

// A comparative analysis of Kenya's *ad hoc* versus chartered
shipping freight rates for exports and imports of dry general
cargo //

by

Wambui G. Gichuri

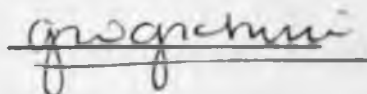
*Research paper submitted to the Department of Economics,
University of Nairobi, for partial fulfilment of the
requirements for the Degree of Master of Arts in Economics*

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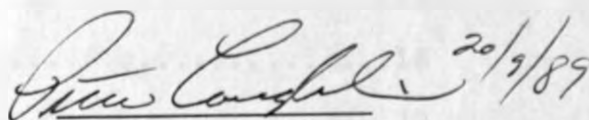
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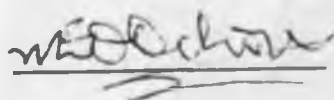


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This research paper has been submitted for examination with our approval as university supervisors.



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Abstract

This study compares freight rates under the current *ad hoc* shipping against freight rates in time-chartering for Kenya's imports and exports of dry-general cargo. The study also tests for the statistical significance of the differences between the mean freight rates for imports and exports in both shipping arrangements.

The study shows that Kenya pays excessively for the ocean-transport of its dry general cargo. The structure under which Kenya ships its cargo is dominated by conferences, monopolistic cartels limiting competition and entry, while keeping freight rates high. Kenya has, however, continued to rely on them due to lack of an alternative.

This study concludes that time-chartering could reduce Kenya's ocean freight bill. Transporting cargo in time-chartered ships saves about 65% of the current ocean freight bill. This study therefore recommends implementation of a well-structured, and well-operated time-charter programme. With institutional support such a programme could help save and earn much needed foreign exchange.

Chapter 1

Introduction

Transport is important in economic development. It is an input in the production process, permitting goods and people to be transferred between and within production and consumption centres. Transport improvements shift production possibility functions. Transport also increases welfare of individuals by extending the range of social facilities available to them (Button 1982:17).

The industrial revolution was successful, partly because of a prior revolution on transport technology. Sodersten(1970:77) even postulates a link between transport and economic growth.

For geographical, economic and historical reasons, most LDCs depend on international trade for their economic growth. In international trade, the most important mode of transport is ocean transport: between 85% and 90% of international transport is by sea (Beth, Harder and Kappel 1984:7).

Kenya's trade also relies heavily on ocean transport as 85% of its trade is conveyed this way. Growth of Kenya's export commodity trade is important for economic growth, as exports earn much of the nation's income. Ocean transport costs are a big part of the c.i.f. price for many export commodities. Freight rates would, therefore, be expected to strongly influence the demand for exports in the import markets.

The problem

Ocean transport influences the flow of trade. The cost of shipping goods affects the sources of imports, whether or not the cost of transport accounts for a large percentage of landed value of goods. The price and quality of shipping services can also affect the industry of developing countries, particularly infant manufacturing industries processing raw materials into manufactured or semi-manufactured exports.

Transport costs are shared between the producer and the consumer, depending on the buyers' elasticity of demand for the exports. If the elasticity is low, the buyer meets most of the transport costs; if high, as for primary commodity exports, then the seller pays most of the transport costs (Lipsey 1976:106).

Elasticity of demand for ocean transport is also important in determining cost-sharing between the producer and the consumer. There are no close substitutes for ocean transport especially for low-value, high-volume cargo transported long distances. LDCs' demand for ocean transport is inelastic, so they pay most of the transport costs (UNCTAD 1987:22). LDCs are also not able to choose among different ocean transporters because of loyalty arrangements with shipping conferences.

LDCs have complained of excessive charges for the ocean transportation of their cargo. Studies by UNCTAD (1987) show that for many primary commodities exported from developing countries, the bulk of ocean transport charges or increases appear to be borne by exporters due to reduced export prices and/or reduced import demand. Evidently, decreases in freight charges are not necessarily passed on to exporters.

Maeti (1985:105) showed that Kenya is charged excessively for the ocean transport of dry general cargo imports, and there is freight discrimination along Kenya's trade routes under the present structure. Maeti estimated the excess costs from 1980 to 1983 as K£65,058,000 in 1980; K£63,262,000 in 1981; K£61,084,000 in 1982; and K£61,214,000 in 1983.

Kenya's ocean freight bill is very high: in 1988, 16% of the total value of imports went into payments of ocean freight (Kenya 1988:50). For LDCs as a group, the ocean freight bill is 10% of the c.i.f. value of imports (Behnam 1988:28).

The government realized the need to reassess its high freight costs and started the Kenya National Shipping Line in 1987. The line is expected to start operating in 1990 in partnership with a German firm, Unimar Sea-transport. The government will control 70% shares; Unimar, 30%.

In Kenya, dry general cargo is shipped in small consignments. This increases freight costs. This study evaluates whether Kenya could lower freight costs by organizing these small consignments into larger volumes and transporting them in full loads in chartered vessels. No study has been done on the viability of chartering ships, though that may be cheaper than the present *ad hoc* shipping.

Objectives

This study compares freight rates under *ad hoc* shipping and various charter arrangements in dry general cargo trade. Three major routes are compared: East Africa/Europe, East Africa/Far East, and East Africa/Indian subcontinent. These are the main sources and destinations for Kenya's dry general cargo. North America is also a major source and destination, but cargoes to and from there are not shipped directly, but transhipped through European ports, e.g., Le Havre and Felixstowe.

The study will:

- examine freight rates under *ad hoc* and chartered shipping:
- estimate the excess costs of using whichever is the more expensive arrangement:
- test for the significance of the difference between the mean freight rates; and
- make recommendations for a better institutional framework.

Justification

What Kenya receives as proceeds from trade is important for national development. High ocean-freight costs on exports lower Kenya's net revenues and make exports more expensive. High freight costs also increase prices of imported inputs, leading to expensive final products and thus discouraging re-exports. Since Kenya pays excessively for ocean transport there is need to explore an alternative (Maeti 1985:105).

Kenya has no policy regarding shipment of goods, incoming or outgoing. Consequently, goods are transported in small consignments by space chartering, after negotiations with brokers. The Kenya National Shipping Agency or parastatals dealing with specific commodities (e.g., Kenya Planters Co-operative Union and the Kenya Tea Development Authority) negotiate for transport of government cargo.

Such un-coordinated shipping leads to different freight rates per tonne, even for similar cargoes coming to Mombasa from the same port or leaving Mombasa for the same ports. Consolidating these small consignments into larger volumes and transporting them in full shiploads may lower freight costs.

The Inter-Governmental Standing Committee on Shipping (ISCOS) represents the interests of shippers from Kenya, Uganda, Tanzania, and Zambia . ISCOS's main function is to negotiate with conferences about freight increases, especially for government cargo. It's bargaining power is, however, limited by political problems among members and lack of a common policy. Since ISCOS is only a monitoring body, Kenya cannot rely on it to find ways of reducing freight costs.

UNCTAD has been encouraging developing countries to develop their shipping industry to be able to control freight rates and to save and earn foreign exchange. UNCTAD's Code of Conduct for Liner Conferences, which entered into force in October 1983, allows each country to transport 40% of its export cargo, 40% to be transported by the trading partner and 20% by a third party (UNCTAD 1986:15). The code allows countries to use chartered vessels.

Among the categories of cargo, only transport of dry general cargo can be reorganized easily. The other two--dry bulk and liquid bulk--are dominated by vertically integrated multinational corporations and are, therefore, difficult to penetrate. By focusing on dry general cargo, the study will be able to provide practical recommendations.

Lastly, ocean transport has received little attention from researchers. After the breakup of the East Africa National Shipping Line, the government concentrated most development in port infrastructure. Until 1987, when the Kenya National Shipping Line was set up (it is still not operating), no efforts had been directed towards ways to reduce freight costs.

Chapter 2

Background of Kenya's Shipping

Kenya is not a big a maritime country compared with countries like Norway and Britain. Major shipping may only be traced to 1896 when the first jetty was built at Kilindini, the present Mombasa port. The main aim was to transport materials for the construction of the railway through Kenya to Uganda. Since then, traffic has continued to continued to grow. The port has deep berths and can handle all kinds of ships. Despite the natural advantages of the port, however, Kenya still relies on foreign shipowners to transport its cargo.

Table 1: Cargo throughput (Deadweight tonnes) 1987 and 1988 (millions)

	1987	1988
Imports		
Dry general cargo	1.73	1.61
Dry bulk cargo	0.41	0.37
Total dry imports	2.13	1.98
P.O.L. in bulk	2.59	2.72
Other bulk liquids	0.15	0.16
Total bulk liquids	2.75	2.89
Total imports	4.88	4.87
Exports		
Dry general cargo	1.23	1.09
Dry bulk cargo	0.42	0.39
Total dry exports	1.66	1.49
P.O.L. in bulk	0.03	0.00
Bunker oils	0.30	0.27
Total bulk oils	0.33	0.27
Other bulk liquids	0.02	0.03
Total bulk liquids	0.36	0.30
Total exports	2.01	1.78
Transshipment	0.03	0.02
Grand total	6.92	6.67

Source: KPA (1989:12)

To handle the cargo shown on the table, the port has:

- 16 deep water berths;
- 2 bulk oil jetties;
- 2 bulk cement berths;
- 1 cased oil jetty;
- 2 lighterage wharves;
- 1 explosives jetty;
- 2 dhow jetties;
- cold storage facilities for landing bulk soda ash, bulk molasses, edible and other bulk liquids; and
- container terminal.

In Kenya, the decision to book space for export cargo is seldom controlled by local shippers. Sales terms of national marketing boards and export associations are mostly f.o.b. (free on board). Freight arrangements are usually left to overseas buyers' local representatives or foreign-controlled exporters.

Imports are also usually left to the foreign suppliers' discretion for freight arrangements. East Africa terms are usually c.i.f. landed. This is so even for governmental equipment tenders where no provisions have been made with specific shipping lines.

Classification of cargo

There are three broad categories of cargo: dry-bulk, dry-general, and bulk-liquid cargo. These categories have given rise to three types of carriers; bulk, general cargo, and liquid-bulk carriers.

Dry-bulk cargo is solid, bulky cargo, e.g., cement, soda ash, and iron ore, loaded in bulk into a vessel. Dry bulk carriers normally carry full shiploads of a single commodity between ports with no intermediate stops. Such vessels are usually chartered by the owners or buyers of the cargo, e.g., Bamburi Portland Cement and other extractive industries.

Bulk liquid is liquid cargo in large quantities requiring special vessels. The main bulk liquids include refined petroleum oils, industrial acids, and liquefied gases. Bulk-liquid vessels carry full loads without making intermediate calls. They are also chartered or carry cargo on an owner-carrier basis, especially for oil companies.

Dry general cargo, the focus of this study, is solid cargo, packaged or unitized to make units that can be stowed in a ship and loaded and discharged as single units e.g., tea chests, coffee bags, canned goods, motor cars, and machinery. A dry-general-cargo vessel loads several types of consignments from different consignors to different consignees and stops at several ports during the voyage. Transport of dry general cargo is mainly by liner ships sailing regularly along given routes to pre-determined ports. Kenya is well connected by regular liner services to various trading zones.

Shipping conferences

Supply of services in the liner sector is dominated by shipping conferences. These are shipping cartels formed by owners serving the same routes. Conference vessels operate over regular routes between the same ports according to the itinerary indicated in the sailing schedule. These connections are maintained with a fixed frequency, independent of the load factor for those vessels (Chrzanowski 1985:28). Shipping conferences appeared over 100 years ago. The first conference--the United Kingdom-Calcutta--was inaugurated in 1875, grouping British shipowners serving the Europe-India trade route.

Conferences strive to eliminate competition among members and to enhance their market power against outsiders. To do this, conferences:

- establish unique freight tariffs;
- set conditions of carriage of cargo;
- fix number of departures for each member line;
- identify areas for operation for member lines; and
- establish a system of rebates for their customers.

They have, however, been criticised for charging high freight rates and imposing surcharges.

Chapter 3

Literature Review

Demand and supply of transport

In the ocean-transport market, the sellers are the shipowners, the buyers are the cargo owners, and the service sold is transport. An important characteristic of transport is that its demand is derived from the demand for cargo. For passenger transport, travellers want to derive some benefit at the destination.

The earliest economic theories of industrial location recognized the key role played by transport services. Provision of good transport allows industries to be separated from their customers and their sources of raw materials. Transport costs are not only instrumental in influencing where firms locate, but are also important in determining the market area served by each firm. Transport costs, given the industry's location, can determine the total quantity of goods sold, their price, and the spatial distribution of output (Button 1982:26).

Button (1982:27) developed a transport model treating transport demand as derived from the demand for the final product and assuming all demand and supply curves to be linear. The model also assumes price depends on demand, not vice versa. Initially, the firm is assumed to produce a homogenous product supplied to a single customer located some distance from the firm.

$$P_s = a_0 + a_1 \cdot Q_s + P_t \quad (i)$$

$$P_d = b_0 - b_1 \cdot Q_d \quad (ii)$$

$$Q_d = Q_s \quad (iii)$$

$$P_s = P_d \quad (iv)$$

where;

P_s = supply price of the commodity;

P_d = demand price of the commodity;

Q_d = quantity demanded;

Q_s = quantity supplied;

P_t = constant transport cost per unit carried to the customer but borne by the shipper.

These equations yield the equilibrium supply Q_e as:

$$Q_e = \frac{b_0 - a_0}{a_1 + b_1} - \frac{P_t}{a_1 + b_1} \quad (v)$$

Equation (v) assumes transport costs exert a negative influence on the quantity and the maximum output firms wish to sell. If $P_t = 0$, equilibrium output rises by:

$$\frac{P_t}{a_1 + b_1}$$

Equilibrium price to be charged to the customer is:

$$P_e = \frac{a_1 b_0 + a_0 b_1}{a_1 + b_1} + \frac{b_1 P_t}{a_1 + b_1} \quad (vi)$$

The transport cost component increases the equilibrium price by:

$$\frac{b_1 P_t}{a_1 + b_1}$$

Factors influencing demand for and supply of transport

An important characteristic of demand for transport is its regular fluctuation over time for all modes. For example, in urban areas, demand for road space and public transport services is higher in the morning than later.

International freight transport, especially shipping, has long demand cycles. This tendency for peaks and troughs reflects fluctuations in the demand for the final products made accessible by transport services. The longer-term fluctuations in demand for shipping services reflect the trading nations' business cycles.

Demand for a commodity (D_a) is generally influenced by its price (P_a), other goods' prices ($P_a, P_1, \dots, P_n$), and the level of income (Y). $D_a = f(P_a, P_1, P_2, \dots, P_n, Y)$. This simple framework holds for transport as for all other goods and services. Price, for example, is not simply the fare paid or haulage fees; it must include all costs for obtaining the transport service.

In many cases, price changes within certain limits have little effect on the quantity of travel or transport services demanded. Demand for cargo shipping, for example, is inelastic partly because of lack of close substitutes for shipping services and partly because demand for the raw materials carried is inelastic. Demand will also be inelastic where freight rates are a small proportion of the final price of cargoes.

Transport is a normal good: more is demanded at higher levels of income and less, at lower levels. Demand for any transport service is also likely to be influenced by actions of competitive and complementary suppliers. In the conference system where competition is restricted, freight rates are usually higher than in tramp shipping. In tramp shipping, there is intense competition and freight rates are lower and fluctuate more than in the conference system.

In economic theory, supply is a positive function of price (Koutsoyiannis 1977:159). The amount of transport offered at any price level will be greatly influenced by the costs. The direct costs borne by the shipowner are financial costs for purchase of fuel, factor services in the market-wages, and interest on capital.

In transport, as in other industries, there are economies of scale from large vehicle size (Table 2). A classic example of this is in ocean shipping since capacity (volume) increases much faster than the surface area. Crew members, for example, do not increase proportionately with vessel size.

Table 2: Economies of scale in bulk carriers

Ship size ('000 dwt)	15	25	41	61	120	200
Index of size	100	167	267	432	793	1318
Capital cost index	100	140	197	291	457	641
Operating cost, (excluding fuel)	100	121	143	155	201	275
Seafaring fuel consumption index	100	155	230	253	578	843
Crew size	31	38	38	38	38	38

Source: Button (1982:80)

Ocean transport costs

Costs are expenditures by producers to generate goods or services. Costs in ocean transport are borne by the ship operator to produce the service for the user. How costs in ocean transport are shared between the shipper and the shipowner depends on the elasticity of demand for the cargo and elasticity of demand for ocean transport.

Economic theory distinguishes short and long-run costs. In the short run, capital and management costs are usually fixed. In the long run, all factors of production are variable. Costs borne by the ship operator are the main determinants of shipping-service tariffs in liner shipping, and charter rates in tramp shipping. This, however, does not mean that pricing of shipping services is exclusively based on costs.

An important criteria for classifying costs is division into fixed or variable costs. Fixed costs-fixed overhead or indirect costs-vary with the size of production. This definition analyses short-term costs because costs vary in the long-run.

Shipping economists distinguish four groups of costs:

- company overheads;
- vessels' operating expenses for maintaining a ship, fixed independently of output e.g., maintenance and repair, crew wages, marine insurance and indemnity insurance, depending on the route taken and the size and type of vessel;
- voyage costs for running the ship under normal operating conditions, including fuel costs in transit and in port, port dues, and agency expenses;

- cargo or direct costs, varying with the quantity and nature of cargo handled (These costs include loading and discharging of cargo. The more cargo a ship loads or discharges, the more it pays in stevedoring charges and for the time it stays in the port. When a ship has committed itself to a voyage, most costs become fixed (Chrzanowski 1985:69).

In defining costs, a distinction is made between total, average, marginal, and opportunity costs. These costs are further defined according to a ship's size, distance travelled, and speed so as to determine factors influencing the cost of transporting one tonne of cargo (Chrzanowski 1985:71).

Marginal cost, a unit increase in total cost when production is increased by one unit, is important in analysing costs. On scheduled services, the marginal cost of transporting one extra tonne of cargo equals the additional handling costs, other elements being equal (Pace 1979:7). However, in tramp shipping, other costs may be involved. The marginal cost of loading or discharging an additional unit of cargo is usually constant if stevedoring charges are fixed. Marginal costs of transporting additional cargo between already scheduled ports is usually low when the ship's space is not fully used (Pace 1979:7).

In liner shipping, the freight rate includes cargo handling costs. Therefore, high productivity at a port reduces a ship's stay and port fees thus reducing freight rates. Port efficiency means simplification of management organizations and customs' procedures, access to inland transportation, improvement in cargo handling, and adequate maintenance of cargo handling gear.

Due to the inefficiency of Mombasa port, turnaround time for ships is longer than for most other ports. At Mombasa the average handling productivity of general cargo is 750 tonnes/ship/day. This is low. Liner shipping operators expect a port to handle 1000 tonnes of general cargo a day (JICA 1984:85). Due to delays, congestion has been a serious problem: vessels wait, on average, three days before berthing.

Mombasa's low port performance has been attributed to:

- low staff morale especially since the abolition of overtime schedules;
- port facilities: although Mombasa has natural advantages, other complementary facilities like proper functioning cranes, railway siding and clear approach for road vehicles are crucial in reducing delays and risk of damage to cargo.
- lack of adequate maintenance of cargo handling equipment.

- inadequate ship-to-shore communication, and inadequate inward and outward pilotage; and
- lengthy documentation procedures and excessive bureaucracy.

Handling is the most important operation in a port, calling for new techniques and the most investment. Handling is important in the cost price of a tonne of cargo delivered to the port. Failures in cargo handling result in congestion, and in port inefficiency.

Congestion increases operating costs which are reflected in the freight rates. The costs imposed by congestion are time costs. Congestion arises due to slow movement of goods, in turn, due to: lack of coordination of related operations; inadequate infrastructure, equipment, and surface transport; and the complexity of documentary and administrative formalities. Due to delays in cargo handling in Mombasa port, a congestion charge of \$78 per 20-ft. container has been imposed, leading to less ship calls.

Determination of freight rates

UNCTAD (1970:16) defines a freight rate as a rate corresponding to a route, cargo, time of shipment, and distance the cargo will be carried. In liner shipping, two systems for freight rates are used: cost-based, and "what the traffic can bear." Cost-based rates cover the carrier's expenses plus a reasonable profit. Competition in liner shipping is, however, limited.

Rates are fixed by agreement of the participants in shipping conferences. Rate making in the conference system implies:

- uniform rates are applied to eliminate competition among members; and
- rates are fixed above marginal costs.

In tramp shipping the classification of freight rates includes:

- voyage charter, the most common form of chartering, believed to price freight rates closest to the actual demand for and supply of tonnage;
- time charter, covering a definite period of time, usually from one month to a year; and
- bareboat or demise charter, which is a variation of the time charter (Chrzanowski 1985:22).

Certain criteria have special importance in setting freight rates e.g., value of the cargo, amount of space that a tonne of commodity will require, handling and stowage characteristics, cost of handling cargo, possibility of obtaining return cargo, competition, insurance, and general economic conditions (Kendall 1986:280).

As common with other modes of transport, conferences give rebates or promotional freight rates for regular cargo from one shipper. Rebates are also given for any commodity that moves in large, regular volumes, but are not for irregular, small consignments.

Pace (1979:11) lists costs of handling cargo at port (loading and discharging), nature of cargo, value of cargo, characteristics of cargo, port dues, balance of cargo movements, competition from other carriers and other modes of transport as major determinants of freight rates.

A regression analysis by Maeti (1985) showed that for Kenya's main trade routes, the main factors determining freight rates were tonnage and value. Distance was found to have insignificant effect on freight rates. Assuming a functional relationship between freight charged and factors determining it, the regression function took the form: $R = f(X_1, X_2, \dots, X_n, Y_1, Y_2, \dots, Y_m)$ where, R is the freight charged, $X_1, X_2, \dots, X_n$ are variable factors, and $Y_1, Y_2, \dots, Y_m$ are qualitative variables. Qualitative variables included physical characteristics of cargo, packaging, stowage, competition, and possibility of getting return cargo. $X_1, X_2, \dots, X_n$, therefore, affect the regression hyperplane throughout its path with $Y_1, Y_2, \dots, Y_m$ affecting only the intercept (Maeti 1985:97).

The implicit functional relationship was:

$$R = g(X_1, X_2, \dots, X_n),$$

where all X_s were variable factors. The study considered three explanatory variables: distance, value and tonnage.

The implicit functional form, therefore, became:

$$R = g(D, T, V)$$

where,

R = freight charged,

D = distance cargo is transported,

T = tonnage of cargo,

V = value of cargo.

The study considered the routes from East Africa to the Far East, Indian subcontinent, Australia and to North America. The regression results are shown in Appendix 1.

The study also analyzed excess costs due to excess charges on the main routes in Kenya's trade. A monopoly power index was obtained for each zone using the formula:

$$MP = \frac{1}{N} \sum_{i=1}^N \frac{F_i - C_i}{F_i}$$

where,

F_i = freight paid for consignment i

C_i = consignment's cost to shipowner

N = number of observations.

Table 3: Monopoly power by zone

zone	monopoly power index
Europe	0.65
Far East	0.68
Indian subcontinent	0.41
North America	0.87
Australia	0.57
All regions	0.66

Source: Maeti (1985:101)

Monopoly power was significant since freight charged exceeded the average cost to the shipowner by more than 50% in most regions (Maeti 1985:101).

The ratio of freight cost to value of imports is 0.12 and monopoly power, 0.66. The product of the ratio of freight cost to value of imports and the monopoly gives 0.08, the excess cost per unit of import. Multiplying 0.08 by the value of imports for the four years yields the excess costs (Table 4).

Table 4: Excess costs incurred on Kenya's imports
Ksh millions

	Total imports	estimated value of seaborne imports	excess freight costs
1980	959	930	1300
1981	932	904	1260
1982	900	873	1220
1983	902	875	1220

Source: Maeti(1985:105)

The excess costs are paid to foreign shipowners in foreign exchange. This has serious impact on Kenya's foreign exchange resources, local prices, and exports that use imported inputs.

Maeti's analysis on factors determining freight rates shows why the freight charged for high-value incoming cargoes is higher than the low-value outgoing cargoes, mainly agricultural commodities. The cargo's value does not seriously affect ship costs. The cargo must, however, be protected from damage and contamination.

The assumption of perfect competition in the pricing of maritime services in an industry as monopolistic as ocean shipping is awkward.

Price discrimination in transport

Price discrimination exists when the same product is sold at different prices to different buyers (Koutsoyiannis 1977:117). The cost of production for such a product is either the same, or may have differences that do not justify different prices. The goods or services being sold are, however, similar. Discrimination requires that:

- The market be divided into sub-markets with different price elasticities.
- The buyers be separated so that no re-selling can occur from a low-price to a high price market. (This shows why price discrimination is easier with a service like transport, which, cannot be resold).

Sellers discriminate to increase total revenues and profits. Price discrimination implies charging customers the most they are willing and able to pay for the service.

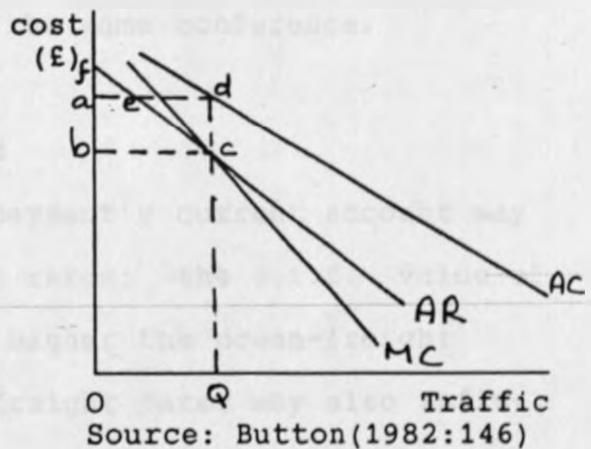
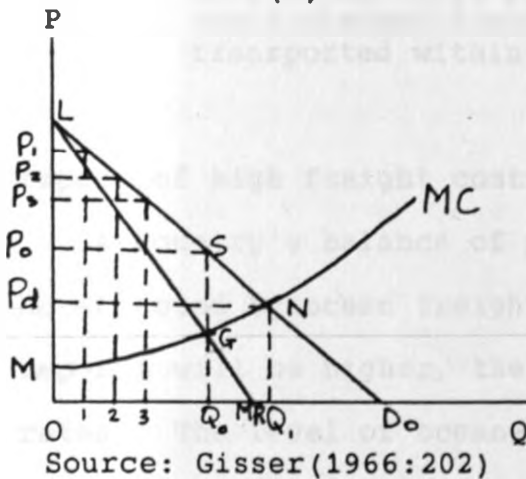
The sellers attempt to ascertain the maximum amount each customer or group of customers would pay for the service.

After purchase, transport services cannot usually be transferred. The suppliers (shipowners) can, therefore, practice price discrimination to increase profits. This implies charging higher freight rates for small consignments and low rates for larger consignments as evident in the Kenyan data (graphs 1-16 and Appendices 5 and 6). Discrimination occurs by charging *different ports, different groups of shippers, or different classes of cargo* different freight rates. For example, in (Figure 1a) they could charge P_1 to the first group of shippers, or class of cargo, P_2 to the second group of shippers or class of cargo and so on until Q_1 is reached (Gisser 1966:202). By providing Q_1 , the producers surplus is the area LMN . In monopoly, total revenue equals OP_0SQ_0 (or equivalently the integral under the marginal revenue curve $OLGQ_0$) and costs, $OMGQ_0$; in discrimination the total revenue equals the integral under the demand curve $OLNQ_1$ and total cost, $OMNQ_1$. Under discrimination the profits have increased by LNG , compared to monopoly.

Shipowners can also increase profits by classifying ports. Different ports or groups of ports may have uniform freight rates charged. Charges may also be differentiated due to different elasticities of demand for the product being shipped.

There are exceptional cases in shipping, where even for monopoly, all costs cannot be recovered by charging a single price to all users. Then, at no level of output would average revenue exceed the average cost (Figure 1b). Here, the shipowners resort to price discrimination, charging different freight rates to different users. Even though the average revenue curve is below the average cost curve at all points, by fixing output at the same level as done for marginal cost pricing though charging different freight rates to different shippers, costs can be covered. Thus total value equals $OfcQ$, while total cost equals $OadQ$. It becomes profitable if $afe > cde$ (Button 1982:147).

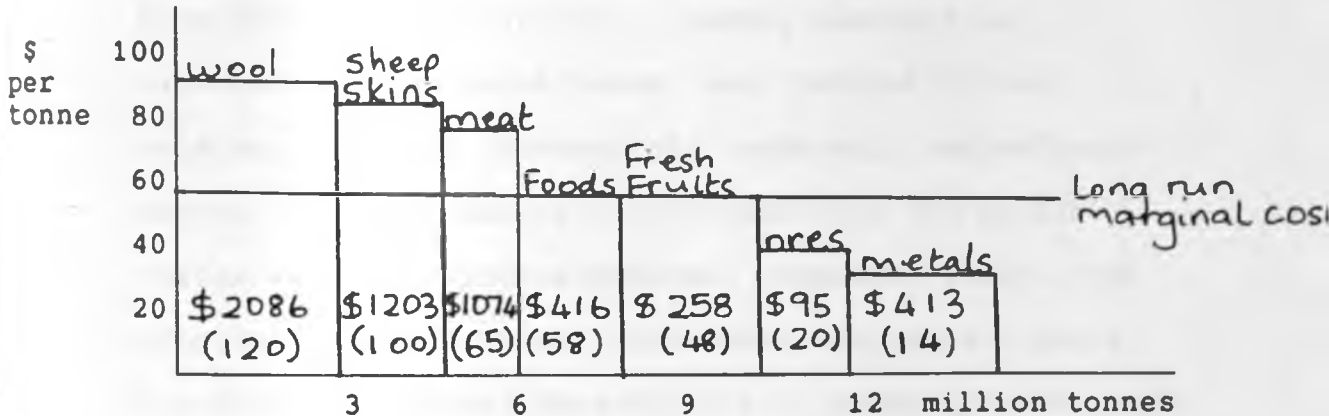
Figure 1: Price discrimination in transport
(a) (b)



Price discrimination is common in ocean transport since shippers have few alternative means of transport. As freight rates increase, the quantity of goods shipped falls little. Price discrimination is popular among shipping conferences which monopolize regular liner services between major ports.

Given the high capital costs for ocean transportation, conferences argue that, without price discrimination, shipping lines could not operate profitably. Their rates are highly discriminatory. Discrimination among different users is based on demand.

Figure 2: Average revenues from cargoes carried by the Australia/Europe Conference 1973/4



Source: Button (1982:148)

Note: The average value per tonne is stated in dollars; the stowage factor in cubic feet per long tonne is in parentheses. The steps show the different freight rates per tonne for cargo transported within the same conference.

Impact of high freight costs

A country's balance of payment's current account may be affected by ocean freight rates: the c.i.f. value of imports will be higher, the higher the ocean-freight rates. The level of ocean-freight rates may also influence the competitiveness of exports particularly those produced from imported raw materials. High freight rates also influence the further processing of semi-manufactured goods for re-export since the freight costs are for both inward and outward voyages.

In a study, "Estimates of effects of ocean freight costs on export demand," UNCTAD (1987) found that, for individual countries' commodities, demand responds substantially to variations in ocean-freight costs. As freight costs increase, commodity prices rise; and importers, choosing from many producers reject those charging higher prices. The changes in import demand from 1975 to 1983 covered 10 sample commodities: bananas, coffee, cocoa beans, tea, natural rubber, bauxite, iron ore, coconut oil, palm oil, and refined copper. Demand changes were studied for the United States and the European Economic Community (EEC). The calculations used three independent variables: price elasticity of import demand; c.i.f. import prices; and ocean freight rates.

The study estimated price elasticities of import demand for the sample commodities. Then, annual percentage changes in import prices due to changes in freight rates were multiplied by the price elasticities. Thus, the estimated percentage changes in imports reflect only the influence of ocean freight costs. Results for some developing countries' commodities are summarized in Appendix 2.

The study concluded:

- For many primary commodities exported by developing countries, LDCs bear most of the ocean transport costs or their increases.

- For many primary-commodity exports, freight costs are a large share of commodity price. Much of the export earnings are absorbed by ocean freight costs.
- Exports from developing countries generally appear to bear higher freight charges and costs than corresponding exports from developed countries.
- Relative levels of freight rates between exports from different origins are important determinants of exports of individual developing countries since importers substitute between competing sources.

The UNCTAD study and conclusions showed the problems faced by LDCs exports due to high freight costs. Though only a few countries and commodities were covered, the results are relevant for others.

Efforts by LDCs towards reducing freight payments

The international trade of many LDCs is imbalanced. Imports often exceed exports by value due to heavy import requirements of manufactured goods and the deteriorating terms of trade against primary product exports. The contribution of ocean-transport receipts in improving the current-account trade balance has encouraged LDCs to set up or expand national shipping fleets, to reduce dependence on foreign shipping companies and, perhaps, lower freight payments.

The New International Maritime Order, first proposed in 1977 in the Ivory Coast, aims in the long run to guarantee significant and equitable participation of LDCs in all shipping operations related to the transport of cargo they generate in international trade. About 80% of the supply of shipping services has, however, remained in developed industrialized countries and the organization and functioning of the world-shipping industry has continued to be shaped by the developed countries' influence (Behnam 1988:2).

Due to the adverse effects of ocean transportation on LDCs, some have invested in vessels to meet their ocean-transport requirements and to lower freight rates. Most LDC's are limited in direct investment by the amount of capital required. Heavy borrowing is necessary to acquire vessels.

Kenya established the Kenya National Shipping Line (KNSL) in 1987. When operational, the shipping line will be responsible for the transport of Kenya's coastal and international seaborne trade. The line aims to start operating in 1990 by slot chartering (a slot is the space occupied by one container) so as to:

- promote Kenya's trade;
- improve balance of payments by earning and saving foreign exchange;
- benefit from development of maritime infrastructure, including human skills;

- promote regional co-operation in maritime activities especially among countries in the Preferential Trade Agreement; and
- give shippers favourable freight rates.

Some developing countries have registered ships they don't actually own-flying "flags of convenience". The five leading nations in registering foreign ships under flags of convenience are: Liberia, Panama, Cyprus, Bahamas, and Bermuda. Shipowners register vessels under foreign flags to evade taxes, take advantage of cheap labour in countries of registration; and avoid government regulations (UNCTAD 1981:8). Owners can conceal their identities and escape the responsibilities and law-enforcement procedures required under normal flags.

Open registries could be beneficial to a country like Kenya due to:

- increased demand for secondary industries in Kenya e.g., ship repair services;
- employment of local crew; and
- earnings through registration fees (Nzavu 1987:17).

Muindi (1987:80) advocates that Kenya should allow open registry as long as foreign vessels comply with standards and regulations. The current merchant shipping act in Kenya limits registration to: a resident owner in Kenya; corporate bodies incorporated under laws of Kenya; and the Government (Laws of Kenya 1967:15).

UNCTAD argues that open registry leads to abuse of maritime laws and those of the flag state because there is no economic link between the vessel and the flag state. Identifying owners and bringing them to courts is thus difficult. Accordingly, the expansion of open-registry fleets has adversely affected the expansion of fleets in LDCs including those not allowing open-registry (UNCTAD 1981:24).

The Code of Conduct for liner conferences entered into force on October 6, 1983. The code permits and provides a right for developing countries to participate in liner shipping. The convention aims to:

- facilitate the orderly expansion of world seaborne trade;
- stimulate the development of regular and efficient liner services adequate to the requirements of the trade concerned; and
- ensure a balance of interests between suppliers and users of liner services (Georgandopoulos 1985:54).

The code regulates rights of admission of national shipping lines to conferences serving their countries' trade. For LDCs the benefits from the code are limited because they do not have the capital needed to acquire ships. Chartered vessels, however, qualify as national carriers and can be used to implement the code.

Formation of shippers' councils has been used by LDCs to redress the adverse impact of maritime patterns. A shippers' council should unite and educate shippers, giving them the necessary bargaining strength to obtain adequate and efficient services at minimum cost.

A newly formed council should resist demands by conferences for freight increases. Shippers' councils also help shipowners, government agencies, and port authorities communicate with shippers. The need for shippers' councils is particularly important for shippers using liner services since liner operators have much bargaining power.

Shippers, unlike shipowners, are widely dispersed and they do not deal primarily with shipping. They, therefore, have less bargaining power than shipowners. To enhance their bargaining power, shipper's councils, therefore, need to be strong and well informed and have the research capability to develop good data about shipping.

Chartering

Charters are contracts guaranteeing a shipper the use of ships for a fee. Agreements may be for voyage, time, or bareboat charters. Under voyage charters, the shippers provide tonnage for the ocean transport of a specified full or partial cargo between predetermined ports within a restricted range of loading and discharging ports. Both parties agree on the amount of money to be paid in a lump sum for the space. Here, the freight is not related to any particular unit of weight or measurement, but to the available cargo carrying capacity for a specific voyage (Ihre, Gordon and Sandevan 1980:1). For time and bareboat chartering, the hire rate is related to the time needed to fulfill the charterer's requirements.

Chartering involves exchange of information. It is a trade where the right information at the right time is necessary for success. Everyone dealing with chartering acts as a collector, judge, and distributor of information. Many LDCs are limited in this by inadequate systems for collecting, storing, and disseminating data.

UNCTAD has suggested that LDCs could better charter rather than purchase vessels if the aim of chartering is to obtain some leverage on freight rates through membership of liner conferences. Time-chartering is crucial for gaining experience in shipping management. Chartering is also useful if raising capital is difficult.

The proper use of charter or contract shipping may be frustrated by inadequate port or marshalling facilities, or by lack of organization needed to produce and market larger consignments. This problem is difficult to overcome because shippers lack the initiative to change traditional patterns of operation. This leads to fragmentation of the total traffic into non-economical consignments. The more a country's trade is fragmented into small consignments shipped in many vessels, the higher the costs.

A country must, therefore, influence its overseas shipping. In LDCs, only governments can do this.

Chapter 4

Hypothesis and Methodology

This study compares freight rates in *ad hoc* shipping and under time charters for Kenya's exports and imports of dry general cargo. The trade zones covered are East Africa/Europe, East Africa/Far East, and East Africa/Indian subcontinent. These zones cover major sources and destinations of Kenya's dry-general cargo.

The hypothesis to be tested, is the null hypothesis that the mean freight rate in *ad hoc* shipping is equal to the freight rate for chartered vessels. This is tested against the alternative hypothesis that the mean freight rate in current shipping is greater than the mean freight rate in chartered shipping. This follows from the theoretical conception that due to restricted competition in current shipping, freight rates would be expected to be higher than in chartered shipping where competition is present. The null hypothesis, therefore, becomes:

$$H_0 : b_{an} = b_{cn}$$

against the alternative hypothesis:

$$H_1 : b_{an} > b_{cn}$$

at the 90%, 95%, and 99% levels of confidence, where;

b_{an} = mean freight rate in *ad hoc* shipping on route n ; and

b_{cn} = mean freight rate of chartered shipping on route n .

The formula to be used is:

$$Z = \frac{b_{an} - b_{cn}}{\sigma(b_{an})}$$

where,

$\sigma(b_{an})$ = the standard error of the current
mean freight rate on route n .

If H_0 is accepted, it means the differences in the mean freight rates were small and could be attributed to chance. If H_0 is rejected, then the difference between the means was significant.

Using the accumulated tonnage and freight rates, a step graph was plotted, showing the different rates of freight paid for the different consignments, starting with the lowest.

Methodology

The import data comes from individual consignments of cargo, carried by dry-general-cargo ships that called on Mombasa from June to December 1988. The data comes from customs entries where shippers declare their consignments. Each custom's entry shows the tonnage in metric tonnes, freight paid in foreign currency, value of cargo, and port of loading.

Export data came from exporters of major commodities: coffee, tea, and pineapples. Data was obtained from Del Monte, KTDA, and the Kenya Planters Co-operative Union (KPCU).

Data on charter rates was obtained from Marship Shipping Company. Marship provided the daily hire rates for different capacity vessels. The charter rates were then modified to include port and ship costs to make them comparable with the *ad hoc* rates. Other major shipping companies; Mitchell Cotts, Mackenzie Maritime, Oceanfreight, and Spanfreight were interviewed, but were unable to provide charter rates.

The period under study is seven months, from June to December 1988. I considered seven months enough because no major changes in local or international shipping patterns took place then. The period is also recent enough to make the observations valid. There were also no freight rate increases for the three zones.

The sample sizes were different for different trade zone because these zones have different volumes of trade with Kenya. Europe has bigger samples than the Indian subcontinent and the Far East. Europe trades more with Kenya and, therefore, had bigger samples for greater accuracy, though sizes were not chosen in strict proportion to the levels of trade with each region.

Sampling technique

Data on *ad hoc* shipping freight rates came from the three trade zones, each comprising a group of countries. The sample sizes for imports for the zones differ since some areas trade more with Kenya than others, e.g., the sample from Europe was larger than for other zones.

Each zone was divided into clusters containing several ports, roughly the same distance from Mombasa. The East Africa/Europe zone was divided into United Kingdom, the northwest Europe, and Mediterranean. The United Kingdom, represented by Felixstowe, has 75 observations. The Mediterranean ports-Naples, Barcelona, Marseilles-50 observations. The northwestern European ports include Antwerp, Rotterdam and Amsterdam with 75 observations, and Hamburg, Bremen, and Bremenhaven with 75 observations. Europe, therefore, has 275 observations.

The East Africa/Far East zone had three clusters: Japan, 50 observations; Singapore, 50 observations; and Shanghai and Hong Kong, 50 observations. The East Africa/Indian subcontinent had one cluster-Bombay and Karachi-with 50 observations. The study, therefore, has 400 observations for imports, obtained by stratified random sampling.

Export freight rates were obtained for the clusters, from three major exporters: Del Monte; KTDA; and KPCU. Del Monte does not export pineapples to the Far East and Indian subcontinent. Del Monte therefore provided data only for Europe. Coffee and tea are exported to all the three zones; Europe, the Far East, and Indian subcontinent. The sample size for Europe is 12. The sample size for the Far East is 6, Indian subcontinent had 2 observations.

It was not possible to obtain export data in as much detail as import data due to refusal by shipping companies to give access to their invoices. The exporters were also too scattered to be reached, so only major exporters were interviewed.

Chapter 5

Data analysis and results

Freight rates for *ad hoc* and charter arrangements

This chapter discusses the study's empirical results comparing the freight rates for *ad hoc* and charter shipping. Results for the tests of significance of the difference between the means of both shipping arrangements, the excess costs of the more expensive shipping arrangement, and recommendations for a better institutional framework.

Table 5: Weighted average freight rates in both shipping arrangements (Ksh per tonne)

	charter		ad hoc	
	imports	exports	imports	exports

Europe				
Mombasa-Felixstowe (n = 75)				
	960	620	5960	1960
Mombasa-Antwerp (n = 75)				
	930	770	4440	1770
Mombasa-Hamburg (n = 75)				
	950	700	3340	1770
Mombasa-Mediterranean ports (n = 50)				
	570	540	2560	1260
Far East				
Mombasa-Japan (n = 50)				
	880	800	2860	1770
Mombasa-Shanghai (n = 50)				
	898	790	4240	1770
Mombasa-Singapore (n = 50)				
	750	580	2230	1770
Indian subcontinent				
Bombay & Karachi (n = 50)				
	650	560	3540	1250

Note: The mean freight rates have been weighted with the tonnages for each consignment in the sample for every port.

Imports: The differences between the charter and *ad hoc* mean freight rates are statistically significant for all ports except Singapore, at the 90%, 95%, and 99% levels of confidence. For the Mediterranean ports, Felixstowe, and Shanghai the *ad hoc* freight rate is more than four times the charter rate. For Hamburg and Japan the *ad hoc* freight rate is more than three times the charter rate. The *ad hoc* freight rate is more than double the charter rate for Singapore.

Exports: The differences between the charter and *ad hoc* mean freight rates are statistically significant for all ports, at the 90%, 95% and 99% levels of confidence. The *ad hoc* freight rates are lower for exports than imports. *Ad hoc* rates are twice the charter rates for Antwerp, Hamburg, Mediterranean ports, Shanghai Singapore and Bombay. The *ad hoc* rates are three times the charter rates for Felixstowe and Japan. For both imports and exports there is latitude to charge less than half the present *ad hoc* freight rate.

The different rates per tonne charged in *ad hoc* shipping and the charter rates are shown in the following graphs, for each zone, separately for imports and exports. In each graph, the difference between the two curves shows the excess costs of *ad hoc* shipping. The variations in *ad hoc* freight rates show the *ad hoc* manner by which these rates are set. Shipowners set rates by "what the traffic can bear" rather than according to cost.

These large variations are not due to changes in the shilling's value in convertible currency. The shilling has been relatively stable compared to the variations in the freight rates per tonne. Between June and December 1988, the exchange-rate fluctuated 6.5% against the Japanese yen, 5.9% against the dollar, and 5.9% against the sterling pound. Freight rates, however, varied more than 300% for all ports.

Excess costs

For both shipping arrangements, costs were obtained by multiplying the mean freight rate per tonne times the volume of cargo for each route for exports and imports (Appendices 3 and 4). The excess costs for imports were: Ksh 4,901.73 million for 1987; Ksh 4,572.18 million for 1988. The excess costs for exports were: Ksh 1,586.54 for 1987; Ksh 1,055.57 for 1988. This study covers six months, but the same patterns of freight charging were assumed for the rest of the year hence savings were projected on full year basis.

Figure 3 : Savings of charter over ad hoc shipping for imports from Felixstowe

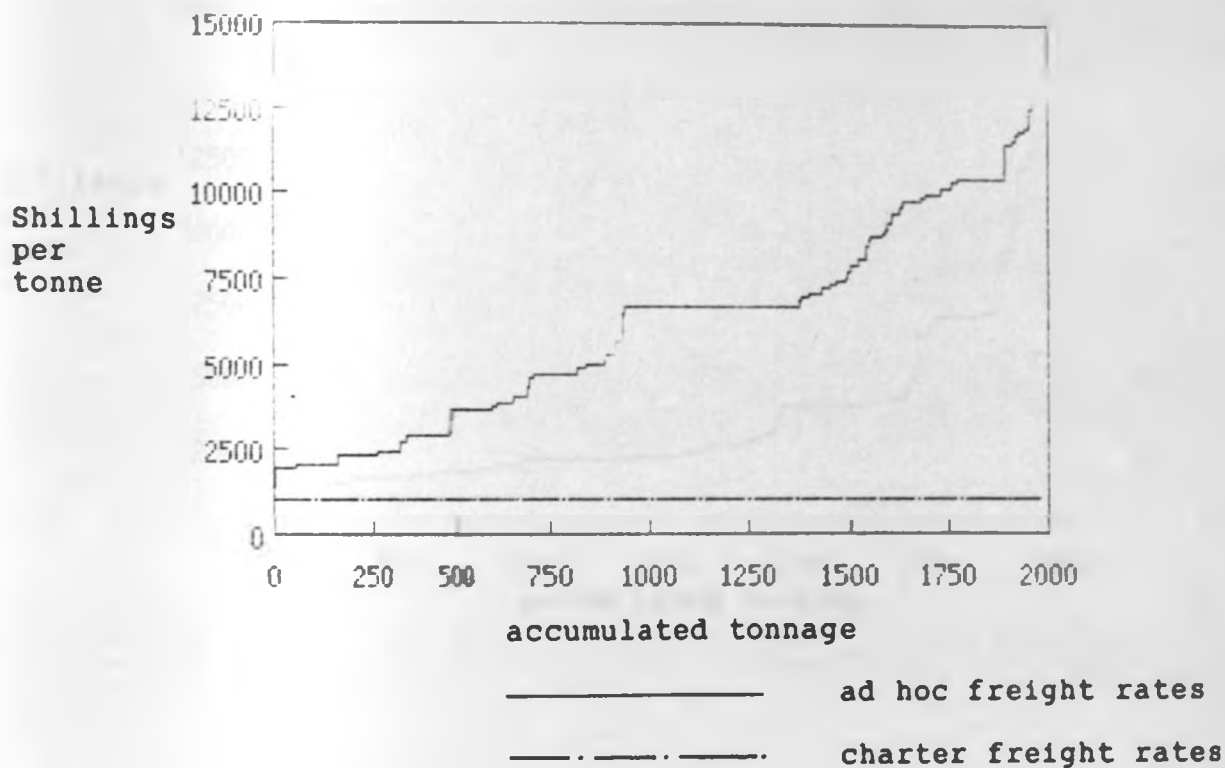


Figure 4 : Savings of charter over ad hoc shipping for imports from Antwerp

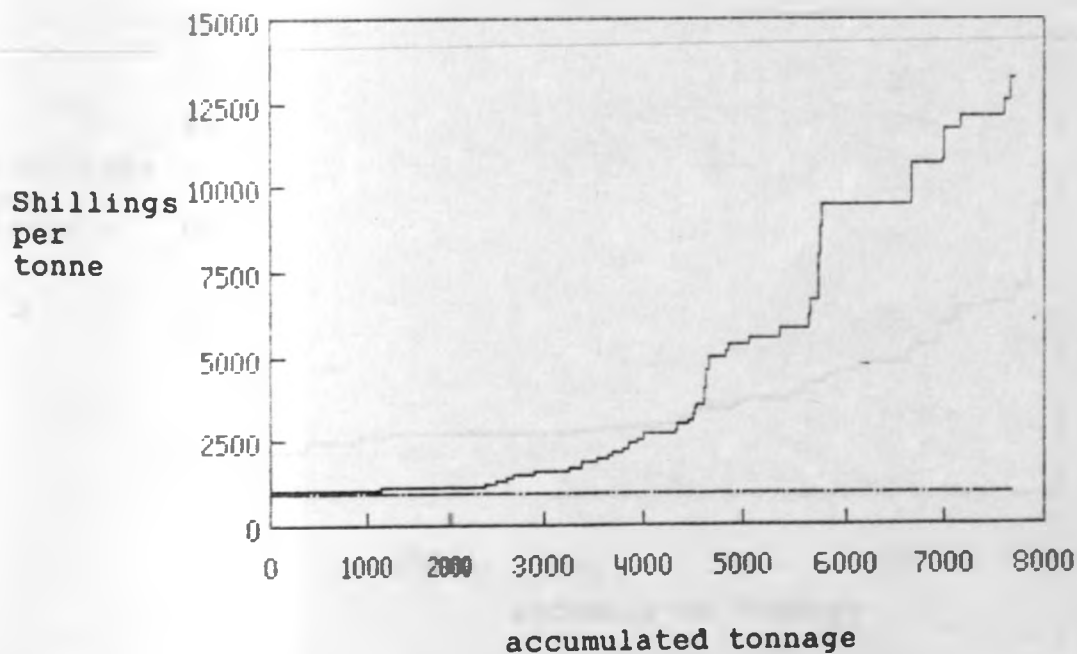


Figure 5 : Savings of charter over ad hoc shipping for imports from Hamburg

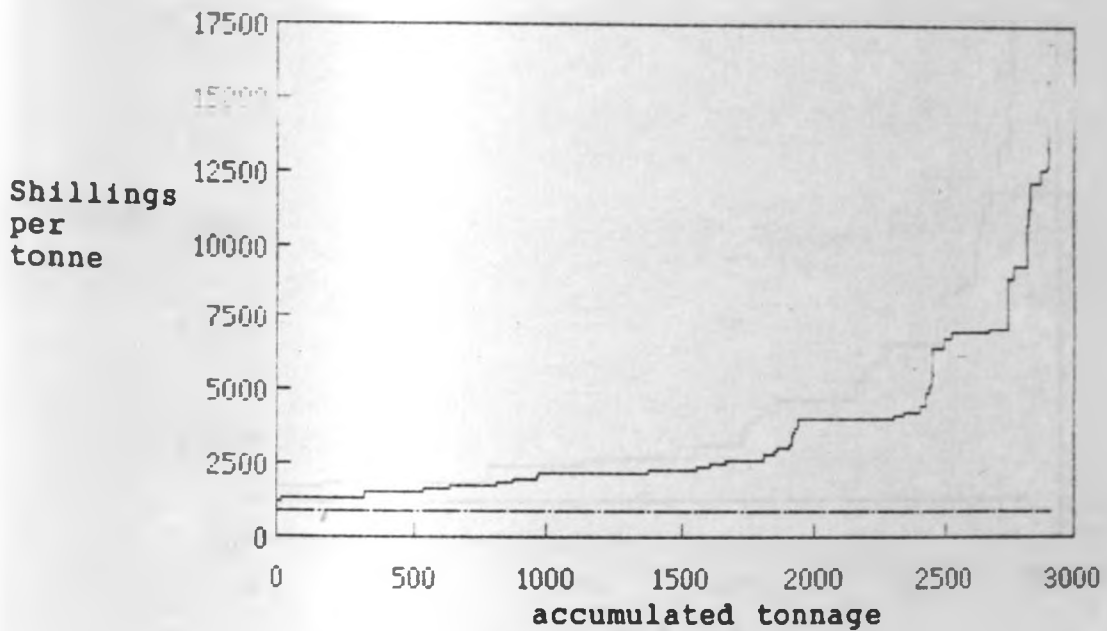


Figure 6 : Savings of charter over ad hoc shipping for imports from Mediterranean ports

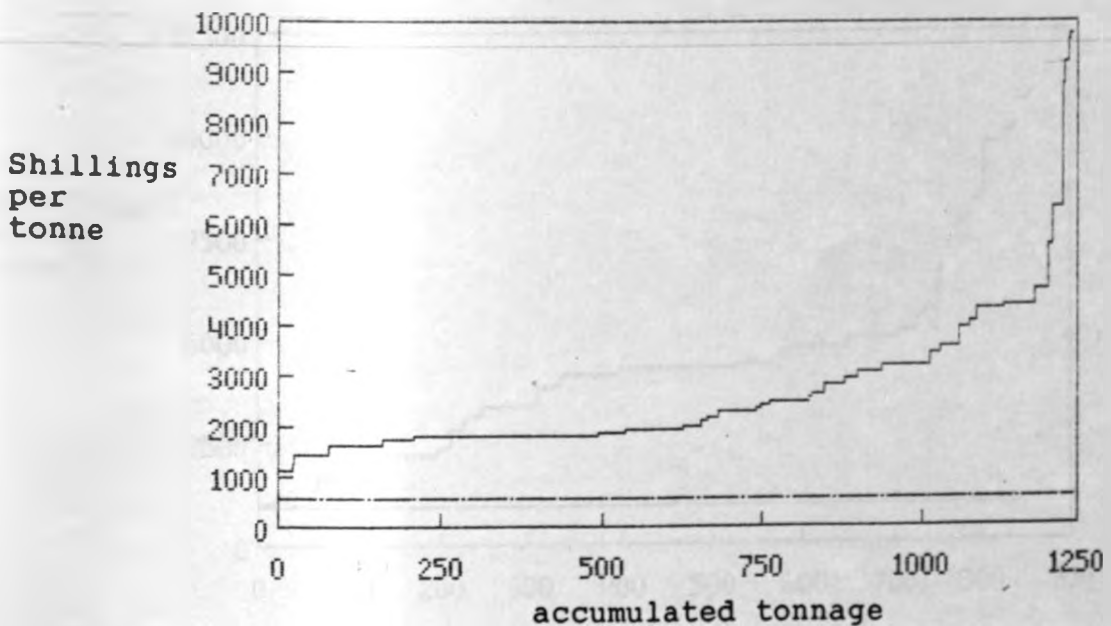


Figure 7 : Savings of charter over ad hoc shipping for imports from Japan

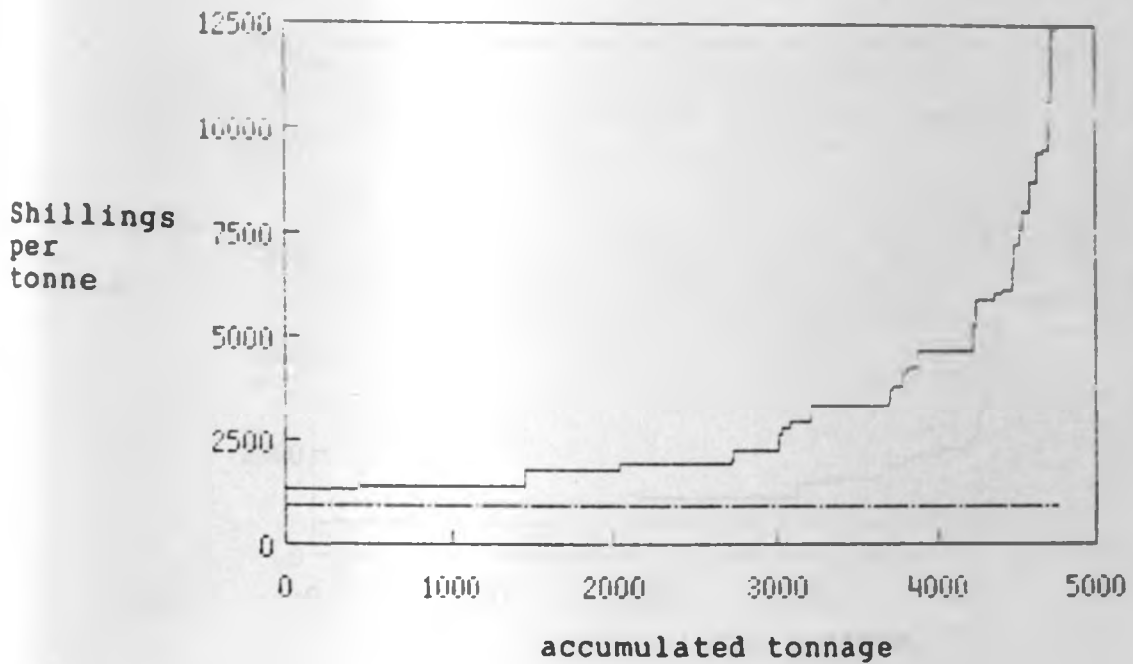


Figure 8 : Savings of charter over ad hoc shipping for imports from Shanghai

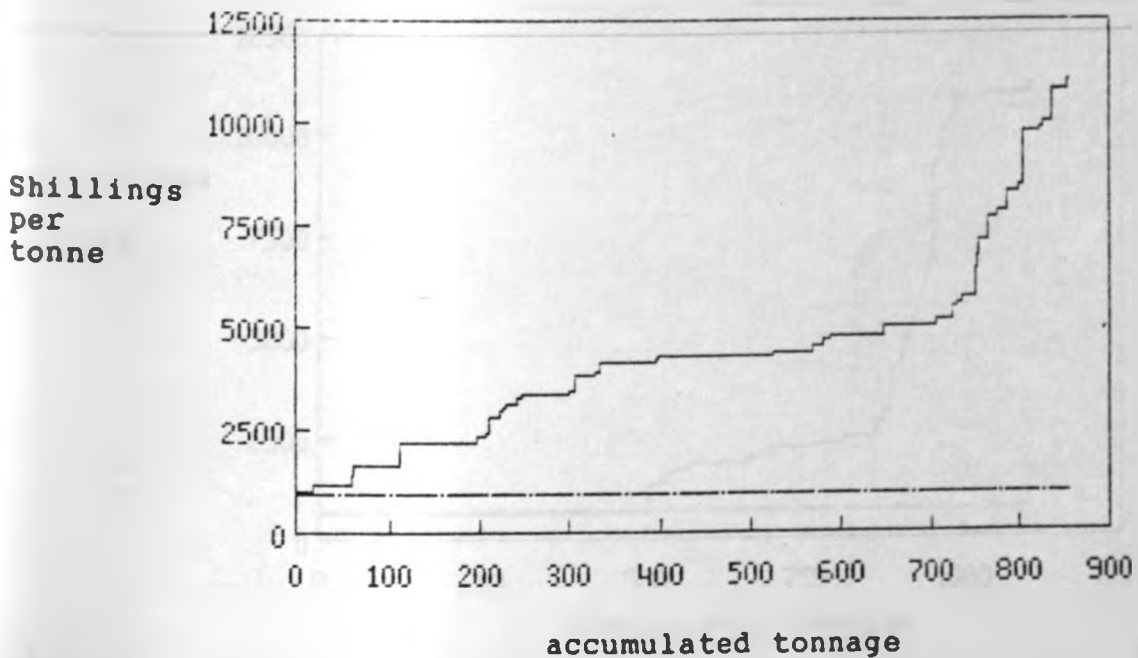


Figure 9 : Savings of charter over ad hoc shipping for imports from Singapore

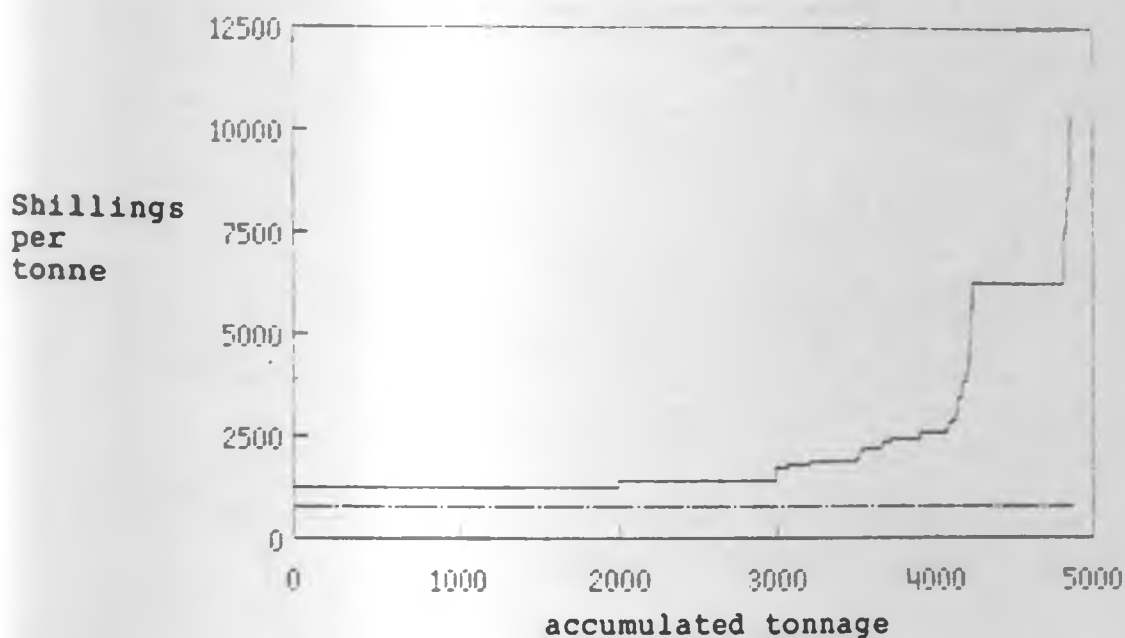


Figure 10 : Savings of charter over ad hoc shipping for imports from Bombay

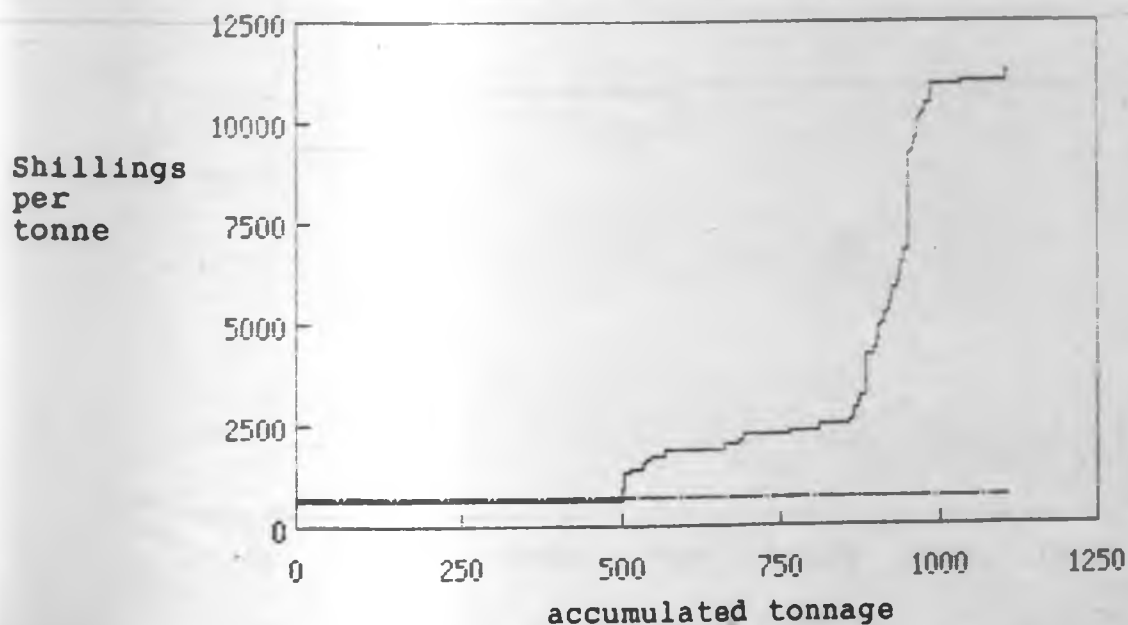


Figure 11: Savings of charter over ad hoc shipping for exports to Felixstowe

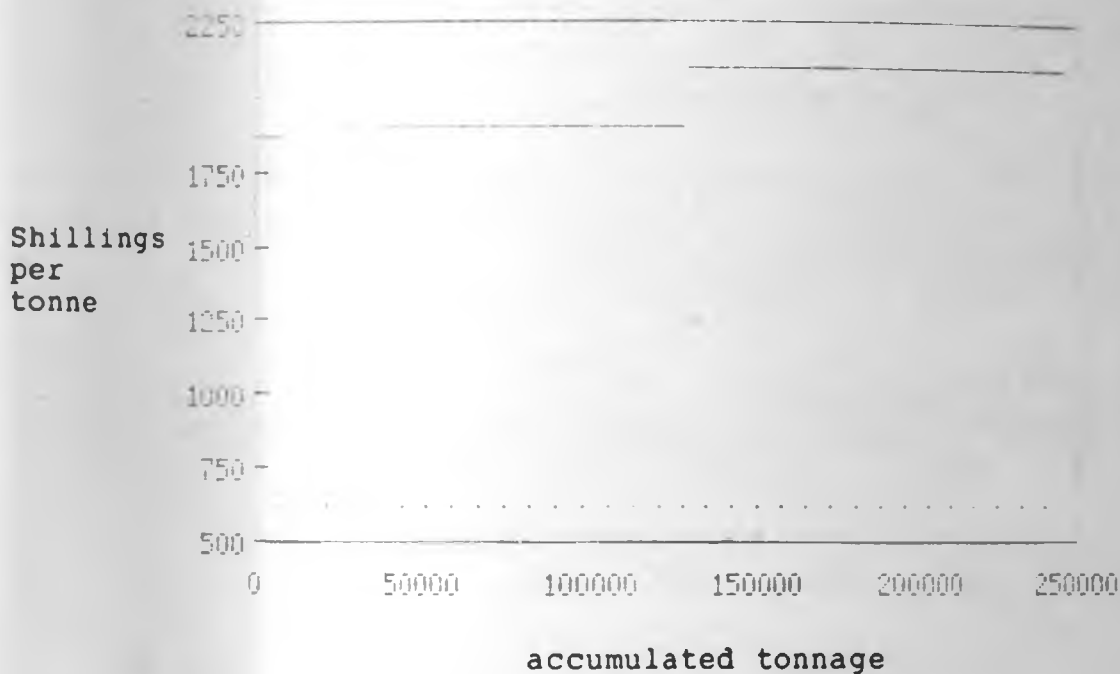


Figure 12: Savings of charter over ad hoc shipping for exports to Antwerp

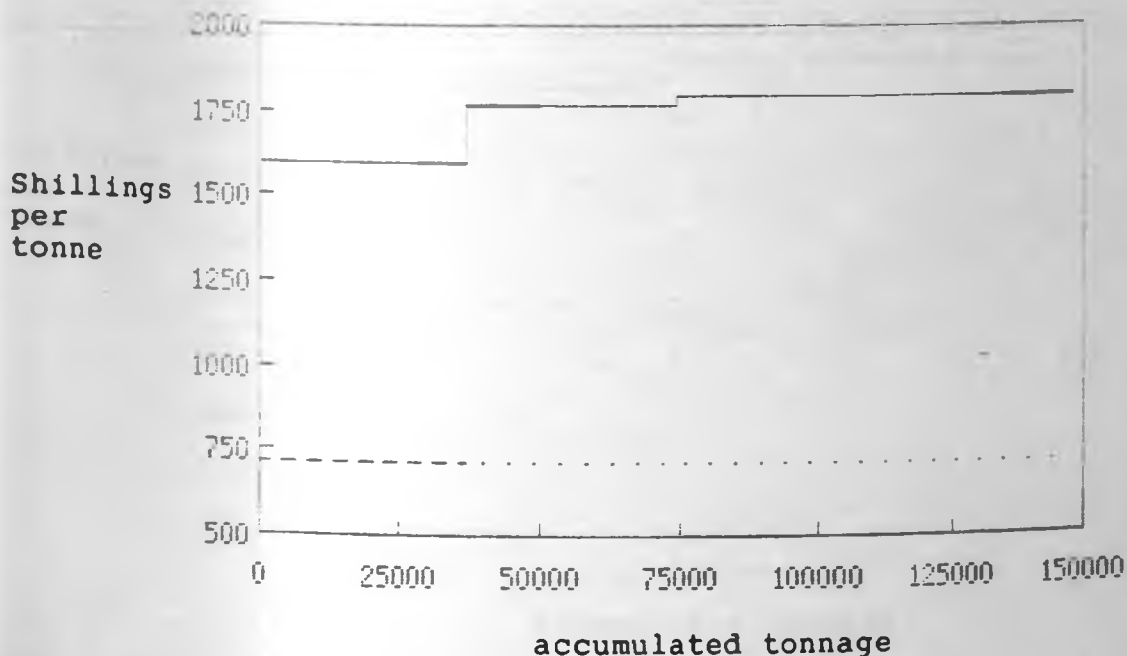


Figure 13: Savings of charter over ad hoc shipping for exports to Hamburg

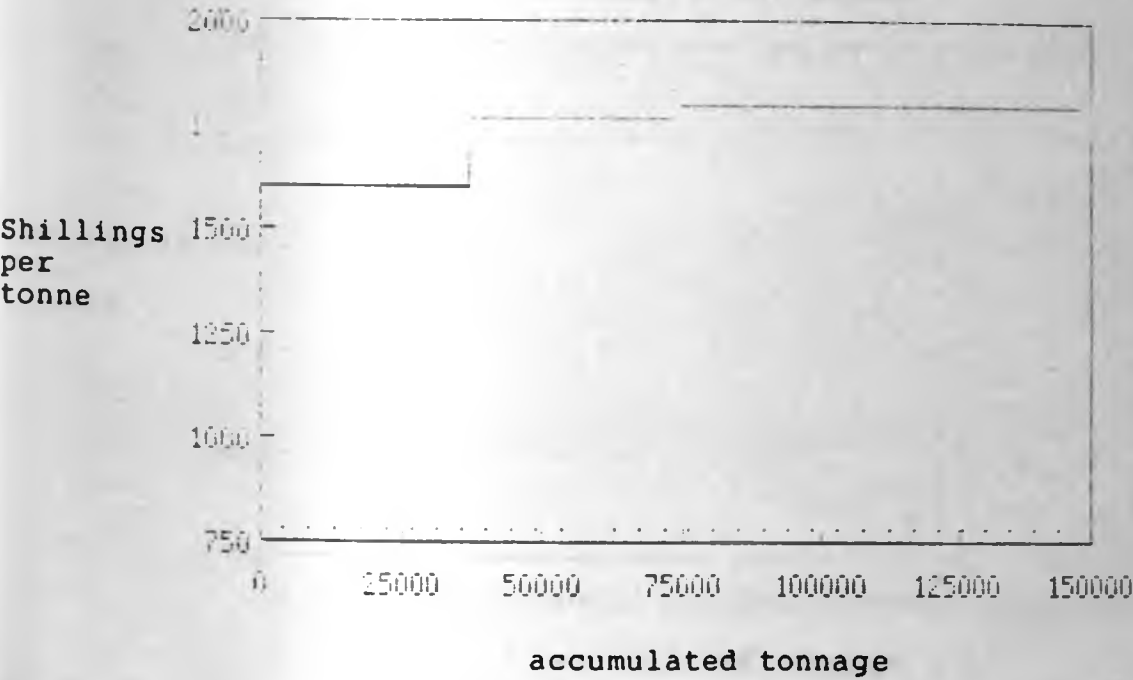


Figure 14: Savings of charter over ad hoc shipping for exports to Mediterranean ports

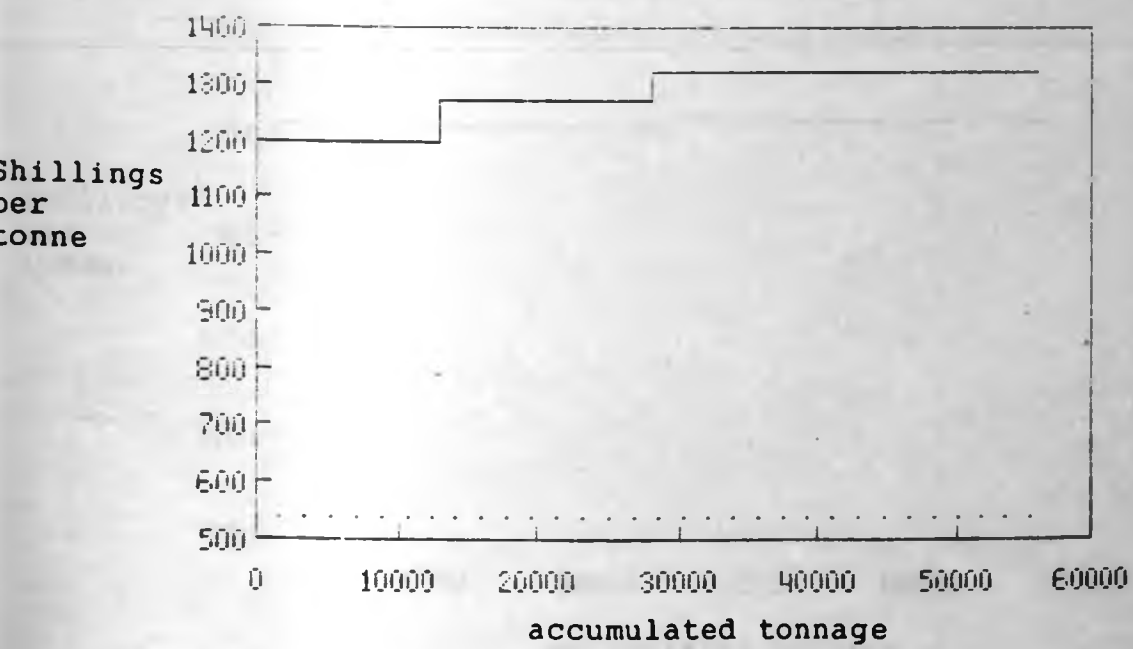


Figure 15 : Savings of charter over ad hoc shipping for exports to Japan



Figure 16 : Savings of charter over ad hoc shipping for exports to Shanghai

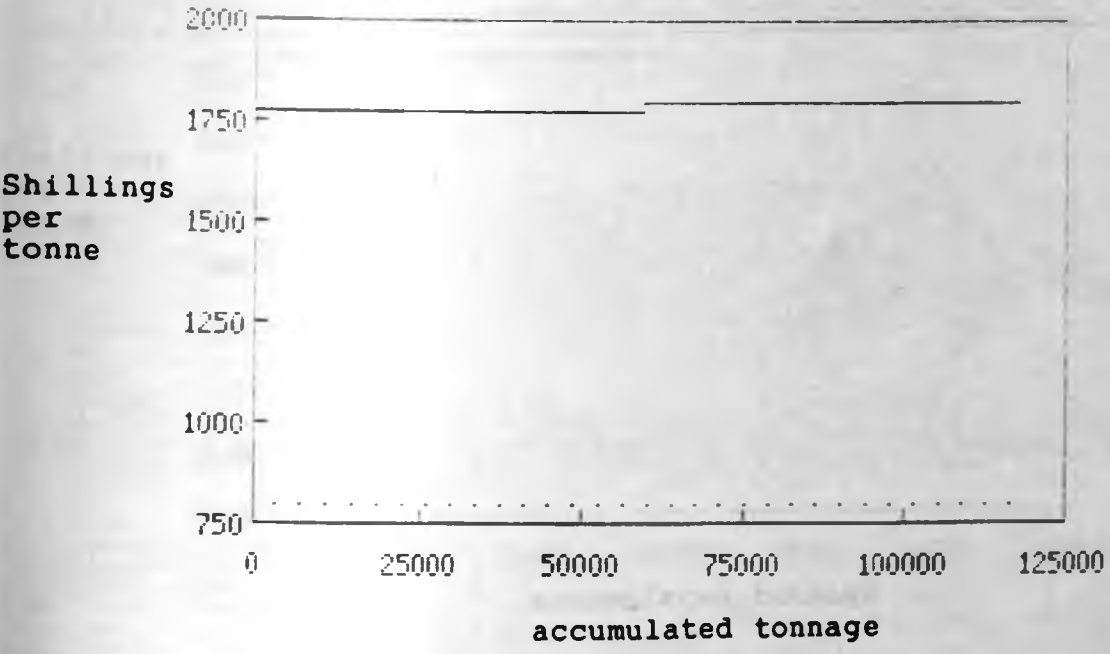


Figure 17: Savings of charter over ad hoc shipping for exports to Singapore

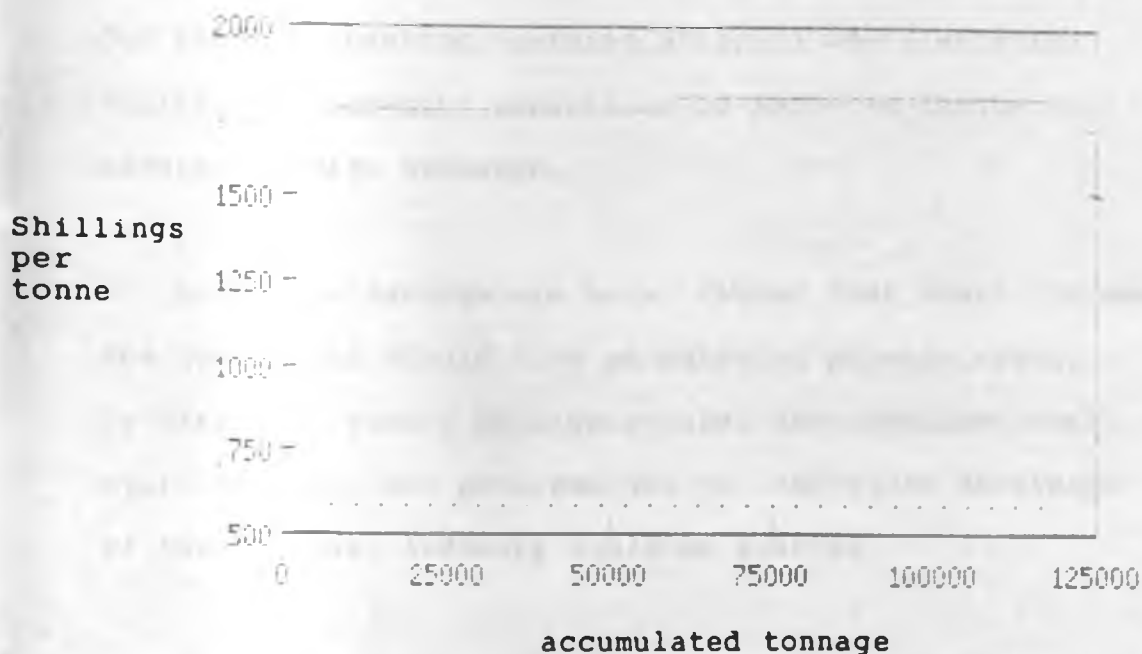
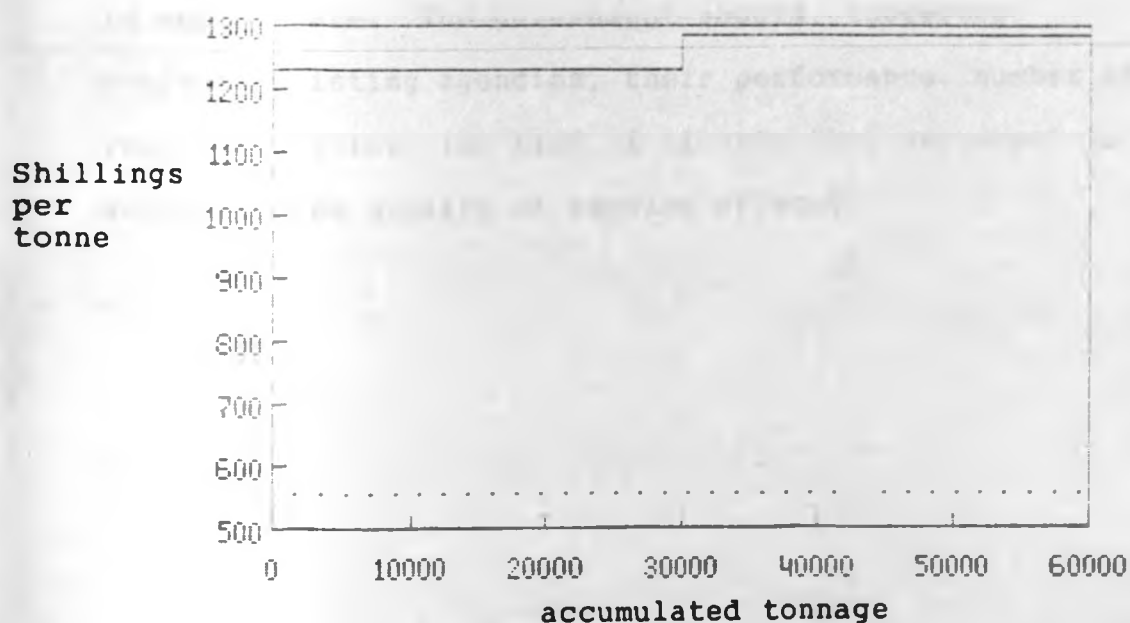


Figure 18: Savings of charter over ad hoc shipping for exports to Bombay



Institutional framework for implementing a chartering programme

A time-chartering programme would benefit Kenya by charging low freight rates thus saving foreign exchange, making exports more competitive abroad, setting a basis for future expansion, gaining shipping administration skills, and boosting exports using imported inputs thus earning foreign exchange.

Since the savings are huge, rather than start its own the government should hire an existing private agency. By hiring an agency of high repute, the programme would start quickly, and problems due to inadequate knowledge of the shipping industry would be averted.

Hiring an agency may be expensive, but the savings from the programme will be much more. It would not make sense for the government to delay while trying to form its own agency. Since the programme should be implemented by experts, and an existing agency of high repute is appropriate. The government should, therefore, evaluate existing agencies, their performance, number of years in service, the kind of clients they represent to ascertain the quality of service offered.

The agency should advertise its chartered vessels' sailing schedules and make cargo bookings. The agency would hire different combinations of vessel sizes for different periods because of the imbalances in export and import cargo volumes: exports are less (in volume) and fluctuate more than imports due to the seasonality of agriculture.

The service should be good. This depends on speed and, sometimes, safety. The programme would ensure high quality service by hiring a good agency and identifying well-maintained and administered vessels. Thorough inspection of vessels before chartering is, therefore, crucial. Advertised schedules must be reliably adhered to. Shippers like to be assured of the expected delivery time.

The chartering service should serve all shippers on the major routes and have enough vessels to accomodate peak movements, especially for coffee, tea, and pineapples. Since the charter programme would respond to shippers' demand, it would serve their needs adequately.

Vessels in the charter programme should operate independently, not in conferences. If the vessels joined a conference, they would offer the same high *ad hoc* freight rates. This would distort the objectives of the programme. Though operating outside conferences, the vessels would still face competition from independent operators.

To operate well, enough cargo must be available here and in the foreign ports. Imports to Kenya are billed cost, insurance, and freight, i.e., freight charges are paid by the importer. The foreign exporter quotes the cost and freight to the Kenyan importer. The importer then applies for foreign-exchange allocation to cover the quoted cost plus freight and usually pays the exporter by letter of credit before shipment. The quoted freight cost might, however, be inflated so the exporter can make some money or for transfer pricing.

The Kenyan importer should insist that the cargo should be shipped on the chartered vessel. Normally the exporter would do as the customer wants for fear of losing the customer to other exporters.

The price incentive--halving the present freight cost--should be enough to attract most imports without coercion. Securing regularly incoming cargoes like fertilizers would ensure adequate capacity utilization. Major fertilizer importers (e.g., Kenya Tea Development Authority, Kenya National Trading Corporation, and the Kenya Grain Growers Co-operative Union) should, therefore, be instructed to co-operate.

Most of Kenya's exports--e.g., pineapples, tea, and coffee--go f.o.b. (free on board); the foreign importer pays the freight charges. Big companies like Del Monte argue that, to lower costs, they negotiate with shipping companies for the global shipping of their products. Even with such negotiations the possibility of lowering costs drastically should motivate them to ship on the chartered vessels since these companies' current costs are high.

Enough cargo should be secured to use most of the vessel's space on return voyages. The government should, therefore, require certain commodities, especially coffee, tea, and pineapples, to go by the chartered vessels. Since most of the export cargo is private, the government should instruct that such cargoes go by chartered vessels. Government cargo, if going to areas served by the chartered vessels should also go by these vessels. Getting adequate cargo for long periods would enable the agency to charter vessels for long periods and probably secure lower rates.

If the response from importers and exporters were not positive, the government could evaluate instituting measures (e.g., a surcharge) to shift cargo to the charter programme.

The chartering programme would face problems in its operations. Since the shipping industry is cartelized and dominated by conferences, the chartering programme would need strong policies, government support, co-operation from exporters and importers, and high-quality service to penetrate the industry. Conferences bind their customers by loyalty agreements for specified periods, but their prices are high. With a programme offering similar services for less than half the conference rates, conferences are likely to react, possibly starting a price war. It is unlikely, however, that they could even halve their present rates.

Changing shippers' habits is hard: exporters are many and scattered. A programme to educate exporters about the benefits of using the chartered vessels is necessary. Forming exporters' councils may help educate them. Importers should also learn to insist that their cargo be shipped on vessels they choose. Good service and low rates is effective in attracting shippers.

During the field work, many professionals were sceptical about the government's ability to operate a charter programme satisfactorily due to lack of experts. These professionals opined that problems facing other government institutions would probably make the programme an expensive drain on Kenya's resources. With a hired agency of experts, the chartering programme should operate well.

For a well functioning charter programme, all users should pay promptly. Payments for freight are usually made before shipment. This should apply to government and private cargo. Government institutions are lax and, sometimes, do not pay their debts. Strict financial procedures and commercial decisions must be adhered to.

Depending on the response and performance of the programme, Kenya may want its own agency to operate the programme. If so, the first offices could be set up for busy routes. For other routes, the hired agency could be retained. Taking over the agency's function should only occur after gaining enough experience.

Chapter 6

Conclusions

Kenya pays exorbitantly for ocean transport of dry general cargo. The excess foreign exchange costs of *ad hoc* over charter shipping for imports were Ksh 4,901.73 million for 1987 and Ksh 4,572.18 million for 1988. The excess costs for exports were Ksh 1,586.54 million for 1987 and Ksh 1,055.57 million for 1988. Chartering could save Kenyan importers and exporters over a half of their current costs.

Large variations in the rates of freight per tonne are charged for the same ports and even for similar cargoes, particularly for imports. For example, for Felixstowe, the difference between the lowest and the highest freight rates (Ksh 1,379 and Ksh 13,425) is Ksh 12,046, an 800% variation. The charter rate for one port or range of ports is at least three times lower than the *ad hoc* rate.

Kenya's shipping needs to be re-organized to transport cargo in larger consignments to lower costs. The big variations in freight rates indicate that there is room for re-organization. Time-chartering could save Kenya enormous amounts of money by giving shippers lower freight rates.

If properly implemented, time-chartering with the right commercial, financial and institutional backing could lower Kenya's freight costs. If the port lowered the average number of days ships wait before berthing and increased the speed of handling cargo thus reducing congestion, it would help the charter programme lower costs. This programme, as opposed to buying vessels, is faster to implement and requires low capital cost. Merely chartering slots and joining a conference would not lower freight rates since the conference rates would be used.

The time-chartering programme should, however, be implemented by experts. It must also have enough vessels to meet shippers' needs considering the seasonality and perishability of agricultural produce. A charter programme should be implemented by an agency hired by the government.

Limitations of the study

The study had to rely on charter rates quoted by just one shipping company. Other companies refused to provide quotes. For the large import consignments, for example, from Singapore, Shanghai, and Hamburg the charter rates were very close to the *ad hoc* rates. For Bombay, the large import consignment's *ad hoc* freight rate is even lower than the charter rate. The charter rates were, therefore, realistic. The study also lacked export data in as much detail as the import data; and the sample sizes for exports were smaller than imports. Shipping companies interviewed refused to give access to export invoices. The exporters were also too scattered to be reached.

Areas of further research

Many important areas of Kenya's ocean transport are unresearched:

- What is the impact of ocean freight costs and their changes on the demand for Kenya's imports and exports?
- Would it be feasible for Kenya to purchase vessels?
- What is the possibility and impact of bareboat chartering (the charterer takes full control of the vessel including its administration) on Kenya's freight rates for dry general cargo?

- Would regional co-operation along the East African coast improve coastal shipping ?
- Is UNCTAD's code of conduct for liner conferences a practical way of ensuring Kenya's participation in liner shipping?

Appendix 1: Results from Maeti's (1985) study (additive variant)

variable name	regression coefficient	t statistic	R^2 when variable is excluded	

Europe ($n = 312$, $R^2 = 0.67$, $\bar{R}^2 = 0.64$)				
constant	- 1995.7560	0.48	0.67	0.64
distance	0.3005	0.46	0.67	0.64
tonnage	12.7209	3.11	0.67	0.64
value*	0.1133	22.82	0.13	0.08
Far East ($n = 162$, $R^2 = 0.85$, $\bar{R}^2 = 0.79$)				
constant	489.6766	0.38	0.85	0.79
distance	- 0.0648	0.33	0.85	0.79
tonnage	15.8471	7.55	0.79	0.72
value *	0.1081	13.11	0.67	0.58
Indian subcontinent ($n = 70$, $R^2 = 0.37$, $\bar{R}^2 = 0.29$)				
constant	755.6223	1.06	0.36	0.27
distance	-0.2670	0.96	0.36	0.28
tonnage*	69.5583	4.83	0.15	0.04
value	0.0049	0.48	0.14	0.28
North America ($n = 36$, $R^2 = 0.90$, $\bar{R}^2 = 0.86$)				
constant	3506.6767	0.82	0.90	0.86
distance	-0.3597	0.79	0.90	0.86
tonnage *	86.4130	7.05	0.77	0.67
value	0.0541	6.57	0.79	0.69
Australia ($n = 11$, $R^2 = 0.96$, $\bar{R}^2 = 0.96$)				
constant	-1472.0571	0.08	0.96	0.96
distance	0.2630	0.09	0.96	0.96
tonnage*	13.3541	1.17	0.96	0.96
value	0.0318	8.91	0.55	0.52
All regions ($R^2 = 0.66$, $\bar{R}^2 = 0.64$)				
constant	-320.6641	0.47	0.66	0.64
distance	0.423	0.39	0.66	0.64
tonnage	13.9758	5.10	0.64	0.62
value*	0.1087	30.06	0.15	0.09

Source: Maeti(1985:77)

* The variable with the asterix has the highest explanatory power for that region.

Appendix 2: Indicators of change in ocean freight rates, import prices, and import demand for selected exports of developing countries (%)

	largest annual decrease	largest annual increase	mean change (1975-1983)
Iron ore from Liberia to EEC			
freight rate	-48.5	91.9	4.8
import price	-7.9	28.8	0.2
import demand	-471.3	131.0	-42.4
 Coffee from Brazil to EEC			
freight rate	-12.4	25.4	5.1
import price	-0.8	1.2	0.2
import demand	-2.8	1.8	-0.4
 Tea from Sri Lanka to the United States			
freight rate	-11.2	26.5	5.5
import price	1.4	2.1	0.7
import demand	-6.4	3.1	-2.4
 Tea from Sri Lanka to the EEC			
freight rate	-13.6	26.5	2.9
import price	-0.9	2.1	0.2
import demand	-7.1	3.1	-0.8
 Copper from Zambia to the United States			
freight rate	-38.5	15.4	1.1
import price	-1.4	0.7	0.1
import demand	-3.1	6.5	-0.4
 Cocoa beans from Ghana to the EEC			
freight rate	-11.7	25.0	10.0
import price	-0.5	1.7	0.6
import demand	-4.7	1.2	-1.6

Source: UNCTAD(1987:24)

Appendix 3: Excess costs for transportation of imports, 1987 and 1988

Tonnes ('000)	weighted average <i>ad hoc</i> freight rate	charter freight rate	weighted <i>ad hoc</i> freight rate minus charter rate Ksh	estimated excess costs
	Ksh	Ksh		
Pelixstowe				
373 (348)	5964	959	5005	1866.87 (1741.74)
Antwerp				
233 (217)	4441	930	3511	818.06 (761.89)
Hamburg				
233 (217)	3344	950	2394	558.80 (519.50)
Mediterranean ports				
93 (86)	2560	570	1990	185.07 (171.14)
Japan				
155 (145)	2860	880	1980	306.90 (287.10)
Shanghai				
186 (174)	4242	898	3344	621.98 (581.86)
Singapore				
186 (174)	2230	750	1480	275.28 (257.52)
Bombay				
93 (87)	3540	650	2890	268.77 (251.43)
Total				4901.73 (4572.18)
K£ equivalent				245.07 (228.61)

Note: Figures in parentheses are for 1988. The freight rates are assumed to be the same for 1987 and 1988.

Appendix 4: Excess costs for transportation of exports, 1987 and 1988

Tonnes ('000)	weighted average <i>ad hoc</i> freight rate	charter freight rate	weighted <i>ad hoc</i> freight rate minus charter freight rate Ksh	estimated excess costs
	Ksh	Ksh		
Felixstowe				
266 (235)	1960	620	1340	356.44 (314.90)
Antwerp				
165 (148)	1770	770	1000	165.00 (148.00)
Hamburg				
165 (148)	1770	700	1070	176.55 (158.36)
Mediterranean ports				
65 (59)	1260	540	720	46.80 (42.48)
Japan				
111 (98)	1770	800	970	107.60 (95.06)
Shanghai				
133 (118)	1770	790	980	130.34 (115.64)
Singapore				
133 (118)	1770	580	1190	158.27 (140.42)
Bombay				
66 (59)	1250	560	690	45.54 (40.71)
Total				1586.54 (1055.57)
KE equivalent				79.33 (52.78)

Note: Figures in parentheses are 1988. The freight rates are assumed to be 1987 and 1988.

Appendix 5 : Imports

Felixstowe

	Weight (Tonnes)	price per tonne (Ksh)	competitive price per tonne
1	4.00	1,379.00	959.00
2	52.00	1,964.00	959.00
3	102.00	2,050.00	959.00
4	6.00	2,316.00	959.00
5	96.00	2,351.00	959.00
6	2.00	2,382.00	959.00
7	63.00	2,389.00	959.00
8	2.00	2,453.00	959.00
9	17.00	2,660.00	959.00
10	81.00	2,892.00	959.00
11	2.00	2,928.00	959.00
12	50.00	2,930.00	959.00
13	2.00	3,016.00	959.00
14	5.00	3,344.00	959.00
15	126.00	3,630.00	959.00
16	9.00	3,766.00	959.00
17	2.00	3,785.00	959.00
18	40.00	3,817.00	959.00
19	37.00	4,037.00	959.00
20	3.00	4,268.00	959.00
21	10.00	4,598.00	959.00
22	2.00	4,656.00	959.00
23	102.00	4,707.00	959.00
24	21.00	4,830.00	959.00
25	2.00	4,880.00	959.00
26	22.00	4,956.00	959.00
27	26.00	5,005.00	959.00
28	24.00	5,277.00	959.00
29	19.00	5,657.00	959.00
30	5.00	6,448.00	959.00
31	443.00	6,629.00	959.00
32	5.00	6,827.00	959.00
33	19.00	6,969.00	959.00
34	30.00	7,049.00	959.00
35	19.00	7,262.00	959.00
36	11.00	7,302.00	959.00
37	4.00	7,322.00	959.00
38	24.00	7,410.00	959.00
39	4.00	7,460.00	959.00
40	3.00	7,655.00	959.00
41	6.00	7,736.00	959.00
42	19.00	7,920.00	959.00
43	16.00	8,023.00	959.00
44	2.00	8,209.00	959.00
45	8.00	8,405.00	959.00
46	3.00	8,597.00	959.00
47	31.00	8,774.00	959.00
48	3.00	8,787.00	959.00
49	4.00	8,811.00	959.00
50	5.00	8,960.00	959.00

72
73
74
75

7.00
9.00
15.00
3.00

11,966.00
12,515.00
12,971.00
13,427.00

959.00
959.00
959.00
959.00

Antwerp, Rotterdam and Amsterdam

	Weight (Tonnes)	price per tonne(Ksh)	competitive price per tonne
1	800.00	1,017.00	930.00
2	238.00	1,019.00	930.00
3	110.00	1,042.00	930.00
4	1,000.00	1,058.00	930.00
5	285.00	1,080.00	930.00
6	6.00	1,116.00	930.00
7	47.00	1,164.00	930.00
8	41.00	1,177.00	930.00
9	21.00	1,199.00	930.00
10	97.00	1,280.00	930.00
11	65.00	1,372.00	930.00
12	122.00	1,499.00	930.00
13	73.00	1,507.00	930.00
14	250.00	1,559.00	930.00
15	96.00	1,590.00	930.00
16	10.00	1,628.00	930.00
17	51.00	1,688.00	930.00
18	51.00	1,708.00	930.00
19	100.00	1,841.00	930.00
20	62.00	1,870.00	930.00
21	101.00	1,901.00	930.00
22	11.00	1,959.00	930.00
23	45.00	2,014.00	930.00
24	54.00	2,090.00	930.00
25	21.00	2,100.00	930.00
26	25.00	2,113.00	930.00
27	60.00	2,219.00	930.00
28	50.00	2,369.00	930.00
29	50.00	2,370.00	930.00
30	49.00	2,467.00	930.00
31	4.00	2,555.00	930.00
32	5.00	2,579.00	930.00
33	35.00	2,687.00	930.00
34	13.00	2,703.00	930.00
35	107.00	2,720.00	930.00
36	50.00	2,735.00	930.00
37	107.00	2,741.00	930.00
38	7.00	2,760.00	930.00
39	17.00	2,782.00	930.00
40	51.00	2,899.00	930.00
41	51.00	2,968.00	930.00
42	47.00	3,106.00	930.00
43	20.00	3,292.00	930.00
44	6.00	3,498.00	930.00
45	84.00	3,541.00	930.00
46	1.00	3,616.00	930.00
47	6.00	3,830.00	930.00
48	6.00	3,982.00	930.00
49	28.00	4,603.00	930.00
50	100.00	4,913.00	930.00
51	75.00	4,976.00	930.00
52	27.00	5,164.00	930.00
53	210.00	5,311.00	930.00
54	294.00	5,504.00	930.00

55	20.00	5,554.00	930.00
56	280.00	5,779.00	930.00
57	3.00	6,188.00	930.00
58	14.00	6,634.00	930.00
59	69.00	6,641.00	930.00
60	3.00	7,064.00	930.00
61	2.00	7,188.00	930.00
62	3.00	7,948.00	930.00
63	3.00	7,999.00	930.00
64	2.00	8,249.00	930.00
65	2.00	8,594.00	930.00
66	16.00	8,803.00	930.00
67	900.00	9,514.00	930.00
68	1.00	10,485.00	930.00
69	329.00	10,750.00	930.00
70	7.00	10,810.00	930.00
71	3.00	10,960.00	930.00
72	164.00	11,710.00	930.00
73	431.00	12,079.00	930.00
74	66.00	12,559.00	930.00
75	44.00	13,212.00	930.00

Hamburg, Bremen and Bremenhaven

	Weight (Tonnes)	price per tonne(Ksh)	competitive price per tonne
1	20.00	1,170.00	890.00
2	245.00	1,241.00	890.00
3	26.00	1,279.00	890.00
4	28.00	1,332.00	890.00
5	68.00	1,475.00	890.00
6	100.00	1,506.00	890.00
7	49.00	1,536.00	890.00
8	68.00	1,612.00	890.00
9	35.00	1,626.00	890.00
10	48.00	1,669.00	890.00
11	22.00	1,669.00	890.00
12	15.00	1,720.00	890.00
13	84.00	1,737.00	890.00
14	2.00	1,739.00	890.00
15	27.00	1,792.00	890.00
16	31.00	1,810.00	890.00
17	4.00	1,843.00	890.00
18	50.00	1,889.00	890.00
19	5.00	1,896.00	890.00
20	18.00	1,907.00	890.00
21	20.00	1,988.00	890.00
22	5.00	2,044.00	890.00
23	5.00	2,105.00	890.00
24	100.00	2,148.00	890.00
25	300.00	2,174.00	890.00
26	90.00	2,228.00	890.00
27	13.00	2,304.00	890.00
28	13.00	2,304.00	890.00
29	63.00	2,322.00	890.00
30	50.00	2,341.00	890.00
31	4.00	2,400.00	890.00
32	2.00	2,500.00	890.00
33	56.00	2,511.00	890.00
34	110.00	2,563.00	890.00
35	11.00	2,584.00	890.00
36	16.00	2,586.00	890.00
37	6.00	2,861.00	890.00
38	37.00	2,865.00	890.00
39	11.00	2,945.00	890.00
40	6.00	2,998.00	890.00
41	38.00	3,051.00	890.00
42	11.00	3,134.00	890.00
43	4.00	3,475.00	890.00
44	4.00	3,554.00	890.00
45	3.00	3,611.00	890.00
46	3.00	3,627.00	890.00
47	4.00	3,651.00	890.00
48	7.00	3,665.00	890.00
49	98.00	4,014.00	890.00

71	9.00	11,333.00	890.00
72	38.00	12,197.00	890.00
73	26.00	12,613.00	890.00
73	26.00	12,613.00	890.00
74	4.00	12,750.00	890.00
75	5.00	15,716.00	890.00

Mediterranean Ports

	Weight (Tonnes)	price per tonne(Ksh)	competitive price pe tonne
1	21.00	1,108.00	569.00
5	34.00	1,602.00	569.00
6	31.00	1,619.00	569.00
7	4.00	1,630.00	569.00
8	52.00	1,765.00	569.00
9	33.00	1,769.00	569.00
10	203.00	1,803.00	569.00
11	33.00	1,803.00	569.00
12	17.00	1,806.00	569.00
13	13.00	1,860.00	569.00
14	31.00	1,891.00	569.00
15	29.00	1,895.00	569.00
16	6.00	1,898.00	569.00
17	56.00	1,937.00	569.00
18	13.00	2,000.00	569.00
19	15.00	2,013.00	569.00
20	7.00	2,107.00	569.00
21	2.00	2,142.00	569.00
22	16.00	2,154.00	569.00
23	8.00	2,279.00	569.00
24	50.00	2,313.00	569.00
25	8.00	2,395.00	569.00
26	14.00	2,424.00	569.00
27	63.00	2,487.00	569.00
28	4.00	2,550.00	569.00
29	11.00	2,610.00	569.00
30	7.00	2,634.00	569.00
31	33.00	2,772.00	569.00
32	19.00	2,899.00	569.00
33	32.00	3,026.00	569.00
34	5.00	3,047.00	569.00
35	75.00	3,166.00	569.00
36	3.00	3,168.00	569.00
37	13.00	3,401.00	569.00
38	3.00	3,453.00	569.00
39	33.00	3,537.00	569.00
40	16.00	3,954.00	569.00
41	14.00	4,090.00	569.00
42	43.00	4,288.00	569.00
43	47.00	4,343.00	569.00
44	21.00	4,704.00	569.00
45	8.00	5,567.00	569.00
46	16.00	6,300.00	569.00
47	2.00	8,775.00	569.00
48	8.00	9,239.00	569.00
49	3.00	9,633.00	569.00
50	3.00	9,785.00	569.00

Japan

	Weight (tonnes)	competitive price per tonne Ksh.	price per tonne
1	2.00	880.00	626.00
2	1.00	880.00	1,150.00
3	2.00	880.00	1,235.00
4	22.00	880.00	1,314.00
5	413.00	880.00	1,325.00
6	164.00	880.00	1,348.00
7	413.00	880.00	1,350.00
8	437.00	880.00	1,352.00
9	4.00	880.00	1,612.00
10	51.00	880.00	1,765.00
11	528.00	880.00	1,793.00
12	676.00	880.00	1,916.00
13	1.00	880.00	1,995.00
14	289.00	880.00	2,272.00
15	1.00	880.00	2,339.00
16	24.00	880.00	2,655.00
17	46.00	880.00	2,821.00
18	127.00	880.00	2,933.00
19	485.00	880.00	3,343.00
20	7.00	880.00	3,343.00
21	7.00	880.00	3,397.00
22	3.00	880.00	3,747.00
23	22.00	880.00	3,754.00
24	54.00	880.00	3,804.00
25	39.00	880.00	4,139.00
26	60.00	880.00	4,299.00
27	31.00	880.00	4,653.00
28	315.00	880.00	4,719.00
29	17.00	880.00	5,284.00
30	2.00	880.00	5,575.00
31	115.00	880.00	5,956.00
32	46.00	880.00	6,121.00
33	60.00	880.00	6,155.00
34	6.00	880.00	6,500.00
35	4.00	880.00	6,750.00
36	38.00	880.00	7,284.00
37	2.00	880.00	7,374.00
38	20.00	880.00	7,650.00
39	2.00	880.00	7,864.00
40	2.00	880.00	7,962.00
41	46.00	880.00	8,028.00
42	4.00	880.00	8,652.00
43	42.00	880.00	8,793.00
44	39.00	880.00	9,469.00
45	39.00	880.00	9,549.00
46	2.00	880.00	10,321.00
47	2.00	880.00	10,333.00
48	14.00	880.00	10,714.00
49	4.00	880.00	10,868.00
50	31.00	880.00	12,442.00

Singapore

	Weight (Tonnes)	competitive price per tonne	Price per Tonne, KSH
1	1,996.00	750	1,205.00
2	993.00	750	1,397.00
3	75.00	750	1,662.00
4	64.00	750	1,780.00
5	64.00	750	1,782.00
6	6.00	750	1,809.00
7	12.00	750	1,859.00
8	293.00	750	1,866.00
9	17.00	750	1,968.00
10	22.00	750	2,070.00
11	128.00	750	2,199.00
12	5.00	750	2,305.00
13	2.00	750	2,310.00
14	37.00	750	2,332.00
15	91.00	750	2,426.00
16	91.00	750	2,426.00
17	165.00	750	2,589.00
18	5.00	750	2,647.00
19	10.00	750	2,659.00
20	4.00	750	2,714.00
21	17.00	750	2,768.00
22	4.00	750	2,847.00
23	19.00	750	2,877.00
24	3.00	750	3,041.00
25	11.00	750	3,069.00
26	4.00	750	3,416.00
27	20.00	750	3,421.00
28	3.00	750	3,665.00
29	3.00	750	3,801.00
30	27.00	750	3,829.00
31	4.00	750	3,854.00
32	1.00	750	3,902.00
33	3.00	750	3,956.00
34	5.00	750	4,025.00
35	3.00	750	4,300.00
36	6.00	750	4,328.00
37	2.00	750	4,555.00
38	9.00	750	4,759.00
39	3.00	750	5,639.00
40	2.00	750	5,800.00
41	593.00	750	6,256.00
42	5.00	750	7,432.00
43	8.00	750	7,497.00
44	5.00	750	7,659.00
45	11.00	750	8,409.00
46	10.00	750	8,610.00
47	2.00	750	8,782.00
48	5.00	750	10,182.00
49	6.00	750	10,452.00
50	5.00	750	10,960.00

Shanghai and Hongkong

	Weight (Tonnes)	competitive price per tonne Ksh.	price per tonne
1	19.00	898.00	981.00
2	41.00	898.00	1,118.00
3	3.00	898.00	1,422.00
4	48.00	898.00	1,636.00
5	86.00	898.00	2,171.00
6	2.00	898.00	2,345.00
7	8.00	898.00	2,355.00
8	4.00	898.00	2,395.00
9	12.00	898.00	2,782.00
10	3.00	898.00	2,962.00
11	4.00	898.00	3,007.00
12	12.00	898.00	3,135.00
13	4.00	898.00	3,306.00
14	3.00	898.00	3,348.00
15	3.00	898.00	3,348.00
16	3.00	898.00	3,348.00
17	11.00	898.00	3,358.00
18	31.00	898.00	3,375.00
19	3.00	898.00	3,384.00
20	7.00	898.00	3,390.00
21	23.00	898.00	3,798.00
22	4.00	898.00	3,890.00
23	61.00	898.00	4,115.00
24	2.00	898.00	4,175.00
25	60.00	898.00	4,275.00
26	66.00	898.00	4,236.00
27	44.00	898.00	4,398.00
28	12.00	898.00	4,494.00
29	9.00	898.00	4,698.00
30	9.00	898.00	4,742.00
31	50.00	898.00	4,794.00
32	14.00	898.00	4,964.00
33	44.00	898.00	4,964.00
34	19.00	898.00	5,144.00
35	5.00	898.00	5,498.00
36	5.00	898.00	5,523.00
37	16.00	898.00	5,701.00
38	1.00	898.00	6,391.00
39	1.00	898.00	6,745.00
40	11.00	898.00	7,121.00
41	11.00	898.00	7,640.00
42	12.00	898.00	7,846.00
43	13.00	898.00	8,291.00
44	5.00	898.00	8,449.00
45	9.00	898.00	9,783.00
46	10.00	898.00	9,797.00
47	4.00	898.00	9,855.00
48	10.00	898.00	10,035.00
49	17.00	898.00	10,774.00
50	2.00	898.00	11,052.00

Bombay and Karachi

	weight (tonnes)	price per tonne Rs	competitive price per tonne Ksh.
1	500.00	600.00	650.00
2	3.00	928.00	650.00
3	7.00	1,300.00	650.00
4	2.00	1,300.00	650.00
5	20.00	1,394.00	650.00
6	5.00	1,560.00	650.00
7	7.00	1,627.00	650.00
8	20.00	1,690.00	650.00
9	90.00	1,846.00	650.00
10	6.00	1,858.00	650.00
11	13.00	2,000.00	650.00
12	12.00	2,026.00	650.00
13	7.00	2,100.00	650.00
14	3.00	2,210.00	650.00
15	68.00	2,271.00	650.00
16	48.00	2,323.00	650.00
17	48.00	2,468.00	650.00
18	5.00	2,600.00	650.00
19	2.00	2,655.00	650.00
20	7.00	2,883.00	650.00
21	3.00	3,027.00	650.00
22	5.00	3,194.00	650.00
23	5.00	3,194.00	650.00
24	11.00	4,186.00	650.00
25	3.00	4,333.00	650.00
26	2.00	4,344.00	650.00
27	3.00	4,637.00	650.00
28	4.00	4,956.00	650.00
29	4.00	4,986.00	650.00
30	5.00	5,226.00	650.00
31	3.00	5,323.00	650.00
32	3.00	5,440.00	650.00
33	3.00	5,701.00	650.00
34	7.00	5,882.00	650.00
35	2.00	6,019.00	650.00
36	3.00	6,143.00	650.00
37	4.00	6,500.00	650.00
38	3.00	6,771.00	650.00
39	3.00	6,771.00	650.00
40	6.00	9,210.00	650.00
41	3.00	9,301.00	650.00
42	1.00	9,458.00	650.00
43	4.00	9,590.00	650.00
44	6.00	10,137.00	650.00
45	2.00	10,140.00	650.00
46	4.00	10,250.00	650.00
47	10.00	10,460.00	650.00
48	49.00	10,992.00	650.00
49	71.00	11,063.00	650.00
50	2.00	11,250.00	650.00

Appendix 6 : Exports

Felixstowe

tonnage (000)	accumulated tonnage	competitive freight per tonne	freight per tonne Ksh.
59000	10000	620	1870
118000	128000	620	1900
118000	246000	620	2100

Antwerp

tonnage	accumulated tonnage	freight rate tonne(Ksh)	competitive freight rate per tonne(Ksh)
37000	37000	1600	710
37000	74000	1770	710
74000	148000	1800	710

Hamburg

tonnage	accumulated tonnage	freight rate tonne(Ksh)	competitive freight rate per tonne(Ksh)
37000	37000	1600	775
37000	74000	1770	775
74000	148000	1800	775

Mediterranean ports

tonnage	accumulated tonnage	freight rate tonne(Ksh)	competitive freight rate per tonne(Ksh)
13000	13000	1200	538
15000	28000	1325	538
28000	56000	1275	538

Japan

tonnage	accumulated tonnage	freight rate tonne(Ksh) per tonne(Ksh)	competitive freight rate per tonne(Ksh)
49000	49000	1755	798
49000	98000	1800	798

Shanghai

tonnage	accumulated tonnage	freight rate tonne(Ksh)	competitive freight rate per tonne(Ksh)
59000	59000	1755	792
59000	118000	1800	792

Singapore

tonnage	accumulated tonnage	freight rate tonne(Ksh)	competitive freight rate per tonne(Ksh)
59000	59000	1755	580
59000	118000	1800	580

Bombay

tonnage	accumulated tonnage	freight rate tonne(Ksh)	competitive freight rate per tonne(Ksh)
30000	30000	1230	554
30000	60000	1285	554

References

- Beth, H.L.; Hader, A.; and Kappel, R.; 1984. *25 Years of World Shipping*. Bremen: Fairplay Publications.
- Behnam, A. 1988. *Maritime Transport: Shipping and the Developing Countries*. Malaysia.
- Button, K. J. 1982. *Transport Economics*. London: Heineman Educational Books.
- Chrzanowski, I. 1985. *An Introduction to Shipping Economics*. London: Fairplay Publications.
- Georgandopoulous, E. L. A.; 1978. *Shipping in Developing Countries: Prospects and Problems*. Bremen: Bremen Institute of Shipping Economics.
- Gisser, M. 1966. *Introduction to Price Theory*. Pennsylvania: International Textbook Company.
- Ihre, R; Gorton, L.; and Sandevan, A. 1980. *Shipbrokering and Chartering Practice*. London: Lloyd's of London Press.
- Kendall, L. C. 1986. *The Business of Shipping*. Maryland: Cornwell University Press.
- Kenya Government and Japanese International Co-operation Agency. 1983. *National Transport Plan In The Republic of Kenya*. Nairobi.
- Kenya. Laws of Kenya 1967. *The Merchant Shipping Act*, cap. 389, Nairobi: GP.
- Kenya. Central Bureau of Statistics. 1988. *Statistical Abstract 1988*. Nairobi:GP
- Kenya Ports Authority. 1988. *Port statistics*. Mombasa: KPA.
- Koutsoyiannis, A. 1977. *Modern Microeconomics*. Ontario, Macmillan Press.
- Lipsey, R.G. 1976. *An Introduction to Positive Economics*, Ontario, Oxford University Press.
- Maeti, G. M. M. 1985. *The Structure and Economic Impacts of Maritime Transport in Kenya*. M.A. thesis, Department of Economics, University of Nairobi.
- Muindi, J.P. 1987. *The Role of Shipping in Kenya's National Development*. M.Sc. thesis, World Maritime University, Sweden.
- Nzavu, S.N. 1985. *The Importance of a Merchant Fleet in Kenya*. M.Sc. thesis, World Maritime University, Sweden.
- Pace, M.H. 1979. *Determination of Ocean Freight Rates: Towards a New Formula*. Bremen: Bremen Institute of Shipping Economics.

Sodersten, B. 1970. *International Economics*. London: Macmillan Press.

UNCTAD, 1970. *Protection of shippers: Guidelines for Developing Countries*. Geneva: United Nations.

UNCTAD. 1987. *Ocean Freight Rates and Their Effects on Exports of Developing Countries*. Geneva: United Nations.

UNCTAD. 1981. *Open Registry*. Geneva: United Nations.

UNCTAD. 1986. *United Nations Code of Conduct for Liner Conferences*. Geneva. United Nations.