



BULLETIN

FACILITATION OF TRANSPORT AND TRADE IN LATIN AMERICA AND THE CARIBBEAN

Infrastructure charges: Creating incentives to improve environmental performance

This edition of the *FAL Bulletin* analyses the way in which port charges are currently differentiated, focusing on strategic differentiation to understand current practices and to identify potentials for reaching local environmental goals and standards.

Port dues differentiation has evolved in a market-driven, competitive environment. It has been proven to contribute to certain development goals, but always in combination with other flanking measures. It could even be said that differentiation of port dues is a flanking measure within a wider policy-based approach. Particular emphasis in this respect is afforded to the possibilities of differentiating port charges with reference to environmental performance at a local level. The experiences from Europe are particularly interesting in terms of their lessons for Latin America and the Caribbean, where strategic differentiation for environmental goals is still absent.

The concept of strategic differentiation of infrastructure charges to encourage more environmentally sound behaviour, reduce emissions or promote technological change can be used as a tool for moving towards a greener economy.

Introduction

"The assumption that a pattern of change exists in the history of mankind [...], that it consists of irreversible changes in one direction only, and that this direction is towards improvement." Sidney Pollard, 1968

As society has progressed, the demand for infrastructure and transport as a means for meeting society's needs has grown. But history has shown that technological improvements and advancements alone are not

This *FAL Bulletin* analyses the potential contribution of differentiated infrastructure charges to the promotion of more environmentally sound behaviour, such as energy efficiency and technological change.

Port infrastructure charges are used as an example of how charge differentiation can be used as a fiscal tool to enhance the environmental performance of infrastructure services.

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enough to improve the environmental performance of the transport sector.

More than 80% of world trade (in terms of volume) is moved using waterborne transport (UNCTAD, 2010). Port infrastructure fulfils a facilitating role in meeting the demands of world trade; its availability has important repercussions for trade, economic development and the competitiveness of economies. As a result, the pressure for port infrastructure development is high. Decisions on how this infrastructure is managed and where it is located in the supply and logistics chains can move maritime transport sector development towards sustainability. In this context, port infrastructure charges and their strategic differentiation might be an intermediate step, creating incentives at the local level to improve environmental performance and encourage more environmentally sound behaviour on the part of port users.

Levels and structures of port infrastructure charges vary markedly across countries and terminals. Particularly in developing countries, existing charging regimes seem to be far from internalizing external costs and are rarely based on efficiency principles.

This issue of the *FAL Bulletin* reviews examples of charge differentiation structures in place at a number of European ports, in order to understand current practices and identify potentials and challenges for wider implementation. The bulletin stresses the need for a dynamic approach when introducing strategic differentiation of charges in order to maintain the efficiency of the strategy over time. The author compares data from two primary sources: (a) qualitative data derived from personal interviews at ports and (b) data obtained through interviews with port users.

Potential differentiated charging schemes on ships for port channels/fairways, associated port infrastructure and port services are identified, and recommendations for effective differentiation of charges in order to enhance the sustainability of port infrastructure management are provided.

I. Port infrastructure charging

In general, ports are no different from any other multiproduct industry offering a range of services and operating under different environments and organizational structures. However, the port sector is neither standardized nor homogenous in regards to ownership, organization, competitive framework or management. Furthermore, ports vary in size, functions and geographical location. Despite the fact that basic scaling factors used for price differentiation are somewhat similar, the operational scheme of a port

(public-sector, concessioned or 100% privately-operated) has a significant impact on the charges levied because of the different degrees of regulation and supervision involved. In the case of container ports, the landlord port model is the most common one. To understand differentiation schemes for port charges it is necessary to understand the general objectives of a port and its current pricing principles.

Rationales for providing port services vary. They range from the European (continental) view of ports as part of the social infrastructure, valuing their contribution to development in the region, to the Anglo-Saxon rationale focusing on port profitability and self-sufficiency (Bennathan and Walters, 1979), the Latin rationale entailing centralized control of ports, and the municipal Hanseatic model, involving autonomous port authorities (Veenstra, 1999).

The traditional role of the public sector in the delivery of port services has declined throughout the years. Today, ports are generally perceived as commercial entities that should recover their full costs from the user (Strandenes and Marlow, 2000). On the one hand, port operation has become more fragmented since the terminals of one port might have different operators, and port services (such as pilotage) have passed to private-sector operators. On the other hand, horizontal and vertical integration in the maritime industry have led to the development of global and regional terminal networks being operated by a single operator and shipping lines operating specific dedicated terminals.

Competition, commercialization and vertical integration in the maritime transport sector have significantly influenced the prevalent quality factors of ports, which in turn influence demand elasticities. The role of port costs from a user perspective also varies significantly, depending on the type of traffic and service. Port charges make up only 5% to 10% of overall transit costs for deep-sea shipping compared with 40% to 60% for vessels engaged in short-sea trades (European Commission, 1997).

Strandenes and Marlow (2000) argue that existing pricing structures try to satisfy conflicting objectives and that any successful pricing policy would have to acknowledge the trade-offs being made between financial, economic, environmental and social objectives while maintaining rigid managerial discipline and encouraging trade.

The next section examines the current structure of port charges and evaluates the degree to which port users are charged in a manner that differentiates and encourages more environmentally sound behaviour.

II. Port charges-structure and differentiation

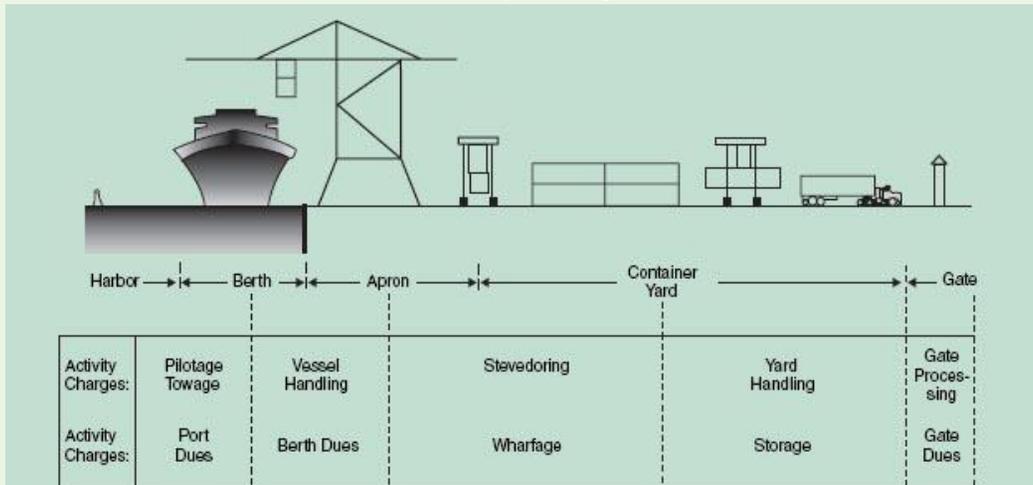
Current port pricing structure in many ways reflects the history and traditions of each port. UNCTAD (1995) classifies port pricing as a strategic matter with three approaches to port financing: economic, financial and public enterprise. The economic approach argues for marginal cost pricing, taking into consideration the effects on all parties, including benefits and costs to others. The financial approach argues for prices to be set on the basis of accounting costs in order to achieve a profit. The public-enterprise approach aims to foster local development, economic activities and maximization of throughput. As

such, it has also proven to require subsidies to cover part of the infrastructure or fairway costs.

The analysis of current pricing structures shows that in most cases clear classification of a particular port into any single one of these approaches is not possible. In a competitive environment ports, like any other business, seek to gain competitive advantages. Differentiation of pricing is one way to do that.

In general, charges can be assigned to different phases of a ship call (see figure 1) and can be classified into facilities, services and general tariffs (see figure 2). The specific dues and fees under each category reflect the complexity of port charges.

Figure 1
Basic structure of port charges and dues



Source: Doerr 2006.

Figure 2
Categorization of port charges



Source: Prepared by the author.



Gross tonnage (GT) is the principal scale factor for port dues; one exception is France.¹ Its spreading throughout most of the world has its origin in the International Convention on Tonnage Measurement of Ships, 1969, which introduced a universal tonnage measurement system.²

In its general remarks on port tariffs, ISL (2006) states that there is no common regulation for the compilation and publication of tariffs for port users. The ISL study continues "... in most cases ports are free to decide about the nature and absolute level of charges..." Even if the charges are published, the final price paid by the user is, in general, negotiable. Under the landlord scheme, the port authority often has responsibility only for the infrastructure charge.

Interviews with port officials have confirmed that port authorities perceive themselves to be operating in very competitive environments. This is a leading argument in defence of their existing pricing and differentiation schemes. For example, the Port of Valencia uses port pricing to distinguish itself from competing ports, giving discounts to vessels that call regularly and to RoRo vessels that operate between European Union ports, thereby strengthening intermodality. This port also grants discounts to ships complying with specific regulations and standards. For instance, vessels accrediting the delivery of liquid waste in accordance with MARPOL I receive a discount of 20 euros per ton with a limit of 10% of the net amount; services certified to UNE-EN 45011 or equivalent standards receive a 3% discount.

The main objectives for price differentiation are equity, cost coverage (no clear evidence exists as to whether this is based on marginal or long-term costs), profits or the principal of "what the cargo can bear". The strategic objectives are environmental, specific market capture (such as short sea shipping) and safety.

Table 1
Types of differentiation in relation to objectives in ports

Objectives/types		Ship type	Ship size	Type of traffic	Frequency	Compliance with environmental standards	Compliance with safety standards	Type of cargo
	Equity							
	Cost coverage							
	Profits							
Strategic	Safety							
	Environmental							
	Markets							

Source: Prepared by the author.

Note: Analysis based on personal interviews with port officials and literature research.

Used to achieve objectives
 Partly used to achieve objectives

¹ In France, port dues are based on the volume of the ship. This scale factor is calculated from the length, breadth and summer draft of the ship, which is then multiplied by a specific factor based on the type of ship. For details see, for example, the port tariff table at <http://www.havre-port.net/pahweb.html>.

² For details, see www.imo.org/conventions/mainframe (August 2007).

III. Strategic differentiation, discriminatory charges and voluntary differentiation

Strandenes and Marlow (2000) argue that traditional port charges can typically be defined as discriminatory, as previously identified by Talley (1994) and Svendsen (1967). While this might be true, the author holds that specific differentiation regimes are based more on strategy than on discrimination.

The approach to differentiated port charges can be driven by a port's own strategic decision (UNCTAD, 1995) or can be voluntary in order to anticipate developments driven by external influences (such as environmental policy at the national level). The main difference between strategic and voluntary differentiation is that, in theory, a voluntary differentiation scheme has to be revenue-neutral to be attractive for implementation and should not negatively impact competitiveness with other ports. Examples of voluntary differentiation schemes can be found primarily in the Swedish port sector, in the form of environmental differentiation schemes.

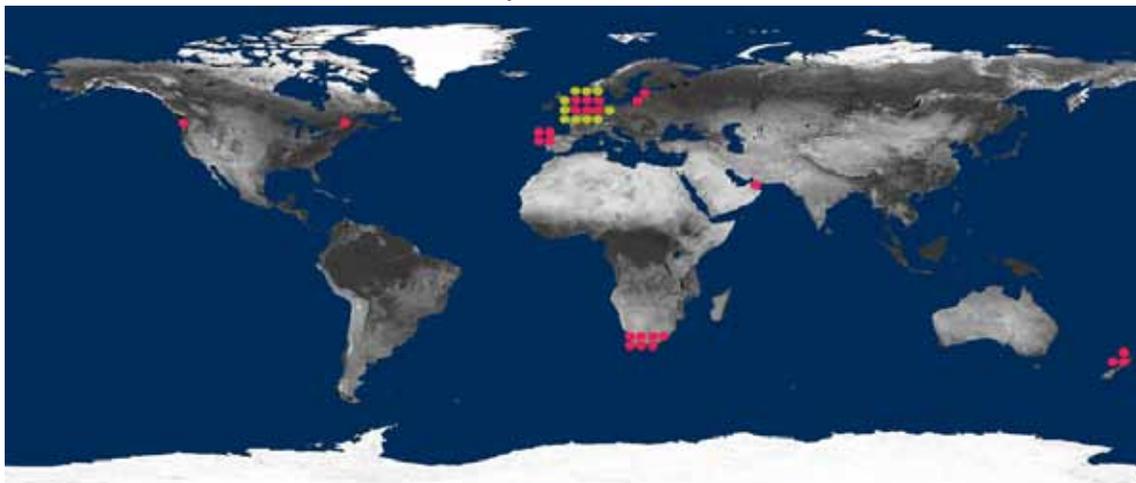
The decision by a port to adopt strategic differentiation may also be driven the goal of maximizing profits from a certain user group or a long-run strategy for market expansion. Consequently, it will not necessarily be revenue-neutral. These regimes are prevalent in many ports because they favour certain types of traffic over others or try to attract certain types of traffic to enhance the port's strategic position within the global and /or regional port system.

For example, several ports in the European Union have adopted a scheme that incentivizes intra-European Union container shipping services. The reasons for this strategic pricing option are manifold. First, a preferential tariff for intra-European Union short sea shipping services is in line with European Union policy to strengthen waterborne transport and to shift intra-European Union traffic from road to sea. Second, port administrators in general have incentives to increase or maximize port throughput, which also strengthens their position within the port hierarchy in the region. In order to be attractive for mainline services, ports need to attract a high level of feeder services that provide the fine distribution within the region.

The following section focuses on strategic differentiation of port charges to reach environmental policy objectives. Strategic differentiation of port charges for other strategic reasons, such as to promote short sea shipping, will not be discussed further in this bulletin.

The Green Award system was launched in 1994 based on an initiative by the Port of Rotterdam. The programme was designed to give large liquid and dry bulk vessels an incentive to increase their attention to safety and environmental protection. The Green Award is given to ship owners if their vessels, crews and procedures comply with a number of requirements in vessel operation and specifications. To date, 284 dry bulk ships and tankers belonging to 78 companies have been certified. A number of ports give incentives to certified ships in the form of differentiated user charges. However, no ports in Latin America and the Caribbean provide such incentives.

Map 1
Incentives providers-Green Award



Due to the origin of the initiative, the discount scheme is most widely practised in the Netherlands, where a number of nautical service providers also offer discounts on their tariffs for ships that are Green Award certified. The discount, which generally ranges from 3% to 6%,³ is granted on the port dues.

Interviews with officials of the Port of Amsterdam in the Netherlands and the Port of Sullom Voe in Scotland's Shetland Islands have shown different perceptions of the scheme and its effects and validity. Representatives of the Port of Sullom Voe (February 2007) stated that the 5% discount is no longer granted because all ships calling at the port comply with the Green Award requirements in any case. The differentiation scheme thus seems to have fulfilled its purpose and is no longer necessary. However, particularly in developing countries such incentives could still have a significant impact on port users and the local environment.

The Port of Amsterdam maintains the Green Award discount as of its marketing strategy as a "green" port. The Port of Amsterdam's geographical location might be one of the main reasons that it seeks to promote a green image, since it is right next to the city, while Sullom Voe is located in the remote northern region of the main Shetland island with no nearby human settlements.

Experiences with the introduction of voluntary environmental differentiation schemes vary. From July 2001 to June 2003 the Port of Hamburg ran a pilot programme that gave a 6% discount on port dues to ships that were ISO 14000 Environmental Management or Green Award certified. Based on three further indicators (use of Tributyltin-free⁴ anti-fouling coating, use of bunker oil with sulphur content < 1.5%, and NOx emissions 15% below the IMO NOx curve), ships were eligible for a further 6% reduction.

The scheme had three significant drawbacks. First, it did not prove to be revenue-neutral. Due to the institutional set-up, the port had to be repaid, out of the public budget, for the discounts given to ship operators. Second, the scheme was politically driven and therefore dependent on political support, but with the change in government funding was lost. Third, there was no agreement between the port and the ship operators to strengthen this programme.

In the current institutional set-up, the port authority neither has nor foresees any incentive to develop and reintroduce such a scheme. The port authority itself does not see the need to reinstate environmental differentiation of this

kind. Its basic dilemma is that if the scheme were to entail costs for the port, there is no funding for reimbursing them. If the scheme were to create profits, the main issue would be how to invest the money accordingly so as to encourage more environmentally friendly performance by the shipping sector.

Positive results can be drawn from the Swedish dues differentiation programme. The programme is based on a consensus between the Swedish Maritime Administration (SMA), the Swedish Shipowners' Association and the Swedish Ports and Stevedores Association. It came into operation in 1998; a revised programme was launched in 2005. Unlike the Hamburg scheme, the agreement included a programme of environmentally differentiated fairway dues administered by the SMA and provisions for a partial subsidy to ship owners for installing NOx emissions-reducing technologies, besides the voluntary port dues differentiation.

One significant difference compared with other European Union countries is that Sweden has long had a maritime infrastructure charging scheme for its fairways. While the effect of differentiated fairway dues is straightforward (because all Swedish fairways are overseen by the SMA), the implementation of environmentally differentiated port dues requires voluntary port participation. By 2006, 30 out of 52 ports had introduced voluntary environmentally differentiated port dues.

As mentioned earlier, ports (especially those participating in international container shipping) operate in an increasingly competitive environment. To preserve revenue neutrality, ports have to offset any incentive offered to low-polluting ships by charging higher dues for high-polluting ships (NERA 2005). This creates the risk that high-polluting users will move to competing ports that do not impose such rules. While the port achieves its goal of reducing pollution in the port, it loses business and—from a macro perspective, even worse—does not solve the problem of high-polluting ships but just shifts them to another geographic area.

IV. Discussion

Port officials have stated that their current pricing structures have historic roots and are subject to market developments and, in many cases, reflect a compromise between the differing views of economists, port authorities, governments and users.

The fact that port infrastructure charges have different payers and recipients limits the effectiveness of differentiating them. Port infrastructure charges and cargo handling charges are in general invoiced by two different parties: the former by the port authority and

³ Based on examples from the Port of Ghent, Klaipeda State Seaport Authority, Porto de Sines, Portos do Douro e Leixões, Porto de Lisboa, Porto de Setúbal, Amsterdam Port Authority, Port of Rotterdam, Port of Dordrecht, Moerdijk Port Authority, Zealand Seaports and Port of Sullom Voe.

⁴ For details, see <http://pmep.cce.cornell.edu/profiles/extoxnet/pyrethrins-ziram/tributyltin-ext.html>.

the latter by the service provider (e.g., terminal operator). Based on the assumption that port infrastructure charges are only a small portion of all port costs (Trujillo and Nombela, 1999), the decision to use a port will rather depend on the charging structure and level of the terminal operator whose operation entails the highest cost to the shipping line. Consequently, the success of any differentiation strategy heavily depends on the attractiveness of the terminal operator to a shipping line and shipper and on market captivity.

Price differentiation (in this case, to encourage sound environmental performance) is a means to present and promote service differentiation and to brand the port's services to attain a competitive advantage in an ever more competitive environment. Differentiation of port infrastructure charges as seen from the political perspective is only to a much reduced extent a facilitator of certain developments (such as environmental goals). When it comes to evaluating the potential offered by the differentiation of port charges, successful ports must constantly be prepared to take on new roles in order to cope with the changing market environment (Notteboom and Winkelmanns, 2001).

In the port sector, the effectiveness of strategic differentiation has a certain life span defined by the efficiency of the measure. For example, the differentiation of port dues to attract higher-standard ships using Green Award compliance as the measure of differentiation makes sense during the start-up and expansion phase of such schemes. However, as soon as the scheme comes into maturation the differentiation effects decline and the strategic incentive loses impact. This is, for example, the case with Sullom Voe, where the differentiation is no longer applied because all ships fulfil the differentiation criteria.

V. Conclusion

Today's highly differentiated port charges are a result of their historical development, in which successive attempts have been made to eliminate perceived inequalities in the system.

In a market-driven environment with increasing competition, differentiation of services is a principal part of port strategy in Europe. Differentiation of prices is a way to showcase the port's strategy, as shown by the examples of the Port of Gothenburg and the Port of Valencia.

Differentiation of port infrastructure charges is one of many economic instruments a port can use to secure its market position. But is it wise to artificially introduce differentiation into a market-driven sector to reach certain local, national or even regional policy goals? With the commercialization of ports and port authorities in many countries, ports are no longer State entities and any externally imposed

differentiation would need to be revenue-neutral. Otherwise, such schemes may not be sustainable in the medium and long term if funding is not secured. Moreover, would the creation of funds to finance differentiation to meet a certain policy goal not have to be considered as subsidization? Subsidization does not create fair competition; the current trend is towards eliminating port subsidization.

Differentiation in the port sector has been conclusively proven to deliver certain development goals. This has not received attention in developing countries, and strategic differentiation of port charges to reach environmental goals is, to date, absent in Latin America and the Caribbean. That is why this issue of the FAL bulletin has focused on experiences in Europe.

However, strategies for differentiating port infrastructure charges have been successful in connection with parallel flanking measures. It might even be said that the differentiation of port dues is a flanking measure of wider policy concepts.

In view of this, the concept of strategic differentiation of port infrastructure charges—to provide incentive for more environmentally sound behaviour, reduce emissions or promote technological change—has possible applications for other types of infrastructure and thus could be used as a tool to move towards a greener economy.

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