and should be based on costs (Button, 1979). The determination of which costs should be reflected in prices largely depends on the type of port organisation (Voorhamme and Winkelmanns, 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<sup>2</sup> 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



**Figure 1:** Preconditions for efficient pricing

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.<sup>3</sup>

### *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 <i>à fonds perdus</i>	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 ( $\pm 15$  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 ( $\pm 15$  to  $50\%$ )<sup>4</sup>; 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.

### **Acknowledgement**

Earlier versions of this paper have been presented at the 2001 Annual Conference of the International Association of Maritime Economists (IAME) in Hong Kong, and at the 9th World Conference on Transport Research, Seoul, Korea, 2001. The authors are grateful to two anonymous referees for their constructive input. Views and opinions expressed herein are those of the authors only and ought not to be construed as necessarily committing the European Commission.

### **ENDNOTES**

---

- <sup>1</sup> 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).
- <sup>2</sup> 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.



- <sup>3</sup> 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.
- <sup>4</sup> 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.

## REFERENCES

- Bennathan, E and Walters, AA. 1979: *Port pricing and investment policy for developing countries*. Oxford University Press.
- Button, KJ. 1979: The economics of port pricing. *Maritime Policy and Management* 6: 201-207.
- Coppejans, L and Bergantino, A. 1998: *Economic considerations with respect to port pricing*, Cardiff University Report.
- Dowd, TJ and Fleming, D. 1994: Port pricing. *Maritime Policy and Management* 21(1): 29-35.
- European Commission. 1997: *Green paper on sea ports and maritime infrastructure*, 678 final, 10 December 1997.
- European Commission. 1998: *White Paper on fair payment for infrastructure use: a phased approach to a common transport infrastructure charging framework in EU*, 466 final.
- European Commission. 2001a: Communication from the Commission to the European Parliament and the Council: ‘Reinforcing quality service in sea ports: a key for European transport’. Proposal for a Directive of the European Parliament and of the Council on market access to port services. COM(2001) 35 final, Brussels, 13.2.2001.
- European Commission. 2001b: Commission staff working document on public financing and charging practices in the Community sea port sector. SEC (2001), Brussels, 14.2.2001.
- Gardner. 1977: Port pricing – an alternative approach. In: *Transport of steel exports – an investigation into the scope for rationalisation*, Vol. I, Chapter 4.2, Department of Maritime studies, Transport Research Unit.
- Heggie, IG. 1974: Charging for port facilities. *Journal of transport economics and Policy* 8: 3-25.
- Jansson, JO and Shneerson, D. 1982: *Port economics*, MIT Press.
- Pollock, EE. 1980: Port tariff policy in Europe – A British view. *Tijdschrift voor de vervoerswetenschap*, 199-204.
- Ramsey, F. 1927: A contribution to the theory of taxation. *Economic Journal* 37: 47-61.
- Robinson, R. 1991: Pricing port services in Australia – the issues. Paper presented to *new thinking on port pricing*, Executive Development Programme, University of Wollongong, Centre for Transport Analysis.
- Suykens, F. 1986: Ports should be efficient (even if this means that some of them are subsidised). *Maritime Policy and Management* 13(2): 105-126.
- Suykens, F and Van de Voorde, E. 1998: A quarter of a century of port management in Europe: objectives and tools. *Maritime Policy and Management* 25(3): 251-261.
- Talley, WK. 1994: Port pricing: a cost axiomatic approach. *Maritime Policy and Management* 21(1): 61-76.
- Thomas, BJ. 1978: Port charging practices. *Maritime Policy and Management* 5: 117-132.
- UNCTAD. 1975: *Port Pricing*, TD/B/C.4/110/Rev.1, New York: United Nations.
- UNCTAD. 1976: *Manual on port management – Part Four (Modern management techniques): Port Pricing*.
- Van Niekerk, HC. 1996: Efficient pricing for public ports. *IAME International conference*, Vancouver.
- Verhoeff, JM. 1981: Seaport competition: some fundamental and political aspects. *Maritime Policy and Management* 8: 49-60.
- Voorhamme, R and Winkelmans, W. 1980: Port tariff making in 10 EEC sea ports. *Tijdschrift voor de vervoerswetenschap*, 253-272.



- Walters, AA. 1975: Marginal cost pricing in ports. *The Logistics and Transportation Review* 11 (4): 299-308.
- Zachcial, M and Hantau, MU. 1998: *Relevant pricing techniques applied to port and maritime infra- and superstructure*. Report: Institute for Shipping Economics and Logistics, Bremen.