Chapter 3

A comparative study of selected African ports and Ports within a BRICS-specific Port (Durban, South Africa)

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Abstract

At its simplest, this article addresses issues associated with the economic role and functions of seaports. A seaport may be seen primarily as an interface between sea and land-based modes of transport; it is mostly a firm on its own, created to facilitate trade and economic activity by keeping at minimal level the cost of transport services. Last, as an economic actor, a seaport can induce the economic activity within the city as well as within the region where it is located.

To fulfill its economic role, a seaport must provide marine and cargo-related infrastructure to allow ships to load, discharge, distribute, store and add value to transported cargo. As any other economic actor, a seaport sells its service to the users to whom a price is charged for the benefit of using its infrastructure and/or services. Setting a tariff or fixing the price for the facilities and services provided by a seaport is a complex and challenging exercise. There are principles and rules to be observed if one has to present a tariff for a given port.

A detailed interrogation of the principles and rules to be observed in setting a rational basis for efficient port pricing lies at the heart of this paper. An acceptable port tariff structure is understood in this context to be one that takes into account the actual cost of providing port facilities and service; one that treats equitably the various parties benefiting from such facilities or service; and one that contributes to trade facilitation. The particular context in which the present study is conducted and where this conceptual framework is applied, is the ports of Douala and Matadi in Central Africa.

Keywords: Maritime management, economics, Douala, Matadi, infrastructure development

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Interest on The Port of Douala and Matadi

The focus on these ports is motivated by two reasons: theoretical and practical.

Theoretically, the intention of the research is to understand the basis for any significant difference in the tariff regimes for these two ports, which otherwise present some physical similarity – both ports are found in developing economies, and both ports are upriver ports linked to the sea via an access channel - in the light of sound marine pricing theories. In fact, there exist very few studies conducted and papers written on African ports; it is the intention of this dissertation to make an analytical contribution on the way some African ports are actually facing the new challenges of global trade.

From the practical stand point, in the wake of the construction of a deep-sea port at Banana in DRC, there is a pressing need to reform the port sector in the DRC as it has also become imperative to restructure all the public enterprises in that country; this study may be a contribution to present efforts aiming at transforming Congolese ports into modern economic entities. In this context, the port policies, management type and tariff structure associated with the port of Douala may in some respects be presented as a model to be followed in the DRC, while some of the overarching dimensions of port governance and port pricing in South Africa and other BRICS countries may also be advanced as a possible benchmark for the Central African ports in question.

1. Seaport Basics

This section deals with fundamentals regarding seaports: definition, functions, types and status of a seaport; in the last part, general principles and practice of port pricing are discussed. Even if Douala and Matadi are ports located on the bank of fresh water rivers, they still qualify to be called seaports in the sense that they handle ocean-going vessels engaged in mainstream seaborne trade.

In general terms, a seaport is a place where people and merchandise can leave or enter a country by sea. According to Haralambides and Veenstra [1], there is nothing that can be rightly qualified as port and there is nowhere to find two or more identical ports: a protected patch of sea on which a fisherman stands to cast his nets, a single jetty alongside which a vessel moors to load or offload cargo and a huge industrial complex connecting the sea to railway lines and roads can all rightfully be described as a port.

For the purpose of this paper, a port is an interface between land and sea transport; it is also an important element of the supply chain. In order to better understand the reality described by the word port or seaport in economic terms, it is appropriate to look at what are the functions fulfilled by seaports.

1.1. The Economic Functions of a Seaport

To allow a seamless transfer of goods and people from one mode of transport to the other, a seaport requires a piece of land, marine infrastructure, cargo-handling equipment and labour. In an attempt to establish the real economic function of a seaport, port economists have also helped clarify the role played by seaports in today world. They have identified three economic functions for seaports [2] [3]:

1. A seaport is a provider of increments to producers' and consumers' surplus;
2. A seaport is a generator of employment in its locality;
3. A seaport is a firm like any other aiming at minimizing costs and maximizing profits.

In simple words, the primary function of a port is to facilitate the transfer of goods and people from the sea-based mode of transport to the shore and vice versa. If a seaport efficiently fulfills this role, producers of goods exported will benefit from the income derived from the sale of their goods; likewise, consumers of goods imported will have their needs satisfied. As rightly put by Goss, "a measure of the economic efficiency of a port is the aggregate cost of passing cargo through it". In other words, the basic function of a seaport is to minimize the generalized costs of transport and promote trade. An expensive port induces high costs for goods transiting through it and therefore it contributes to diminishing producers' and consumers' surplus. The high costs can be quantified in terms of time, money and risk.

The second function of a seaport is to energize economic activities in its immediate and wider port hinterland via the provision of employment for people living in its locality and around it. This employment can be directly linked to the port activity itself (cargo handling, service to ship, cargo storage, cargo packing, etc.) or to the activity of producers' and consumers' benefitting from the vicinity of the port installations.

The last function of a port is to minimize the aggregate cost of transport and to maximize profit as a self-standing firm. As such, a port offers a service to its customers and is expected to optimize the profit for the benefit of its owners.

1.2 Typology of Seaports

Seaports are classified following two perspectives: a static perspective and a dynamic perspective. The static perspective categorizes ports according to the nature of cargo handled, depth of water, port ownership and the relationship between the port and its catchment. The dynamic perspective takes into account the evolution of the port-related activities and the behavior of port users over time.

From the static perspective, following types of ports can be found: industrial port, common-user bulk port, liner ports, transshipment or hub ports and main ports. [4]

An industrial port is one that is bulk commodity oriented, generally owned by private interests and located close to the source of the product to be transported. It enjoys deep-water draught and handles big volume of cargo. It is generally an extension of mining industries.

A common-user bulk port is also a commodity-oriented gateway but serves for the handling of one or many bulk commodities as well as general cargo; it is generally managed by a port authority or by a partnership between public and private sectors. Like the industrial port, it also enjoys water depth and handles big volume of cargo; it is located close to sites where the commodity transported is extracted or produced.

A liner port has a more diversified traffic base and multiple quays and terminals. It is a general cargo port, necessitating substantial cargo-handling and cargo-storing facilities. It may be owned by public powers or by private interests or by both; it is strongly linked to the local host economy; such a port is generally labor-intensive operation.

A transshipment or hub port is an extension of the seaborne activity in the sense that the main focus is placed on container operations; this is in opposition to the industrial port, which can be considered as the extension of land-based activity. A transshipment port is more related to major carriers rather than to the host economy; it is usually located at crossroads of major trade routes and serves as a focal point for 'hub and spoke' liner operations.

A main port has a diversity of bulk and liner activities. It offers advanced cargo-handling and cargo-storing facilities; it can play the role of a hub, as it is linked to the economy of cities and localities surrounding it via an integral logistic support. It enjoys deep-water draught and can be managed by a strong port authority, supported by a mix of public private partnerships in terminals and other facilities management. As it stands, the main port is in competition with other ports of the region for the hinterland cargo.

For the dynamic perspective, following types of ports are listed: port city, port area, port region and port network. This approach of port classification was devised by the United Nations Conference on trade and Development Report [5], and further elaborated by van Klink. In fact, this typology is history oriented; it provides a picture of how most ports of the world have evolved over the time.

According to van Klink [6], the port city is the heart of trade and small-sized industry. The flow of international trade is very limited and concerns only general cargo (food and energy commodities). It is a shallow port, placed under the supervision of a port authority whose main task is to provide nautical services. The UNCTAD report 1992, with its concept of port generation, locates this type of ports on the period before 1950.

The port area functions as an industrial complex, with an increased international trade of raw materials. The port is surrounded by industries, which are

the prime users of its services. The port authority provides capital-intensive equipment for cargo handling, as well as port grounds and infrastructure. This is the second generation of ports, situated by the UNCTAD afore-mentioned report during the period between 1950 and 1980.

The port region is a commercial and industrial center, further characterized by an increased cargo unitization and by the container revolution. The port operates in a wider and more diffuse hinterland in which it must compete with other ports for the cargo; as the latter is transported in containers, port ancillary activities such as consolidation and distribution of goods are located farther from the quays. It offers an integrated system of data collection and procession. The main task of the port authority is marketing: in a context of increased competition with other ports of the region, the survival of the port depends on the quality of services it may offer to its customers. This is the third generation of ports from 1980.

The port network is the fourth generation of seaports since 2000. It is an advanced and dominant main port in a borderless and globalized economy, supported by technology innovation, the logistic integration, the removal of trade barriers, the individualization of demand and the rise of information technology. The port network faces demand from society in terms of environmental issues and greater concern of quality of life. Within a network port, physically separated terminals form a network and are linked through common operators or through a common administration. Port-related activities relocate from the port, under the influence of attraction and repulsion forces (push and pull factors): congestion, environment issues, labor practices, low property costs, quality of life and market access.

1.3 Management of Seaports

After discussing different types of seaports on previous section, it is important at this stage to look at how seaports are managed. We will consider the management type of a common-user port, not that of an industrial port.

Microeconomic theory and commonsense dictate that there should be some sort of public involvement in the management of seaports. Goss has identified 5 reasons has to why the Public powers should be involved in seaports management [7]: Property rights; Planning needs; Provision of public goods; Externalities; Economic efficiency.

Given the specific nature of a seaport to be dealing with land-based and sea-based modes of transport, the question of who has legal title to "areas of water, the vertical column beneath it, the seabed or anything beneath it" arises. The solution can only come from the existence of a body, instituted by legislation and bestowed with property rights on the land and sea areas devoted to port activity, to build port structure.

The second reason for having a port authority is the need to plan the construction of port infrastructure, the road or rail access to port premises by cargo

and port-users and mostly the planning at national level, of transport corridors and regional development requirements.

Since port structure requires massive investments, unlikely to be provided sufficiently and satisfactorily by private interests, it follows that seaports present a strong case of a public good and therefore to be provided by the public power. The main characteristics of public goods is that there may be used jointly and in a non-rivalrous way by many consumers at the same time; there is no way to exclude from consumption those who refuse to pay. Seaports present these characteristics and should therefore be provided by a public body.

Dealing with side effects resulting from the seaport activities - that is, economic externalities – also establishes a reason to institute a port authority. Positive or negative externalities of the port's activities (e.g. congestion, safety, security of goods and people), must be dealt with a body vested with enough powers in this respect.

Last, the port authority is rendered necessary by the need to regulate potential monopolist behavior for some port-users. In a monopolistic situation, there exists an inefficient allocation of resources, with the result that the monopolist maximizes his profits to the expense of the consumers. A port authority is required to protect the interests of all port users. However, where authorities find themselves operating as monopolistic actors, the need arises to create a port regulator as a body to oversee the practices of the port authority itself.

The question at this stage is not of whether a port authority is necessary – preceding paragraphs have clearly exposed arguments as to the importance of a port authority – but under what format such a body should exist.

A port authority can be controlled at three different levels of public governance: at local or municipal level, at provincial or regional level or at national level. In reality, there are no watertight categories of control exercised on port authority as there is a great diversity within and across countries.

A local or municipal port authority is controlled by local decision-makers body such as a city council; the main decision regarding port investment, capacity development or planning are articulated with the basic needs of the local community.

A provincial or regional port authority is controlled by the decision-maker of the province or state concerned.

A national port authority is controlled at the national government level, which exercises a strong control over the transport system: roads, rails, pipelines and airports. This category of port authority presents the advantage of ensuring a better planning of transport infrastructure nationwide and prevents from the risks of overcapacity or duplication of investment.

Besides the nature of control exercised on port authority, it is important to look at the functions of port authorities. According to the main tasks fulfilled by a port

authority, the latter may be a landlord, a tool port or an operating port.

A landlord port authority is responsible for the provision of port infrastructure only. A tool port authority provides the port infrastructure and superstructure. An operating or comprehensive port authority also provides cargo-handling services, on top of the provision of infrastructure and superstructure. In reality, there exist hybrid arrangements, where public and private sectors work in partnership for the supply of port services.

1.4 Port Pricing

Port pricing is the mechanism through which port managers determine the price for the selling of their services. This price is commonly reflected in a set of port tariffs or tariff "book". To understand this mechanism, we will discuss the general principles for port pricing as they exist in the literature; thereafter, we will look at the tariffs themselves in practice.

General Principles

In a paper outlining pricing practices in USA and Canadian ports, Dowd & Fleming [8], have argued that port pricing does not exist as an isolated item; port pricing is "*a major factor in the implementation of a port's strategic plan and an element of the port management concept*" [8]. It interacts and supports two other elements of port management, which are:

- Port's planning, development philosophy, goals and objectives;
- Port's investment criteria and policies.

Put differently, port pricing is the reflection of port's goals and objectives and an expression of its investment policies. This means that for a better understanding of pricing practice at any given port, it is important to look at that port's planning and investment policies. According to this paper, there are three approaches to port pricing: economic, financial and public enterprise approaches.

The economic approach is based on marginal cost. This is the economically efficient approach. The financial approach is used by port aiming mainly at profit maximization; it sets the price at level allowing the recovery of fixed and variable costs. The public enterprise approach "argues for prices to be set to recognize the need for the port to be a means to foster local development and existing local, regional and/or national economic activities". This approach aims at throughput maximization and can call for subsides on certain operations or port function to attract cargo.

On their part, Haralambides & Veenstra [9] explain the importance of port pricing in maritime economics: price can make or break a port; high tariffs will chase potential clients away, while low prices may not allow return on investment. Since a

port is an oligopolistic firm, port pricing is a strategic pricing, in the sense that it is fixed in order to achieve certain objectives: profit maximization, throughput maximization, generation of employment and economic activity, regional development, minimization of ship time in port, promotion of trade.

However, due to the globalization process and to the trade liberalization, the value and the volume of goods exchanged have drastically increased and the demand for port capacity has also accrued; this has brought competition among ports. Therefore, competitive ports will be those pricing their infrastructure and service in a cost-based approach (short-run and long run marginal cost); in the long run, efficiently run ports should allow for cost recovery. For ports facing little competition or those serving local industry as an important center of regional development, the need to recover infrastructure development costs is not stressed out; these ports are simply considered as public goods, generating major economic activity in the area (trade, employment).

Cost-relatedness and full cost recovery are easier said than done. A port is a multi-product firm and prices for many of its services are often bundled in port dues. It is therefore difficult to apportion such costs to port services. The difficulty is aggravated by the inability to measure port costs, especially the marginal cost: absence of reliable statistics, diverging accounting systems, lack of transparency on financial flows between the port and its institutional owner.

Haralambides and Veenstra consider that the consistent application of marginal cost pricing in ports could eliminate deficit and the need for public funding; this could lead to an efficient allocation of scarce resources and achieve a level playing field for competing ports. They demonstrate this by presenting a detailed analysis on port excess capacity, short and long run marginal costs, increased returns to scale, costs recovery through marginal cost pricing, before concluding that today, measuring long-run average or marginal cost is equal to forecasting a port throughput. Further, they explain that there is no need to endorse marginal cost pricing if the rest of the infrastructure (roads, railways) does not follow; efficient port pricing cannot be seen in isolation, but only through a general equilibrium approach.

In substance, Haralambides and Veenstra argue that "*cost recovery and pricing of port services are complex and controversial issues, both technically and conceptually*"; they are at cross-roads of development and provision of infrastructure, economic development, public investment, fiscal policy, role of the State in the economic activity [10].

The last study worth considering when discussing general principles on port pricing is that of Khalid Bichou in his extensive analysis of Port operations, planning and logistics.

Bichou [11] indicates that there are three approaches to port pricing: cost-based pricing, congestion pricing and strategic pricing.

The cost-pricing approach sets port tariff based on marginal or average costs;

Ramsey pricing and multi-part tariff is also a variant of the cost-based pricing.

Congestion pricing consists in levying a congestion surcharge to reduce port congestion.

Strategic pricing is based on the premise that pricing can be used as a tool to promote port competition; this approach involves a certain degree of price discrimination, for instance by shipping service, by type of traffic or by cargo value.

Port Pricing in Practice

According to Bichou, "ports and terminal operators are hard-pressed to negotiate port dues tariffs charges with shipping Lines and other port customers and users in today's highly competitive and commercial market places, as ports become more aware of the structure and evolution of their cost base, modern approach for tariff setting rely on management accounting data, rather than on traditional pricing by historical accident" [12].

In this context of fierce competition between ports, port tariffs are generally negotiated with major global carriers and service contracts are put in place for this category of port users, by contrast with the general tariff applicable to any user.

When it comes to the structure of port charges, Bichou makes a distinction between user charges and service charges. User charges "*are directly related to the port user or customer and to the nature and objectives of the utilization of a port's infrastructure*".

On the other hand, "*services charges refer to the charges relative to the use of different port resources, facilities and services*". Channel and port dues payable by a calling ship may be regarded as user charges, while pilotage and towage charges can be classified as services charges.

As an illustration of port pricing in practice, Bichou gives an example of Salalah Container Terminal Tariffs 2008, where a single charge named consolidated marine charge is levied per ship length overall on any vessel calling at the container terminal. This consolidated charge is deemed to include pilotage, tug, berthing and unberthing charges, port dues and daily sanitary charge.

In the course material of Applied Port Economics [4], Professor Jones asks two fundamental questions:

- What are the principal facilities and services a modern port provides for its users?
- What are the costs associated with these facilities and services?

In response to the first question, we note that a modern port provides a marine infrastructure and marine services to its users; the marine infrastructure consists of approach channels, water depth, breakwaters, turning basins, quay walls, berths an

sometimes locks. The marine services are pilotage, towage and mooring.

The costs associated with these facilities and services are listed hereafter:

- Port dues: charges billed to cover the costs resulting from the provision and use of approach channels, water depth, breakwaters, turning basins, quay walls;
- Berth dues: charges billed to cover to costs resulting from the use of quay walls and berths;
- Pilotage charge: charges associated with the pilot service
- Towage charge: charge associated with use of tugs;
- Mooring charge: charge associated with the mooring/unmooring service.

In other words, Professor Jones states that in practice, port pricing proceeds per specific port function. For instance, port dues are charged in order to finance the marine infrastructure; berth dues are billed as a price for the use of the quay space; wharfage or cargo dues are charged in order to finance the use of cargo-working infrastructure. Other marine charges such as pilotage, towage, are usually non-controversial and are in the hands of private operators [13].

The question on what is the right basis to charge port dues, berth dues and other port charges remains open: what feature of the ship characteristics has to be used as the basis of the charge: the ship gross or net tonnage, draft, volume, time spent at quay?

Here again, the answer lies within the port philosophy and objectives, which can be expressed in terms of efficiency, strategy or equity.

A port authority concerned with cost-relatedness (efficiency) for instance will base the port dues on the vessel draft; the idea behind this is to say that the vessel benefiting from considerable water depth should be paying more. However, a port authority concerned with the strategy to attract larger vessels at his port will not make them pay more, if they have a considerable draft; the cost of an additional vessel passing through port channel with a set water depth is close to zero. Last, a port authority promoting equity through its tariffs will attach an importance to the principle of benefit (those benefiting from facility should pay and not all the users) and to the principle of the ability to pay (a user is charged according to what he is able to pay).

An overview of port pricing general principles and practice has led us to consider that, when evoking this topic, one has to bear in mind that the following items are determinant to port pricing:

- Port nature (industrial, common-user port) ;
- Its ownership (public or private) and its role in a particular national context;
- Its philosophy, objectives and goals;

- The facilities and services that it offers;
- The way in which it associates cost to these facilities and services.

We will keep in mind those principles and practice when perusing Douala and Matadi port tariffs. Mostly, we will try to find out if there is any similarity in the guidelines, layout and contents of these port tariffs

2. Comparison of Tariff Base and Port Charges on the Two Ports

Using the vessel *Stadt Dusserdorf* as a tool to measure the level of port charges in Douala and Matadi, we have noted that overall, calling at Matadi is six times more expensive than calling at Douala. Where the ship owner is expected to pay 6 464 euro as port charges in Douala, in Matadi the charges are estimated at 42 610 euro. Why is it so? Why is the port of Matadi so expensive? Is there a cost element not taken into account in Douala tariff? Is the difference in the tariff structure due to the nature of strategies and objectives set by respective port authorities? What are these strategies and objectives?

In an attempt to respond to these questions, we have identified hereafter the components of ports charges that present remarkable differences:

- ✓ Pilot charges: 1 180 euro in Douala, as opposed to 5 652 euro in Matadi (Matadi is 4 times more expensive than Douala);
- ✓ Harbor dues: 291 euro in Douala against 2 763 euro in Matadi (Matadi is 9 times more expensive than Douala);
- ✓ Channel dues: 2 402 euro in Douala as opposed to 36 778 euro in Matadi (Matadi is 15 times more expensive than Douala)
- ✓ Towage charges: 1 087 euro in Douala against zero charge in Matadi.

Other moderate differences concern mooring, security and cargo dues.

2.1 Difference on Pilot Charges

Pilot service costs four times more in Matadi than in Douala. In Douala, pilot charge is based on the ship's cubic capacity and is made of two components: pilot charge for day or night time and pilot bonus. This is straight forward. In Matadi, pilot service is based on ship gross tonnage and has four cost elements: basic pilot charge, pilot charge per number of days spent on board the ship, pilot charge for embarking and disembarking the pilot and the unofficial pilot bonus.

In Douala, the pilot boards the vessel from the entrance of the channel and guides the ship captain until the ship berths. The channel is 50 km long and can be covered in few hours. However, the distance between the mouth of Congo River and Matadi is 133 km; with the heavy current downstream, a ship may require many hours

to reach the port of Matadi under pilot supervision.

The tariff base used in Douala and Matadi is another parameter that may explain the difference on the level of charge paid: a rate per ship's cubic capacity in Douala as opposed to a lump sum in Matadi. The apparent reason to fix the lump sum on pilot charge at the level it is in Matadi is to collect more payments from the callers, in order to optimize CVM (La Congolaise des Voies Maritimes) revenue. In basing the pilot charge on the ship's cubic capacity, the PAD (Port Autonome de Douala) seems to be aware of the principles of efficiency and equity: pilot charge paid by ship owner varies with the physical characteristics of the ship; bigger vessels will pay more pilotage charges than smaller ones. Moreover, a night time, weekend or public holiday pilot service attracts a 50% additional surcharge; this makes a lot of sense as working outside normal hours (08h00 to 16h30), on weekend or during public holiday requires additional remuneration for the staff involved in most labor legislations. The lump sum charge levied by CVM in Matadi for pilot service ignores the necessity to take into account the size of the ship and the time of the day when a pilot service is required. Port user ends up paying more in Matadi than in Douala in terms of pilot service.

2.2 Difference on Harbour Dues

Harbor dues are nine times more expensive in Matadi than in Douala. Both port tariffs use the ship gross tonnage as the basis for the calculation of the harbor dues. The rate per unit is the reason for this difference: 0.29 euro per gross tonnage in Matadi against 0.030 euro per gross tonnage in Douala. Harbor dues are collected by port authorities to finance the port infrastructure that serves to accommodate the ship during her call: approach channel, water depth, turning basins. In the case of Matadi, harbor dues also cater for the use of berth during discharging and loading operations. Berth dues were previously levied per ship gross tonnage (not per ship LOA and per day of berth occupancy) according to Onatra tariff; they have since been cancelled from the tariff during the 2010 revision. In Douala, harbor and berth dues are two separate items of the port charges; put together, they cost 777 euro to *Stadt Dusseldorf* in respect of the port call in Douala, whereas the harbour dues paid in Matadi represent 2 763 euro. As for the pilot charges, the objective of collecting the maximum revenue from the callers seems to be the main drive for CVM tariff. This clearly contrasts with the absence of investments in recent years to maintain or upgrade the marine infrastructure.

2.3 Difference on Channel Dues

PAD tariff levies a charge especially dedicated to finance the dredging of 50km long channel leading to the port of Douala. The tariff basis is the ship's volume; frequent callers of more than 50 000 cubic meters qualify for an annual rebate. CVM tariff, on the other hand, levies a general tax destined to cover dredging costs and beaconing fees. This general tax is based on ship gross tonnage and provides no rebate

to frequent callers. A reduced tariff applies for ships at anchorage for bunkering or for loading or discharging crude oil and for ships loading or discharging cargo, the tonnage of which is equivalent to not more than one quarter of her GRT (Gross Registered Tonnage).

For the vessel under consideration, the channel dues are 15 times more expensive in Matadi than in Douala. For a vessel operator, this charge is the most important item of port charges in Matadi. Dredging and maintaining water depth on the 133 km leading to the port of Matadi is indeed a very challenging and resource consuming task.

However, it would make more sense to base this charge on ship's characteristic such as her draught or cubic capacity instead of calculating it on the basis on her gross tonnage. A ship draught is one of the determinants of her cubic capacity; the two other being her LOA (Length Overall) and her beam. The gross tonnage is the "internal measurement of ship's open space" [14]. The internal and open space in a ship has no direct relationship with the use of water depth; it therefore makes no sense to base channel or beaconing dues on ship's gross tonnage. Further, it would even be better if dredging and beaconing costs were known and the channel dues level directly related to these costs.

As things stand, the rationale for setting the general tax in Matadi at its actual level is to collect as much funds as possible from ship owners; however, in spite of collecting so much general tax from ship owners, there is no clear plan for maintenance dredging on the Congo River [15]. Moreover, CVM has no dredger of its own and always struggles to find funds necessary to pay contractors engaged in Congo River dredging activities [16]. On the other hand, PAD collect so little channel dues per caller, but has been able to buy and operate a dredger of a capacity 630 cubic meters; it has even signed a five-year contract with Jan de Nul for maintenance and deepening dredging.

2.4 Difference on Towage Charges

Despite a heavy current downstream on the Congo River, vessels dock and undock without towage assistance. The ship's captain maneuvers under the supervision of the port pilot. This may be seen as a cost-saving from the ship owner view. In the port of Douala, towage service is offered and is based on ship's gross tonnage and per hour. Towage is a compulsory service in this port; all container ships of over 180 m LOA and not equipped with a bow thruster must be escorted by 2 tugs. Towage service offered during night time, weekend and public holiday is 50% more expensive than the one offered during normal week hours. A tug line is also to be hired each time a ship is being towed.

In Douala, the towage service is performed by a private operator named Boluda. This activity has been privatized in December 2003 in application of a public-private partnership agreement, for a period of 10 years. Provision of towage service is

subjected to VAT charge of 19.25%. Boluda is also offering mooring service.

2.5 Difference on Mooring Charges

Mooring is one of the services for which the port of Matadi is less expensive than the port of Douala: 116 euro in Matadi against 249 euro in Douala for the ship under examination. Here this service is offered by the private operator, Boluda as part of a PPP agreement. In Matadi, mooring is offered by seamen operating under the umbrella of Congolese Seamen Club, Pool des Marins Congolais. The latter was created in 1993 by a Government decree as a specialized service within The National Agency for Employment, which reports to the Ministry of Labour and Social Security, to take care of seamen's welfare and protect their interests.

In Matadi, all vessels, irrespective of their nature and size, are billed a lump sum of 77 euro for attaching and securing them against the wharves, plus another 39 euro for detaching them. There is no reference to cost incurred to provide this service during day or night time, on weekend or during public holiday. In Douala, mooring charges are levied on the basis of ship gross tonnage. Service rendered during night time, weekend and public holiday attracts an increase of 50% on top of the charge billed during normal hours. As for the tug service, mooring attracts VAT in Douala.

2.6 Difference on Ship Security Charges

The security of the ship while on port premises is also part of port tariff. In Douala, the security of the ship is provided by PAD and is billed as a lump sum per day, irrespective of ship nature and size. In Matadi, the security of the ship is provided by the Seaman's club. This organization posts as many watchmen as required and bills a lump sum of 8 euro per watchman per day. For the sake of illustration on vessel under study, we have considered a gang of eight watchmen working for two days in two shifts. This service is also cheaper in Matadi than in Douala: *Stadt Dusseldorf* ends up paying 64 euro in Matadi and 152 euro in Douala.

2.7 Difference on Cargo Dues

Cargo dues are normally designed to finance cargo-working infrastructure such as road and rail access, landfill, cargo aprons. Cargo owners are the ones benefiting from the cargo-working infrastructure and therefore, should be the one paying these dues. In Matadi, a ship owner pays no cargo dues on merchandise discharged or loaded. This charge is directly billed to merchants by SCTP (Société Commerciale des Transports et des Ports). In Douala, this is not the case. The port authority includes on its bill of port charges to ship owners a charge on cargo discharged or loaded. This charge is based on cargo weight, not on cargo value. For a vessel discharging 2 500 tons and loading 2 000 tons of cargoes, the charge payable is

617 euro.

3. Conclusion

Section 2 has put an emphasis on differences noted when comparing the price of marine infrastructure and harbor services in the ports of Douala and Matadi. The extent of the difference is such that we are given to believe that none of the parties responsible for the determination of tariff levels takes into account the principles of efficiency, cost-relatedness, transparency and competitiveness. In our view, PAD and CVM are two public organisms, controlled at national level and tasked by the Public Powers to manage the respective ports following the public enterprise approach. As stated on Section 1, the public enterprise approach "argues for prices to be set to recognize the need for the port to be a means to foster local development and existing local, regional and/or national economic activities" [17]. It aims at throughput maximization and can call for subsides on certain operations or port functions to attract cargo. In this regard, port tariffs have intentionally remained low in Douala and have not been modified over the last 20 years in order to attract more calls; the increasing cost of operating the port infrastructure and harbour services is not transferred to port-users. Likewise, in Matadi, the huge revenue collected as general taxes is used as a means to cross-subsidize other port functions such as berth dues, cargo dues and real estate, which should be generating revenue on their own merit. In both ports, the income generated by port activity is regarded as tax or duty, therefore part of public treasury. When necessary, Government officials may draw funds from the port to fulfill other general expenditure needs, or provide subsidies to the port if and when the need arises. Although PAD is an autonomous public enterprise, expected to operate as a private firm, it cannot affect its annual profit to capital investment in port infrastructure without the authorization from the National Port Authority or the National Government. This is clearly stipulation on Decree N° 99/130 of 1999 creating the PAD [18]. Where marine infrastructure and harbor services are priced without consideration of the costs incurred to deliver such a service or where port are subsidized, it becomes difficult to fix the right price and to effectively contribute to reducing the generalized costs of transport.

Decision makers at PAD, CVM and at all other African ports are reminded that it is necessary to respect the principles of efficiency, cost-relatedness, transparency and competitiveness when devising port tariffs. If they fail to do so, they impose additional burden of ship and cargo owners, thus contributing to increase levels of poverty across Africa.

3 A Benchmark for Douala and Matadi Port: Transnet National Port Authority Proposal (Tnpa)

The exercise of comparing port tariffs in Douala and Matadi has put in evidence noticeable difference on the level of charges levied for marine infrastructure

and harbour services. There seems to be no clarity and transparency as to rules and principles, policies and strategies justifying the actual level of these charges. This is the case in Cameroon and DRC, but this is also the case in South Africa. In South Africa, the ports system has a long history setting prices below costs for all of the port functions [19]. In spite of efforts to reform port tariff in 2002, TNPA has failed to provide adequate ground to the Port Regulator for the increase of port tariffs over the last few years. This situation has prompted TNPA to devise a proposal on pricing strategy, which takes into account the national policies related to transport and port matters and sets clear principles for a new port tariff.

The TNPA Proposal is discussed in the present section and is proposed as a benchmark that can be used for the ports of Douala and Matadi.

The proposal by Transnet National Ports Authority to revise its port tariff, although inspired by the National Commercial Ports Policy, has been triggered directly by a growing pressure and scrutiny from stakeholders, and from the Ports Regulator in particular, to revise its pricing strategy. It is vital to note that the Ports Regulator is an independent body established by Section 29 of the National Ports Act 2005; its main function is threefold [20]:

- Exercise economic regulation of the ports system in line with Government strategic objectives;
- Promote equity of access to ports and to facilities and services provided in ports;
- Monitor the activities of TNPA to ensure that it performs its functions in accordance with the National Ports Act 2005.

The weaknesses of the present tariff structure are identified and listed in the TNPA Proposal in these exact terms [21]:

- Lack of a clear set of principles and rules to be applied in determining the individual tariffs for the various services and facilities;
- Lack of clarity and transparency regarding all operating costs, expenses and revenues incurred or generated from a specific service or facility, as well as the value of the capital stock related to such services or facilities;
- Lack of explanation for differential tariffs for different commodities using the same handling classification;
- Lack of information detail with respect to services or facilities pricing and cost relationships, making it impossible to determine where and in which direction subsidisation takes place or if it does not;
- Lack of information on how the tariff structure promotes access to ports and efficient and effective management and operation of ports;
- High transportation costs in South Africa that negatively impact the country's

trade competitiveness;

- Increased regulatory pressure for TNPA to fully comply with legislation, including demonstration of transparency and fairness of tariffs and equal treatment of all customers;
- Regulatory pressure on price increase applications by TNPA:

– In 2011/12, TNPA requested a price increase of 11.91% but received a 4.49% increase;

– In 2012/13, TNPA requested a price increase of 18.06% but received a 2.76% increase.

•Increased competition from capital investment in regional ports such as Maputo and Walvis Bay.

To remedy these weaknesses and to enable stakeholders to have a comprehensive understanding of its tariffs, TNPA has embraced four core principles as the foundation for the proposed pricing strategy. These principles are:

- ✓ *Cost recovery*: port prices to be set at levels allowing recovery of the costs of providing infrastructure or services;
- ✓ *User pays*: each port user to support the cost of providing the facility or service he uses;
- ✓ *Required revenue*: tariff level for marine infrastructure and service should contribute to cover the operating costs, depreciation, taxation and generate a margin for TNPA. Since South African ports are self-funded, the margin expected must be proportional to the risk of owning, managing, controlling and administering ports and of providing facilities and services [22].
- ✓ *Competitiveness*: consider market expectation in setting tariff to allow competition among port users and competition with foreign ports.

Full details provided in the Proposal regarding the methodology used to determine the overall revenue requirement supported by the tariff will not be considered here; this study will concern itself only with dimensions that concern the marine infrastructure and the provision of marine services. Other admittedly important parts of the proposal dealing with cargo dues for cargo owners and the rental of the port real estate for terminal operators are not considered here either. TNPA proposed tariff structure is based on the following allocation of assets:

- Wet infrastructure (fairways, turning basin and seawalls) and marine service (towage, pilotage, mooring): the cost of maintaining the wet infrastructure and of providing marine services is charged to shipping lines via the port dues and respective charge; it is to be noted that the cost of maintenance as opposed to the cost of ownership the basic marine infrastructure is the only charge proposed to be for the account of ship owners. This is a major departure from previous practice in South Africa and is at odds with most

other Authorities' practices.

- Common infrastructure (channel, breakwaters, roads, bridges, etc): the cost of owning and maintaining the common infrastructure is recovered via the cargo dues and billed to cargo owners. This is also another radical change.
- Quay walls and land: the cost of owning and maintaining quay walls and the land is recovered from the tenants via the rental or concession charge.

In conclusion, it is not our intention to recommend that relevant Authorities in Cameroon and DRC adopt the tariff structure proposed by TNPA as it is. Instead, our point is to say that port users in Douala, Matadi and South Africa are facing the same kind of problems when it comes to port tariffs: there are no clear principles and rules in place in determining individual tariff, no clarity on costs involved to provide service and facilities, high cost of transport, inefficient provision of port facilities and services, etc.

South Africa provides a benchmark in respect on the institutional context and legal frameworks put in place to address this situation.

In terms of institutional context, South African Government has designed reconstruction and development plans and programmes addressing the socio-economic needs of the country through global and specific policies. These policies give priority to employment, growth, infrastructure development and trade facilitation. On the specific matters relating to ports, the policies formulated affirm in unequivocal terms that these are strategic nodes for trade facilitation and should be efficiently managed to become competitive with the ports of the world.

The principles envisioned by these policies are given effect through the National Ports Act, which establishes the Ports Authority and provides mechanics for the control of its activities and the way its sets port tariffs: this is the legal framework.

In the case on Cameroon, the existence of two presidential decrees creating respectively the National Port Authority and the PAD have been noted; these decrees are said to be made in accordance with the Constitution and the National Ports Act. However, there is no independent mechanism in place to control the activities of the Port Authority or the PAD in so far as the pricing strategy is concerned. The principles of port efficiency, cost reduction, promotion of competition among port-users are well stated in these decrees and remain on paper. There is no entity to guarantee their application on the daily management of ports activities. For example, the PAD tariff provides that a vessel of 17 700 GRT or 50 000 CBM qualifies for a discount on channel dues depending on the frequency of her calls. For the last three years, PAD refuses to grant this discount to shipping lines and there is no mechanism at the disposal of port users, such as the port regulator, to force PAD to respect its own tariff. Another example concerns the number of tugs used. When a vessel qualifies to use two tugs, she is billed for two tugs even if in reality she only used one; there is no recourse for the vessel operator.

In the case of DRC, the institutional context and the legal framework are not

contributing to ensure efficient management of transport and shipping activities; the focus is on the efforts to reform public enterprises and the necessity to attract direct foreign investment. If the Government does not articulate clear policies on transport and port sectors, the effectiveness of the current reforms, on the national economy in general and on port users in particular, will be mitigated. For instance, the committee piloting the reform of public enterprises has proposed to maintain the existing dual structure of SCTP and CVM as public bodies in charge of Congolese ports affairs; SCTP will remain an assets management company leasing its assets to private interests, while CVM will enter in PPP agreement with potential investors for the maintenance of the channel. Why not starting by formulating clear global policies and specific policies in respect of national transport system and the ports system? Why not establishing a National Port Authority of the like of TNPA? A few years ago, the port of Matadi was the main gateway for the export of the Congolese mineral production sourced from the Katanga province. Today, Congolese mineral production is exported via the ports of Dar Es Salaam, Beira, Durban, Walvis Bay and very soon Lobito; these ports also serve for imports bound to eastern and southern parts of DRC. The port of Pointe Noire is expanding its facilities and reviewing its accessibility, in order to gain a direct access to the city of Kinshasa via a railway to be renovated between Pointe Noire and Brazzaville and via a bridge on the Congo River. If there is no planning and defining of policies at national level regarding transport and port sectors, hence the contemplated reforms may be vain. If planning and definition of policies are not properly translated into correct port tariffs, the port of Matadi will continue to be managed in the way it is, heading slowly but surely to its extinction. This extinction will be a direct consequence of falling to compete with other ports of the region. It is in this sense that we recommend the institutional context and legal framework that have given rise to the TNPA proposal for a new tariff structure, as the way to go.

References

[1] H Haralambides & A Veenstra, "Port Pricing" in Costas Grammenos (ed) ***The handbook of Maritime Economics and Business***, Lloyds's of London Press, 2002.

[2] R O Goss, "Economic policies and seaports: 1. The economic functions of seaports", in ***Maritime Policy & Management***, 1990, Volume 17, No 3, p 207-209.

[3] Esra Bennathan & A Walters, **Port pricing and investment policy for developing countries**, Oxford University Press, 1979.

[4] T Jones, ***Port economics***, unpublished course material, 2009.

[5] Patrick Verhoeven, ***A Review of port authority functions: towards a renaissance?,*** on-line edition, 2010.

[6] H A van Klink, "The port network as a new stage in port development: the case of Rotterdam", in **Environment and Planning**, 1998, Volume 30.

[7] R O Goss, "Economic policies and seaports: 3. Are port authorities necessary?", in ***Maritime Policy & Management***, 1990, Volume 17, No 4, p 257-271.

[8] Thomas J Dowd and Douglas K Fleming, "Port Pricing" in ***Maritime Policy & Management***, 1994, Volume 21, No1, page 29 – 35.

[9] Haralambides & Veenstra (2002)

[10] H Haralambides & A Veenstra, ibidem.

[11] Khalid Bichou, **Port operations, Planning & logistics**. Informa, London, 2009.

[12] Khalid Bichou, ibidem.

[13] T Jones, ***Applied Port economics***, unpublished course material, 2009.

[14] Stopford, Martin (2009) *Maritime economics*. 3rd Edition, London, Routledge. Page xxii.

[15] http://www.leclimat.cd/News/Details/Economie/faute-dragage-port-matadi-totalement-congestionne ; the title of this press article dated 11/03/2011 says it all: the port of Matadi is congested due to the absence of dredging on the channel.

[16] http://www.digitalcongo.net/article/82686 ; this press article of 29/03/2012 informs the public on how DRC Government has signed a contract with a Belgian Dredging company named Dreaging for the dredging on the lower part of the Congo River during 23 days. With all the funds collected over the years, CVM should have its own dredgers; sand accumulation on the channel of the Congo River is a permanent phenomenon.

[17] Refer Section 1, footnote 11.

[18] Decree N° 99/130 of 1999, Article 4, Section 2; Article 34.

[19] Jones, Trevor (2002), *Tariff reform article,* May 2002.

[20] *National Ports Act 2005*, Section 30.1.

[21] *TNPA Proposal for a new tariff structure*, pages 9 – 10.

[22] Idem, page 5.