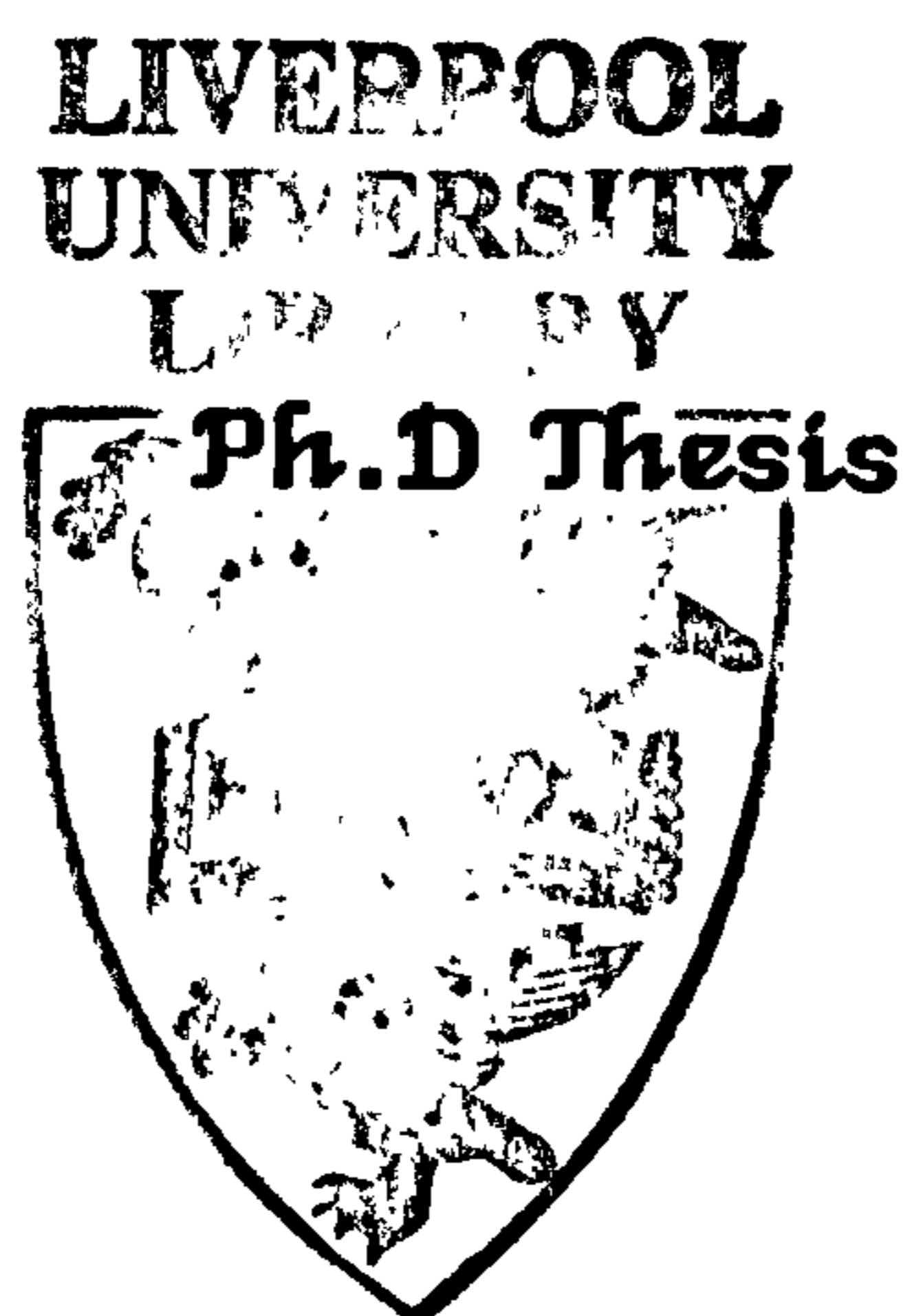


**MARKET IMPERFECTIONS
IN KOREAN DRY BULK TRADES**



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The University of Liverpool

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MARKET IMPERFECTIONS IN KOREAN DRY BULK TRADES

**This thesis submitted in accordance with the
requirements of the University of Liverpool
for the degree of Doctor in Philosophy by**

JONG-HEE, GHANG

July, 1990

For my son, Sang-Jin who is now in Heaven

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Abstract

This thesis argues that the Korean dry bulk shipping market has been generally subject to various market imperfections and as a result, almost all Korean dry bulkship operators were worse off than they would have been if the Korean market had been an open one. It is further argued that maritime economists' traditional assumption of a perfectly competitive structure for the world tramp shipping market was inapplicable to the Korean dry bulk shipping market.

Having shown that the correlation coefficient between freight rate movements in the two markets is significantly low, it is established that the Korean market is a separate entity, distinct from the world market which is generally considered to be a fairly open one. It is also shown that the Korean dry bulk shipping market contains very significant market imperfections, which may invalidate the above mentioned traditional assumption.

The thesis considers the difference between market function in the Korean dry bulk shipping market and that predicted in the literature. It is shown that the demand for Korean owned dry bulkship services in Korean trades was price inelastic, whilst the overall supply was very elastic. It is observed that the short-term supply of Korean owned dry bulkships in Korean trades was negatively correlated with world freight rates. It is thus argued that freight rates of Korean dry bulkships in Korean trades

were, in the short run, supply-determined, and for this reason were normally lower than those in the world tramp shipping market especially in times of recession. In addition, it is argued that market imperfections have produced strong manifestations of non-profit maximising behaviour. It is shown that the influence of market imperfections has carried adversely over to such business variables as firms' objectives, ship investment, financing, and pricing in the context of the development of the Korean dry bulk shipping industry.

The thesis evaluates the effect of market imperfections in relation to the development of the Korean dry bulk shipping industry. It is shown that imperfections have resulted in the lower degree of the divisionalisation of Korean dry bulk shipping, in the higher cost structure of the Korean fleet, and in the higher degree of the susceptibility to over capacity in Korean trades. It is for this reason argued that Korean dry bulkships have become generally unprofitable assets to own in the Korean dry bulk shipping market.

Given the above findings, government shipping policy instruments are re-examined to see how they should be re-interpreted in relation to the justification for internationalism as one of Korean shipping policy objectives. We conclude with a statement on the implications of the thesis for future research.

TABLE OF CONTENTS

| | <u>Page</u> |
|---|-------------|
| ABBREVIATIONS ----- | vi |
| LIST OF TABLES ----- | vii |
| LIST OF ILLUSTRATIONS ----- | ix |
| | |
| CHAPTER 1 : INTRODUCTION ----- | 1 |
| 1.1 Principal Argument and Study Objectives ----- | 2 |
| 1.2 Scope of the Study and Methodology Adopted ----- | 5 |
| 1.3 Outline of the Thesis ----- | 6 |
| | |
| CHAPTER 2 : A HISTORICAL REVIEW OF KOREAN DRY BULK SHIPPING SERVICES ----- | 9 |
| 2.1 Definition of the Korean Dry Bulk Shipping Market ----- | 9 |
| 2.1.1 Classification of the Market and Its Definition----- | 10 |
| 2.1.2 Organisation of the Market----- | 14 |
| 2.2 A Historical Review of Korean Dry Bulk Shipping Services ---- | 20 |
| 2.2.1 Demand for Transport of Dry Bulk Cargoes ----- | 20 |
| 2.2.2 Supply of Transport of Dry Bulk Cargoes ----- | 25 |
| 2.3 Summary ----- | 29 |

Table of Contents

| | |
|--|-----------|
| CHAPTER 3 : MARKET IMPERFECTIONS ----- | 31 |
| 3.1 The Historical Development of the Concepts of Perfect Competition ----- | 32 |
| 3.2. The Nature of the Tramp Shipping Market : <i>A Review of Past Literature</i> ----- | 37 |
| 3.3 Imperfections in the Korean Dry Bulk Shipping Market ----- | 42 |
| 3.3.1 Inherent Imperfections ----- | 42 |
| 3.3.1.1 Homogeneity and Differentiation ----- | 43 |
| 3.3.1.2 Imperfect Information ----- | 47 |
| 3.3.1.3 Price Bidder ----- | 49 |
| 3.3.2 Barriers to Competition ----- | 50 |
| 3.3.2.1 Legal Restrictions ----- | 52 |
| 3.3.2.2 Policy Restrictions ----- | 56 |
| 3.3.3 Unequal Competition ----- | 60 |
| 3.3.3.1 Rate Preference ----- | 60 |
| 3.3.3.2 The Government Planned Shipbuilding Programme----- | 63 |
| 3.3.3.3 Ship Financing----- | 66 |
| 3.4 Principal Patterns of Market Behaviour in the Korean Dry Bulk shipping Market ----- | 69 |
| 3.4.1 Monopsony ----- | 70 |
| 3.4.2 Oligopsony ----- | 71 |
| 3.4.3 Oligopoly ----- | 73 |
| 3.5 Summary ----- | 74 |

Table of Contents

| | |
|--|------------|
| CHAPTER 4 : THE DEMAND AND SUPPLY OF KOREAN OWNED DRY BULKSHIP SERVICES ----- | 76 |
| 4.1 The Demand for Korean Dry Bulkship Services ----- | 77 |
| 4.1.1 Factors affecting the Magnitude of Demand ----- | 77 |
| 4.1.2 The Elasticity of Demand ----- | 79 |
| 4.1.2.1 The Concept of the Elasticity of Demand ----- | 80 |
| 4.1.2.2 An Analysis of the elasticity of Demand ----- | 83 |
| 4.1.3 The Shape of the Demand Schedule ----- | 87 |
| 4.2 The Supply of Korean Dry Bulkship Services ----- | 94 |
| 4.2.1 Factors Affecting the Capacity of Supply ----- | 94 |
| 4.2.1.1 Acquisition ----- | 96 |
| 4.2.1.2 Other Substitutes of Increment of Supply ----- | 98 |
| 4.2.1.3 Retirement ----- | 100 |
| 4.2.1.4 Short-run Methods for the Decrement of Supply ----- | 102 |
| 4.2.2 The Elasticity of Supply ----- | 104 |
| 4.2.3 The Shape of the Supply Schedule ----- | 106 |
| 4.3 Summary ----- | 110 |
| | |
| CHAPTER 5 : STRATEGIC BEHAVIOUR OF KOREAN DRY BULKSHIP OPERATORS----- | 112 |
| | |
| 5.1 Strategic Objectives ----- | 112 |
| 5.1.1 Revenue Maximisation ----- | 114 |
| 5.1.2 Capacity Maximisation----- | 120 |

Table of Contents

| | |
|--|------------|
| 5.2 Strategic Ship Investment ----- | 121 |
| 5.2.1 Investigations Referring to Ship Investment----- | 122 |
| 5.2.2 Non-profit Maximising Ship Investment----- | 126 |
| 5.2.2.1 Ship Investment as a function of Freight Rates ----- | 126 |
| 5.2.2.2 Ship Investment as a function of Freight Revenues----- | 130 |
| 5.2.2.3 Ship Investment as a function of Technological Development ----- | 133 |
| 5.3 Strategic Financing ----- | 136 |
| 5.3.1 The Concept of the Flow of Funds----- | 136 |
| 5.3.2 Non-profit Related Financing ----- | 141 |
| 5.4 Strategic Pricing ----- | 148 |
| 5.4.1 Traditional Demand-determined Pricing of Trampships-- | 149 |
| 5.4.2 Supply-determined Pricing of Korean Dry Bulkships ----- | 151 |
| 5.5 Summary ----- | 156 |
| | |
| CHAPTER 6 : AN OBSERVATION OF FREIGHT RATES ----- | 158 |
| 6.1 Shipping Freight Rates and Open Market Fixtures ----- | 159 |
| 6.1.1 The Concept of Shipping Freight Rates----- | 159 |
| 6.1.2 Observation of Open Market Fixtures ----- | 161 |
| 6.2 Freight Rate Development and Interdependency of the Korean Dry Bulk Shipping Market ----- | 165 |
| 6.2.1 Overall Freight Rate Development in Korean Trades----- | 166 |
| 6.2.2 Measuring the Degree of Interdependency of the Market -- | 168 |
| 6.3 Summary ----- | 170 |

Table of Contents

| | |
|---|------------|
| CHAPTER 7 : EVALUATION OF MARKET IMPERFECTIONS IN RELATION TO THE DEVELOPMENT OF THE KOREAN DRY BULK SHIPPING INDUSTRY ----- | 171 |
| 7.1 International Competitiveness of the Korean Dry Bulk Fleet----- | 172 |
| 7.1.1 Divisionalisation of the Korean Dry Bulk Shipping ----- | 172 |
| 7.1.2 Cost Structure and Profitability of the Korean Fleet----- | 178 |
| 7.2 Imbalance of the Supply and Demand of Korean Dry Bulkship Services ----- | 185 |
| 7.2.1 Distorted Function of Reducing Capacity ----- | 185 |
| 7.2.2 Distorted Function of Supply ----- | 190 |
| 7.3 Summary----- | 191 |
| | |
| CHAPTER 8 : IMPLICATIONS OF THE THESIS ----- | 193 |
| | |
| REFERENCES----- | 204 |
| 1. English Publications ----- | 204 |
| 2. Oriental Publications ----- | 211 |

ABBREVIATIONS

| | |
|--------------|--|
| 1. AC | Average Cost |
| 2. BBC/PO | Bare-boat Charter with Purchase Option |
| 3. Bil. | Billion |
| 4. COA | Contract of Affreightment |
| 5. EPB | Economic Planning Board |
| 6. FOC | Flags of Convenience |
| 7. GRT or GT | Gross Registered Tonne |
| 8. GPSP | Government Planned Shipbuilding Programme |
| 9. HMM | Hyundai Merchant Marine |
| 10. KDB | Korea Development Bank |
| 11. KMI | Korea Maritime Institute |
| 12. KMPA | Korea Maritime and Port Administration |
| 13. KSA | Korea Shipowners' Association |
| 14. KSC | Korea Shipping Corp. |
| 15. LIBOR | London Interbank Offered Rate |
| 16. MC | Marginal Cost |
| 17. Mil. | Million |
| 18. MR | Marginal Revenue |
| 19. MRI | Maritime Research, Inc. |
| 20. M/T | Metric Tonne |
| 21. POSCO | Pohang Steel Co. |
| 22. PSC | Proprietary Ship Contract |
| 23. SIRP | The Shipping Industry Rationalisation Plan |
| 24. TBS | Temple, Barker & Sloane, Inc. |

LIST OF TABLES

| | Page |
|--|------|
| <2 - 1> Participants of the Korean Deep-Sea Shipping Market ----- | 13 |
| <2 - 2> Classification of the Korean Deep-Sea Shipping Market ----- | 14 |
| <2 - 3> Share of Korean Operators in Korean Seaborne Trade ----- | 16 |
| <2 - 4> Number of Korean Operators by Segment: 1970-1983 ----- | 17 |
| <2 - 5> Types of Contract for POSCO's imports of Raw Material ----- | 18 |
| <2 - 6> Acquisition of Korean Dry Bulkships by BBC/PO: 1976-1983 ---- | 20 |
| <2 - 7> Growth of Korean Seaborne Trade : 1976-1984 ----- | 21 |
| <2 - 8> Growth of World Seaborne Trade : 1976-1984 ----- | 22 |
| <2 - 9> Korean Major Dry Bulk Seaborne Trade : 1976-1984 ----- | 23 |
| <2-10> Korean Major Dry Bulk Seaborne Trade by Region : 1976-1984 -- | 24 |
| <2-11> Regional Share of Korean Dry Bulk Seaborne Trade : 1976-1984- | 24 |
| <2-12> Growth of the World Fleet : 1976-1984 ----- | 26 |
| <2-13> Growth of the Korean Ocean Going Merchant Fleet : 1976-1984- | 27 |
| <2-14> Growth of the Korean Capacity by Type of Ship : 1976-1984 --- | 27 |
| <2-15> Average Ship Size of the Korean and World Dry Bulk Fleets : 1976-1984 ----- | 28 |
| <3 - 1> Korean Ore and Bulk Carrier Stock by Size : 1978-1984 ----- | 44 |
| <3 - 2> Share of Korean Operators of Major Dry Bulk Cargoes in 1986 ----- | 45 |
| <3 - 3> Summary Measures of Size Concentration ----- | 47 |
| <3 - 4> Historical Share of the Korean Fleet in Korean Trades ----- | 58 |
| <3 - 5> The Government Planned Shipbuilding Programme: 1976-1981-- | 65 |
| <3 - 6> Dry Bulk Capacity by Firm and Its Concentration Ratio ----- | 68 |
| <3 - 7> Major Korean Dry Bulk Shippers and Their Trade Volume ----- | 72 |
| <4 - 1> Dry Bulk Trade Volume and Freight Index : 1976-1984 ----- | 85 |
| <4 - 2> Correlation Coefficients of Freight Index with Trade Volume- | 85 |
| <4- 3> Freight Index and Share of the Korean Dry Bulk Fleet in Korean Dry Bulk Trades ----- | 88 |
| <4 - 4> Correlation Coefficients of Share of the Korean Dry Bulk Fleet with Freight Index----- | 88 |
| <4- 5> Potential and Actual Quantity Share of the Korean Dry Bulk Fleet per DWT in Korean Dry Bulk Trades ----- | 93 |
| <4 - 6> Capacity of Acquisition of Korean Dry Bulkships ----- | 96 |
| <4 - 7> Freight Index and the Capacity of Acquisition ----- | 98 |

| | | |
|----------|---|-----|
| <4 - 8> | Correlation Coefficients of the Capacity with Freight Index -- | 98 |
| <4 - 9> | Korean Dry Bulkships Retired and Freight Index ----- | 101 |
| <4 - 10> | Average Q'nty Share of the Korean Dry Bulk Fleet per GT in Korean dry Bulk Trades : 1976-1984 ----- | 108 |
| <5 - 1> | Gross Revenue, Trade Volume, and World Freight Index ----- | 115 |
| <5 - 2> | Correlation Matrix for Variables : Revenue, T. Volume, and K. Fleet--- | 116 |
| <5 - 3> | Korean Operators Retained Profits : 1977-1983 ----- | 118 |
| <5 - 4> | Government Financing to the Korean Operators for Short-term Working Capital : 1977-1983 ----- | 119 |
| <5 - 5> | Growth of Korean Dry Bulk Seaborne Trade and Ocean Going Dry Bulk Fleet : 1976-1984 ----- | 120 |
| <5 - 6> | Growth of Traditional Maritime Nations' Fleets ----- | 129 |
| <5 - 7> | Accumulated Age Distribution of Selected Nations' Fleets in 1985 ----- | 130 |
| <5 - 8> | Freight Revenue and the Dry Bulkship Capacity of Acquisition- | 131 |
| <5 - 9> | Correlation Coefficients of the Dry Bulkship Capacity with Freight Revenue ----- | 132 |
| <5-10> | Newbuilding Orders Received by Korean Yards ----- | 135 |
| <5-11> | Government Loans for the Planned Shipbuilding Programme --- | 135 |
| <5-12> | Korean Yards' Newbuilding Prices : 1982-1983 ----- | 135 |
| <5-13> | A Korean Operator's Average Retained Profit ----- | 139 |
| <5-14> | Government Financing to the Korean Operators ----- | 143 |
| <5-15> | Aid to Domestic Shipowners by Shipbuilding Countries----- | 144 |
| <5-16> | Financial Leverage Ratios of Selected Operators in 1984 ----- | 146 |
| <5-17> | Average Freight Rate of the Korean Fleet in 1980 and 1984 ----- | 155 |
| <6- 1> | F. Index and No. of Open Market Fixtures In Korean Trades ---- | 162 |
| <6- 2> | Correlation Matrix for Variables : F. Index and No. of Fixtures ----- | 164 |
| <6- 3> | Mean Yearly Freight Rates in Korean trades : 1976-1984----- | 166 |
| <6- 4> | Correlation Matrix for Variables : Freight Rates In Korean Trades and MRI freight Indexes----- | 170 |
| <7- 1> | Comparison of the statements of Profit and Loss for Selected Korean and Japanese Operators in 1984 ----- | 181 |
| <7- 2> | Profitability Ratios of Selected Operators in 1984 ----- | 183 |
| <7- 3> | Net profit Margin of Korean Operators by Industry Segment : 1980-1983 ----- | 184 |
| <7- 4> | Annual Inflation Rates : 1978-1981----- | 191 |

LIST OF ILLUSTRATIONS

| | | Page |
|---------|---|------|
| <2 - 1> | Growth of Fleet Index : 1976-1984 ----- | 27 |
| <3 - 2> | Historical Share of the Korean Fleet in Korean Trades----- | 59 |
| <3 - 3> | Unequal Costs of Finance ----- | 67 |
| <3 - 4> | Cumulative Firm's Tonnage Share Curve ----- | 69 |
| <4 - 1> | Scatter Diagram of Average Q'nty Share of the Korean Dry Bulk Fleet per GT vs. Freight Index : 1976-1984 ----- | 109 |
| <5 - 1> | Growth of Revenue ----- | 116 |
| <5 - 2> | Development of Freight Rates and of Dry Bulk Carrier (incl. Combined Carrier) Newbuilding Orders ----- | 127 |
| <5 - 3> | Development of Freight Rate and of the Korean Operators' Acquisition of Dry Bulk Carriers ----- | 128 |
| <5 - 4> | The Flow of Funds ----- | 138 |
| <5 - 5> | Short-term Demand and Supply of Tramp Tonnage ----- | 150 |
| <5 - 6> | Short-term Demand and Supply of Korean Dry Bulkships in Korean Trades and Equilibrium of the Market (in Recession Periods)-- | 153 |
| <6 - 1> | Scatter Diagrams of No. of Fixtures vs. F. Index----- | 164 |
| <6 - 2> | Overall Freight Rate Development in Korean Trades ----- | 167 |
| <7 - 1> | Development of Laid-up Tonnage for World Dry Cargo Ships : 1978-1986 ----- | 186 |

CHAPTER 1

INTRODUCTION

Market Imperfections
in Korean Dry Bulk Trades

CHAPTER 1

INTRODUCTION

'It is not unusual for highly trade-dependent economies *and military powers* to develop strong maritime industries which enhance national security by ensuring a measure of national control of import and export shipping in times of crisis.' (KMI and TBS, 1985, P. 1-17; *Italics added*) The USA and Japan are historical examples in these respects. Korean intellectuals who most ardently espoused sentiments of national security and economic development have quoted these examples in order to justify Korean shipping policy objectives, which have encouraged Korean operators to expand capacity for reasons of national defence and economic efficiency. The result of these policy objectives, as is often the case with international shipping, was a maze of restrictions and restraints in favour of the national fleet. These restrictions and restraints are criticised in this thesis in respect of their effects on the development of the Korean shipping industry and economic efficiency.

One of the major effects of these restrictions, and in particular of the limitations in access of foreign tonnage to the Korean market, has been that the market operates in many respects independently of the world market. Where there are inter-relationships with the world market they tend to work in such a way as to increase the instability in the Korean market. Other aspects of policy have encouraged purchase of relatively low quality second-hand tonnage in periods of high market prices. They have also encouraged a very high debt profile in the part of Korean owners,

non-profit maximising behaviour, and uneconomic pricing. As a result, it is argued that almost all Korean operators have been worse off than they would have been if the market had been an open one. With respect to these arguments, study objective of the thesis is presented. This Chapter then goes on to consider the scope of the study and methodology adopted. An outline of the contents of the remaining Chapters of the thesis concludes this Chapter.

1.1 Principal Argument and Study Objectives

Some countries put great strategic importance by their national fleet and Korea has not been an exception to this. There are two main reasons. Firstly, foreign trade has been a crucial element in Korea's national development strategy. During the 1970's Korea's foreign trade grew at an average rate of 30.3 percent per annum in volume terms. Between 1980 and 1984 the rate of growth fell somewhat, but was still very high, at 10.8 percent per annum. As a result, trade accounted for 73.8 percent of gross national product in 1984.(EPB, statistical yearbook 1985) Nearly 98 percent of this foreign trade in terms of weight is transported by sea. The second main reason is attributable to the political situation between the Republic of Korea - in this thesis it is generally referred to as Korea - and the communist regime of North Korea. For these two reasons, Korean shipping policy objectives have been aimed at the expansion of national fleet with a view to meeting trade growth and preparing for the worst that might happen politically. To achieve this objective the Korean Government introduced such policy instruments as the cargo reservation system, a shipping promotion fund, a planned shipbuilding program, and a tax-

exemption scheme etc. Some of these instruments are discussed in some detail in Chapter 3.

Korean shipping policy instruments, combined with a shipping boom in 1978-1982, provided the trigger for dramatic increase of the Korean fleet. Total gross registered tonnes, in ships of 100 GT or over, in the Korean fleet increased from 3.377 million of 1977 to 6.806 million in 1982 - more than doubling in this 5 year period. However, this rapid growth of the fleet occurred in a climate of increasing unprofitability. Compounding this was the sudden shift from the booming market to a deep recession in 1982. Most Korean operators then began to experience heavy negative returns on sales, a trend which has continued since 1982.

It is argued that these events call into question propositions made in favour of Korean shipping policy instruments as a crucial aid to the development of the Korean shipping industry. In particular it is argued that behaviour of Korean operators and function of the Korean dry bulk shipping market have led the market into a position of chronic oversupply, to the receipt of relatively lower freight rates and to a high cost structure, the combination of these factors throwing most Korean operators into crisis in the early 1980's.*

*) In response to this problem, the Korean Government introduced the Shipping Industry Rationalisation Program (SIRP) in the end of 1983, a prime aim of which was to prevent the Korean shipping industry from collective bankruptcy by consolidating 69 ocean-going shipping companies into 17 groups.

The oversupply in the Korean dry bulk shipping market has arisen at the same time as a general imbalance between supply and demand in the world tramp shipping market. However, the imbalance of supply and demand has been even more severe in the Korean market than in the world market, leading to cut-throat competition among Korean operators in recession periods. The thesis expatiates on this issue, explaining the nature of the relationships which bring this about

Unprofitability of the Korean dry bulk shipping industry has been partly a question of low freight rates, but a second main factor has been the industry's high cost structure. Further to this, surplus in the market and overkill competition arising therefrom are not the only explanatory variables of low freight rates. Such factors as the non-profit maximising objectives of Korean carriers' and/or their strategic pricing behaviour are an important part of the explanation. We discuss this at greater length in Chapter 5.

The cost structure of the Korean dry bulk shipping industry, in spite of the strong support of the government, has been generally high as compared to that of advanced shipping countries. This has arisen possibly because of irrationally speculative investment in capacity by Korean operators. If this is the case, it would be concluded that although Korean shipping policy objectives and its instruments have contributed to the development in tonnage terms of the Korean fleet, they have also led to inefficiencies, diseconomies, and a consequent misallocation of resources. The thesis attempts to ratify this statement.

With these arguments as background, the ultimate objective of this thesis is to provide a basis for answering a question which has generally been taboo in Korean shipping circles. That is :

Is internationalism, as one of Korean shipping policy objectives, desirable for the future development of the Korean shipping industry ?

(In this sense, internationalism may involve the removal of government shipping policy measures such as cargo reservation and rate preference etc.)

1.2. Scope of the Study and Methodology adopted

Bulk shipping embraces the shipment of unpacked commodities moving in full ship load. It breaks into two categories i.e., liquid bulk and dry bulk. The former embraces the shipment of crude oil and products, and the latter the shipment of iron ore, coal, grain, and phosphate rock etc. The thesis, however, is limited to the analysis of the dry bulk sector only. This is mainly because most Korean oil tanker owners, unlike those in the dry bulk sector, are vertically integrated with their shippers. As a result, the open market rarely exists for crude oil, as it is transported mostly by industrial carriers. It is, therefore, very difficult to get access to information on the Korean tanker market.

In realising the above study objectives the study programme divides into two main strands. The first sets out to establish the behaviour patterns of Korean operators and of the market as a whole have been

subject to various imperfections. It is shown that the demand and supply of Korean dry bulkship services in the Korean market (Chapter 4) and the behaviour of Korean dry bulkship operators (Chapter 5) were significantly different from those of the theoretical models of competitive markets. It is further argued that there exist comprehensive inefficiencies and diseconomies in the Korean dry bulk shipping market. These propositions are further supported in the second part by empirical observation of freight rates in the Korean dry bulk shipping market (Chapter 6) as well as by the evaluation of market imperfections in relation to the development of the Korean dry bulk shipping industry (Chapter 7).

In analysing market behaviour, we would ideally need a wide range of fixtures completed in the Korean market. However, most of such data are kept highly confidential and thus are not reported. This is particularly so for the fixtures concluded directly between Korean owners (or operators) and Korean charterers (or shippers), such data being actually unobtainable. As a result, limited use has been made of such data from MRI Chartering Annuals as charter fixtures and freight rate indices* reported in New York and London. Regression and correlation analysis on these data over the period 1976-1984 are used in analysing the market mechanism.

1.3. Outline of the Thesis

The thesis is arranged in eight Chapters. Chapter 2 defines the Korean

*) In many cases, 'grain freight indices' will be used as the best candidate for freight rate simply because these indices are widely used and accepted the Korean dry bulk shipping circles.

dry bulk shipping market, examining the division of the shipping market into tramp and liner shipping. The Chapter includes a historical review of Korean dry bulk shipping services since 1976, as it is via a detailed understanding of these services that the Korean dry bulk shipping market can best be understood.

Chapter 3 is devoted to the discussion of conditions under which the Korean dry bulk shipping market functions. The first part reviews the literature, which is examined to determine what weight of evidence has been collected to establish that free or perfect competition is the norm in the tramp shipping market. It is shown that the evidence is rather thin in the Korean dry bulk shipping market. The Chapter ends with a discussion of the principal patterns of the Korean dry bulk shipping market.

Chapter 4 looks at the influence of market imperfections, especially cargo reservation and rate preference, on the demand and supply of Korean dry bulkship services. It is shown that the functioning of the Korean market mechanism is somewhat different from that of the theoretical model of the tramp shipping market. The behaviour of Korean operators in entering on a large scale into the world market in times of prosperity, and returning to the Korean market in periods of recession is also explored.

Chapter 5 presents an empirical analysis of the non-profit maximising strategic behaviour of Korean dry bulkship operators. This is a discussion of the causal relationship between policy instruments and the behaviour of Korean operators. Care is taken to derive precise causality because this

causality paves the way for evaluating particular market imperfections in the Korean dry bulk shipping market in relation to the development of the industry in Chapter 7.

Chapter 6 considers the development of freight rates in the Korean dry bulk shipping market. It is shown that overall freight rate developments in this market have not followed developments in the world market absolutely. It is also established that such developments in these two markets have a measure of independence in the short run, as hypothesised. The conclusion is that the Korean dry bulk shipping market can be regarded as a separate entity, distinct from the world tramp shipping market which is generally a fairly open one.

Chapter 7 argues that most Korean dry bulkships have become generally unprofitable assets to own in the Korean shipping market. This is established by showing that the international competitiveness of the Korean dry bulk fleet is inferior to its main foreign competitors and that the Korean dry bulk shipping market is very susceptible to overcapacity.

Finally, Chapter 8 returns to the question raised in Study Objectives. Prior to answer this question, we shall briefly summarise our findings. Given the findings, government shipping policy instruments are revisited to see how they should be reinterpreted in relation to the question. We shall then conclude with a statement on the implications of the thesis for future research.

CHAPTER 2
A HISTORICAL REVIEW OF
KOREAN DRY BULK SHIPPING SERVICES

Market Imperfections
in Korean Dry Bulk Trades

CHAPTER 2

A HISTORICAL REVIEW OF KOREAN DRY BULK SHIPPING SERVICES

This chapter has two purposes. Firstly, it provides an argument in favour of the thesis that the Korean dry bulk shipping market is a separate entity, distinct from the world tramp market which is generally considered to be a fairly open one. Broad definitions of the term 'market' are examined, from which we elicit a definition of the Korean dry bulk shipping market for our purpose. Secondly, it presents an introductory discussion of the nature of the Korean dry bulk shipping market by examining its organisation and reviewing past dry bulk shipping services in that market.

2.1 Definition of the Korean Dry Bulk Shipping Market

It is noted that markets can show every level of interdependence from absolute homogeneity to complete independence. Although we assume that the Korean dry bulk shipping market has been distinct from the world market, this does not necessarily mean that the two markets have to be completely independent. If the freight rates in the two markets have a measure of independence in the relatively short run, we can regard the Korean dry bulk shipping market as a separate entity. In Chapter 6, we will examine the correlation coefficient between the freight rates of the Korean market and those of the world market and thereby we will show that the two markets have comparatively limited degree of interdependence. However, this comparison itself assumes the existence of a separate market. For this reason, the Korean dry bulk shipping market must

now be defined.

2.1.1 Classification of the Market and Its Definition

The definition of the term 'market' has given rise to much debate and is common source of confusion. Literally the term 'market' has been understood as a place where goods are bought and sold. Lipsey(1974) simply states that "originally the word 'market' designated a place where things were bought and sold"(Positive Economics, 3rd. ed., P. 69). Today, such markets include both an apparent place where the buyers and sellers concurrently exist and an abstract place where market functions are, for instance, performed over the telephone as in the case of the foreign exchange market. In general, however, this definition is not enough to describe markets of today because they are still very much in a state of evolution.

In many cases the market designates the area within which price is determined. The earliest definitions known to the author are those of Cournot and Marshall who wrote in the following terms :

"Economists understand by the term market, not any particular market place in which things are bought and sold, but the whole of any region in which buyers and sellers are in such free intercourse with one another that the price of the same goods tend to equality easily and quickly."(Marshall A. *Principles of Economics*, 8th ed., Macmillan, 1972, P. 270)

Stigler and Sherwin make a similar definition. As they put it :

"The market is the area within which price is determined : the market is that set of suppliers and demanders whose trading establishes the price of a good."(Stigler & Sherwin, 1985, p. 555)

The term 'market' is sometimes used to refer to a process or role. Samuelson uses this definition stating :

"For our purpose, then, a market is a process by which the buyers and sellers of a good interact to determine its price and quantity." (Samuelson and Nordhaus, 1985, p. 43).

Paying attention to the role of the market, Ferguson argues that "the market groups together firms producing products which are close substitutes from the buyer's point of view".(Ferguson, 1988, P.32)

In other circumstances, the term 'market' is defined for particular purposes. U.S. department of justice merger guideline provides an example of this, defining a market as :

"a group of products and an associated geographic area such that (in the absence of new entry) a hypothetical, unregulated firm that made all the sales of those products in that area could increase its profits through a small but significant and non-transitory increase in price (above prevailing or likely future)" (U.S. Department of Justice, Merger Guidelines, at 4 n. 6, 1982)

The purpose of this definition is to identify markets that are sufficiently insulated from competition to allow some exercise of market power. However, Stigler and Sherwin(1985) have argued that this market definition is completely nonoperational, because no data will allow the existence of the conditions to be determined empirically.

From the review above, it can be seen that the term 'market' can be

defined from a number of points. By the same token, the term 'shipping market' has also been subject to a number of definitions.

The term 'shipping market' seems generally to be limited to the freight market which, in much of the literature (e.g. Metaxas, 1981; Shimozo, 1980; Miyashita, 1986), designates the area within which prices for shipping services are determined. In the tramp sector, it is often used to refer to specific shipping exchanges such as the London-based 'Baltic Mercantile and Shipping Exchange' and 'the Maritime Exchange of New York, etc., where shipping services are bought and sold through chartering brokers. It is worth noting that Zannetos defined these markets as the organised markets. As he put it :

"There are cases of transactions that occur outside **the organised markets**, for which the parties get together on a private basis without intermediaries."
(Zannetos, 1966, p. 179; bolds added)

The above definitions of the term 'the tramp market' are confined to a place which embraces all participants with common interests in shipping services and, therefore, are not quite applicable to a specific market which is to be compared with all the rest of it. So below we will define the term 'the Korean dry bulk shipping market' with our purpose in mind.

Before proceeding to the discussion of the definition, it is necessary to show how the Korean dry bulk shipping market is classified in the context of the Korean deep-sea shipping market in order to avoid ambiguities that could possibly arise between the term 'dry bulk' and

'non-bulk' or 'liquid bulk'.

There are several ways of classifying shipping markets by segments. However, the criteria which will be applied here are types of ship operation and character of the participants. Referring first to the types we divide ship operation into two categories, i.e. liner and tramp. The liner operation is a frequent regular services on an established itinerary. The tramp operation is one which a ship is employed on a voyage by voyage basis to haul bulk and/or semi bulk cargoes.'(Gilman,1983) On the other hand, dichotomising the participants into operators and Korean shippers, we obtain Table 2-1, the participants of the Korean deep-sea shipping market.

Table <2-1> Participants of the Korean Deep-sea Shipping Market

| shippers | bulk cargoes | | general cargoes | |
|------------------------------|--------------|--------|-----------------|-----------|
| | dry | liquid | break-bulk | container |
| operators | | | | |
| car carriers | | | 1 | |
| combi-carriers | 2 | 3 | | |
| dry bulk carriers | 4 | | | |
| full container | | | | 5 |
| general cargo ships | 6 | | 7 | |
| log carriers | 8 | | 9 | |
| ore/coal carriers | 10 | | | |
| special purpose ships | | 11 | | |
| semi container | | | 12 | 13 |
| tanker | | 14 | | |

Operators : classified according to KSA publication

Numbers : possible combination order

Combination of Table 2-1 with the types of ship operation gives four

different markets, i.e. the conventional liner shipping market, the container shipping market, the dry bulk shipping market and the liquid shipping market. This is brought out more clearly in Table 2-2.

Table <2-2> Classification of the Korean Deep-sea Shipping Market

| <u>Type of Operation</u> | <u>Shipping Market</u> | <u>Combination Order</u> |
|--------------------------|------------------------|--------------------------|
| | Conventional Liner | 1. 7. 9. 12. |
| <u>Liner Market</u> | Container | 5. 13 |
| | Dry Bulk | 2. 4. 6. 8. 10. |
| <u>Tramp Market</u> | Liquid | 3. 11. 14. |

Combination order : transferred from Table 2-1

Now that we have classified the dry bulk shipping market in the context of the Korean deep-sea shipping market, let us turn to the issue of its definition. For our purpose, then, **the Korean dry bulk shipping market is a field, irrespective of visible or invisible, within which price for shipping services offered to Korean shippers and operators are determined. This market includes all participants involved in dry bulk shipping services in Korean foreign seaborne trades.**

For the sake of clarity of this definition, we shall be exploring the organisation of the Korean dry bulk shipping market in the following.

2.1.2 Organisation of the Market

Having introduced the definition of the market, an attempt is made to explore the organisation of the Korean dry bulk shipping market. In discussing the organisation of the market, what we are concerned with are all participants involved in concluding contracts of carriage, and the types

of contract concluded between these participants. Undoubtedly the major participants within the market are Korean shippers who import and export dry bulk cargoes in Korean foreign seaborne trades and operators (or owners) who provide ships to carry such cargoes. Chartering brokers are also very important participants. On the other hand, there are five basic types of charter in the Korean dry bulk shipping market : voyage charters, contracts of affreightment, proprietary ship contracts, time charters, and bare-boat charters. We discuss each of these charters briefly from the terminological point of view.

A Korean shipper has a volume of dry bulk cargo to be exported or imported from/to Korea by sea. The Korean import of the major dry bulk commodities are grain, coal, iron ore, and phosphate rock, while fertilizer and cement are the major export commodities. Log, salt, lumber, plywood, steel, sugar and wood chips are also classified as dry bulk commodities, but these are excluded in our scope of analysis for two reasons - firstly, the limitations of statistical sources - secondly, the trend of unitisation of these commodities. It may well be the case that such commodities are classified as semi-drybulk cargoes. For instance, Gilman(1983) paid the following tribute to the term 'semi-bulk cargo' :

"Unitised or self unitising cargo in large volume, e.g. timber, forest products, steel, sometimes expanded to embrace cars and liquids like chemicals and oil"(Gilman, 1983, p. xiv)

The shipper is either an individual or an establishment, however, as far as Korean shippers are concerned, they are mostly huge establishments

of government agencies, and big businesses who can themselves influence the level of freight rates. This point is returned to in Chapter 3.

Operators comprise both Korean carriers and foreign carriers who come to the Korean market with own or chartered ships available. This is well observed in Table 2-3. A large percentage of import cargoes purchased on f.o.b. and export cargoes sold on c.i.f. are carried by Korean operators with either Korean flag ships or foreign flag chartered ships.

Table <2-3> Share of Korean Operators In Korean Seaborne Trade in 1984

| | Quantity ('000 Tonne) | Share(%) |
|---|-----------------------|--------------|
| Total Q'nty Transported by Sea | 125,736 | 100.0 |
| Q'nty Transported by Korean Operators | <u>90,046</u> | <u>71.6</u> |
| (- by Korean Flag Vessels) | 58,228 | 46.3) |
| (- Chartered Foreign Flag Vessels*) | 31,818 | 25.3) |
| Q'nty Transported by Foreign Operators | 25,763 | 28.4 |

Source : KMI, Maritime Statistical Yearbook, 1985

*) : It should be noted that chartered foreign flag vessels do not benefit from government protectionist measures

In 1980 there were 43 separate Korean dry bulkship operators in the market: from companies with only one owned ship to a big company owning a great number of ships. Table 2-4 presents historical data on the number of Korean operators by types of trade. The most rapid expansion of non-crude oil bulk operators occurred in the past. This is one of the reasons why our thesis focuses on the dry bulk sector in analysing the Korean shipping industry.

Table <2-4> Number of Korean Operators by Segment : 1970 - 1983

| | 1970 | 1975 | 1980 | 1983 |
|--------------------------|------|------|------|------|
| Liner | 9 | 11 | 21 | 23 |
| Crude Oil Carrier | 2 | 3 | 4 | 4 |
| Other Bulker* | 10 | 35 | 43 | 41 |

Source : Reproduced from KMI & TBS, 1985, P. II-28

*) : Include parcel tankers

Korean Chartering Brokers have had a limited involvement in the market. The majority of Korean operators and Korean shippers have pursued direct contact each other. This is mainly because shippers commonly approach operators directly requesting bids or may deal with an individual operator. Domestic chartering brokers, in turn, have been very subordinate and torpid. Thus Korean operators and Korean shippers would rather prefer to contact foreign brokers for their needs of charter.

For identification of the **types of contract**, no single criterion exists : 'From the shipowners' point of view the main difference between type of charter is the degree of owner involvement in shipping operation, the division of costs and the extent to which the cargo to be transported is specified in the contract'(Stopford, 1988). We accept this approach in identifying the types of contract in the Korean market.

A Voyage Charter is an agreement to carry a dry bulk cargo on either a single voyage or an extended number of consecutive voyages in Korean foreign trades. The payment is made on the basis of quantity of cargo delivered. The operator (or the owner) is responsible for all voyage costs

but stevedoring is customarily borne by the shipper (or the charterer). Many Korean coal and grain shippers use this charter which is fixed up by bid or on the basis of private negotiation. Shippers' own charter parties are generally used for this contract and terms and conditions other than freight rates are not much subject to negotiation.

A Contract of Affreightment is a contract providing for the transportation of a certain amount of cargoes, during a specific period at fixed or more likely flexible freight rates, between two ports in Korean foreign seaborne trades. This contract, which is quite common in the Korean dry bulk market, is consummated for policy reasons, viz., utilisation of Korean flag ships.

A Proprietary Ship Contract is an agreement in which the owner provides a ship to the shipper for the shipment of regular cargoes over a long period of time. The ship is controlled by the shipper for his own use and the owner assumes responsibility for providing a warranty of ship's seaworthiness. This contract has a complex rate structure based on

Table <2-5> Types of Contract for POSCO's imports[±] of Raw Materials

| Types of contract | PSC | COA | Spot |
|--------------------------|-------------------|----------------------------|----------------------------|
| Ratio | 81 % | 13 % | 6 % |
| Owner | Korean Operator | Korean/Foreign Operator | Korean/Foreign Operator |
| Period | 10 Years and More | 1-5 Years | Voyage(s) |

Source : POSCO

Import[±] : f.o.b. cargo only which covers 90% of total imports.

operating and voyage costs. A large portion of Korean imports of iron ore and coking coal has been transported under this contract. Data from Pohang Steel Co.(1988) does provide pertinent evidence, which is presented in Table 2-5.

A Time Charter is a contract under which the ship is put at the disposal of the charterer for a specified period of time, which could be anything from the time taken to complete a single voyage (a 'time charter trip') or for the period of months or years (a 'period time charter'), against the payment of hire, at the rate fixed per day and per ton of vessel deadweight. During that period, the owner continues to pay the operating costs of the vessel, but the charterer directs the commercial operations of the vessel and pays all voyage expenses. For the purpose of this study, we only need to know that the time charter is used by Korean operators who hire foreign flag ships for the shipment of the dry bulk cargo in Korean trades. A glance at Table 2-3 shows that time chartering has exerted significant influence on the Korean dry bulk shipping market.

A Bare-boat or Demise Charter is an agreement under which the shipowner purchases a vessel and provides for the delivery of the 'bare' vessel to the charterer who has to man, equip and operate the ship at his own risk and expenses. "The owner is not active in the operation of the vessel and does not require any specific maritime skills."(Stopford ,1988, p. 26) The bare-boat charter with purchase option, a modified type of the bare-boat charter, has been used by a number of Korean operators as a means of increasing their operating capacity. Table 2-6 provides evidence for this statement.

Table <2-6> Acquisition of Korean Dry Bulkships by BBC/PO : 1976-1983

| | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|--------------------|------|------|------|------|------|------|------|------|
| No. of ship | 5 | 3 | 6 | 3 | 11 | 10 | 1 | 3 |
| '000 qt | 118 | 36 | 127 | 53 | 232 | 311 | 12 | 56 |

Source : KMI, Maritime Statistical YearBook

We have now completed our discussion of the organisation of the Korean dry bulk shipping market. The next section continues the discussion of the nature of the Korean dry bulk shipping market by reviewing past Korean dry bulk shipping services so that we can approach the market from a different point of view.

2.2 A Historical Review of Korean Dry Bulk Shipping Services

A shipping market is greatly influenced by the internal structure of two inter-linked elements, the demand for, and the supply of, shipping services. The internal structure of Korean dry bulk shipping services has been subject to continuous changes over last decades. On the demand side, the most prominent features are increasing cargo volume and quantity, and the evolution of new types of carrying arrangement : on the supply side, they are the increasing capacity and specialisation of ships.

2.2.1 Demand for Transport of Dry Bulk Cargoes

The demand for shipping services is derived one stemming from sea-borne trade. The demand for transport by sea, therefore, depends on trade volume and distance of transport. For this reason, the demand for shipping services is frequently measured on a tonne-mile basis.

"The major dry bulks are minerals and agricultural products, which are shipped in large quantities, usually between a limited number of ports." (Sletmo & Williams Jr., 1986, P. 47) The main dry bulk cargoes in world seaborne trade are grain, coal, iron ore, bauxite and alumina, and phosphate rock. There are also several other minor dry bulk cargoes, such as steel products, forest products, cement, manufactured fertilizer, non-ferrous metal ores, sugar, salt, and sulphur etc., which may move in bulk. However, because of their trade volume, major cargoes that have been the driving force behind the Korean dry bulk shipping market are grain, coal, iron ore, phosphate rock, manufactured fertilizer, and cement. The historical growth of Korean seaborne trade is shown in Table 2-7.

Table <2-7> Growth of Korean Seaborne Trade : 1976-1984
(Thousand Tonnes)

| | Total Im. | | D.bulk Im | | Total Ex. | | D.bulk Ex | | Total Trade | | D.bulk Trade | |
|-------------|-----------|------|-----------|------|-----------|------|-----------|-------|-------------|------|--------------|------|
| | Ton. | % | Ton. | % | Ton. | % | Ton. | % | Ton. | % | Ton. | % |
| 1976 | 41,447 | | 8,348 | | 14,311 | | 3,252 | | 55,758 | | 11,600 | |
| 1977 | 51,489 | 24.2 | 11,049 | 32.4 | 16,814 | 17.5 | 4,337 | 33.4 | 68,303 | 22.5 | 15,386 | 32.6 |
| 1978 | 61,843 | 20.1 | 12,412 | 12.3 | 16,039 | -4.6 | 3,308 | -23.7 | 77,882 | 14.0 | 15,720 | 2.2 |
| 1979 | 72,992 | 18.0 | 20,444 | 64.7 | 17,828 | 11.2 | 3,026 | -8.5 | 90,820 | 16.6 | 23,470 | 49.3 |
| 1980 | 71,353 | -2.2 | 23,830 | 16.6 | 22,682 | 27.2 | 5,702 | 88.4 | 94,035 | 3.5 | 29,532 | 25.8 |
| 1981 | 79,024 | 10.8 | 32,824 | 37.7 | 26,297 | 15.9 | 6,356 | 11.5 | 105,321 | 12.0 | 39,180 | 32.7 |
| 1982 | 80,938 | 2.4 | 31,974 | -2.6 | 27,569 | 4.8 | 6,470 | 1.8 | 108,597 | 3.0 | 38,444 | -1.9 |
| 1983 | 88,905 | 9.8 | 33,393 | 4.4 | 29,279 | 6.2 | 6,138 | -5.1 | 118,184 | 8.9 | 39,531 | 2.8 |
| 1984 | 95,119 | 7.0 | 36,952 | 10.7 | 30,617 | 4.6 | 4,395 | -28.4 | 125,736 | 6.4 | 41,347 | 4.6 |
| Avrg | | 11.3 | | 22.0 | | 10.4 | | 8.7 | | 10.9 | | 18.5 |

Source : KMPA, Statistical Yearbook of Maritime and Ports

Notes : 1) Dry Bulk Import : Grain, Coal, Iron Ore, Phosphate Rock

2) Dry Bulk Export : Fertilizer, Cement

3) % : Annual Change of Growth 4) Avrg : Average % Change

The volume of Korean seaborne trade has continued to grow. It grew from about 56 million tonnes of 1976 to about 126 million tonnes in 1984, or at an average growth rate of 10.9 percent a year. This contrasts strongly with the fluctuating growth of world seaborne trade. After a slight increase in the late 1970's, it fell again in 1980 and 1983. (See Table 2-8) During that period the volume of major Korean dry bulk cargoes has been increasing at a remarkably rapid rate: there was an 18.5 percent average annual increase in total, which almost quadrupled in the period. The world dry bulk trade, however, stayed at a low level, alternating irregularly between increase and decrease. It is worthy of note that growth in carriage of Korean dry bulk import has outpaced that of export. This is attributable to Korea's economic structure, which heavily depends on import of raw materials.

Table <2-8> Growth of World Seaborne Trade : 1976-1984

| | <u>World Trade</u> | | <u>World Dry Bulk Seaborne Trade</u> | | | | |
|----------------|--------------------|----------|--------------------------------------|------|----------|-----------|----------|
| | Mil. Tonnes | % Change | Grain | Coal | Iron Ore | Sub-Total | % Change |
| 1976 | 3,312 | | 146 | 127 | 294 | 567 | |
| 1977 | 3,399 | 2.6 | 147 | 132 | 276 | 555 | -2.1 |
| 1978 | 3,466 | 2.0 | 169 | 127 | 278 | 574 | 3.4 |
| 1979 | 3,714 | 7.2 | 182 | 159 | 327 | 668 | 16.4 |
| 1980 | 3,606 | -2.9 | 198 | 188 | 314 | 700 | 4.8 |
| 1981 | 3,461 | -4.0 | 206 | 210 | 303 | 719 | 2.7 |
| 1982 | 3,199 | -7.6 | 200 | 208 | 273 | 681 | -5.3 |
| 1983 | 3,090 | -3.4 | 199 | 197 | 257 | 653 | -4.1 |
| 1984 | 3,292 | 6.5 | 207 | 232 | 306 | 745 | 14.5 |
| Average | | 0.5 | | | | | 3.7 |

Source : Fernley Review

It is quite clear from Table 2-9 that each of Korean major dry bulk trade followed its own distinctive growth pattern during the period. Coal grew rapidly until 1981, after which the trade has tended to level off. Iron ore followed a similar pattern. Grain grew fairly steadily throughout the period, though it has been fluctuating year-to-year. Phosphate rock grew rapidly during the late 1970's, but stagnated thereafter. The two remaining export commodities, manufactured fertilizer and cement, also have enjoyed a fairly high growth rate during the period. In summary, the pattern of growth of Korean major dry bulk trade is not simple but each cargo has its own distinctive industrial characteristics, growth trends and impact upon the Korean dry bulk shipping market.

Table 2-9> Korean Major Dry Bulk Seaborne Trade : 1976-1984

| (Thousand Tonnes) | | | | | | | | | | |
|--------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|
| | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | % |
| Grain | 3,131 | 4,025 | 3,798 | 5,616 | 5,534 | 7,301 | 5,872 | 7,126 | 7,026 | 12.7 |
| Coal | 1,688 | 2,037 | 3,024 | 5,786 | 7,757 | 12,426 | 11,918 | 12,143 | 14,468 | 34.0 |
| Iron Ore | 2,635 | 3,502 | 3,980 | 7,169 | 8,897 | 11,804 | 12,531 | 12,428 | 13,556 | 24.8 |
| Phosphate | 894 | 1,467 | 1,160 | 1,873 | 1,642 | 1,257 | 1,653 | 1,696 | 1,902 | 12.6 |
| Fertilizer | 158 | 624 | 973 | 978 | 1,344 | 809 | 948 | 1,113 | 1,181 | 48.7 |
| Cement | 3,094 | 3,713 | 2,335 | 2,048 | 4,358 | 5,547 | 5,522 | 5,025 | 3,214 | 8.2 |
| Total | 11,600 | 15,386 | 15,720 | 23,470 | 29,532 | 39,180 | 38,444 | 39,531 | 41,347 | 18.5 |

Source : KMPA, Statistical Yearbook of Maritime and Ports

% : Average Annual Change

As far as the distance of Korean dry bulk seaborne trade is concerned, it has been on the increase throughout the period. Table 2-10 shows that a 18.5 percent annual increase in tonnage carried, with variations across regional markets. Regional market share over the period 1976 to 1984 is

Table<2-10> Korean Major Dry Bulk Seaborne Trade by Region : 1976-1984

| (Thousand Tonnes) | | | | | | | | | | |
|--------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|
| | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | % |
| Japan | 440 | 532 | 167 | 830 | 923 | 1,576 | 658 | 772 | 596 | 45.9 |
| S.E. Asia | 2,631 | 2,792 | 4,297 | 6,050 | 12,819 | 15,202 | 15,789 | 15,643 | 12,509 | 26.8 |
| N. America | 3,964 | 5,219 | 5,702 | 9,694 | 9,664 | 9,992 | 11,461 | 12,695 | 13,347 | 18.1 |
| Europe | 406 | 296 | 220 | 122 | 145 | 167 | 173 | 274 | 209 | -3.1 |
| Others* | 4,159 | 6,547 | 5,334 | 6,774 | 5,981 | 12,313 | 10,363 | 10,147 | 14,686 | 23.4 |
| Total | 11,600 | 15,386 | 15,720 | 23,470 | 29,535 | 39,180 | 38,144 | 39,531 | 41,347 | 18.5 |

Source : KMPA, Statistical Yearbook of Maritime and Ports

Major Dry Bulk : Grain, Coal, Iron Ore, Phosphate Rock, Manufactured Fertilizer, and Cement

*Others : Include mainly Australia, South America, and Middle East region

% : Average Annual Change

presented in Table 2-11, from which two points are noteworthy. Firstly, tonnage share of each regional market, except for Europe, varied only slightly. North America's share was reasonably stable at an average of around 33 percent, whilst Europe experienced significant variations. This

Table <2-11> Regional Share of Korean Dry Bulk Seaborne Trade :**1976-1984**

| unit : % | | | | | | | | | | |
|-----------------|------|------|------|------|------|------|------|------|-------|------|
| | 1976 | 1977 | 1978 | 1980 | 1981 | 1983 | 1984 | Avg. | Stdev | CY |
| Asia | 26.5 | 21.6 | 28.4 | 46.5 | 42.8 | 41.5 | 31.7 | 34.6 | 8.4 | 24.3 |
| N. America | 34.2 | 33.9 | 36.3 | 32.7 | 25.3 | 32.1 | 32.3 | 33.1 | 4.1 | 12.4 |
| Europe | 3.5 | 1.9 | 1.4 | 0.5 | 0.4 | 0.7 | 0.5 | 1.1 | 1.0 | 91.0 |
| Others | 35.0 | 42.6 | 33.9 | 20.3 | 31.4 | 25.7 | 35.5 | 31.2 | 6.2 | 20.0 |

Source : Table 3-4

Notes : 1) Asia : Includes Japan and Southeast Asian Countries.

2) Avg : Average Share during the period

3) Stdev : Standard Deviation

4) CY : Coefficient of Variance [= (Stdev/Avg) x 100]

is well evidenced by the fact that the coefficient of variance of Europe (CV=91) is more than seven times larger than that of North America (CV=12.4). Secondly, there has been an apparent increase in the concentration of geographical trade route : Asian region's tonnage share nearly doubling in the early 1980's. However, this does not necessarily mean that total ton-miles have decreased. Overall, the data on seaborne trade indicate that total Korean dry bulk tonne-miles have grown quite rapidly with a significant increase of trade volume in most routes in the period.

2.2.2 Supply of Transport of Dry Bulk Cargoes

Attention is now turned to the description of the supply side. We are concerned, in particular, with the past trend in supply provided by Korean operators. Thus, the changes that have taken place in the Korean dry bulk fleet over the period 1976-1984 are examined.

The capacity of the fleet is measured in deadweight cargo tonnes (dwct) or in gross registered tonnes (grt). Gross registered tonnes measure a vessel's total enclosed capacity, less certain exempted space, by volume in units of 100 cubic feet. Deadweight cargo tonnes measure a vessel's capacity dedicated to carry cargo. DWCT is, therefore, a measure which more effectively relates to the volume of cargo transported than does GRT. However, most of data employed in the thesis uses GRT, because the source material of the Korean fleet has been so published.

The merchant fleet has continued to grow worldwide. As the data in

Table 2-12 show, the world fleet increased from 372 million grt of 1976 to 419 million grt of 1984, representing an annual increase rate of 1.5 percent. During the same period the Korean ocean going merchant fleet grew at an annual rate of 11.9 percent : it jumped from 3,026 thousand grt of 1976 to 7,303 thousand grt of 1984 - more than doubled during the period.(Table 2-13) Particularly worthy of note is the significant growth of the Korean dry bulk fleet, which experienced a remarkable 851.8 percent expansion of its capacity during the past 9-year period 1976-1984, as compared to 141.4 percent increase of the total capacity of the Korean fleet. The rapid growth rate of the Korean dry bulk fleet allowed it to expand its share of total Korean ocean going merchant fleet from 15.1 percent to 59.4 percent. This is brought out more clearly in Figure 2-1 and Table 2-14.

Table <2-12> Growth of the World Fleet : 1976-1984

| | <u>World Total Fleet</u> | | | <u>World Dry Bulk Fleet</u> | | |
|-------------|--------------------------|---------|------|-----------------------------|---------|-----|
| | No. of Ship | Mil. GT | % | No. of Ship | Mil. GT | % |
| 1976 | 65,889 | 372 | | 3,932 | 92 | |
| 1977 | 67,945 | 394 | 5.9 | 4,313 | 101 | 9.8 |
| 1978 | 69,020 | 406 | 3.0 | 4,557 | 107 | 5.9 |
| 1979 | 71,129 | 413 | 1.7 | 4,637 | 108 | 0.9 |
| 1980 | 73,832 | 420 | 1.7 | 4,706 | 110 | 1.9 |
| 1981 | 73,864 | 421 | 0.2 | 4,736 | 113 | 2.7 |
| 1982 | 75,151 | 425 | 1.0 | 4,947 | 119 | 5.3 |
| 1983 | 76,106 | 423 | -0.5 | 5,073 | 124 | 4.2 |
| 1984 | 76,068 | 419 | -0.9 | 5,229 | 128 | 3.2 |
| Avg | | | 1.5 | | | 4.2 |

Source : Lloyd's Register of Shipping, Statistical Table 1987

Notes : 1) As of 1st July Each Year 2) Ship : 100 GT Over

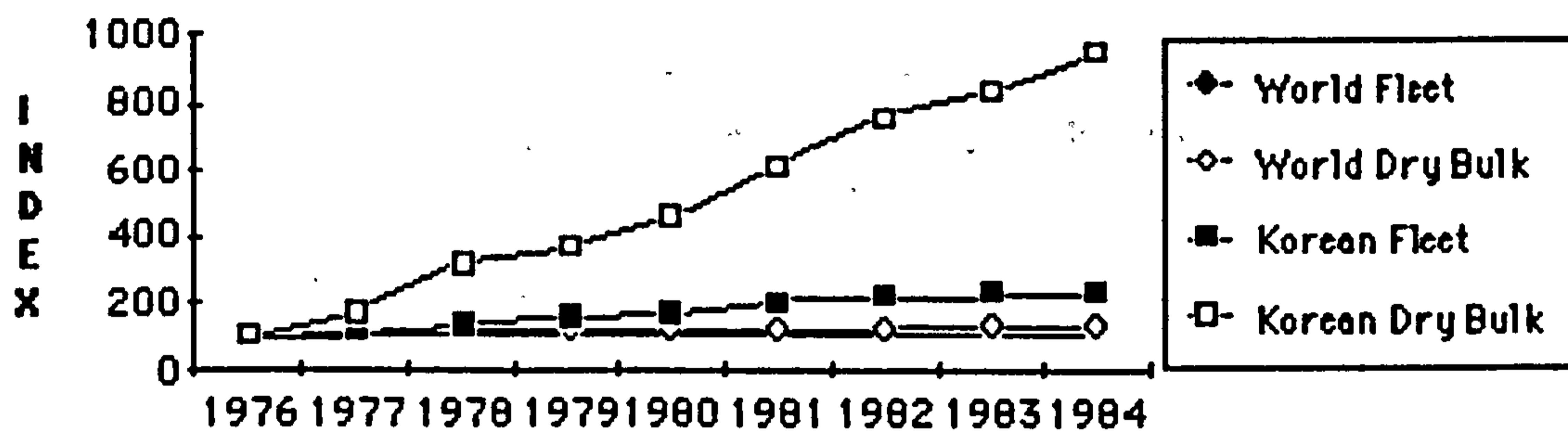
3) OBO Carriers are Included in Dry Bulk Fleet

Table <2-13> Growth of the Korean Ocean Going Merchant Fleet : 1976-1984

| | Total Fleet | | | Dry Bulk Fleet | | |
|-------------|-------------|---------|-------------|----------------|---------|-------------|
| | No. of Ship | '000 GT | % | No. of Ship | '000 GT | % |
| 1976 | 419 | 3,206 | | 33 | 456 | |
| 1977 | 442 | 3,350 | 10.7 | 48 | 797 | 74.8 |
| 1978 | 507 | 4,296 | 28.2 | 92 | 1,454 | 82.4 |
| 1979 | 512 | 4,671 | 8.7 | 112 | 1,698 | 16.8 |
| 1980 | 530 | 5,138 | 10.0 | 135 | 2,071 | 22.0 |
| 1981 | 552 | 6,216 | 21.0 | 155 | 2,800 | 35.2 |
| 1982 | 553 | 6,808 | 9.5 | 170 | 3,464 | 23.7 |
| 1983 | 558 | 7,030 | 3.3 | 173 | 3,827 | 10.5 |
| 1984 | 547 | 7,303 | 3.9 | 187 | 4,340 | 13.4 |
| Avrg | | | 11.9 | | | 34.9 |

Source : KSA, Annual Statistics of Korean Flag Ocean Going Vessel

Notes : 1) As of Year-End 2) BBC/PO Ships included

Figure <2-1> Growth of Fleet Index : 1976-1984
Index : 1976=100

Note : Adopted from Table 2-12 and 2-13

Table <2-14> Growth of the Korean Capacity by Type of Ship : 1976-1984
(Thousand GT)

| | G/C | | Logger | | D.Bulker | | Container | | Tanker | | Others | | Total | |
|-----------------|-----|------------|--------|--------------|----------|--------------|-----------|--------------|--------|------------|--------|-------------|-------|--------------|
| | GT | % | GT | % | GT | % | GT | % | GT | % | GT | % | GT | % |
| 1976 | 709 | 23.4 | 354 | 11.7 | 456 | 15.1 | 105 | 3.5 | 1,312 | 43.4 | 89 | 2.9 | 3,025 | 100 |
| 1984 | 745 | 10.2 | 234 | 3.2 | 4,340 | 59.4 | 528 | 7.2 | 1,332 | 18.2 | 123 | 1.7 | 7,302 | 100 |
| % Change | | 5.1 | | -33.9 | | 851.8 | | 402.9 | | 1.5 | | 38.2 | | 141.4 |

Source : KSA

The relative magnitude of the expansion of the Korean dry bulk fleet can be partially attributed to the increase of average ship size. Table 2-15 presents historical data on the average ship size of the Korean and world dry bulk fleets. It is worth noting that the trend in the average ship size of the Korean fleet has not followed the pattern of changes in that of the world fleet. Whereas the latter stabilised throughout the period, the former experienced a strong and sustained upward growth : the Korean fleet achieved a 68 percent increase in average size, as compared to the only 5 percent increase experienced by the world fleet during the same period. As a result, the average ship size of the Korean fleet which had been relatively small in 1970's closely approximated the average size of the world fleet in the early 1980's.

Table <2-15> Average Ship Size of the Korean and World Dry Bulk Fleets :
1976-1984

| | <u>Korean Bulk Fleet</u> | | <u>World Bulk Fleet</u> | |
|-------------|--------------------------|--------------|-------------------------|--------------|
| | <u>Average GT</u> | <u>INDEX</u> | <u>Average GT</u> | <u>INDEX</u> |
| 1976 | 13,818 | 100 | 23,398 | 100 |
| 1977 | 16,604 | 120 | 23,418 | 100 |
| 1978 | 15,804 | 114 | 23,480 | 100 |
| 1979 | 15,161 | 110 | 23,286 | 100 |
| 1980 | 15,341 | 111 | 23,374 | 100 |
| 1981 | 18,065 | 131 | 23,860 | 102 |
| 1982 | 20,376 | 147 | 24,055 | 103 |
| 1983 | 22,121 | 160 | 24,443 | 105 |
| 1984 | 23,209 | 168 | 24,479 | 105 |

Source : Table 2-12 and 2-13

Note : Index : 1976 =100

In summing up the above brief review of the structure of the Korean dry bulk fleet, it could be argued that the fleet has been growing so fast that demand could not keep up with it. (compare this fleet growth with seaborne trade in Table 2-7) As a result, there has been a structural overcapacity in the Korean dry bulk shipping market. We will take up this issue of the structural overcapacity in the later Chapters (4, 5 and 7).

2.3 Summary

In this Chapter we examined broad definitions of the term 'market' and in light of which we have defined 'the Korean dry bulk shipping market' for our purpose. For the sake of clarity of our definition, we then explored briefly the organisation of the Korean dry bulk shipping market concerning the participants involved in concluding contracts of carriage in that market. The types of contract concluded between these participants were also discussed.

We next reviewed historical Korean dry bulk shipping services. In particular, we considered their structures and developments over the period 1976- 1984.

On the demand side, significant trends during the period were :

1) Between 1976 and 1984 there was a 18.5 percent average annual increase in the Korean dry bulk seaborne trade. This contrasts with the world dry bulk seaborne trade which experienced an average annual increase of 3.7 percent.

2) The tonnage share of each regional market in the Korean dry bulk seaborne trade varied only slightly. North America's share was reasonably

stable at an average share of around 33 percent.

3) Overall, the data on seaborne trade indicate that the total Korean dry bulk ton-miles have grown quite rapidly with a significant increase of trade volume in most trade routes.

On the supply side, we noted that :

1) The Korean dry bulk fleet experienced a remarkable 851.5 percent expansion of its capacity, representing an annual increase rate of 34.9 percent throughout the period.

2) The average ship size of the Korean dry bulk fleet was considerably below that of the world average in the 1970's. However, after a strong and sustained upward growth, the Korean fleet closely approximated the average size of the world fleet in the early 1980's.

3) Comparing this fleet growth with seaborne trade volume, it could be justly argued that there has been a structural overcapacity in the Korean dry bulk shipping market.

CHAPTER 3
MARKET IMPERFECTIONS

Market Imperfections
in Korean Dry Bulk Trades

CHAPTER 3

MARKET IMPERFECTIONS

Tramp shipping has traditionally been quoted as a good example of an industry that has a market not dissimilar in structure to the free or perfectly competitive market described in economic theory. Metaxas(1971, 1981 reprinted), for example, refers to, (1) the large number of buyers and sellers, (2) the free access to all resources needed for producing the transport services, (3) the ease of entry and exit, (4) the identical (that is, homogeneous) services, (5) the smallness of the increment from the entry of one additional firm relative to the industry's output, and (6) the freely obtainable information. Such claims might have applied in the past and possibly reflect the realities of some sectors of the world tramp shipping market today. But, as we shall see, they would not be justified in terms of the present realities of the Korean dry bulk shipping market.

In this Chapter four topics are covered. The first section provides a historical review of the basic concept of perfect competition as it functions in a market economy. This sets out the conditions by which the character of a market may be judged for our purpose. The second reviews past literature on the nature of tramp shipping market with particular emphasis on its characteristics in relation to the conditions which define a perfectly competitive market. In the third section, the imperfections of the Korean dry bulk shipping market are examined. Finally, we generalise the arguments to describe the principal patterns of market behaviour in

the Korean dry bulk shipping market. These are, monopsony, oligopsony and oligopoly.

3.1 The Historical Development of the Concepts of Perfect Competition

As Burke et al.(1988) has correctly pointed out, in spite of a most extensive literature there is still little agreement on what competition really entails - let alone whether it is a good or bad thing. The literature considers many different possible states of competition. This section is devoted to a brief summary of the historical development of the concept of perfect competition which is the base case.

McNulty in *Economic Theory and the Meaning of Competition* said that "the concept of competition which was at once more fundamental and pervasive in all of economics was less satisfactorily developed(McNulty, 1968, P. 639)". These words are as true today as they were then since it is still not easy to provide a simple definition of competition.

In recent literature economists have developed the approach to competition, and, in particular, have tried to establish the specific conditions under which competition would result in the equalisation of prices and costs, which had been so ubiquitously presumed hitherto.(cf. Hay and Morris, 1986, P. 6)

The development of the theory of competition may be traced back to Adam Smith, who presumed that, except for rare and generally temporary exceptions, the forces of competition would drive 'the market price' into

equality with 'the natural price'*. However, when Smith spoke of competition, it was in connection with the impact of market price on profits which were postulated to be reduced to a minimum. Thus "it was not competition and monopoly per se, or as market models, which Smith contrasted, but rather the level of prices resulting from the presence or absence of competition as a regulatory force (McNulty, 1968, P. 643)".

The first steps in the analytical refinement of the concept of competition were made by neoclassical economists. The groundwork for this development was laid by Cournot (*Mathematical Principles of the Theory of Wealth*), Jevons (*Theory of Political Economy*), and Edgeworth (*Mathematical Psychics*) in the nineteenth century. They concentrated on the conditions under which price would equate with average cost leading to the absence of monopoly profit. This approach was further developed by J.B. Clark (*The Distribution of Wealth*), leading ultimately to the concept of perfect competition (after refinement by Frank Knight in *Risk, Uncertainty and Profit*, 1921) as we know it today. Marshall also contributed to the concept of perfect competition, deriving a basic model which differs in certain respect from that of his contemporaries. The Marshallian model assumes consumer sovereignty and establishes the specific conditions under which it is exercised. (cf. Holland, 1987, PP. 66-67)

*) When the price of any commodity is neither more nor less than what is sufficient to pay the rent of the land, the wages of the labour, and the profits of the stock employed in raising, preparing, and bringing it to the market, according to their natural rates, the commodity is then sold for what may be called its **natural price**. . . . The actual price at which any commodity is commonly sold is called its **market price**. (Heilbroner, *The Essential Adam Smith*, 1986, p. 187)

Both Knight's model and the Marshallian model of perfect competition depend on a number of conditions which are hard or perhaps even impossible to find in the real world. Nonetheless, most of these conditions have been incorporated into their successors' models of perfect competition so that they are commonly treated as clones of the two originals. For this reason, we will not discuss the conditions of these two models directly. Instead, we shall introduce a recent model integrating both.

Rosser(1988, P. 124) has summarised the following set of 6 conditions required for a market to be perfectly competitive :

1. **A large number of buyers and sellers.** Numbers must be large enough to ensure that no individual buyer or seller can exercise any significant control over the price of the product.
2. **Perfect information.** Everyone has full information about all opportunities to buy and sell. A firm cannot sell the good to a consumer at a higher price than a competitor would, because the consumer would always be aware of the opportunity to buy at lower price.
3. **Free entry and exit.** There are no restrictions on new firms setting up in the industry, if they think it will be profitable to do so, and existing firms are free to leave the industry if they wish.
4. **A homogeneous product.** All firms produce a homogeneous (that is, identical) product and consumers are indifferent as to which firm they buy from.
5. **Divisibility.** The product can be divided into small units.
6. **Profit maximisation.** All firms try to maximise profits.

One is unlikely to find a real industry where all these conditions are satisfied completely. However, this set of assumptions allows a workable model to be constructed and used as a base case.

A few economists have relaxed the above conditions in a search for a general model which allows a closer approximation to the real world. For instance, if all of the above conditions, except condition 2 relating to perfect knowledge, are met then the term 'pure competition', as opposed to perfect competition may be used. (Ritson, 1977; Burke et al., 1988) The theory of monopolistic competition, the ideas of which were originally set out by Chamberlin (*The Economics of Monopolistic Competition*), 'considers a market structure that lies between the limiting cases of monopoly and perfect competition, the main feature distinguishing it from perfect competition being product differentiation (Rosser, 1988, P. 174)'. Andrews replaced the term 'perfect competition' with 'open competition' under the following definition:

"The essential characteristic of an industry which is in open competition, as I define it, is nothing more than that such an industry is formally *open to the entry of new competition*". (Andrews, 1966, P. 16; emphasis added)

Baumol et al. (1982) in *Contestable Market and the Theory of Industry Structure* presented the theory of contestable markets. In their work a contestable market is defined as one in which entry is free and exit is costless. Their theory is a relatively recent development, and yet their 'whole analysis is a sizable theoretical accomplishment, opening new areas for pertinent research (Shepherd, 1984, P. 572)'. Although there has been

much controversy over those recent theories of competition, we do not present any detailed discussion here, since it belongs not to the scope of this thesis.

Given its unreality, why then do economists pay perfect competition so much attention ? Samuelson(1985, P. 502) claims that they do so for two major reasons. "First, under certain limited conditions, perfect competition attains allocative efficiency, squeezing the most satisfaction out of society's limited resources." This is, however, frequently a subject of controversy because of public goods and the existence of externalities. For instance, 'if public goods, such as defence, are provided at all in a free market economy they are likely to be provided at a suboptimal level(Burke et al., 1988, P. 53)'. "Second, competitive economies are relatively easy to analyse and understand." This is well evidenced, for example, by the fact that most tramp shipping models treat the tramp shipping market as a fairly homogeneous one, and deal with demand and supply in this market at a very aggregated level. But there is a third reason. That is, competition often claims to be norm or value-free. A number of politicians and economists plausibly base their philosophy on this. Yet, their real philosophy has little to do with the virtues of competition.(Burke et al., 1988, p. 3) It seems rather related to the paradox of competition : businesses compete in order to reduce competition. When they speak of competition, they may surely be in a position to be more competitive than their rivals. Holland quips :

"..., a monopolistic structure is the logical outcome of rewards for winners and penalties for losers through competition".(Holland, 1987, P. 29)

There is also a fourth reason. As Mrs Robinson herself observes that "perfect competition is never likely to prevail . . . , but it provides a limiting case of imperfect competition which is of considerable service in analysis (Robinson, 1948, reprinted, p. 51; emphasis added)". The present study supports this claim in a different way.

3.2 The Nature of the Tramp Shipping Market : *A Review of Past Literature*

Following the general discussion of perfect competition, this section reviews past contributions in the structure of the tramp shipping market, with a principal question in mind. That is, what evidence is there to support the view that the tramp shipping market is a perfectly competitive one.

Glen(1987, P. 20) observed that the number of studies monitoring and analysing the progress of the market for oil tankers have been relatively limited. The same may well be said of the dry bulk sector and hence of all classes of tramp ships. Glen considered T. C. Koopman (Tanker Freight Rates and Tankship Building, 1939) and J. Tinbergen (1939, see *Selected Papers*, L. H. Klassen et al. editors, 1959) to be the earliest known to authors in the tanker sector. He adds a comment that "both have since become famous names in the economics profession". T. Thorburn, in his *Supply and Demand of Water Transport* (1960), also introduced some other earlier contributors such as K. Giese (Das Seefrachtarifwesen, 1919), S. Helander (Die Internationale Schifffahrtskrise und ihre weltwirtschaftliche Bedeutung, 1928), A. Sanderson (Control of Ocean Freight Rates in Foreign Trade, 1938), S. Zuellig (Die Seefrachten 1920-1938, 1942) and F. Fisser

(Tramp Shipping, 1957). However, most of these works are concerned with freight rates, that is, the prices of ship transport.(cf. Thorburn, 1960, P 2) Thorburn also applied himself to the analysis of price making on sea transport. In most ways, therefore, these earlier works concentrate on the behaviour rather than the structure of the shipping market and they are largely neglected today.

The first attempt of a systematic and rigorous analysis of the field was made by Sturmev(1962). His views seem to be the parents of widespread beliefs on the nature of the tramp shipping market. As Sturmev himself states :

"The Market for tramp ships is practically *perfect* as there are *large numbers of owners and charterers* while owners' and charterers' brokers have almost *complete knowledge* of rates being paid in the main chartering centres for each different trade and of the ships receiving those rates".(Sturmev, 1962, p.25; emphasis added)

However, it is worth noting that he did not maintain this view of the competitive nature of the market as far as the pricing of tankship freight services was concerned. He points this out when he says, in his article of "*On the Pricing of Tramp Ship Freight Services*", that :

"The oil tanker market is very similar to the dry cargo market, but with two important differences. First, there are relatively few charterers of oil tankers so that **the market could be regarded as oligopolistic**, although in practice it appears to be competitive as the dry cargo freight market. Second, the charterers of oil tankers own approximately one third of their tonnage requirements, take approximately another one

third on time charter and enter the voyage charter market only for the remainder. There is thus a strong tendency for the effects of short-term fluctuation in the demand for oil tankers to be concentrated on a narrow part of the total market, whereas in the dry cargo markets the effects of such fluctuations are spread over a wider area of the market".(Sturmey, 1979, pp. 109-119, emphasis added)

This allegation is, however, rejected by Zannetos, who argues in the following terms :

Do the tankship markets operate under the impact of oligopolistic influence? The answer is no! Although logic as well as ownership composition would imply the contrary, the tankship markets operate more like a perfectly competitive market.(Zannetos, 1966, pp. 175-176)

What reasons are, then, given by Zannetos for expecting the tankship markets - in this respect the tankship markets are considered to be the spot market - to be perfectly competitive ? Glen(1987, P. 23) has summarised them by giving the following set of seven assumptions of the tanker spot market :

Firstly, no one owner ever has more than a few vessels operating in the market at a time - i.e. no single owner can 'corner the market' in terms of supply.

Secondly, the existence of well established shipbrokers guarantees that sellers and buyers are brought together efficiently.

Thirdly, spot contracts are based upon vessel characteristics ("the vessel is the firm").

Fourthly, tankers are mobile. They are so mobile that regional imbalances are prevented from becoming great.

Fifthly, no single vessel is able to exert any influence on rates, because

their size is tiny relative to the market.

Sixthly, exit is also supposed to be easy.

Finally, the homogeneity of the product means that the market is homogeneous.

Glen claims that most of the Zannetos' argument is a priori. More specifically, he proves that differentiation by both size and route has developed during the period he examined, which suggests that the tanker market is no longer homogeneous. Yet, Zannetos' argument about the competitive nature of the tanker market seems to have a considerable impact on writings on the dry bulk sector, in that his assumptions have been implicitly imitated by successors, so that the tramp shipping market is commonly treated as a perfectly competitive one.

Probably the most well known treatment of the tramp shipping market is that of Metaxas(1971) in *The Economics of Tramp Shipping*. He provides the following set of assumptions, which he argues are the typical features of the tramp freight market :

1) There are hundreds of firms owning tramp ships which are capable of producing identical services.

2) All potential entrants have free access to all resources needed for producing the transport services under consideration, since there is virtually no monopolisation of ownership by established firms.

3) There are no artificial impediments to entry, and new entrants can produce services identical to those of established firms.

4) The increment to the industry's output resulting from the entry of

one additional firm is so small as to have no perceptible effect on freight rates. (Thus, the potential entrant is not deterred by fear of changing the existing situation so far as price levels are concerned.)

5) There are no artificial obstacles to free exit from the market for the tramp shipping firms.

6) The exit of a firm from the freight market does not necessarily mean a corresponding decrease in the supply of tonnage, since a firm leaving the market may decide to sell its tonnage to another firm and the new owners may continue operating this tonnage until the end of its economic life.

7) Advertisement for the services offered by the tramp shipping firm is not necessary.

8) Information regarding freight rates and other business matters is freely obtainable.

Four points are noteworthy from the Metaxas argument. Firstly, Metaxas did not extend the level of precision of Zannetos. Secondly, his argument was one sided : he paid no attention to the demand side (a criticism which also applied to Zannetos). Such a situation is, therefore, not so specific as to enable the precise analysis of a market where we have to deal with monopsony or oligopsony. Thirdly, there is little statistical evidence supporting his statements as to market structure. Finally, although his argument may have applied to the 1960s, changes in the structure of the tramp shipping market are such that it is unlikely to apply today. This point will be taken up in the following section. In conclusion, both Zannetos and Metaxas essentially postulate rather than prove their cases.

3.3 Imperfections in the Korean Dry Bulk Shipping Market

As we have indicated earlier (in chapter 2), the Korean dry bulk shipping market does not conform to the theoretical model of model of the tramp shipping market. It contains significant market imperfections, which are the result partly of structural deviations from perfect competition and partly of government behaviour. In this section we will discuss the nature of these deviations and behaviour. We will refrain from going into the particular consequences of each of deviations and behaviour at this stage but will simply summarise the general sources of those market imperfections which have a bearing upon market behaviour. We will begin by looking at imperfections which have been inherent in the Korean dry bulk shipping market. This part gives an overview of the sources of structural market imperfections. We will then go on to discuss barriers to competition. This discussion will concentrate on those elements of legislative and policy control that restrict competition in the market. Finally, we will go into the sources of inequality in competition between Korean- and foreign-flag ships, and between Korean operators themselves.

3.3.1 Inherent Imperfections

The inherent imperfections in the Korean dry bulk shipping market relate to its characteristics in respect of homogeneity (e.g., see pp. 40-41 of this thesis, Metaxas' assumption of 1), perfect information (e.g., see *ibid.*, assumption of 8), and price taking (e.g., see *ibid.*, assumption of 4).

3.3.1.1 Homogeneity and Differentiation

"Homogeneity implies that substitution between all vessels across all routes is well nigh perfect." (Glen, 1987, p. 37) The assumption of homogeneity is a prerequisite for the market analysis at an aggregate level. The case for homogeneity seems to rest on three points. These are the common character of tramp shipping services, the high degree of mobility of all tramp ships, and the smallness of the largest vessels relative to the total volume of demand. Taken together, they would justify an assumption of homogeneity allow construction of a (simple) model of the tramp shipping market and the derivation of solutions in terms of equilibrium freight rates. (e.g. see Wergeland, 1981)

Glen (1987) argues that economists use the term 'differentiation' rather loosely, but the irony is that he himself seems to be one such when he states that 'differentiation will be deemed to exist if the gross profit margins per tonne mile differs across *vessel sizes* or *routes* in a consistent fashion' (p. 13; emphasis added). We should admit that he was only looking at the tanker market, nonetheless his argument is one-sided because he invokes only two factors, vessel size and route, and pays little regard to segmentation by product or service. However, as a result of technical and commercial developments, the market has become segmented by service.

In reality the Korean dry bulk shipping market has three segments of differentiation - service, size, and geography.

Service Differentiation : The supply of Korean dry bulkship services experienced considerable change during the late 1970's and the early 1980's. Table 3-1 shows how the size structure of the Korean ore/bulk fleet changed over time, leading to an increasing degree of service differentiation. This point can be further illustrated by referring back to Table 2-5, in which we notice that proprietary ship contracts have gained in importance. The supply of other dry bulkship services has also tended to be more differentiated in such a way as to increase cost efficiency. However, it could be argued that none of the benefits of this efficiency have been received by Korean shipowners due to the monopsonistic or the oligopsonistic power of Korean shippers.

Table <3-1> Korean Ore and Bulk Carrier Stock by Size : 1978-1984

(As at 1st July)

| | Unit : '000 GT | | | | |
|---------------------|----------------|--------------|--------------|--------------|--------------|
| Size | 1978 | 1980 | 1982 | 1983 | 1984 |
| 6- 6.999 | | 7 | 7 | | |
| 7- 9.999 | 155 | 182 | 164 | 154 | 145 |
| 10-14.999 | 298 | 458 | 619 | 673 | 670 |
| 15-19.999 | 118 | 358 | 529 | 580 | 613 |
| 20-29.999 | 101 | 229 | 407 | 529 | 579 |
| 30-39.999 | | 99 | 335 | 480 | 622 |
| 40-49.999 | 45 | 45 | 90 | 136 | 137 |
| 50 and above | 56 | 56 | 394 | 1,026 | 1,091 |
| Total | 773 | 1,434 | 2,545 | 3,578 | 3,857 |

Source : Lloyd's Register of Shipping "Statistical Table"

Size differentiation: Glen(1987, P. 12) argues that "even if some vessels are limited in their employment opportunities, differentiation by size and

route may not necessarily develop". His explanation for this runs as follows : "Given the information flows available to interested parties, it may be that arbitrage by vessels which can substitute is sufficient to equalise returns across both size and route". However, interestingly enough, this is not the case with the Korean dry bulk shipping market. Size differentiation in the Korean dry bulk trades appears to have arisen due to the better chances of employment for some vessels. This has occurred for two reasons. Firstly, as Table 3-2 indicates, commercial arrangements have enabled Korean shippers frequently to sell on C & F terms and buy on f.o.b. terms. This has given shippers control of vessel size and improves chances of employment for those particular sizes they prefer. Secondly, the expansion of port facilities and amelioration of draft limitations have enabled large vessels to compete with increasing effectiveness in an ever wider range of trades. With this argument as background, concentration in the Korean fleet are considered below.

Table <3-2> Share of Korean Operators of Major Dry Bulk Cargoes in 1986

| Commodity | Total Tonnage ('000 M/T) | % Share | % Transported on f.o.b. terms |
|-----------------------|-------------------------------------|----------------|--|
| Grain | 8,666 | 60 | 57 |
| Raw Fertilizer | 2,480 | 100 | 74 |
| coal | 13,504 | 63 | 56 |
| Iron Material | 20,474 | 78 | 78 |
| Cement(Export) | 4,268 | 41 | 62(C & F) |
| Total | 49,392 | 69 | 70 |

Source : KSA

Simple concentration ratios (CR) and Hirschman-Herfindahl indices (HHI) are calculated here to determine the extent to which the distribution of vessels by size has altered. CR measures the cumulative tonnage share of the largest x-categorised vessels ranked in descending order of its tonnage share. Notationally, we can write :

$$CR_x = \sum_{i=1}^x S_i$$

where: CR_x = the x-categorised vessels concentration ratio
 S_i = the percentage tonnage share of the ith categorised vessels

Although x is usually taken to be 3, 4 or 5, we calculate ratios for x=1 and x=2. A value close to zero would indicate that the x-categorised vessels sharing largest tonnage supply but a small share of the tonnage : 100 percent would indicate a single categorised vessels operate in the market. On the other hand, HHI is calculated by summing the squares of the tonnage shares of all categorised vessels in the fleet :

$$HHI = \sum_{i=1}^n S_i^2$$

where: S_i = the tonnage share of the ith categorised vessels, measured as the tonnage of the ith categorised divided by total tonnage

This index will be close to zero when the most even spread of vessels over a given set of size ranges occurs. The results of utilising the data in Table 3-1 are presented in Table 3-3. There are difficulties in the interpretation of these figures, because they suggest that vessel size inequality has first decreased and then increased. Nonetheless this strengthens our argument which assumes a strong relationship between the introduction of large vessels and size differentiation, as inspection of Table 3-1 identifies a sharp increase in share of large vessels as a main cause of increasing figures of size concentration in 1983 and 1984.

Table <3-3> Summary Measures of Size Concentration

| | 1978 | 1980 | 1982 | 1983 | 1984 |
|------------|-------|-------|-------|-------|-------|
| CR1 | 38.55 | 31.94 | 24.32 | 28.68 | 28.29 |
| CR2 | 58.68 | 56.91 | 45.11 | 47.49 | 45.66 |
| HHI | 0.24 | 0.21 | 0.17 | 0.19 | 0.19 |

Geographical differentiation may arise for a variety of reasons. For instance, as Glen(1987) argues, it may arise because of the entry limitations forced upon certain vessel size classes. In the Korean dry bulk shipping market this is attributable mainly to policy instruments (many of them informal), which protect certain vessels from direct competition on particular routes. Glen examines such differentiation using a statistical approach, but in the case of Korean dry bulk shipping market a statistical proof is not required as the market is directly differentiated by policy instruments. This point is discussed below.

3.3.1.2 Imperfect Information

The tramp shipping industry generally is rich in market information. Well established brokers and shipping centres enormously facilitate the transmission of information, whilst outside sources also publish a huge amount of data. Thus, tramp shipping information can be acquired quite inexpensively and freely through routine channels. For this reason, it is often claimed that market information is perfect. However, in the Korean dry bulk shipping market, this is not the reality.

In the Korean dry bulk shipping market, the imperfections of information relate to prices (that is, freight rates) and shipping costs, the

participants of the market being well informed with regard to the relevant aspects of vessels and cargoes available. Barriers to the transmission of information about shipping costs and prices include, for example, monopsonistic control over particular dry bulk commodities by individual shippers. Operators in the Korean dry bulk shipping market are, in many cases, price bidders and, for this reason, the data on shipping costs and freight rates that can be used for bid decisions are kept secret and are virtually unobtainable. This is well evidenced by the fact that most Korean operators have usually kept their fixtures and accounting books secret. It should be emphasised that this statement strongly contrasts with Zannetos'(1972) claim that ascribes a major reason for the secrecy (in which both oil companies and independents indulge) to the inability of those who possess the data to use them for managerial decisions(Lorange et al., ed., *Shipping Management*, 1972, P. 43).

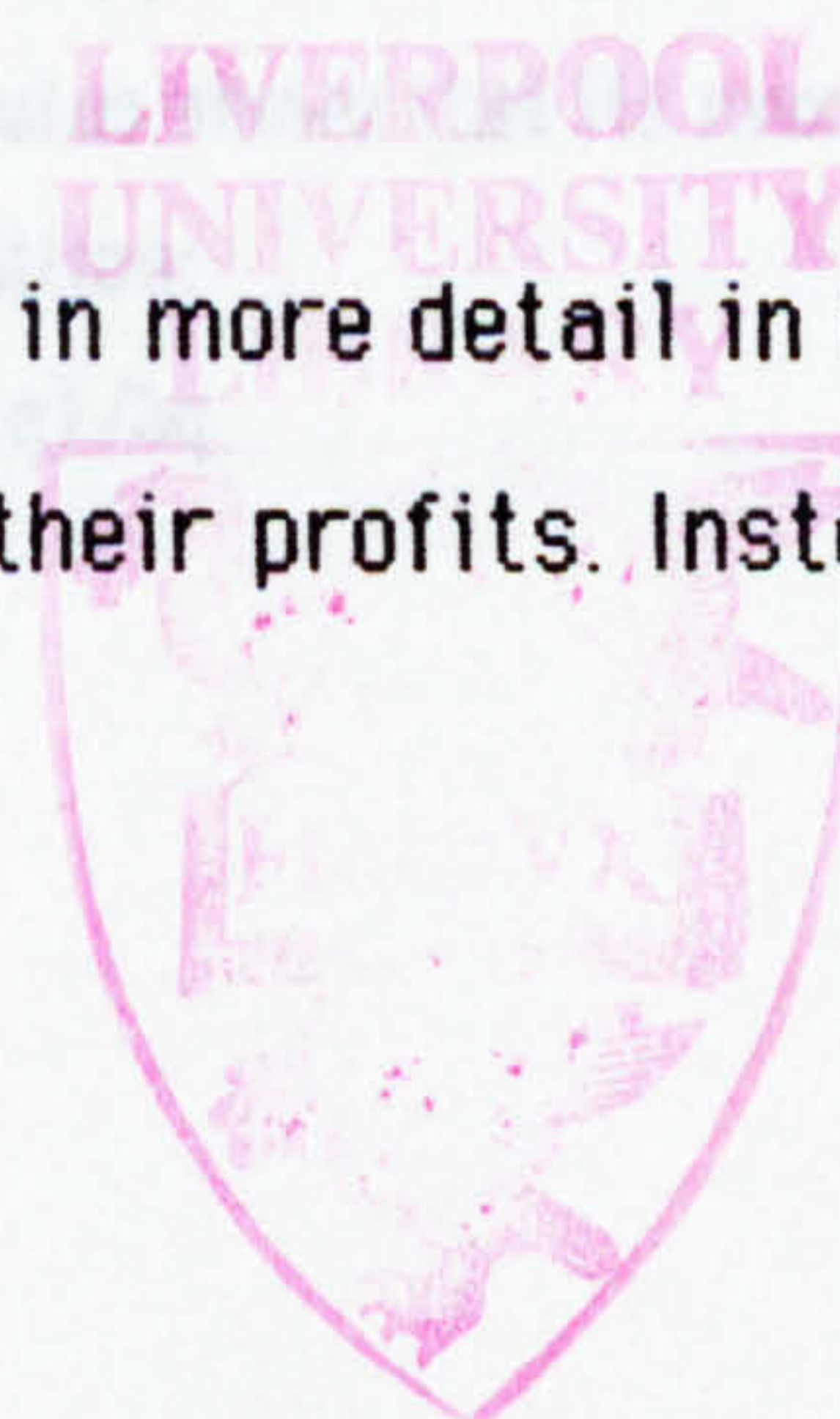
Prices themselves represent important information, and can also be said to transmit other information. However, anything that prevents prices from expressing freely the conditions of demand or supply interferes with transmission of accurate information.(cf. Friedman, 1985, P. 35) Legal and policy restrictions that favour the national fleet are good examples. They do not prevent the transmission of information through the price system, but they distort the information transmitted. High freight rates in the Korean dry bulk trades, derived from the unexpected world shipping boom in 1978-1982, transmitted very important information. However, the information transmitted did not reflect the impending shift to deep recession and the rapid development of new technologies and more

economical ships. In other words, restrictions on competition by the government prevented information about such changes and developments from being transmitted accurately to Korean operators. Incomplete information provided the trigger for a dramatic increase of the Korean fleet, leading to oversupply and unprofitability.

3.3.1.3 Price Bidder

In addition to the assumptions of homogeneity and perfect information, most analyses of the freight market in tramp shipping also rely on the crucial assumption that shipowners - in this respect shipowners are considered synonymous with ship operators - are numerous so that no single owner can corner the market in terms of supply. In other words, there are a great number of shipowners and hence an individual shipowner may increase or reduce his output level without any perceptible effect on freight rates. The individual shipowner acts as if he had no influence on freight rates and merely adjusts to what he considers a given market situation. Thus, each shipowner is assumed to take price as given in the sense that he assumes carriage at prevailing market freight rates. If shipowners are price takers, they are also assumed to maximise their profits through competition for the cargoes of numerous shippers. Thus, the shipowner will be concerned only with determining the profit maximising levels of outputs and inputs. However, such assumptions are far from the reality of the Korean dry bulk shipping market.

As will be discussed in more detail in Chapter 5, Korean operators have not aimed to maximise their profits. Instead, they have tried to maximise



both revenue and capacity. Added to this is the crucial fact that Korean shippers have not been numerous and as a result have not been price-takers. As we shall see in the following section, Korean dry bulk shippers are mostly government agencies and big businesses. Thus, the market is monopsonistic or oligopsonistic in character. However, shippers' influence on the level of freight rates has appeared to be somewhat implicit or indirect. Since the majority of Korean shippers have used open bids in order to contract operators, the Korean operators have been acting as price bidders rather than price takers. This distinction is crucial. If operators act as price-bidders, they tend to price their services on a 'cost plus' basis rather than on the 'marginal costs of output', since prices are no longer exogenous variables to the profit-maximisation problem. Therefore, it could plausibly be argued that the demand curve for each Korean operator slopes somewhat downward. (cf. Samuelson & Nordhaus, 1985, P. 503; Figure 23-1) This underlines how little the Korean dry bulk shipping market has in common with the model of free or perfect competition.

3.3.2 Barriers to Competition

We move now to the discussion of barriers to entry and exit, that is,

*) If the operator acts so as to maximise his profit, the problem facing the operator can be written as:

$$\text{Max } R(q) - C(q) = \text{Max } pq - C(q)$$

(where R = revenue, C = cost, p = market price(constant), q = output)

A simple application of calculus shows that its maximum-profit equilibrium is characterised by the condition:

$$\partial R(q) / \partial q = \partial C(q) / \partial q$$

$$p = MC$$

deviations from the assumptions of free entry and exit. Another term suggested by Samuelson(1985, PP. 506-509) is "barriers to competition". We, as he has emphasised, also choose to stress barriers to competition because restrictions on the intensity of competition discussed here do not always related to entry and exit. Also, In conventional price theory the significance of entry barriers lies in the implications for the long-run equilibrium level of price and profit. If there is perfect ease of entry, price cannot in the long run exceed the minimum average cost of production, and consequently super-normal profits cannot be earned. Conversely, if there are entry barriers, price may exceed minimum average cost even in the long run, and abnormal profits may thus persist.(Shaw and Sutton, 1976, P. 14) This was confirmed in the case of manufacturing industries by Bain(1956) who showed that the most important barriers to entry were product differentiation advantages, economies of large scale, and absolute cost advantages. However, in the Korean dry bulk shipping industry these factors do not apply. We, therefore, prefer to emphasise what Samuelson observed when he says :

"Analysts have learned that, in addition to cost-based market imperfections, there are as well certain barriers to competition : A barrier to competition arises when legal or psychological factors reduce the number of competitors or the vigour of rivalry below levels that would otherwise naturally occur. The most important barriers are legal restrictions and product differentiation."(Samuelson & Nordhaus, 1985, P. 507, emphasis added)

With regard to product differentiation, one aspect requires special mention. That is, as Holland(cf. 1987, PP. 83-91) argues that so-called

imperfection through differentiated products may be a necessary condition for market entry, and is a device widely used by both new and established firms to establish or increase market share. Given our argument that service differentiation has been developed along side in the increase of national fleet, we may also argue that entry into Korean dry bulk trades, at least to some extent, has been consistent with service differentiation. (However, it should be noted that service differentiation interferes with arbitrage.) For this reason, we shall be concerned only with legal and policy restrictions as important barriers to competition.

3.3.2.1 Legal Restrictions

Korea has regarded marine transportation as an area of particular national interest and, accordingly, has formulated specific Acts toward shipping consistent with her national objectives, method of government, and economic requirements. These Acts favouring particular aspects of the national interest restrict competition in certain situations. Important examples of restrictive measures by Acts are 'license for shipping business' and 'registration of ships'.

License is a very common form of legal restriction to entry. The first modern Korean regulation of 'license for shipping business' was introduced by the 1963 Marine Transportation Business Act. This Act was amended in 1983. However, many of provisions of the 1983 Act were imported from those of 1963 with very little alteration. In particular, the 1983 provisions of license replicate those of 1963, extending them in the process. We will, therefore, provide a brief review of the 1983 provisions involved in license.

According to Article 26 of the Act, any person who desires to operate a marine cargo transportation business shall obtain a license from the Administrator of the Korea Maritime and Port Administration (Paragraph 1). A person who desires to obtain a license shall submit an application accompanied by a business plan to the Administrator under the conditions as prescribed by the Ordinance of the Ministry of Transportation (Paragraph 3). When the Administrator issues a license for deep-sea tramp cargo transportation it applies only for a specified area of operation under the conditions as prescribed by the Presidential Decree(Paragraph 2). When a license is to be granted, the Administrator, according to Paragraph 1 of Article 27, shall examine the business concerned as to whether or not it conforms to the following requirements :

1. The commencement of the business concerned shall conform to transportation demand;

2. The operational plan drafted shall conform to the operation of the business concerned;

3. The vessels and the financial status of the business concerned shall meet the standards as prescribed by the Ordinance of the Ministry of Transportation;

4. The marine affairs officer shall be employed under the conditions as prescribed by the Ordinance of the Ministry of Transportation; and

5. The business plan concerned shall conform to the Basic Plan for Fostering Marine Transportation Industry as prescribed in Article 3 of the Marine Transportation Industry Fostering Act.

In addition to these, when the Administrator intends to grant to a foreign-invested corporation a license, he shall consider whether or not it

conforms to the following requirements :

1. The commencement of the business concerned shall not endanger the development of the deep-sea cargo transportation business; and
2. The business concerned shall be deemed particularly necessary, by the Government, for international liner routes by full-containerised vessels.

The Act has had a considerable effect upon the operation of the market. Table 2-4 shows that there was a high entry into Korean dry bulk shipping market during the five-year period between 1970 and 1975. However, the turnover since 1975 has been low, with a total of 10 movements comprising 8 entrances and 2 exits over the period 1976-1983. Bearing in mind the fact that the tramp shipping market sustained a boom between 1978 and 1982, the relatively low rate of entry supports the view that the market has not been perfectly competitive. It is clear that the low rate of entry is a direct result of government's restriction. One result of this barrier is that licenses were bought and sold in the past.*

Registration is another form of legal obstacle to competition in the market. State regulation of shipping through registration is a right granted by international conventions such as the 1958 Geneva Convention on the High Seas, the 1982 United Nations Convention on the Law of the Sea, and the 1986 United Nations Convention on Conditions for Registration of Ships.

*) e.g., Yulsan Shipping co., bought a license for deep-sea tramp cargo transportation business from Keumryong Shipping Co., in 1976 and entered into Korean seaborne trades.

The Article 5 of the Geneva Convention simply provided that :

"Each state shall fix the conditions for the grant of its nationality to ships, for the registration of ships in its territory, and for the right to fly its flag. . . . , in particular the state effectively exercise its jurisdiction and control in administration, financial and social matters on ships flying its flag . . . "

However, Odeke(1988, P. 245) argues that various countries have exercised these rights to enable them to intervene in, and control, the merchant marine industry in their territory in different ways and in circumstances that could not have been intended by the Convention. Korea has not been an exception : the historical stringency of requirements for registration of Korean ships has effectively prevented foreign investors from participating in Korean shipping.

Requirements for registration of Korean ships are stipulated in the Ship Act, which was first introduced in 1960. This Act had stringent provisions excluding foreigners from investment in Korean shipping. The Act, however, went through a number of amendments, reflecting changes in the international shipping environment. The latest amendment was made in 1982. Yet, requirements for registration have remained virtually unchanged since 1978, when the Act, for the first time, relaxed requirements to some extent from constraints of investment by foreigners. Thus, Article 2 of the current Act provides that :

The ships falling under each of the following items shall be the ships of the Republic of Korea.

1. State-owned or public-owned ships;

2. Ships owned by citizens of the Republic of Korea;

3. Ships owned by commercially companies incorporated under the laws of the Republic of Korea, with the majority of investments thereto and more than three-fifths of the voting rights at the board of directors belonging to citizens of the Republic of Korea, in this case the representative director of the company shall be citizens of the Republic of Korea; and

4. Ships owned by a juridical person other than those under item 3 above, whose head office is located in the Republic of Korea and whose representative (in case of joint representative, all of them) are citizens of the Republic of Korea.

On the other hand, the owner of a Korean ship, according to Article 8, shall apply for registration of the ship concerned to the marine transportation office having jurisdiction over the the port of registry.

Nevertheless, foreigners have so far neither invested, nor have been allowed to invest in the Korean dry bulk shipping industry. It is for this reason that we may argue that above requirements for registration of Korean ships are stringent enough to constitute a barrier to entry into the Korean dry bulk shipping market. On the other hand, the rationale of the stringency of such requirements seems to be found in the nation's desire to build its own fleet, and thereby to protect the national interest.

3.3.2.1 Policy Restrictions

Restrictive practices preventing foreign ships or foreign operators

from entry into Korean trades have also been largely implemented by Government shipping policy measures. (In this case, we regard a measure as a shipping policy measure when it is either enacted or adopted by the Government particularly in favour of the Korean fleet. Thus, a policy restriction is distinguished from a legal restriction by our adoption that the latter is implemented by an Act, the purpose of which is to control or interfere with a particular industry as a whole consistent with national objectives.) Many Korean shipping policy measures are, however, not easily ascertainable, since they are informal and involve several government agencies (KMI and TBS, 1985, P. 1 - 3). We will, therefore, continue the discussion to important elements of policy restrictions pertaining to cargo reservation, and restrictions on time-charter, which are argued to have constituted barriers to entry into Korean trades.

Cargo Reservation : Although the history of this policy, which is widely known as 'the waiver system', dates to the early 1950s in the liner sector, it was not established in the bulk sector until 1967, when the 'Shipping Promotion Act' was introduced. This Act marked the beginning of comprehensive government intervention in the Korean shipping industry by its introduction of various regulations and government aids. It was replaced by 'the 1984 Marine Transportation Industry Fostering Act', which is an extended version of the former in every respect. Thus, in relation to the system, Article 16 of the new Act provides that a person who intends to transport the main cargoes as prescribed in the Presidential Decree shall utilise Korean flag vessels (Paragraph 1). According to this provision, imports of iron ore, coal, raw chemical products, grain, fertilizer, crude

oil, and government purchases as well as exports of plywood, cement, and steel are reserved for Korean flag vessels unless a waiver is granted to a foreign vessel by the KSA. However, this shall not apply where this constitutes violation of an international treaty or an agreement regarding marine transportation (Paragraph 1).

It goes without saying that the main purpose of cargo reservation is to encourage the development of national merchant marine. Korea has achieved this purpose up to a point. This is brought out in Table 3-4 and more clearly in Figure 3-2. These show that the share of the Korean fleet in major import of export dry cargoes grew considerably in the early 1980s, ending up among the highest in the world.(cf. KMI & TBS, 1985, P. 1 - 17)* As a corollary, there has been a criticism that cargo reservation hampers entry of foreign flag vessels into Korean trades. However, this, as we argued, has never been contributive to the development of the Korean dry bulk shipping industry.

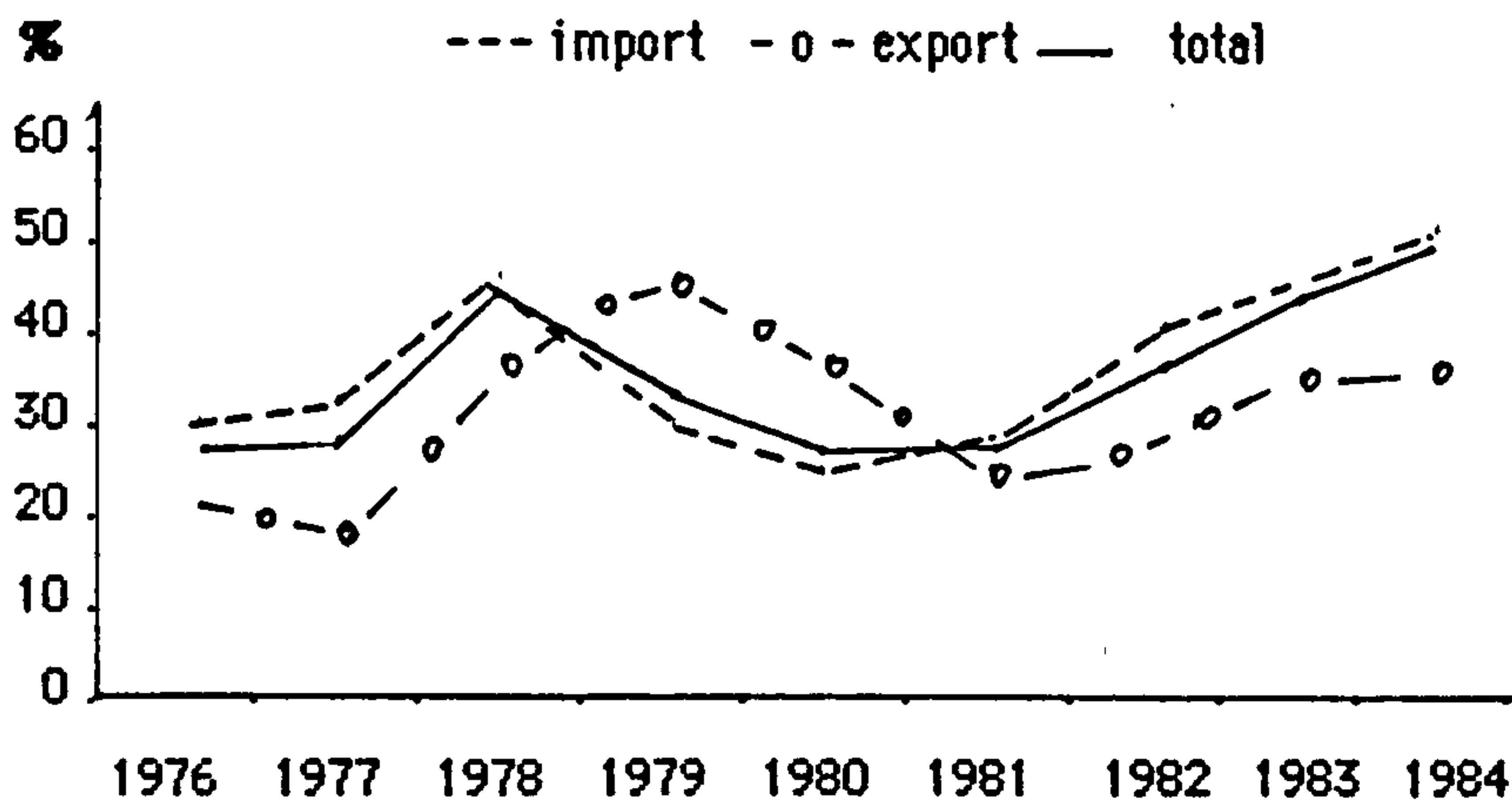
Table <3-4> Historical Share of the Korean Fleet in Korean Trades : 1976-1984

| | Unit : % | | | | | | | | |
|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
| Import | 30 | 33 | 47 | 30 | 25 | 29 | 40 | 46 | 51 |
| Export | 21 | 19 | 37 | 45 | 37 | 23 | 28 | 34 | 35 |
| Total | 28 | 29 | 45 | 32 | 28 | 28 | 38 | 44 | 50 |

Source : KMPA, Statistical Yearbook of Maritime and Ports

Import : Grain, Coal, Iron Ore, Phosphate Rock **Export** : Fertilizer, Cement

*) KMI and TBS(ibid.) argued that by 1983 the only economies that had levels of domestic shipping involvement in excess of 40 percent were Finland, Spain, Japan, and Canada in their import trades and Finland, Greece, and Norway in their export trades.

Figure <3-1> Historical Share of the Korean Fleet in Korean Trades

On Time-Charter: Time-charter operation is a vital element affecting competition because it moves vessels efficiently* from market to market. As a result, productive capacity is not fixed even in the short term and supply can be redeployed to meet changes in global demand. Time-charter operation has, however, failed to function as an equaliser in the Korean dry bulk shipping market. This is attributable partly to flag discrimination as a result of cargo reservation, under which foreign vessels chartered by Korean operators are even restricted in their access to Korean trades. But it is also due to various government interventions applying to Korean operators who desire to charter foreign vessels. For instance, the 1963 Marine Transportation Business Act provided that Korean operators who desire to charter foreign vessels should obtain permission from the

*) It is, for example, referred to the utilisation rates as a result of acceptance 'in position', hiring only when business available, and selection of the most appropriate vessel size for each voyage. (Farrell, 1986, P. 284)

Administrator of the KMPA (Article 29). The amended Act of 1984 relaxed this constraint with the replacement of the phrase 'shall obtain permission from' with 'shall report to' (Article 53). Yet, the new Act still grants the Administrator the power to restrict the charter of foreign vessels, if this is deemed necessary for maintaining proper capacity and keeping order on the service routes (Article 54). No empirical evidence is available to prove that these Acts have hampered Korean operators from chartering foreign vessels. Nevertheless, it is apparent that such Acts have precluded chartered vessels flying foreign flags from entry into Korean trades as no Korean operators would charter foreign vessels for employment in a trade where Korean flag vessels are fully protected and at the same time sufficiently employed.

3.3.3 Unequal Competition

Perfectly competitive models of the tramp shipping market implicitly assume equal competition between operators or vessels participating in a market. However, the Korean dry bulk shipping market has been subject to unequal competition not only between Korean- and foreign-flag vessels but also between Korean operators themselves. This is the direct result of rate preference and unequal access to shipbuilding programme and ship finance. We will review briefly the sources of inequality.

3.3.3.1 Rate Preference

Before we proceed with the review of unequal competition caused by rate preference, we will present a brief discussion of the term 'rate preference' and 'rate discrimination', since the former is very unfamiliar to the literature of economics.

Viewed from the common practice that the term 'flag preference' is often used interchangeably with 'flag discrimination', it would not be surprising if we could use the terms 'rate preference' and 'rate discrimination' as synonymous when discussing different rates for homogeneous services or goods. However, we would tentatively suggest use of the term 'rate preference' rather than 'rate discrimination' in relation to different rates for homogeneous shipping services in the Korean dry bulk shipping market.

More than 30 years ago, Chinitz(1956, P. 5) said in his '*Rate Discrimination in Ocean Transportation*' that price* discrimination was a subject which had received a lot of attention in the literature of economics. Yet, this is not a passing comment, since price discrimination, as it was then, is still one of the major topics under the general heading of monopoly in most treaties and textbooks on price theory. Nevertheless, it appears that no suitable definition as yet exists for the term 'price discrimination' that is applicable to the Korean dry bulk shipping market. A close examination of the following two famous definitions will clarify this point.

"The act of selling the same article, produced under a single control, at different prices to different buyers is known as *price discrimination*."(Robinson, 1948, p. 179)

"Price discrimination, in which a firm sells the same product at different prices for reasons not related to cost or meeting competition."(Samuelson, 1985, p. 544)

*) Chinitz used the word 'price' interchangeably with 'rate'. However, 'rate' seems to be rather an appropriate word when discussing it in connection with the service industry.

Both definitions have a shortcoming in the point of generality. As it stands, they do not cover the case where two sellers produce homogeneous services (or goods) and sell them at different rates (or prices) to the same buyer. This is a practice which could hardly be expected but it is in fact relevant in the case of the Korean dry bulk shipping market. The definitions also assume implicitly that the seller has some degree of monopoly power. This is because if the seller is subject to ordinary competitive conditions, his demand curve is likely to be very elastic, and hence price discrimination becomes impracticable. Suffice it to say in this case, however, there is no need to assume a government intervention in such monopoly power. For instance, if customers will not move readily from one seller to another as a result of imperfect information or brand loyalty, it is possible for an individual seller to behave as a monopolist and thus price discrimination becomes practicable. However, as we shall see, as the direct result of government intervention Korean operators can sell their homogeneous services at different rates. In light of the above discussion, we choose the term 'rate preference' rather than 'rate discrimination' in relation to such different rates in Korean trades. Thus, in our view, the term 'rate preference' refers to a government intervention in pricing for the purpose of setting an order for national fleets preference. Generally speaking, rate preference seeks higher rates for certain vessels adopting the flag as the operative criterion.

The objective of rate preference in Korean trades is to give Korean flag vessels an advantage when competing with a foreign flag in a bid for a main cargo. More specifically, when a Korean shipper fixes a ship for the

transportation of a main cargo by an open bid, it is not awarded to the lowest bidder if his vessel is not of the Korean flag. Instead, the government intervenes, giving first priority to the Korean flag such that the Korean flag operator can outbid the lowest foreign flag bidder upto 10 percent higher. For example, it is awarded to the second lowest Korean flag bidder unless his bidding rate exceeds the lowest foreign flag bidder's rate by 10 percent. The principle purpose of this rate preference was, of course, to protect Korean operators against the competition of foreign operators; but the result has been to create unequal competition between Korean operators themselves, favouring those who offer Korean flags over those employing chartered vessels flying foreign flags. As we shall see later, this has led to oversupply and cut-throat competition in the market.

3.3.3.2 The Government Planned Shipbuilding Programme

Korea's seaborne trade achieved a rapid rate of growth in the early 1970s. It almost doubled during the five years from 1970 to 1975 rising from 22.4 million tonnes to 41.3 million tonnes, at an annual growth rate of 13 percent. The Korean shipping industry then faced the problem of expanding capacity in response to such rapidly increasing demand. Put simply, the main reason for this problem was the inability of the individual firm to raise the capital necessary for expansion. This led to a turning point in the government's policy. In 1975 the government launched 'the five-year deep sea shipping promotion plan' with the aim of expanding the national ocean-going merchant fleet to 8.5 million grt by 1981 and increasing the share of the Korean fleet in import and export cargo to 50 percent. (EPB, The detailed plan of the GPSP, 1976) In accordance with this plan, the

Government Planned Shipbuilding Programme was instituted in 1976. This Programme provided both Korean shipowners and domestic yards with financial support, the main terms of which are as follows :

1. Ocean-going carriers that qualify under the KMPA administered the GPSP for vessels built in domestic yards could obtain Korean currency loans from the KDB for about 70 percent of the ship price, at an interest rate of 10 percent for a total period 10.5 years with a moratorium on principal repayments of 2.5 years.

2. Qualifying carriers could also obtain foreign currency loans through the KDB for about 20 percent of the the ship price at an interest rate usually in excess of LIBOR. Such loans would usually be 10 years with a moratorium on principal repayments for the first four years.

3. Carriers were required to invest 10 percent of equity capital in the newbuilding; but owners of full container ships need invest only 8 percent in equity capital.'(KMI & TBS, 1985, P. 1- 10)

Table 3-5 provides a summary of the record of tonnage ordered and delivered under the Programmes. Between 1976 and 1981, a total of 75 ocean-going merchant vessels, amounting about 0.78 million grt, were delivered. This figure accounted for 26 percent of the increase in capacity of the Korean ocean-going merchant fleet during the period.(cf. Table 2-13) Thus, we see that the GPSP was of help in expanding the Korean fleet, leading to an increase of the supply of shipping service, inter alia, in Korean dry bulk trades, in which some 66 percent of the total delivered tonnage was employed. Suffice to say, the GPSP has also contributed to a lowering of the average age of the Korean Fleet. In fact, however, it is

Table <3-5> The Government Planned Shipbuilding Programme: 1976-1981
(for Ocean-Going Merchant Vessels Only)

| | Total Ordered | | Total Delivered | | Dry Bulk Delivered | | (B/A)x100 |
|---------|---------------|------|-----------------|-----|--------------------|-----|-----------|
| | '000 qt | No. | '000 qt(=A) | No. | '000 qt(=B) | No. | % |
| 1976 | 67.6 | 8 | | | | | |
| 1977 | 169.7 | 17 | 73.8 | 10 | 57.2 | 4 | 77.5 |
| 1978 | 246.2 | 18 | 135.7 | 13 | 28.2 | 10 | 94.5 |
| 1979 | 205.3 | 17 | 202.5 | 19 | 71.3 | 6 | 35.2 |
| 1980 | 182.6 | 14 | 178.2 | 21 | 113.8 | 8 | 63.9 |
| 1981 | (273.6) | (12) | 193.3 | 12 | 46.7 | 4 | 75.9 |
| Total | 871.4 | 74 | 783.5 | 75 | 517.2 | 32 | |
| Average | 174.3 | 15 | 156.7 | 15 | 163.4 | 6.4 | 66.0 |

Source : KMPA and KSA

() : Not included in Total and Average

argued that the GPSP has in the long run adversely affected the development and competitiveness of the Korean shipping industry on the grounds that it has served many of small firms as an impediment of competitiveness in the Korean shipping market.

An empirical study (Ghang, 1985) shows that new vessels built under the GPSP was more competitive than second-hand ones purchased through foreign currency loans. This competitiveness was attributable to two main factors. These are the steady devaluation of the Korean currency against foreign currencies before 1986 (note that the new building was provided with Korean currency financing for 70 percent of the ship price) and the efficiency of bunker consumption of the newbuilding (remember that bunker prices were at their highest throughout the 1970s and the early 1980s). However, the quantity of newbuildings by small firms under the GPSP has been very limited because of the

insufficiency in funds for domestic loans and the comparatively strict terms and conditions relating to them. For the requirements of the investment of 10 percent of equity capital and of the cargo guarantee of the new vessel are favourable more to the big firm for award. In addition, with the institution of the GPSP in 1976, the government proclaimed that, where possible, all new vessels flying Korean flag should be built at domestic yards. As it turns out, this has further strengthened the competitive position of the big firms who were favoured with the GPSP. Thus the GPSP has been an important element of unequal competition between big and small firms and has constituted a barriers to entry to small firms into Korean trades.

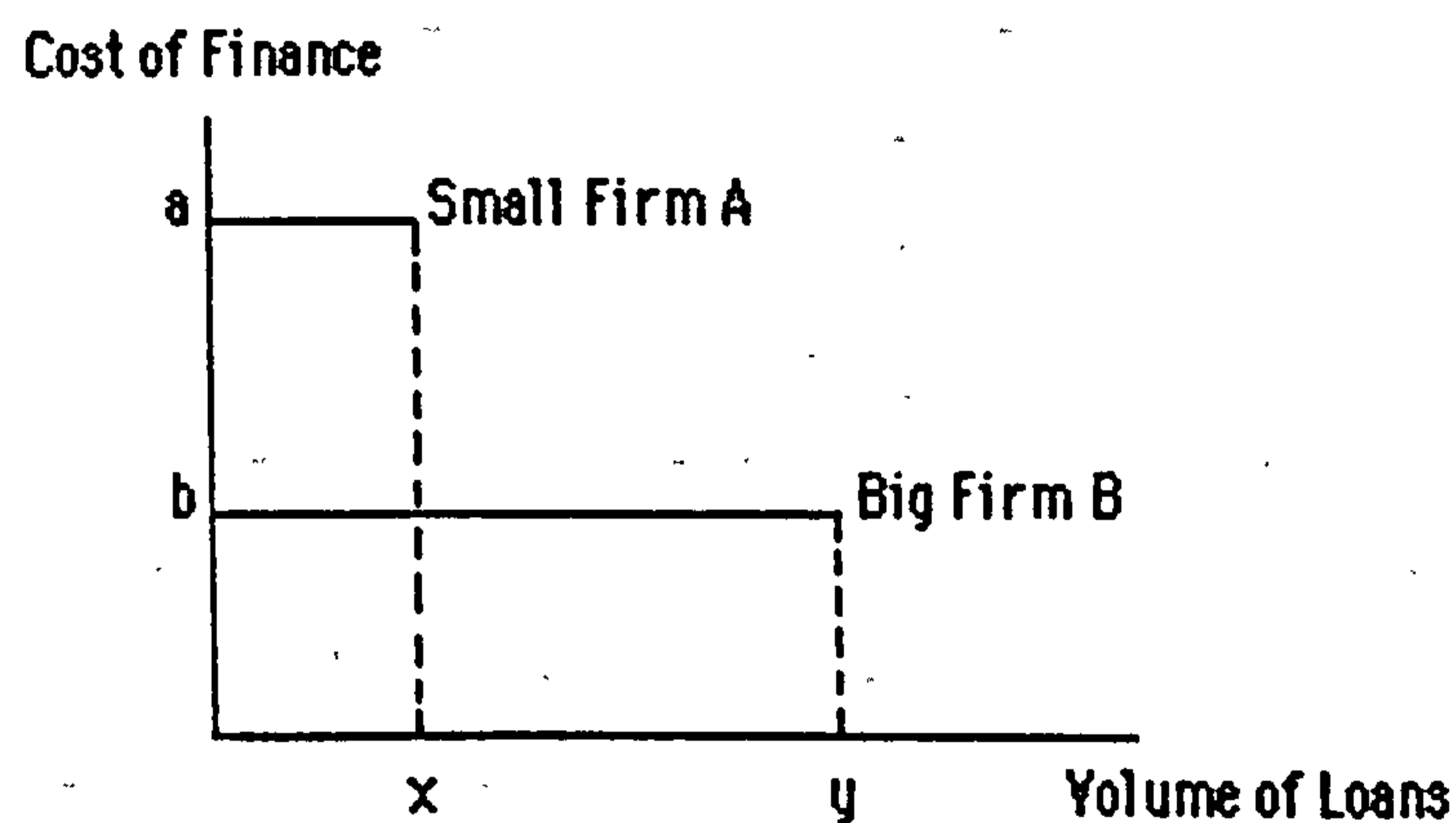
3.3.3.3 Ship Financing

The availability of adequate financing instruments for the acquisition of ships has been always of great concern for both big and small shipping firms. As already indicated, the availability of domestic finance for newbuildings has far from matched needs. It is for this reason that most Korean shipowners have resorted to foreign loans for purchases of second-hand tonnage. But of course there have been a number of obstacles domestically that lead to unequal borrowing costs and unequal access to funds. We will take up two important obstacles here : the bureaucracy of the government and the underdeveloped domestic financial system.

Successive implementation of economic development plans led by the Korean government during the last three decades brought unprecedented control by the government over the details of economic life : control of

foreign exchange, restriction of imports, and, most important, allocation of funds. To gain foreign loans, a firm would need to persuade the government to give approval. However, the bureaucracy that is hard on small firms, presenting a barrier of red tape and involving additional costs and time. Coupled with such bureaucracy was the backwardness of domestic financial system. Like many other developing countries the domestic financial market has been dominated by state-owned banks. These banks are generally very conservative by nature so that they do not guarantee foreign lenders against payment on behalf of borrowers unless they are offered sufficient immovable collateral from the borrower. In addition, as Holland(1987, P. 157) rightly pointed out, it is very evident that Korean banks have had a clear idea of the different creditworthiness of big and small firms, based on their relative chance of long-term survival. As a result, most small shipping firms have been forced to submit to higher incidental costs on their loans, while big firms could gain lower terms on their borrowings. This is brought out more clearly in Figure 3-2, duplicating Holland's own figure(Holland, 1987 p. 158). In this Figure, small

Figure <3-2> Unequal Costs of Finance



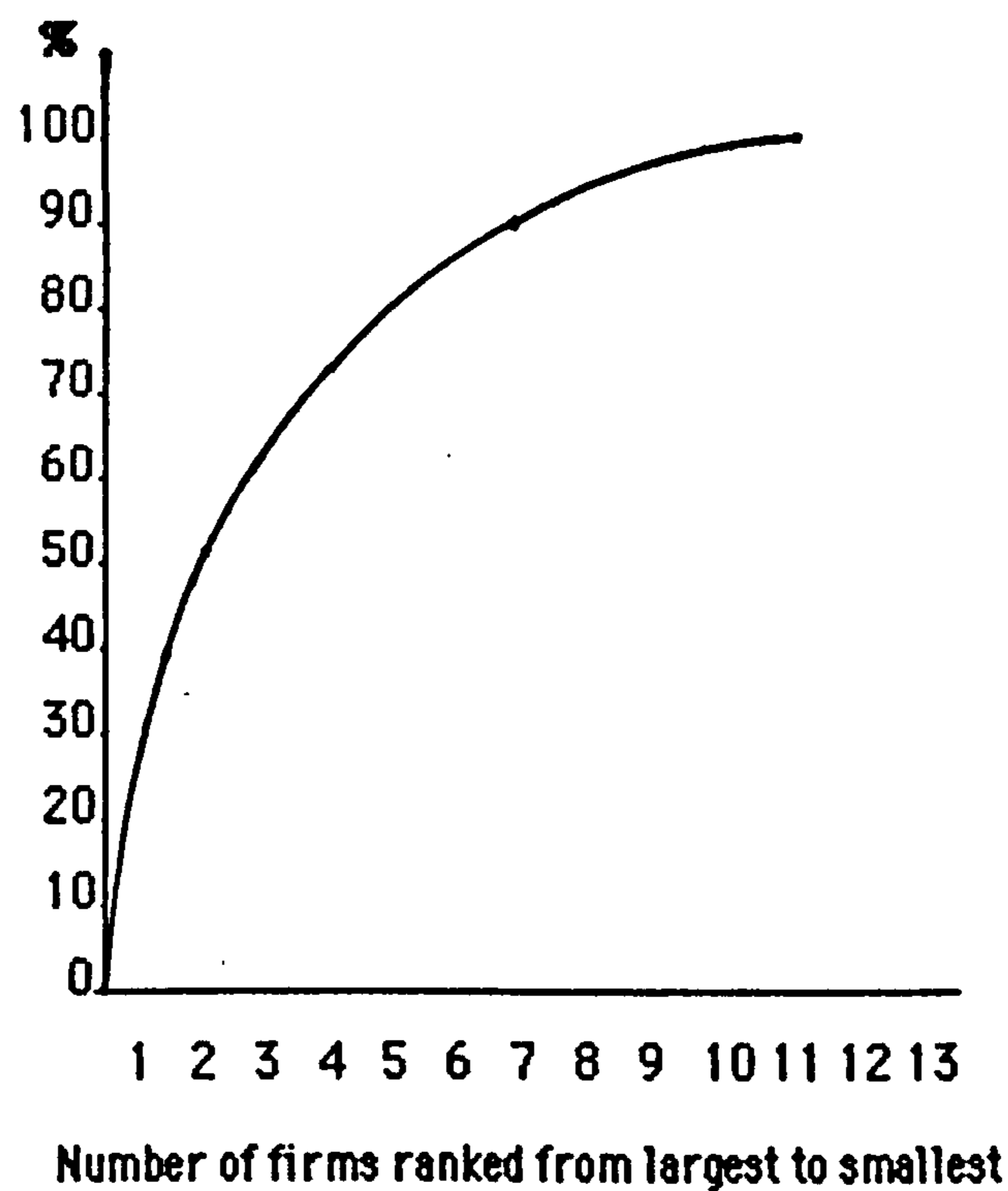
Korean shipping firms borrowed less at volume x and paid more at cost level a , while big firms in general borrowed more at volume y and paid less at cost level b .

By way of an illustration of the above discussion, we will consider the tonnage concentration of Korean dry bulk operators. In Table 3-6, firms are ranked in tonnage share order from the largest to the smallest and the cumulative tonnage share is calculated. The data are then graphed in Figure 3-3. This shows that the largest firm supplied about 36 percent of tonnage in 1984 and the largest three firms over 60 percent of the tonnage. This gives a clear indication of the effects of unequal access to ship finance.

Table <3-6> Dry Bulk Capacity by Firm and Its Concentration Ratio
(As at the end of 1984)

| | Tonnage '000 DWT | Share by firm % | Cumulative Share CR = % |
|----------------------|---------------------|--------------------|----------------------------|
| Pan Ocean Shipping | 2,910 | 36.2 | 36.2 |
| Korea Shipping Corp. | 1,234 | 15.3 | 51.5 |
| Hyundai Merchant M. | 834 | 10.4 | 61.9 |
| Dae Yang Shipping | 804 | 10.0 | 71.9 |
| Korea line Corp. | 711 | 8.8 | 80.7 |
| Kukje Shipping | 380 | 4.7 | 85.4 |
| Doo Yang Line | 320 | 4.0 | 94.1 |
| Cho Yang Shipping | 241 | 3.0 | 97.1 |
| Seyang Shipping | 108 | 1.3 | 98.4 |
| Young Jin Shipping | 82 | 1.0 | 99.4 |
| Shilla Shipping | 41 | 0.5 | 99.9 |
| Heung-A Shipping | 6 | 0.1 | 100.0 |
| Total | 8,046 | 100.0 | |

Source : KMI, Maritime Statistical Yearbook 1985

Figure <3-3> Cumulative Firm's Tonnage Share Curve

3.4 Principal Patterns of Market Behaviour In the Korean Dry Bulk Shipping Market

Having shown various deviations from the structural assumptions of the theoretical model of the tramp shipping market, we will now go on to discuss the principal patterns of market behaviour in the Korean dry bulk shipping market. These patterns are to be used in later Chapters from the terminological point of view. Patterns of market behaviour may take many forms. However, we will not attempt to survey each of these varieties. Instead, we will be concerned with the three different patterns, which are assumed to be common to the Korean dry bulk shipping market. These are monopsony, oligopsony and oligopoly. We will take them up very briefly in turn.

3.4.1 Monopsony

As we have already indicated, the Korean dry bulk shipping market has shown a high degree of control by government agencies or big corporations, who could exercise control as a result of their heavy cargo flows they have bought on f.o.b. terms. Coupled with this has been their monopsonistic position in buying shipping services.

"It is monopsonistic if it is the only institution in a position to buy a specific good or service." (Shubik, 1980, p. 5) Exclusive monopsonies are rare within the conventional market paradigm, which usually assumes many atomistic buyers. However, some Korean shippers have held monopsonistic powers. This is partly because of the result of the government's role in their industry and partly because of their dominance in their own markets. For example, POSCO has been the single steel supplier in the domestic market, as a result of which it has been also the single shipper who has chartered large ore carriers in Korean iron ore trades, the vessels being offered by many Korean operators. POSCO's monopsonistic power has been somewhat strengthened by the fact that most ore carriers operated by Korean operators found it hard to find employment outside Korean trades, since 'world iron ore trades have been controlled by transnational corporations who have been always involved in vertically integrated operations (UNCTAD, 1984, p. 9)'. The problem may have been exacerbated due to extensive differentiation of service, size and route in Korean trades; because such differentiation could hamper specific ore carriers from finding remunerative employments in other trades.

Under monopsony, a monopoly on the buyer's side, it is in the interest of the buyer to obtain his purchases (usually input) at as low a cost as possible, just as the monopolists seeks to obtain as large as a return as possible. (Baumol, 1965, P. 322) A priori this is true if a monopsonist is a competitor in its output market. However, as stated above, Korean shippers who are monopsonists in the Korean shipping market are also in most cases monopolists in their domestic output markets. In consequence, they have been usually concerned with the stability of transportation service prior to freight rates, which resulted in an increase number of long term contracts such as COA and PSC.

3.4.2 Oligopsony

"A market with two buyers is a *duopsony*, and a market with a small number greater than two is an *oligopsony*." (Henderson & Quandt, 1980, P. 212; their emphasis) In most cases the number of Korean shippers buying the specific dry bulk shipping service in Korean trades has been greater than one, but, as Table 3-7 shows, it is still small enough for them to be able to influence freight rates. Thus the Korean dry bulk shipping market has some sectors which are oligopolistic.

It should be emphasised that the political and economic considerations of the government are very important as a factor in the oligopsonistic behaviour of Korean dry bulk shippers. Table 3 -7 shows implicitly that the government may intervene at the level of demand. Big shippers are closely related with the government through its direct participation in their equity capital, its involvement in their output and distribution (by reason

Table <3-7> Major Korean Dry Bulk Shippers and their Trade Volume : 1986

| Commodity | Shippers | Trade Volume | Share |
|----------------------------------|--|---------------|-------------|
| | | '000 M/T | % |
| Grain (8,666) | Korea Feed Association | 2,667 | 30.7 |
| | Korea Flour Industry Association | 2,000 | 23.0 |
| | Nat'l Livestock Corporatives Fed. | 1,858 | 21.4 |
| | <u>Korea Corn Processing Ind. Assoc.</u> | <u>1,043</u> | <u>12.0</u> |
| | Sub-Total | 7,568 | 86.7 |
| Phosphate Rock (1,680) | Namhae Chemical Co. | 1,000 | 59.5 |
| | Youngnam Chem. Co. | 400 | 23.8 |
| | <u>Chinhae Chemical Co.</u> | <u>200</u> | <u>11.9</u> |
| | Sub-Total | 1,600 | 95.2 |
| Coal* (13,054) | Dae Han Coal Corp. | 3,758 | 28.8 |
| | <u>Korea Electric Power Corp.</u> | <u>5,966</u> | <u>45.7</u> |
| | Sub-Total | 9,724 | 74.5 |
| Cement (4,268) | Ssang Yong Cement Co. | 3,548 | 83.1 |
| | <u>Dong Yang Cement Co.</u> | <u>720</u> | <u>26.9</u> |
| | Sub-Total | 4,268 | 100.0 |
| (27,668) | 11 Shippers | 23,157 | 83.7 |

Source : KSA

Note : Coal* = POSCO's Coking Coal is not included.

() = Total Trade Volume('000 M/T)

that these dry bulk commodities are aligned with a wider public and social interest), and hence with government economic plans. Such being the case, a number of Korean dry bulk shippers have often controlled their purchases from the government's viewpoint without being affected by the actions of the other shippers. As a result, their behaviours could be similar to that in the monopsonistic case.

3.4.3 Oligopoly

"An oligopoly is a market having few firms (but more than one firm) on the supply side and a very large number of buyers on the demand side, each of whom makes a negligible contribution to the market demand function." (J. Friedman, 1986, P. 1) In view of this structural definition, the Korean dry bulk shipping market is not an oligopolistic one, for the number of buyers (that is, shippers) is not large enough so that a buyer would not take market condition as given. Furthermore, each seller (that is, operator) has not usually held a sizable share of the market. Nevertheless, oligopoly theory shall not be ignored when trying to explain the Korean shipping market behaviour, because some Korean dry bulkship operators have behaved like oligopolists, being strategically linked one to another. Given such an exclusion, Henderson and Quandt can correctly stress that :

"It is not sufficient to distinguish oligopoly from perfect competition for a homogeneous product or from the many-sellers case of monopolistic competition for a differentiated product on the basis of the number of sellers alone. **The essential distinguishing feature is the interdependence of the various sellers' actions.**" (Henderson and Quandt, 1980, p. 200, emphasis added)

As we shall see in Chapter 5, profits have not played a role in the pricing decisions of Korean operators but rather they were subordinate to revenue and capacity maximisation. Each Korean operator has tried to stay a step ahead of its rivals in terms of investment, finance, and pricing etc. in order to survive. In other words, if they had been purely competitive operators, they would have lacked these strategies, because the choices of a single operator have no effect on a market which is given. It is

comforting to know in this connection that because of the different possible strategies that can be adopted, there is an endless variety of oligopoly structures at each level. It is also for this reason that there are no generally accepted behavioral assumptions.

3.5 Summary

In this Chapter we have shown that the Korean dry bulk shipping market, which on the basis of a priori characteristics and viewed from past literature might have been expected to have operated as a perfectly competitive one, was subject to various imperfections.

We began by considering the conditions by which the character of a market might be judged for our purpose. Thus we reviewed the historical concept of perfect competition. However, we found that in spite of a voluminous literature there is still little agreement on such conditions.

We then reviewed the past literature on the nature of the tramp shipping market. This review has focused upon the principal question. The evidence that has been put forward supporting the view that the tramp shipping market is a perfectly competitive one was considered, and criticised.

With that back ground, we examined market imperfections, to which the Korean dry bulk shipping market has been subject. In particular, we have concentrated on the general sources of those market imperfections which have influenced the market behaviour and showed that :

1. The Korean dry bulk shipping market has been subject to inherent market imperfections. More specifically :

- The market was differentiated by three distinct segments such as service, size, and geography.
- Information on Korean dry bulk shipping was imperfect.
- Operators participating in the market were no longer price takers. They were price bidders.

2. There have been various barriers to competition in the market that reduced the number of competitors or the vigour of rivalry below levels that would have otherwise naturally occurred. The most significant barriers to competition were legal (such as licence and registration of ships) and policy restrictions (such as cargo reservation and on time charter).

3. The Korean dry bulk shipping market has been also subject to unequal competition. This has arisen because of rate preference, and limitations of domestic shipbuilding and ship finance. Competition was increasingly unequal both between big and small operators, and between Korean- and foreign-flag vessels.

Finally, we completed this Chapter with a discussion of the principal patterns of market behaviour in the Korean dry bulk shipping market. They are summarised into three different patterns. These are, monopsony, oligopsony, and oligopoly. However, all these three patterns have overlapped in the market.

CHAPTER 4
THE DEMAND AND SUPPLY
OF KOREAN OWNED DRY BULKSHIP SERVICES

Market Imperfections
in Korean Dry Bulk Trades

CHAPTER 4

THE DEMAND AND SUPPLY OF KOREAN OWNED DRY BULKSHIP SERVICES

The preceding Chapter considered aspects of the Korean dry bulk shipping market that has been subject to various market imperfections. In this Chapter we shall be concerned with the argument that such imperfections have significantly affected the behaviour of demand and supply of **Korean owned dry bulkship services** (hereafter referred as Korean dry bulkship services)* **in Korean trades**. This is established by showing that certain traditional views on the demand and supply of trampship services are inapplicable to the demand and supply of Korean dry bulkship services. For instance, Stopford(1988, P. 63) argues that "the dominant feature of the shipping supply and demand model is that demand is volatile, quick to change and comparatively unpredictable, whilst supply is ponderous and slow to change". As we shall see, however, this has not held for Korean dry bulkship services in the Korean market; the opposite has in fact been the case. That is, the forward progress of the Korean dry bulkship services was a case of supply going ahead of demand, which brought a severe imbalance between demand and supply of Korean dry bulkship services in

*) Note that Korean owned dry bulkships (**that is, Korean-flag bottoms**) are a part of total tonnage supplied in Korean trades. The demand for Korean owned dry bulkship services is, therefore, a part of the total demand generated in Korean trades. **It is important to emphasise in this connection that distinction should be made between the demand for Korean owned dry bulkship services and the (total) demand for Korean dry bulk shipping services**

Korean trades in the early 1980s. With such a proposition in mind, this Chapter is split into two broad sections. Section 1 focuses on the demand side, whilst section 2 considers the supply side.

4.1 The Demand for Korean Dry Bulkship Services

Establishing the argument that market imperfections influenced the demand for Korean dry bulkship services in Korean trades requires the demonstration that there are certain differences between the shape of the demand schedule in this sector and that for trampship services of the theoretical model. This point is established in this section. We will not attempt to present a complete theory of the (total) demand for Korean dry bulk shipping services, but restrict ourselves to considering the important relationship between market imperfections and the shape of the short-term demand schedule for Korean dry bulkship services in Korean trades.

We shall begin by considering briefly factors affecting the magnitude of demand for Korean dry bulkships (in other words, Korean-flag bottoms) in Korean trades, because the shape of the short-term demand schedule for Korean dry bulkship services as a whole in these trades can then be better appreciated.

4.1.1 Factors Affecting the Magnitude of Demand

The trade volume and route length, which determine the magnitude of the demand for Korean dry bulk shipping services on a tonne-mile basis, were discussed in some detail in Chapter 2. However, it should be pointed out that the magnitude measured in terms of tonne-miles can not properly

account for the demand for Korean dry bulkships in Korean dry bulk trades, because this has been determined to an extent by external factors, that is to say, factors existing outside the market mechanism. Such factors are of great importance when trying to explain the imbalance of supply and demand in the Korean market.

KMI(1985) developed a series of estimates regarding the optimum scale of the Korean ocean-going fleet. They postulated a standard ship for each trade based on different cargo quantity, load factor, share of the Korean fleet and days per leg. On this basis they proposed the following formulae to obtain the optimum demand for Korean-flag bottoms in Korean trades :

a) In case that the return voyage is linked with the laden voyage

$$D_i = Q/L \times 1/2 \times V/350 \times S \quad i = 1, 2, \dots, k \text{ (number of trade)}$$

b) In case that the return voyage is linked with the ballast voyage

$$D_j = Q/L \times V/350 \times S \quad j = 1, 2, \dots, l \text{ (number of trade)}$$

Where D_i = demand in dwt for Korean-flag bottoms in the i trade

Q = trade volume per year (* : see footnote)

L = load factor (L in (a) is the average load factor for the round voyage)

V = number of days per voyage

S = ratio of the Korean fleet's share (This is predetermined by government shipping policy)

c) Thus the final formula for the total demand is given as follows :

$$DD = \sum_{i=1}^k D_i + \sum_{j=1}^l D_j \quad k + l = n \text{ (number of trades)}$$

*) Q is estimated separately in most cases from the following model :

$$Q = \sum Q_i = A_i + B_{i1} X_{i1} + B_{i2} X_{i2} + B_{i3} X_{i3} \quad i = 1, 2, \dots, n \text{ (the number of commodity)}$$

where A_i = intercept B_{ij} = slope coefficient X_{i1} = GNP X_{i2} = domestic production

X_{i3} = trade volume in the previous year

One of strong features of this approach is that, in contrast to many treatments in the literature, the determinants of demand are treated at a very disaggregate level. This enables it to capture the quantitative trend of demand with a relatively high degree of accuracy. Such treatment also sheds light on the factors affecting the magnitude of demand.

The above formulae relate the level of demand for Korean dry bulkship in Korean trades to four major factors. That is,

$$D_i = f_i(Q, L, V, S) \quad i = 1, 2, \dots, n$$

The most interesting point in the structure of this model is that the ratio of the Korean fleet's share (S) is included. Verification of this point will be of great importance in the establishment of our thesis. As we shall see, government shipping policy is an important factor influencing the level of demand for the Korean fleet in Korean trades. One of the Korean Government's shipping policy objectives was to maintain a national flag share in Korean trades of 50 percent. Certainly alteration of the flag share significantly affects the magnitude of demand for Korean dry bulkships and hence the magnitude of Korean dry bulkship services demanded in Korean trades.

4.1.2 The Elasticity of Demand

The nature of demand for transport services is highly relevant to an evaluation of the impact of freight rates on trade flows and trade volume. For this reason we will here make an attempt to explore the relationship between freight rates and Korean trade volume. Before proceeding, we will discuss briefly the concept of the elasticity of demand for sea transport.

4.1.2.1 The Concept of the Elasticity of Demand for Sea Transport

'The concept of elasticity', as Holland(1987, P. 69) claims, 'is widely used by economists - more so than it may be by firms themselves'. Elasticity is a concept of measuring the degree to which x responds to a given change in y. Thus the price elasticity of demand is defined as the degree to which demand responds to an alteration in the price level; income elasticity of demand indicates the degree of responsiveness of demand to changes in income, while cross-price elasticity of demand relates the demand for specific goods and services to the price change in another.

Conventional demand analysis pays considerable attention to price as an important determinant of demand. The effect of price on consumer demand has been studied extensively. As a result, the elasticity of demand has been often treated as a synonym for the price elasticity of demand (e.g. see Samuelson and Nordhaus, 1985, p. 379). The elasticity of demand for shipping services is no exception. It has always been considered to be the concept for measuring the responsiveness of demand for sea transport to changes in freight rate.

Probably the most famous treatment of the subject of the elasticity of demand for shipping services is that of Bennathan and Walters(1969) in their *"The Economics of Ocean Freight Rates"*. They established a formula which is used to explore an issue related to the elasticity of demand for sea transport. Their influence on the literature is noticeable in that most authors replicate their formulae when discussing the elasticity of demand

for sea transport (e.g. Totland, 1980; Sletmo & Williams, 1986; Evans & Marlow, 1986). We will therefore attempt to reproduce here in brief their work on it.

Shipping services are a factor of production. The elasticity of demand for sea transport is accordingly compounded of variety of factors relating to the nature of the product, the markets in which it is sold, and the situation of the producers. For a simple and general grouping of these different influences, the elasticity of demand for shipping services is taken as the joint product of two further degrees of elasticity. First, the elasticity of demand for the product in the market of destination is the proportional change in the quantity demanded there as a small proportional change occurs in the c.i.f. price. Second, the degree of the elasticity of export supply also enters into the determination of the elasticity of demand for transport services. This measurement refers to the supplying country and determines the elasticity of export supply to small changes in f.o.b. prices. The elasticity of demand for sea transport is also broadly related to the value per ton of the commodity. If the transport cost is a large fraction of the final delivered price (i.e., c.i.f. price), the quantity shipped probably would respond sensitively to the freight rate. To generalise the argument, we now consider numerically the relationship between the price elasticity of demand for sea transport and those factors (these are, the price elasticities of demand for and supply of the commodity transported, and the fraction of the demand price that is spent on sea transport).

In the first instance we consider the general case where a producing

country with a given supply function is faced by a given demand in a single importing country. P_d is the 'demand price' or c.i.f. marginal valuation of the quantity x , while P_s is the supply price or the f.o.b price obtained by the exporter. Thus when transport cost t is included, then from the accounting relationship we have :

$$P_d(x) = P_s(x) + t \quad (1)$$

Differentiating with respect to t :

$$(\partial P_d(x)/\partial x)(\partial x/\partial t) = (\partial P_s(x)/\partial x)(\partial x/\partial t) + 1$$

so :

$$\partial x/\partial t = 1/[(\partial P_d(x)/\partial x) - (\partial P_s(x)/\partial x)] \quad (2)$$

Let E_t denote the price elasticity of demand for sea transport, then it is defined as :

$$E_t = (\partial x/\partial t)/(x/t) \quad (3)$$

Substituting (1) and (2) into (3), and rearranging produces :

$$\begin{aligned} E_t &= (t/x)/\{(\partial P_d(x)/\partial x) - (\partial P_s(x)/\partial x)\} \\ &= (t/P_d)/[(x/P_d)(\partial P_d/\partial x) - \{x/(P_s+t)\}(\partial P_s/\partial x)] \\ &= (t/P_d)/[(x/P_d)(\partial P_d/\partial x) - \{1/(1+t/P_s)\}(x/P_s)(\partial P_s/\partial x)] \quad (4) \end{aligned}$$

Now the price elasticity of demand for the good is defined as :

$$E_d = 1/(x/P_d)(\partial P_d/\partial x) \quad (5)$$

The price elasticity of supply of the good is defined as :

$$E_s = 1/(x/P_s)(\partial P_s/\partial x) \quad (6)$$

Substituting (5) and (6) into (4)

$$\begin{aligned} E_t &= (t/P_d)/[(1/E_d) - \{1/(1+t/P_s)\}(1/E_s)] \\ &= (t/P_d)[(E_d)(E_s)/\{E_s - (1 - (t/P_d))E_d\}] \quad (7) \end{aligned}$$

and if P_t is the proportion of freight rate to the c.i.f. price (i.e., P_d)

$$E_t = P_t[(E_d)(E_s)/\{E_s - (1 - P_t)E_d\}] \quad (8)$$

Thus, it is concluded that the elasticity of demand for sea transport is dependent upon the elasticity of demand for the goods in the importing country, the elasticity of supply in the exporting country and the proportion of the freight to the price in the importing country.

As we shall see in the following when we discuss the relative inelasticity of demand for Korean dry bulk shipping services and the shape of demand schedule for Korean dry bulkship services in Korean trades, the above formula (8) has further applications that are of considerable relevance.

4.1.2.2 An Analysis of the Elasticity of Demand for Korean Dry Bulk Shipping Services

Now that we have discussed the concept of the elasticity of demand for sea transport, an attempt is made to explore the elasticity of the (total) demand for Korean dry bulk shipping services.

The measurement of the elasticity of demand for sea transport by formula (8) is, however, somewhat problematic. As the formula implies, 'there are large differences in the share of freight rate to the demand price (P_t) which depends on complicated factors such as vessel type, *size, age, and flag, etc., the trade* and its distance, and the value/volume ratio (Totland, 1980, italics added)'. These factors accordingly lead to large variations in the elasticity of demand for sea transport. A second problem which arises is that the price elasticity of goods also varies significantly by country. Therefore, from the point of view of an importing country it is

very difficult to measure E_s and by the same token it is not easy for an exporting country to estimate E_d . Thirdly, the price elasticity of demand for the import of goods (E_d) has been also the subject of debate. For example, the demand for import of raw materials is ultimately determined by the demand for final consumer products rather than by the delivery price (that is, the f.o.b. price). No matter how high the f.o.b. price, it may be said that the price elasticities of the demand for import of raw materials in Korean trades have been rather lower than those of finished goods. This is because (Korea is poorly endowed with natural resources and for this reason) most Korean imported raw materials are usually 'necessities', of which the volume, as Table 4-1 shows, has continued to grow whilst the growth of world dry bulk trade as a whole has been comparatively constant.

For the above reasons, we refrain from going into the measurement of the price elasticity of demand for Korean dry bulk shipping services per se. Instead, we intend to bring out the effect of market imperfections on the demand for Korean dry bulk shipping services, and show the relatively lower price elasticity of demand as compared to that of demand for world dry bulk shipping services. A simple way of examining whether or not the demand for dry bulk shipping services in Korean trades has been less price elastic than the demand for those in the world tramp shipping market is to examine the correlation of the major dry bulk trade volume with the freight index. As the correlation analysis measures the strength of the association between the two variables, we can deduce that the lower is the value of a correlation coefficient then the more inelastic is the demand.

Using data of Table 4-1 for 1974-1984 from KMPA, MRI and Fearnley's Review, the values of the correlation coefficient between the volume of major dry bulk trades and the mean yearly freight index were computed. The results are presented in Table 4-2. Inspection suggests that the demand for Korean dry bulk shipping services was less elastic for the period to changes in international freight rates than the demand for world

Table <4-1> Dry Bulk Trade Volume and Freight Index : 1976-1984

| Year | World Dry Bulk(mil. ton) | | Korean Dry Bulk('000 ton) | | Grain FI | General FI |
|------|--------------------------|-------------|---------------------------|-------------|-----------|------------|
| | Grain | Total trade | Grain | Total trade | ('72=100) | ('72=100) |
| 1976 | 146 | 567 | 3131 | 8348 | 164.3 | 173.4 |
| 1977 | 147 | 555 | 4025 | 11049 | 156.6 | 166.2 |
| 1978 | 169 | 574 | 3798 | 12412 | 185.9 | 194.9 |
| 1979 | 182 | 668 | 5616 | 20444 | 300.8 | 301.4 |
| 1980 | 198 | 700 | 5534 | 23830 | 378.1 | 368.7 |
| 1981 | 206 | 719 | 7301 | 32824 | 325.1 | 321.1 |
| 1982 | 200 | 681 | 5872 | 31974 | 225.9 | 231.6 |
| 1983 | 199 | 653 | 7126 | 33393 | 212.9 | 220.4 |
| 1984 | 207 | 745 | 7026 | 36952 | 208.4 | 216.6 |

Source : As for Tables 2-7 and 2-8

Notes : 1) Total Trade : World Dry Bulk - Grain, Coal, Iron Ore

Korean Dry Bulk - Grain, Coal, Iron Ore, Phosphate Rock

2) FI : Yearly Mean Freight Index reported by MRI's Weekly News Letter.

Table <4-2> Correlation Coefficients of Freight Index with Trade Volume

| | World Dry Bulk | | Korean Dry Bulk | |
|----------------------------------|----------------|-------------|-----------------|-------------|
| | Grain | Total Trade | Grain | Total Trade |
| MRI Grain Freight Index | 0.607 | 0.664 | 0.485 | 0.390 |
| MRI General Freight Index | 0.616 | 0.672 | 0.495 | 0.400 |

dry bulk shipping services. In addition, the result that the values in the two markets have a measure of difference itself suggests that the Korean market has been somewhat distinct from the world market.

However, there are some problems which need to be considered in interpreting these results. Firstly, "a correlation coefficient provides no information concerning the direction of causality between two variables (Pokorny, 1987, p. 49)". Viewed from 'the law of demand'* and given that the values of the result are positive, it could just as plausibly be argued that the level of freight rate depends on the trade volume, and that the direction of causality is not, therefore, from freight rates to the trade volume, but rather vice versa. Secondly, the analysis pays little regard to variations in routing in response to change in the freight index. However, in light of the fact that, as Table 2-11 shows, the tonnage share of each regional market in Korean dry bulk trades varied only slightly for the period, it is felt that these considerations would make at best a scant difference to the result.

On the basis of the above discussion, we can safely infer that the demand for Korean dry bulk shipping services for the period we examined was less elastic than that for the world dry bulk shipping services.

*) "If a consumer is compensated so as to maintain his utility constant, he always responds to a rise in the price of a good by reducing his demand for it. This is famous 'law of demand' and, in terms of price (p) and income (m) derivatives, implies that

$$\partial Q_i / \partial P_i + Q_i (\partial Q_i / \partial m) < 0$$

Thus, if a demand equation is to consistent with theory its derivatives must generally obey this restrictions." (Thomas, 1987, pp. 3-4)

4.1.3 The Shape of the Demand Schedule

Having examined the elasticity of the demand for dry bulk shipping services, this section will now be completed with the discussion of the shape of the demand schedule for Korean dry bulkship services in Korean trades.

This analysis also has its complexities, although at face value it may appear straightforward. We can determine that the demand for Korean dry bulkship services in Korean trades is likely to be price inelastic, on the basis of three factors, first because of the inelastic nature of the demand for Korean dry bulk cargoes, second because of the relatively small importance of freight rates, and third because of government shipping policies.

Turning now to a correlation analysis, Table 4-3 relates the data for the freight index to the volume and percent share of the Korean dry bulk fleet of major dry bulk cargoes in Korean trades. The results are presented in Table 4-4. This shows very low values for both import and total share of quantity cells. This strongly contrasts with those in Table 4-2. Given that these values are close to zero, we could conclude that the trade volume transported by Korean dry bulk ships was quite unrelated to international freight rates. As a corollary, it is also inferred at a rather abstract level that the demand for Korean dry bulkship services in Korean trades has been very inelastic to changes in freight rates.

**Table <4-3> Freight Index and Share of the Korean Dry Bulk Fleet
in Korean Dry Bulk Trades : 1976 -1984**

| Year | Import | | Export | | Total | | MRI General Freight Index (1972 = 100) |
|------|------------|-------|------------|-------|------------|-------|--|
| | Quantity | Share | Quantity | Share | Quantity | Share | |
| | ('000 ton) | (%) | ('000 ton) | (%) | ('000 ton) | (%) | |
| 1976 | 2,591 | 30 | 68 | 21 | 2,200 | 28 | 173.4 |
| 1977 | 3,660 | 33 | 828 | 19 | 4,488 | 29 | 166.2 |
| 1978 | 5,863 | 47 | 1,218 | 37 | 7,081 | 45 | 194.9 |
| 1979 | 6,204 | 30 | 1,369 | 45 | 7,573 | 32 | 301.4 |
| 1980 | 6,006 | 25 | 2,110 | 37 | 8,116 | 28 | 368.7 |
| 1981 | 9,366 | 29 | 1,487 | 23 | 10,853 | 28 | 321.1 |
| 1982 | 12,902 | 40 | 1,836 | 28 | 14,738 | 38 | 231.6 |
| 1983 | 15,226 | 46 | 2,115 | 34 | 17,341 | 44 | 220.4 |
| 1984 | 18,906 | 51 | 1,552 | 35 | 20,458 | 50 | 216.6 |

Source : As for Tables 2-7, 3-4, and 4-1

Note : Import - Grain, Coal, Iron Ore, Phosphate Rock

Export - Cement, Fertilizer

Quantity = Total trade volume x share %/100

**Table <4-4> Correlation Coefficients of Share of the Korean Dry
Bulk Fleet in Korean Dry Bulk Trades with Freight Index**

| | Import | | Export | | Total | |
|----------------|----------|--------|----------|-------|----------|--------|
| | Quantity | Share | Quantity | Share | Quantity | Share |
| MRI General FI | 0.017 | -0.535 | 0.595 | 0.434 | 0.087 | -0.363 |

Attention is now turned to those determinants of demand which create the inelasticity suggested above. The demand schedule for transport services varies for different products and for different routes and can only be determined by empirical observation. However, on the basis of the

discussion we have so far made, a number of important factors which have influenced the elasticity of demand for Korean dry bulkship services in Korean trades can be identified. As we have already indicated, among them are the elasticity of demand for imports (E_d) and exports (E_s) of Korean dry bulk cargoes, the relative share of ocean freight to the prices (P_t) and the share of the Korean fleet (S). We will now take these factors in turn.

We consider first E_d . To recap we repeat formula (8) regarding the elasticity of demand for sea transport :

$$E_t = P_t [(E_d)(E_s) / \{E_s - (1 - P_t)E_d\}] \quad (8)$$

As already pointed out, we cannot easily measure E_s when trying to estimate E_t for import commodities. For this reason, E_s is often ignored such that it is taken as infinite.* Thus :

$$\begin{aligned} \lim_{E_s \rightarrow \infty} E_t &= \lim_{E_s \rightarrow \infty} P_t [(E_d)(E_s) / \{E_s - (1 - P_t)E_d\}] \\ &= (P_t) \times (E_d) \end{aligned} \quad (9)$$

In other words, the price elasticity of demand for sea transport of import cargoes can be estimated by multiplying the relative share of freight rate to the demand price with the price elasticity of the demand for import of goods. In this case, E_t is always less than E_d . Yet, this formula tells us that the main determinant of the demand for sea transport of import cargoes is the effect of the final delivered prices (P_d)

*) 1. This is called Marshall's First Law. (Bennathan & Walters, 1966, pp. 111 - 112)

2. An empirical study, for example, showed that in Japan the E_s was infinite over the period 1955-1970. (see Totland, 1980, p. 109)

***) Recall from the formula (5) and the definition of P_t that the formula (9) can be written as :

$$E_t = (t/P_d) [(\partial x / \partial P_d)(P_d/x)]$$

on the demand for import of goods.** However, the demand for import of major Korean dry bulk cargoes (E_d) was very inelastic to changes in price for the following three main reasons :

1. The availability of close substitutes for the products in question is limited. Heavy capital investment is required in establishing facilities to produce final outputs (e.g., such as steel and fertilizer). For this reason the cost of imported raw materials is only a very small fraction of the total cost of the final output. As a result, changes in the price of such commodities have no appreciable effect on the cost of the final product and do not force substitution of inputs.(cf. Zannetos, 1966; p. 35 items 1. and 2.)

2. The changes in the delivered prices of major Korean imported dry bulk cargoes in most cases were not borne by shippers. The carriers of these cargoes and/or the consumers of the final outputs usually bore these price changes because most Korean shippers were monopsonists in the Korean shipping market and monopolists in their domestic markets. In consequence, changes in the delivered prices would have no great effect on the total demand for import of their cargoes.

3. Finally, bulk imports were essential to the national economy as a whole. The quantity of each of them imported in the past being the direct outcome of government economic development plans.

As shown above a factor usually ignored in estimating E_t for the import of goods is E_s . However, in the case of estimating E_t for the export of goods, it is sometimes logical to take E_d rather than E_s as infinite. Thus :

$$\begin{aligned} \lim_{E_d \rightarrow \infty} E_t &= \lim_{E_d \rightarrow \infty} P_t \left[\frac{(E_d)(E_s)}{\{E_s - (1 - P_t)E_d\}} \right] \\ &= \left[\frac{P_t}{(P_t - 1)} \right] (E_s) \end{aligned} \quad (10)$$

In other words, the price elasticity of demand for sea transport of export cargoes is estimated by multiplying the fraction of transport cost to the supply price with the elasticity of supply of goods.* This tells us that the main determinant of the demand for the sea transport of export cargoes is the effect of supply prices on the demand for exports.** Hence the lower the elasticity of demand for exports the more likely it is that *ceteris paribus* the demand for sea transport of export cargoes tends to be inelastic. It may well be argued that the demand for export of major Korean dry bulk cargoes was generally relatively inelastic within certain limits. This is chiefly because of government export promotion policies which operated to the effect that the total demand generated by export of domestic products was inelastic. Exporters have been forced directly or indirectly to pursue the government targets, and they were allowed to pursue production plans quite independently of the profitability of export. In many cases the exporting companies were protected in the domestic markets in such a way as to lessen the impact of price changes on the quantity of export targets.

Next we consider P_t . As it stands, the higher is the relative share of freight rate (t) to the demand (P_d) or supply price (P_s), then the more elastic is the demand for sea transport. It should be noted, however, that

*) This is exactly symmetrical with Marshall's Law (formula (9)). To give this formula (10) a symmetrical name it is called Marshall's Second Law, and the formula (9) is called Marshall's First Law. (Bennathan & Walters, 1966, p. 114)

***) Recall from the formula (6) and the definition of P_t that the formula (10) can be written as :

$$E_t = (-t/P_s) [(\partial x / \partial P_s)(P_s/x)]$$

this is not precise since it assumes implicitly that there exists in the shipping market full competition such that any change in freight rate is borne by shippers. Such a situation of full competition did not exist in the Korean dry bulk shipping market where we deal with monopsony or oligopsony with respect to the demand for dry bulk shipping services. As a result, any change in freight rates has at best a tenuous relation to the real demand for Korean dry bulk shipping services.

Finally, we consider S. It is noted from Table 4-4 that there existed a negative relationship between the percent share of Korean fleet of the trade volume and the mean yearly freight index. This may suggest that cargo reservation was one of the most significant factors contributing to the inelasticity of the demand for Korean dry bulk ships in Korean trades. Cargo reservation seems to have allowed Korean dry bulkship operators to adjust in such a way as to lessen the impact of changes in freight rate on the quantity of transportation demanded. In other words, in periods of low rates the supply of Korean dry bulk ships rises in the Korean trades where Korean flags find employment easily owing to cargo reservation. Thus, the relative quantity demanded for the Korean dry bulk fleet in Korean trades increases when the total demand is low and decreases when total demand is high. As a result, it may be said that the magnitude of the demand for Korean dry bulkship services in Korean trades has been quite stable and hence the demand was relatively inelastic to changes in freight rate. A comparison of the data of Tables 2-7, 2-13 and 4-3 provides pertinent evidence for this statement, which is summarised in Table 4-5. Note that the coefficient of variance (CV) is a relative measure of dispersion. In

Table <4-5> Potential and Actual Quantity Share of the Korean Dry Bulk Fleet per DWT in Korean Dry Bulk Trades

| | Freight Index '72 = 100 | Korean D. Bulk Trade Volume ('000 ton) = A | Q'nty Share of the K. fleet ('000 ton) = B | Capacity of the Korean D. fleet ('000 DWT) = C | Potential and Actual Q'nty Share per DWT | |
|---------------------------------------|----------------------------|--|--|--|--|-------------|
| | | | | | Potential(A/C) | Actual(B/C) |
| 1981 | 321.1 | 39,180 | 10,853(28%) | 2,800 | 13.6 | 3.87 |
| 1982 | 231.6 | 38,444 | 14,738(38%) | 3,464 | 11.1 | 4.25 |
| 1983 | 220.4 | 39,531 | 17,341(44%) | 3,827 | 10.3 | 4.53 |
| Average = X | | | | | 11.7 | 4.21 |
| Standard Deviation = Y | | | | | 1.41 | 0.27 |
| Coefficient of variance = (Y/X) * 100 | | | | | 12.05 | 6.41 |

view of the lower CV (=6.41) of the actual quantity share of the Korean dry bulk fleet per DWT in Korean dry bulk trades than that of the potential share, it could be safely argued that the relative magnitude of the demand for Korean dry bulkship services in Korean trades has been comparatively stable.

In summary, then, we conclude that the short-term demand for Korean dry bulkship services in Korean trades was price inelastic within certain limits due to market imperfections such as monopsonistic and/or oligopsonistic position of Korean shippers in the Korean dry bulk shipping market, their monopolistic power in domestic output markets, and the government's policy restrictions etc. (This conclusion may point to the need for the imprint of the demand schedule perhaps using scatter diagrams of the number of transactions completed at the various freight

rates, such as that reached by Zannetos(1969, see pp. 42-49). However, as we shall see when we discuss open market fixtures in Chapter 6, not enough information is available to allow the identification of such imprint.)

4.2 The Supply of Korean Dry Bulkship Services

In the previous section we have dealt with various aspects of the demand for Korean dry bulkship services. We now intend to discuss the supply side. Specifically, we address ourselves to the relationship between market imperfections and the short-term supply schedule of Korean dry bulkship services in Korean trades. It will be shown that, although there were many barriers to competition, the short-term supply of Korean dry bulkship services in Korean trades was volatile and quick to change. This evidence is viewed as supporting the argument that market imperfections have adversely influenced the balance between demand and supply of Korean dry bulkship services in Korean trades.

4.2.1 Factors Affecting the Capacity of Supply

The starting point for the discussion of the short-term supply of Korean dry bulkship services in Korean trades is with the factors affecting transport capacity. We are concerned in particular with the market imperfections which have influenced the capacity of Korean dry bulkships offered in Korean trades.

Before proceeding to discuss these factors in detail, we will briefly introduce some definitions in regard to the term 'supply of tonnage'.

Although there are many different ways in which the term can be defined, probably the most extensive treatment of definitions is that of Metaxas (1971). In *'The Economics of Tramp Shipping'*. Metaxas gives the following definitions :

"All tramp ships, and their substitutes, that are trading at a given period of time constitute the **active supply**. All productive units of the industry that are not trading at the same period of time, either because of the state of the market (i.e. the laid-up tonnage) or because they are under repairs, or because they are detained, and so on, constitute the **available supply**. All tramp ships that are suitable for trading within a given period of time constitute part of the **total supply** of tramp shipping tonnage. In addition to tramp ships, other vessels that, under certain circumstances, may enter the tramp freight market may be termed **potential supply**." (Metaxas, 1971, P. 70)

Bearing in mind the above definitions and relating them to the capacity of supply of Korean dry bulkships, we presume the capacity of these ships available at any moment of time in Korean dry bulk trades may be changed by any one or a combination of the following factors :

- 1) Acquisition : *delivery of new buildings, purchase of second-hand vessel, BBC with hire purchase*
- 2) Other substitute of increment of supply : *recommissioning of laid-up tonnage, the inflow of other special purpose vessel, transfer of Korean-flag vessels from other markets etc*
- 3) Retirement : *sale, scrap, conversion*
- 4) Short-run methods for the decrement of supply : *slowdown, idleness due to repairs, loading, discharging, lay-ups, participation of cross trades etc.*

We will take each of these factors in turn, and see what influences, if any, they might have upon supply.

4.2.1.1 Acquisition

As already indicated in Chapter 2, there was a dramatic increase in the capacity of the Korean dry bulk fleet during the 8-year period 1977-1984. During this period the fleet sustained a net increase of 154 ships, totalling 3.340 million grt.(Table 2-13) This was the direct result of acquisition of ships by Korean dry bulkship operators as is clearly shown in Table 4-6.

Table <4-6> Capacity of Acquisition of Korean Dry Bulkships by Type

| | New Building | | Purchase of SH | | BBC/HP* | | Total | |
|--------------|--------------|--------------|----------------|--------------|------------|------------|---------------|--------------|
| | No. | '000 GT | No. | '000 GT | No. | '000 GT | No. | '000 GT |
| 1976 | - | - | 2 | 57 | 5 | 118 | 7 | 175 |
| 1977 | 4 | 57 | 9 | 117 | 3 | 36 | 16 | 210 |
| 1978 | 10 | 128 | 26 | 391 | 6 | 127 | 42 | 646 |
| 1979 | 6 | 71 | 9 | 118 | 3 | 53 | 18 | 242 |
| 1980 | 8 | 114 | 13 | 239 | 11 | 232 | 32 | 585 |
| 1981 | 5 | 158 | 25 | 625 | 10 | 311 | 40 | 1,094 |
| 1982 | 7 | 173 | 11 | 489 | 1 | 12 | 18 | 674 |
| 1983 | 8 | 251 | 9 | 327 | 3 | 53 | 20 | 631 |
| 1984 | 6 | 176 | 3 | 217 | 2 | 53 | 11 | 446 |
| Total | 54 | 1,128 | 107 | 2,580 | 44 | 995 | 205 | 4,703 |
| Share | 24% | | 55% | | 21% | | (100%) | |

Source : KSA *) It should be mentioned that BBC/PO is very often considered synonymous with BBC with hire purchase (BBC/HP).

The above Table also shows that the expansion of the fleet depended largely on the acquisition of second-hand vessels. (Note that according to

the regulation, Korean operators could acquire only second-hand vessels by BBC/HP.) As a result, in contrast with the world tramp shipping market as a whole, where the capacity can't easily expand in a given period of time, the supply of Korean dry bulkships could be quick to expand. This is due, of course, to the fact that there is a relatively short time-lag between an operator's decision and the actual time of delivery of a second-hand vessel. The main reasons for the concentration on second-hand vessels relate to the effects of the government shipping policy, and specifically to cargo reservation, rate preference, and the GPSP. Under the circumstances that we have sketched here, it may be surmised that the supply of Korean dry bulkships was elastic. In order to be more concrete, we consider below the relationship between the mean yearly freight index and the acquisition of capacity of Korean dry bulkships.

In Table 4-7 we reproduce the freight index data of Table 4-3 and the lagged annual data of Table 4-6 relating to the capacity of acquisition of Korean dry bulkships. Note that we would generally expect that the freight index in period $t-2$ (t refers to year) was relevant to the delivery of new buildings, whilst the index in period $t-1$ related to the acquisition of second-hand vessels. Utilising these data the correlation coefficients for the capacity of each sector with the freight index were computed (Table 4-8). The regression equation gives the value (t-statistic is in bracket) :

$$Y^* = -491.665 + 4.084X$$

(5.176)

R-squared : 0.899

Adjusted R-squared : 0.866

where X represents the yearly mean of MRI general freight index. The value

of the correlation coefficient between X and Y is 0.948, and the coefficient of determination is 0.899, which is very satisfactory. The coefficient is significantly different from zero at the 95 percent confidence level. We notice that regression coefficient is positive and somewhat larger value, providing support for the argument that the supply of Korean dry bulkships was very capable of responding to freight changes with certain time-lags.

Table <4-7> Freight Index and the Capacity of Acquisition

| | <u>MRI Index</u> | <u>New Building</u> | <u>Second-hand</u> | <u>BBC/HP</u> | <u>Total</u> |
|----------|------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------|
| t = year | X _t | Y ₁ =Y ₁ (t+2) | Y ₂ =Y ₂ (t+1) | Y ₃ =Y ₃ (t+1) | Y * |
| 1978 | 194.9 | 114 | 118 | 53 | 285 |
| 1979 | 301.4 | 158 | 239 | 232 | 629 |
| 1980 | 368.7 | 173 | 625 | 311 | 1,109 |
| 1981 | 321.1 | 251 | 489 | 12 | 752 |
| 1982 | 231.6 | 176 | 327 | 53 | 556 |

Source : As for Table 4-3 and Table 4-5

Note : Y* = Y₁ + Y₂ + Y₃ (unit : Mil. GRT)

Table <4-8> Correlation Coefficients of the Capacity with Freight Index

| | <u>New Order</u> | <u>Purchase of SH</u> | <u>BBC/HP</u> | <u>Total</u> |
|----------------------|------------------|-----------------------|---------------|--------------|
| <u>Freight Index</u> | 0.559 | 0.863 | 0.644 | 0.948 |

4.2.1.2 Other Substitutes of Increment of Supply

There is relatively little in the very short-run that can be done to increase the capacity of the Korean dry bulk fleet itself. However, this does not necessarily mean that the magnitude of the active supply of Korean dry bulkships in Korean trades remains absolutely static. As

already indicated by Table 4-4 which shows the inverse correlation between the percent share of the Korean dry bulk fleet in Korean trades and freight rates, a transfer of Korean flag vessels from other markets into Korean trades took place in recession periods. Thus, the active supply of Korean dry bulkships in Korean trades increased during periods of low freight rates. On the other hand, in periods of high rates the active supply could also increase even in the very short run as a result of such developments as partial or total postponement of periodic surveys and repairs, an increment of service speed, expedition of the process of loading and discharging, and recommissioning of laid-up tonnage. In most cases, however, costs increase sharply and the short-term supply schedule becomes almost vertical beyond the point of the full capacity of active supply. (cf. Zannetos, 1966 p. 50)

During the early stages of revival of a market when operators anticipate a general rise in the level of the rates, supply may be somewhat expanded in the medium term by an inflow from neighbouring sectors such as tankers, conventional liners, vehicle carriers, and log carriers etc. However, these conversions were quantitatively insignificant in the Korean dry bulk shipping market. Because these vessels are specialised, conversion or change of trade is also costly. Thus one would expect such conversions to happen only when dry bulkship rates are high in relation to rates in the markets from which capacity might be diverted. (cf. also *ibid.*) However, as we have indicated earlier, in the past the Korean dry bulk shipping sector was in no way remunerative. This suggests that conversion was unlikely in Korean dry bulk trades. We would therefore conclude that

the only significant changes in the supply occurred through ship acquisitions and the transfer of Korean flag vessels from other markets into Korean trades.

4.2.1.3 Retirement

Up to this point, we have been concerned with the factors that have increased the supply of capacity of Korean dry bulkships in Korean trades. We will now turn to the factors decreasing supply. Decrement may occur either permanently and temporarily. We will here consider the former category, leaving the latter to subsequent discussion.

Metaxas(1971, P. 95) noted that "the supply of tonnage may contract in the long run substantially because the following alternatives are open to entrepreneurs :

- 1) Disposal of old tonnage for breaking up.

- 2) Conversion of tramp ships to productive units that are suitable for employment in the markets of neighbouring industries. (Mostly into cargo liners and very rarely in the past into tankers.)" However, in addition to these alternatives, the sale of a Korean dry bulkship to another flag is of course a very important alternative for the reduction of capacity.

It is argued that as there is so much fluctuation and uncertainty in rates in the long-run, it is quite probable that the owners of vessels base their expectation on the only concrete evidence that they have, that is to say, existing spot rates. For this reason, the number of vessels retired is expected to be inversely related to spot rates.(Zannetos, 1966, p. 117) However,

the reverse seems to be true when trying to explain retirements of Korean dry bulkships. This is clearly shown in the data of Table 4-8, which gives us empirical evidence that the correlation is positive between freight rates and Korean dry bulkships retired in the period we examined.

Table <4-9> Korean Dry Bulkships Retired and Freight Index
(Yearly Data : 1977 - 1984)

| Year | Net Increment '000 GT(A) | Acquisition '000 GT(B) | Retirement B - A | MRI General Freight Index |
|-------------|-------------------------------------|-----------------------------------|-----------------------------|--------------------------------------|
| 1977 | 341 | 210 | (131) | 166.2 |
| 1978 | 657 | 646 | (11) | 194.9 |
| 1979 | 244 | 242 | (1) | 301.4 |
| 1980 | 373 | 585 | 212 | 368.7 |
| 1981 | 729 | 1,094 | 365 | 321.1 |
| 1983 | 363 | 631 | 268 | 220.4 |
| 1984 | 513 | 446 | (67) | 216.6 |

Source : As for Tables 2-13, 4-1, and 4-5.

Note : The value in () may imply increment through other than acquisition.

The above Table presents the yearly data for retirements from the dry bulk fleet and the mean yearly freight index for each year between 1977 and 1984. The value of the correlation coefficient between the decrement and freight index is $r = 0.635$, which implies that retirements of dry bulkships increased with rising freight rates. (It should be, however, stressed that, as the above Table shows, the retirement figure of the Korean dry bulk fleet was insignificant if it is compared with that of acquisition.) This positive correlation indicates that in periods of low rates Korean dry bulk shipowners based their expectations on government

protectionist measures and hence were very reluctant to retire their (old) tonnages during the recession and depression stages. They sold their tonnage when freight rates were high at prices which were considerably higher than scrap value. It, thus, appears that retirement policy has adversely affected the long-run equilibrium of the Korean dry bulk shipping industry.

4.2.1.4 Short-run Methods for the Decrement of Supply

We shall now turn to the factors that have affected supply in the short-run. If freight rates fall to a non-renumerative level, capacity of active supply of the Korean dry bulk fleet in Korean trades may decrease in short-run as a result of the following developments :

- 1) slowdown, extended repair, retardation of loading and unloading
- 2) lay-ups
- 3) entry of dry bulk tonnage to the neighbouring industries
- 4) participation of cross trades or charter-out

The main purpose of the first category is conceivably to reduce financial losses, but capacity is also lost in the process. However, developments of this sort have scarcely ever happened in Korean dry bulk trades as Korean dry bulk shipowners were not profit maximisers. Lay-ups were also quantitatively insignificant in relation to the active supply. In other words, most Korean dry bulkship operators would rather forgo profit than lay up non-renumerative vessels when rates were low. This is due to the fact that they have not pursued a profit maximisation strategy. Another possible explanation may lie in the domestic financial system. As

we have already explained earlier, domestic banks used to be so conservative that no Korean operator could obtain bank loans without a reliable collateral such as a ship. This has forced Korean operators to keep their vessels afloat even in the periods of low rates at which they were not competing in the market. In addition, given that the neighbouring industries of dry bulk tonnage are more specialised ones, we may assert that the entry of Korean dry bulk tonnage was not very significant in the past. Thus, we may conclude that the factors which may conceivably lead to a fall in active supply in recession periods have not exerted any significant influence in the Korean dry bulk market. Chapter 7 provides more detailed discussion on this point.

It is a little odd and rather unfortunate that the capacity of Korean dry bulkships available in Korean trades could reduce during periods of high freight rates. However, Tables 4-3 and 4-4 show that this is indeed the case. These two Tables show that the share of the Korean fleet was inversely related to freight rates. This should not be taken to mean that the correlation is also negative between the total dry bulk tonnages carried by the Korean dry bulk fleet and freight rates. Yet, it implies that the entry of Korean dry bulkships to cross trades has relatively increased during periods of prosperity. In other words, active supply decreased when Korean operators were able to take advantage of the very favourable dry bulk freight market in cross trades.

To sum up briefly, we may conclude that overall the supply of Korean dry bulkships has been positively related to freight rates. (However, as we

shall see, this should not be taken to mean that the short-term elasticity of the supply of Korean dry bulkship in Korean trades is positive.) Yet, factors which would tend to reduce capacity have not been sufficiently effective in the past when the freight market was in depression, whilst some capacity has moved out of the Korean market during periods of high freight rates and vice versa.

4.2.2 The Elasticity of Supply

Before we proceed with the analysis of the supply schedule of Korean dry bulkship services, we shall here present a brief discussion of the concept of the elasticity of supply.

Just as the elasticity of demand for shipping services was measured by the responsiveness of demand for sea transport to changes in freight rate; so the elasticity of supply of shipping services means the responsiveness of shipping services supplied (Q) to changes in freight rate (P). Thus, the elasticity of shipping supply is notationally given by :

$$E_s = (\partial Q/Q)(P/\partial P) \\ = P/Q(\partial P/\partial Q) \quad (1)$$

However, the estimation of the elasticity of shipping supply has always been somewhat problematic. For one thing, there is no real consensus as to the measurement of Q. With few exceptions, it has been measured on a tonne-mile basis. Thus, in the expression of Evans(1988), it can be written:

$$Q = \sum_{i=1}^n q_i s_i w_i \quad (i = 1, 2, \dots, n) \quad (2)$$

Where Q = output of vessel i in ton-miles per day; q = a constant representing the ratio of loaded to total tonne-miles; s = speed in miles

per day; and W_i = deadweight of vessel i . The total supply is thus given by horizontal summation for n vessels. Note the above equation has no port time. Lack of account for such factors in the shipping output may result in erroneous conclusions particularly when the demand and supply of shipping services must be estimated simultaneously for comparison in a given period. It is for this reason that Shimojo(1979) proposed the concept of 'efficient tonnage' as a unit of the shipping output. The efficient tonnage, in his words, is "the tonnage of a cargo a ship is capable to transport during a month or 30 days on a unit route. For example, if a ship will take 50 days to transport 10,000 tons of cargo on a unit route, then the ship is said to have

$$10,000 \text{ tons} \times 30 \text{ days} / 50 \text{ days} = 6,000 \text{ efficiency tons.}''$$

However, we run into problems when trying to use it in the real world. As Shimojo himself put it : "For what should be the unit route we have no concrete idea yet." On the other hand, it is of also interest to note that Zannetos(1966) used the notion of 'operating fleet as a percentage of total fleet' instead of tonne-miles. For the measurement of the elasticity of tanker shipping supply he used an index based on the 'working petroleum fleet' rather than the total fleet, for the reason that such an index depicts changes in the level of employment more accurately.

Another problem which arises with the estimation of the elasticity of shipping supply is the choice of optimising criteria for tramp freight rates, which vary widely with factors such as vessel, cargo and quantity, route, and time etc. This means that the own price elasticity of tramp shipping supply is indefinable in practical terms. Such seems to be the view of Holland, when he says :

"The theoretical principles are simple enough, granted a little attention. But principles and practice diverge. For one thing, while measurement of elasticities *ex post*, or after the event, may be straightforward (depending on the availability of data), forward forecasts of elasticities *ex ante* are much harder to establish. This is not only a matter of anyone's difficulty in foretelling the future, but is especially hard in terms of estimating overall cross-elasticities . . ."

With the preceding qualification in mind, we shall now turn to the discussion of the supply schedule of Korean dry bulkship services.

4.2.3 The Shape of the Supply Schedule

It may well be the case that "the supply schedule of shipping services can be found, never strange, to be a right-up curve (Shimojo, 1979, P. 60). Can the short-term supply schedule of Korean dry bulkship services in Korean trades be also said to be similar to that of ordinary commodities? No unequivocal answers can be found at this time of a rather abstract level. Yet, we can safely infer from the material explored earlier in this section that it was somewhat different. We attempt to prove this in the remainder of this section.

Broadly, two types of schedule are considered when trying to appreciate the shape of the supply schedule at different rate levels: the short-run supply schedule, which, as Zannetos (1966, P. 160) put it "by definition, depicts the various quantities of a commodity the producers are willing to supply at different prices under conditions of limited freedom for adjustment in capacity", and the long-run supply schedule, which renders relating changes in price to the quantity supplied under no time restriction

for adjustment in capacity. As Varian(1984, P. 36) points out, "long run and short run are of course relative concepts". "Which factors are considered variable and which are considered fixed depends on the particular problem being analysed"(ibid.). Zannetos seems to be quite explicit on this point when he says :

"... we can ill afford to define our short run as one extending over a period of time long enough to allow for new entry or permanent exit of capacity, in response to shifts in demand that have occurred during the same time period. On the other hand, we do not wish to revert to the notion of the shortest of all possible short runs, namely, the *market supply curve*. The latter schedule will be mostly vertical, with deviations from the vertical occurring because of pure speculation and not because of marginal costs. In between, we can find short runs during which the capacity is fixed both in quality and quantity, with the exception of new capacity that has been initiated by conditions independent of the present demand and prices."(Zannetos, 1966, P. 161)

It may not be difficult to assume that in the absence of external effects the long-run supply schedule will be positively sloped. Conventional microeconomic theory tells us that the short-run aggregate supply schedule in the perfectly competitive market has also positive slope.* However, as we have already indicated, it seems probable that the short-term supply schedule of Korean dry bulkship services in the Korean trades was negatively sloped. This poses the question of whether or not it is possible to determine empirically the shape of the short-term supply

*) The second-order condition for maximum profit requires the MC to be rising. The firm's supply function is therefore monotonically increasing for prices at or above minimum AVC. The horizontal sum of monotonically increasing function is itself monotonically increasing.(see Hnaderzon and Quandt, 1980, p. 141)

schedule, especially since empirical observations refer to different points of time. The answer to the question just posed is, yes, though what one determines is an approximation to theoretical perfection.(cf. Zannetos, P. 160)

In formulation of supply side in the Korean dry bulk shipping market, one difficulty is that outputs of Korean dry bulkships in terms of tonne-miles can not be easily estimated due to unavailability of suitable data. For this reason, instead of tonne-miles we shall use 'historical share of the Korean dry bulk fleet in Korean dry bulk trades'(Table 4-3). For the measurement of the elasticity of active supply we shall use 'average quantity share of the Korean dry bulk fleet per GT in Korean dry bulk trades'(Table 4-10), because the supply of Korean dry bulkship services in

Table <4-10> Average Q'nty Share of the Korean Dry Bulk Fleet per GT in Korean Dry Bulk Trades : 1976-1984

| Year | Cargo Q'nty Shared by KDBF | Korean Dry Bulk Fleet | Average Q'nty Share per GT | MRI General Freight Index |
|-------------|-----------------------------------|------------------------------|-----------------------------------|----------------------------------|
| | '000 ton (A) | '000 GT (B) | ton(=A/B) | 1972=100 |
| 1976 | 2,200 | 456 | 4.82 | 173.4 |
| 1977 | 4,488 | 797 | 5.63 | 166.2 |
| 1978 | 7,081 | 1,454 | 4.87 | 194.9 |
| 1979 | 7,573 | 1,698 | 4.46 | 301.4 |
| 1980 | 8,116 | 2,071 | 3.92 | 368.7 |
| 1981 | 10,853 | 2,800 | 3.88 | 321.1 |
| 1982 | 14,738 | 3,464 | 4.25 | 231.6 |
| 1983 | 17,341 | 3,827 | 4.53 | 220.4 |
| 1984 | 20,458 | 4,340 | 4.71 | 216.6 |

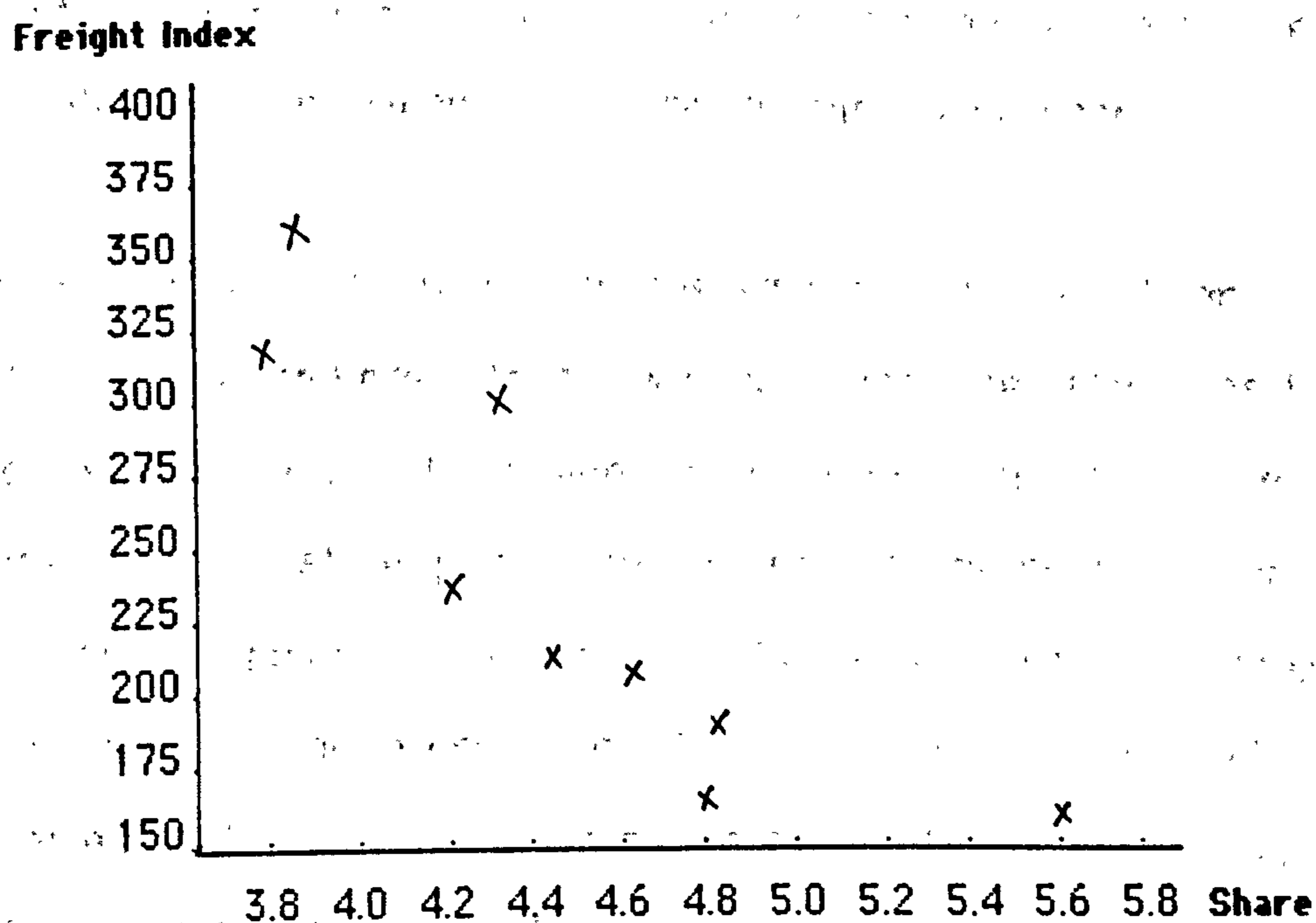
Source : As for Table 2-13 and Table 4-3

Note : KDBF = Korean dry bulk fleet

Korean trades is a function of cargo tonnage shared by the Korean dry bulk fleet in those trades.

Figure 4-1 presents a scatter diagram of the average quantity share of the Korean dry bulk fleet per GT in Korean trades versus the mean yearly spot rates of MRI weekly general freight index for the years 1976 - 1984. We notice that the average quantity share per GT, which shows elasticity, was negatively correlated with freight rates and not positively as Shimojo's argument would imply. This observation is in complete agreement with our expectation which we based on our principal argument. The quantitative relationship between the average quantity share per GT (Y) and rates (X) is best expressed by (t-statistic is in bracket):

Figure <4-1> Scatter Diagram of Average Q'nty Share of the Korean Dry Bulk Fleet per GT vs. Freight Index : 1976-1984(Yearly)



$$Y = 6.125 - 0.006 X$$

(4.095)

R-squared : 0.84

Adjusted R-squared : 0.66

The correlation coefficient is 0.92 with the coefficient of determination of 0.84, and the coefficient on X is significantly different from zero at the 95 percent confidence level, which is a respectable relationship. This might also help to explain the imbalance of demand and supply of Korean dry bulkship services in Korean dry bulk trades and hence to establish our thesis.

4.3 Summary

As indicated at the beginning, our aim in this Chapter has been to discuss some of the basic properties of the demand and supply of Korean dry bulkship services in Korean trades which are of significant so far as various market imperfections are concerned. In this respect, evidence relevant to a number of hypotheses concerning the nature of the demand and supply of Korean dry bulkship services has been presented.

On the demand side, it was suggested that the demand for Korean dry bulkship services in Korean trades was very price inelastic in part because of the inelastic nature of the demand for Korean dry bulk cargoes, in part because of the relatively small importance of freight rates, and in part because of government shipping policies. Evidence supporting this argument is presented. On the other hand, it is noted from the results of the correlation analysis between freight rates and the dry bulk trade volume that freight rates depend on the trade volume, and that the direction of

causality is not from freight rates to the trade volume, but rather vice versa.

On the supply side, in contrast with the argument that "the supply of *tramp shipping services* is inelastic and not capable of responding to demand and price changes at a given period of time"(Metaxas, 1971, P. 101; emphasis added), it was suggested that the overall supply of Korean dry bulk shipping services was very price elastic. Evidence has been presented in support of our argument. It is, however, observed that because of shifts in supply arising mainly from market differentiation, the short-term supply of Korean dry bulkship services **in Korean trades** was negatively correlated with freight rates. This observation can not be ignored when trying to explain the pricing of Korean dry bulkship services in the Korean shipping market, which shall be undertaken in Chapter 5.

CHAPTER 5
STRATEGIC BEHAVIOUR
OF KOREAN DRY BULKSHIP OPERATORS

Market Imperfections
in Korean Dry Bulk Trades

CHAPTER 5

STRATEGIC BEHAVIOUR OF KOREAN DRY BULKSHIP OPERATORS

In previous Chapter we have discussed the influence of market imperfections on the demand and supply of Korean dry bulkship services. In this Chapter the discussion will be extended to cover the 'strategic behaviour'* of Korean dry bulkship operators bearing in mind that it is assumed that their behaviour has been also influenced significantly by market imperfections.

The main purpose of this Chapter will be to show that the evidence supports the proposition that market imperfections have produced strong manifestations of non-profit maximising behaviour. Thus, it will be seen that the influence of market imperfections has carried adversely over to such business variables as firms' objectives, ship investment, financing, and pricing, in the context of the development of the Korean dry bulk shipping industry. We will deal each of these variables in turn.

5.1 Strategic Objectives

The traditional theory of the firm assumes that the firm makes its decisions on output and price with a complete knowledge of demand

*) In this Chapter the term 'strategic behaviour' is considered to be synonymous with 'strategic moves' and for this reason we shall follow Schelling in defining a 'strategic move' as follows: "A strategic move is one that influences the other person's choice, in a manner favourable to one's self, by affecting the other person's expectations on how one's self will behave. (Schelling, T.C., 1973, *The Strategy of Conflict*, p. 160, see also Clarke & McGuinness, 1987, p. 63)"

conditions and cost functions given the prices of inputs and the production function facing the firm. It also assumes the firm has an objective function containing only one variable, namely profit, which it seeks to maximise in the short run. (Dorward, 1987, p. 10) More specifically, the firm selects output to maximise profits where $MR(=P) = MC$. This is obviously an abstraction from reality, because it assumes small owner-managed firms operating in a free market. It is, therefore, less likely to be true of present-day large firms operating in an imperfectly competitive market. In fact, as Hay and Morris (1986, P. 238) pointed out, "there now exists a voluminous literature which directly or indirectly questions the profit-maximisation postulate". The developments leading to a reappraisal of the traditional profit-maximisation assumptions are neatly summarised by Hartley and Tisdell (1981, P. 172) as follows :

1. Evidence seemed to show that firms did not maximise profits: the theory appeared to be based on unrealistic assumptions about marginal cost and revenue.

2. The separation of ownership and control was believed to allow managers opportunities for pursuing their own goals rather than those of shareholders.

3. Discretionary behaviour and the pursuit of managerial goals was believed to be more likely in imperfect markets.

The result was, of course, the development of a considerable number of newer models of behaviour of firms that have included a variety of assumptions about business motivation and nonmaximising behaviour. Among them may be mentioned models by Baumol (sales revenue maximisation model), Williamson (model of managerial discretion), and Marris (growth maximisation

model). (Since each of these models is always one of the major topics under the general heading of either managerial objectives or firm's objectives in most textbooks on managerial economics, we will not attempt an exposition here.) Yet, there are few studies that have been made of alternative specification of the objective functions of Korean dry bulkship operators. Nor is it easy to demonstrate whether or not these operators behave in the ways and for the reasons suggested in these models of alternative objective functions, since they clearly did pursue one or more of those objectives in practice. However, there appears to be strong evidence that objectives other than profit maximisation were pursued by Korean operators. The Shipping Industry Rationalisation Program of 1984, for instance, implies that profits were rarely maximised and that maximum profits were not pursued. It will be argued here that the desire for government support gave rise to non-profit maximising behaviour, leading to, from all indications, greater emphasis on pursuit of both revenue and capacity maximisation. These two objectives will be examined in some detail in the following.

5.1.1 Revenue Maximisation

As we have already indicated, one alternative to profit maximisation is suggested by W. J. Baumol in his *Business Behaviour, Value and Growth* (1959), namely the suggestion that 'instead of maximising profits - either in the short term or long run - firms will tend to maximise sales, subject to the condition that their profits do not fall below some minimum value' (Holland, 1987, p. 150). The prediction of this model, therefore, is that profit will be sacrificed for revenue. This is justified on the basis that the

manager of large firms have more to gain from this strategy than profit maximisation. However, Korean operators' motivation to maximise revenue is, as we shall see, different from that of Baumol's model.

Table 5-1 gives us empirical evidence relating to revenue maximising behaviour of Korean operators. (The Table shows the gross revenue and the total Korean ocean going fleet in both Korean and world trade. Trade volume is total quantity carried by Korean operators by their own and chartered vessels. The fourth column is the world freight index. Thus, the data does show the relationships between the behaviour of Korean operators and a prime indicator of world market.) It is quite clear that substantial increases in both the revenue and the trade volume occurred over the period 1977-1983; the seven year annual average growth rates are 27.1 and 24.4 percent respectively, outstripping the growth of the fleet

Table <5-1> Gross Revenue, Trade Volume, and World Freight Index

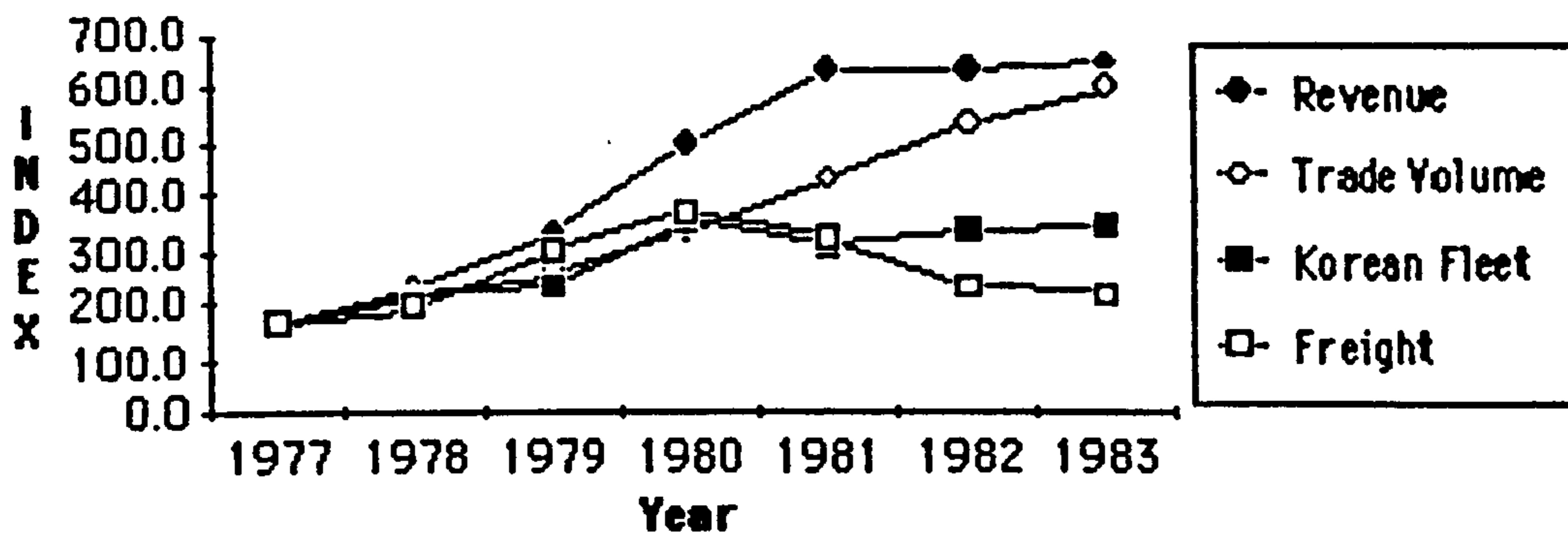
(Yearly data : 1976-1983)

| | Korean Operators' Gross Revenue (Mil. USD) | Total Trade Volume Transported by K. Operators ('000 tonne) | Total Korean Ocean going Fleet ('000 GT) | MRI General Freight Index (1972 =100) |
|----------------|--|---|---|---|
| 1977 | 629(166.2) | 34,682(166.2) | 3,350(166.2) | 166.2 |
| 1978 | 876(231.5) | 46,333(222.0) | 4,296(213.1) | 194.9 |
| 1979 | 1,246(334.4) | 55,047(263.8) | 4,671(231.7) | 301.4 |
| 1980 | 1,885(498.1) | 70,573(338.2) | 7,138(354.1) | 368.7 |
| 1981 | 2,399(633.9) | 90,617(434.2) | 6,216(308.4) | 321.1 |
| 1982 | 2,393(632.3) | 113,363(543.2) | 6,808(337.8) | 236.6 |
| 1983 | 2,465(651.3) | 120,079(609.0) | 7,030(348.8) | 216.6 |
| Annual Average | 27.1 % | 24.4 % | 14.9 % | |

Source : KMI, Maritime Statistical Yearbook 1985

Note : () = index; 1977 = 166.2

Figure <5-1> Growth of Revenue : 1977-1983



Source : Adapted from Table 5-1

size. Even more impressive is the comparison between the trade volume and the freight rate : it appears that the former is independent of the changes in freight rates. One glance at Figure 5-2 clarifies this point, as it shows clearly that the trade volume has increased steadily, whilst the freight rate has experienced a fairly regular cycle of seven years duration from trough to trough. A simple correlation analysis will also help to fix the point. In Table 5-1, values in brackets represent the relative variation of each variable from 1977 to 1983. Utilising these indices data the correlation coefficients for the variables are computed. The results are presented in Table 5-2. It is noted that the correlation coefficient between the trade volume and the freight index is very low, as expected, being close to zero (i.e. $r = 0.14$). We might then tentatively argue that, in view

Table <5-2> Correlation Matrix for Variables : R'vnuce, T. Vol., and K. Fleet

| | Revenue | Trade Volume | Korean Fleet |
|---------------|---------|--------------|--------------|
| Trade Volume | 0.939 | | |
| Korean Fleet | 0.925 | 0.849 | |
| Freight Index | 0.436 | 0.140 | 0.531 |

of the relatively low freight rates during the period, the substantial growth in trade volume has resulted from a revenue-maximisation strategy. A regression model will make this argument clear. If we denote the relative revenue index in year t by R_t , the relative trade volume index by TV_t , the relative Korean fleet size index by KF_t , and the freight index by Fl_t , then the multiple regression of R_t on TV_t , KF_t , and Fl_t produces the following equation (t-statistics in brackets) :

$$R_t = -168.769 + 1.185 TV_t - 0.246 KF_t + 0.973 Fl_t$$

$$(3.971) \quad (0.299) \quad (2.173)$$

Adjusted R-squared = 0.953
F-statistic = 41.328 D. W = 1.75

We notice that the coefficient on KF_t is of the unexpected negative sign. This means that the bigger the Korean fleet size the less is Korean operators' shipping revenue. However, this coefficient is insignificant. It appears that the insignificance of KF_t results from a high degree of multicollinearity between fleet size and other independent variables. As shown in Table 5-2, the correlation coefficient between KF_t and TV_t is 0.849 and the correlation between KF_t and Fl_t is 0.531, we can conclude that a very high degree of multicollinearity is present. As it is apparent that the insignificance of KF_t results from the interaction between KF_t and other variables then there are statistical grounds for excluding KF_t . A regression of R_t on just TV_t and Fl_t produces the following equation :

$$R_t = -176.701 + 1.097 TV_t + 0.862 Fl_t$$

$$(11.367) \quad (3.945)$$

Adjusted R-squared = 0.964
F-statistic = 80.209 D. W = 1.802

The effect of excluding KF_t is noticeable in that the fit has indeed

improved. All the coefficients are significantly different from zero at 95 percent confidence level, and the F-statistic, at 80.209, is also significant at the same level. The adjusted R-squared even marginally improves. The regression analysis thus tells us that Korean operators' trade volume and the freight index of world tramp markets appear to explain most of variations in the revenue of Korean operators over the period we examined, but because of the high degree of multicollinearity which is present in the data it is not possible to measure accurately the influence of Korean fleet size on the revenue. It is then reasonably assumed that Korean operators tended to maximise sales revenue given freight markets facing them. Although the above regression equation does not demonstrate this point statistically, Table 5-3 indicates that this is indeed the case. We see from this Table that, if the revenue is compared with the retained profit, the latter is negatively correlated with the former (i.e. $r = -0.514$). This may imply that profits were no longer a constraint for Korean operators to maximise their revenue, which contrasts strongly with Baumol's model that assumes some minimum value of profits as a constraint. Then the question arises why profits played no role in the behavioral decisions of Korean operators. It will be shown that the desire for government support is a very important factor to neglect profits in the short-run.

Table <5-3> Korean Operators' Retained Profits : 1977-1983

| Year | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Profits(Mil. USD) | 8 | -17 | 5 | 26 | 29 | -137 | -163 |

Source : KSA, Annual Report

The data in Table 5-4 show that the government financing to Korean operators appeared to be much more correlated with revenues (i.e. $r=0.949$) than with retained profits (i.e. $r=-0.751$), implying that the operators who earned more revenues could finance more than the operators who earned less revenues, as a result of which there was greater emphasis on the pursuit of revenues than short-run profits. It should be mentioned that financing of short-term working capital was loaned for 90 days at, for instance, 10 percent annual interest in 1984. The total amount of such funding to a company was subject to a limit of 10 percent of the company's annual revenue in the previous year based on a formula of dollar freight earnings overseas converted at, *for example, 640 Korean Won to the dollar in 1985.* (KMI & TBS, 1985, P. 1 - 8 ; italics added) We could, therefore, conclude that the government played an active role to prompt Korean operators to pursue government's own objectives, (one of which was to achieve a target shipping revenue,) at the expense of the operators' profit objective.

Table <5-4> Government Finance to the Korean Operators for Short-term Working Capital: 1977-1983

| Year | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Amount(Mil USD) | 14 | 50 | 75 | 117 | 197 | 264 | 282 |

Source : KMI & TBS, 1985, p. 1 - 9

5.1.2 Capacity Maximisation

From our discussion of policy restrictions (e.g. cargo reservation) and unequal competition (e.g. rate preference), it is not difficult to assume that Korean dry bulkship operators pursued a capacity maximisation strategy. Note that capacity, in this case, is confined to Korean-flag ship's bottoms. Table 5-5 provides the relevant evidence for the assumption. The significance of this Table is that it shows that the growth of the dry bulk fleet was at a very high rate, representing 'an annual average growth rate' (= AAGR) of 34.9 percent, whilst dry bulk trade volume grew at a relatively low rate of 18.5 percent per annum. A comparison of these figures with the growth of the world dry bulk fleet (AAGR of 4.2 percent during the same period) given in Table 2-12 and world dry bulk seaborne trade (AAGR of 3.7

Table <5-5> Growth of Korean Dry Bulk Seaborne Trade and Ocean Going Dry Bulk Fleet : 1976-1984

| | <u>Trade Volume</u> | | <u>Dry Bulk Fleet</u> | |
|-------------------------|---------------------|----------|-----------------------|----------|
| | '000 tonnes | % change | '000 GT | % change |
| 1976 | 11,600 | | 456 | |
| 1977 | 15,386 | 32.6 | 797 | 74.8 |
| 1978 | 15,720 | 2.2 | 1,454 | 82.4 |
| 1979 | 23,470 | 49.3 | 1,698 | 16.8 |
| 1980 | 29,532 | 25.8 | 2,071 | 22.0 |
| 1981 | 39,180 | 32.7 | 2,800 | 35.2 |
| 1982 | 38,444 | -1.9 | 3,464 | 23.7 |
| 1983 | 39,531 | 2.8 | 3,827 | 10.5 |
| 1984 | 41,347 | 4.6 | 4,340 | 13.4 |
| Average % change | | 18.5 | | 34.9 |

Source : As for Table 2-9 and Table 2-13

percent) given in Table 2-8 provides further support for the assumption of seeing the Korean dry bulkship operators as capacity maximisers.

Cargo reservation and rate preference in favour of the Korean fleet would indicate that the strategic aim of capacity maximisation need not contradict a strategy of profit maximisation, but for the Korean dry bulkship operators it was not fulfilled. This may be due to two reasons. Firstly, unit costs of the Korean dry bulk fleet were increased by capacity maximisation, which resulted in the high cost structure of the industry. Secondly, in spite of strong support of the government, the Korean fleet received relatively lower freight rates. These two points occupy later Chapters 6 and 7. The remainder of this Chapter, however, continues the analysis of non-profit maximising behaviour of Korean operators which also recognises these points.

5.2 Strategic Ship Investment

Strategic objectives of Korean operators indicate the existence of a close relationship between ship investment and government shipping policies. They acknowledge that ship investment was mainly motivated by the desire for government support. They also recognise, therefore, that the growth in ship investment has been due more to government incentives than market expansion(cf. Table 5-5). And they even suggest that Korean operators have not followed the traditional approach in ship investment, "that is to consider freight rate development, the financing opportunities, and the actions concerned with internal cost savings(Yolk, 1984, P. 15)". Finally, they suggest that Korean operators did not have a close look at external and structural changes.

With the above qualifications in mind, the plan of this section is as follows. First, we review the literature on ship investment, which is not found to be very large. Second, we explore the strength of the causal nexus between such developments as freight rate development, freight revenue development, and technological development, (which have been argued to lead to the shipping investment cycle,) and ship investment of Korean operators and show that to a lesser degree Korean operators did follow the general ship investment cycle of a global phenomenon. It is also shown that this weak relationship was very closely related to the non-profit maximising behaviour of Korean operators.

5.2.1 Investigations referring to Ship Investment

The starting point for the discussion of the ship investment behaviour is the survey of important developments in this field. We are concerned in particular with research work which attempted to explain factors affecting ship investment. There are relatively few theoretical analyses that have been made of the ship investment behaviour, whilst the majority of the studies have been concerned with actual conditions. The first step on the empirical side was a study by J. Tinbergen, who, in his classical article on the '*shipping cycle*', "found out that shipping investments are dependent on the freight rate development 12 to 18 months before, i.e., high freight rates - with a certain time lag - correspond with the placing of newbuilding orders (Yolk, 1984)". Koopmans also made similar observations in his '*Tanker Freight Rates and Tankship Building* (1939)'. In contrast to this,

*) J. Tinbergen, 1932, *Ein Schiffbauzyklus?* in *Weltwirtschaftliches Archive*, 34. Band. (quoted from Yolk, 1984, P. 48)

however, Schneider(1961)* empirically observed irregularities in the relation between ship investment and freight rates. More specifically, he found that "the possibility to invest into replacement tonnage or into additional tonnage is primarily dependent on the income situation of the shipowner, i.e. on his capability to raise the funds necessary as collateral for shipyard or bank financing (Yolk,1984, p. 4)". Yolk goes on to add that:

"There is no constant time interval, and in some cases the newbuilding orders were clearly placed prior to the freight rate upturn. Additionally, he observed freight rate increases which were not accompanied a corresponding rise in the order volume. A comparison between shipbuilding activity and the unsteady freight income for various shipping countries did reveal, however, that shipbuilding stagnates with the decrease of freight revenues." (ibid.)

One of the few who theoretically analysed the ship investment behaviour was Zannetos. In his '*The Theory of Oil Tankship Rates*(1966, PP. 51-57)', he assumes that tankship orders placed are closely related to the spot rates. Thus, he defines

$$O_t = f(R_s, C_s)$$

where O_t stands for orders budgeted for period t , and R_s , C_s stand for the spot rates and cost of shipbuilding respectively, both in the short run. Assuming that the function can be differentiated, he, with an application of calculus, shows that the most important factors influencing orders placed are the elasticities of expectation generated by the movement in

**) J. Schneider, 1961, *Empirische Untersuchungen über den Einfluß von Frachtraten, Frachteinnahmen und Schiffbaupreisen auf den Bau von seegehenden Güterschiffen 1900-1958*, Berlin.(quoted from Yolk, 1984, P. 47).

short-term rates.* He then empirically demonstrates the existence of a close relationship between orders placed and spot rates.**

The investigations that were undertaken during the late seventies and early eighties are, for example, works by Chryssos*** and Volk(1984). Chryssos' study refers to the experience of the period after the second World War. He observed that "freight rate booms have been periods of generous credit lendings for the acquisition of newbuildings and of second hand tonnage. The bank and other financial institutions usually hurried to get their share of the prosperous shipping business. In such periods the bulk shipowners felt tempted or even compelled to seek their chance and, using easy credit, to pull through their replacement or expansion projects. In order to secure bank credits, the shipowner needs collateral which at best can be offered during periods of freight rate prosperity (e.g. through a long-term charter fixture)."(Volk, 1984, p. 5) Thus, Chryssos was led to the conclusion that a causal nexus is generated between freight rates, bank loans, charter fixtures, and ship investment. A few years later, Volk also made similar observations in his '*Shipping Investment in Recession*(1984)'. He looked at the cyclical development of international shipping and of ship investment in the dry bulk sector during the seventies and early eighties. He observed a close relationship between the development of freight rates and the development of the placement of newbuilding orders. However, he

*) For details see Zannetos(1966) pp. 51-57.

**) For details see also Zannetos(1966) pp. 76-82.

***) A. Chryssos, 1979, *A Contribution to the Discussion on the Elements of the Investment Process Theory in Shipping and the Shipping Cycle*, Bremen.(quoted from Volk, 1984)

found that the placement of orders could also take place without a visible increase in freight rates. He ascribed this to advances in the technological development by which considerable cost savings have been made possible. He also pointed out that cut-rate shipyard prices, cheap financing, replacement demand, and the growing market for minor bulk cargoes does support the shipowner's decision to invest. Volk concluded that an investment theory should include not only the replacement cycle, freight rate and freight revenue development, and financing possibilities, but also include advances in technology in so far as they lead to considerable cost savings.

To summarise briefly, the theoretical and empirical research on the considerations of the ship investment behaviour undertaken in the past showed that ship investment would be affected by following three main developments or a combination of such.

1. Freight rate development. It is hypothesised that spot rates and the expectations generated by such rates are main factors influencing ship investment.

2. Freight revenue development. For instance, a better income situation enables the shipowner to raise the funds necessary as collateral for shipyard or bank financing.

3. Technological development. Advances in technology stimulate orders in so far as they lead to considerable cost savings.

As we shall now go on to see, these developments must be taken account of when trying to explain Korean operators' ship investment behaviour. However, we suggest that the influences of such factors on the Korean market has little in common with that in the world market.

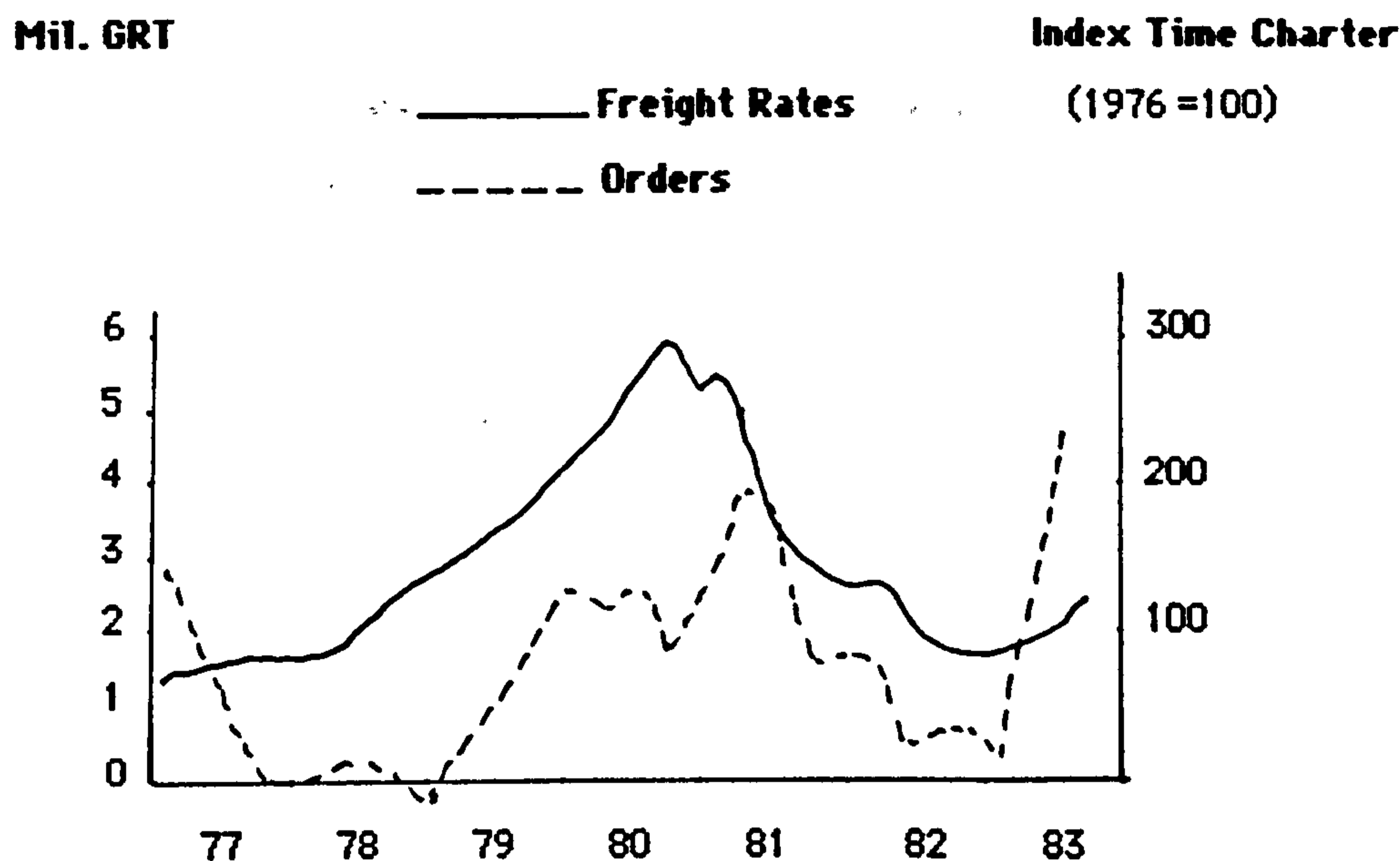
5.2.2 Non-profit Maximising Ship Investment

Having identified the main developments that have been influenced ship investment as a global phenomenon, the next step is to proceed to the discussion of the interrelationship between such developments and ship investment of Korean operators. As already indicated, we will here establish that ship investment of Korean operators has not followed the same line as the global shipping investment cycle and thereby show that such difference was closely related to the non-profit maximising behaviour of Korean operators.

5.2.2.1 Ship Investment as a Function of Freight Rate Development

To begin the discussion of the non-profit maximising ship investment of Korean operators under the freight rate development, we first present Volk's (1984) simple framework of the freight rate development. Using data on the quarterly volume of new building orders for dry bulk carriers and the Tramp Charter Index of the General Council of British Shipping which is based on charter fixtures for dry bulk carriers (combined index for all sizes), the development of freight rates and the development of the placement of newbuilding orders are compared in Figure 5-2. It can be seen from this Figure that the newbuilding order volume generally increases when freight rates increase. However, the observation that the placement of orders decreased at times during the upward trend of the freight market or the placement of orders increased during the downward trend of the freight market weighs against the drawing of rigid conclusions from the level of the freights rates and the direction of the freight rate movements onto the ship investment activity. In contrast to this, there seems to be

**Figure <5-2> Development of Freight Rates and of Dry Bulk Carrier
(incl. Combined Carrier) Newbuilding Orders**

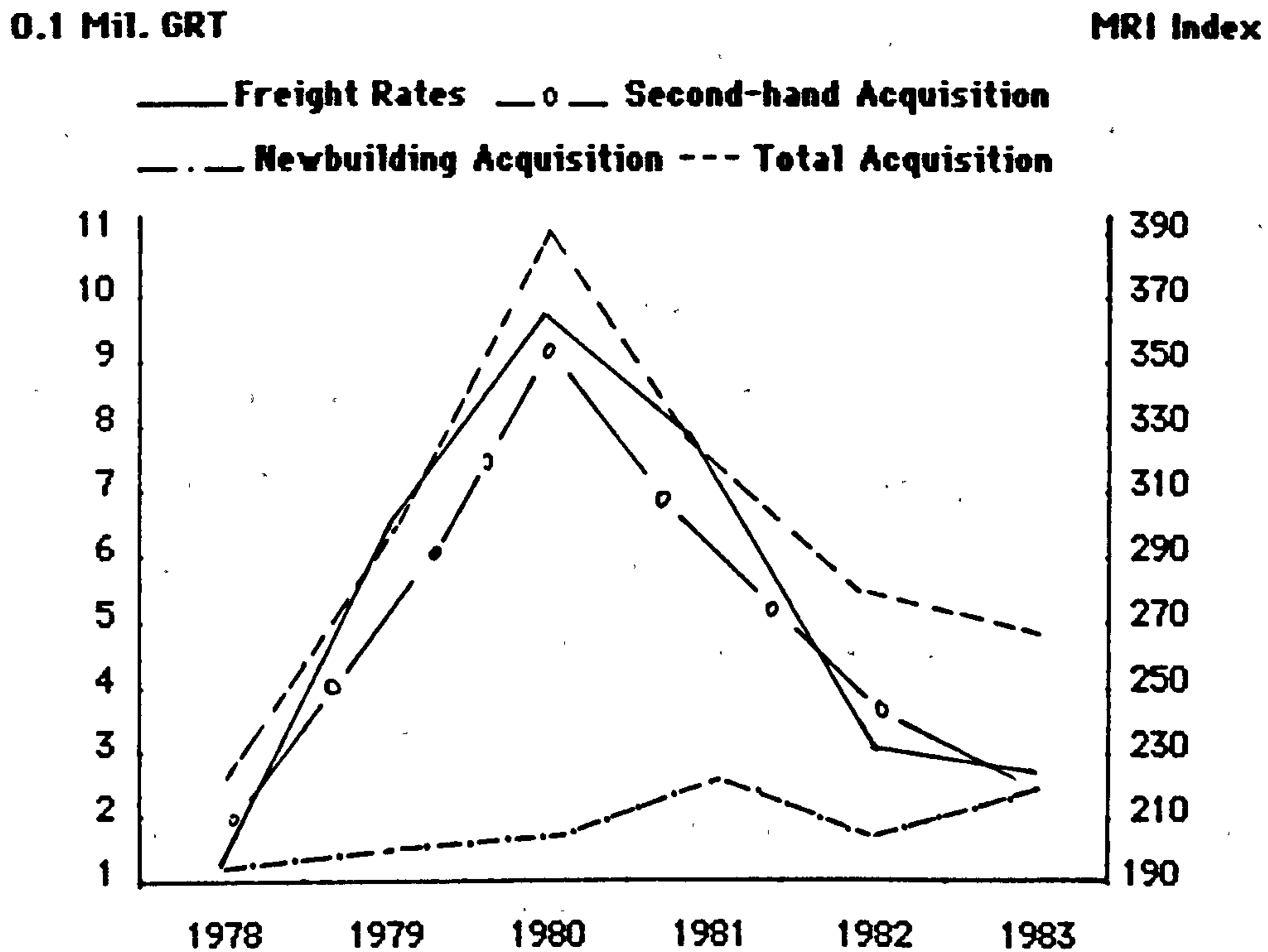


Source : Volk(1984, p. 7)

Note : Note that the negative order volume during the 4th quarter 1978 happened since more orders were cancelled than had been newly placed during the quarter.

evidence that ship investment of Korean operators has had a very strong correlation with the level of the freight rates. Turning to Tables 4-7 and 4-8, for instance, we notice that the acquisition of ships by Korean operators has been very strongly related to the freight rate development. This is brought out more clearly in Figure 5-3 which is graphed from the data of Table 4-6, taking due account of the lags. Note that ship investment of Korean operators comprises the acquisition not only of newbuildings but also second-hand vessels, whilst ship investment as a global level generally means the order of newbuildings. A number of points arise from the comparison of Figure 5-2 with Figure 5-3. Firstly, as can be

Figure <5-3> Development of Freight Rates and of the Korean Operators' Acquisition of Dry Bulk Carriers
(Yearly Data : 1978-1982)



Source : Table 4-6

Note : Second-hand includes the acquisition of BBC/HP

seen in Figure 5-3, ship investment of Korean operators followed much the same development as freight rates. This contrasts strongly with the investment curve in Figure 5-2 which has many exceptional cases such as the situations, for instance, in 1977-1978 and in 1983 when investments inversely reacted to freight rate movements. It can be, therefore, said that relatively heavier investments were made by Korean operators when the freight market was at a high level. It would seem that these heavy investments undertaken in times of freight rate prosperity have consequently led to a higher capital cost for the Korean fleet, since both

newbuilding and second-hand prices have always reacted in accordance to the freight rate movements.(see Volk, 1984, p. 9, graphs 3 & 4) Secondly, Korean operators relied heavily on purchases of second-hand vessels in their ship investments in such good shipping years as 1979-1981.* It is of interest to note, however, that many traditional maritime nations reduced their fleets by selling or retiring old tonnages in this good period, as shown in the data for Table 5-6. As a result, it became apparent that overall the Korean fleet, of which the average age was above those of traditional maritime nations(Table 5-7), has tended to be operated at relatively high cost. This is due, of course, to the lower productivity, and higher operating and voyage cost of old tonnage. Thirdly, Korean operators' acquisition of newbuilding appears not to fit well into the freight rate development. This may be due to two factors - firstly, the government prohibition of acquisition of newbuildings built at foreign yards - secondly, the limited availability of domestic finance for newbuilding.** It seems probable that these two

Table <5-6> Growth of Traditional Maritime Nations' Fleets

(Yearly Data : 1979-1981)

| | Korea | | U. K. | | Norway | | France | | Japan | |
|-------------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|
| | '000 GT | % change | '000 GT | % change | '000 GT | % change | '000 GT | % change | '000 GT | % change |
| 1979 | 3,480 | 18.0 | 27,951 | -9.5 | 22,349 | -14.5 | 11,946 | -2.1 | 39,973 | 2.1 |
| 1980 | 4,070 | 6.0 | 27,153 | -0.3 | 22,007 | -1.5 | 11,925 | -0.2 | 40,960 | 0.2 |
| 1981 | 4,857 | 19.3 | 25,451 | -6.3 | 21,657 | -1.5 | 11,455 | -3.9 | 40,836 | -0.3 |

Source : Lloyd's Register of Shipping 'Statistical Table'

*) Recall that with the institution of the GPSP in 1976, the Korean government proclaimed that, where possible, all new vessels flying Korean flag should be built at domestic yards.

***) For details see pp. 63-65.

Table <5-7> Cumulative Age Distribution of Selected Nations' Fleets in 1985

| | over 30 years | 25 yrs | 20 yrs | 15 yrs | 10 yrs | 5 yrs | Total |
|---------------|---------------|--------|--------|--------|--------|-------|-------|
| Korea | 1.1 % | 2.4 | 7.1 | 33.2 | 64.6 | 83.0 | 100 % |
| U.K. | 1.0 % | 2.6 | 6.6 | 18.4 | 58.4 | 85.6 | 100 % |
| France | 0.6 % | 1.6 | 3.6 | 6.4 | 46.8 | 88.4 | 100 % |
| Japan | 0.2 % | 0.5 | 1.2 | 7.4 | 43.5 | 70.2 | 100 % |
| World | 2.4 % | 5.0 | 10.8 | 24.4 | 55.3 | 81.0 | 100 % |

Source : reproduced from KMI, Shipping Information, 13/Oct/1986

factors, on the other hand, generated Korean operators' heavy reliance on purchases of second-hand vessels to expand their capacity. If so, it could be justly argued that government intervention in ship investment has been nothing less than a catastrophe for Korean operators.

In summary, many shipping economists have already provided empirical evidence that freight rate movements and ship investment are positively related. We have also found that the same relationship existed between ship investment of Korean operators and freight rate development; what is more, there was an almost one-to-one correspondence between these two variables. This strong correlation between investment and the freight rate development is, then, argued to be a clear manifestation of non-profit ship investment behaviour of Korean operators.

5.2.2.2 Ship Investment as a Function of Freight Revenue Development

As already mentioned, a lot of research work has identified a causal context in terms of a tight relationship between ship investment and the freight revenue situation. However, if freight revenue were relevant to the

investment activity of Korean operators, there would be much more to say in terms of analysis. It is for this reason that we now turn to some empirical quantitative evidence on the relationship between ship investment of Korean operators and freight revenue development.

In Table 5-8 we reproduce the freight revenue data of Table 5-1 and the lagged data of Table 4-6 relating to the capacity of acquisition of Korean dry bulk carriers. We would again expect that the freight revenue in period $t-2$ (t refers to year) was relevant to the delivery of new tonnage, whilst freight revenue in period $t-1$ relates to the acquisition of second-hand vessels. These data were, then, used to calculate the correlation coefficients for the capacity of each sector with freight revenue. The results are presented in Table 5-9. They show that the low value for r ($=0.297$) relating the total capacity of acquisition and freight revenue

Table <5-8> Freight Revenue and the Dry Bulkship Capacity of Acquisition

(Yearly Data : 1977-1983)

| | Frts. Revenue (Mil. USD) | Newbuilding (‘000 GRT) | Second-hand (‘000 GRT) | Total Capacity (‘000 GRT) |
|-----------------|------------------------------------|----------------------------------|----------------------------------|-------------------------------------|
| t = year | X = Xt | Y1 = Y1(t+2) | Y2 = Y2(t+1) | Y* = Y1 + Y2 |
| 1977 | 629 | 71 | 518 | 589 |
| 1978 | 876 | 114 | 171 | 285 |
| 1979 | 1,246 | 158 | 471 | 629 |
| 1980 | 1,885 | 173 | 936 | 1,109 |
| 1981 | 2,399 | 251 | 501 | 752 |
| 1982 | 2,393 | 196 | 380 | 556 |
| 1983 | 2,465 | 230 | 270 | 500 |

Source : KSA

**Table<5-9> Correlation Coefficients of the Dry
Bulkship Capacity with Freight Revenue**

| | <u>Newbuilding</u> | <u>Second-Hand</u> | <u>Total Capacity</u> |
|------------------------|--------------------|--------------------|-----------------------|
| <u>Freight Revenue</u> | 0.913 | 0.076 | 0.297 |

contradicts past empirical research on ship investment behaviour. The significance of this result is that it shows that freight revenue and new tonnage acquisition were strongly related, while the acquisition of second-hand vessels had almost no correlation with freight revenue. The strong correlation between the acquisition of new tonnage and freight revenue ($r = 0.913$) provides further support for our argument that the operators who earned more revenues could finance more than those who earned less revenues, as a result of which there was greater emphasis on the pursuit of revenues than short-run profits. Due to the inability of the individual operators to raise the capital necessary for the expansion of the Korean fleet, the Korean government instituted in 1976 the Government Planned Shipbuilding Programme. This proclaimed that all new ships flying the Korean flag should be built at domestic yards. From the strong correlation between Korean operators' acquisition of newbuildings and freight rate movements, and the minimal correlation coefficient between acquisition of second-hand vessels and freight revenue ($r = 0.076$), we can establish Korean operators' heavy reliance on the foreign capital market. This market used to offer developing countries opportunities for generous credit lendings for the acquisition of second-hand tonnage in periods of freight rate booms. It should be particularly remembered in this connection that the cost of finance, including interest, in the international

capital market has often paralleled the development of freight rate (e.g. see Volk, 1984 p. 9, graph 4). It is, therefore, now abundantly clear that the Korean fleet which expanded to a great extent in periods of freight rate booms has been burdened with high capital cost as compared with advanced countries' fleets. (Ghang, 1985)

In summary, we can say that ship investment of Korean operators was weakly related with their income situation and for this reason is assumed to be connected with non-profit maximising behaviour in the short and medium term at least.

5.2.2.3 Ship Investment as a Function of Technological Development

Attention is now turned to the relationship between technological development and the ship investment behaviour of Korean operators. It is now becoming apparent from investigations undertaken during the early eighties that a significant technological advance can potentially explain heavy investments which could be made in recession periods. Volk(1984), for instance, observes the investment upturn in such bad shipping year as 1983 (see Figure 5-2), which was caused by a significant technological advances. As he put it :

"The investment upturn in 1983 was caused by the development of new propulsion systems which are considerably more efficient than older ones. Shipowners now can realise 'economies of bunker'. Of course, cut-rate shipyard prices, cheap financing, replacement demand, and the growing market for minor bulk cargoes do support the shipowner's decision to invest. But the decisive stimulus was given by the advance in the technological development by which considerable cost savings have been made possible." (Volk, 1984, P. 15)

Interestingly enough, we also saw the upturn of orders for new tonnage by Korean operators in 1983 (Figure 5-3). This is, nonetheless, considered to be caused by factors other than the technological advance. The upturn may have come about for two main factors. Firstly, generous loans were granted by the Government with the aim of securing employment in the domestic shipbuilding industry. This was due, of course, to the significant 1982 decrease in newbuilding orders received by Korean yards following the collapse of the freight market in 1981 (Figure 5-2). As shown in Table 5-10, orders had been increased since 1978, reaching a peak of 1.853 million GT in 1981. They, however, tumbled down to 1.355 million GT in 1982, dropping to 73 percent of the peak capacity. Total contract prices also dropped to 76 percent of their peak value. In response to this, the Government increased funds for the Government Planned Shipbuilding Programme from 131.1 million USD in 1982 to 175.7 million USD in 1983 (Table 5-11), which resulted in the order upturn in 1983. Secondly, cut-rate shipbuilding prices exerted a significant effect on the volume of orders. Table 5-12 gives figures for the overall changes in Korean yards' contracting prices from 1982 to 1983. The contracting price per GT (i.e. unit price) fell by 44 percent, to USD 74 in 1983 from USD 131 in 1982. This implies the increase of total capacity ordered under the GPSP with given loans being available to Korean operators. This evidence very strongly suggests that the order upturn for Korean dry bulk carriers in 1983 was caused by government shipping and shipbuilding policy rather than technological development. It may be for this reason that the order upturn in 1983 was less significant for Korean dry bulk carriers than it was for world handy-sized dry bulk carriers, as shown in Figures 5-2 and 5-3. As a

Table <5-10> Newbuilding Orders Received by Korean Yards**(Yearly Data : 1976-1982)**

| | No. of Ships | | Total Capacity | | Total Contracting Price | |
|------|---------------------|----------------|-----------------------|-----------------|--------------------------------|--|
| | No. | '000 GT | % Change | Mil. USD | % Change | |
| 1976 | 151 | 324 | | 398 | | |
| 1977 | 244 | 647 | 100 | 544 | 37 | |
| 1978 | 148 | 463 | -28 | 379 | -30 | |
| 1979 | 130 | 1,203 | 160 | 1,002 | 164 | |
| 1980 | 104 | 1,690 | 41 | 1,772 | 77 | |
| 1981 | 108 | 1,853 | 8 | 2,333 | 32 | |
| 1982 | 85 | 1,355 | -27 | 1,779 | -24 | |
| 1983 | 179 | 4,098 | 202 | 3,034 | 71 | |

Source : Korea Shipbuilders' Association

Table <5-11> Loans for the Government Planned Shipbuilding Programme**(Yearly Data : 1982-1983)**

| | Type of Vessel | Capacity Ordered | | Domestic Loan | Foreign Loan | Total Loan |
|------|-----------------------|-------------------------|------------|----------------------|---------------------|-------------------|
| | | '000 GT | No. | (Mil. USD) | (Mil. USD) | (Mil. USD) |
| 1982 | ocean | 169.0 | 8 | 95.4 | 16.7 | 112.1 |
| | coastal | 10.8 | 18 | 18.0 | 2.0 | 20.0 |
| | total | 179.8 | 26 | 113.4 | 18.7 | 132.1 |
| 1983 | ocean | 262.2 | 12 | 118.5 | 27.9 | 146.4 |
| | coastal | 16.9 | 17 | 25.3 | 4.0 | 29.3 |
| | total | 279.4 | 29 | 143.8 | 31.9 | 175.7 |

Source : KMPA, reproduced from KMI & TBS, 1985, P. 1- 11.

Table <5-12> Korean Yards' Newbuilding Prices : 1982-1983

| | T. Capacity Ordered | T. Contracting Prices | Unit Price | U. Price Index |
|------|----------------------------|------------------------------|---------------------|-----------------------|
| | '000 GT (=A) | Mil. USD (=B) | USD/GT (B/A) | ('82=100) |
| 1982 | 1,355 | 1,779 | 131.3 | 100 |
| 1983 | 4,098 | 3,034 | 74.0 | 56 |

Source : Table 5-10. Note : T. = Total , U. = Unit

corollary, it is inferred that Korean operators' low level of investment in newbuildings (which have the benefit of higher productivity, and lower capital, operating and voyage cost) in recession periods has resulted in the further weakness of the Korean fleet. We would, therefore, conclude that the overall ship investment of Korean operators has little association with technological development and this is a major factor in the structural weakness of the Korean fleet.

To summarise. Empirical evidence presented in this section shows that there have been a number of differences between ship investment of Korean operators and the global shipping investment cycle. In general, the former overlapped with the freight rate development, while the latter often showed significant irregularities in relation to such development. The evidence suggests that government shipping and shipbuilding policy influenced ship investment of Korean operators, with a resulting the strong correlation between investment and freight rate movements. These findings, however, do not imply that the possibility of Korean operators to invest has been dependent on their freight income, but rather that heavy investments in times of freight rate prosperity have adversely affected the competitiveness of the Korean fleet.

5.3 Strategic Financing

It has already been indicated that the inability of Korean operators to raise capital for expansion from the market has brought unprecedented control by the government over the details of shipping finance. In Chapter 3 attention was focused on unequal access to funds between big and small

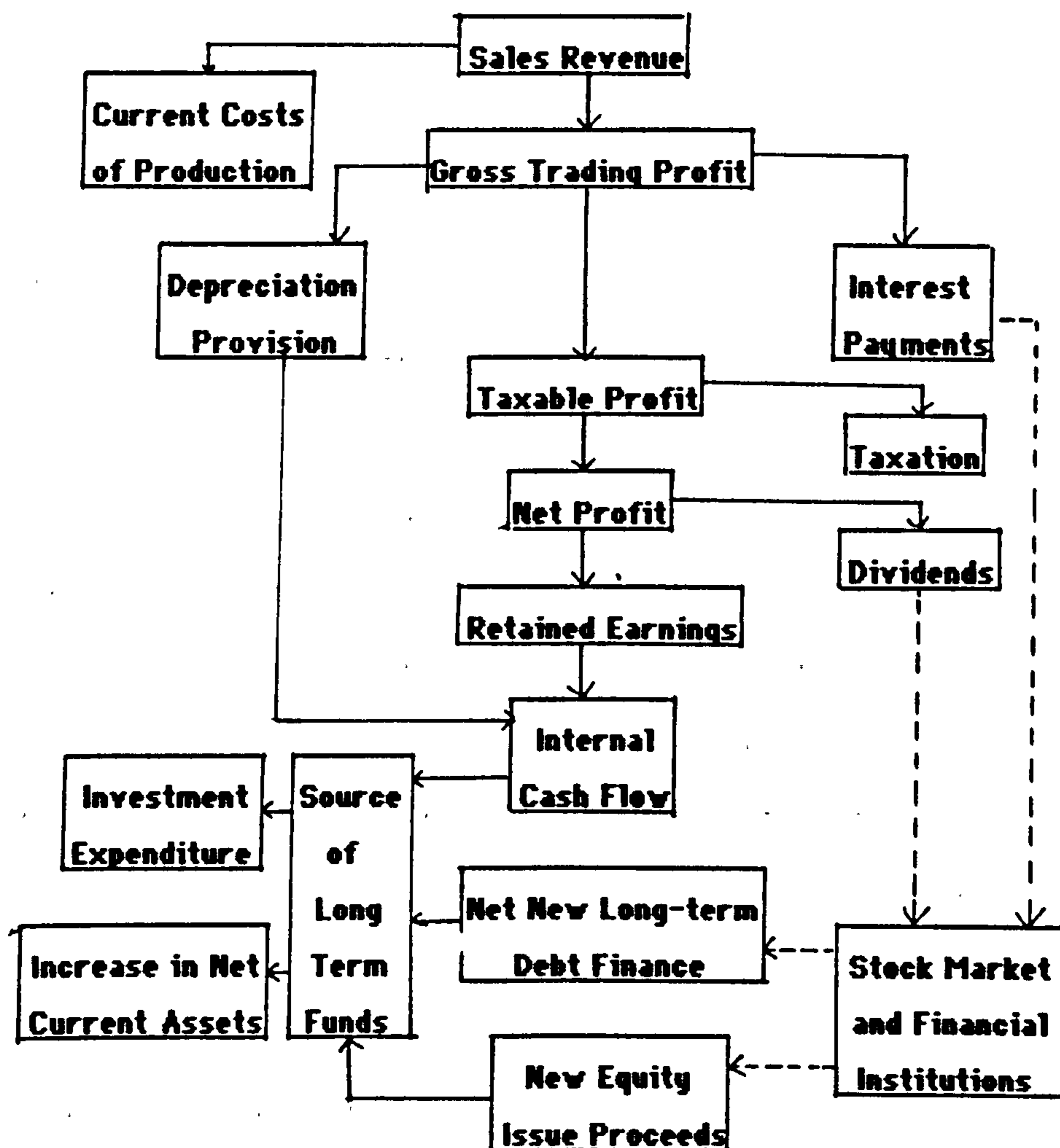
shipping firms under the government control over the domestic financial market. (For details see subsections 3.3.3.2 and 3.3.3.3) In this section the aim is to discuss the consequences of government shipping finance policy. It will be argued that such policy has adversely affected the financing behaviour of Korean operators with special relevance to their levels of financial risk.

5.3.1 The Concept of the Flow of Funds

Before we proceed with the analysis of the non-profit financing of Korean operators, we shall briefly discuss the concept of the flow of funds that purports to explain the reasons why Korean operators have heavily relied on the government support for their finance.

The concept of the flow of funds is neatly summarised by Hay and Morris(1986, PP. 323-326) and for this reason is introduced in brief here simply for ease of exposition. The main financial flows in a company are shown in Figure 5-4. Gross trading profit is that part of sales revenue remaining after paying current production costs, and is split into three element, i.e., provision for depreciation of capital stock, interest on all types of short- and long-term borrowings, and the remainder, which is taxable profit. Subtraction of taxation from the remainder leaves the firm with its net profit, which is split into dividends paid to shareholders and retained earnings. The total funds internally generated are then the depreciation provision and retained earnings. The sum of these is generally called 'internal cash flow'. Adding in new long-term debt finance and equity issue in proportions, we have the total of all long-term funds available to the company. Both will, of course, depend on the stock

Figure <5-4> The Flows of Funds



Source : Reproduced from Hay & Morris, P. 324

markets' and financial institutions' view of the company, which in turn will be a function of the existing pattern of interest and dividend payments(dotted line). Long-term debt finance normally includes three items : long-term bank loans at fixed or variable rates of interest, other long-term loans, e.g. from other companies, the government, etc., and debentures, which are fixed interest marketable company bonds and are

held by both individuals and institutions. Those funds are shown as going into two uses. The first is expenditure on new investment, predominantly physical but also including research and development and marketing investment. Second, funds may be used to build up current assets – mainly stocks and work-in-progress, financial assets, short-term loans to debtors, and cash balances – or to reduce current liabilities – mainly amounts owed to creditors, banks and other short term loans. In other case the result is to increase net current assets.

Having introduced the general concept of the flow of funds, we are now in a position to consider funds available to Korean operators. We consider first the internal cash flow. The internal funds are depreciation provisions and retained earnings. The former is, however, 'purely book-keeping operation. It identifies the part of gross trading profit estimated as necessary to cover the cost of deterioration of machinery, plant, etc. Of itself this operation involves no flow of funds into or out of the company.'(ibid.) In a very real sense, therefore, it can be said that retained earnings take over the dominant role in the internal fund flow. By this token, only retained profits of Korean operators are considered here. Table 5-13 gives figures for Korean operators' retained profits in US dollar over

Table <5-13> A Korean Operator's Average Retained Profits

(Yearly Data : 1976-1984)

| | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|-----------------------|------|------|------|------|------|------|------|------|------|
| R.P.(Mil. USD)=A | 5 | 8 | -17 | 5 | 26 | 29 | -137 | -163 | -191 |
| No. of Operators=B | n.a | n.a | n.a | n.a | 57 | 58 | 59 | 61 | 83 |
| Average(Mil. USD)=A/B | - | - | - | - | 0.5 | 0.5 | -2.3 | -2.7 | -2.3 |

Source : KSA Note : R.P = Retained Profit

the period 1976-1984. (Note that because most Korean operators were private companies, retained profits do not necessarily exclude dividends.) Lines 3 and 4 of this Table show the total number of operators and the average retained profits of an operator. The significance of Table 5-13 is that it shows that, although Korean operators have retained profits in many good shipping years, they might have required funds for expansion well beyond any retained earnings. This is largely due to the fact that they retained only small earnings in good shipping years (e.g. at best USD 0.5 million for a company in a year), whilst their deficit has reached into relatively huge figures in recession periods.

Next we consider equity issue proceeds. Additional funds can be raised by the issue of shares. Here, the position is complicated by the fact that most Korean operators were private companies. (It is noted that only 3 out of 83 shipping companies offered shares of stock for public subscription in 1984) For instance, as Sloggett(1984, P. 11) has rightly noted, 'in case of a private company an increase in the share capital may present difficulties unless the existing shareholders are themselves able to provide the additional funds; a private company not being allowed to advertise its shares to the public - also the number of shareholders may be restricted.' So much for Korean operators in the past.

The final source of funds for Korean operators' debt finance has been also troublesome. As an alternative to equity issue proceeds, a company may be able to consider issuing debentures and raising loan capital. Shipping companies' loan capital for expansion normally includes credits

from sources such as (Frankel, 1987, p. 133) :

- supplier credits including shipbuilder loans
- government export credits
- commercial mortgage loans
- commercial loans against charter agreements or other acceptable collateral
- government loans

Issuing debentures will depend upon the existing capital structure and on the state of the market for new issues. The ratios of loan funds to equity funds is known as the 'gearing'*. (Sloggett, 1984, p. 12) It is apparent that Korean operators have found it difficult to raise more funds by issuing debentures, since their gearing ratio, as we shall see in the following subsection, was comparatively high. In consequence, it is assumed that Korean operators wishing to raise funds for expansion have relied heavily on loan capital. It should be stressed in this connection that most domestic loan capital, as already indicated (in Chapter 3), has been allocated by the government. It is argued, however, in the following that such control by the government resulted in a high level of financial risk on the part of Korean operators.

5.3.2 Non-profit Related Financing

In the foregoing, reference was made to the flow of funds, and it was

*) If D is debt finance and M is equity finance, 'the gearing ratio (h)' is defined as follow :

$$h = D/(D+M) = (D/M)/[(D/M) + 1] = L/(L + 1)$$

It is for this reason that 'the gearing ratio' is to be distinguished from the leverage ratio (L) which is the ratio of debt to equity finance. (Hay & Morris, 1986, pp. 322-323)

implied that the government played an active role in the financing decisions of Korean operators. Before proceeding, it is worth noting that 'there is one primary advantage to financing with debt : It's cheaper than any other capital source. This is because debt is the safest security an investor can buy, and also because of the tax deductibility of interest charges. A secondary advantage of financing with debt is that it does not dilute stockholder control since debt is a creditor instrument.'(Joy, 1977, p. 359) The questions, then, arise as to whether the government debt finance to Korean operators was more expensive than any other capital source and has diluted operators control. We believe the answer to these questions is positive, though we can provide little empirical evidence to prove this. It will be shown, however, that financing with the government loans resulted in an increase in financial leverage to Korean operators. This evidence is viewed as supporting the argument that government shipping finance policy has adversely affected the financing behaviour of Korean operators.

Table 5-14 gives figures for three types of government financing to Korean operators over the period 1977-1983. Firstly, as we have already mentioned, financing of short-term working capital needs where money is loaned for 90 days at somewhat lower interest rate (e.g., 10 percent per annum in 1984) than banks' general lending rates (e.g., approximately 11 percent in 1984). Total financing of this loan to operators amounted to USD 282 million in 1983, having increased dramatically from 14 million in 1977. Secondly, special loans to operators to assist in the payment of principal and interest payments on ship mortgages were introduced in 1977. They were discontinued in 1979 when operators began to take advantage of the

Table <5-14> Government Financing to the Korean Operators**(Yearly Data in Mil. USD : 1977 -1983)**

| | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | Total |
|-----------------------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| S-Term Working Capital | 14 | 50 | 75 | 117 | 197 | 264 | 282 | 999 |
| Special Loans to Assist in | | | | | | | | |
| Repayment of Ship Mortgages | 5 | 8 | 4 | - | - | 74 | 147 | 238 |
| Shipbuilding(GPSP) loans | 121 | 170 | 216 | 164 | 228 | 132 | 176 | 1,207 |
| Total | 140 | 228 | 285 | 281 | 425 | 470 | 605 | 2,444 |

Source : KMI & TBS, 1985

favourable tramp freight markets, and then recommenced in 1982 but only for payments on foreign currency loans. The interest rate on this loan (e.g., 16 percent per annum in 1984) was normally higher than those on other government loans. Last but not least, considerable amount of funds for expansion of the Korean fleet and support to the Korean shipbuilding industry have been supplied through the GPSP that was instituted in 1976. It is assumed that this financing was cheaper than any other domestic capital source. Nevertheless, as shown in Table 5-15, it appears to be still more expensive than those supplied by other shipbuilding countries. This provides further support for our argument as to the uncompetitiveness of the Korean fleet.

Attention is now turned to the discussion of the non-profit maximising strategic financing behaviour of Korean operators. Each operator has different capital structures and may react differently to the same change in the economic outlook. With reference to different reactions, eight fundamental principles (or factors) in financial structure strategy was suggested by Cheyenne(1979, P. 65) as follows :

**Table <5-15> Aids to Domestic Shipowners by Shipbuilding Countries
at Early 1982 (Direct Shipyard Subsidies not Included)**

| Country | Term(years) | Amount(%) | Interest(%) | Others |
|---------|-------------|-----------|------------------------------------|---|
| Belgium | 15 | 80 | 4.5 | 2 years' moratorium |
| Brazil | 12 | 70 | 5 | 30 % investment award, operating subsidies |
| Denmark | 12 | 80 | 8 | 2 years' moratorium |
| Italy | 15 | 70 | | 50 % credit cheapening |
| Japan | 13 | up to 90 | 60 % at 7.3 30 % at 8.6 | 3 years moratorium |
| Sweden | 15 | 90 | 8 | 4 years' moratorium |
| Spain | 12 | 85 | 8 | 2 years' moratorium |
| Taiwan | 12 | 80 | 8.5 | dollar contract |
| Korea | 10.5 | up to 90 | 70 % at 13 20 % LIBOR + premium | 2.5 years' moratorium |

Source : Reproduced from Volk, 1984, p. 45(Korea added)

1. To avoid the dilution of equity and the possible loss of control.
2. To maintain a reasonably, but not overly, conservative capital structure.
3. To keep the cost of capital low.
4. To employ financial leverage.
5. To avoid possible failure in the payment of excessive fixed charges and other obligations.
6. To take the advantage of government influence.
7. To maintain a flexible capitalisation and capital structure.
8. To manage proper marketability and timing.

Not all these principles can be pursued by every company. As Cheng(ibid.)

put it: "Each of the principles suggested is not equally important for every company. In some instances one or more of the suggested principles may be relevant. Special circumstances may bring additional principles. The various principles verbalise forces that are not necessarily harmonious. Various forces push the company toward the use of debt securities. Other forces work in the opposite direction. All of the objectives cannot be pursued at the same time. To achieve more in one direction, something usually has to be given up in another direction." There are few studies that have been made of any principles in the financial structure strategy of Korean operators. However, as we shall see in the following, there seems to be strong evidence that most of the above principles except 'to take the advantage of government influence' were rarely pursued.

Data from KMI(1987) summarises the key points we shall consider, which is presented in Table 5-16. Financial leverage ratios indicate to what extent the firm has financed its investment by borrowing. "Use of debt financing increases the risk of the firm: the more extensive the use of debt, the larger the firm's leverage ratios and the more risk present in the firm."(Joy, 1977, P. 26) While there are many leverage ratios, we will look at four together with one profitability ratio. These are, debt to total assets ratio, current liabilities-equity ratio, long term liabilities-equity ratio, time interest earned, and unit cost to debt. We shall take them below one by one in some detail.

The debt to total assets ratio is the ratio in percent of the total debt in the firm, both long- and short-term, to total assets, where total assets are

Table <5-16> Financial Leverage Ratios of Selected Operators in 1984

| | **) Korean Operators | American Operators | Japanese Operators |
|----------------------------|---------------------------------------|-------------------------------------|-------------------------------------|
| Debt to Total | | | |
| Assets Ratios(A) | 87.26 | 61.95 | 82.58 |
| Current Liabilities | | | |
| - Equity Ratios(B) | 261.70 | 43.06 | 208.44 |
| L-T Liabilities | | | |
| - Equity Ratios(C) | 422.21 | 122.41 | 256.61 |
| Times Interest | | | |
| Earned(D) | 0.51 | 3.05 | 1.17 |
| Unit Cost to | | | |
| Debt(E)* | 8.30 | 6.94 | 6.15 |

Source : KMI, 1987, pp. 15 & 18

Notes : A = (Debt/Total Assets) x 100

B = (Current Liabilities/Equity) x 100

C = (Long-term Liabilities/Equity) x 100

D = (Interest Expense + Net Income before Taxes)/Interest Expense

E = [(Interest and discount expenses)/Debt] x 100

*) profitability ratio.

**) Korean Operators : Pan Ocean, KSC, HMM, Choyang, Korea Line, Hanjin

American Operators : Sea-land, Mclean, APC

Japan Operators : NYK, K-Line, YS-Line, J-Line, MOL.

the sum of debt and equity. "A high ratio means that the firm has liberally used debt (has borrowed) to finance its assets, and a low ratio means the firm has paid for its assets mainly with equity money."(ibid.) Any ratio over 50 percent means the firm has used more debt than equity to finance its investment. Korean operators obviously were much more aggressive (ratio = 87.26) than their foreign competitors (e.g., Americans = 61.95,

Japanese = 82.58) in using debt financing. It became clear that this higher percentage of Korean operators has been the cause of great concern for them and the government as well in recent recession periods.

Current liabilities-, and long term liabilities- equity ratios which have equity in their denominator indicate the percentage of short-, and long-term liabilities to equity. The higher the percentage, the more financial risk in the firm. So much for Korean operators as their ratios were higher than those of other competitors. We would emphasise that Korean operators' long term liabilities-equity ratio (=422.21) was particularly higher as compared to others, which implies their heavy reliance on debt financing (and hence on the government loans) for their acquisition of ships.

Time interest earned is the sum of net income before taxes and interest expense divided by interest expense. "It is supposed to measure how ably the firm can meet its interest obligations. In other words, it is a kind of 'interest coverage' ratio that shows how many times the interest payments are covered by funds that are *normally available* to pay the interest expense. Note that 'normally available' is emphasised because there are other financial resources that are also available to meet interest expenses." (Joy, 1977, P. 27) For Korean operators 'time interest earned' was significantly lower than the competitors' average, which reinforces the discussion above regarding the other leverage ratios showing Korean operators' comparatively higher percentage of debt to total financing.

The unit cost to debt is one of several profitability ratios. These ratios, as the name indicates, tell a story about the firms's profitability. The unit cost to debt ratio relates interest and discount expenses to the firm's debt paying interest. Thus the higher percentage of the firms' total debt that is supplied by creditors, the less profitability and, as a result, the more financial risk in the firm. Korean operators' unit cost to debt (= 8.30) is larger than that of foreign competitors. This is due to several factors - firstly, the comparatively higher interest rates of domestic loans - secondly, foreign currency loans borrowed in boom periods, which usually imply higher interest rates.

In brief, Korean operators used much more debt than their typical foreign competitors. The main reasons for this lie in government shipping and shipbuilding policy. It is argued that this policy led Korean operators into a heavy debt burden which accelerated their unprofitability, sealed the bankruptcy of many Korean operators in the early eighties, and eventually led the Shipping Industry Rationalisation Programme of 1984.

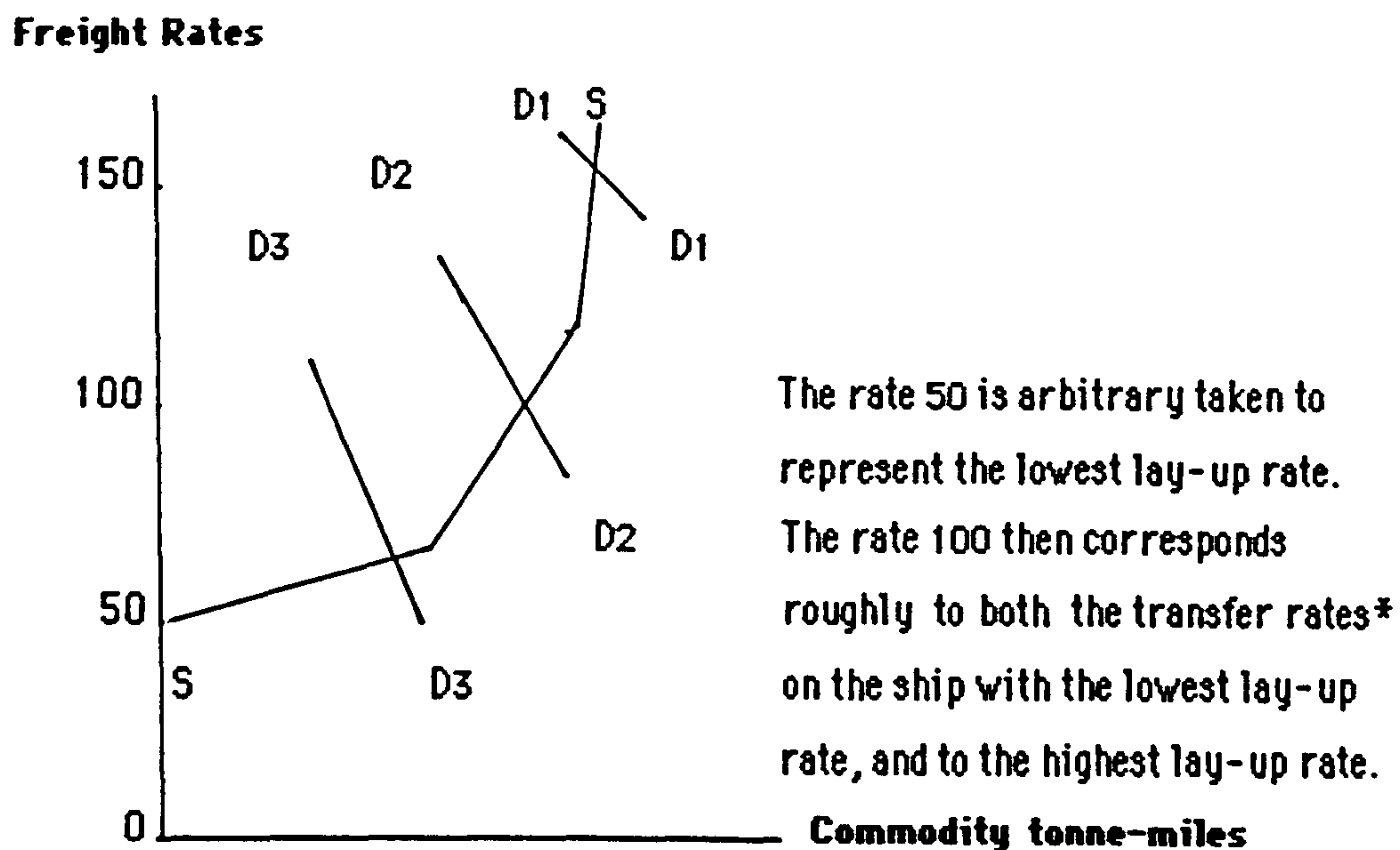
5.4 Strategic Pricing

In Chapter 4 it was shown that, in contrast to the theoretical tramp shipping supply and demand model, the short-term supply of Korean dry bulkship services in Korean trades have been relatively volatile as compared with the demand for them. It is argued in this section that such difference calls into question the application of the traditional demand-determined pricing model of trampships to the pricing of Korean dry bulkships in the Korean shipping market. More specifically, it will be

argued that freight rates of Korean dry bulkships in Korean trades were, in the short term, supply-determined and for this reason were significantly non-remunerative in times when the world tramp ship freight market was depressed. For this argument, we proceed first to Sturmeys model with respect to the general type of a demand-determined pricing theory. In a second step, we deal with a supply-determined interpretation of the pricing of Korean dry bulkships in the Korean market.

5.4.1 Traditional Demand-determined Pricing of Trampships

"Demand-determined presumably means that freight rate changes in the short run (say, in the business cycle) must be imputed mainly to changes of demand. This would be the case if tramp *ship* capacity could not be significantly expanded in the short run because it was always reasonably fully utilised; it would not be contracted in the short run because of high economic cost of laying-up." (Bennathan & Walters, 1969, P. 63; italics added) Such seems to be the view of Sturmeys (1979, P. 110), when he, in his article '*On the Pricing of Tramp Ship Freight Services*' argues that "tramp ship operates only in response to demand" He, then, goes on argue that "the level of the freight rates of trampships at any one time is given by the interaction of the *short-term* demand and supply curves *in terms of commodity tonne-miles*" (p. 114; italics added)", as shown in Figure 5-5. As can be seen in this Figure, tramp freight rates in the short-term are governed by shifts in demand (which may arise from from natural disasters, wars, canal closures, crop failures, market sentiment or tone and so on), whilst the total supply of trampships is inelastic at all rates down to the highest lay-up rate. Thus, we see that when demand is high, (for example, D_1D_1) in

Figure <5-5> Short-term Demand and Supply of Tramp Tonnage

Source : Reproduced from Sturmev, 1979, p. 114

this Figure the demand curve crosses the supply curve in its inelastic range. Any change in demand is completely taken up by a change in price, with no change in the amount of tonnage supplied ; quite small changes in demand lead to large changes in freight rates. "If demand is lower (D₂D₂) so that the demand curve cuts the supply curve at a point where it is becoming elastic, changes in demand have a smaller effect on price and begin to affect the volume of tonnage supplied. As demand falls (to D₃D₃), the demand curve intersects the supply curve in the range in which the effect on price is reduced and the effect on tonnage is increased, until, at the lay-up point of the ship with the lowest voyage costs, supply is

*) The transfer rate is that rate which will more or less enable the owner to break even but will leave him wondering whether he would be better using his capital and his entrepreneurial skill in another direction which will yield him a proper profit. (Sturmev, 1979, p. 111)

completely elastic. Price can then fall no further and all further falls in demand affect only the volume of tonnage kept in operation."(Sturmey, 1979, P. 114)

To sum up the above argument, tramp freight rates are volatile because demand varies very rapidly, whilst supply of tramp tonnage is relatively fixed in the short period. This said, we now turn to discuss the pricing of Korean dry bulkships in the Korean shipping market.

5.4.2 Supply-determined Pricing* of Korean Dry Bulkships

The traditional demand-determined pricing of trampships is based upon the conventional view of the tramp shipping market behaviour, that is, as have been already mentioned (in Chapter 4), 'demand is volatile, quick to change and comparatively unpredictable, whilst supply is ponderous and slow to change(Stopford, 1988, P. 63)'. However, this traditional pricing is rather obscure in the Korean dry bulk shipping market because of a different view of market behaviour, a view which postulates shifts in supply as the governing factor for pricing.

Consider first the short-term demand curve for Korean dry bulkship services in Korean trades. It is said that 'at any particular level of demand there is a certain elasticity with respect to price(Sturmey, 1979, p. 113)'. However, as has been examined (in Chapter 4), the short-term demand for Korean dry bulkship services was very inelastic with respect to freight

*) Note in this case that pricing means the fixing of spot freight rates for voyage charters.

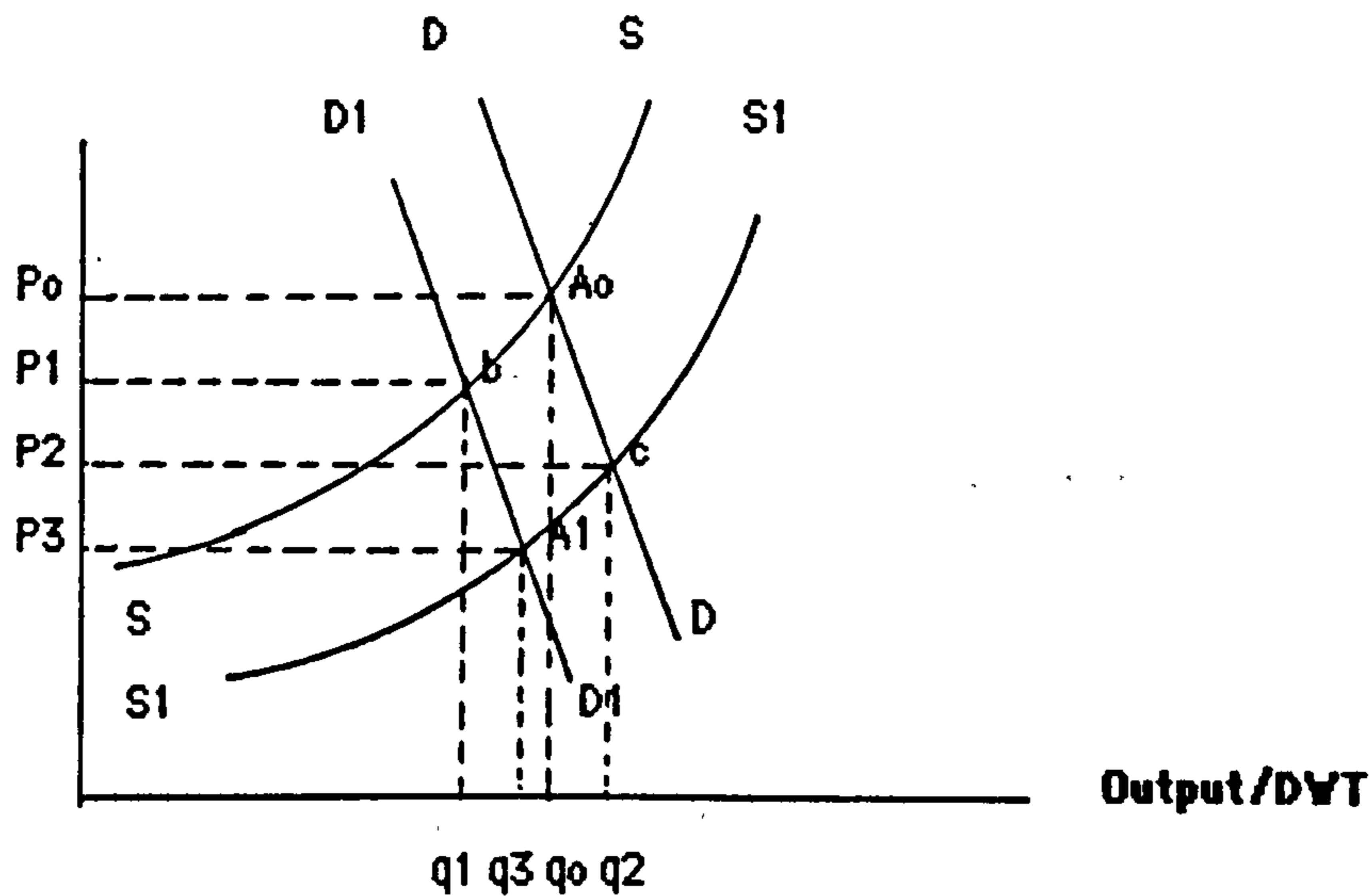
rate. Furthermore, as Table 4-3 indicates, the demand for Korean dry bulkship services in Korean trades has not varied rapidly in the short run. This implies that the link between freight rates in the Korean dry bulk shipping market and shifts in the demand for the Korean dry bulkship services was tenuous or difficult to discern. In consequence, we assume an inelastic demand curve (e.g. DD in Figure 5-6) for Korean dry bulkship services in Korean trades, irrespective of freight rate changes in the short period.

And now, consider the short-term supply curve for Korean dry bulkship services in the Korean market. The total supply of Korean dry bulkships has a certain limit. In the very short-term, no matter how high the freight level may be, any more tonnage cannot be supplied than the limit. When the freight level falls below the laying-up point, the supply will cease, because most of ships can lessen their loss only by laying up. Thus, the very short-term static supply curve SS (in Figure 5-6) of Korean dry bulkships is drawn from the distribution of tonnage by the levels of their laying-up point.

Given the discussion above, the short-term supply and demand of the Korean dry bulkship services in Korean trades, and equilibrium of the market is shown in Figure 5-6. At the broad level of generality, we first assume that given the absence of freight rate changes in the world tramp market, the supply and demand curves (in both the world and the Korean tramp shipping market) intersect each other at a point A_0 , where a freight level P_0 with the output/DWT Q_0 is determined. If the demand is lower (for

Figure <5-6> Short-term Supply and Demand of Korean Dry Bulkships in Korean Trades and Equilibrium of the Market (in Recession Periods)

Freight Rates



example, D_1D_1) in the world market (,whilst the demand for Korean dry bulkship services in the Korean market stays at DD ,) so that the demand curve cuts the supply curve at a point b , which determines the world freight rate P_1 with output/DWT q_1 . Then, what happens in the Korean dry bulk shipping market is that, as already indicated in previous Chapter, many of Korean dry bulkships are transferred from cross trades to the Korean market where they can secure employments more easily under government protectionist measures. Coupled with this a considerable amount of newbuilding and second-hand tonnage acquired by Korean operators in a short period of shipping boom usually have come into the Korean market in long recession periods due to time lags between contracting (or agreement of purchase) and delivery of vessels. (Recall that we have generally expected that the freight rate index in period $t-2$ (t

refers to year) was relevant to the delivery of newbuildings, whilst the index in period in $t-1$ related to the acquisition of second-hand vessels.) These have resulted a noticeable shift of the supply curve of Korean dry bulkships in Figure 5-6 from SS to S_1S_1 , so that the supply curve cuts the demand curve at a point c , where a freight level is determined at P_2 , which is lower than that of the world market ; but the output/DWT is determined relatively higher at q_2 . If the demand for Korean dry bulkships also falls (for example, to D_1D_1), the short-term equilibrium in a recession period is attained at a point A_1 and the levels of freight rate and output are determined at P_3 and q_3 respectively. In any cases, therefore, if the world tramp market remains at a low level, the freight rate of the Korean dry bulk fleet in Korean trades seemed generally lower than those in the world market; but the relative output/DWT of the fleet in the Korean market has increased (for details of the increased output/DWT, see Table 4-10). One simple set of statistics provides pertinent evidence for such relatively lower freight rates of the Korean dry bulk fleet, which is presented in Table 5-17.

In Table 5-17, the average yearly grain freight rate* received by Korean operators in Korean trades is compared with the MRI mean yearly (world) grain freight index. The average grain freight rate received by Korean operators in the Korean market reached a historic peak of USD 27.91/tonne in 1981 when the world tramp freight market was at a high level; but it dropped to USD 14.96/tonne at a period of recession in 1984, which is only 53.6 percent of the peak rate. By contrast, the mean yearly index of the

*) Note that we present the average yearly grain freight rate here as evidence, since a large majority of grain fixtures in Korean trades were concluded on spot basis.

Table <5-17> Relative Comparison of Average Grain Freight Rate in Korean Trades and MRI (World) Grain Freight Index

| | 1981 (Boom) | 1984 (Recession) | % Change |
|---|----------------|---------------------|----------|
| Freight Earned by Korean Operators in Korean Grain Trades (USD '000) = A | 188,350 | 95,480 | |
| T. Volume Transported by K. Operators In K. Grain Trades ('000 tonnes) = B | 6,748 | 6,382 | |
| Average Grain Freight Rate Received by K. Operators in K. Trades (USD/tonne) = A/B | 27.91 | 14.96 | -46.4 % |
| MRI (World) Grain Freight Index 1972 = 100 | 325.1 | 208.4 | -35.9% |

Source : KSA

(world) grain freight rate of MRI was at 325.1(1972=100) in 1981 and at 208.4 in 1984, dropping to 74.1 percent of the 1981 average. In view of this, we may assert that freight rates of the Korean dry bulk fleet in the Korean market have been lower than those of trampships in the world market in recession periods. (It seems also probable even in times of freight rate prosperity that, because of the monopsony and/or oligopsony elements present, freight rates of the Korean dry bulk fleet in Korean trades were lower than they would have been in relatively free trades.)

To summarise this section briefly, we can say that, in contrast to the traditional pricing of trampships, short-term (spot) freight rates in the Korean dry bulk shipping market were governed by shifts in supply and for this reason were argued to be normally lower than those in the world tramp shipping market in times of recession. (In this case, however, it is

reasonably assumed that Korean operators have generally speculated that implicit or expected freight rates for Korean dry bulkships in the world market were relatively lower than those in the Korean market.)

5.5 Summary

This chapter has discussed the strategic behaviour of Korean operators. We have ranged rather widely over the very diverse literature on firms' behaviour. We, then, went on to examine the relationship between the behaviour of Korean operators in the Korean market facing various imperfections and that of trampship operators as a whole in the world market. Our main conclusions are as follows :

1) It has been indicated from, for example, the SIRP of 1984 that profits were rarely maximised and that maximum profits were not directly pursued by Korean operators. Evidence shows that the government played an active role to prompt Korean operators to pursue government's own objectives, (among which were to achieve target capacity and freight revenue,) at the expense of Korean operators' short-term profit objective. In fact, Korean operators' strong desire for government support gave rise to non-profit maximising behaviour, leading to greater emphasis on pursuit of both revenue and capacity maximisation.

2) Ship investment of Korean operators has mirrored almost exactly world freight rate developments, whilst the global shipping investment cycle followed freight rate movements generally with many significant irregularities. As a result, particularly heavy investments were made by Korean operators in times of freight rate prosperity. This has brought Korean operators a severe burden of high capital costs and hence has

adversely affected the competitiveness of the Korean fleet.

3) Government shipping and shipbuilding policy helped Korean operators use much more debt than their typical foreign competitors, leading to a heavy debt burden which accelerated their unprofitability (especially in a period of depression such as 1982-1983). In consequence, Korean operators as a whole were on the verge of bankruptcy in the early eighties, which eventually led the SIRP of 1984.

4) In contrast to the traditional demand-determined pricing of trampships, short-term freight rates in the Korean dry bulk shipping market were governed by shifts in supply arising mainly from market differentiation, government shipping and shipbuilding policy, and so on. It is argued for this reason that freight rates of the Korean dry bulk fleet in Korean trades were normally lower than those of trampships in the world market in recession periods.

The above conclusions that have emerged from examining the behaviour of Korean operators will provide the basis for the evaluation of market imperfections in relation to the development of the Korean dry bulk shipping industry in Chapter 7.

CHAPTER 6

**AN OBSERVATION
OF FREIGHT RATES**

Market Imperfections
in Korean Dry Bulk Trades

CHAPTER 6

AN OBSERVATION OF FREIGHT RATES

In previous Chapters, we have discussed the mechanism of the Korean dry bulk shipping market, the basic characteristics of the short-term demand and supply of Korean dry bulkship services (Chapter 4), and the strategic behaviour of Korean operators (Chapter 5). The possibility that the Korean dry bulk shipping market might have been distinct from the world market has been noted. Freight rates in the Korean market are, therefore, now explored to see if they support the hypothesis that the Korean dry bulk shipping market functions as a separate market.

This Chapter is organised into two sections. The first section considers charter fixtures in Korean dry bulk trades based on the review of the data reported by MRI annual reports. These data seem rather insufficient, being limited to open market fixtures*, nonetheless we expect to find that they shall provide additional support for the argument relating to the short-term demand and supply of Korean dry bulkship services. The second section examines the correlation between freight rates in the Korean market and those in the world market. It is thereby shown that the two markets had comparatively limited degree of interdependence.

*) Note that 'open market fixture' is a term used here to describe charter fixtures which are concluded normally by chartering brokers and then known to outside parties. In this connection differentiation should be made between our term and that treated by UNCTAD. They, for ease of exposition, treat 'open market fixtures' as covering everything under one year and 'negotiated fixtures' as covering everything over three years. (cf. UNCTAD, 1968, TD/B/C, 4/38, P. 31)

6.1 Shipping Freight Rates and Open Market Fixtures

In Chapter 4 we were concerned with the short-term demand and supply of Korean dry bulkship services in Korean trades, and it is now the purpose of this section to examine further evidence on our argument relating to this matter by observation of open market fixtures completed at various freight rates. However, the term 'freight rate' appears to be used rather loosely, so, before proceeding, we shall take a moment to review briefly the concept of the term in the following.

6.1.1 The Concept of Shipping Freight Rates

The role of freight rates has always been central in economic analysis of the shipping market with special relevance to shipping investment. Despite this, it is often not at all clear what is meant by the term 'freight rate' and it is as well to start by pointing out the difficulties that are inherent in this term

By definition, 'the prices of shipping services are called shipping freights(Shimojo, 1979, P. 40)'. There are a number of freight markets in which a price of shipping services may be made, and it is very likely that different situations require and involve different shipping services. Chrzanowski (1985, P. 84) is very explicit on this point, when he says "The mechanism of fixing freight rates in tramp shipping includes several forms transactions (such as voyage charter, time charter, and bareboat or demise charter)". In practice, freight rates and charter hire rates are very often used as synonymous. In addition there, it is of interest to note that Shimojo(1979, PP. 40-41) expands the concept of the shipping market by

including the newbuilding, and the sale and purchase market and as a result includes contracting and second-hand prices among freight rates. If the shipping market is perfect as a whole, it may be simply true that each of these freight rates will tend to be much the same. In such a case, an economic analysis of the shipping market will yield the same result no matter which kind of freight rates are concerned with. However, as already indicated, there have been considerable market imperfections, with the result that each charter market shows a separation to some extent from the other markets and, as a corollary, has its own development of charter hire. It must be, for this reason, stressed that any economic analysis is bound to be defective approximate unless freight rates are properly relevant to the research.

There is also one other point that should be made concerning the methodology of an economic analysis of the shipping market on the basis of freight rates. Sturmev(1979, P. 206) points this out clearly in his *Ocean Freight Rates and Economic Research**, when he says "the most important methodological question is that of selection of *freight rates* (italics added)". Introducing the question of selection raises an issue regarding the classification of freight rates. Because the shipping market can be divided into several sections, it is difficult to find any explicit classification of freight rates. Sturmev suggests a simple-two-part classification into free market and administered rates.** However, as Sturmev himself

*) This paper was submitted to the Special Session of the Committee on Shipping of UNCTAD in July, 1966.

***) For more details see Sturmev, 1979, p. 209

acknowledges, this simple dichotomy of freight rates is misleading. In the free market, for example, 'there exists a number of particular freight markets each of which is defined by the types of ships employed, their speed and loading characteristics, nature of cargo, ports served, etc. There is a considerable degree of substitution between these markets and the ships employed in them, but each freight market (e.g. coal, grain or iron ore freight market) enjoys a relative distinctiveness from other markets and has its own rate fixing mechanism.' (Chrzanowski, 1985, p. 84) Thus, viewed from such a variety of freight rates, we may say that the choice of method can only be made on the basis of what is practicable. In other words, as Sturmev put it, 'no final statement about methodology can be made until it is clear what information will be available'. This said, we will now go on to discuss open market fixtures in Korean trades.

6.1.2 Observation of Open Market Fixtures

To examine whether there is any further quantitative evidence on our argument relating to the short-term demand and supply of Korean dry bulkship services, we will now look at freight rates and transactions in Korean trades. However, sources from which we can obtain such data are far more limited, since most of fixtures in Korean trades have resulted from either tendering or direct negotiation between Korean charterers (or shippers) and owners (or operators) and, as a result, have normally remained unknown to outside parties. However, this does not deny the possibility that the expertise of chartering brokers of the London and New York exchanges has been used in concluding some fixtures involved in Korean dry bulk trades. Fixtures concluded by chartering brokers have been

normally known to outside parties and for this reason called as open market fixtures. We will, therefore, conduct the investigation in terms of open market fixtures in the following.

Open market fixtures can be obtained from a variety of sources. As far as charter fixtures in Korean dry bulk trades are concerned, the most important is Maritime Research Inc., who provides a large amount of detailed charter fixtures, in particular via Chartering Annuals, which are compiled from the Maritime Research Charter Weekly Newsletter. Thus, with regard to freight rates and transactions in Korean dry bulk trades, the yearly data of freight index and the number of charter fixtures that have been reported in these Annuals are presented in Table 6-1. Note that

Table <6-1> Freight Index and No. of Open Market Fixtures in Korean Trades
(Yearly Data : 1976-1984)

| | MRI Grain | Yoyage Charter Fixtures | | | T. Charter | Total |
|------|-----------|-------------------------|---------|----------|------------|----------|
| | F. Index | K. Flag | F. Flag | Subtotal | Fixtures | Fixtures |
| 1976 | 164.3 | 21 | 96 | 117 | 8 | 125 |
| 1977 | 156.6 | 29 | 98 | 127 | 8 | 135 |
| 1978 | 185.9 | 31 | 94 | 125 | 24 | 149 |
| 1979 | 300.8 | 40 | 67 | 107 | 55 | 162 |
| 1980 | 378.1 | 24 | 42 | 66 | 90 | 156 |
| 1981 | 325.1 | 8 | 37 | 45 | 82 | 127 |
| 1982 | 225.9 | 10 | 51 | 61 | 73 | 134 |
| 1983 | 212.9 | 9 | 69 | 78 | 70 | 148 |
| 1984 | 208.4 | 7 | 49 | 56 | 55 | 111 |

Source : MRI Annual Reports, 1976-1984

Notes : F. Index = Mean Yearly Freight Index

Yoyage Charter Fixtures = Grain, Coal, Ore, Phosphate Rock

K. Flag = Korean-Flag Yessels F. Flag = Foreign-Flag Yessels

We use here grain freight index* as the best candidate for the freight rate. However, as we may infer from this Table, the number of charter fixtures is not so enough as to quantify the relationship between freight rates and transactions in terms of weekly or monthly equivalents. This is particularly so for the voyage charter fixtures related to Korean flag vessels, preventing presentation of empirical approximations to the short-term demand schedule for Korean dry bulkship services on the basis of open market fixtures. However, this should not be taken to mean that open market fixtures in Korean dry bulk trades can not be used at all in the analysis of the market mechanism.

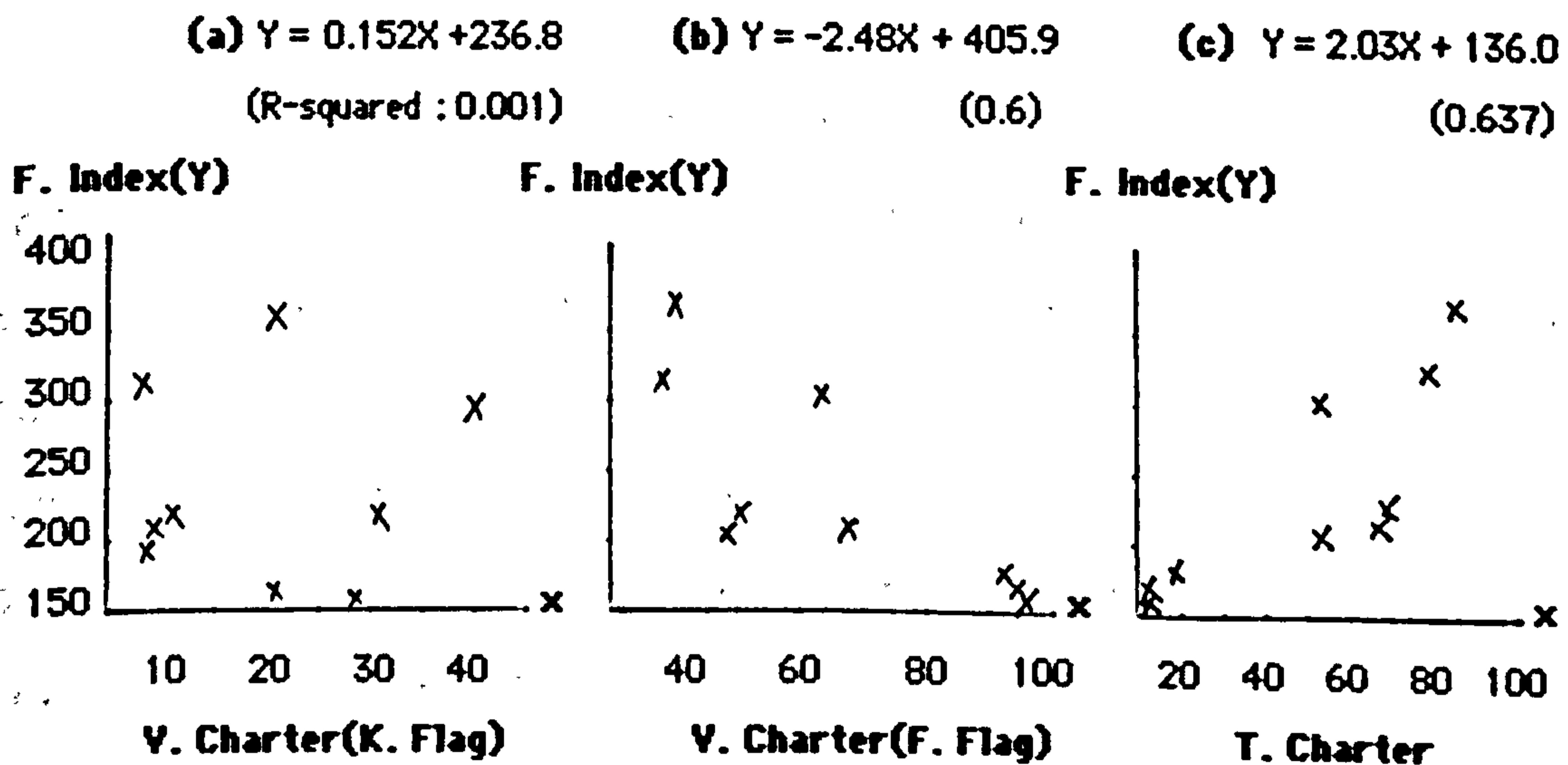
If we define a cycle as the period from trough to trough, the world tramp shipping market (as shown in figure 5-2) went through an almost complete rate cycle during the nine years between 1976 and 1984 that we have examined for this study. This implies that the fixtures in this period cover one complete cycle in terms of comparatively short-term rates. In other words, if we can afford to define our short-term as a period long enough to allow for one complete shipping cycle, then the yearly data of Table 6-1 could be of considerable importance in the establishment of our argument. In order to substantiate this claim we consider once again the yearly data on the charter fixtures. One issue we may wish to consider is of course the extent to which these data are related to movements in the freight index. Thus, correlation analysis was performed on these data, and the results are presented in Table 6-2. (These are illustrated graphically

* MRI publishes five indexes weekly such as General Freight, Grain Freight, Misc. Freight, and Time Charter Index. (For more details see MRI Chartering Annual)

**Table <6-2> Correlation Matrix for Variables :
Freight Index and No. of Fixtures**

| | <u>Voyage Charter Fixtures</u> | | | <u>T. Charter</u> | <u>Total</u> |
|-----------------|--------------------------------|----------------|-----------------|-------------------|-----------------|
| | <u>K. Flag</u> | <u>F. Flag</u> | <u>Subtotal</u> | <u>Fixtures</u> | <u>fixtures</u> |
| <u>F. Index</u> | 0.024 | -0.775 | -0.571 | 0.821 | 0.423 |

**Figure <6-1> Scatter Diagrams of No. of Fixtures vs. F. Index
(Yearly Data : 1976-1984)**



in Figure 6-1, using scatter diagrams) A number of points are worth noting from inspecting this Table.

The correlation coefficient between voyage charter fixtures relating Korean owned dry bulkships (i.e. Korean-flag vessels) and freight index was very small and positive ($r = 0.024$). Thus, given that this value for r is close to zero, we may say that the short-term demand for Korean dry bulkships in Korean trades was not volatile, since any changes in freight rates seemed to have almost little effect on the number of fixtures concluded for Korean-flag vessels.

Secondly, as shown more clearly in Figure 6-1 (b), the number of voyage charter fixtures related to foreign-flag vessels was very strongly inversely related to freight rates. However, this relationship is very difficult to interpret, because we hardly know to what extent Korean operators have involved in these fixtures. However, experience has shown that ironically Korean shippers tended to disclose their requirement to open market intentionally in periods of relatively low freight rates, a result of which was really a cut-throat competition in Korean trades.

Thirdly, time charter fixtures in Korean trades generally increased with freight rates, which resulted in a very strong positive correlation ($r = 0.821$) between two variables. This observation is very consistent with our argument of the negative correlation of the short-term supply of Korean dry bulkships in Korean trades, since the increasing proportion of chartered foreign-flag vessels participating in these trades at times of freight rate prosperity implies the decrement of the actual supply of Korean owned dry bulkships in the short run. Thus, our general conclusion, on the basis of the data on open market fixtures, is that the short-term supply of Korean dry bulkship services in Korean trades was more volatile and quick to change, as we have already effectively shown in Chapter 4.

6.2 Freight Rate Developments and Interdependency of the Korean Dry Bulk Shipping Market

In this section examination will be made of the crucial interdependence between the Korean dry bulk shipping market and the world market, but first it is of interest to consider freight rate developments in Korean trades as a preparatory step to this examination.

6.2.1 Overall Freight Rate Developments in Korean Trades

As already mentioned, the empirical data on freight rates in Korean dry bulk trades are actually unobtainable. However, this does not necessarily exclude the possibility to deduce approximations to freight rates in these trades. For instance, KSA measures mean yearly freight rates in Korean trades simply in terms of revenue per tonne, that is, shipping revenue divided by cargo quantity transported by Korean operators in a given year. In so doing, figures for approximations to freight rates in Korean trades over the period 1976-1984 are presented in Table 6-3. They are then illustrated graphically in Figure 6-2.

Table <6-3> Mean Yearly Freight Rates in Korean Trades : 1976-1984

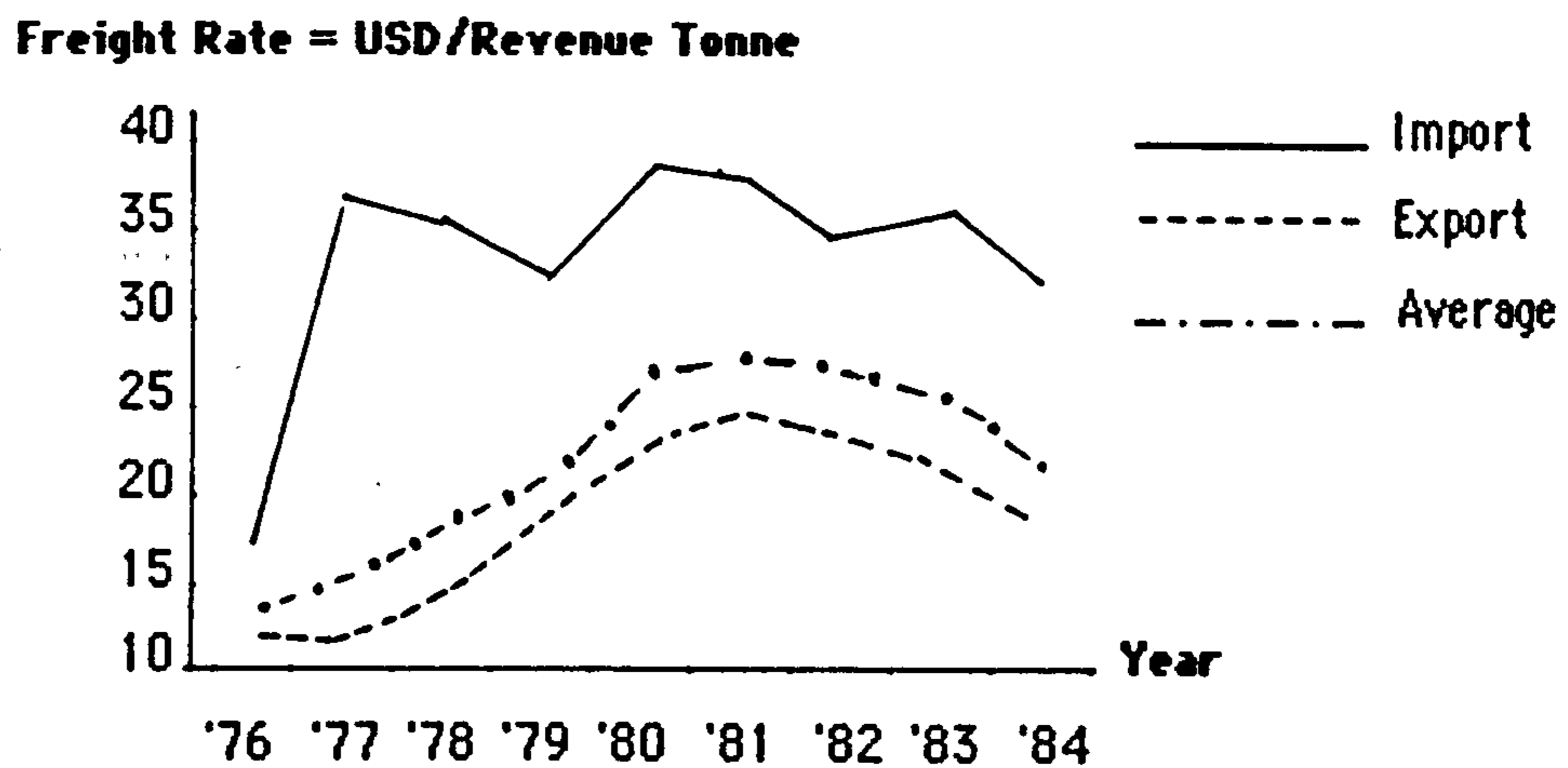
| (Unit : USD/Tonne) | | | |
|--------------------|--------|--------|---------|
| Year | Trades | | Average |
| | Import | Export | |
| 1976 | 17.2 | 12.5 | 13.5 |
| 1977 | 37.2 | 11.9 | 15.7 |
| 1978 | 35.5 | 14.8 | 18.4 |
| 1979 | 32.5 | 18.2 | 20.9 |
| 1980 | 39.1 | 24.4 | 27.7 |
| 1981 | 38.8 | 25.3 | 28.6 |
| 1982 | 35.4 | 24.1 | 27.1 |
| 1983 | 36.6 | 22.9 | 26.1 |
| 1984 | 33.2 | 19.4 | 22.6 |
| Average | 33.9 | 19.3 | 22.3 |
| Stdev | 6.3 | 5.0 | 5.2 |
| CY | 18.5 | 25.7 | 23.4 |

Source : KSA, Reproduced from KMI, 1986, P. 56

Notes : Stdev = Standard Deviation

CY = Coefficient of Variance

Figure <6-2> Overall Freight Rate Developments In Korean Trades
(Yearly Data : 1976-1984)



Looking at the nine-year period between 1976 and 1984, overall freight rates in Korean trades have experienced nearly a complete rate cycle, as we have noticed in the world market. They varied quite substantially from trough to peak, and the highest level of mean yearly freight rate in all trades was over twice as high as the lowest (1972). However, as we shall see in the following subsection, statistical evidence shows that although freight rates in these trades did vary with general fluctuations in the world (tramp) shipping market, they did not follow such fluctuations absolutely. This was particularly so in import trades. (We also face this issue in the following subsection.) For example, as can be seen from Figure 6-2, import freight rates have tended to fluctuate relatively in the very short-term ; during the period we have used for the purpose of this study, they went through three small cycles as they reached a peak in 1977, 1980, and 1983 respectively. By contrast, export trades have experienced only one peak in 1981, similar to that which the world market reached a peak in 1980. It is of interest to note, however, that, despite comparatively

irregular and lumpier fluctuations, the coefficient of variance of freight rates in import trades (i.e. 18.5) is smaller than that in export trades (i.e. 25.7). The reasons for this may be manifold. Among these the most important seems to be the very nature of import trades in which the spot market has been existed only on a relatively small scale. It may be, therefore, justly argued in conclusion that freight rates developments in Korean import trades have been quite different from those in the world tramp shipping market as a whole. With this argument as background, we will now go on to consider the degree of interdependence of the Korean shipping market.

6.2.2 Measuring the Degree of Interdependence of the Market

So far we have made a number of references to the possibility that the Korean dry bulk shipping market have been separated by substantial market imperfections. It is, therefore, now necessary to turn our attention to the measurement of the degree of interdependence between this Korean and the world market in order to show their separateness.

A useful starting point is to examine the degree of the similarity of freight rate movements within the market. 'If we find closely parallel freight rate movements, the loci of the freight rates are in the same market. If we find significant nonparallel freight rates movements, the loci of the freight rates are not in the same market.' (cf. Stigler and Sherwin, 1985, p. 557) In other words, if freight rates in the two markets have a measure of independence in the short run, and that independence is relatively considerable, the two markets are separated each other. (It

should be noted, however, that there is no unique criterion for the level of independence between two freight rate series which determines that they are in the different market.) With this qualification in mind, we shall now analyse freight rate series in the Korean and the world market.

We consider the yearly freight rates in the Korean shipping market and the yearly MRI freight indexes as substitutes for the world's tramp freight rates for the nine year period 1976-1984. Remember that we define our 'short-term' as a period of long enough to allow for one complete shipping cycle. Thus, given data in Tables 4-1 and 6-3 are used to compute correlation coefficients of freight rate movements in these two markets. The results are presented in Table 6-4. These figures are sufficient to show the separateness of the Korean shipping market from the world market. Inspection of this Table reveals a perfect serial correlation ($r = 1$) between two freight indexes in the world market, and viewed from which we can interpret relatively lower serial correlations of freight rates movements in Korean and world market as showing a larger degree of short-run independence of freight rates. More specifically, given that the value for r between two series of Korean import trades and the world market is significantly low (0.457), it is easy to accept the conclusion that the Korean dry bulk shipping market is a very separate entity, distinct from the world (tramp) shipping market. If so, how shall we interpret the fact that the value for r is somewhat higher, although still fairly low ($r = 0.727$) between series in Korean export trades and those in the world market? The direct and reasonable answer is that freight rates in these two markets have a significant measure of independence; but they share major movements of freight rates. (cf. Stigler and Sherwin, 1985, p. 564)

**Table <6-4> Correlation Matrix for Variables :
Freight Rates in Korean Trades and MRI Freight Indexes**

| | <u>Import Trades</u> | <u>Export trades</u> | <u>Average</u> | <u>MRI General F.I.</u> |
|----------------------|----------------------|----------------------|----------------|-------------------------|
| <u>MRI Grain F.I</u> | 0.457 | 0.727 | 0.717 | 1.000 |

In summary, we can say that as a result of market imperfections, freight rate movements in the Korean dry bulk shipping market have not followed those in the world market ; hence the independence of freight rates in the Korean dry bulk shipping market is almost complete in the relatively short-term.

6.3 Summary

This Chapter has focussed upon two issues. Firstly, additional evidence that has been put forward concerning the demand and supply of Korean dry bulkship services in Korean trades was shown to support the argument that the short-term supply of Korean dry bulkship services was volatile and quick to change, whilst the demand was price inelastic. Secondly, the degree of interdependence between the Korean dry bulk shipping market and the world tramp shipping market was examined, and shown to be significantly weak.

CHAPTER 7

EVALUATION OF MARKET IMPERFECTIONS IN RELATION TO THE DEVELOPMENT OF THE KOREAN DRY BULK SHIPPING INDUSTRY

Market Imperfections

in Korean Dry Bulk Trades

CHAPTER 7

EVALUATION OF MARKET IMPERFECTIONS IN RELATION TO THE DEVELOPMENT OF THE KOREAN DRY BULK SHIPPING INDUSTRY

Our discussion so far may be summarised as follows. The Korean dry bulk shipping market has generally been subject to such a degree of market imperfections that its mechanism has become different from that of the theoretical model of the tramp shipping market. Evidence was also presented which suggests that the Korean dry bulk shipping market can be regarded as a separate entity from the world market. The purpose of this Chapter is to evaluate the effect of this imperfect competition in relation to the development of the Korean dry bulk shipping industry. It will be shown that Korean dry bulkships have become unprofitable assets to own in the Korean dry bulk shipping market.

This Chapter proceeds in two sections. In section 1, we will discuss the international competitiveness of the Korean dry bulk fleet. By reference to the low degree of the divisionalisation of Korean dry bulk shipping and its high cost structure, it is established that the competitiveness of the Korean dry bulk fleet has been generally inferior to that of its foreign competitors. In section 2, we consider the arguments relating to the imbalance of supply and demand in the Korean dry bulk shipping market. It is shown that due to the distorted supply function the Korean dry bulk shipping market was very susceptible to overcapacity.

7.1 International Competitiveness of the Korean Dry Bulk fleet

This section analyses the international competitiveness of the Korean dry bulk fleet. In this connection it should be pointed out that, as Spence has rightly noted, "international competitiveness is a difficult subject because it is exceedingly complex. It encompasses policies, competition, and business practice with respect to trade, technology, and regulation. It is also inherently linked to macroeconomic magnitudes like the savings rate and to tax, fiscal, and monetary policies that affect them." (Spence & Hazard, 1988, PP. xxii - xxiii) In other words, it will not be possible to draw simply the rigid definition of international competitiveness covering all these components. By this token, we will not attempt a full analysis of international competitiveness. Instead, we restrict our attention to two major components - the divisionalisation of Korean dry bulk shipping, and the cost structure and profitability of the fleet.

7.1.1 Divisionalisation of Korean Dry Bulk Shipping

The divisionalisation of shipping can be looked at in a number of different ways depending on the nature of the classification. It may be examined in terms of the production process relating to shipping services or the structure of ownership, or the nature of the participation of a country in shipping. In the following, we show that Korean dry bulk shipping has a lower degree of divisionalisation in terms of all these categories.

We consider first the production process relating to shipping services. Shimojo, for example, appears to look at the divisionalisation in terms of

this process. As he put it :

"Shipping services consist of three kinds of services, owning, operating and maneuvering the ship. Owning services are rendered by the owner, in purchasing the ship, manning the seamen, and procuring the supplies. Operating services to connect the ship with cargo demanded to carry and to arrange the necessary services for the transport, are performed by a group of people named operators. And maneuvering of services are rendered by seamen aboard ship to control the ship and its engine and to direct the transport of cargo. These three kinds of services are *the production process of . . . the shipping*. Each service can be obtained by exchange, . . . , and has its price."(Shimojo, 1979, p.27; emphasis added)

The shipping market can be divided broadly into three submarkets. These are the ship chartering market, the cargo affreightment market (which is more often referred as the voyage charter market) and the labour market. The more advance is the development and separation of each market then the higher is the degree of the divisionalisation of shipping. Specific shipping exchanges in traditional maritime countries, such as the London based 'Baltic Mercantile and Shipping Exchange' and 'the Maritime Exchange of New York' etc. where shipping services are bought and sold through chartering brokers as a result of free competition, are good examples of well developed shipping markets. Thus, existence of a large number of chartering and manning brokers in a shipping market and their extensive involvement in concluding fixtures and contracts are the hallmark of the high degree of divisionalisation. In these terms, it can be seen that the degree of the divisionalisation of the Korean dry bulk shipping was very low. This is of course due to the fact that, as we have already indicated, brokers had a limited involvement in the Korean dry bulk

shipping market because of market imperfections and for this reason submarkets have hardly developed in this market.

Next we consider the structure of ownership. As Demsetz(1988, p. 187) stated in his essay on *The Structure of Ownership and the Theory of the Firm*, "the separation of ownership and control in the modern corporation, an issue brought to the fore so effectively by Berle and Means fifty years ago, retains a central position of in recent writings about the economic theory of the firm". However, without delving too deeply into shipping history, we may easily infer that as a consequence of the requirement for large funds, the concept of shared ownership of ships and thereby the separation of ownership and control in the shipping firm trace back to the mid nineteenth century and the beginning of the steam age. The change from wood to iron and steel hulls leading to larger and more expensive vessels saw the rise of shipowning as a separate business based on finance raised through joint stock companies - many leading shipping companies of the present day can trace their origins to this time.(Sloggett, 1984, P. 1) As Sloggett points out 'the joint stock limited liability company is a quite separate legal entity from the individuals who own and control it. The funding and operation of such companies is controlled by legislation(ibid.)'. In the early stage of development of limited companies the holders of company stock still had large control over his resource, since most companies were private ones ; a private company has a limited number of shareholders and for this reason can be easily controlled by them. However, these private companies have been forced to 'go public' by turning themselves into public companies because a limited number of

existing shareholders were not able to provide additional funds for acquisition of very expensive modern ships. (Recall that the private company is not allowed to advertise its shares to the public.) In contrast with the private company, the holder of the public company's stock experiences a significant loss of control over his resources because ownership is so broadly dispersed across large number of shareholders. For this reason, we can safely argue that the public company of modern corporation is a more divisionalised form than the private company. However, such divisionalisation resulting from the separation of ownership and control has been rarely achieved by Korean operators who could obtain domestic financing through government shipping and shipbuilding policy programmes. In other words, Korean operators who, as Table 5-16 shows, were capable in principle of supporting more debt finance than their foreign competitors did not need to go public for additional funds. As a result, most Korean shipping firms took the form of private companies and for this reason have been less divisionalised than their foreign competitors.

Finally, we consider the nature of the participation of a country in shipping. Williamson(1986, P. 151), in his article on *The Modern Corporation*, says that 'three developments are particularly noteworthy in the evolution of the modern corporation in the twentieth century. The first of these was the appearance of the multidivisional organisation. Later developments are conglomerate and multinational corporation.' However, it is more likely that the first of these three developments in the field of shipping was the multinational corporation. According to Holland(1987, P.

14) "Multinational designates activities undertaken by the same companies in different countries. For one thing, all multinational companies are incorporated in some form under the national law of different states and in that sense formally acquire different nationalities." If we accept this terminology, it is possible to conceive of flags of convenience which predate the early 1920s* as a manifestation of the development of the multinational corporation in shipping because the business organisation of shipping concerns operating tonnage under flags of convenience is normally incorporated under the national law of different states. The following passage relating to flags of convenience supports this view :

"The entrepreneur (whether one or more person) creates a Panamanian Company usually for each of his vessels. The Panamanian Company is legally represented in Panama at a certain fee per annum. The Panamanian Company applies to the Panamanian, Costa Rican, Liberian, or Honduras Government (whichever is the case) for the registration of the vessel in question under its national flag. Needless to say that all these formalities can be and are, completed by correspondence from London, New York, Piræus, or Athens. Once a vessel is purchased it can be operated by one or two or more ship-broking offices that act as agencies of the Owners and are located in the above-mentioned cities or in the South of France, East coast U.S.A., and so on."(Metaxas, 1981, p. 157)

In formal terms, flags of convenience are the result of *foreign direct investments by multinational corporations* or independent bulk carrier operators such as Aristotle Onassis or K. Ludwig.(Cafruny, 1987, P. 91; emphasis

*) In 1924, fifteen ships, including several owned by oil companies and passenger ships owned by Averill Harriman, were transferred to Panamanian registry to take advantage of foreign crews.(Cafruny, 1987, p. 91)

added) This implies that flags of convenience entail the divisionalisation of shipping through the participation of a number of different countries.

Cafruny(1987, P. 90) argues that open registries* confer four major types of benefits on shipowners. In descending order of importance, they are: (1) lower labour costs; (2) tax reduction; (3) ability to evade safety and environmental regulations; and (4) freedom from government intervention for political, economic, and military purposes. It has already been seen that the world shipping particularly in liquid and dry bulk sectors has tended to be divisionalised through open registry facilities to obtain these benefits. This is evidenced by the fact that the FOC fleets have grown at a phenomenal rate in last four decades : 'In 1939, about 800,000 grt of shipping was registered under FOCs - just over 1% of the world total, by 1950 over 5% of world shipping was under FOCs, and by 1980 this had increased to over 31%.'(The National Union of Seamen of Great Britain, 1982, p. 4) By contrast, however, most Korean operators have felt less tempted to seek open registries, although some operators used these facilities for acquisition of foreign ships by BBC/PO**. This must be imputed mainly to government shipping policy which excluded the participation of foreign flags in the Korean market by restricting their access to cargo and finance etc. Exclusion of this participation has been associated a lesser degree of divisionalisation in Korean dry bulk shipping and a lower degree of international competitiveness.

*) Note that the term 'flag of convenience' refers to the registration of ships on the "open" registries of countries.(Cafruny, 1987, p. 91)

***) Note that as far as Korean operators are concerned in this case, open registries bear no relation to economic benefits because such benefits normally revert to real owners.

To summarise then, it could be justly argued that due to imperfect competition in the Korean shipping market the divisionalisation of Korean dry bulk shipping was generally neglected by Korean operators. Thus, among numerous detrimental effects which market imperfections has on the industry we may include a reduced degree of divisionalisation and reduced international competitiveness.

7.1.2 Cost Structure and Profitability of the Korean Dry Bulk Fleet

The competitive situation of an operator is largely dependent on his internal cost structure and efficiency of his fleet. Taking this principle as a starting point, we examine the internal cost structure of selected Korean operators and show that their profitability was significantly lower than that of their foreign competitors.

It is very difficult to achieve precise quantification of shipping costs. "This is not just because of the practical difficulties of obtaining access to large quantities of confidential information, but also reflects the variability of shipping costs in relation to external factors such as voyage patterns and exchange rates." (Farrell, 1986, P. 281) It may be for this reason that debates on shipping costs have tended to be qualitative in nature. Recently, however, there have been a number of econometric studies of shipping costs. Tolofari, Button, and Pitfield (1986) have provided an exemplar. Using the translog function*, they examined the detailed cost

*) For details of the transcendental logarithmic (translog) cost function see Christensen & Greene, 1976, 'Economies of Scale in US Electric Power Generation' Journal of Political Economy, 84, pp. 655-656

differences between the traditional maritime nations and those offering open registry, and thereby claimed that, when using the total cost approach, traditional registry ships have costs some 8.7 percent above those of open registries. This figure, however, rises to 23.1 percent when the variable cost function is employed - the main reason for this being that the model reveals that manning in the average open registry ship costs considerably less than the average traditionally registered vessel. This claim of the importance of manning in shipping costs has already been supported by many shipping economists.* Nevertheless, the claim based on the quantitative analysis is, of course, open to criticism both theoretically and empirically. This is simply because any quantitative method 'requires explicit assumptions on various parameters such as ship life, technical conditions of ship exploitation, voyage characteristics etc., and data on cost components such as purchase price, scrap value, and crew and other operating costs'.(de Borger & Nonneman, 1981, P. 80)

Another difficulty in quantifying shipping costs is, as Glen(1987, P. 86) has rightly pointed out, that 'there is no real consensus as to categorisation of shipping costs'. For instance, Korean operators include in capital costs such expenses as acquisition tax, registration fees, customs duties on import of vessels, interest on the contracting price during the

*) See, e.g., Doganis & Metaxas, 1976, *The Impact of Flags of Convenience*, Polytechnic of Central London, Goss, 1985, "Social Costs", *Transfer Payments and International Competition in Shipping*, Maritime Policy and Management, 12, pp. 135-143, Metaxas, 1985, *Flags of Convenience*, Gower Press, and Tolofari, 1987, *Open Registry Costs and Freight Rates: Are they Related ?*, *International Journal of Transport Economics*, Feb., pp. 85-103.

construction period, management fee for the loan, brokerage, and other incidental expenses for the delivery of vessels, whilst others do not. In addition there, the classification of shipping costs is also problematic. Since there exist large variations in classifying shipping costs*, it is almost impossible to define any sort of standard cost to be matched between different companies, still less between different countries.

For reasons mentioned above and the lack of comprehensive statistics on shipping costs, what can be done is here to compare individual cost items between selected Korean and Japanese operators as shown in Table 7-1 in order to see a general indication of their significance of the cost structure. (Note that the accounting system of Korean operators is very similar to that of Japanese operators.) From this Table we observe many considerable differences in the cost structure between the two countries. Among them three points require special mention. Firstly, in the case of Japanese operators, manning accounted for only 2.9 percent of overall costs in 1984, significantly lower than the 4 percent of Korean operators although the comparison is not direct. This contrasts with a widely held claim in shipping circle that manning is the crucial determinant of the competitiveness of the traditional maritime nations. Secondly, although it has been frequently argued that 'many fleets in developing countries are characterised by high overheads(cf. Farrell, 1986, P. 286)', this does not

*) For a detailed survey of the literature dealing with the classification of shipping costs see Shimojo(1978, PP. 39-42).

**Table <7-1> Comparison of the Statements of Profit and Loss
for Selected Korean and Japanese Operators in 1984**

| | *) <u>Korean Operators</u> | | <u>Japanese Operators</u> | |
|---------------------------------|----------------------------|------------|---------------------------|------------|
| | Bil. Won | % | Bil. Yen | % |
| Total Revenue | 1,080.4 | 100 | 1,985.4 | 100 |
| Shipping Revenue | 1,054.7 | 97.6 | 1,904.8 | 95.9 |
| Other Business Operating Income | 16.8 | 1.6 | 61.5 | 3.1 |
| Special Gains | 8.9 | 0.8 | 19.1 | 1.0 |
| Total Costs | 1,144.4 | 100 | 1,985.5 | 100 |
| Yoyage Costs | 492.8 | 43.1 | 829.7 | 41.8 |
| Manning Costs | 46.2 | 4.0 | 56.9 | 2.9 |
| Yessel Costs(1) | 133.1 | 11.6 | 112.5 | 5.7 |
| (Depreciation) | (79.4) | (6.9) | (85.5) | (4.3) |
| Charter Hire | 238.8 | 20.9 | 604.5 | 30.4 |
| Other Ship Operating Costs | 15.1 | 1.3 | 166.6 | 8.4 |
| Other Business Operating Costs | 0.5 | 0.0 | 0.4 | 0.0 |
| Overhead (Administration) Costs | 44.5 | 3.9 | 90.6 | 4.6 |
| Non-ship Operating Costs(2) | 165.3 | 14.5 | 88.4 | 4.5 |
| Special Loss | 7.0 | 0.6 | 23.6 | 1.2 |
| Taxes | 0.5 | 0.0 | 12.3 | 0.6 |
| Net Profit after Taxes | -64.0 | | -0.1 | |

Source : Adapted from KMI, 1987

Notes : 1) Yessel Costs = Store, Lube Oil, Repair & Maintenance, Insurance, Depreciation

2) Non-ship Operating Costs = Interest and Discount, Deferred Foreign Exchange Losses, and Gurantee Fee etc.

*) Korean Operators = Pan Ocean, KSC, HMM, Choyang, Korea Line, Hanjin

Japanese Operators = NYK, K-line, YS-line, J-Line, MOL

appear to the case in Korea. In 1984 overheads of Korean operators accounted for 3.9 percent of total costs, while it accounted for 4.6 percent in the case of Japanese operators. Thirdly, the proportion of Korean

operators' non-ship operating costs (such as interest payments, discount expenses, gurantee fees, and deferred foreign exchange losses etc.) accounted for 14.5 percent of total costs in 1984. Suffice to say, this is a significantly high figure when compared with that of Japanese operators (4.5 percent). This high proportion for non-ship operating costs of Korean operators can be attributed to two main factors - firstly, the high leverage of Korean operators - secondly, comparatively high interest rates on their credit. If depreciation of their ships(6.9 percent for Korean owners and 4.3 percent for Japanese owners in 1984) is taken into account in this connection, it can be deduced that Korean operators have been comparatively heavily burdened with capital costs*. As we shall now go on to see, this heavy burden of capital costs is regarded as being the most important factor in assessing the profitability of the Korean fleet.

A direct inspection of Table 7-1 suggests initially that the comparative profitability of the Korean fleet has been lower than that of their foreign competitors. (In 1984 Korean operators had negative net profit, whilst their Japanese competitors kept the balance in the black.) As we have already indicated (in Chapter 5), this poor profitability of the Korean fleet is claimed to be caused by two main factors : these are (i) the short-term market conditions in Korean dry bulk trades, and (ii) structural and managerial problems within the fleet itself. In order to substantiate this claim, we consider two sets of profitability ratios of Korean operators.

*) By definition in financing accounting, capital cost consists of the interest on credit and depreciation. However, in practice this cost is calculated based on discounted cash flow (DCF) techniques, which determines an annual cash expenditure to be spread over the trading life of a vessel. For more details see Drewry, 1984, pp. 15-19.

As the name indicates, profitability ratios give us indication of the firm's efficiency of operation. These ratios are broadly of two types : those showing profitability in relation to sales (i.e. shipping revenue in our case) and those showing profitability in relation to investment.(Yan Horne, 1980, P. 725) We will here only look at the former.

Using the data of Table 7-1, we present the profit margins of selected Korean and Japanese operators in Table 7-2. The gross profit margin tells us the profit of the fleet relative to shipping revenue after deduction of ship operating costs*. The net profit margin relates to the relative efficiency of the fleet after taking into account all costs and taxes. By considering both ratios, we obtain an important insight into the operations of the Korean fleet. As shown in Table below, Korean operators' gross

Table <7-2> Profitability Ratios of Selected Operators in 1984

| | Korean Operators | Japanese Operators |
|-------------------------------|---------------------|-----------------------|
| Gross Profit Margin(1) | 12.15 | 7.04 |
| Net Profit Margin(2) | -6.07 | -0.01 |

Notes : 1) $GPM = [Shipping\ Revenue\ less\ Ship\ Operating\ Costs / Shipping\ Revenue] \times 100$

2) $NPM = [Net\ Profit\ after\ Taxes / Shipping\ Revenue] \times 100$

*) Ship operating costs here include voyage costs, depreciation, manning, stores and lube oil, repairs and maintenance, and insurance etc., but exclude administration. Differentiation should be, therefore, made between this term and the term 'operating costs' which normally relates to five main cost heads such as manning, stores and lube oil, repairs and maintenance, insurance, and administration. For more details see Drewry(1984, PP. 1 - 14).

profit margin (12.15 percent) is significantly above that of Japanese operators (7.04 percent), the difference being more than 5 percent. However, when the net profit margin is employed the figure reverses, both operators having experienced a negative margin. The reason for this of course is that, as can be inferred from Table 7-1, Korean operators have suffered from comparatively high non-ship operating costs. This implies that Korean operators have used debt more aggressively than their competitors and have very much larger interest payments.

Table 7-3 presents the key short-term market conditions. As shown in this Table, although each segment of the Korean fleet has experienced a considerable negative net profit margin in the period under consideration, the comparative unprofitability of the bulk segment has not observed a similar margin of the liner segment. Closer inspection shows that the bulk segment sustained a relatively higher negative profit margin in the recession period of 1982 and 1983. This point provides further support for our argument that freight rates of Korean dry bulkships in Korean trades were, in the short-term, supply-determined and for this reason were significantly non-remunerative in times of recession.

Table <7-3> Net Profit Margin of Korean Operators by Industry Segment :
1980-1983

| | 1980 | 1981 | 1982 | 1983 | Average |
|------------------------|------|------|------|------|---------|
| Liner Operators | -2.8 | 1.6 | -1.2 | -1.0 | -0.85 |
| Bulk Operators | -0.3 | 0.1 | -5.8 | -9.7 | -3.93 |

Source : Reproduced from KMI & TBS, 1985, p. 11-45

To sum up our argument here, there was a considerable difference in the cost structure between the Korean fleet and its competitors. A direct comparison of the aggregate profit and loss statement of selected Korean and Japanese operators shows that Korean performance suffered from comparatively high non-ship operating costs, whilst other costs were fairly similar in proportion. In addition, it was shown again that Korean performance further deteriorated as a result of the short-term domestic market conditions. Thus, on the basis of the foregoing, we may say that the profitability of the Korean dry bulk fleet most certainly did not compare with that of its main foreign competitors.

7.2 Imbalance of the Supply and Demand of Korean Dry Bulkship Services

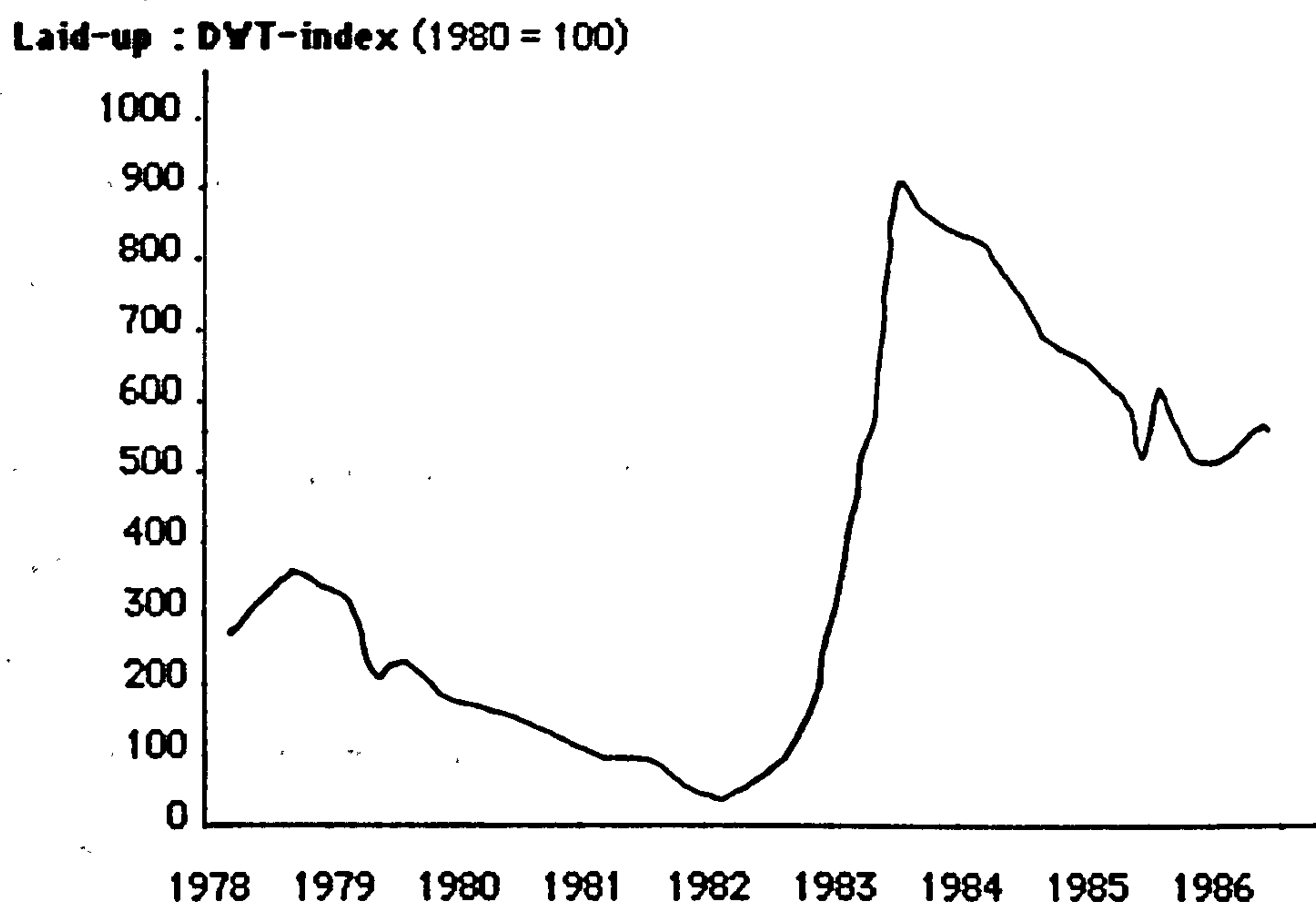
The possibility of overcapacity in Korean trades* has already been noted (Chapters 4 & 5). In this section, as was mentioned in Chapter 4, we pick up the question of lay-up (by which Korean operators could have reduced excess capacity) and show why this has been quantitatively insignificant in the Korean market. We will also discuss some other specific reasons behind overcapacity.

7.2.1 Distorted Function of Reducing Excess Capacity

It is clear that laying-up could play a significant role in the short-run in removing overcapacity from the market. This is brought out more clearly in Figure 7-1. If this Figure is compared with the development of world

*) For more details of overcapacity in Korean trades see also KMI(1985).

**Figure <7-1> Development of Laid-up Tonnage for World
Dry Cargo Ships : 1978-1986**



Source : Reproduced from Institute of Shipping Economics and Logistics, 1987. P. 33

freight rates, it will be seen that lay-ups have been inversely related to the development of freight rates. In other words, laying-up had a significant part to play in decreasing the excessive supply in the world shipping market when freight rates slumped. However, according to information given by KMI, lay-ups have scarcely happened with the Korean dry bulk fleet even in recession periods. As already mentioned, this stems from two main factors : the adoption of non-profit maximising strategy by Korean operators and underdeveloped domestic banking system. (For more on this see 4.2.1.4 of this thesis.) Yet, there are also other possible explanations, which cannot be ignored when trying to show the seriousness of the susceptibility of overcapacity in the Korean dry bulk shipping market. In this context, the concept of laying-up point deserves mention.

Probably the most famous theoretical treatment of the concept of laying-up point is that of A. S. Svendsen(1958) in his article *"Factors determining the laying-up of ships"*. He established for the first time a formula which is used to explore an issue related to the lay-up of ships. In the following we shall attempt to reproduce very briefly his work on it for our purpose.

Accepting a Japanese economist, Shotaro Kojima, Svendsen divides operational costs per voyage into three parts as follows :

f (fixed costs) : interest on ship's original price, depreciation

n (variable navigation costs) : fuel, port costs, cargo handling costs

m (other variable operational costs) : insurance, repairs & maintenance
supplies and stores, administration

m' (operational costs when ship is laid up)* : Insurance, crew wages,
administration. etc.

If we denote freight earnings per voyage by E, the total sailing costs then are :

$$(f + m + n)$$

the operation loss by sailing :

$$(f + m + n) - E$$

and the operational loss by laying the ship up :

$$(f + m')$$

Thus, we have the following relations :

$$(f + m + n) - E \leq (f + m')$$

*) For more on this see *"Laid-up Shipping"* Fairplay, 5 Aug., 1980, pp. 13-17

solving the equation, we get

$$E \geq (m - m') + n$$

This implies that freight earnings E must be greater than or equal to

$$(m - m') + n$$

if the ship is to continue sailing. The laying up point, we may say, is reached when

$$E = (m - m') + n \quad (1)$$

Freight earnings are the product of the ship's cargo Q and the freight rate F

$$E = Q \times F \quad (2)$$

The cargo capacity can, of course, be utilised to a greater or lesser extent. During a freight depression there will be a ruling tendency for ships to go with only part-full cargoes. If we combine equations (1) and (2) we get

$$F = \{(m - m') + n\}/Q$$

Two points arise from this equation in connection with our argument. Firstly, if Q diminishes, the numerator will not diminish to the same extent as it is only certain of the cargo handling expenses, etc., which are directly dependent on the volume of cargo. F will, therefore, grow when Q becomes smaller, i.e., the operators' claim with respect to a minimum freight will rise. In other words, the laying up point of the ship will vary initially according to the quantity of cargo available to the vessel. If it gets a full cargo, the ship can bear lower freight rates. The laying up point will then lie of its lowest point. This factor is important in Korea because Korean operators can secure relatively full cargo under the policy of cargo reservation. Secondly, The laying up point of the ship will vary significantly according to the crew costs, since these are avoided when the ship is laid up without crew. Thus, the lower are crew costs then the

smaller is the difference between the variable operational costs (m) and the costs when ship is laid up (m') and the lowest is the laying up point. If the shipowner has to pay all the officers and the seamen who have sailed with the company for many years, the laying up point will further decrease. In these respects, the laying up point of the Korean fleet is lower than that of foreign competitors partly because the wages of Korean crews are lower than those of traditional maritime nations and partly because Korean crews are in many cases employed for life. Thus, in view of the comparatively lower laying up point of the Korean fleet in recession periods, we can say that withdrawal of excess capacity in the Korean dry bulk shipping market has been less active than that in the world market. (However, as recalled from the fact that the fixed costs such as interest on credit and depreciation are excluded from factors determining the laying up of ships, the lowness of the laying up point should not be taken to mean that the Korean dry bulk fleet is more competitive or profitable than its competitors.)

With regard to the distorted market response to reducing excess supply in the Korean dry bulk shipping market, there is one final point that should be made. As Svendsen(1958) and Zannetos(1966, P. 184) have noted, it might be that Korean operators operate ships even if freight rates were below the laying up point because of a prestige factors - that the owner will hide his difficulties. As Svendesen put it :

"This can be attributed to the fact that he is afraid for his credit and fears strong pressure if it should become known that he has to lay up his ship. Laying up will mean that the ship will not possess any great value above the breaking-up value so that prospective mortgages will probably claim extra security. Laying up calculations will, therefore, always be influenced by strongly subjective factors" (Svendsen, 1958, P. 806)

In summary, it would be fair to conclude from the exploration of factors determining the laying-up of ships that the short-run market response to reducing excess capacity was distorted in the Korean dry bulk shipping market due to various market imperfections, and as a result the market has experienced relatively severe overcapacity in recession periods.

7.2.2 Distorted Function of Supply

As one might expect, overcapacity in Korean dry bulk trades in the 1980s is primarily blamed on the massive expansion of the Korean dry bulk fleet during the boom period 1978-1982.(see Figure 5-3) The main reason of this expansion was, of course, government protectionist policy wishing to expand the national fleet. Another reasons may have been excessive optimism generated by strong shipping booms and excessive confidence in continued high rates of domestic economic growth and trade*. Generous government financing during that period also had a considerable bearing upon the expansion. In addition to all these reasons, however, there are still two important points to be made. Firstly, Korean operators were certainly speculators, possibly even gamblers. Because of the comparatively high levels of inflation suffered by the Korean economy as shown in Table 7-4, it would not be surprising if most Korean operators had rushed in for acquisition of their own tonnage on a speculative basis. This does indeed appear to be the case although the evidence for this is largely indirect and circumstantial. Secondly, the monopsonistic power

*) It is noted that domestic real GNP has achieved an annual growth rate of 9.5 percent and the trade volume increased at a rate of 18 percent per annum during the 1970s.

Table <7-4> Annual Inflation Rates : 1978-1981
(Percentage Annual Change in Consumer Price Index)

| | 1978 | 1979 | 1980 | 1981 | Average |
|----------------|------|------|------|------|---------|
| Korea | 14.4 | 18.3 | 28.7 | 21.3 | 20.7 |
| U.K. | 8.3 | 13.4 | 18.0 | 11.9 | 12.9 |
| U.S.A. | 7.5 | 11.3 | 13.5 | 10.4 | 10.7 |
| Germany | 2.8 | 4.1 | 5.5 | 5.9 | 4.6 |
| Japan | 3.8 | 3.6 | 8.0 | 4.9 | 5.1 |

Source : Drewry, 1984, P. 26

and thereby dominant position of big Korean shippers over Korean operators has contributed extensively to the rapid growth of large dry bulkers in the early 1980s.(see. Table 2-15) As we have already seen, the volume of Korean dry bulk seaborne trade had continued to grow during the 1970s. In order to match such increase safely, there has been a ruling tendency for Korean big shippers to enter into a proprietary ship contract. For this reason, many Korean operators who were confident of the future acquired a large number of panamax bulk carriers without securing prior contracts, the result of which was a overcapacity in Korean dry bulk trades. Thus, on the basis of the foregoing, it may be stated that the overall functions of supply in the Korean dry bulk shipping market were also distorted due to various market imperfections, which led to overcapacity in the market in the 1980s.

7.3 Summary

We can draw two conclusions from the work reported in this Chapter. The first concerns the international competitiveness of the Korean dry

bulk fleet and the second relates to its susceptibility to overcapacity. It is clear that the Korean fleet was inferior to its foreign competitors, although the precise extent of this is very difficult to determine. This stems from two main sources - firstly, the lower degree of the divisionalisation of Korean dry bulk shipping - secondly, the comparatively higher cost structure and lower profitability of the fleet. Turning to the second issue, the evidence supports the view that the Korean dry bulk shipping market was particularly susceptible to overcapacity. It is shown by the exploration of factors determining the laying-up of ships that the short term market response to reducing excessive capacity was distorted. On the other hand, it is noted that the overall functions of supply in the Korean dry bulk shipping market were also distorted due to market imperfections. Thus, in the light of the conclusions above, it may be safely argued that Korean dry bulkships have become unprofitable assets to own in the Korean dry bulk shipping market.

CHAPTER 8

IMPLICATIONS OF THE THESIS

Market Imperfections

in Korean Dry Bulk Trades

CHAPTER 8

IMPLICATIONS OF THE THESIS

In this final Chapter the question we have raised in Study Objectives is considered in the light of the findings in this thesis. To recap, the fundamental question is :

Is internationalism, as one of Korean shipping policy objectives, desirable for the future development of the Korean shipping industry ?

Before proceeding, we will briefly summarise our findings. Then, given the findings, government shipping policy instruments are re-examined to see how they should be re-interpreted in relation to the above question. We conclude with a statement on the implications of the thesis for future research.

The thesis has argued that maritime economists' traditional assumption of a perfectly competitive structure for the (world) tramp shipping market was inapplicable to the Korean dry bulk shipping market. More specifically, we have tried to argue that the Korean market is a separate entity, distinct from the world market which is generally considered to be a fairly open one.(Chapter 2)

In Chapter 3, Sturmev(1962), Zannetos(1966), and Metaxas(1971) in particular were examined, because they were considered to be exemplars of those economists mentioned above. It was shown that the Korean dry bulk shipping market contained significant market imperfections, which

invalidate the traditional assumption of a perfectly competitive structure. Those market imperfections were summarised under three general categories. First, the market has been subject to *inherent market imperfections*: it was differentiated by the three distinctive segments such as service, size, and geography; information was imperfect and Korean operators were not price takers, they were price bidders. Second, there existed various *barriers to competition* in the market that reduced the number of (most probably foreign) competitors. It was noted that the requirements of Korean shipping business for licenses and registration of Korean ships were stringent legal restrictions for foreign operators constituting barriers to entry into the Korean market. In addition, cargo reservation and restrictive provisions regarding time chartering were significant policy restrictions that have prevented foreign flags from entry into Korean trades. Third, the market has been subjected to *unequal competition* not only between Korean- and foreign- flag vessels but also between Korean operators themselves. It was noted in particular that 'rate preference' was the most significant source of unequal competition in the market. This refers to a government intervention in pricing, seeking higher rates for Korean-flag vessels. In the light of all the above mentioned market imperfections, the principal patterns of market behaviour in the market were discussed. It was indicated that monopsony, oligopsony, and oligopoly have overlapped in the market.

Chapter 6 provided further support regarding the invalidity of the traditional competitive market assumption in the Korean market. We showed that the correlation coefficient between the yearly mean freight

rates in the two markets for the nine-year period 1976-1984 was significantly low. Therefore, as Stigler and Sherwin(1985) have effectively done, we can safely argue that the independence of freight rates in the Korean dry bulk shipping market was almost complete in the relatively short-run; hence the market was a separate entity from the world market.

With the above qualifications in mind, the difference between market function in the Korean dry bulk market and that predicted in the literature was analysed in Chapters 4 and 5. It has generally been argued that freight rates of trampships are governed by changes in demand.(see Sturmev, 1979; Bennathan & Walters, 1969, and Metaxas, 1979 etc.) In contrast, however, it was shown that despite a number of barriers to competition, the short-term supply of Korean dry bulkships in Korean trades was volatile and quick to change. More specifically, it was suggested that the demand for Korean dry bulkship services in Korean trades was price inelastic in part because of the inelastic nature of the demand for Korean dry bulk cargoes, in part because of the relatively small importance of freight rates, and in part because of government shipping policies. On the other hand, it was shown that the over all supply of Korean dry bulk shipping services was very price elastic. Interestingly enough, it was observed that the short-term supply of Korean dry bulkships in Korean trades was negatively correlated with (world) freight rates. This observation called into question the application of the traditional demand-determined pricing model of trampships to the pricing of Korean dry bulkships in Korean trades. Put simply, the thesis has argued (in Chapter 5) that freight rates of Korean dry bulkships in Korean trades were, in the short-run, supply-determined,

based on a different view of market behaviour, a view which postulates shifts in supply as the governing factor for short-term pricing.

Chapter 5 discussed the characteristic behaviour patterns of Korean operators. It was shown that market imperfections have produced strong manifestations of non-profit maximising behaviour. The main points here are summarised as follows. Firstly, it was indicated that the desire for government support gave rise to non-profit maximising behaviour, leading to greater emphasis on pursuit of both revenue and capacity maximisation. There is, however, one important qualification to be made. It was implied that profits were no longer a constraint for Korean operators in following the policy of maximising their revenue. This strongly contrasts with Baumol's sales revenue maximisation model that assumes some minimum value of profits as a constraint. Secondly, it is generally noted that ship investment of Korean operators has mirrored almost exactly world freight rate developments, whilst the global shipping investment cycle followed such movements only generally with many significant irregularities. This has brought Korean operators a severe burden of high capital costs. In addition, there are at least three points that should be highlighted, which are as follows :

1. It seems probable that the government prohibition of acquisition of newbuildings built at foreign yards and the limited availability of domestic finance for newbuilding generated Korean operators' heavy reliance on purchases of second-hand vessels to expand their capacity particularly in periods of freight rate prosperity.

2. It was noted that ship investment of Korean operators was weakly

related with their income situation and for this reason is assumed to be connected with non-profit maximising behaviour in the short and medium term at least.

3. It might well be arguable that the over all ship investment of Korean operators has little association with technological development and this was a major factor in the structural weakness of the Korean fleet.

Thirdly, It was shown that Korean operators used more debt than their typical foreign competitors. The main reasons for this, as we argued, lie in government shipping and shipbuilding policy. The thesis has argued that such policies have led Korean operators into a particularly heavy debt burden which accelerated their unprofitability, sealed the bankruptcy of many Korean operators in the early 1980's and eventually led the SIRP of 1984. Fourthly, as was mentioned above, it was argued that short-term freight rates in the dry bulk shipping market were governed by shifts in supply and for this reason were normally lower than those in the world tramp shipping market especially in times of recession.

Finally, Chapter 7 evaluates the effect of market imperfections in relation to the development of the Korean dry bulk shipping industry. It is noted that various market imperfections have resulted in the lower degree of the divisionalisation of Korean dry bulk shipping, in the higher cost structure of the Korean fleet, and in the higher degree of the susceptibility to overcapacity in Korean trades. Thus, the conclusion reached here is that Korean dry bulkships have become unprofitable assets to own in the Korean dry bulk shipping market.

Attention is now turned to the re-examination of government shipping policy instruments. Subsidy and flag discrimination are often operated together in many countries.(see Sturmev, 1979, pp. 180-183) However, as indicated above, Korea has by and large resorted to flag discrimination, including cargo reservation, and rate preference etc. The main reason may have been the incapability of the Government to afford subsidies. It must be pointed out in this connection that 'subsidies are generally possible only for a relatively rich country with a well-developed civil services' (ibid). The aims of flag discrimination may be manifold and need not be repeated here. The particular point of interest here is the arguments concerning the cost implications of flag discrimination. As Farrell(1986, P. 279) pointed out, most of the criticism of this instrument has been focused on its potential for increasing shipping costs to the consumer. Sturmev goes on argue that flag discrimination is not cheaper than subsidies but the cost is carried through the pricing system, not through taxation. He further adds : "Any country adopting complete flag discrimination would immediately find that freight rates rose by about 50 percent as a result of the additional ballast voyages required. Rates would not double because voyages in ballast or with part-loading regularly occur at present. If the fleet was uneconomic there would be an additional rise depending of the extent to which costs in such countries were excessive by international standards. These rises would affect both real costs and money rates." (Sturmev, 1979, p. 199) However, this claim that increased costs resulting from flag discrimination lead to a rise in freight rates (and hence are transferred to shippers) is not well confirmed in the Korean dry bulk shipping market where, for instance, a relatively limited number

of shippers exist so that monopsony and/or oligopsony characteristics influence the market. As we have already seen, in the Korean dry bulk shipping market flag discrimination has led to over-tonnaging, increased competition and lower freight rates. Another point which needs to be stressed here is that in Korean trades flag discrimination itself has not brought cost immediate increase. Farrell(1986, PP. 279-180), for instance, claims that cost increases occur for following four main reasons :

1. The directional cargo imbalances arising from segmentation of the market : a refusal to allow vessels to compete for traffic on certain legs of their voyage is likely to increase the frequency of ballast sailing and increase the number of vessels required to service a given volume of trade.
2. The substitution of high-cost local shipping lines for low-cost foreign ones : if local shipping lines were as efficient as foreign ones, it is argued, they would already have captured the business without the help of cargo reservation laws.
3. The creation of monopolies and their exploitation of the consumer : in the case of domestic shipping lines, removal of the threat of foreign competition may open up for the first time the opportunity for profitable collusion, whilst the separation of foreign shipping lines on a route-by-route basis also increases their monopoly powers.
4. it is widely accepted that constraints on competition reduce the incentive to innovate and implement technological change.

However, it could be reasonably argued that this claim, except for item 4, is simply unrealistic when applied to the Korean dry bulk shipping market. The reasons for this are as follows. Firstly, in contrast to most of the argument, a refusal to allow foreign vessels to compete in Korean

trades has not always increased the frequency of ballast sailing ; so far as the Korean fleet alone is concerned, it has rather brought relatively increased output (e.g. see Table 4-3). This is attributable to two main reasons. The first is that cross trades have been quite open for Korean operators. It may even be thought that Korean operators who operate their vessels in cross trades can easily enter into Korean trades to reduce ballast sailings by flag discrimination. The second is that due to differentiation such as in size and service etc., substitution between certain vessels across routes has become less significant. This implies that certain specialised vessels could have improved performance through cargo reservation in their own routes. Secondly, it may be also said that the substitution of some low-cost local shipping lines for high-cost foreign ones could happen and thereby bring lower freight rates. Although little empirical evidence has been available, it is quite clear that this has really happened in certain Korean phosphate and ore trades by the introduction of cargo reservation in these trades. Finally, it is possible, but most unlikely in Korean dry bulk trades that the creation of monopoly has increased shipping costs; it was frequently witnessed that removal of the threat of foreign competition in Korean trades has led to ruinous competition among Korean operators rather than opening them up for profitable collusion. In summing up the above considerations, it should be reiterated here that flag discrimination in Korean dry bulk trades is unlikely to produce a good policy, not in the sense of its potential for increasing shipping costs to the consumer, but in the sense of its potential for over-tonnaging, and thereby increased ruinous competition and lowered freight rates to the Korean operator. This said, we will now go on to consider our ultimate question.

The economic role of shipping, and of sea transport in general, cannot be overestimated.(Chrzanowsky, 1985, P. 98) This is particularly so for Korea due to two main factors - firstly, hostilities between the divided two Koreas - secondly, the structure of its foreign trade which largely consists of imports of raw materials and exports of manufacturers. The importance of these two factors has always been reflected in government shipping policy objectives in favour of the national fleet. As a result, over the last three decades, there have been strong nationalistic tendencies in Korean shipping : the word 'internationalism' was a taboo in Korean shipping circles. The rhetoric implicitly assumed of course that nationalism in shipping improved national security. However, the result of nationalism was a catastrophe for the development of the Korean shipping industry. As it developed, Korean shipping policy excluded fair competition in the market. Instead, it provided incentives for Korean operators to maximise capacity and revenue rather than profit. It helped them to be more highly leveraged than their foreign competitors. In recession periods, it encouraged uneconomic vessels to stay in the market, lowering freight rates to rock bottom. Eventually, it led Korean operators to the brink of collective bankruptcy that brought the final hypernationalism of the SIRP of 1984.

A policy of 'internationalism' would imply that shipping companies would seek the trades in which they could most profitably offer their know-how, specialised techniques and vessels(Horn, 1969, P. 246). It is argued here that this would be a more appropriate way to approach Korean shipping policy. It cannot be emphasised too much in this connection that

Korea is one of the leading labour supplying and shipbuilding countries in the international shipping. There are several other reasons why Korea should pursue internationalism in shipping. Firstly, the Korean fleet (especially the bulk fleet) has grown too large to operate simply within national boundaries. To reduce excess capacity, Korean shipping must operate independently of Korean trades. In other words, the greater the extent of cross trading by the Korean fleet, the less should the Korean government engage in practices that could conflict with its own interest. The reason is clear: a cross-trading fleet is likely to more vulnerable to discriminating practices - whether governmental or commercial - and therefore more likely to suffer financial losses as a result. The avoidance of conflicting measures derives, therefore, simply from self-interest.' (Georgandopoulos, 1986, P. 225) Secondly, Korea, with its meagre endowment of natural resources, has no choice but to depend largely on exports for its national economy. Clearly, every exporting country (probably except for Japan) has tended to adopt cooperative attitude towards other countries. In so far as Korean shipping is a crucial link in Korean foreign trade, it should be approached in cooperative way. Last but not least, just as in the case of flags of convenience, we have seen in recent years a great deal of breaking down of nationalistic tendencies in shipping through the international division of labour. A key to concept of 'internationalism' thus lies in its recognition of the extent to which the rise of multinational shipping business has undermined the basis of conventional nationalism in shipping.

We shall now turn to the implications for future research. As suggested

in most research works, the first task must be replicate and extend the research documented in this thesis in order to confirm its validity. This could be done in a number of ways. First of all, the analysis of market behaviour must be undertaken using sufficient cross-section data on freight rates and other variables such as transactions, acquisition, and shipping revenue etc., to test the thesis. Secondly, some detailed econometric studies on demand and supply, investment, and cost differences etc., are required in order to provide support for a number of qualitative arguments. Thirdly, it would be particularly interesting to update the study to determine whether or not the findings in this thesis still hold for the present market. If this thesis is confirmed or at least not refuted, then following studies should be undertaken before any shipping policy can be adopted based on this thesis: (1) past contributions of the Korean fleet to the national economy; (2) costs and benefits of existing regulations in the Korean shipping. These studies must be based on a sound economic analysis, although they are not easily quantifiable in the form of economic indexes. Most past studies were by and large based on intuition and so much for Korean shipping policies as a result.

In conclusion, this thesis has argued that the Korean dry bulk shipping market has generally been subject to various market imperfections and as a result, almost all Korean operators were worse off than they would have been if the market had been an open one. The thesis has already offered a rich set of evidence for this. Although our findings do not itself provide a full justification for international competition, we must accept the need for internationalism if we want to create a vital and dynamic innovative and self-sustaining industry.

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