

SHIPPING NEW ZEALAND'S AGRICULTURAL EXPORTS:

BACKGROUND AND ISSUES

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*THE AGRICULTURAL ECONOMICS RESEARCH UNIT*

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## PREFACE

This study has been undertaken as part of the Agricultural Economics Research Unit's programme of research into marketing costs of New Zealand's agricultural products.

The present report has been compiled in order to provide background to a highly significant component of New Zealand's marketing costs, that of overseas shipping. It is anticipated that the report will be of assistance to those policy makers concerned with marketing and transport of agricultural exports, as well as providing general background to a number of long term shipping issues facing agricultural producers and exporters.

Professor J.B. Dent  
Director

## SUMMARY

This report presents a background to international sea transport and identifies a number of sea transport issues relevant to New Zealand agricultural producers and exporters.

Sea freight is shown to contribute a highly significant proportion of total farm gate to overseas port marketing and processing charges for major agricultural products exported from New Zealand.

Various types of shipping systems exist in world trade; New Zealand shippers predominantly use regular services organized into conferences; this predominant use of conference lines has been partly based on the very demanding shipping requirements of the meat trade as well as a lack of incentive for utilising alternative shipping systems.

Issues discussed in the report, other than the choice of shipping system, are the conference system of setting freight rates, containerisation, integration of Australian and New Zealand shipping services to other countries, and cargo concentration and port efficiency in New Zealand. These issues are discussed, and some conclusions and recommendations presented.

## ACKNOWLEDGEMENTS

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## CHAPTER 1

### INTRODUCTION

As an island state with an economy vitally dependent on trading activity, New Zealand's (N.Z.'s) overseas cargo transport system is a crucial link in its marketing and supply chains. However, the economics of sea transport in the N.Z. context is surprisingly poorly documented. The objective of this report is to assemble background information on present shipping systems for N.Z. and to highlight some of the major longer term issues currently facing N.Z. shippers. The report has been prepared mainly from the point of view of the shipper and concentrates more on export cargo than on imports. Exports of agricultural origin are given particular attention since such cargoes account for a high proportion of export cargo both by weight and by volume.

Chapter 2 of this report establishes the importance of the overseas shipping activity in an agricultural marketing context. Chapter 3 defines different types of shipping systems that exist in sea transport and describes recent world trends in cargo shipping. An account of current N.Z. cargo flows and shipping systems is given in Chapter 4. Chapter 5 attempts to identify the major shipping issues facing New Zealand and highlights a number of courses of action that N.Z. shippers could pursue for the future. Conclusions and recommendations emanating from the study are presented in Chapter 6.



## CHAPTER 2

### IMPORTANCE OF SHIPPING IN MARKETING NEW ZEALAND'S AGRICULTURAL PRODUCTS

#### 2.1 Sea Freight and Marketing Charges

The shipping sector is a principal component of farm gate to market charges for most of N.Z.'s agricultural exports. To demonstrate the significance of the sea freight charge, a summary of charges from farm gate to overseas market for major exports of agricultural origin together with the sea freight component is given in Table 1.

TABLE 1

Marketing and Processing Charges from Farm Gate to  
Overseas Port for Agricultural Exports Showing  
Relative Magnitude of Sea Freight (1975/76 Season)

Agricultural Export	Farm Gate to Market Charge (\$/tonne)	Sea Freight Rate (\$/tonne)	Sea Freight Rate as % Charges from Farm Gate to Overseas Port
Wool <sup>a</sup>	350	159	45
Lamb <sup>b</sup>	463	213	46
Mutton <sup>c</sup>	484	212	44
Beef <sup>d</sup>	461	132	29
Butter <sup>e</sup>	242	122	50
Milk Powder <sup>f</sup>	265	90	34

<sup>a</sup>Refers to greasy wool sold through auction destined to U.K; sea freight figure refers to net freight rate.

<sup>b</sup>Refers to carcass lamb destined for U.K.

<sup>c</sup>Refers to carcass mutton destined for Japan.

<sup>d</sup>Refers to boneless beef destined for U.S; sea freight figure also includes marine insurance.

<sup>e</sup>Refers to cartoned butter destined to U.K.

<sup>f</sup>Refers to milk powder despatched to Asian markets.

Sources: New Zealand Wool Marketing Corporation; the New Zealand Meat Producer, 5(3), 1976 and 4(9), 1976; New Zealand Dairy Board.

For greasy wool destined to U.K. (and to most of Europe as well) sea freight made up some 45 percent of total farm gate to overseas port charges in the 1975/76 Season; for scoured wool this proportion would be slightly lower. For lamb destined for sale at the Smithfield (U.K.) market, sea freight in January 1976, made up 46 percent of farm gate to U.K. port charges; sea freight for lamb was higher than the killing and freezing charge within New Zealand. For mutton marketed in Japan, sea freight contributed 44 percent of farm gate to Japanese port charges and for beef, sea freight made up 29 percent of charges from farm gate to the port of New York.

For dairy products, the sea freight for butter destined for the U.K. made up 50 percent of farm gate to U.K. port charges; for milk powder destined for Asia, sea freight contributed 34 percent of farm gate to overseas port charges. In addition, distribution and shipping costs made up nearly 70 percent of total marketing and processing charges for apples and pears in 1975/76, with export shipping costs being the major costs involved.

Overall, the foregoing Table shows that the sea freight sector is a substantial component of marketing charges for the majority of N.Z.'s products that are exported.

## 2.2 Rates of Increase for Sea Freight for Major Cargoes

Sea freight rates for N.Z. export cargoes are not well documented, largely because most cargoes are carried by consortia of shipping lines; the consortia agree contract rates with shippers. Although such rates are not freely available, rates of freight can be assembled from various sources and the lack of documentation probably reflects more the lack of interest in shipping economics within N.Z. than the

difficulty in assembling rates.

Historical sea freight rate series for major export products are detailed in Tables 2 and 3, and are presented in index form (1960=100) in Table 4, together with indices of farm product and farm input prices.

TABLE 2

Sea Freight Rates for Greasy  
Wool Shipped to U.K./Europe

	U.K. pounds/tonne	U.S. cents/kg	N.Z. cents/kg
1 Dec 1960	28.188	7.91	5.68
1961	26.424	7.41	5.32
1962	22.859	6.40	4.60
1963	24.960	6.98	5.03
1964	27.461	7.66	5.53
1965	30.125	8.44	6.07
1966	31.923	8.90	6.43
1967	33.120	7.96	7.10
1968	35.935	8.56	7.70
1969	36.765	8.82	7.88
1970	38.052	9.10	8.15
1971	42.800	10.88	9.10
1972	42.400	9.97	8.34
1973	56.020	12.94	9.06
1974	57.640	13.46	10.26
1975	81.740	16.58	15.89
1976	105.183	17.89	18.84

Note: Up to 1976, freight rates were set in pounds sterling terms. The above rates have been adjusted for appropriate currency adjustment surcharges, bunker surcharges and rebates and are therefore net rates. Above rates have been expressed in U.S. c/kg due to the instability of sterling. From 1976, rates for carriage of wool actually have been set in U.S.\$\$. Exchange conversions have been made from rates published each year in the Bulletin of the Reserve Bank of New Zealand.

Source: New Zealand Wool Commission, Report for Year ended 30th June 1969; New Zealand Wool Marketing Corporation.

TABLE 3

Sea Freight Rates for Lamb Carcasses,  
Butter, and Cheese Shipped to U.K.

	U.K. pounds/tonne		N.Z. cents/kg	
	Lamb Carcasses	Butter & Cheese	Lamb Carcasses	Butter & Cheese
1 Dec 1960	30.63	17.94	6.17	3.61
1961	30.63	17.94	6.17	3.61
1962	32.47	19.01	6.54	3.83
1963	32.43	19.01	6.53	3.83
1964	34.08	19.96	6.86	4.02
1965	34.08	19.96	6.86	4.02
1966	36.28	21.34	7.31	4.30
1967	37.66	22.16	8.07	4.75
1968	39.04	22.99	8.37	4.93
1969	40.05	23.54	8.58	5.04
1970	41.89	24.60	8.98	5.27
1971	56.44	33.15	12.01	7.05
1972	60.41	35.47	11.89	6.98
1973	70.33	41.28	11.37	6.67
1974	94.80	55.64	16.87	9.90
1975	109.79	62.94	21.34	12.23
1976	140.10	74.30	25.11	13.32

Source: N.Z. Dairy Board

N.Z. Meat Producers' Board

TABLE 4

Price, Farm Input Cost, and Sea Freight Indices  
for Wool, Lamb and Butter  
(N.Z.\$ base, 1965/66 = 100)

Year ending 30th June	Wool		Lamb		Butter		
	Farm Gate Price Index <sup>a</sup>	Sea Freight Rate Index	Farm Gate Price Index <sup>b</sup>	Sea Freight Rate Index	Export Price Index <sup>c</sup>	Sea Freight Rate Index	Farm Input Price Index <sup>d</sup>
1966	100	100	100	100	100	100	100
1967	83	106	106	106	95	107	103
1968	63	117	111	118	97	119	107
1969	78	127	123	123	99	123	110
1970	71	130	150	125	99	126	114
1971	67	134	131	132	104	132	119
1972	84	150	109	176	176	176	127
1973	191	137	176	174	139	174	133
1974	184	150	223	166	120	167	152
1975	115	169	150	246	133	247	172
1976	206	262	206	312	178	305	193
1977	284	310	268	367	N.A. <sup>e</sup>	332	229

<sup>a</sup>Auction Price

<sup>b</sup>P.M. Grade Schedule

<sup>c</sup>F.O.B. Prices

<sup>d</sup>Based on an input price index for sheep farmers; inspection of input price indices for both sheep and dairy farming showed both have moved in a similar fashion.

<sup>e</sup>Not available at time of typing.

Source: Annual Review of Sheep and Beef Industry, 1976/77, New Zealand's Meat and Wool Boards' Economic Service; Monthly Abstract of Statistics, July 1977.



Table 4 exemplifies the dramatic increase in sea freight rates over the past five years; sea freight rates have increased faster than farm input prices as well as farm gate prices for the three major exports considered.

### 2.3 Total Sea Freight Bill for N.Z.

Accurate estimates of a total sea freight bill for N.Z. export cargoes are difficult to assemble due to the effort involved in assembling various rates of freight for individual cargoes as well as the number of trade routes involved. However, an estimate of the sea freight bill for the major agricultural export cargoes carried by liner services is attempted in Table 5.

If freight bills for sheepskins, tallow, hides and skins, fruit, vegetables etc., are added to the estimates of Table 5, the N.Z.\$260 million total would be considerably increased. In addition, cargoes such as grains, apples and pears, timber products etc., are not shipped in liner services but add further to the export shipping bill. The total sea freight bill for N.Z.'s agricultural exports for the 1975/76 season could be approaching \$400 million. Sea freight for exports of manufactured products in 1975/76 was probably of the order of \$50-100 million. If imports are included, the total sea freight bill for New Zealand may have been of the order of \$700 million in 1975/76; substantial increases in freight rates have occurred since so that in the current year the total bill may be of the order of \$800-900 million.

Unlike most developed countries, this aggregate export shipping bill for N.Z. can be seen as a direct drain on foreign exchange earnings. This is because prices of major exports are determined by overseas markets and producers' returns are therefore lower

TABLE 5

Estimates of Annual Sea Freight Bill  
for Major Export Cargoes (1975/76 Season)

Cargo	Tonnage Exported	Freight Rate Estimate <sup>b</sup> (N.Z.\$/tonne)	Estimated Total Freight Cost (N.Z.\$million)
Wool	269168	200	54
Meat	697517	230	160
Dairy Produce	458820 <sup>a</sup>	100	46
Total			260

<sup>a</sup>Dairy exports in the 1975/76 Season were less than dairy production due to the trade recession; in a normal year, around 600,000 tonnes would be exported.

<sup>b</sup>Freight rate estimates take account of different products, cargo forms, and overseas destinations.

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Source: Tonnages extracted from Annual Reports of New Zealand Wool Marketing Corporation, New Zealand Meat Producers Board, and New Zealand Dairy Board.

than potential revenues by an amount equal to the export freight bill. In addition, the ability of N.Z. products to compete on overseas markets can easily be influenced by rates of freight.

Making sales of some products can be particularly sensitive to small changes in the levels of sea freight incurred (e.g. milk powders). Other products (e.g. wool) will not be so sensitive to small freight rate changes. Nevertheless, rates of freight directly influence farm gate prices of most of N.Z.'s agricultural exports.

#### 2.4 Sea Transport and Marketing

Apart from the cost of sea freight, the shipping sector is vital in an overall marketing context. Shipping service attributes such as frequencies and reliability of sailings, transit time, documentation, and damage-free transit all influence the overall level of service provided to overseas purchasers of N.Z. products or, in the case of c.i.f. sales, to N.Z. exporters attempting to meet competition in foreign markets.

The shipping system also interacts with other marketing activities such as stockholding, financing, and the transport and distribution systems both within New Zealand and countries importing N.Z. cargoes.



## CHAPTER 3

### BACKGROUND TO SHIPPING SYSTEMS

The major purpose of this Chapter is to define different types of shipping systems that exist in world transport and to describe briefly recent trends in cargo shipping.

#### 3.1 Liner and Tramp Shipping Systems

An often made distinction between cargo shipping systems is that between liner shipping and tramp shipping. Tramp shipping is characterised by non scheduled voyages, that is ships picking up cargo where and when it is profitable; tramps are usually concentrated along major trade routes. Freight rates for tramp shipping are negotiated by shipper and shipowner and usually vary substantially according to the supply of and demand for shipping in particular areas at particular times. The London Baltic Exchange is perhaps the most important centre where information on supply and demand is translated into actual freight rate agreements between shipowners and shippers on voyage and time charters. Tramp systems have been traditional in the bulk trades (e.g. grain) and have been associated more with lower than higher valued cargoes.

The liner shipping system, on the other hand, is characterised by vessels plying regularly between specified ports, sailings being advertised in advance. Liner freight rates do not vary as much as tramp rates and are effectively set by the shipping companies participating in the trade. Most liner trades are organized into 'shipping conferences'. The main function of a conference is to protect its member lines from internal competition by fixing a common schedule of freight rates for the route; other

methods by which internal competition is dampened are the control of numbers of sailings by individual member lines, the sharing of cargo according to some prearranged pattern, and, in some conferences, the sharing of certain revenues generated from the route. Liner systems have been particularly suited to trades involving small consignments of goods and where large numbers of shippers are responsible for the cargo flow.

The argument for 'monopoly' rate fixing to avert ruinous competition in transport industries, and other industries with high overheads and low variable costs, has often been used to defend rate fixing by shipping conferences. With variable costs only perhaps 20 percent of total costs, each shipping company would be enticed in the short term to reduce rates down towards the level of variable costs in an entirely competitive situation; in turn this would result in disruption to the shipping industry and perhaps closure of some lines. However, this traditional argument assumes an inelastic demand for shipping and a permanent overcapacity of tonnage. On the latter point, it is apparent that some flexibility exists between trades as liner companies currently move small amounts of tonnage between various trades in which they are engaged.

The stability of rates and regularity of sailings provided by the conference system have come to be considered as positive benefits accruing to shippers. The lack of rate competition, however, is often cited as a major disadvantage of the conference system leading to the maintenance of over-capacity, high cost services, and lack of flexibility with respect to changing demand and trade patterns.

It is important to note how conferences resist

'outside' competition such as non-conference liner services and tramp vessels. Many freight rate 'wars' have resulted from non-conference shipping companies competing with established liner conferences. The outside company has been either driven out from the trade by this rate cutting, or if commanding substantial financial reserves, may eventually gain a place within the conference service. Conferences also protect themselves from outside competition by a system of deferred rebates or contract rates. Deferred rebates hold shippers to sole conference use by allowing rebates on freight rates paid by shippers over a past period, provided the shipper has remained 'loyal' to the conference lines. If a shipper has made use of a non-conference vessel, the rebate is not allowed. For the same reason, contract rates are lowered rates given to shippers for loyalty, but are usually not deferred so are not considered so inhibiting to competition.

A major problem in setting rates of freight for various cargoes when more than one cargo is carried in the same sailing is that of apportioning overhead costs to the different cargoes carried. Either weight or volume can be the limiting factor on how much cargo can be carried by a particular ship; which factor is limiting will depend on the cargo characteristics and the ship specification. It would be theoretically possible to apportion overhead costs by a weight or volume factor, or a combination of the two, but in practice this is rarely effected.

Instead of attempting to allocate overhead costs to various cargoes, and so set rates according to the costs of carrying each cargo, conferences appear to set rates according to what the market for each particular cargo can accommodate with respect to its trading activity. Such rates are also set within bounds dictated by potential outside competition. High

value cargoes are therefore often charged more than low value cargoes (relative to what would be charged on a weight or volume basis); in this respect the value of each cargo appears to be taken as a proxy for the elasticity of demand for shipping for that cargo. Such rate discrimination may lead to cross subsidisation of rates between cargoes.

A challenge to the established liner conferences has recently emerged in the form of a United Nations code on liner conferences; such a code would support developing countries by enabling 40 percent of their trade to be carried by their own ships; however, difficulties in ratifying such a code are numerous and a successful implementation of its objectives may take considerable time. Nevertheless, flag preference legislation among developing countries is increasing without United Nations backing.

A further threat to conferences and Western liner shipping has emerged in the 1970's in the form of a greatly expanded Russian fleet of conventional ships, and more recently, of container and Ro-Ro vessels. Russian ships have been increasingly competing as cross-traders with established liner conferences as outsiders and, because of the Soviet system's incompatibility with Western costing procedures, are able to undercut rates derived in a Western economy fashion.

Several alternatives to current conference rate fixing procedures have been suggested including a forward or futures market in freight rates. A suggestion for a multi-level tariff system for liner freight rates has been made by Evans and Behnam [1975]; freight rates would vary within set bounds but within these bounds rates would reflect the desired level of shipper requirements.

A detailed account of liner conferences is available in Deakin and Seward [1973], and more



general descriptions in Goss [1968], Bennathan and Walters [1969], and Sturmev [1975].

### 3.2 Other Shipping Systems

In between tramp and liner shipping systems are a number of other systems including time chartering, contract agreements, bareboat chartering, and integrated shipping. Under a time charter agreement, a shipowner hires out his ship for a specific period (months or years) for a specified charge. Time charter rates, especially those over longer periods, are usually more stable than single voyage charter rates and are used when regular shipments throughout a period are desired.

Contract agreements are another method by which a shipper and a shipowner can each gain security; various contract arrangements can be made whereby a shipowner contracts to provide a certain number of ships, or sailings, or to move an agreed amount of cargo over a specified period or periods; the shipper may have to guarantee a certain minimum amount of cargo. Rates can then be fixed several years ahead often with built in cost inflation allowances.

Bareboat chartering and integrated shipping both refer to a situation where the shipper requires complete shipping control and actually purchases or builds ships for his trade (integrated shipping) or, to avoid the initial capital commitment, charters a ship (or ships) on a long term basis and runs it as his own.

These 'in between' shipping systems are quite common in the bulk trades and where large quantities of raw materials or other large consignments of uniform products are to be moved on a regular basis

from one region to another (e.g. oil, iron ore, timber products). Such contractual arrangements are increasing in terms of trade volume at the expense of both liner and tramp systems; for example, the rapid increase in the volume of semi-bulk commodities carried by bulk carriers is referred to in an Unctad Report in 1971 [Anon 1971a]. To some extent this change is the result of economies associated with ship size and specialisation to which further reference is made in Section 3.3.

### 3.3 Trends in Ship Types and Sizes

Technological change has been occurring in sea transport throughout history. The change from sail to steam, the introduction of refrigerated ships, and the change from coal to oil powered ships, have all contributed to lower shipping costs and greater trading activity around the world.

The type of conventional cargo ship employed in liner services after World War Two, remained virtually unchanged up until the early nineteen sixties: multi-deck vessels of about 10-15000 deadweight tonnes running at about 15-18 knots [Laing, 1975]. Cargo handling expenses (loading and discharging) made up some 50 percent of gross freight income and time spent in port was some 30-50 percent of total round voyage time [Getz et al, 1968]. For example, in the N.Z. to U.K./Europe trade in the early sixties it was reported that about 60 percent of total round voyage time was spent in port, although cargo was being loaded or discharged for only 15 percent of the time ships were actually in port [Johnson and Garnett, 1971].

The major change that ensued was the introduction of improved cargo handling systems by way of cargo unitisation allowing more cargo to be lifted per

crane movement; a specific form of unitisation, containerisation, became extremely popular in the mid-sixties and thereafter, since it achieved even faster turnround of ships due to complete unification of cargo form. Further reduction in port time was achieved by the introduction of 'cellular' container vessels where containers could be lowered neatly into slots in the ship's hold, simplifying stowage procedures. The benefits of improved cargo handling systems arose from both a reduction in handling costs per se, and quicker turnround times which in turn led to fewer ships required to service a particular quantity of cargo.

Other cargo handling systems (e.g. pallet systems) and ship types (e.g. unit sideloading, Roll-on roll-off, Lash, Liper) have also been developed and have been competing with the cellular container ship concept. However, cellular container ships currently outnumber other modern cargo liners with conventional cargo liners decreasing in importance.

The traditional 'tramp' ship has in recent years been mainly concerned with the grain trade. Greater specialisation of ship types in terms of car carriers, paper pulp carriers, chemical carriers, fruit carriers, and other specialised carriers, as well as an increase in general 'bulk carriers' has reduced expansion of the traditional 'tramp' fleet. Such specialisation has been accompanied by an increase in contract arrangements over longer periods between shipper and shipowner. Integrated shipping has also increased (e.g. oil tankers).

Faster turnround times have enabled advantage to be taken of economies of ship size. Under traditional labour intensive handling systems, to

increase ship size would have increased the proportion of time such ships would need to spend in port since cargo quantities would be greater; having a more expensive (larger) ship tied up in port for even longer periods than was then the case would have more than offset other potential economies of scale in larger ships (e.g. lower operating costs at sea, lower capital charges per tonne of cargo carried).

With faster turnaround times, the advantages of scale economies are still not clear cut since larger ships usually still result in a higher proportion of their time in port. With longer round voyage distances, the proportion of time spent in port decreases and economies of scale are more likely to dominate.

Frequency of service demanded in a liner trade will also limit to what extent ship size economies can be exploited. Larger ships mean fewer sailings per annum which can have important implications for storage and financing arrangements and costs, as well as for marketing strategies for particular cargoes. Other factors affecting ship size are canal restrictions (e.g. Panama), as well as port and berth limitations.

Such theory has been borne out in reality. One of the most significant trends in modern shipping is that of increased ship size, particularly in the bulk trades where mammoth oil tankers (up to half a million D.W.T.) and giant ore carriers (up to 200,000 D.W.T.) can be considered phenomena of modern times. Bulk carriers achieve far greater economies of scale in capital costs than conventional liner vessels or even cellular container vessels, and are more amenable to 'free flow' cargo handling systems that mean time in port for larger carriers compared

with smaller carriers may not be increased proportionately to total cargo carried.

In the liner trades, there has been an increase in ship size associated with the change from conventional shipping to cellular container vessels and other ships utilising improved cargo handling methods but increases have been less than in bulk carriers. Container ships on the North Atlantic route vary from 500 to 2500 T.E.U. (say, 9000 to 45000 D.W.T.) and container ships on the Australian-Europe route are around 1250-1500 T.E.U. (say around 25000-30000 D.W.T.), compared with conventional cargo liners of 10000-15000 D.W.T.



## CHAPTER 4

### NEW ZEALAND EXPORT SHIPPING SYSTEMS

#### 4.1 Trade Routes and Liner Systems

Most of New Zealand's exports are carried by general cargo ships running within liner services; exceptions to this include:

- .The log and timber product trade which in part utilises bulk carriers and other specialised ships.
- .Apples and pears which are carried by specialised reefer vessels designed for the fruit trade.
- .Ironsands and other products of low value per unit weight suitable for shipment in bulk carriers.
- .Certain products sold f.o.b. or f.a.s. where various shipping arrangements are made by the purchasing organisation or country concerned.

If such exceptions are excluded, the major demand for sea transport out of New Zealand is derived from goods being carried to the regions listed in Table 6.

Whilst these figures are rather dated and tonnages vary from year to year in total as well as between destinations, Table 6 gives a fair indication of the major tonnage flows. Some waste paper and some timber may also be carried by cargo liners but has not been included here as most logs and timber products are carried by bulk carriers or other specialised shipping. Sheepskins and sausage casings have not been included in export tonnages of Table 6 since statistics for such exports are usually presented in numbers of items and conversion factors were not readily available. Both these cargoes are destined mainly for U.K./Europe/U.S.

The main feature of Table 6 is the dominance

TABLE 6

Major Export Cargo Flows Within  
Liner Services for Year Ending 30th, June 1973

Trading Region	Export Tonnage	Principal Commodities By Weight
United Kingdom and Europe	905,600	Lamb, beef, mutton, tallow, peas, butter and cheese, wool, hides and skins.
United States and Canada	236,966	Beef, lamb, mutton, cheese, casein.
Japan	199,038	Mutton, dairy products, tallow, wool.
South-East Asia	132,381	Dairy products.
South America	59,057	Dairy products.
Carribean and West Indies	29,666	Meat, dairy products.
Australia	23,483	Wool, peas and seeds.
Africa	13,948	Peas, tallow, dairy products.

Source: Adapted from New Zealand Year Book, 1976.



of U.K./Europe as still the major destination for export cargo; however, this market (particularly U.K.) has been contracting both pre-and post 1973. Japanese and South East Asian markets have been expanding as has been the Australian market for manufactured exports.

Information on import tonnage flows has not been assembled in this report.

#### 4.2 Description of New Zealand Liner Services

Detailed descriptions of liner services to and from New Zealand are given in a booklet produced by the Department of Trade and Industry [Anon, 1976]. The major liner services can be divided into the following groups<sup>1</sup>:

1. Service to U.K., Eastern and Western Europe, Scandinavia and Mediterranean Countries.

There are some 13 shipping lines serving this trade, by far the largest trade. Most ships are conventional liners but are currently being replaced over the next two years by predominantly cellular container ships; one line has announced its intention to use Ro-Ro ships; another development is the intended complete integration of the container and Ro-Ro services with those serving Australia.

Shipping lines on this trade are organized into a 'tight' conference that controls freight rates, sailing schedules, and utilises cargo sharing arrangements and revenue pooling. The Polish National Line currently operates outside the conference.

2. Service to United States and Canada (East Coast).

This service is made up by three lines, all of

<sup>1</sup>It is likely that changes to various services have taken place since these descriptions were compiled.

which run cellular containerships from Australia and New Zealand to the East Coast of North America. The lines make up what can be termed a 'freight conference'; competition in terms of service to customer, ports visited, frequencies of service, and tonnage carried, appears to exist.

3. Service to United States and Canada (West Coast).

This service is carried out by predominantly the same lines involved in the East Coast service. The service is partly containerised but some conventional shipping remains. Lines can also be considered to make up a 'freight conference'; the service is also integrated with Australia.

4. Service to Japan.

Four lines operate a service to Japan; most ships are conventional but three lines are now employing two cellular containerships on the route. The four lines are members of a shipping conference. A fifth line is operating on this route as well, outside the conference.

5. Service to South East Asia.

Three lines operate a joint service to the Phillipines, Hong Kong, and Taiwan. These lines also belong to a conference, and whilst a different service, are part of the same conference associated with the N.Z. to Japan service. Four conventional vessels are employed.

A new line has recently entered into competition with these conference lines. In addition, a British line has a service to Malaysia and Singapore, a Dutch line to Indonesia, Thailand, Malaysia and Singapore, and the Indian National Line serves South East Asian as well as Indian and Sri Lankan ports.

#### 6. Service to South America.

A British line operates a service to South American East and West Coast ports in association with the N.Z. to U.K. service; however, the service is not regular as most shipments of butter and milk powders are made in large consignments under contract to the Dairy Board.

#### 7. Service to Carribean and West Indies.

A container service has recently started to the Carribean by one of the lines engaged on the East Coast of North America trade. However, the main cargo of meat and dairy products is carried by a British Line under contract to the Producer Boards in association with the N.Z.-U.K. service; ships engaged can carry containers which are used for meat but not for dairy products. Other cargoes are often transhipped from East Coast North America ports.

#### 8. Service to Australia.

Apart from the Union Steamship Company, which provides a Ro-Ro service as well as a conventional ship service, the Australian National Line run an irregular service from Australia to New Zealand as part of its 'round the world' container service.

#### 9. Service to Africa.

A Dutch line runs a conventional vessel service to South and East African ports. South and West African ports may also be served by the British Lines involved in the N.Z.-U.K. trade.

#### 10. Service to Persian Gulf.

A British Line runs a conventional vessel service to the Arabian Gulf; the trade may be containerised in 1978.

It would appear that liner services within the



by the Dairy Board or when such products are sold f.a.s. or f.o.b. Major arguments for the predominant use of liner services for these major products have been the need for regular services, the need for stable freight rates, and the dependability of the lines involved.

Up until the 1970 season, apples and pears also were shipped out of New Zealand in liner services. However, in the 1971 season, specialised fruit carrying vessels were engaged on a contract basis by the Apple and Pear Marketing Board to ship most of the fruit to U.K./Europe and North America. The switch away from liners was made due to freight rate savings, a requirement for strict temperature control that may not have been possible with containerisation, and the attainment of greater marketing flexibility in being able to control up until the last minute where ships loaded and discharged, such decisions being made according to the relative strengths of different markets.

Apart from the influence of customer requirements on the type of shipping system used, the shipper organisation within New Zealand also has a marked influence. For example, the Dairy Board and Apple and Pear Marketing Board are export monopolists which bestows greater flexibility to the Boards on their choice of system; it is noteworthy that these Boards are the only Producer groups to use anything other than liner shipping.

The Meat Producers' Board and the Wool Corporation both have shipping control, but use only liner services, due in part to the multi-shipper nature of their marketing systems.



## CHAPTER 5

### MAJOR SHIPPING ISSUES FACING NEW ZEALAND

This Chapter is aimed at identifying a number of major long term issues in export shipping and makes suggestions as to possible courses of action that N.Z. shippers of agricultural products could pursue for the future.

#### 5.1 Choice of Shipping System

As in most other trading countries, particularly less developed countries, shipping conferences organized around N.Z. export trades have been accepted in the past with mixed feelings. Within the N.Z. scene, most attention has been focussed on the N.Z. to U.K./Europe conference because of the size of the trade and the 'tightness' of the conference. The arguments for and against the conference system in the New Zealand context were aired at a Forum on New Zealand's Maritime Policy held in Wellington in 1968 [Anon, 1968]. Basic arguments put forward against the conference system were the lack of price competition, the monopoly position of the conference lines and the cost plus system under which they operated, as well as the effect of the conference system on the New Zealand Waterfront Industry.

A Commission of Enquiry into New Zealand shipping, reporting in 1971 [Anon, 1971b], touched again on the conference system:

Despite the pros and cons of the conference system, no critic of it has yet suggested a workable alternative arrangement which can provide what a shipper in New Zealand needs most - high class specialised ships, regular sailings to ports as scheduled, whether the ship is full or half full, and a stable freight rate.

However, it could be disputed whether high class ships and regular sailings are really what are required by New Zealand shippers given the current seasonality of shipping requirements and ever escalating freight rates.

Various measures can be taken by Governments and shippers to offset the potentially negative effect of the conference system. They include

1. Encouragement of competition to the conference lines by shipper organisations. This measure has not been adopted by most New Zealand shippers and any initiatives in this area have come from non-conference shipping companies.
2. Encouragement of competition to the conference lines by Government. This measure has not been adopted in New Zealand where the Government is apparently 'neutral', and sees shipping arrangements lying in the domain of N.Z. shippers and Producer Boards. Government incentives to competition, such as the banning of the loyalty rebate system by the United States Government, have not been manifest in N.Z. Government policy.
3. A policy of establishing a National Shipping Line, so that over time knowledge of conference activities can be built up and pressure exerted on the conference accordingly. Such ventures by Governments of other countries have not exhibited marked success in the past [Bennathan and Walters, 1969]; this could be due to conflicts between the objectives of ensuring profits, and holding down freight rates. New Zealand has clearly opted for this policy by establishing, early in 1974, the Shipping Corporation of New Zealand.



4. Action by Governments through international co-operation such as through the U.N.'s deliberations on a code for liner conferences.
5. Costing exercises such as those involved in the London Agreement<sup>2</sup>. However, instead of freight rate increases being granted according to a cost plus formula, greater benefits may accrue by the N.Z. Government or shipper groups independently costing existing and alternative services in order to suggest (and indeed demand) where cost savings, improvements and rationalisation of services may be effected, especially in terms of different ship types, scheduling arrangements, and internal cargo movements. The desirability of having such information available would indicate the need for a more detailed data base and a greater research effort into shipping.

Alternatives to the conference system.

Wool could be shipped economically in unit load form in modern conventional ships or in bulk carriers under long term contract systems [Anon, 1971c; Chudleigh, 1975]. However, the likely response from the N.Z. to Europe/U.K. conference of losing wool from their carriage would be to increase freight rates on meat and dairy products. Whether this is a valid argument is doubtful and is in need of further study [Chudleigh, 1976].

It is possible that lower cost shipping using a unit load handling system could be initiated for

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<sup>2</sup>In the London Agreement, the British Conference Lines present details of their accounts to an independent firm of accountants; such details are then used in freight negotiations between Producer Boards and the Lines.

N.Z. to Europe/U.K. dairy product cargo; again such a move is probably inhibited by the potentially higher conference line charges for meat that may ensue.

Meat cargoes, because of their high demand on reefer space, are not so amenable to movement by alternative means. Whilst refrigerated tonnage probably exists outside the lines currently serving New Zealand, the procurement and organization of such tonnage to meet the December to June peak shipments for meat may be extremely difficult; this period also coincides with a period of high world demand for refrigerated shipping space. This demand for refrigerated capacity considerably constrains alternative shipping systems that may be envisaged to the conference system.

In addition, if support is to be given to the N.Z. manufacturing export sector, liner systems (and therefore conference systems) may be quite essential in sector development and expansion. Nevertheless, considerable scope for different shipping system combinations exists, especially since, with the Australian-N.Z. integration of most trades, the rudiments of a liner system will almost always be present. The splitting off of further base cargo from liner conferences for carriage by alternative systems must remain a possibility. The effects of such possibilities require careful research and exposition.

## 5.2 Liner System of Freight Rate Setting

Because cargo liners usually carry more than one cargo, the problem of what are 'correct' rates of freight is important in terms of identifying cross-subsidy effects between cargoes.

Cross subsidisation of rates between import and export cargoes may well be of significance. The identification of such cross subsidies would appear

important in terms of Government policies associated with the relative magnitudes of other support schemes to different producer groups (both agricultural and manufacturing). For example, an analysis of freight rates for Australian export products has shown that cross subsidisation appears to act as an export subsidy for manufactured items and as an export tax on wool [Zerby and Conlon, 1976].

### 5.3 Containerisation

Since this is the most current development facing New Zealand shipping, it is worthwhile reviewing the development of containerisation in the N.Z. trade. The following brief review is not exhaustive; further more detailed references to the early developments of containerisation in New Zealand are given in Sligo [1971].

In 1964, the Streamlining Committee [Anon, 1964] presented its report on shipping, ports, transport and other services and considered that containers would be unsuitable for the N.Z.-U.K./Europe trade at that time or in the foreseeable future. It is interesting to note that the Streamlining Committee Report has been hailed by Goss [1968], a leading world shipping economist, as "one of the most detailed and expert studies of a specific liner trade that has ever been carried out and may be regarded as a model for other trades".

In 1967 a Report on Container and Cargo Handling was produced by Shipping Line members of the New Zealand-U.K./Europe conference and has been subsequently referred to as the Molyneux Report [Anon, 1967]. The principal aim of the Report was to explore in greater detail the application of containers to the New Zealand-U.K./Europe trade. Whilst the Report referred to the advantages of containers in terms of quicker loading and discharging rates, a number of reasons why

containers were considered unsuitable for the N.Z. trade were raised:

1. The seasonal nature of exports from New Zealand.
2. The imbalance in volume of liner trade (less southbound than northbound).
3. The large element of refrigeration required northbound.
4. The large number of ports serviced at that time and the costs and difficulty in distribution with aggregation of cargo at fewer ports.
5. The unsuitability of the then existing transport and storage facilities, and other N.Z. support services.

When each of the major export commodities was considered, it was concluded that whilst all products could be carried in containers, fruit and wool could be equally or better handled by a pallet system, that dairy produce was flexible with regard to cargo handling, and that the lamb trade was seasonal and containers could therefore be an expensive cargo handling form. It was felt, however, that unit loading and palletisation of cargo would probably require new types of ships just as a change to a container system would.

The Report concluded that the major limiting factor to a container ship service was the amount of southbound cargo available. It was envisaged therefore that perhaps container ships could service the most balanced part of the trade in which lay the greatest profit potential, with the remainder of the trade being serviced by conventional shipping. The Report compared container ships with conventional and unit load ships and came to the conclusion that there was an advantage in container shipping, and that a limited container service should be introduced.

At a Forum on New Zealand's Maritime Policy held in Wellington in 1968 [Anon, 1968], a number of participants expressed doubts on the cost advantages of containerisation.

At about this time, the New Zealand Transport Commission contracted with the Metra Consulting Group Ltd., to investigate the containerisation proposal further. In 1969, Metra reported [Anon, 1969] that containerisation could lead to a reduction of about 20 percent in the total cost of transporting New Zealand's trade with U.K. and Europe. Palletised systems were estimated to reduce costs by only 10 percent.

At about the same time, the British Conference Lines announced that they would be containerising the trade from New Zealand to U.K./Europe with a fortnightly service utilising four ships to start in 1972 between Auckland and Wellington and the U.K. It was envisaged that most southbound but only 50 percent of containerisable northbound cargo would be carried in containers; this was due to the southbound/northbound trade imbalance. The N.Z. Government accepted the recommended service later in 1969.

Also in 1969, a decision was made that three fully cellular container ships would be built for a Columbus Line service between Australia, New Zealand, and the East Coast of North America. In June 1971, the first container ship on this service arrived, other lines followed, and the North American East Coast trade was soon to be entirely containerised.

However, in 1971, the British Lines unexpectedly cancelled their plans to introduce containers to the N.Z.-U.K. trade.

In 1972, the final Report of a Royal Commission

of Enquiry into Containers was published [Anon, 1972a].  
The Report concluded:

From the evidence which we have received, and our own studies, we are not satisfied that containerisation is a less expensive system for N.Z. exporters than that which it supersedes.

Despite these reservations, limited containerisation plans were again announced for the U.K./Europe trade in 1972, this time to be integrated with the Australian trade. These plans have been realised; currently other lines have followed and are implementing containerisation so that 85 percent of N.Z. exports to U.K./Europe are expected to be containerised by the end of 1978. The N.Z.-Japan trade, and N.Z.-West Coast of North America trade have also been partly containerised. It is sufficient to conclude that the introduction of containers to N.Z.'s export trade has been accompanied by considerable controversy.

If various studies aimed at comparing the costs involved in services of different ship types are considered (e.g. Anon [1969], Laing [1975], Nielsen [1975], Markussen and Bergli [1974]), the general consensus has been that 'conventional' shipping incurs higher costs than unit load, cellular container, or Ro-Ro vessels. However, comparisons between unit load, cellular container, and Ro-Ro vessels have not produced clear cut results; cellular containerships would appear to be slightly superior to Ro-Ro on a theoretical cost basis. This advantage would appear to be borne out by the predominantly cellular container ships operating on most deep sea routes.

A summary of the findings of some of these studies, especially those relevant to the N.Z.-U.K./Europe trade, are given in Table 7. Results presented in Table 7 are not exhaustive of all cost comparisons made over the years. Explanations for the different results would most likely be associated with the definition of the system being studied, and

TABLE 7

Summary of Cost Comparison Studies  
For Different Vessels and  
Cargo Handling Systems

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I Getz et al [1968]  
1967 Costs, U.S.A.-Europe Service, Receiving on Quay to Delivery Ex Quay.

Vessel Type	Type of Cargo Consignment	Cost (U.S. \$/ton)
Conventional	-	27.10
Pallet Vessel	Port to Port <sup>a</sup>	15.80
Pallet Vessel	Door to Door	12.60
Cellular Container	Port to Port	23.65
Cellular Container	Door to Door	17.15

II Markussen and Bergli [1974]  
1974 Costs, U.S.A.-Europe Service, Receiving on Quay to Delivery Ex Quay.

Vessel Type	Type of Cargo Consignment	Cost (U.S. \$/ton)
Conventional	-	56.52
Pallet Vessel	Port to Port	38.12
Pallet Vessel	Door to Door	31.70
Cellular Container	Port to Port	58.77
Cellular Container	Door to Door	43.80

III Metra Report [1969]  
1968 Costs, N.Z.-U.K.

Service Type	Total System Costs (Cargo Origin to Destination) (N.Z.\$m per annum)
Conventional	
Break Bulk Cargo	98.80
Palletised Cargo	89.55
Container Fleet and Residual Service	80.80

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TABLE 7 (contd.)

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 IV Laing [1975]  
 1971 Costs, U.K.-N.Z. Service, Dock Gate to Dock Gate

Vessel Type	Size of Ship	Cost £STG/ton
Conventional Cellular Container		27.61
	1000 T.E.U.	24.18
	2000 T.E.U.	22.81
Lash		24.93
Ro-Ro		
	10000 D.W.T.	27.59
	20000 D.W.T.	24.95

 V Nielsen [1975]  
 1974 Costs, Europe-Australia

Vessel Type	Type of Cargo Consignment	Cost (U.S. \$ per ton.)
	General Cargo	
Conventional	Pier to Pier	127.82
Cellular Container	Pier to Pier	104.79
Ro-Ro with Pallets	Pier to Pier	110.59
with Containers	Pier to Pier	123.26
Conventional	Door to Door	129.48
Cellular Container	Door to Door	94.10
Ro-Ro with Pallets	Door to Door	102.11
with Containers	Door to Door	112.57
	Newsprint	
Conventional	Pier to Pier	100.69
Cellular Container	Pier to Pier	86.63
Ro-Ro with Bolster		
Operation	Pier to Pier	74.69
With Containers	Pier to Pier	102.30

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<sup>a</sup>The type of cargo consignment determines whether cargo has to be aggregated (disaggregated) (e.g. container unpacked) in the port; if such an activity is required the quay to quay cost is increased.



particular characteristics of individual trades.

Even though cellular container ships would appear to dominate most dense traffic trades, Markussen and Bergli [1974] state that in the seven years from 1967 to 1974, fuel and steel prices have increased by amounts far greater than other costs (Table 8) and that this relative change has worked against cellular container shipping.

TABLE 8

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Increases in Costs Associated with Shipping  
1967 to 1974

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Capital Costs of Ships	% Increase
Conventional	220
Pallet	350
Container	540
Fuel	450
Running Costs	50
Port Expenses	30
Cargo Handling	100
Equipment	
Pallets	100
Containers	50

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Source: [Markussen and Bergli, 1974].

Similar doubts have been expressed elsewhere on the economics of cellular container vessels. Hurst [1976] has commented that even before the oil price increase, fears were expressed on the overspecialisation of the cellular vessels, and that it was unlikely that the then present generation of highly specialised cellular container vessels would be repeated for most trades.

The imbalance of New Zealand's traditional liner trade with respect to cargo tonnage must be a major issue to those concerned with the successful introduction of the high degree of containerisation now envisaged on the N.Z. to U.K./Europe trade. In a study published in 1974 [Anon, 1974a] the New Zealand Ports Authority reports projections of the number of containers moving in and out of New Zealand in 1980 and 1990, assuming that most liner cargoes are containerised. A summary of these projections for all trades is given in Table 9; projected container requirements for the N.Z./European trade adapted from the same source are given in Chudleigh [1976].

It is believed that estimates for all trades by the various shipping lines for 1978 show less of an imbalance:

about 110,000 export containers,  
80,000 import containers.

It is possible that the unexpected stagnation in N.Z. agricultural output accounts for some of this variation in estimates. Nevertheless, the imbalance will necessitate the transport of large numbers of empty containers across the Tasman or from other origins as well as substantial repositioning and extra handling within New Zealand. As most cost studies on containerisation have assumed reasonably balanced trades, it would be of interest to carry out analyses for different handling systems, ship types, and

TABLE 9

Projected Number of Containers  
Required For Exports and Imports  
by Region by Year

		1980		1990	
		Exports	Imports	Exports	Imports
Auckland	Full: <sup>a</sup>	88,600	55,100	106,500	58,000
	Reduced: <sup>b</sup>	53,000	41,000	63,400	40,000
Wellington	Full:	69,600	18,400	68,700	8,200
	Reduced:	55,600	13,700	52,400	5,700
South Island	Full:	68,700	15,000	79,500	9,800
	Reduced:	22,300	11,200	66,100	7,100
Total	Full:	226,900	88,500	254,700	76,000
	Reduced:	130,900	65,900	181,900	52,800

<sup>a</sup>"Full" - Assumes containerisation of all trades and of all cargo suitable for containerisation.

<sup>b</sup>"Reduced" - Assumes no containerisation of Mediterranean, Middle-east, African or South-east Asian trades; assumes meat loaders operational up to 1980, but not 1990; allows for deductions for cargoes likely to be shipped in conventional or Ro-Ro vessels.

Source: New Zealand Ports Authority [Anon, 1974a].

degrees of containerisation with respect to the unbalanced N.Z. trade, both integrated with the Australian trade and as a direct New Zealand service.

The difference between containerisation and the use of cellular container vessels should be noted; many non-cellular container vessels can carry containers (probably at lower efficiency than cellular vessels) but are also capable of carrying other cargo forms. For example, the Ro-Ro ships expected to commence on the N.Z.-Europe trade in 1978 will probably carry containers but their flexibility in cargo form will allow a more balanced container flow to be achieved than will be the case for cellular container operators.

The question of whether predominant containerisation of all major N.Z. liner trades was a good decision is now really only of academic interest. The decisions have been made, and the shipping line, harbour board, railway, and shipper facility investment has been undertaken. In addition, some groups of customers for New Zealand's agricultural products are 'container orientated'; information on the desire to receive goods in containers still requires clarification by product and by geographical area.

The real issue at present is to make containerisation work efficiently in the short term. Experience in other countries suggests that it could take considerable time in N.Z. before an efficient container movement pattern is established.

In the longer term it is important that alternative cargo handling forms for specific products are evaluated alongside containerisation so that future replacement decisions on the overall container infrastructure are made in the national interest.

The question of what ship types should in future carry the mix of containers and other cargoes shipped out of New Zealand is another important issue that should be tackled with longer term interests in mind. In this context, it is important to note the importance of cargo handling rates and costs in determining the least cost overall shipping technology [Gilman, 1977].

#### 5.4. Integration with Australian Liner Trades

Foreign shipping companies serving Australian trades are similar to those serving New Zealand. Whilst past conventional services were not integrated to a large extent, the movement towards larger and faster vessels has enabled the services from Australia and New Zealand to Europe and from Australia and New Zealand to North America (both coasts) to be highly integrated, presumably on the rationale that higher load factors may be achieved if both countries are visited. In this regard, it is likely that New Zealand exporters may benefit more than Australian since the higher Australian trade volumes would allow reasonably high load factors to be obtained without New Zealand but not vice versa. In addition, on the U.K./European trade, northbound-southbound container imbalances between U.K./Europe and Australia (more cargo southbound) and U.K./Europe and New Zealand (more cargo northbound), should be compensatory. An important issue for the future will be the relativity in freight rates for similar cargo carried to U.K./Europe from Australia and New Zealand. Such relativities may become of greater importance in freight rate negotiations.

It is interesting to note that the integration of the trades is not given a very wide exposure by the lines. In analysing services and ship schedules in the weekly New Zealand Shipping Gazette, it is not apparent that such integration is currently being practised at all.

One implication of integration is that greater numbers of container ships will be calling at New Zealand compared with the situation if direct services had been used. For example, it was originally envisaged that five ships would be sufficient on the N.Z./Europe service; with integration, the number of ships calling at New Zealand will be 14 or more on this service. It could follow that considerably greater investment in berth and handling facilities has been required. On the other hand, perhaps improved labour utilisation on the N.Z. waterfront could also result from more ships each loading smaller amounts of cargo.

#### 5.5 Cargo Concentration

One of the major local implications of larger more costly ships and improved cargo handling rates is the economy that can be achieved by concentrating cargo at fewer ports. The implications for rationalising port facilities, especially where costly port investment is required, have been recognised at an early stage in New Zealand by the establishment of the Ports Authority Act 1968, whereby the New Zealand Ports Authority was set up to coordinate an efficient ports system. The Authority's major control is through its right to control loan monies for individual Harbour Boards.

The regional socio-economic impact of concentrating cargo at fewer ports is currently of major concern to what have now been termed the 'secondary' ports, those ports not designated as cellular container ports.

The original Metra Study [1969] showed that the least cost shipping system for the U.K.-Europe trade would utilise one or two ports in New Zealand and originally, container facilities were approved for both Wellington and Auckland. Pressure for a South Island container port increased with the result

that there are now four N.Z. ports designated to construct container handling facilities. Political pressures have now been diverted to the number of berths and container cranes to be made available in each port [Anon, 1974b; Anon, 1977].

Whilst a high degree of import cargo distribution from a reduced number of ports is probably inevitable, an alternative policy to all out cellular containerisation may have been for the Government or shippers to encourage less aggregation than now envisaged by encouraging a higher proportion of more flexible vessels in the trade and by encouraging the scheduling of such vessels to serve non-container ports. However, it is unlikely that the conference system could accommodate such an internally orientated policy within its own cargo sharing and revenue pooling agreements. The conflict of interests may be real; the objective function of the conference lines is not to maximize the total utility of its shippers or that of the New Zealand Government, nor is it to minimise total costs; it would be more likely to be one of survival and equity between lines in the profits they all seek.

#### 5.6 Port Efficiency

Whilst the issue of port efficiency is periodically highlighted in terms of strikes with ensuing delays and costs to cargo and ships, the relationship between N.Z. port efficiency and sea freight rates does not appear to have been given very much attention by New Zealand shippers.

Most liner sea freight rates are set to cover loading and discharging costs, operating costs of ships whilst at sea and in port (such as fuel, crew wages, port charges, stores, etc.), capital costs (interest and depreciation), and other overhead and administration costs. Some liner freight rates also cover various

pre- and post-shipment operations (e.g. wharfage, wharfhandling, centralisation levies, wool dumping). Such pre-shipment operations, when combined with loading and stowing activities, port charges, and the time ships actually spend in N.Z. ports, contribute a considerable proportion of the costs that make up the sea freight rates for N.Z.'s export products that have been reported in Chapter 2. It is not possible to estimate the size of this porportion without considerable research since the proportion may vary somewhat between cargoes. With appropriate research it would be possible to isolate proportions of the sea freight rates directly attributable to N.Z. on-shore activities.

Because most port activities have traditionally been the ship's responsibility, and because costs of such activities have been passed on in increased freight rates, the real significance of such costs has not been highlighted to New Zealand shippers. If liner freight rates were replaced with f.i.o. rates, increased efforts by shippers aimed at containing pre- and post-shipment charges may result [Anon, 1972b]. In this respect it is to be regretted that containerisation has advanced the role of the shipping companies further into pre-shipment activities.

Associated with the "responsibility" for costs in port is the conference practice (applied in N.Z.) of "averaging" sea freight rates so that the same rate is charged from all ports in N.Z. to a range of ports in the destination region. It is commonly argued that averaging destroys any incentive for an inefficient port to improve its efficiency as it is, in effect, subsidised by the other more efficient ports. Whether it would be possible to introduce differential freight rates or f.i.o. rates in the N.Z. conference lines context is worthy of investigation.



## CHAPTER 6

### CONCLUSIONS AND RECOMMENDATIONS

Sea freight has been shown to contribute a highly significant proportion of total farm gate to overseas destination marketing and processing charges. Sea freight rate increases in the past five years have been greater than increases in prices for major agricultural exports; if this pattern continues, New Zealand's ability to compete on international markets as well as give a return to agricultural production and processing activities may be threatened. In addition, shipping system characteristics other than cost are important in the overall marketing strategy for agricultural exports.

The traditional differentiation between liner and tramp systems of shipping is centred around regular versus irregular sailings and stable versus unstable freight rates. Most liner trades are organized into shipping conferences or cartels which limit competition between member lines; however, the stable rates and regular sailings are valued by shippers. Conferences set freight rates according to what the market for each particular cargo can accommodate; potential outside competition often provides the upper bound for some rates set by conferences. The United Nations code on liner conferences, increasing flag preference legislation, and an expanding Russian fleet are all currently testing the strength of the conference system.

Other shipping systems include contract agreements and time chartering, bareboat chartering and integrated shipping. Such systems have become increasingly important in the bulk and semi-bulk trades.

Over the past 20 years cargo unitisation has improved the turnaround time of cargo liners. Such improved cargo handling methods have been accompanied by changes in ship type and size. The increase in ship size is one of the most significant trends in modern shipping, particularly in the bulk trades.

Agricultural exports are shipped from New Zealand predominantly by liner shipping systems rather than by tramp systems, long term charter-contract systems, or integrated shipping. This decision has been largely based on the requirement for regular and dependable shipping services and charging rates of freight that are reasonably stable. Some exceptions to liner shipping do occur with respect to apples and pears, and some dairy products.

As most liner systems are associated with the conference or cartel system, the four major shipping trades from New Zealand are organized in this way but with different degrees of restrictions to competition. The benefits of the liner system (and by implication conference system) currently outweigh the disadvantages in the eyes of those holding shipping power in New Zealand, namely the Producer Boards.

Major conclusions and recommendations emanating from this background study are given below.

1. The choice of shipping system is one of the continuing issues facing New Zealand exporters. The liner system has been chosen in the past for very good reasons and is still the principal system serving New Zealand. However, perhaps more could have been done by the New Zealand Government and its shippers in moulding the liner service to marketing requirements apart from a common objective of minimising charge increases.

Little encouragement of competition to the

conference lines has been shown by the N.Z. Government or Producer Boards. The N.Z. Government's policy on conferences has been of a passive nature compared to many other trading nations; to some extent this may be because of the traditional 'producer control' in agricultural exporting from New Zealand, British Governmental pressure, and the fear of losing a dependable and stable shipping service. This latter fear has been shared by both producers and government and has been partly based on the very demanding shipping requirements of the meat trade and perhaps a lack of incentive to understand and utilise alternative shipping systems.

Benefits to N.Z. shippers could accrue by the N.Z. Government or shipper groups undertaking cost studies from the shippers' point of view to demonstrate where cost savings, improvements, and rationalisation of liner services may be effected, especially in terms of different ship types, scheduling arrangements, and internal cargo movements. Such studies would require a more detailed data base in N.Z. and a greater research effort into shipping than hitherto. Studies could also be directed at cargo handling systems for different products as well as alternative shipping systems. For example, it has been reported that wool could be shipped by alternative means, but what interaction would this have with the marketing system for wool and what effect on the liner carriage of the remaining cargoes? Studies on the combination of cargoes, shipping systems, and ship types would enable conference freight rate negotiations to be concluded more successfully than hitherto and could help mould the most desirable shipping system for New Zealand.

2. The identification of cross subsidies in the current export trade (and export-import cross subsidies) would appear a useful exercise from the point of view of

Government support schemes for different N.Z. sectors.

3. Containerisation has been introduced into New Zealand amidst considerable controversy. It is clear that if cellular containerships had not been introduced, other modern tonnage would have been necessary. It is important that the ship types (or balance of ship types) that should in future carry the mix of containers and other cargoes out of New Zealand are identified over the long term.

4. Other issues that require detailed attention from shippers are the closer integration of the Australian and New Zealand liner systems to other parts of the world, and cargo concentration through fewer New Zealand ports.

5. Several of the issues detailed in this report illustrate the need for greater shipper involvement in planning export shipping systems. A passive attitude by shippers has resulted in a situation where no benchmark exists for the evaluation of the current system. Shipper oriented handling trials, economic research studies, and the encouragement of competition have in the main been sacrificed for the status quo of conference liner shipping.

Greater shipper involvement in the planning of pre-shipment operations is particularly required since a large proportion of the freight rate for some cargoes is related to port and even pre-port activities.

6. To some extent the inactivity of shippers has been due to a multi-shipper structure of marketing (with an associated price-minus outlook). Whilst marketing requirements for some products are probably fairly well researched in terms of shipping, such requirements for other cargoes may need to be sought in terms of the level and stability of freight rates,

transit times, regularity and frequency requirements, and associated factors such as size of consignments, stockholding policies, etc. For example, it could be that shippers of some products may not be particularly worried about rate stability if a lower overall average rate could be achieved. In short, shipping systems should be seen to be part of a total marketing mix rather than a means of sending products away from the N.Z. coast. In this respect, if it could be shown that more efficient or lower cost shipping could result from a change in the marketing system (e.g. central handling of wool), such potential cost savings should be used in arguments for change.

7. A critical question is whether producers of specific products have the right to seek out the shipping system that produces the highest return to them either through lowered freight rates, or marketing effects leading to higher prices, or whether it is the total net return to the nation from all exports that should dictate policy. The exporting objectives of the country is the issue at stake here. If most concern is with the national interest, there is still no excuse for not attempting to identify optimal shipping services for each product. Cross-subsidy effects in the wider sense could then be more realistically evaluated. In addition, a higher degree of cooperation and integration should be encouraged between the major Producer Boards and other exporters.

If it were agreed that the change from a multi-shipper system for specific products to an export monopoly Board philosophy would result in "better" overall shipping systems, then the argument could be taken further to suggest one export monopoly Board for New Zealand. Such a Board could then negotiate shipping systems within a total marketing framework with the objective of maximizing export income.

8. Finally, it does seem as though there is scope for an improved set of machinery to monitor and plan New Zealand's overseas shipping systems from the shipper's point of view. The concept of the Exports and Shipping Council should be seen as inappropriate because of the shipping company involvement. A Shippers' Council together with a Shipping Research Unit may be the kind of organisational structure required. Such a Shipping Research Unit could carry out studies in the national interest on freight rates, ship types and costs, and improved organization of N.Z. shipping systems; results of such studies could be used in freight rate negotiations by the Shippers' Council; such negotiations could then be conducted with greater knowledge of alternative shipping measures available to shippers as well as a more unified front between the various producer and exporter groups.

GLOSSARY OF TERMS USED IN REPORT

- Bolster:** Platforms used for handling loose and palletized cargo in and out of Ro-Ro ships by fork-lift trucks [Nielsen, 1975].
- D.W.T.** Deadweight tonnes. The maximum weight of cargo, fuel, stores and crew that can be carried by a ship.
- f.a.s., f.o.b., c. and f., c.i.f., f.i.o.** Terms used to denote type of exchange transaction and determine which charges are paid by buyer and seller:  
f.a.s. free alongside ship  
f.o.b. free on board  
c. and f. cost and freight  
c.i.f. cost, insurance and freight  
f.i.o. free, in and out.
- L.A.S.H.** Lighter aboard ship. 'Barges' are handled on and off ships with a shipboard crane without the need for port facilities.
- Liner Service:** A shipping service which is characterised by regular sailings on fixed routes, the service being well advertised in advance.
- Liner Vessel:** A multi-purpose dry cargo ship designed with a view to effective transport of general cargo in a liner service (Liner) as well as being able to transport minor bulk commodities effectively (Tramper). [Andersen, 1976].
- Pallet:** A platform used to give a base to a unit load, for assembly and carriage.
- Pallet Vessel:** A specially designed pallet vessel with a number of decks; the main cargo handling system is based on side doors and elevators [Markussen and Bergli, 1974].
- Reefer Vessel:** A vessel that is designed to carry cargo predominantly under refrigerated conditions.
- Ro-Ro:** Roll on Roll off. Ships with ramps so that cargo can be loaded horizontally.
- T.E.U.** Most containers are 20' in length and container capacity is measured in 'twenty foot equivalent units' or T.E.U.'s.
- Tramp Vessel:** Any vessel with a tonnage of 4,000 D.W.T. or above which in the long run does not have a fixed itinerary, and which carries mainly dry cargoes in bulk over relatively long distances and from one or more ports to one or more ports, is an ocean or a deep-sea tramp [Metaxas, 1972].

## LIST OF REFERENCES

- Andersen, O. [1976] "The Liper - Conventional Ship of the Future," *Transportant*, 6(3):27-30.
- Anon [1964] "New Zealand Overseas Trade: Report on Shipping, Ports, Transport and Other Services," Producer Boards' Shipping Utilisation Committee, New Zealand and New Zealand Trade Streamlining Committee, London.
- Anon [1967] "New Zealand Overseas Trade - Report on Container and Cargo Handling," Report by a Container and Cargo Handling Committee of British Lines.
- Anon [1968] "Maritime Policy for New Zealand," Proceedings of Forum Held by Exports and Shipping Council of New Zealand, Wellington.
- Anon [1969] "The Economics of Container Transport for New Zealand," Report by Metra Consulting Group Ltd., to New Zealand Transport Commission.
- Anon [1971a] "Review of Maritime Transport, 1970," Report by Secretariat of U.N.C.T.A.D., United Nations, New York.
- Anon [1971b] "New Zealand Shipping," Report of the Commission of Enquiry into New Zealand Shipping, Wellington.
- Anon [1971c] "Transport and Handling of Australia's Wool Production," Bureau of Transport Economics, Canberra.
- Anon [1972a] "Containers," Final Report of the Royal Commission of Inquiry, Wellington.
- Anon [1972b] "Shipping in the Seventies," Report by the Secretariat of UNCTAD, United Nations, New York.
- Anon [1974a] "Future Container Traffic: A Report by the New Zealand Ports Authority on Overseas Container Traffic and Required Ports Facilities in 1980 and 1990," New Zealand Ports Authority, Wellington.
- Anon [1974b] "Report of the New Zealand Ports Authority on the Development of Ports Facilities for Cellular Container Shipping in the South Island," New Zealand Ports Authority, Wellington.
- Anon [1976] "Freight Services 1976 Handbook," Department of Trade and Industry, Wellington.



- Anon [1977] "Decision of the New Zealand Ports Authority on a Proposed Variation to the Declared National Ports Plan in Respect of the South Island Container Ports," New Zealand Ports Authority, Wellington.
- Bennathan, E. and Walters, A.A. [1969] "The Economics of Ocean Freight Rates," Praeger, New York.
- Chudleigh, P.D. [1975] "The Economic Potential of Specialised Wool Shipping Services," Journal of Transport Economics and Policy, 9(3):1-25.
- Chudleigh, P.D. [1976] "Some Economic Aspects of Conference and Non-Conference Wool Shipping," A.E.R.U. Discussion Paper No.37, Lincoln College.
- Deakin, B.M. and Seward, T. [1973] "Shipping Conferences: A Study of Their Origins, Development, and Economic Practices," Cambridge University Press.
- Evans, J.J. and Behnam, A. [1975] "A Fork Tariff System for Liner Freight Rates," Journal of Transport Economics and Policy, 9(1):62-66.
- Getz, J.R., Erichsen, S. and Heirung, E. [1968] "Design of a Cargo Liner in Light of the Development of General Cargo Transportation," paper presented to the Society of Naval Architects and Marine Engineers, New York.
- Gilman, S. [1977] "Optimal Shipping Technologies for Routes to Developing Countries," Journal of Transport Economics and Policy, 11(1):24-44.
- Goss, R.O. [1968] "Studies in Maritime Economics," Cambridge University Press.
- Hirst, R.R. [1976] "Technical Change, Flags of Convenience, Conferences: Controversial Developments for Australia," Current Affairs Bulletin, 52(9):17-30.
- Johnson, K.M. and Garnett, H.C. [1971] "The Economics of Containerisation," George Allen and Unwin Ltd., London.
- Laing, E.T. [1975] "Containers and Their Competitors: The Economics of Deep Sea General Cargo Shipping in the 1970's," Marine Transport Centre, University of Liverpool.
- Markussen, M. and Bergli, T. [1974] "Comparison of Three Different Transport Systems," Mimeo paper, Oslo.

- Metaxas, B.N. [1972] "The Future of the Tramp Shipping Industry," *Journal of Transport Economics and Policy*, 6(3):271-280.
- Nielsen, E.W. [1975] "Roll On/Roll Off Problems Facing Operators," *Proceedings of 12th Biennial Conference, International Cargo Handling Co-ordination Association, Florence.*
- Sligo, F.X. [1971] "Containerisation - With Special Reference to New Zealand - An Annotated Bibliography," *New Zealand Library School, Wellington.*
- Sturmey, S.G. [1975] "Shipping Economics - Collected Papers," *MacMillan, London.*
- Zerby, J.A. and Conlon, R.M. [1976] "A Model of Capacity Utilisation in Liner Shipping," *Shipping Economics Discussion Paper No. 1, Centre for Applied Economic Research, University of New South Wales.*

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