

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.

**World Processed Food Trade: A Comparative  
Analysis of New Zealand and  
Selected Exporters**

A Thesis Presented in Partial Fulfillment of the  
Requirements for the Degree

**MASTER OF APPLIED ECONOMICS**

in Agricultural Economics

Massey University

Hamish M. Smith

2000

## Abstract

International trade in processed food products has been a dynamic component of world economic activity over the past twenty years, with the value of world processed food trade more than tripling between 1976 and 1996. Fueling this growth has been recent dietary trends towards higher-valued processed foods, which has been accelerated by rising incomes, urbanisation and demographic and socio-economic factors. In highly developed markets such as the European Union, North America and Japan, consumer ready processed goods make up a large and growing share of the food and agricultural imports. Consumer ready processed goods are also making inroads in developing countries as consumers demand convenience foods such as frozen 'ready-meals' and evening 'meal solutions.' Despite this, most agro-food trade research has been concentrated on the trade in bulk commodities (non-processed food products).

This research evaluates the performance of New Zealand's processed food exports, relative to the performance of five other leading processed food competitors. Combined with revealed comparative advantage indices, a constant market share model is applied to the data to determine factors responsible for enhancing or retarding the performance of a focus country's processed food exports.

An important empirical finding is that New Zealand's competitive position in international processed food markets deteriorated over the 1976-1996 period. A combination of declining competitiveness, reduced comparative advantage and a heavy reliance on traditional export markets has eroded New Zealand's share of world processed food trade. The failure to capitalise on the potential offered by Asian markets has also limited the growth of New Zealand's processed food trade. However evidence suggests that since the early 1990s New Zealand has been able to diversify into the fast growing Asian markets and is beginning to increase her competitiveness.

## **Acknowledgements**

There have been several people who have contributed towards the development of this research. Firstly I would especially like to acknowledge and thank my supervisor, Professor Allan Rae for his efforts throughout the duration of this study. His invaluable assistance and guidance is very much appreciated. I would also like to thank Dr Shamim Shakur for his assistance with various aspects of this research and Professor Srikanta Chatterjee for his assistance with the methodology and results sections of this research. A special thanks must go to Mrs Julia Fisher for her enthusiasm and persistence in making me do work.

Finally, I must extend my thanks to all my friends, family, and fellow postgraduate students who have all supported me and have contributed towards what has been an enjoyable and memorable year.

## Table of Contents

	<b>Page</b>
Abstract	i
Acknowledgements	ii
Table of Contents	iii
List of Tables	vii
List of Figures	ix
Chapter One Introduction	1
1.1 Objectives of the Research	6
1.2 Thesis Outline	6
Chapter Two International Processed Food Trade	8
2.0 Introduction	8
2.1 Changing Nature of Processed Food Composition	8
2.2 Growth in World Processed Food Trade	10
2.2.1 World Export Growth of Individual Processed Food Commodities	13
2.3 Processed Food Exporters	15
2.4 Processed Food Importers	17
2.5 Intra-Regional Trade	21
2.6 Protectionism and Processed Food Trade	22
Chapter Three Determinants Influencing Changing Consumption Patterns Towards Processed Foods	25
3.0 Introduction	25
3.1 Consumption Effects Due to Changes in Income	26
3.2 The Role of Urbanisation as a Determinant of Changing Consumption Patterns	29
3.3 Demographic and Socio-Economic Developments	31
3.4 Convergence of World Consumption Patterns	34

Chapter Four	Indicators of Export Competitiveness	37
4.0	Introduction	37
4.1	Market Shares	37
4.2	Trade-Share Accounting	38
4.3	Constant Market Share Analysis	41
4.4	Revealed Comparative Advantage Indices	45
Chapter Five	Method and Materials	50
5.0	Introduction	50
5.1	Selection of Export and Import Countries and Regions	50
5.1.1	Export Countries and Regions	50
5.1.2	Export Destinations	51
5.2	The Data	52
5.3	The Method	53
Chapter Six	Comparative Export Performance: Empirical Results	56
6.0	Introduction	56
6.1	ASEAN	56
6.1.1	World Trade Effect	56
6.1.2	Commodity Composition Effect	58
6.1.3	Market Distribution Effect	60
6.1.4	Competitiveness Residual	61
6.2	Australia	62
6.2.1	World Trade Effect	62
6.2.2	Commodity Composition Effect	63
6.2.3	Market Distribution Effect	64
6.2.4	Competitiveness Residual	66
6.3	Chile	67
6.3.1	World Trade Effect	67
6.3.2	Commodity Composition Effect	68
6.3.3	Market Distribution Effect	69
6.3.4	Competitiveness Residual	70

6.4	European Union	71
6.4.1	World Trade Effect	71
6.4.2	Commodity Composition Effect	72
6.4.3	Market Distribution Effect	73
6.4.4	Competitiveness Residual	74
6.5	NAFTA	75
6.5.1	World Trade Effect	75
6.5.2	Commodity Composition Effect	77
6.5.3	Market Distribution Effect	78
6.5.4	Competitiveness Residual	79
6.6	New Zealand	80
6.6.1	World Trade Effect	80
6.6.2	Commodity Composition Effect	81
6.6.3	Market Distribution Effect	83
6.6.4	Competitiveness Residual	84
6.7	Revealed Comparative Advantage Indices	85
6.7.1	ASEAN	85
6.7.2	Australia	86
6.7.3	Chile	87
6.7.4	European Union	88
6.7.5	NAFTA	89
6.7.6	New Zealand	90
Chapter Seven	Summary, Conclusion and Suggestions for Future Research	92
7.1	Summary and Discussion	92
7.2	Conclusion	97
7.3	Future Research	99
	References	101

Appendix A	Processed Food Commodity Aggregate Composition	109
Appendix B	Focus Country's and Regions	110
Appendix C	Frequency of Commodities Recording Above Growth Above the World Growth Rate for Total Processed Foods	111
Appendix D	Frequency of Two-Year Sub-Periods an Export Destination Recorded Import Demand-Growth Above World Demand-Growth By Commodity	112
Appendix E	ASEAN	113
Appendix F	Australia	116
Appendix G	Chile	119
Appendix H	The European Union	122
Appendix I	NAFTA	125
Appendix J	New Zealand	128



## List of Tables

<b>Table</b>	<b>Page</b>
1.1 Percentage Growth of World Exports	2
1.2 Value of SMP Payments	5
1.3 New Zealand Producer Subsidy Equivalents	5
2.1 Individual Processed Food Commodities Annual World Export Growth Rates	13
2.2 Annual Import Demand-Growth for Processed Foods	19
2.3 Percentage of Total Processed Food Trade that is Intra-Regional	21
2.4 The EU's Tariff Reductions on Coffee and Cocoa Imports	23
6.1 Constant Market Share Results for ASEAN's Processed Food Exports	57
6.2 Percentage of Total Processed Food Exports Derived from 'Growth' Commodities	59
6.3 Constant Market Share Results for Australia's Processed Food Exports	63
6.4 Constant Market Share Results for Chile's Processed Food Exports	67
6.5 Constant Market Share Results for the European Union's Processed Food Exports	71
6.6 Constant Market Share Results for NAFTA's Processed Food Exports	76
6.7 Constant Market Share Results for New Zealand's Processed Food Exports	81
6.8 Revealed Comparative Advantage Indices for ASEAN's Individual Processed Food Commodities	86
6.9 Revealed Comparative Advantage Indices for Australia's Individual Processed Food Commodities	87
6.10 Revealed Comparative Advantage Indices for Chile's Individual Processed Food Commodities	88
6.11 Revealed Comparative Advantage Indices for the European Union's Individual Processed Food Commodities	89
6.12 Revealed Comparative Advantage Indices for NAFTA's Individual Processed Food Commodities	90
6.13 Revealed Comparative Advantage Indices for New Zealand's Individual Processed Food Commodities	91

7.1	Summary of the Main Constant Market Share Results for the Six Processed Food Exporters Studied	92
7.2	Summary of Revealed Comparative Advantage Indices for Total Processed Food Trade for the Six Processed Food Exporters Studied	93

## List of Figures

<b>Figure</b>		<b>Page</b>
1.1	Processed Food as a Percentage of Total World Food and Agricultural Exports	2
1.2	Processed Food as a Percentage of Total New Zealand Food and Agricultural Exports	4
2.1	Individuals Commodities as a Share of Total World Processed Food Exports	9
2.2	Annual Growth Rate of World Processed Food Trade and Total World Trade	10
2.3	Food Price Index	11
2.4	Exporters Share of World Processed Food Trade	16
2.5	Percentage Share of World Processed Food Imports	18
6.1	Overall Processed Food Revealed Comparative Advantage Indices	85

# Chapter One

## Introduction

Processed food<sup>1</sup> is a value-added industry, transforming raw agricultural commodities into value-added convenient processed food products. International trade in processed foods has been a dynamic component of world economic activity over the past two decades, due to both demand developments and advances in marketing and distribution techniques. Not only has the growth in the value of world processed food trade more than tripled between 1976 and 1996, but trade in processed foods has achieved the third fastest growth over the twenty year period,<sup>2</sup> behind the rapid expansion of total world trade and the well documented expansion of world trade in manufactured goods (Table 1.1).

In addition to the strong growth recorded by the processed food sector, Figure 1.1 illustrates that processed foods are a growing share of both total food exports and agricultural exports (although processed food products have historically contributed significantly to both total food and agricultural exports, as indicated by Figure 1.1). Athukorala and Sen (1998) point out that this feature of international processed food trade is likely to continue as world consumption behaviour becomes more globalised, and imported food products play an increasingly important role in the consumption patterns of consumers in developed countries and in many developing nations as diets shift towards high-valued and value-added foods.

---

<sup>1</sup> The processed food aggregate used in this study includes both lowly (or crudely) processed foods such as frozen carcass meat and butter and highly processed foods such as chocolate. Also, no distinction is made between different stages of processing. For example, beef sold 'on-hoof' is listed as a raw commodity, but as beef moves further downstream towards the consumer, it is here defined in the processed food category whether it is sold as carcass beef (slaughter), as boxed beef (initial packaging), or as final cut beef (shrink wrapped in grocery display cases) (Henderson, Handy and Neff 1996, p.3). Refer to section 5.4 for a discussion on the processed food aggregate and Appendix A for a complete list of the Standard International Trade Classification (SITC) divisions incorporated in it.

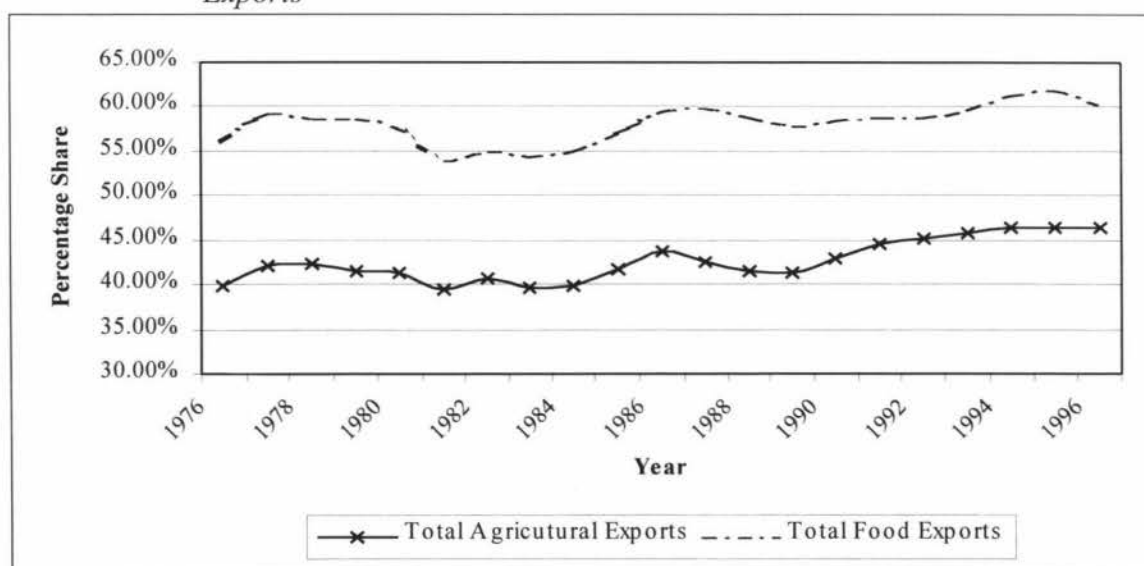
<sup>2</sup> The reader should note that the time period of this research does not incorporate the events of the 'Asian Crisis.'

Table 1.1 *Percentage Growth of World Exports*<sup>a</sup>

	<i>1976-86</i>	<i>1986-96</i>	<i>1976-96</i>
<b>Total World Exports</b>	112.52	148.07	427.20
<i>Agricultural</i>	72.38	104.84	253.10
<i>Manufactured</i>	158.83	166.34	588.56
<i>Total Food</i> <sup>b</sup>	78.51	114.50	282.48
<i>Processed Food</i> <sup>c</sup>	89.28	117.62	311.92
<i>Non-Processed Food</i> <sup>d</sup>	64.33	109.91	244.93
<b>Fuels, Metals, Minerals</b>	27.60	98.94	153.85
<i>Non-Manufactured</i> <sup>e</sup>	46.48	101.79	195.57
<i>Primary Products</i> <sup>f</sup>	37.89	97.43	172.23

- Notes: a. Growth rates are calculated as point growth rates between time period  $X_1$  and  $X_2$ , using the formula  $((X_2 - X_1) / X_1) * 100$ .
- b. Total Food Exports is the sum of SITC divisions 0: Food and Live Animals; 1: Beverages and Tobacco; and 4: Animal, Vegetable Oil, Fat.
- c. As defined by the NAPES database. Refer to Appendix A for a complete disaggregated of SITC divisions included.
- d. Total Food Exports less Processed Food Exports.
- e. Total World Exports less Manufactured Exports.
- f. Non-Manufactured Exports less Processed Food Exports.

Source: *Author's calculations, derived from the National Asia Pacific Economic and Scientific (NAPES) Database, Australian National University (ANU).*

Figure 1.1 *Processed Food as a Percentage of Total World Food and Agricultural Exports*

Source: *Author's calculations, derived from the NAPES Database, ANU*

Notwithstanding the importance of processed food trade and the high value returns that processed foods often provide exporters, research centred around agro-food trade has generally concentrated on the trade in bulk commodities or non-processed commodities. This point was noted by Dayton and Henderson (1992, p.1), who comment that compared to trade in commodities, "...agricultural economists have given relatively little attention to international trade flows in processed foods" (cited in Henderson, Handy and Neff 1996, p.6).

The changing nature of world food consumption patterns away from traditional non-processed foods, to more processed foods, will have important implications for those countries that are major exporters of both non-processed bulk commodities and processed food products. This is particularly so as major exporters of such products reduce trade barriers (e.g., import tariffs and government subsidies paid to agro-food producers) under the recently completed Uruguay Round of the General Agreement on Tariffs and Trade (GATT) negotiations. These reductions should make New Zealand's processed food exports more competitive with foreign produced processed food products in international markets and should also help to lower the prices of processed food products in formerly protected markets, thus increasing the international demand for processed food products.

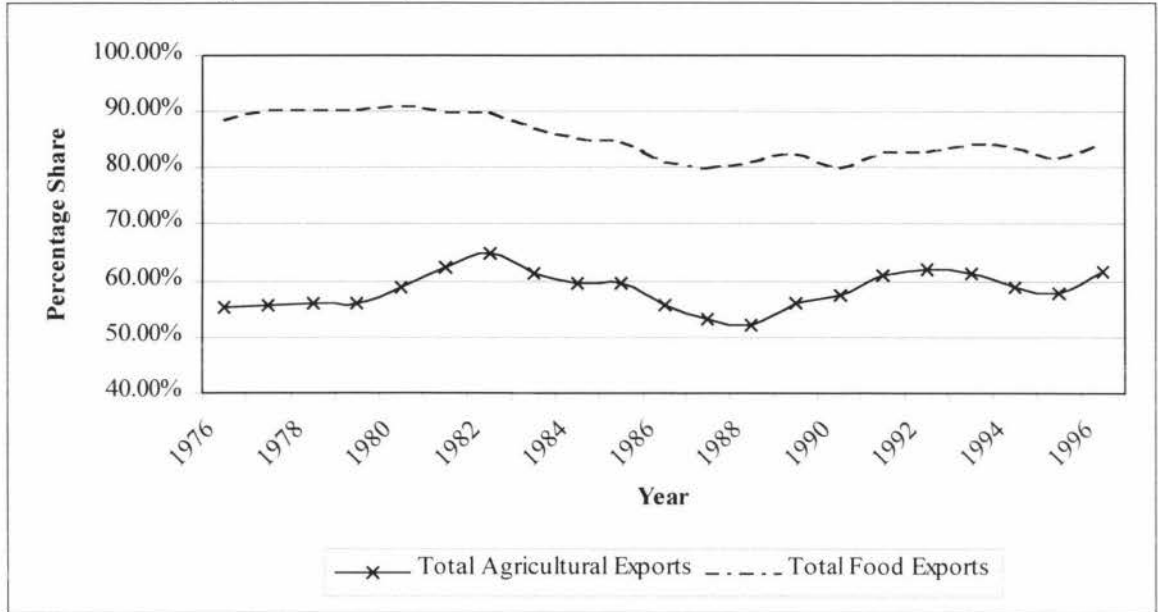
As extensively documented New Zealand has traditionally been regarded as an agricultural producing nation. Due to favourable climatic conditions and resource endowment which are conducive to producing agricultural and agro-food products, the New Zealand economy has for many years been heavily dependant on both agricultural and agro-food products for export receipts. Figure 1.2 illustrates the important role that processed food exports have played in terms of both total food exports and agricultural exports from New Zealand over the past twenty years.<sup>3</sup> An interesting trend revealed by Figure 1.2 is the declining percentage of processed food exports in New Zealand's total

---

<sup>3</sup> The high proportion of processed food exports in New Zealand's total food exports may surprise the reader, given that New Zealand is often considered a commodity trader as opposed to a processed food trader. The reason being is that while agro-food products such as carcass beef, frozen lamb and butter are generally considered to be bulk commodities, because a small amount of processing has taken place from the raw commodity (beef, lamb and milk respectively), they are included in the processed food category. Refer to Appendix A for the processed food aggregate used in this research.

food and agricultural exports between 1982 and 1988, a result that went against the world trend over this period (Figure 1.1).

Figure 1.2 *Processed Food as a Percentage of Total New Zealand Food and Agricultural Exports*



Source: Author's calculations, derived from the NAPES Database, ANU

While world processed food trade expanded by 49.2 percent between 1982 and 1988 New Zealand's processed food exports grew by only 21.8 percent. Contrary to the growth of New Zealand's processed food exports, New Zealand's exports of non-processed foods expanded by 159.3 percent between 1982 and 1988. During the same period, there was only a modest expansion in world non-processed food trade of 26.6 percent. As illustrated by Figure 1.2 since 1987 for total food exports and 1988 for agricultural exports, the declining share of processed food exports has been reversed. Since this time processed food exports have generally exhibited a rising share of both total food exports and agricultural exports. By 1996 however, processed foods share of both total food and agricultural exports had still not reached the levels that were attained in 1982.

One explanation for the declining share of processed food between 1982 and 1988 is that this period of New Zealand's history was characterised by intense economic reforms, particularly in the agricultural sector. One of the main forms of government support to be abolished during this period was the Supplementary Minimum Price

(SMP) scheme. Between 1978 and 1984 the government guaranteed minimum prices for sheepmeat,<sup>4</sup> beef, dairy and wool products. If international prices fell below these minimum set levels the difference in price was paid to producers by the government in the form of a SMP payment.

Until 1982 only minimal SMP payments had been required, but as international agricultural prices fell during the 1980s there was heavy demand on SMPs, particularly from sheepmeat producers, but also from beef producers (Table 1.2). The heavy demand on SMPs and other government subsidies meant that the producer subsidy equivalent (PSE)<sup>5</sup> for New Zealand's agro-food producers began to rise to unsustainable levels. In 1982, the PSE for beef producers peaked at 24 percent. This meant that 24 percent of beef producers' income was generated from government assistance. At the same time the PSE for sheepmeat producers was 36 percent and peaked at 90 percent in 1984 (Table 1.3).

*Table 1.2 Value of SMP Payments (NZ\$ millions)*

	<b>1980</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>
<b>Sheepmeat</b>	0	0	53	183	264
<b>Beef</b>	0	1	43	58	0
<b>Dairy</b>	17	0	0	0	0

*Source: Sandrey and Reynolds*

*Table 1.3 New Zealand Producer Subsidy Equivalents (Percentage)*

	<b>1980</b>	<b>1981</b>	<b>1982</b>	<b>1983</b>	<b>1984</b>
<b>Sheepmeat</b>	15	15	36	84	90
<b>Beef</b>	5	17	24	19	13
<b>Dairy</b>	32	10	17	18	13

*Source: Sandrey and Reynolds*

With deregulation and the abolition of government subsidies, agro-food producers' incomes declined, forcing some inefficient producers out of the industry and others to diversify into more profitable ventures such as forestry and horticulture. Between 1981 and 1991 the New Zealand sheep flock experienced a 21 percent decline,

<sup>4</sup> Sheepmeat also received SMP payments for the 1984/85 season as a transitional measure.

<sup>5</sup> This measure of assistance as defined by Sandrey and Reynolds, includes assistance to output, input and value-adding factors. It is expressed as a percentage of the final value of output.



as sheep numbers fell from 69.8 million sheep to 55.2 million. During the same period the national beef herd declined by 7.8 percent, from 5.1 million to 4.7 million head of cattle (Statistics New Zealand 1997, p.434). This reduction in livestock numbers resulted in less stock being slaughtered, causing a reduction in the amount of meat processing in New Zealand.

An additional factor influencing the decline of processed foods as a percentage of both total food and agricultural exports was the kiwifruit boom to 'hit' New Zealand during the 1980s. Between 1981 and 1991 the number of export trays of kiwifruit rose from 6.2 million to 59.8 million (Statistics New Zealand 1997, p.452). This increase in kiwifruit exports is one explanation for the large growth in the value of non-processed food observed over the 1982-88 period.

### ***1.1 Objectives of the Research***

The main objective of this research is to describe the trends in processed food trade over the 1976-1996 period and to compare and contrast the relative performance of New Zealand's processed food exports with that of other major world processed food exporters. Specifically it will:

- Document the structure and pattern of world processed food trade,
- Identify factors influencing changing consumption patterns,
- Measure changes in major processed food exporters' shares of world processed food trade and comparative advantage,
- Identify sources of growth and determine the influencing factors of New Zealand and her competitors' overall performance in the processed food trade.

### ***1.2 Thesis Outline***

This study is divided into seven chapters. Following the introductory chapter, chapter two examines trade flows and the growth of world processed food trade. Chapter three reviews the changing nature of world consumption patterns, identifying and discussing three major determinants. Chapter four backgrounds different measure of

export competitiveness before chapter five describes the method and issues of data and selection of study countries and regions. The main findings are presented in chapter six. The study ends with a concluding chapter which draws together the main findings of the study and areas of further research.