

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

**COMPETITION AND CONTESTABILITY
IN TRANS-TASMAN LINER SHIPPING INDUSTRY**

**A Research Thesis submitted in fulfilment of
the requirements for the degree of Masters
of Applied Economics at Massey University**

LI, GANG RICHARD

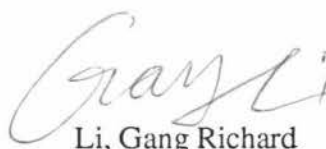
Department of Applied and International Economics

Massey University, New Zealand

1997

STATEMENT OF SOURCES

The work presented in this study is the original and independent work of the author, except where otherwise stated or acknowledged. No part of this work has been previously submitted to Massey University, or any other university, for the attainment of a formal qualification.

A handwritten signature in cursive script, appearing to read 'Gang Li', written in dark ink.

Li, Gang Richard

19 February, 1998

ACKNOWLEDGEMENTS

I would like to take this opportunity to acknowledge the people that have advised, assisted and, contributed to the completion of this thesis.

Firstly I would like to thank my supervisor Dr. Neil Campbell for his invaluable comments, and for his support, patience, and guidance. I will always remember his great enthusiasm to pursue knowledge, and the inspiration I got from it during the course of this study.

Thanks are also due to Professor Cremer, Dr. Bala Ramasamy, Dr. John Gandar, Mr. Brent Kelsen, the Wellington Central Library staff, and particularly the Massey University library staff, for their contributions to my work. My sincere thanks also go to the people that I have interviewed in the New Zealand Ministry of Transport, the Shipping Federation, the Commerce Commission, and the shipping and ports industry. Without them providing useful data, information and advice, this study would not have been successful.

I am especially grateful to my friends, Anne Henderson and Tony Banks, for greatly helpful proof-reading. Without them, I doubt very much that I would have done English writing on my thesis. Thanks also go to staff in the Department of Economics, the Scholarship Committee, and the Research Projects and Funding Committee, Massey University, for their support that helped this study get underway.

I dedicate this thesis to my parents, who have encouraged and supported me to study overseas. They will continue to be a positive and strengthening influence in my life.

Finally, I would like to express all my proudness and happiness being with my dearest Ellen.

ABSTRACT

This study examines competition and contestability in trans-Tasman liner shipping industry for the period of waterfront deregulation. Contestability, often known as a benchmark in markets, is one of the most controversial issues of industrial organization theory. In this study, contestability in trans-Tasman liner shipping industry is analyzed, since this industry had been highly regulated and protected by trade union policy and practice until the recent waterfront reforms.

Using a normative analysis, the study finds that parts of the trans-Tasman liner trade exhibit characteristics of contestability, such as frequent entry/exit, an absence of sunk costs, and pricing behaviour. In contrast to the predictions of contestability theory, actual competition, rather than potential competition has been found to have a substantial effect on market performance. Hence, the study further employs a "Conjectural Variations" model to examine firms' strategic behaviours. The simulation results indicate that since post-deregulation, a period of intensive competition has occurred.

The study suggests that contestability theory may not be robust with small deviations from the assumptions. Instead, contestability theory supplements industrial organization theory with a new device specializing in performance implications of competition. In practice, the study concludes that deregulation has brought very substantial benefits to the shippers and to the national economy. As a result, a new wave of restructuring in the liner shipping industry and in the whole ports/shipping network is just beginning.

TABLE OF CONTENTS

STATEMENT OF SOURCES	I
ACKNOWLEDGEMENTS	II
ABSTRACT	III
TABLE OF CONTENTS	IV
LIST OF TABLES	VII
LIST OF FIGURES	VIII
LIST OF ABBREVIATIONS	IX
 1. INTRODUCTIONS	 1
1.1 TRANS-TASMAN LINER SHIPPING INDUSTRY: A BRIEF OVERVIEW	1
1.2 OBJECTIVES AND STRUCTURE OF THE RESEARCH	3
1.3 COMPETITION AND CONTESTABILITY	4
1.4 CHAPTER OUTLINES	5
 2. THEORIES AND EMPIRICAL ANALYSIS OF COMPETITION AND CONTESTABILITY: LITERATURE REVIEW	 7
2.1 INTRODUCTION	7
2.2 CONTESTABILITY THEORY	8
2.3 COMPETITION AND CONTESTABILITY	17
2.4 EMPIRICAL TESTS ON COMPETITION AND CONTESTABILITY	23
2.5 SUMMARY	27
 3. AN OVERVIEW OF TRANS-TASMAN LINER SHIPPING INDUSTRY	 28

3.1 INTRODUCTION	28
3.2 TRANS-TASMAN LINER SHIPPING INDUSTRY: A HISTORICAL REVIEW	29
3.3 POLICY AND REGULATORY FRAMEWORK IN TRANS-TASMAN LINER TRADE	34
3.4 SUMMARY AND IMPLICATIONS	44
4. MARKET STRUCTURE AND PERFORMANCE IN TRANS-TASMAN LINER SHIPPING: THEORETICAL MODEL, DATA, AND SOME APPLICATIONS	46
4.1 INTRODUCTION	46
4.2 COSTS AND PRICING IN TRANS-TASMAN LINER SHIPPING INDUSTRY	47
4.3 ENTRY AND EXIT IN THE TRANS-TASMAN LINER TRADE	58
4.4 A TEST OF THE CONTESTABILITY HYPOTHESIS	61
4.5 CONCLUDING COMMENTS	67
5. A STUDY ON STRATEGIC BEHAVIOUR: CONJECTURAL VARIATIONS	68
5.1 INTRODUCTION	68
5.2 CONJECTURAL VARIATIONS MODEL	69
5.3 EVIDENCE FROM DEREGULATED TRANS-TASMAN LINER SHIPPING	80
5.4 SUMMARY	84
6. SUMMARY AND CONCLUSIONS	85
6.1 INTRODUCTION	85
6.2 SUMMARY	85
6.3 CONCLUSIONS	87
6.4 FURTHER RESEARCH	89

APPENDICES	90
A. A "CONJECTURAL VARIATIONS" MODEL: <i>N</i> -FIRM CASE	90
B. A "CONJECTURAL VARIATIONS" MODEL: DUOPOLY CASE	92
C. TRANS-TASMAN SHIPPING OPERATORS	93
BIBLIOGRAPHY	95

LIST OF TABLES

TABLE 3.1	TRADE WITH AUSTRALIA	32
TABLE 3.2	CONTAINER FREIGHT CHARGES FROM AUSTRALIA	36
TABLE 3.3	CAPACITY OF DEDICATED OPERATORS IN TRANS-TASMAN LINER SHIPPING	40
TABLE 3.4	TRANS-TASMAN LINER SERVICES AND CAPACITY (TEU)	41
TABLE 4.1	COST OF PROVIDING ADDITIONAL VOYAGE CAPACITY	53
TABLE 4.2	COST OF OPERATING AN AUSTRALASIAN-CREWED CONTAINER VESSEL	55
TABLE 4.3	CAPACITY OF DEDICATED OPERATORS IN TRANS-TASMAN LINER SHIPPING	56
TABLE 4.4	FREIGHT RATE INDICES: 1975=100	57
TABLE 4.5	ENTRY AND EXIT OF TRANS-TASMAN LINER SERVICES (DEDICATED OPERATORS)	59
TABLE 4.6	ENTRY AND EXIT OF TRANS-TASMAN LINER SERVICES (CROSS-TRADERS)	59
TABLE 4.7	MARGINAL COSTS OF TRANS-TASMAN CROSS-TRADERS (\$A PER TEU)	60
TABLE 5.1	ANALYSIS OF CONTAINER-SHIP COSTS FOR A HYPOTHETICAL TRANS-TASMAN SERVICE	74
TABLE 5.2	DATA AND CONDUCT PARAMETERS	77
TABLE 5.3	SENSITIVITY OF CONDUCT PARAMETERS	79

LIST OF FIGURES

FIGURE 2.1 SUSTAINABLE CONFIGURATION IN SINGLE-PRODUCT INDUSTRIES	15
FIGURE 2.2 RELATIONSHIP BETWEEN BERTRAND EQUILIBRIUM AND SUSTAINABILITY	19
FIGURE 4.1 RELATIONSHIP BETWEEN UNIT COSTS AND LOAD FACTORS FOR A SINGLE VESSEL	48
FIGURE 4.2 FLEET ADJUSTMENT AND LONG-RUN COSTS	49
FIGURE 4.3 NORMAL-COST PRICING MODEL	52

LIST OF ABBREVIATIONS

AC	Average Cost
ANL	Australian National Line
ANZDL	Australia and New Zealand Direct Line
AVC	Average Variable Cost
BHP	Broken Hill Proprietary Transport
BTCE	Australian Bureau of Transport and Communications Economics
CER	Closer Economic Relations Trade Agreement
CIF	Costs, Insurance and Freight
DTC	Australian Department of Transport and Communications
FOB	Free On Board
GDP	Gross Domestic Product
LRAC	Long-Run Average Costs
LRMC	Long-Run Marginal Costs
MC	Marginal Cost
MOT	New Zealand Ministry of Transport
MUA	Australian Maritime Union
NVOCC	Non-Vessel Operating Common Carrier
PCM	Price-Cost Margin
P&O	Peninsular and Oriental Steam Navigation Company
P&ON	P&O Nedlloyd Container Line
SPS	South Pacific Shipping
SRAMC	Short-Run Average Marginal Costs
STARCH	Short-Run Average Total Costs
SARCO	Short-Run Average Variable Costs
TEL	Tasman Express Line
TEU	Twenty-foot Equivalent-container Unit
UDL	Union Direct Line

CHAPTER ONE

Introduction

A research agenda for the Transport industry must meet several criteria: 1) it must be relevant to the concerns of the industry participants; 2) the approach to creating knowledge must be systematic; 3) the research agenda should have a strategic focus; and 4) the research agenda must look ahead to deal with issues that will take the industry and New Zealand into the 21st century.

— D. Mollenkopf, 1997, p. 13.

1.1 Trans-Tasman Liner Shipping Industry: A Brief Overview

The cheapening of ocean transport was the most significant factor in the development of international trade (*Containerisation International*, July 1995, p. 52). Since 1870 technical improvements in ocean transport have brought a world-wide trading network. The comparatively modern system of international exchange and specialization was made possible by the advent of the steamship with its ability to maintain regular schedules. Once the goods could rely on regular services to reach its markets, trade became less speculative and more a matter of supply and demand (Branch, 1975).

New Zealand, situated 1900 km from the nearest continent, Australia, is in a peripheral position with respect to world markets. Nevertheless, New Zealand is highly dependent on international trade for its livelihood. Merchandise exports in New Zealand represented 23.9 per cent of GDP in 1996, while imports represented 24.8 per cent of GDP in the same year (NZ Official Yearbook, 1997).

Australia is New Zealand's top trading partner, receiving 20.3 per cent (\$NZ 4,207 million) of New Zealand's exports and supplying 23.2 per cent (\$NZ 4,964 million) of New Zealand's imports in the June 1996 year. Meanwhile, New Zealand and Australia have enjoyed a closer relationship, namely the Closer Economic Relations Trade Agreement (CER), than any other pair of countries in the world. In 1996, exports from Australia to New Zealand (eastbound trade) comprised \$NZ 4,964 million (54 per cent of

trans-Tasman trade) whilst exports from New Zealand to Australia (westbound trade) comprised \$NZ 4,207 million (NZ Official Yearbook, 1997). Even though trans-Tasman trade is split relatively equally between Australia and New Zealand, it is more important to New Zealand than to Australia. Australia is the destination for one-fifth of New Zealand exports whilst the New Zealand market accounts for only 5 per cent of Australia's exports.

In 1996, about 85 per cent of the trans-Tasman trade by value and over 99 per cent by volume were carried by ship. In the case of imports, around 75 per cent by value were carried by sea and the volume was also over 99 per cent (NZ Official Yearbook, 1997, p. 512). Liner shipping is served by shipping lines maintaining regular services between specified ports according to schedules advertised well in advance. Trans-Tasman liner shipping accounts for over three quarters of trans-Tasman sea trade by value. In general, liner services carry containers and cars only. Specifically, the focus of this study will be the container shipping.¹

Trans-Tasman liner shipping was firstly assessed as part of the 1992 full review of the Closer Economic Relations Trade Agreement (CER) undertaken by the governments of Australia and New Zealand.² The CER, signed in 1983 and reviewed in 1988 and 1992, is the most extensive bilateral trade agreement entered into by either country. It aims to rationalise and integrate the economies of Australia and New Zealand by removing barriers to trade in goods and services as well as harmonising business regulations. All goods traded trans-Tasman have been free of tariffs and quantitative restrictions since 1 July 1990. There has also been free trade in most service sectors since 1 January 1989 (NZ Official Yearbook, 1993).

As at January 1992, twelve vessels operated by a total of six shipping companies to carry cargoes between Australia and New Zealand. These services were provided by "dedicated operators" (those operating in the trans-Tasman trade only). Of these vessels, nine were manned by New Zealand crew and the remaining three by Australians. In the meantime,

¹ Without exception, the liner shipping in this study means the container shipping only.

² The joint review of trans-Tasman shipping policy was instigated by the Prime Ministers of Australia and New Zealand in their Joint Statement of 2 July 1990 on Closer Economic Relations (NZ Official Yearbook, 1993). It was conducted jointly by the Australian Department of Transport and Communications (DTC) and the New Zealand Ministry of Transport (MOT).

foreign crewed vessels were excluded from the trans-Tasman trade by trade union policy and practice, in particular by the “Maritime Union Accord”. As stated by the 1992 review, the anti-competitive structure of trans-Tasman liner shipping represented a constraint to the CER. In a policy sense it has been widely accepted that trans-Tasman liner shipping is a service to facilitate trade, rather than being an economic activity on its own right (DTC and MOT, 1992). Therefore, reforms have been conducted in the past few years on both sides of the Tasman sea.

The New Zealand *Shipping Gazette* (Holiday Issue, 1997) indicates that “the ‘Maritime Union Accord’ appears to be in its death throes, heralding greater competition and a major shakedown in trans-Tasman shipping” (p. 2). Currently, it is an open secret in the trans-Tasman shipping industry that foreign-flagged and crewed ships and ‘cross-traders’ (those operating trans-Tasman service on part of a larger international route) have been carrying trans-Tasman cargo, despite the existence of the “Maritime Union Accord”. As a result, in 1997 thirty-seven crosstrading vessels announced to enter trans-Tasman liner shipping market whilst fourteen Australasian crewed vessels provided the dedicated services.

1.2 Objectives and Structure of the Research

Despite continuous scrutiny by public policy makers, there is relatively little economic research into this dramatically reformed industry. The purpose of this research is to fill this gap by undertaking an empirical study of trans-Tasman liner shipping and drawing tentative policy conclusion from it. The analysis in this study will test the hypothesis put forward by economists prior to the reform that productivity would improve with reforms and, in particular, cost factors will display the great improvement.

One hypothesis is that, under shipping regulation,³ the “Maritime Union Accord” (the “Accord”) encouraged and maintained a collusive cartel among shipping firms by limiting competition on routes, prohibiting entry of new ships, and fostering anticompetitive

³ As stated by a senior official of the NZ Ministry of Transport in our interview, trans-Tasman shipping has never been legally regulated. There are no government laws or regulations that prevent the participation of foreign flag ships in the trans-Tasman trade. However, in practice foreign ships were excluded by the trans-Tasman “maritime union accord” (the Accord). Hence, the term of ‘deregulation’ employed in this study means ‘breaking the Accord’.

agreements and consolidations. An implicit corollary is that trans-Tasman shipping deregulation encouraged a competitive market by eliminating regulatory restrictions and collusive activities. In contrast, an alternative hypothesis is that deregulation replaced a public-utility-type regulatory structure and allowed the trans-Tasman liner shipping industry to become highly concentrated and operate as a monopoly.

1.3 Competition and Contestability: Concepts

Because of unsatisfactory data, it is not appropriate to use an econometric methodology. The approach which is taken here involves the use of a detailed case study. As an empirical research in "Industrial Organization" theory, it yields some interesting insights to recover the industry's basic conditions and behaviour. Further, this research is devoted to uncovering the different roles assigned to industrial policy, depending on whether the emphasis is placed on spontaneous adjustment to market forces or on strategic behaviours of firms.

To this end, the methodology used in this research will be based on the theory of contestable market developed by Baumol-Panzar-Willig (1982 and 1986a). A perfectly contestable market is defined as one where: 1) on the production side, entrant and incumbent must be symmetrically placed, being subject to the same regulations, having access to same technology, and being perceived to produce outputs of similar quality; 2) in the technology of production, sunk cost must be absent; and 3) the pricing practices of the market must be such as to prevent responsive pricing by incumbents (Dixit, 1982). When these conditions are satisfied, allocative efficiency, X-efficiency and zero profits will result (Baumol *et al.*, 1982).

In a perfectly contestable market, perfectly competitive performance is spontaneously achieved irrespective of the number of firms present and their scale of production or capital requirements (Baumol *et al.*, 1982). In essence, "the mechanism responsible for achieving this is an omnipresent threat of potential competition" (Spence, 1983, p. 983). In other words, the threat of 'hit-and-run' entry, not actual entry, is the linchpin of contestability theory (Schwartz, 1986).

Davies (1986) applies contestability theory to examine the Canadian shipping experience between 1971 and 1982, and concludes that the theory of contestability has found some supporting facts in the shipping industry. Furthermore, Bailey and Baumol (1984) argue that the concept of contestability could be an eminently relevant analytical tool for regulatory policy. In the same line, this study will look at the present degree of market contestability in the trans-Tasman liner shipping market, and attempt to explore the performance and future prospects of the industry.

Nevertheless, this market mechanism and the concept of contestability have been the target of considerable criticism, especially in terms of realism, robustness and generality (see for example, Brock, 1983; Shepherd, 1984 and 1988). With respect to market equilibria, Shepherd (1984) and Brock (1983) indicate that contestability theory does not employ traditional formulations because its equilibrium conditions are simply generated by perfectly contestable markets. In reality, however, markets are invariably less than perfectly contestable. In addition, Schwartz and Reynolds (1984) argue that contestability theory might only apply for some small neighborhood of costs above zero sunk costs. Beyond this, they expect monopoly prices to prevail. Strategic behaviour models also suggest that prices in concentrated markets may remain high, despite low sunk costs (Fudenberg and Tirole, 1984).

To counter this argument, Grossman (1986) points out that it is important to conduct an analysis on strategic behaviour which could lead to the outcomes predicted by contestability theory. In this respect, reaction functions, conjectural variations and the other concepts traditionally used to analyse oligopoly equilibrium are applicable. Accordingly, this study will further employ a traditional "Conjectural Variations" model to examine market conduct, thereby exploring the relationship between contestability concept and traditional oligopoly concepts.

1.4 Chapter Outlines

The structure of this research is as follows. Chapter Two provides an overview of the relevant literature on contestable market theory. It attempts to address the importance of contestability as a crucial factor which may impinge upon the concept of competition.

Chapter Three presents the descriptive analysis of trans-Tasman liner shipping industry. The focus of this chapter is to provide the trans-Tasman shipping in perspective by examining its history, and its characteristics and performances, in particular with regard to its “deregulation”. Chapter Four applies a normative analysis to evaluate contestability in the trans-Tasman liner trade. Data and some of its implications are also discussed. To explore market conduct, Chapter Five employs a “Conjectural Variations” model to conduct an analysis of firms’ strategic behaviours. A conclusion appears in Chapter Six. It summarizes the results, and discusses further area of research.