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Effect of Port Tariffs on Ship Traffic Volume of Apapa Seaport in Nigeria (1977-2021)

SANUSI, Abubakar Mohammad

Maritime Science Department, Rivers State University, Port Harcourt, Nigeria

Email: princesanusi1@gmail.com

ABSTRACT

The study examined the effect of port tariffs on ship traffic volume of Apapa Seaport in Nigeria (1977-2021). Data were sourced as secondary data from Nigerian Ports Authority (NPA) annual reports and NPA simplified tariff handbook providing time series data on ship dues, ship traffic volume, vessel gross registered tonnage, pilotage charge and habour dues. Six hypotheses were formulated from the objectives of the study to answer the research questions and provide empirical evidence on the statistical results of the study. The study employed Simple Linear Regression Analysis which evaluated the relationship between independent and dependent variables. The study revealed that user patronage of Apapa port has significant impacts on port tariff of the port industry which were the ship dues, harbor dues and pilotage charges paid to the NPA by ship-owners and/or their agents account to the increasing number of ships regularly visiting the port. In conclusion, the study infers that there is significant relationship between port tariff and user patronage of Apapa port Nigeria. Models were developed which determine the relationships between each of the independent and dependent variables. The study recommended that tariff as an instrument of port pricing which also contributes to overall transport cost therefore, should be carefully and moderately designed and billed to encourage patronage of the port industry. Noting that maritime trade is highly competitive and tariff system of a port is a considerable factor for ship-owner to patronize a local port industry.

Keywords: Port Tariffs, Ship Traffic Volume, Harbour Dues, Pilotage Dues

Introduction

Nigeria seaports are important gateways to the national economy as they facilitate the flow of international and coastal trade and enhance efficient logistics flow across all sectors of the national economic systems. They create the interface where all transportation modes land, air, rail, and pipeline interact at the waterfront/seashore. These forms of transportation join or meet at the node or point where traffic is channeled into the maritime mode of transportation (cargo and passenger traffic) from other modes; and at the same time feeds other modes with traffic verse visa. This made maritime transport unique from other modes of transport (Osis, 2003).

Port tariff system is a federal government policy on port pricing. Port pricing policy is viewed in the context of this work as strategies, policy plan, framework and approaches, adopted and used by the Nigerian ports in determination of the prices which port users must pay for consumption and use of various port services. Put another way, from the standpoint of the port users, these sums paid as charges to operators for the port services used constitute the cost of port utilization. Merman *et al.* (2003). Over the years, the pricing policy adopted by the Nigeria Ports Authority in determining prices of port services produced a multiplicity of charges paid for various port services. Such prices for various port services reflect in the form of ship dues, pilotage rates, harbor dues, wharfage, berthage and mooring dues, towage charges, conservancy dues, light dues, etc. The process of arriving at specific prices for port services as enumerated above has always been through government legislations and order. For example, in Nigeria, the Nigeria Port Authorities (NPA) tariff and rates regulations of 1977, 1987, 1999 and 2004 are major regulations detailing the tariff and rates of major port services as prices which port users must pay.

Nonetheless, it is thought that the fundamental tenet of port pricing is that those who utilize port services must pay a fee for the services they receive and/or the facilities they utilize (Oghojafor *et al.,* 2012; Bamidele & Oludele, 2017). Therefore, it is thought that the most significant factor influencing the profitability of port providers as well as customers is price. Economic theory suggests that when the prices of port services are so high that it cannot adequately guarantee that the port users make profit, such users may withdraw their patronage for such ports. This is because the port users too are in business for profit and any increment induced on the operating costs as a result of high cost of port services may either reduce the profit margin of the port users or be transferred to the imports in the form of elevated costs. This implies that a port's pricing strategy affects the costs incurred by port users and operations, as well as the costs of imported commodities and other goods that pass through the port system and industry. It also affects the rate of inflation in the prices of goods within the local economy.

It suggests that port users can choose to stop using the designated ports, or they can agree to pay exorbitant fees for port services, which would then be reflected in an increase in the cost of imported goods in the local market economy (Olaogbebikan *et al.,* 2014). Given the various port tariff and rates regulations in Nigeria over the years that has culminated to increases in the port prices, charges and dues in Nigeria, examining how shippers, shipowners, and other port users are responding to these modifications in port pricing policies has become crucial; charges and rates in addition to calculating the correlations between shifts in port price and port users' usage. It's critical to comprehend the relationship between changes in port pricing and the demand for port services over time in Nigeria from shippers and ship owners.

Objectives of the Study

The main goal is to ascertain how port tariffs affect the number of people that use Nigeria's Apapa Seaport. The study's particular goals are:

    i.   To determine the effect of ship dues on ship traffic volume of Apapa Port from 1977-2021.

    ii.   To determine the effect of pilotage dues on ship traffic volume of Apapa Port from 1977-2021.

    iii.   To determine the effect of harbor dues on ship traffic volume of Apapa Port from 1977 – 2021.

Research Questions

    i.   Is there any significant effect of ship dues on ship traffic volume of Apapa Port from 1977-2021?

    ii.   Is there any significant effect of pilotage dues on ship traffic volume of Apapa Port from 1977-2021?

    iii.   Is there any significant effect of harbor dues on ship traffic volume of Apapa Port from 1977 – 2021?

Research Hypotheses

    i. H_{o1}: There is no significant effect of ship dues on ship traffic volume of Apapa Port from 1977-2021.

    ii. H_{o2}: There is no significant effect of ship dues on gross registered tonnage of Apapa port from 1977-2021.

    iii. $H_{o3:}$ There is no significant effect of pilotage charge on ship traffic volume of Apapa port from 1977-2021.

LITERATURE REVIEW

This paper reviews a variety of literary sources, including lecture notes, scholarly journals, textbooks, and other pertinent materials that fit the study's objectives and parameters. Therefore, the available literatures related to port pricing policy/tariff and billing system of the Nigerian ports and variables reflecting port users' patronage such as vessel traffic, container cargo tonnage, imports and export cargoes were reviewed on this study.

The paper is organized into three subsections which include; - The theoretical evaluation, Conceptual review deals with the explanations of major concepts and terminologies used in the study and empirical review, presents other research works and results in the related area of the study.

Theoretical Review

Theory of user Patronage

According to Drucker in 1973, patronage suggests that every firm exists only to "Create Customer," based on the premise that port users and customers are as ancient as the port (Ugo&Idongesit, 2021). This further suggests that generating client happiness is the only social and economic reason a business may exist (Ugo&Idongesit, 2021). In every company endeavor, the idea of consumer patronage is really deep. It has both non-financial and financial components. Numerous research studies have been conducted to investigate the various economic theories that determine the amount of client patronage. These consist of the company's capacity, the qualities of its goods and services, the state of the economy, the political system, the social and psychological aspects, the competitive environment, and marketing mix initiatives (Ogwo & Igwe, 2012; Schiffman & Kanuk 2009). Experience shows that it is quite challenging to define and quantify patronage (Ugo & Idongesit, 2021). Measures of client patronage have included attitude, behavior, and actual usage. In 1994, Dick and Basu specifically state that repeat business and a positive attitude were necessary to define patronage (Ugo & Idongesit, 2021). Czepiel & Culmore, highlighted in 1987 that the term "intention to use" refers to a distinct desire to maintain a relationship with a service provider (Ugo & Idongesit, 2021). Surveys are typically collected from current clients to determine their propensity to purchase the same brand, good, or service from the same business in order to measure repurchase retention (Ogbeide & Agbadudu, 2015). Compared to behavioral measurements (actual or repeat patronage), attitudes have an advantage since they can offer a deeper comprehension of the variables connected to the emergence and evolution of patronage. The societal pressure and attitude toward engaging in the behavior in issue influence an individual's intention to behave in a particular way (subjective norm). This implies that attitudes and subjective standards vary depending on the individual and behavioral setting.

Theory of Planned Behaviour (TPB)

The perceived behavioral control (TPB) is a component that is added to the Theory of Reasoned Action (TRA) to influence behavioral intention. The primary components of perceived behavioral control are control beliefs and felt power. Customers' commitment to attitude varies, and how committed they are to an attitude item is a measure of how involved they are with it. (Tafamel & Oshodin, 2015). This dedication might vary from apathy to intense

emotional fervor. Customers' intents, including their wants, expectations, future plans, and even their emotional tie to a product, can all influence a company's commitment (Teas, & Agarwal, 2000; Varki, & Colgate, 2001; Salami, & Ajobo, 2012).

This is in line with Tafamel and Oshodin (2015) the statement that "a satisfied customer is more likely to be willing to buy again, either by making additional purchases or by recommending others to buy." Measures of behavioral patronage or usage in the context of behavioral attitude are based on observable reactions to promotional stimuli, objects, repeat purchases, and the quantity of purchases, usage, and behavior, followed by attitude toward the brand or product. (Schiffman & Kanuk, 2009). Crucially, it ignores the psychological component of favoritism.

Conceptual Review

Port tariff

The government sets rates or fees for the use of ports and port infrastructure; this is known as the port tariff system of port pricing. The United Nations Conference on Trade and Commerce (UNCTAD, 2015) reaffirms that port pricing policies should be able to guarantee the fulfillment of these three main goals, which include the following, from the perspectives of both port authorities (service providers) and users:

    i)   arrange for a fair distribution of benefits,

    ii)   make it easier to compare fees and expenses,

    iii)   help to enhance the efficient use of facilities

To this end, a good port tariff structure must be simple and clear, while also providing opportunities for comparison of prices among ports. The objectives of creating opportunity for re-allocation of benefits implies that a good port pricing policy must achieve the objective of ensuring that the port recovers sufficient revenue to ensure the sustainability of port operations and investments. Facilitation of the comparison between port charges and costs aims at ensuring that prices charged for consumption of port services is a derivative of the cost of services production such that investment cost per unit of service is recoverable from the price per unit of service consumed by port users. This enshrines competitiveness among ports and ensures that utility is maximized from the perspectives of the port users. It is this competitive pricing that promotes the efficient use of port facilities (UNCTAD, 2015). According to Rahul and Jean-Pierre (2015), other objectives which port pricing policy must pursue include the reduction of total costs of logistics and transport, increasing patronage for port services, and optimizing port output and revenue.

Port tariff structure

Studies by TNPA (2013) and Meersman *et al.* (2003) note that the processes, strategies and procedures for arriving at an established port pricing plan and/or changing an existing port pricing plan is complex. This is because the price is viewed as constituted of several other variables such as the cost-of-service production, the profit margin and value added tax for example. Thus, port charges and tariff as prices for the paid by port users must be structured to include these individual sub-components and more, depending on the overall pricing objective of the port authority and/or operator. Nonetheless, it needs to be planned for long-term implementation in order to meet both present and future pricing goals (Chioma, 2011).

The United Nations Conference on Trade (UNCTAD, 2015) defined a number of fundamental methods, tactics, and crucial elements that influence port tariff and price structure determination. UNCTAD (2015) opines that to establish an optimal port tariff structure, ports should:

Make clear how users and port facilities are related: This makes it possible to quickly identify the facilities and services that each class of port users uses, allowing prices to be tailored to meet their needs and providing a well-defined framework for how charges relate to one another and the "who pays" consideration guarantees flexibility and fairness when a pricing structure is adopted (UNCTAD, 2015). Ensure that the challenge of double payment is prevented: Duplicity of port charges and tariff should be eliminated in order to ensure that port users are not made to make double payment for unit's port services consumed.

Adopt price mechanisms as a tool to prevent port congestion: In the views of UNCTAD (2015), port facilities that incurred no cost inputs is recommended to be exempted from charges. However, in situations that port congestion occurs as a result free or low port charges, leading to saturation of traffic flow and subsequent imposition of congestion cost; According to UNCTAD, the introduction of congestion prevention charges could serve as a means of preventing congestion in such circumstances. Simplification of port tariffs: It is imperative that port customers are not bewildered by many, intricate, and contradicting costs. This explains why there is a need and desire for a streamlined tariff system. Achieving simplification can be accomplished by lowering the number of charges or the number of variables in each charge's foundation (UNCTAD, 2015).

Ship Traffic Volume

Daily ship traffic volume statistics and prediction are of great significance to shipping market. Reliable prediction of daily ship traffic volume can instruct shipping company to make sound judgment and decision for operational management (Chioma, 2011). Because of the mobility of ships, it may be difficult to obtain the ship traffic volume automatically and frequently. For a given port, four types of daily ship traffic volume are apparent: Drive in The number of ships that drive in the port between two adjacent zero hours. (For "Drive in" ships, they are not in the port at the first zero hour but drive in later before the second zero hour. Moreover, they are still inside the port at the second zero hour. Drive out - the number of ships that drive out the port between two adjacent zero hours. (For "Drive out" ships, they are in the port at the first zero hour but drive out later before the second zero hour. Moreover, they are

still outside the port at the second zero hour. Always stay inside - the number of ships that always stay inside the port between two adjacent zero hours. Once appeared - the number of ships that once appeared in the port between two adjacent zero hours. "Once appeared" ships include the above three cases of ships. Studies indicate that the hybrid methodology is efficient and superior for ship traffic volume prediction. But for passenger ship traffic volume, since the correlation coefficient plot shows feeble correlation in it, the paper analyzes this statistical characterization.

Ship traffic statistics/volume is a term used to denote the number and/or volume of vessels that called to a port over a period of time, usually one year. The volume and nature of shipowners' and/or ship agents' demand for port services and port patronage are shown by ship/vessel traffic statistics. The number of ships that stop at a port over time essentially determines how much money is recouped in ship dues, such as pilotage, berthing, and mooring fees.

Empirical Review

Effect of Port Tariff on Ship Traffic Volume

Oghojafor *et al.* (2012) investigated the issues plaguing the Nigerian ports' operations prior to the 2006 concession program, and found that the concession has successfully raised the system's performance and satiated port customers' desires for better port services. In order to demonstrate the demand and/or patronage for port services among shippers and ship owners, secondary data on key port performance indicators was employed. The gathered data was analyzed using the content analysis method, and the results show that although port concessions have allowed the ports to increase government revenue, because of the ongoing increases in port fees, dues, and operating expenses in the face of longer cargo dwell and ship turnaround times, port users' demands for better services have not been met. According to the study, in order to maximize port users' utility for using port services, port authorities must enhance port services in order to justify raising port prices (Oghojafor *et al.* (2012).

Emenike *et al.* (2018) conducted a study at the Rivers Seaport in Port Harcourt, Rivers State, Nigeria, to assess vessel traffic and customer patronage. The study used information from primary and secondary sources to evaluate vessel traffic and consumer patronage at the harbor on the river. Tables and the standard deviation were used in a descriptive analysis of the collected data. The study's findings show that berthing space, government policy, pricing, and the effectiveness of cargo handling facilities all have a significant impact on whether or not users choose to use the ports' services. The high expense of using the port and the clearing fees are additional significant issues that drive ship owners and shippers to restrict their use of the port. The study suggested that the government lower and consolidate the different fees and taxes that drive up the cost of using port services.

Methodology

In order to accomplish the goals of the study, this paper covered the techniques and processes used to address the research questions. The technique and approach used to conduct research, including the theoretical presumptions that form the basis of the study and the consequences of these for the method(s) used, is known as research methodology. The investigator utilized a time series methodology to gather data, and then applied statistical analysis and ordinary least square (OLS) regression models to determine the correlation between the port tariff system and pricing policy and patronage of ports in Nigeria as well as the way in which port users have responded to increases in port dues and rates throughout time in Nigeria.

Research Design

Using an ex-post facto research design, historical data and a stand-in for port pricing policy were obtained by collecting time series data on the port rates and charges regimes that prevailed in Nigerian ports from 1977 to 2021.

Sources of Data

All of the data used in this study came from secondary sources. The term "secondary data" refers to information obtained through secondary sources, such the yearly reports and statistics published by the Nigerian Ports Authority, the Central Bank of Nigeria's Statistical Bulletin, journal publications, the websites and databases of relevant maritime organizations, etc.

Method of Data Analysis

A dependent variable (Y) and one or more independent variables (X) or Xs are the subject of a statistical inquiry called regression analysis. The modelled relationship is then used to predict, control, or optimize the value of the dependent variable (Y) (Ugwu, 2003).

Simple Linear Regression Analysis

The relationship between the proxies for port users' patronage of Nigerian ports (ship traffic and vessel gross registered tonnage) and the effects of port dues/charges (ship dues, pilotage charge, harbor dues) will be modeled and the hypotheses tested using the simple regression model approach and OLS estimation. The relationship between the port dues/charges and the shippers demand for port services were examined by using the OLS method.

$$Y_{shiptraffic} = \beta o + \beta_1 X_{shipdue} + \mathcal{E} \tag{1}$$

$$Y_{grt} = \beta o + \beta_1 X_{shipdue} + \mathcal{E} \tag{2}$$

$$Y_{shiptraffic} = \beta o + \beta_1 X_{pilotagecharge} + \varepsilon \qquad\qquad (3)$$

RESULTS

The data collected for the study which comprises of NPA statistical data on ship traffic volume and vessel tonnage of Apapa port from 1977-2021   and the ship dues, pilotage charges and habour dues as specified in NPA simplified tariff 1977, 1987 and 2004 were presented, analysed and test of hypotheses using the statistical tools.

Table 1: Study Variables

Year	Av. Ship Dues ($ in Mil)	Av. Pilotage Charges ($ in Mil)	Av. Habour Dues ($ in Mil)	Av. Ship Traffic Volume
1977-1981	0.39	6.33	0.6942	n.a
1982-1986	0.39	6.33	0.6942	n.a
1987-1991	0.78	27.44	0.6942	2344
1997-1999	0.78	27.44	1.6583	3123
2000-2004	0.78	27.44	774.14	3569
2005-2009	280.8	71.28	774.14	4126
2010-2014	280.8	71.28	774.14	5130
2015-2021	280.8	71.28	774.14	4422

Table 2: The Study Variables

Year Variables	1977-1981	1982-1986	1987-1991	1992-1996	1997-1999	2000-2004	2005-2009	2010-2014	2015-2021
Av. Ship Dues	0.39	0.39	0.78	0.78	0.78	0.78	280.8	280.8	280.8
Av. Pilotage Charges	6.33	6.33	27.44	27.44	27.44	27.44	71.28	71.28	71.28
Av. Habour Dues	0.6942	0.6942	0.6942	1.6583	1.6583	774.14	774.14	774.14	774.14
Av. Ship Traffic Volume	n.a	n.a	2344	3113	3123	3569	4126	5130	4422
Av. Vessel Tonnage	n.a	n.a	77166622	81389036	32911941	55162705	88305368	125814815	100997264

Source: SPSS 22 output (2025)

The descriptive data for Apapa port, Nigeria, from 1977 to 2021, about the correlation between average ship dues and average ship traffic, is presented in Table 4.2a. We can infer from the data that the port's typical ship traffic during the review period was 2613.1429 with Standard. Deviation of 1980.16804 whereas the mean ship dues is $80.6743 per ship with 136.71200 Std. Deviation. The mean number informs that on average a total of 2613 ships visited the port annually from 1977-2021 signifying the patronage of ship-owners to the port while standard deviation of 1980.16804 explains the rate or intervals at which the ships visiting to the port varies annually. On the other hand, the mean annual ship dues is given $80.6743 per ship visit to the port which could vary with the standard deviation of $136.71200 from 1977-2021.

Table 3: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
	B	Std. Error	Beta	T	Sig.	Lower Bound	Upper Bound
1 (Constant)	1799.905	698.147		2.578	.050	5.261	3594.549
av_ship_dues	10.081	4.651	.696	2.167	.082	-1.876	22.037

a. Dependent Variable: av_ship_traffic

Source: SPSS 22 output (2025)

Table 3 displays the descriptive data for the average ship dues and average vessel tonnage of Apapa port Nigeria from 1977-2021. From the table we can deduce that the mean vessel tonnage of the port within the periods under review is 44194493.0000 tons with Std. Deviation of 1980.16804 tons whereas the mean ship dues is $80.6743/ship/ton with 136.71200 Std. Deviation. The mean vessel tonnage informs that a total ship tonnage of 2613.1429 visited the port annually from 1977-2021 signifying the patronage of ship-owners to the port while standard deviation of 1980.16804 explains the dispersion at which these tonnages varies annually. On the other hand, the mean annual ship dues is given as $80.6743 per ship per ton visit to the port which could vary with the standard deviation of $136.71200 from 1977-2021.

Table 4: Model Summary

Model	R	R square	Adjusted Square	RStd. Error of the estimate
1	.885	.784	.740	24728370.01137

a.   Predictors: (Constant), av_ship_dues

Source: SPSS 22 output (2025)

The relationship's strength, or the degree to which the independent variable influences the dependent variable and the variable's importance in the model, is displayed in the coefficient table 3. This outcome contributes to the explanation of the study's testing of the hypothesis. The p value in the table is 0.008, which indicates that at the 95% significant level, the p value is less than 0.05. This suggests that the dependent variable (vessel tonnage) of Apapa port, Nigeria, is significantly impacted by the independent variable (ship dues). As a result, we accept the alternative and reject the research hypothesis, according to which there is a statistically significant correlation between ship dues and the gross registered tonnage of the Apapa port between 1977 and 2021.

Discussion

Effect of Port Tariff on Ship Traffic Volume

The average ship traffic indicates how frequently ship owners use the port and how much they pay the port authorities for their vessels throughout the periods under examination. This study shows that there is positive correlation at 69.6 per cent between average ship dues and average ship traffic implying that increase in port patronage by ships will increase the earning of the port industry and vice versa. The table indicates that there is no significant correlation between average ship dues and average ship traffic, as indicated by the P-value of 0.82, which indicates the level of importance of the independent variable over the dependent variable. We thus accept the research hypothesis since the analysis finds no statistically significant relationship between average ship dues and average ship traffic.

The study also establishes the model relationship between average ship traffic and average ship dues by stating the equation of the model using the coefficient of regression lines given in Ship dues = 1799.905 + 10.081$X_{shiptraffic.}$ The model informs that within the periods of study that the average ship dues of Apapa was approximately $1800 and every one unit increase in ship traffic volume would only provide additional $10 increase in average ship dues of Apapa port. The study infers that this increase is not statistically significant. The model informs that within the periods of study the average pilotage charge of Apapa was approximately $420 and a unit increase in ship traffic volume would provide additional $65 increase in average pilotage charge of Apapa port. The study infers that this increase is statistically significant.

The effect of average habour dues on average ship traffic volume. The average ship traffic represents the patronage of ship-owners using the port and the habour dues paid to the port authority within the periods under review. This study shows that there is positive correlation at 78.5 per cent between average habour dues and average ship traffic, implying that increase in port patronage by ships increased the average habour dues. Nonetheless, the table's P-value, which indicates the degree of significance of the independent variable over the dependent variable, was 0. 036, indicating a substantial correlation between average ship traffic and average harbor dues. We accept the alternative and reject the research hypothesis since the analysis finds a statistically significant relationship between average harbor dues and average ship traffic volume. The study also establishes the relationship between average ship traffic and average habour dues by stating the model equation using the coefficient of regression lines given in table 4.6c. habour dues = 1363 + 3.763$X_{shiptraffic.}$

The model informs that within the periods of study that the average habour due of Apapa was approximately $1363 and any unit increase in ship traffic volume would provide additional $3.763 increase in average habour dues of Apapa port. The study infers that this increase is statistically significant.

Conclusion

The study looked into how port user spending at Nigeria's Apapa Seaport affected port tariffs. The study measured the tariffs systems in pilotage services, ship dues, and habours dues in relation to ship traffic volume and ship tonnage for the periods between 1977 and 2021. In general, the study reveals the

significance of port user patronage on tariff earning of Apapa port Nigeria. The associations between each dependent variable and each independent variable were depicted in models that were built. The study informs that user patronage of Apapa port has significant impacts on port tariff earning of the port industry. Increases in ship dues, harbor dues, and pilotage fees paid by ship owners and/or their agents between 1977 and 2021 led to a rise in the number of potential ship owners and shippers who frequented the port, boosting their use of port services.

Recommendations

The following recommendations for this study are based on the literature review, the analysis's findings, and the study's conclusions.

1. From the various literatures reviewed, tariff is an essential means of economic earning of the port industry which transformed port authority the national economic growth and development saver time, therefore, needs to be encouraged, collected and remitted appropriately into the national purse through the port authority.

2. Tariff as an instrument of port pricing which also contributes to overall transport cost should be carefully and moderately designed and bill to encourage patronage of the port industry. Noting that maritime trade is highly competitive and tariff system of a port is a considerable factor for ship owner to patronize a local port industry.

3. The government and port authority should enable development and competitive pricing policy to attract more traffics and tonnages to the port industry for earning through tariff charges.

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APPENDIX

DATA PRESENTATION

Year	Av. Ship Dues ($ in Mil)	Av. Pilotage Charges ($ in Mil)	Av. Habour Dues ($ in Mil)	Av. Ship Traffic Volume	Av. Vessel Tonnage (ton)
1977-1981	0.39	6.33	0.6942	n.a	n.a
1982-1986	0.39	6.33	0.6942	n.a	n.a
1987-1991	0.78	27.44	0.6942	2344	7166622
1997-1999	0.78	27.44	1.6583	3123	32911941
2000-2004	0.78	27.44	774.14	3569	55162705
2005-2009	280.8	71.28	774.14	4126	88305368
2010-2014	280.8	71.28	774.14	5130	125814815
2015-2021	280.8	71.28	774.14	4422	100997264

 Table 1a: Study Variables

Source: Computed by Researcher from various materials; NPA simplified tariff 1977, 1987 and 2004 and NPA statistical data (see appendix tables a, b, c, d, e, and f)

Table 1b: Variable computation

Year / Trade types	19977-1981	1982-1986	1987-1991	1992-1996	1997-1999	2000-2004	2005-2009	2010-2014	2015-2021
Foreign (GRT)	0.39	0.39	0.78	0.78	0.78	0.78	460.8	460.8	460.8
TWA (GRT)	0.39	0.39	0.78	0.78	0.78	0.78	223.2	223.2	223.2
Coastal (GRT)	0.39	0.39	0.78	0.78	0.78	0.78	158.4	158.4	158.4
Average Ship Dues	0.39	0.39	0.78	0.78	0.78	0.78	280.8	280.8	280.8
Ship traffic (Average/yr)	n.a	n.a	2344	3113	3123	3569	4126	5130	4422
Total GRT of ships handled	n.a	n.a	77166622	81389036	32911941	55162705	88305368	125814815	100997264
Average Habour Dues	0.6942	0.6942	0.6942	1.6583	1.6583	774.14	774.14	774.14	774.14

Table 1g: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.696[a]	.484	.381	107.53943

a. Predictors: (Constant), av_ship_traffic

Table 2b: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	54317.378	1	54317.378	4.697	.082[b]
	Residual	57823.648	5	11564.730		
	Total	112141.027	6			

a. Dependent Variable: av_ship_dues

b. Predictors: (Constant), av_ship_traffic

Table 1h: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-44.887	70.773		-.634	.554	-226.813	137.040
	av_ship_traffic	.048	.022	.696	2.167	.082	-.009	.105

a. Dependent Variable: av_ship_dues