COMPETITIVENESS OF THE B.C. FOOD AND BEVERAGE INDUSTRY IN THE PACIFIC RIM:
An Empirical Analysis of the Influencing Factors

by

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Abstract

Factors or characteristics which influence the export competitiveness of British Columbia's food and beverage processing industries in the Pacific Rim markets (i.e., Japan, Hong Kong, Taiwan, China: Mainland, Singapore and South Korea) are studied using pooled time-series and cross-sectional data, for the years 1988 through 1992. Changes in exports and in export market share are explained by changes in systematic exogenous and endogenous differences amongst B.C. and competing provincial industries over the five year period.

The results indicate that, converse to what is suggested in the literature, there is no statistical consistency in the explanatory capability of comparative cost, industrial organization, or firm strategy variables to explain competitiveness in Pacific Rim markets. Rather, it appears export success is due to many unique factors at the firm or provincial level. Hence, it is not possible to make generalizations about the competitiveness determinants of these industries in the Pacific Rim markets.

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Dedications

I dedicate this thesis to my mom and dad (in his memory). My memories of their years of hard work and endless love have guided me through many long hours of study and research.

I can only hope to one day be the sort of people they have left impressioned in my heart.

1.0 INTRODUCTION

To the British Columbia (B.C.) food industry, the Asia-Pacific region represents a substantial and significant export market opportunity. Nemetz (1990, p.1) points out that: "with average growth in both Gross Domestic Product (GDP) and GDP per capita well in excess of the world's market economies (UN [1988], 1985/6 Statistical Yearbook:10-11), the Asia-Pacific bloc[1] is viewed as... an engine of growth that will play a major role in sustaining continued global economic expansion".

As the socio-economic conditions in these markets evolve, increased opportunities in trade arise. This would suggest, therefore, that B.C.'s productive and diversified agri-food sectors would stand to gain. The arising market opportunities in the Pacific Rim, however, signal an increase in competition from other (domestic and international) food and beverage industries, vying for shares in these same markets. Hence, there is a need to identify the factors that will influence the "competitiveness" of the B.C. industry in the Pacific Rim.

The term "competitiveness" has been subject to numerous interpretations over the last decade[2]. One commonly cited definition is that of Agriculture Canada's "Task Force on Competitiveness in Agri-food Industries" (1991) which states: "*A competitive industry is one which possesses the sustained ability to profitably gain and maintain domestic and/or export*

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[1] This includes Oceania, ASEAN, the newly industrializing states (NICs), Japan, island states, the People's Republic of China, and the four smaller independent countries of Kampuchea, Laos, North Korea, and Vietnam. (See Nemetz, 1990).

[2] (These are discussed in more detail in Chapter Two.)

market share". Implicitly this definition underscores the objective of identifying factors or characteristics which determine market success.

The current literature is inconclusive as to the factors that influence or determine an industry's ability to obtain and sustain market share, however. Traditional theory rests on the understanding that relative cost differences between trading nations[3], in addition to industry structure variables (i.e., firm concentration and/or economies of scale production) determine industry success. Recent studies by business management schools, on the other hand, point to the importance of business strategies in explaining domestic or foreign market shares or sales. That is, the notion of competitiveness, while rooted in traditional trade theory, extends a step further to consider the influence of *endogeneous* firm strategy variables into the traditionally *exogeneous* comparative cost and industrial organization paradigms. Conceptually, the notion introduces firm-specific cost-reducing, revenue-enhancing, and other business practices into the array of existing trade theory variables.

Despite this recent emphasis of the important influence of business strategy variables, however, firm-specific factors have typically been omitted from empirical analyses. This is largely due to a lack of available firm-level data; for confidentiality and/or feasibility reasons, such data is inaccessible. In the existing competitiveness literature, rather, there are a large number of conceptual models to be found which offer hypotheses on possible determining factors. Alternatively, there are case studies, which, while important for the purpose of identifying those variables pertinent to one or a few firms, do not permit for generalizations across all firms in an industry. In addition, the literature consists of a large number of highly aggregated analyses, which typically analyze the competitiveness of 'national industries' or of

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3. (Or industries or firms.)

nations themselves. Such highly aggregated data, however, makes it increasingly difficult to understand the influence of more firm-specific strategies on market success.

This thesis attempts to address these data limitations, by undertaking an analysis of *regional* (i.e., provincial) *industry* market competitiveness in the Pacific Rim. This approach allows for consideration of those firm strategies which can be discussed and modelled at the regional industry level. Specifically, the study addresses the strategy of developing new products, as measured or represented by the number of new trademarks applied for by individual firms in an industry.

Analysis of five provincial food and beverage industry sectors, in five provinces, over a five year period is carried out. Competitiveness measures are explained by changes in the systematic exogeneous and endogeneous differences amongst related provincial industries.

1.1 Problem Statement

Although significant export opportunities are seen to exist for the B.C. agri-food industry in the Pacific Rim markets, there is nonetheless a lack of understanding of the driving factors behind gaining or maintaining the industry's competitiveness in this region. Specifically, it is unclear whether or not, or to what extent, competitiveness is determined by trade, industrial organization, and/or business strategy factors. Alternatively, it is unclear whether competitiveness is influenced by factors which are exogeneous to the firm versus those that are inherently a part of the firm's endogeneous decision-makings. And, to the extent that endogeneous characteristics may be important, the significance of investment in cost-reducing versus revenue-enhancing strategies on influencing export market competitiveness need to be understood.

1.2 Objective

Employing a matrix of pooled, time-series industry variables, the objective of this thesis is to identify those characteristics or factors which positively influence the competitiveness of the B.C. food industry in the Pacific Rim. The direction of the research will be to extend the neo-classical trade and industrial organization theory variables to incorporate firm strategy characteristics. Hence, both those factors exogeneous, or beyond the influence of the firm, and those endogeneous, or controlled by the firm, are considered.

In order to achieve this goal, the following specific objectives must be met:

- a model must be built which reflects, in addition to traditional factors, the role of cost-reducing and revenue-enhancing strategies undertaken by firms in food and beverage manufacturing industries;
- data required for estimation of the model must be collected;
- the statistically significant competitiveness variables must be identified, using the above model, by estimating the effects of the traditional and non-traditional variables on domestic market sales and export market shares; and the findings must be interpreted in terms of determining what is necessary to foster the competitiveness of the B.C. food and beverage processing industry in the Pacific Rim marketplace.

1.3 Thesis Outline

The outline of the study is as follows. Chapter Two provides an overview of the alternative competitiveness definitions, and outlines a working definition for the purpose of this research. Chapter Two also provides an overview of some of the market conditions in the Pacific Rim and in specific provincial food and beverage industries. The competitiveness

literature, followed by theoretical considerations are reviewed in Chapter Three. Chapter Four then explains the empirical model. This is followed by a discussion of the data, variable specifications and methodology, in Chapter Five. Results and analyses are presented in Chapter Six, and conclusions are given in Chapter Seven.

2.0 OVERVIEW

2.1 Competitiveness Defined

In the current economic literature a certain degree of confusion surrounds the term "competitiveness". The concept lacks a standard, generally accepted definition[4]. Robert Reich (Wall Street Journal, July 2, 1992) is often quoted as having said, "rarely has a term in public discourse gone so directly from obscurity to meaninglessness without an intervening period of coherence." And yet, strictly translated, into its root word, "compete" and suffixes, "ive" and "ness"[5], competitiveness is simply defined as, "the state of having the ability to compete". That is, competitiveness means "being able to compete".

The real confusion behind the term's interpretation, then, rests not in its literal meaning, but rather in its "applied" meaning. The concern of economists and others is to identify the *indicators* that can or should be used to measure "compete," and, on understanding the *factors or determinants* that influence "being able to". Hence, the interest is in developing a "working" definition for use in empirical analyses.

One noticeable stumbling block, upon which much of the confusion seems to have arisen, however, is that different levels of economic analysis (e.g., firm, industry, or nation) typically call for different indicators and determining factors. That is, for example, while balance of payments might be considered an appropriate indicator of competitiveness at the national level, it has little meaning at the firm or industry levels. Hence, it is very difficult to develop one standard working definition for competitiveness if the approach being taken is dependent upon different measures. A range of definitions, rather, is, at this time, all that is

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[4] See Appendix 1 for a list of the different definitions, as outlined in Ash and Brink (1992) and in Abbott and Bredahl (1994).

[5] See *Webster's New World Dictionary*, 2nd Ed., the suffix "ive" means "of or having the nature of"; the suffix "ness" means "state, quality or instance of being".

available for empirical work.

In this thesis the competitiveness definition developed by the Task Force on Competitiveness in Agri-food Industries (Agriculture Canada, 1991) is adopted. As identified in Chapter One, the definition states: *A competitive industry is one which possesses the sustained ability to profitably gain and maintain domestic and/or export market share.* This interpretation, which is employed rather extensively in the literature[6], is considered in this study for a few reasons. First, the interest of this research lies in identifying those factors that will enable B.C.'s food manufacturing industries to gain and maintain market shares in the Pacific Rim. Implicitly, the phrase, "...possesses the sustained ability to...", emphasizes the objective of identifying factors or characteristics which influence competitiveness.

Second, the Task Force's definition includes the phrase "to profitably gain and maintain" market share; this considers the "dynamics" inherent in a market economy. It implies that market share is not a static concept, which is of particular importance given today's market environment of decreasing tariff and subsidy protection. Once an industry obtains or gains a certain market share, its ability to *maintain* that share will determine its true competitive ability. Hence, inclusion of the phrase gain *and* maintain specifies the *necessary and sufficient* conditions of competitiveness.

Third, the terms "domestic" versus "export" (market share) are important and require some discussion. While B.C.'s exports are of primary interest in the research at hand, the province's domestic sales may prove insightful in identifying general competitiveness factors. This view corresponds to the findings of Hazeldine (1994) whereby it was determined that the 1986 growth in the Canadian food and beverage manufacturing industries can be attributed to

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[6] Refer, for example, to Abbott and Bredahl (1994); Ash and Brink (1994); Hazeldine (1994); Ho and Beghin (1994); and van Duren, Martin, and Wesgren (1994).

these industries having developed their domestic markets first. This is to say that the ability to understand domestic market success is likely to have some bearing on our understanding of the factors that influence the competitiveness in the export markets.

Market "share" is also an important component of the Task Force's definition and requires further dicussion. While an industry's (domestic or export) sales might be increasing in absolute terms, the size of the market to which it is selling may be increasing at an even greater rate; thus, the industry's sales could actually be declining in *relative* terms, in which case only the *share* of sales (i.e., as a percent of total market sales) would be considered an adequate measure or indicator of competitiveness. In the absence of adequate market share data, however, total sales or total exports, as competitiveness indicators, may still prove useful for analytical purposes.

Fourth, related to market share notion is the concept of *relative market share*. While an industry's absolute market share may be increasing, this share increase may be very small relative to the market shares of other industries in that export region. The term "relative", then, highligts the need to consider the market shares of competing industries in any competitiveness assessment.

Finally, the Task Force's definition refers explicitly to *industries*, rather than *nations*, which is important given the level of analysis undertaken here. New developments in the trade, and new, or "strategic trade"[7], literatures point to the importance of firm level characteristics in explaining export market competitiveness. Yet, as previously discussed, firm level data is not readily available for empirical analyses. Rather the approach taken in this thesis is to focus on specific industry sectors.

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[7] Trade theory combined with industrial organization theory is referred to as "strategic" trade theory (see Abbott and Bredahl, 1994, p.19).

2.2 Market Overview

Tables 2.1 to 2.3 below provide a brief statistical overview of some of the economic and market conditions pertaining to the six Pacific Rim markets studied.

Table 2.1 Overview of Population and Income Statistics: Pacific Rim

	POP ('000)[1]			GDP/capita[2] In Own Currency
Market	**1988**	**1994**	**Percent change**	**1988-92 % change**
Japan	122,626	125,107	2.2%	19.9%
Hong Kong	5,651	5,630[3]	-0.5%	39.7%
Taiwan	20,004	21,299	6.1%	29.6%
P.R.C.	1,088,169	1,190,431	8.6%	41.0%
S.Korea	42,773	45,083	5.1%	44.8%
Singapore	2,645	2,859	7.5%	33.3%

[1] Source: U.S. Dept. of Commerce. Statistical Abstract of the U.S., 1994. Table No. 1351. (unless otherwise specified). Based on mid-year populations.

[2] Source: International Monetary Fund. *International Financial Statistics*. May 1994.

[3] Source: Calculated from statistics in Asian Development Bank, Economics and Development Resource Centre. *Key Indicators of Developing Asian and Pacific Countries*. Volume XXIV, 1993.

Table 2.1 shows a general increase in population and in consumer incomes in the particular Pacific Rim economies, over the 1988 to 1992 period. Only Hong Kong exhibits a slight decline in population, but which is then accompanied by a significant increase in total GDP per capita. Theoretically, an increasing population base, faced with increased income per capita, signifies a greater demand for all consumption goods; and hence, greater potential market opportunities for those firms capable of supplying these markets.

Table 2.2 below provides an overview of the actual total (world) import patterns of the six Pacific Rim economies, in processed food and beverage products, over the 1988 to 1992 period. Corresponding to the general trend in increase in population and income, discussed above, the data in Table 2.2 reveal similar general trends in increased total imports. The only exception being imports in processed fruit and vegetable products and in processed cereal and grain products (excluding Japan's processed cereal and grain imports) for the 1992 calendar year. In general, these trends suggest, as expected, increased export opportunities in these markets.

Table 2.3 shows the B.C. exports, by the same industry categories, to these six Pacific Rim economies. In addition, Table 2.3 reveals total domestic shipments (i.e., sales) and value-added sales, for purpose of comparison with the export data. To supplement this, Appendix 2 provides an overview of the Pacific Rim exports of related provincial industries, including the provinces of Alberta, Manitoba, Ontario, and Quebec. Two things stand out in looking at these data. First, despite the general increase in Pacific Rim imports, discussed above, the B.C. industries' exports to the Pacific Rim do not necessarily follow the same smooth inclining trend. Rather, during some years, some industries exhibit increasing exports, while the next year these same industries exhibit a substantial decline in exports, followed by a further increase, etc. Hence, the B.C. industry export data reveals somewhat erratic trends. Moreover, to some Pacific Rim regions, notably South Korea and Singapore, B.C. exports over the 1988 to 1992 period are minimal, if not nil.

Second, the data in Appendix 2 reveals BC's "strength" in Pacific Rim exports relative to the provincial industries' domestic shipments, and relative to the domestic shipments and exports

of the other provinces of Alberta, Manitoba, Ontario and Quebec. Even in comparison to Ontario, which has significantly larger industries, the B.C. industries' exports, as a share of total domestic shipments is relatively greater. This suggests that, in general, B.C. is more competitive than its competing provincial industries in these Asian markets.

Table 2.2 Pacific Rim Total (World) Imports In Five Industry Categories, 1988-1992. ('000 Constant 1990 $Cdn.)

	Japan	Hong Kong	Taiwan	P.R.C.	S. Korea	Singapore
Processed Meat and Fish Products						
1988	18,845,080	1,651,775	308,124	157,874	206,826	1,024,759
1989	17,546,660	1,616,976	500,653	131,306	250,809	1,014,264
1990	17,144,090	1,743,426	482,237	502,170	278,722	953,509
1991	17,614,120	1,803,354	504,928	810,247	311,289	1,050,486
1992	20,380,710	2,104,288	540,625	1,102,675	544,586	1,125,598
Processed Fruit and Vegetable Products						
1988	3,009,663	1,651,775	163,766	110,635	127,004	847,790
1989	3,248,692	1,616,976	171,780	163,716	137,344	798,341
1990	3,041,494	1,743,426	227,913	230,834	111,287	737,640
1991	3,106,436	1,803,354	224,377	428,080	123,032	898,942
1992	2,488,358	708,259	203,543	321,601	62,948	602,174
Processed Cereal and Grain Products						
1988	1,609,167	528,603	650,361	1,511,392	3,496,797	827,551
1989	1,762,556	492,429	640,745	1,663,856	3,620,300	805,451
1990	1,665,905	465,724	466,970	1,560,786	2,671,099	614,128
1991	1,796,295	482,273	545,138	1,587,897	2,309,749	554,688
1992	2,735,642	447,274	464,796	452,513	590,392	340,976
Other Processed Food Products						
1988	2,602,157	845,332	196,300	380,445	1,245,301	792,530
1989	2,338,157	769,140	217,108	272,799	592,138	585,103
1990	1,872,141	788,835	234,307	371,911	557,170	597,651
1991	1,858,349	837,588	266,101	375,689	456,215	549,246
1992	2,407,353	911,920	319,790	585,487	533,623	846,654
Beverage Products						
1988	1,289,998	464,990	105,202	28,937	105,156	326,863
1989	1,595,719	524,245	146,960	45,017	83,192	295,963
1990	1,967,538	593,313	222,322	54,504	96,883	317,731
1991	2,091,789	656,537	252,332	56,907	146,746	332,528
1992	2,152,146	778,362	376,358	70,320	224,162	387,615

Source: Statistics Canada. World Trade Data Base (SITC-Revision 2), On CD-ROM. 1993

Table 2.3 B.C. Exports to the Pacific Rim: 1988 - 1992, by Industry Category

	No. of Estab.	Domestic Shipments	Value-Added	Japan	H.K.	Taiwan	P.R.C.	S. Korea	Sing.
B.C. Processed Meat and Fish Products									
1988	118	1,562,706.0	503,740.4	207,906.0	9,654.7	4,893.9	15,697.9	3.2	141.8
1989	121	1,502,932.0	431,518.3	229,521.2	6,355.0	5,039.8	6,068.3	339.7	177.7
1990	115	1,551,000.0	463,800.0	140,755.8	5,244.3	89,926.8	2,767.0	2,759.6	418.2
1991	109	1,428,883.0	439,204.5	179,629.7	7,012.0	64,263.0	944.4	5,655.6	204.4
1992	112	1,418,937.0	435,074.6	153,910.9	16,859.8	47,998.8	6,548.9	4,790.6	46.0
B.C. Processed Fruit and Vegetable Products									
1988	34	279,317.9	94,389.4	3,624.7	982.6	0.0	43.1	46.4	16.5
1989	34	254,555.0	105,026.2	3,277.7	277.1	19.4	764.9	428.8	90.6
1990	34	256,200.0	91,100.0	2,145.6	126.3	60.5	507.8	64.0	152.5
1991	32	236,931.8	92,992.4	1,513.0	236.1	23.7	134.8	0.0	110.2
1992	27	243,283.6	99,533.6	837.5	247.6	28.4	42.3	29.6	241.0
B.C. Processed Cereal and Grain Products									
1988	88	395,819.6	143,454.3	7,929.9	28.9	22.5	19,304.5	0.0	0.0
1989	93	436,858.6	148,691.1	9,670.9	819.5	2,207.1	7,407.4	0.0	11.7
1990	90	422,100.0	170,900.0	5,373.1	715.0	51.6	4,635.9	2,513.4	24.2
1991	87	382,291.7	153,787.9	8,501.3	741.0	26.0	1,607.7	0.0	7.0
1992	86	414,272.4	170,522.4	10,118.8	234.3	17.3	6,894.8	116.3	92.0
Other B.C. Processed Food Products									
1988	65	292,409.2	131,133.1	10,832.8	133.9	0.0	334.4	0.0	55.2
1989	70	284,607.3	121,047.1	11,732.1	589.3	304.5	0.0	14.5	182.1
1990	64	143,200.0	65,400.0	3,705.7	477.2	275.5	2,177.2	0.0	217.9
1991	63	127,462.1	55,587.1	9,601.6	183.4	396.2	0.0	11.0	34.8
1992	55	168,470.1	67,164.2	2,865.2	770.5	1,343.6	0.0	1.9	837.0
B.C. Beverage Products									
1988	32	518,701.9	253,465.3	54,066.1	22.9	6.9	0	0.0	0.0
1989	34	494,240.8	262,513.1	12,452.4	145.6	57.5	6.6	0.0	3.0
1990	33	492,800.0	242,600.0	7,308.6	0.0	79.2	0.0	0.0	8.0
1991	33	508,049.2	276,041.7	11,393.7	11.4	0.0	0.0	0.0	49.0
1992	35	754,850.7	399,440.3	13,597.4	0.0	2,205.1	377.8	0.0	835.6

Source: Domestic shipments and value-added data: Statistics Canada, Annual Survey of Manufacturers (Cat. No. 31-203); Export trade data: Obtained through 'special request" of the International Trade Division, Statistics Canada. These data were organized into the specific five industry categories developed for the purpose of this thesis. (For less specific export data, refer to Cat. No. 65-003, Jan-Dec, annual.)

3.0 THEORETICAL FRAMEWORK

3.1 Review of the Literatures

The notion of competitiveness is commonly discussed in the context of existing trade theories. Competitiveness can be considered as a further extension of the traditional theories. This chapter reviews some of the important concepts that have developed from the trade literatures, and discusses the new concepts arising from the competitiveness literatures. The chapter ends with theoretical considerations of some of the more common determinants identified.

3.1.1 Traditional Trade Theory

Trade theory dates back at least as far as to Adam Smith's classical work, *The Wealth of Nations* (1773). In this, Smith developed the first theory on the gains from specialization and trade. He explained that when nations specialize in doing whatever it is they do best, and trade their wares with those of other nations, productivity increases, income increases, and overall consumption opportunities increase. Open trading between economies, the theory argues, brings about the most efficient allocation of resources.

David Ricardo (1817), proceeded to further develop Smith's theory of the gains from trade. Ricardo determined that nations gain when each specializes in producing *those commodities in which they have a "comparative cost advantage"*. His observations provided economists with the framework from which to determine *what* commodities would be traded.

In the early 1900's, trade economists were then working to explain why it was that comparative production costs differed between nations. Eli Heckscher and Bertil Ohlin

(1909) determined that the resources required in production, (i.e., land, labour, capital, and technical know-how) exist in different proportions between different countries. The Heckschler-Ohlin (hereafter, H-O) model thus suggested that a country's relative endowment of these factor inputs --as reflected in their relative costs (e.g., land rents, wage rates, and interest rates)-- determines trade. Hence, it was argued that nations faced with lower relative input costs will tend to trade, or export, products that use these inputs in the production process.

MacDougall (1951), whose findings were later supported by Balassa (1963) and Stern (1962), made the first serious attempt to empirically test the H-O model. MacDougall studied the 1937 exports of 25 U.S. and U.K. "industries" (i.e., specified as an aggregate of related products). He estimated a U.S./U.K. export ratio as a function of a labour productivity ratio (or, the ratio of output per U.S. worker to output per U.K. worker). Excluding the mutual trade between the two countries due to the existence of high U.S. and British tariffs, MacDougall determined that, in fact, increases in labour productivity ratios explained *increases* in the export market share. MacDougall, however, found that when one country had the comparative cost advantage, it did not capture the whole of the export market. He attributed the phenomena to "the existence of imperfect markets (oligopolistic and monopolistic), non-homogeneous products, transport costs, and the like" (Chacholiades, p.90). As Chacholiades points out, while MacDougall's findings do support the classical H-O theory, they highlight the theory's "greatest defect...that it does not shed any light on what determines comparative advantage and on how comparative advantage may be expected to change in the future" (Ibid.).

In 1954, a study by Wassily Leontief contradicted the H-O theory. Using 1947 data, Leontief determined that exports from the United States were more labour (and hence, less

capital) intensive than the goods it was importing. This conflicted with the presupposition that the U.S. was relatively more abundant in capital than in labour. Economists subsequently attempted to explain Leontief's paradox. Some of the explanations which developed include: (1) the influence of higher U.S. labour productivity; (2) the existence of tariff and non-tariff barriers in importing countries; and (3) the influence of the quality of labour, or "human capital" as a production input. As Abbott and Bredahl (1994) explain, "most of the explanations that emerged represented minor deviations from necessary assumptions or extensions into a world of multiple dimensions, ... and [so] a marriage of trade theory with modern industrial organization theory arose in order to introduce several new concepts into the analysis" (p.19).

3.1.2 New Trade Theory: Considering I.O. Variables

Industrial organization theory is concerned with markets in which there are few sellers. That is, the theory addresses markets in which the standard perfect competition paradigm no longer holds. As Chamberlin (1933) points out, these markets, which are dominated by a relatively small number of firms and differentiated products arose at the turn of the century, with the development of manufacturing industries. The predominant focus of I.O. theory has been to analyze these different market structures and to determine their consequences for industry performance (not to mention for consumer welfare purposes). Following the works of Bain (1959), much of I.O. theory has rested on the "structure-conduct-performance" (SCP) model. This model considers how the market structure (i.e., as explained by the degree of competition amongst firms in an industry) determines the 'conduct' (or price setting and other behaviours) and, consequently, industry 'performance' (profitability, growth, etc.).

Industry structure is typically measured in terms of the degree of economies of scale

in an industry, and/or the degree of firm concentration (where, one firm exhibits high concentration, or monopolistic type industry characteristics; and many firms exhibit low concentration, reflecting purely competitive industry type characteristics). Industries characterized by increasing returns, or large scale production --considered synonymous with more efficient production-- were seen as determinants of international trade in certain sectors. The H-O model, however, assumed constant returns to scale. Consideration of the I.O. framework in the traditional trade models therefore enabled this limitation of the applied H-O theory to be addressed.

Moreover, Vernon (1966) determined that the "use of advanced technological production techniques and, especially, the investments in research and development to develop them, had not been incorporated into the H-O model" (Pool and Stamos, p.33). This related to the findings by Gruber and Vernon (1970) which suggested that "industries associated with a relatively high research effort, also tend to export a relatively high proportion of their output... [where] "research effort" is by measured by industry R&D expenditures as a percent of industry sales, or by technical personnel as a percentage of total industry employment" (p.235).

3.1.3 Limitations of Trade and I.O. Theories

While trade and/or I.O. theories provide a good starting point for identifying competitiveness factors, they do not, or cannot, necessarily describe competitiveness conduct fully. The current literature suggests that trade theory is at too macro of a level to account for the micro (or firm or industry) level undertakings that in effect are driving trade. Research undertaken by various business schools ascertains the planning and marketing strategies of firms (or behaviours of management) do play an important role in influencing market

performance.

Conventional trade theory explains export market share entirely by differences among countries, especially relative differences in the factor endowments. Empirical analyses typically require extensive data to depict all of the possible factor input price combinations both within and between nations. Such data makes this an empirically difficult task and the high level of aggregation provides little opportunity for analyses of a more complex set of variables. Moreover, "critics of trade theory point out that firms trade, nations don't; that firms make investment and marketing decisions, nations don't; and that firms compete in international markets, nations don't" (Bredahl, Abbott and Reed, p.4).

Similarly, I.O. theory, although employing more dis-aggregated data, places a great deal of emphasis on the nature of the industry rather than on the nature of the firms within the industry. It can be argued that the role of firm conduct, as relayed through the SCP model, is typically ignored. That is, "the SCP framework shifted its emphasis [from] Fellner's analysis ... on the cognitive and motivational properties of agents at the bargaining table ... to the structural environment that determines the opportunity set of each bargaining party. It concentrates on what determines the cards held by each bargainer rather than the skill and aggression with which he plays them" (Caves, Porter, Spence, and Scott, p.5). The elements of firm conduct are, rather, assumed to be "simultaneously determined" by the forces of industrial structure (Ibid.). The predominant focus of I.O. theory on industrial structure has essentially left firms to be interpreted as "passive agents through which industrial structure works its influence on industrial performance" (Sawyer, 1985 p. 90)

The notion of competitiveness then, extends beyond the traditional boundaries of macro trade theory, and, instead, attempts to account for the practices of the firm, by including such variables into the traditional models. As Porter (1990) points out "seeking to

explain competitiveness at the national level, ...is to answer the wrong question. What we must understand is the determinants of [competitiveness],... [by] focusing not on the economy as a whole, but on specific industries and industry segments." (p.6).

3.1.4 Competitiveness: Linking Trade, I.O., and Strategic Management Theories

Analyses of firm behaviour by some business schools have helped to bridge the gap between trade theory and the notion of competitiveness. Some of the earlier contributions to strategic management theory have come from the research findings of the Marketing Science Institute and Harvard Business School's "Profit Impact of Market Strategies" (PIMS) project. The PIMS project, an ongoing study, commencing in 1972, entailed detailed financial and business practices of 57 different major U.S. corporations, entailing over 600 diverse businesses[8].

The project established that strategic planning is linked to profit performance (Schoeffler, Buzzell, and Heany, 1974), as is market share (Buzzell, Gale, and Sultan, 1975). Schoeffler et al. accounted for more than 80% of the variation in profit in the more than 600 businesses analyzed using 37 different factors. Of the seven factors identified as being "most important,"[9] five can be regarded as strategic management characteristics. These include: total marketing expenditures, product quality, R&D expenditures, investment intensity, and corporate diversity[10]. Hence, Buzzell et al. then explain the market share-profitability link by economies of scale, market power, and "quality of management" characteristics.[11].

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[8] See Schoeffler, Buzzel, and Heany (1974) or Buzzel, Gale and Sultan (1975).

[9] Note that the authors do not explain what is meant by "most important", but it is my interpretation that the intended meaning is "statistically significant".

[10] The two remaining factors, market share and return on investment, are really more indicators than determinants of competitiveness.

[11] (These are not mutually exclusive.)

"Good managers (including, perhaps, lucky ones!)," they said, "are successful in achieving high shares of their respective markets" (p.98). According to the authors, 'good managers' encompass those "skilful in controlling costs, getting maximum productivity from employees, and ... [those capable of] achieving a leadership position --possibly by developing a new [product or market] field" (Ibid.).

Later developments in the strategic management literature arose in studies by Porter (1980). Porter proposed that firms develop unique production and marketing strategies, based on the specific market environment in which they conduct business. The important market environment variables influencing firm decisions include the bargaining powers of buyers and of suppliers, the threat of potential entrants, and the existence of substitute goods. Porter contended that firms gain competitive advantage by reducing costs, differentiating product(s) or processes, and by focusing on a niche market. While a necessary condition for competitive advantage, Porter argued that these factors are not sufficient. He contended that a firm must also be effective in all components of its business-- from product development, to production, to customer service.

Porter (1985) then categorized the different business strategies into two groups: primary activities and support activities. The primary activities include: location and, hence, transportation logistics, production operations, marketing and sales, and service. The support activities include: firm infrastructure, human resource management, technological development, and procurement.

In his latest work, *The Competitive Advantage of Nations*, (1990), Porter steps out of firm-level analyses and "contributes to understanding... the national attributes that foster competitive advantage in particular industries, and the implications for both firms and for government" (Porter, 1990a, p.xii). He undertakes an historical case study analysis of

important industries in ten major trading nations. The result of his work is a four-sided framework for competitive analyses, which Porter refers to as the "Diamond of National Competitive Advantage". To some extent a combination of the paradigms developed in his earlier works, Porter's competitiveness framework includes: (i) demand conditions; (ii) factor conditions; (iii) related and supporting industries; (iv) firm strategy, firm structure, and strong domestic rivalry amongst competing firms. He claims that productivity is the only meaningful measure of competitiveness at the national level: the productivity of a nation's labour and capital, produces a high and rising standard of living.

In short, Porter's findings rest on the understanding that a "nation's competitiveness depends on the capacity of its industries to *innovate* and upgrade" (Ibid.). Porter argues that "national prosperity is created, not inherited," and that "it does not grow out of a country's natural endowments, its labour costs, its interest rates, or it's currency's value, as classical economics insists." He points to the role innovation plays in explaining competitive success in the global marketplace. Porter states that "innovation ... can be manifested in a new product design, a new production process, a new marketing approach, or a new way of conducting training"; that it "always involves investments in skill and knowledge, as well as physical assets and brand reputations"; and that "information plays a large role in [its] process" (1990a, p.74).

Similarly, Beck (1992) recommends that innovative firms "turn out new products or services that people actually want to buy,"..."find new markets"...and, "develop new processes that boost quality while reducing costs" (pp. 107-109).

Porter (1990) identifies the following specific company strategies as necessary for competitive advantage:

- create pressures for innovation

- seek out the most capable competitors as motivators
- establish early warning systems (i.e., systems that help identify changes taking place in the market, so they can act on them, thereby getting a jump on competition);
- improve the national diamond; and
- welcome domestic rivalry...(Porter states that "to compete globally, a company needs capable, domestic rivals and vigorous domestic rivalry" (P.92)

(1990a, pp.89-92).

It is interesting to consider how closely linked the concept of innovation is with that of R&D. Although the two words have been used interchangeably, R&D has, in general, tended to be used to explain the development of new production technologies, while innovation has typically been associated with new product development. Rosenberg (1970) explains that economic theory "has always had a difficult time coming to grips with the problems posed by new products. Our analytical apparatus and our techniques of measurement have been notably deficient in the handling of product innovation as opposed to cost-reducing process innovation. But clearly product innovation has been playing, and will probably continue to play, a major role in the changing pattern of international trade" (p.72).

Further consideration reveals, however, that both innovation and R&D entail research, and both entail development --of new products, or of new production techniques. Yet, while the role of research may be explicit in the term 'R&D', its role in the concept of 'innovation' is more subtle. Understanding this role rests on the assumption that any new innovation is restricted to or, alternatively, guided by parameters which in themselves are determined by the innovator's *a priori* knowledge of the production or consumption demands pertaining to the particular innovation. An innovator's knowledge of a growing demand for health food products, for example, influences his or her development of such foods. Similarly, an

innovator's knowledge of the food industry's need for a new production technique entices new technological developments in this area.

Successful innovation or R&D, therefore, infers something about a firm's "market knowledge base". That is, one can assume that a firm which is successful in innovating or developing new products or processes implicitly has been successful in accessing, processing, and utilizing information pertaining to market conditions and production opportunities. Hence, it can be argued that the "research" aspect is crucial since it influences a firm's knowledge or information base.

Addressing the competitiveness of the Canadian agri-food industry, the 57 member Task Force on Competitiveness in the Agri-Food Industry,[12] employed Porter's diamond framework, with some modifications. The Task Force replaced "*firm* strategy, structure, and rivalry with that of the *industry*", and created two other components: (i) government policy and programs; and (ii) innovations and productivity, as two specific firm strategies. With the firm being directly linked to the industry, and the industry itself, sitting in the centre of the amended diamond, the Task Force emphasized the importance of "linkages" between industries and supporting industries, related industries, consumers, and government, etc. The idea being that a certain degree of cooperation and sharing of information or knowledge amongst the industry players can work to enhance their competitive capabilities.

Van Duren, Martin and Westgren (1992; 1994), Toffler (1990), and others, express similar views on the importance of firm *linkages* and *sharing of information.* van Duren et al. (1992) identify linkages as one of many important firm level strategies. They take the approach that a firm's relationships with its customers or suppliers are "often the basis for

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[12] (Established in 1989 by Minister Donald Mazinkowski.)

total quality management (TQM), joint ventures, and flexible vertical relationships" (p.18).

Toffler, on the other hand devotes a whole book to the importance of knowledge, and its influence on creating wealth. He points out that:

> Apart from the fact that no business could open its doors if there were no language, culture, data, information, and know-how, there is the deeper fact that of all the resources needed to create wealth, none is more versatile than these. In fact, knowledge (sometimes just information and data) can be used as a replacement for other sources.
> Knowledge --in principle inexhaustible-- is the ultimate substitute. (P.83).

One frequently noted limitation to the competitiveness studies by Porter and others is that they lack statistical analyses. Statistical analyses would provide some insight into the significance to which the suggested determinants actually influence competitiveness, and hence, give some measure of the degree of reliability. This is the objective of this study.

3.2 Theoretical Considerations

The literature discusses traditional trade, industrial organization, and business management factors which influence competitiveness. In this section, the economic rationale and implications behind the influence of: wage rates, interest rates, exchange rates, import tariffs, transportation costs, industrial concentration, new capital expenditures, labour productivity, and new product innovations (the latter two of which exhibit cost-reducing and revenue-enhancing strategies of firms respectively) are considered.

3.2.1 Wage Rates. Wage rates are commonly used as measures to approximate the opportunity cost of employing labour. Hence, it is assumed that firms will employ labour up to, but not beyond their opportunity cost. Following the comparative advantage doctrine, relative wage rates are therefore inversely related to exports. Theory would suggest that firms

facing lower relative labour costs can employ more workers, and hence increase output --- hence producing more per unit factor input cost than their competitors. Labour efficient firms are, ceteris paribus, more cost competitive and hence, will tend to export more.

However, a study carried out by Kaldor (1978) and recently re-tested by McCorriston and Sheldon (1994) finds a paradox to this traditional comparative cost doctrine. Kaldor presented data on relative unit labour costs and unit export values for eleven major industrialized countries for the period 1963-1975 and compared them with changes in each country's global market share. He found that, in six of the eleven cases...rising (falling) relative labour costs or relative export values were matched with higher (lower) market shares. More recently, McCorriston and Sheldon determined that, during the 1966-1985 period, the market shares of West Germany, Japan and the United States appear to be positively correlated with relative labour costs. Essentially these findings imply that higher wage rates attract more skilled labour, resulting in greater cost efficiency and/or higher product value.[13] These findings would suggest, in turn, that higher wage rates could be positively correlated with export sales.

3.2.2 Interest Rates. Real interest rates, adjusted for inflation affect industry costs through a dynamic process. Faced with lower real interest rates, firms are enticed to invest in new capital expenditures, and undertake financing for product and/or (domestic or export) market development purposes. This investment continues up to, but not beyond, the point where the marginal efficiency of investment equals the opportunity cost of capital, as represented by the real interest rate. Hence, assuming the marginal efficiency of investment is less than the

[13] The resulting decrease in costs or increase in product value would typically depend on the type of higher labour skill employed.

opportunity cost of capital, when real interest rates fall, we can expect investment to increase, and, for those exporting firms, total exports to increase as well, although only for a limited time.

A fall in real interest rates will be offset by a decline in foreign investment, resulting in an excess supply of Canadian dollars on the international market. This in turn will result in a depreciation of the exchange rate. Hence, the exchange rate (expressed in dollars Canadian per unit of foreign currency) rises, enticing firms to further increase exports. As exports increase, however, the value of the Canadian currency increases on the world market, and interest rates will begin to decline accordingly.

3.2.3 Exchange Rates. Real exchange rates measure the relative price of two goods. In the absence of export market price data (i.e., prices paid by consumers in the destination country) real exchange rates (RER) can be employed as proxy measures to reflect the value of selling goods to the particular export market. Expressed in units of domestic currency per unit of foreign currency, a depreciation, or rise in the RER reflects an increase in the price received by domestic manufacturers in the exporting country. Hence, a rise in the RER is expected to be accompanied by an increase in exports.

3.2.4 Tariffs. Tariffs enable an importing country to restrict the number of imports of one or many specific commodities. Hence, tariffs interfere with the free flow of goods into a nation. They adjust the prices at which commodities are traded on the world market to the price faced by consumers inside an importing country. The effect of an import tariff on Canadian exporting manufacturers is on the price of the Canadian good as seen by the consumers in that importing market. Thus, an increase in the rate of an import tariff will

have the effect of reducing exports to that country.

3.2.5 Transportation Costs. In the presence of transportation costs, manufacturers located farthest from the final export market destination are more likely to be at a disadvantage than their competitors, since their goods will bear the transport cost. Depending on the elasticity of demand, increased costs result in increased prices paid by consumers in the importing country. This results in the goods being less desirable in this market, and total exports consequently decline. The more inelastic the demand, the more one can expect transport costs to be embedded in the final consumer purchase price.

While "food" typically exhibits an inelastic demand, value-added, processed food products, tend to be more elastic in nature. Yet this changes as personal income (or GDP per capita) rises. High income economies are more likely to be engaged in secondary or manufacturing industries, leaving less time for production of primary or non-value-added foods, and hence, greater reliance on imported, processed products.

Given the relatively high average personal incomes in Japan, Hong Kong, and Taiwan, increased transport costs are assumed to be inversely related to market share. As transport costs relate to the markets of Singapore, South Korea, and China, on the other hand, one would hypothesize that transport costs, in general, are positively related to market share.

3.2.6 Industrial Concentration. Industrial organization theory emphasizes the importance of the degree of industrial concentration or market power in influencing an industry's competitive performance. Market dominance by one or a few firms provides the opportunity to effectively set prices, and, consequently, realize significantly higher profits for a particular

product. This market power in turn acts as a type of barrier to new firms wishing to enter the market: Those firms that are able to obtain prices above their marginal cost of production have the resources required to invest in research and development towards new products, or new) production processes; increase plant size, and engage in large promotions or advertisements, etc. Thus firms in concentrated industries implicitly evoke some economies of scale dominance.

There are two conflicting arguments in I.O. theory, however, which pertain to how concentration may influence export competitiveness. Traditional I.O. theory would infer that an industry dominated by a few, large firms is inefficient because there is not an 'infinite' number of competitors, forcing the firms to price at marginal cost. Firms are more profitable and consequently obtain "fat", comfortable positions in the domestic market. In doing, they maintain a sluggishness with respect to engaging in foreign competition. In such a situation, firm concentration is hypothesized to be negatively related to export market share.

Dissenters of this traditional I.O. theory, however, believe that such economy of scale firms have only become dominant because they are so efficient. Their costs of production are lower than their competitors and consequently they are able to sell at lower relative market prices. These firms use the profits made in their domestic markets to influence their share of foreign markets -- e.g., by "undercutting" foreign competitors' selling prices (perhaps even below the cost of production, for a period of time), and conducting large advertising or product promotions in order to "push out" competition and/or gain product loyalty. In this case, firm concentration is assumed to relate positively to export market share.

Given today's decreasing domestic protection and thus more opportunity for foreign competition, most firms are unlikely to sit idle in their domestic markets, at least not for long. Rather, aware of the increasing foreign competition, it is hypothesized that firms in highly

concentrated industries will do all they can to increase their market shares both at home and abroad. Therefore, firm concentration relates positively to export market share.

3.2.7 New Capital Expenditures. The economic implication of firm investment in new capital expenditures (i.e., manufacturing plants, machinery, and equipment), can be interpreted in two alternative ways. First, firm output increases, and, in the longer run, profitability rises. Larger manufacturing plants, for example, enable greater economies of scale potential, hence, increasing total output, while typically holding inputs constant. Alternatively, or in addition to, capital investment can result in a decline in the capital to labour ratio, as firms substitute more capital for less labour. A final possible scenario to this sequence is that of an increase in the capital to labour efficiency ratio. With a fixed or given quantity of labour, new capital investments will increase the number of outputs per unit of labour input. In any case, we would hypothesize that investment in new capital expenditures relates positively to greater output, and at lower costs --in the long run. This, in turn, relates positively to export market share.

Second, it can be assumed that new capital expenditures are being driven by increased firm profits. Firms, in a competitive market, producing at a marginal cost below their marginal revenues will be making pure economic profits in the short run. The firms in the industry thus have the necessary finances with which to invest in new expenditures; that is, before new firms enter the industry, reducing pure economic profit back to zero.
In this case, new capital expenditures can be considered a proxy for profitability. As profitability increases, outputs increase (for the reasons given above), and exports will increase as well.

3.2.8 Labour Productivity. Labour productivity is a measure of labour efficiency. It is similar to the capital to labour efficiency ratio, discussed above, except that labour productivity is typically regarded as the output per unit of labour input ratio. Hence, given a fixed quantity of labour, increased output per unit of labour input results in lower costs of production. Alternatively, given a fixed output for less labour inputs also results in lower costs of production. Firms are thus more cost competitive, and hence able to export more, gaining market share. Increased labour productivity, therefore, is assumed to be positively related to export market share.

3.2.9 New Product Innovation. As discussed in Chapter 3.1, the notion of "innovation" is closely linked with "R&D". Both require market or consumer research has been undertaken prior to the new product innovation or development. Hence, embedded in the resulting product is the information or knowledge in the process.

In neoclassical economic theory, "perfect" or complete information is assumed to exist amongst all players in the market economy. In the real world, however, this is not always the case. Consumers rarely have perfect information on all of the products available to them, and producers rarely have perfect information on all consumers' demands and demand elasticities. The closer one is to perfect information, however, the closer they are to exacting a market premium price. In terms of the manufacturer, this is to say that the more the manufacturer knows about the consumer's preferences, the closer they are to pricing based on the consumer's elasticity, and hence achieving a price premium.

In a perfectly competitive world, this might be seen by a rise in the innovating firm's marginal revenue function. In a less than perfectly competitive world, however, when other firms do not have the same market knowledge (or else they would have produced the same

product), this situation can be represented by the innovating firm facing the downward sloping demand function of the consumer (in the perfect case) or consumers (in the less than perfect case), and pricing accordingly.

Hence, to the extent that new product innovation or R&D is synonymous with perfect information or market knowledge, we would expect to see an increase in firm or industry sales, given an increase in the number of new product innovations. Since rarely is it the case that a manufacturer has complete knowledge of the consumer demand, the innovations to sales relationship will tend to be less than perfect, although significant nonetheless.

4.0 MODEL SPECIFICATION

4.1 Conceptual Model

A model employed in a study by Gruber and Vernon (1970), explains exports as a function of the economic characteristics of the industries that generate the exports. That is:

(4.1)

For exporting country i:

$$\sum_{j=1}^{n} E_{ijk} = f(a,b,c,...)$$

where:

E*ijk* specifies total exports from area *i* to area *j* in product category *k*; and

a,b,c,.... specify various economic characteristics applicable to industries producing manufactured goods (p. 237).

Alternatively, equation (4.1) could be modified for the purpose of a competitiveness assessment. Equation 4.1 could be used to explain competitiveness as a function of the economic characteristics of the industries that generate the exports. That is,:

(4.2)

$$C_{ijkt} = f(a,b,c,...)$$

where:

$$C_{ijkt} = SALES_{ijkt} = E_{ijkt} = \frac{E_{ijkt}}{Imp_{jkt}}$$

where,

$Sales_{ijkt}$ = domestic market sales;
E_{ijkt} = total exports; and

E_{ijkt} = export market share (i.e., total exports over
Imp_{jkt} imports).

Conceptually, the statistical significance of one or more of the different competitiveness-influencing factors, proposed in the literature, and discussed in Chapter Three, could then be tested. The specific competitiveness measure and the choice of industry characteristics, for the purpose of empirical analyses, however, will ultimately depend on the particular research question(s) being addressed, and, more notably, on the available data.

The underlying question or purpose of this study is to identify those factors or characteristics which may influence the competitiveness of B.C. processed food and beverage industries in the Pacific Rim, as well as the domestic market. Specifically, the interest lies in determining the influence of exogeneous factors, as suggested in comparative cost and industrial organization doctrines, and endogeneous factors, suggested in business school and, now, competitiveness literatures.

The available data includes a matrix of pooled cross-sectional and time-series observations, encompassing five processed food and beverage exporting industry "categories,"[14] in five Canadian provinces, for the years, 1988 through 1992. The five industry categories include: processed meats and fish (MF), fruits and vegetables (FV), cereals and grains (CG), other processed foods (OTH), and beverages (BEV). The exporting provinces include British Columbia (BC), Alberta (AB), Manitoba (MB), Ontario (ON), and

[14] A thorough description of the industry categories is given in Chapter Five, and is summarized in Appendix 1.

Quebec (QU).

The industry characteristics considered in the analysis are:

XR - exchange rates;
WR - wage rates;
CR - an industry concentration measure;
NC - a measure of new capital expenditures
LP - an endogeneous, cost-reducing measure, reflecting cost-saving practices of firms in the industry -- specifically, changes in labour productivity; and
TM - an endogeneous, revenue-enhancing measure, reflecting revenue-generating practices of firms in the industry; specifically, the number of new trademark applications (a proxy for investments in market research and product innovation).

Hence, given these data, model (4.2) can be re-specified as:

(4.3)

For exporting region i:

$$C_{ijkt} = f(XR_i, WR_{ijt}, CR_{ijt}, NC_{it}, LP_{ijt}, TM_{ijt})$$

where *ijkt* on the applicable RHS variables, specify province *i*, in industry category *j*, in time *t*;

(i = 1..5, provinces);
(j = 1..5, industry categories);
(t = 1..5, years).[15]

4.2 Empirical Model

For empirical purposes, (4.3) is specified as follows:

(4.4)

For exporting region i:

[15] Note that the introduction of exporting "region", as opposed to "country", "industry category" as opposed to "product category" and the change in notation between *j* and *k* in (4.3) is employed to permit the use of consistent notation throughout the rest of the paper.

$$C_{ijkt} = \beta_1 + \beta_2 XR_t + \beta_3 WR_{ijt} + \beta_4 CR_{ijt} + \beta_5 NC_{it} + \beta_6 LP_{ijt} + \beta_7 TM_{ijt} + + \epsilon_{ijt}$$

where,

E_{ijkt} specifies total exports from province i, in industry category j, to area k; in time period t; and

where,

e_{ijt} equates epsilon, the error disturbance term in province i, in industry category j, in time t;

and,

$$\epsilon_{ijt} \sim N(\rho, \sigma^2)$$

It is assumed that the error term, epsilon, is distributed with a non-zero mean and variance sigma-squared, since it is highly likely that there will be certain individual provincial industry effects which will bias the estimated regression coefficients. For example, existing government export policies, and/or pre-arranged contractual trade agreements would be considered fixed effects not measured by the explanatory variables considered, however, embedded in e_{ijt}, , and therefore influencing or biasing the estimated beta coefficients. To account for this, a fixed effects covariance model is employed for estimating purposes.

Described in Kmenta (1986) and Kennedy (1992), amongst others, the idea behind the fixed effects model is that a different intercept exists for each N cross-sectional units and each T time periods. As a result, (N-1) + (T-1) dummy variables are introduced into the equation, hence, creating *fixed effects* in the model.

In the general case, this model can be described as follows:

(4.5)

For exporting region i:

$$Y_{it} = \beta_1 + \beta_2 X_{it,2} + \ldots + \beta_K X_{it,K} + \gamma_2 Z_{it,2} + \gamma_3 Z_{it,3} + \ldots + \gamma_N Z_{it,N} + \delta_2 W_{it,2} + \delta_3 W_{it,3} + \ldots + \delta_T W_{ijt,T} + \epsilon_{it}$$

where, $Z_{it,i}$ = 1 for the ith cross-sectional unit,
= 0 otherwise (i=2, 3,...,N);

$W_{it,t}$ = 1 for the tth time period,
= 0 otherwise (t=2, 3,...,T).

Introducing the fixed effects covariance specification of (4.5) into (4.4), we arrive at the following empirical model:

(4.6)

For exporting region i:

$$C_{ijkt} = \beta_1 + \beta_2 XR_t + \beta_3 WR_{ijt} + \beta_4 CR_{ijt} + \beta_5 NC_{it} + \beta_6 LP_{ijt} + \beta_7 TM_{ijt} + \sum_{i=2}^{5} \gamma DP_i + \sum_{j=2}^{5} \delta DI_j + \sum_{t=2} \rho DT_t + \epsilon_{ijt}$$

where,

C_{ijkt} specifies competitiveness (measured in terms of domestic sales, total exports, or export market shares), from province i, in industry category j, to area k; in time period t; and

WR_{ijt} is wage rates in province i, in industry product category j, in time t;

CR_{ijt} is industry concentration in province i, in industry product category j, in time period t;

NC_{it} is new capital expenditures in province i, in time period t;

LP_{ijt} is labour productivity in province i, in industry product category j, in time period t.; and

TM_{ijt} is the number of new trademark applications of firms in province i, in industry product category j, in time period t.

DP_i is the provincial cross-sectional dummy variable (i=2..5, includes BC, AB, ON, and QU);

DI_j is the industry (product category) cross-sectional dummy variable

(j=2..5, includes MF, FV, CG, OTH, and BEV); and

DT_t is the time dummy (t=2..5, includes 1988, 1989, 1990, 1991, and 1992,); and

e_{ijt} is epsilon, the error term.

A final step in the specification of this empirical model deals with scaling the regression variables. The inclusion of cross sectional data-- in this case, industries of different sizes-- introduces a likely skew in the statistical distribution of the dependent and explanatory variables. To account for this, the data are converted to log form, thus generating a distribution that is more in accord with the normal distribution assumption of the statistical significance test applied here. Hence, model (4.6) is re-specified:

(4.7)

For exporting region i:

$$C_{ijkt} = \beta_1 + \beta_2 logXR_t + \beta_3 logWR_{ijt} + \beta_4 logCR_{ijt} + \beta_5 logNC_{it} + \beta_6 logLP_{ijt} + \beta_7 logTM_{ijt} + \sum_{i=2}^{5} \gamma DP_i + \sum_{j=2}^{5} \delta DI_j + \sum_{t=2} \rho DT + \epsilon_{ijt}$$

5.0 EMPIRICAL IMPLEMENTATION

5.1 DATA

Data pertaining to five explanatory variables, exchange rates (XR), wage rates (WR), industry concentration (CR), labour productivity (LP), and trademarks (TM), and two alternative dependent variables, total exports and export market share, are considered in this analysis. Section 5.1.1 provides an overview of the general data matrices, while 5.1.2 describes the sources and methods for calculating the individual variables.

5.1.1 Data Overview

The data are defined for five processed food and beverage industry "categories,"[16] in five Canadian provinces, for the years, 1988 through 1992. In addition, a matrix of trade-related exports from these provincial industries, to Pacific Rim countries, and total (world) imports into the Pacific Rim are defined.

As discussed briefly in Section 4.1, the five industry categories include: processed meats and fish (MF), fruits and vegetables (FV), cereals and grains (CG), other processed foods (OTH), and beverages (BEV); the exporting provinces include: British Columbia (BC), Alberta (AB), Manitoba (MB), Ontario (ON), and Quebec (QU); and the Pacific Rim export markets considered include: Japan, Hong Kong, Taiwan, China-mainland, South Korea, Singapore, and the United States.

In general, the industry categories entail groups of "similar" 3-digit SIC (i.e., "Standard Industrial Classification") food and beverage manufacturing industries. Similar

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[16] (Defined below.)

groups are defined as industries with common primary inputs[17]. Hence, SIC 105 (Flour, Cereal Food and Feed Industry) is combined with SIC 106 (Vegetable Oil Mills) and with SIC 107 (Bakery Products Industries); SIC 108 (Sugar & Sugar Confectionery Industry) is combined with SIC 109 (Other Food Products Industries); SIC 111 (Soft Drink Industry) is combined with SIC 112 (Distillery Products Industry), SIC 113 (Brewery Products Industry); and SIC 114 (Wine Industry); while SIC 103 (Fruit and Vegetable Industries) is left un-aggregated. The only exception to this "similar inputs" approach is the combination of SIC 101 (Meat & Poultry Products Industries) with SIC 102 (Fish Products Industry). While meat and fish arguably face dissimilar inputs, it has nonetheless been necessary to group these industries together in order to avoid excluding the fish products industry altogether[18]. The only other alternative would be to exclude those provinces lacking a fish products industry of any significant size; omitting these provinces from the analysis would, however, reduce the current data set by more than half.

As alluded to in the above discussion, the specific provinces included in the analysis are chosen primarily on the basis of the size of their processed food and beverage manufacturing industries. Provinces which, on average, lack the necessary industry data, have been omitted.

Provincial industry export and total (world) import data are included for the Pacific Rim markets of Japan, Hong Kong, Taiwan, China-mainland, South Korea, and Singapore. The decision to include these particular countries or economies, over others in the Asia Pacific bloc is due to their relative proximity to the B.C. region, and to their existing and/or

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[17] This was necessary in order to sum together those industries with minimal data.

[18] (The Fish Products Industry in B.C. is an important component of the agri-food industry.)

increasing wealth (i.e., in terms of GDP per capita). It is assumed that a strong relationship exists between per capita GDP and consumption of imported goods. The U.S. export market is also included in the analysis for comparison, and data and model verification purposes, since a substantial proportion of provincial food and beverage product exports are currently destined for U.S. markets.

One problem posed by the above data is that the industry data are categorized based on the SIC system of industry classification, the export data are categorized based on the "Harmonized Commodity Description and Coding System" (H.S.), and the import data are categorized based on the "Standard International Trade Classification System" for commodity coding, Revision-2 (SITC-2). Hence, it has been necessary to "harmonize" the industry classification codes with the commodity classification codes. A list of the concordances between the SICs and the H.S. codes has been obtained by special request from the Standards Division, Statistics Canada. These concordances are summarized in Appendix 2.

The World Trade import data is at the 4-digit level of detail and consequently does not correspond exactly with the H.S. data. The SITC-2 data is, however, based on the H.S. system, and so the task of correlating the two is not wholly impossible. In the end, some allowances have had to be made in terms of permitting some SITC-2 codes to incorrectly concorde with the H.S. codes. The implications for this in terms of the thesis results are believed to be minimal, however, since: (1) the SITC-2 commodity categories *are* generally comparable to the export categories; (2) the concording data are kept consistent across all respective industry export statistics; and (3) since the SITC-2 data are used in the denominator to construct the market share variable, it acts to scale the dependent variable, hence taking the place of the log conversion procedure, which is otherwise used to scale the

total exports dependent variable.[19]

5.1.2 Variable Specification

This section explains the sources and methods employed in specifying the dependent and independent variables in this study. Where applicable, variables are expressed in natural logs. The log conversion procedure is used to scale the data, in order to avoid the statistical skew inherent in most cross sectional industry statistics. At the same time, when both dependent and independent variables are logged, conversion to logs permits comparison of the various provincial industry characteristics on exports in terms of a common elasticity unit. The estimated coefficients explain the percent change influence on the dependent variable given a percentage change in any one of the explanatory variables.

For those variables comprising some zero values, the log approximation is used as the appropriate alternative scaling technique. That is,

$$log(Y + 1)$$

where, **if Y = 0, log(Y+1)= 0**

Since only the left hand side, total export data contains zeros, there are some implications for interpreting the effect of a percent change in an independent variable on the resulting change in the dependent variable. When the left hand side variable is expressed in log approximation form, and the right hand side variables are expressed in log form, the estimated coefficients identify the effect a percent change in X on an *absolute* change in Y. Hence, when Y is zero, as in many of the export data, the estimated coefficient on the X variable explains the absolute change in Y given a percent change in X. If the log approximation

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[19] (The market share variable and log specifications are discussed in more detail in section 5.2, below.)

were not used, any percent change in X would always be met with a 0% change in Y (since Y would be zero to begin with). Applying the log approximation to the dependent variable, however, permits one to recognize that when faced with, for example, a 10% drop in the exchange rate, a 0.2 coefficient on the exchange rate variable would imply a corresponding 2 unit absolute increase in the dependent variable. This is both important and applicable when the dependent variable is very small (i.e., approaches zero). In this case, the log (1+Y) approximates Y. When Y is very large, however, (1+Y) approximates Y, so hence the log(1+Y) is approximately equal to the log(Y). That is, in the latter case, when Y is very large, we move back into a constant elasticity approach for interpreting the estimated coefficients. When Y is very small, however, the coefficient estimate must be interpreted in terms of its absolute influence on Y, rather than its relative or percent change influence.

Data are also, where applicable, expressed in real (1990) Canadian dollars ($Cdn.). The procedure for converting from nominal to real entails dividing by the Canadian CPI (1990=100). CPI are obtained from *International Financial Statistics* (IFS), February 1994 issue, for the countries of Canada, the United States, Japan, China, South Korea, and Singapore. The CPI and nominal exchange rate data for Hong Kong and Taiwan are obtained from *Asian Development Bank*, January 1995 issue. In both publications CPI are expressed in 1990 base year units.

***Total Exports* (EXP)**

Total exports are specified as the log of the real (1990 $Cdn.) value of 8-digit H.S. commodities exported from the provinces in which they are manufactured to the specific Pacific Rim markets. Export documents collected by Canada Customs, and tabulated by Statistics Canada are the principal source of all export statistics for Canadian commodities. The statistics include "both goods which are wholly produced in Canada and goods previously

included in import statistics which have since been changed in form by further processing and then export" (Statistics Canada, Cat. No.65-003, Jan.-Dec. 1988, p.5). Furthermore, "exports are classified to the country to which they are consigned at the time the goods leave Canada, i.e. to the furthest known destination, and are recorded at the values declared on export documents, which usually reflect the actual selling price or, in the case of non-arms length transactions, the transfer price used for company accounting purposes" (Ibid., p.6). "Most exports are valued at the place in Canada where they are laden aboard a carrier for export (e.g. mine, farm or factory) but a significant proportion of exports by water or air reflect values which include transportation to the port of export" (Ibid.).

Provincial export statistics are available through special request of the International Trade Division, Statistics Canada. The purchased data provides "province of origin"[20] export data, based on the H.S. system, at the eight digit level of detail.[21] These regional export data are reported in nominal $Cdn. and are converted to real (1990) $Cdn.

Market Share (MS)

Market Share, is calculated as the percent of total commodity exports produced by industry *i* in province *j*, and exported to Pacific Rim country *k*, expressed as a percent of the total (world) imports of these commodities into country *k*.

Total world import data, for the six Pacific Rim countries, and the U.S., are obtained

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[20] Prior to January 1984, exporters were requested to identify the province in which goods were laden for export, regardless of where the goods were manufactured, grown, or extracted. As of January 1984, exporters have been required to identify the province of origin (i.e., where manufactured, grown, or extracted), instead of the province of lading. Full conversion from the old form to the new form was completed January 1987. (See B.C. Ministry of Industry and Small Business Development, *B.C. External Trade Report, 1985*, p. S2-S1.3.)

[21] Effective January 1988, all commodity trade statistics were based on the H.S. system.

from Statistics Canada's *World Trade Data Base* (SITC-Revision 2), on CDrom[22], 1993. The CDrom database provides a complete matrix of import and export statistics, created from data reported by United Nations member countries. Note that in constructing the World Trade Database (WTD), Statistics Canada "has performed a number of adjustments to alleviate inconsistencies in the data as reported to the United Nations. Relying on the principle that import statistics are generally more accurate than export statistics, the WTD uses imports as the basis for allocating international trade flows. Exports to countries, consequently, are reallocated according to what customer countries report as imports. ... Trade of non-reporting and late reporting countries are imputed using the trade data reported by their trading partners" (Statistics Canada, *World Trade Database on CD-Rom*, User Guide, March 1993, p.1). Furthermore, "the value of trade is measured consistently in thousands of U.S. dollars and valuation adjustments are performed to ensure that the dollar value of exports will equal the dollar value of imports in all trade flows" (Ibid., p.2).

These annual data are reported in nominal $U.S.; statistics are currently available for the period 1980-1992. The data are broken down by country and by commodity, whereby the latter is based on the Standard International Trade Classification, Revision 2, commodity coding system. This data classification system is based on the Harmonized System of commodity coding. The world trade data are harmonized (as closely as is possible) to the H.S.-based provincial export data. Appendix 1 provides a summary of the concordances.

Exchange Rates (XR)

Exchange rates are specified in real terms, expressed as the log of Canadian dollars

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[22] (Produced and maintained by Statistics Canada's International Trade Division.)

per unit of foreign currency. Mathematically this is defined as follows:

$$RER = \log(\frac{eP_T}{P_N})$$

where e is the nominal exchange rate, in units of Canadian currency per unit of foreign currency; P_T is the CPI in the foreign country of interest; and P_N is the Canadian CPI.

CPI and nominal exchange rate data are obtained from *International Financial Statistics* (IFS), February 1994 issue, for the countries of Japan, China-mainland, South Korea, Singapore, the United States, and Canada. The CPI and nominal exchange rate data for Hong Kong and Taiwan are obtained from *Asian Development Bank*, January 1995 issue. Since, in both publications, nominal exchange rates are expressed in units of foreign currency per U.S. dollar, the rates are first inverted and then multiplied by the $Cdn./$U.S. exchange rate, in order that they be specified in units of foreign currency per Canadian dollar. The CPIs in both publications are indexed to the base year 1990.

***Wage Rates* (WR)**

Wage rates, specified in real terms and in logs, and are calculated as:

$$\frac{\textit{total wages paid}}{\textit{total hours paid}}$$

Data on total wages paid and total hours paid, broken down by 4-digit SIC industry categories, are published in Statistics Canada's, *Annual Survey of Manufacturers* (Cat. No. 31-203).

Industry Concentration (CR)

Industry concentration ratios are typically specified as the percent of sales, shipments, or value-added, etc., accounted for by the largest n firms (or establishments) in the industry. The value of 'n' is commonly published as either 4, 8, 12, 16, 20 and 50. While these data are calculated and made available by Statistics Canada, Manufacturing and Primary Industries Division, recent data (i.e., for the years 1988 through 1992) are not currently published.

As an alternative measure, the number of establishments in each provincial industry (based on the 3-digit SIC codes), is employed. The number of industry establishments are, in general, negatively correlated with the published CR4 statistics. To test the reliability of this proxy variable, correlation coefficients were determined where possible. The results of this test are shown in Appendix 5.

Number of establishment data are available in the *Annual Survey of Manufacturers* (Catalogue No. 31-203).

New Capital Expenditures (NC)

The statistics Canada publication, Private and Public Investment in Canada: Intentions, (Catalogue No. 61-205: annual for the years 1982 through 1994), Tables 13-19 (in Section III: Provinces and Territories) provides data on actual investment expenditures on machinery and equipment and on new constructions. These annual data are published for "food and beverage" manufacturing industries (i.e., combined or aggregated 2-digit SIC data), for every province except Ontario and Quebec. In Ontario and Quebec, actual capital investment expenditure data are provided for the "food" and the "beverage" industries separately.

Statistics Canada obtains these data via a survey questionnaire sent to the companies at

the end of each calendar year. The new capital expenditure data used in this study are derived by summing new equipment and machinery expenditures with new construction expenditures, in order to create a "new *total* capital expenditures" variable.

***Labour Productivity* (LP)**

Labour productivity is calculated as the log of the ratio of total value-added to total labour inputs, where "labour input" is measured in terms of "person hours worked". Person-hours worked is the sum of person-hours spent at the place of employment by persons at work. The statistic differs from a measure of "person-hours paid" by excluding vacation time, holidays, time lost due to illness, accidents, etc., and is therefore considered to more accurately reflect productive efficiency.[23]

Provincial industry value-added data, reported by 3-digit SIC, are obtained from the Statistics Canada publication, *Annual Survey of Manufacturers* (Cat. No.31-203). These data are converted to real $Cdn. by the method describe in Section 5.1 above. Person hours worked data are obtained by special request from the Information and Classification Section, Industry Division, Statistics Canada.

Trademarks/New Product Innovations (TM)

The number of new trademark applications in each processed food and beverage industry category, in each province, and in each year are used to determine the trademark statistics variable. These data are obtained from the *Trade-marks Journal*, published by the Trade-marks Division, of the Canadian Intellectual Property Office (CIPO). The journal is a

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[23] Refer to the discussions regarding the benefit of using *hours worked* as the measure of labour input, rather than *wages paid*, in Statistics Canada catalogue #15-240E, *Aggregate Productivity Measures*, February, 1993.

weekly publication listing all new trade-mark applications. Each application is accompanied by a description of the type of "wares" and/or "services" being trademarked; a picture (if applicable); the name and address of the applying firm; and the (approximate) date of the product's entry into the Canadian marketplace. Since the Journal is not indexed, it is necessary to scan each page for related trademark applications. The following procedure was met:

- Only those trademarks listed as "wares" (i.e., as opposed to "services" or "wares *and* services") and pertaining to products of the processed food or beverage categories used in this study[24] were gathered.
- Only those wares listed as "**proposed** for use in Canada" or "**used** in Canada since.. [not earlier than January 1988]" were considered. Trademark applications for products introduced into the Canadian economy prior to January 1988 were not included.
- Further, only those food and beverage manufacturers located in British Columbia, Alberta, Manitoba, Ontario, or Quebec were included.

The result of this search was an annual total of approximately 800 new food and beverage trademark applications for all of the provinces and industries combined. These were then sorted according to the appropriate industry and province of manufacture. The procedure for this needs further explanation; the reason being that certain unforeseen difficulties arose during the data gathering-process. These are summarized in points 1-3 below:

1. Some firms applying for the trade-marks were listed as being located in more than one province, in the *Guide to Canadian Manufacturers* (Statistics Canada, catalogue 32-

[24] (Refer to Appendix 2.)

250) publication. For example, in the Statistics Canada catalogue 32-250, Thomas J. Lipton is classified as a "processed meat" manufacturing firm located in BC, ON, and QU; a "processed fruit and vegetable" manufacturer in ON; and an "other food product" manufacturer, located in Manitoba, Ontario, and Quebec;

2. Sometimes the firm applying for the trade-mark is identified as manufacturing in one SIC industry, while the commodity being trade-marked is distinctly in another. (Some firms thus manufacture products in industries that don't correspond with the industry under which they are classified by Statistics Canada.) For example, the Quaker Oats Company is classified as a manufacturer in the "cereal and grains industry". In 1988, however, this firm trade-marked "fruit drinks", which are classified under the processed fruits and vegetable products industry.

3. Some firms will use one trademark name to protect a number of commodities, which may be classified under different SIC industries. For example, in 1988 Nabisco Brands Canada Inc. trademarked the name "Dickson's" to cover mints, drink crystals, and crackers, amongst other things. The first two commodities would typically be classified as "other foods", while crackers would be classified as "cereals and grains".

Hence, in accounting for these data difficulties (a good estimated guess would be that approximately 15% of the trademark data faced one or more of the above limitations), the following systematic approach was followed:

First, a list of all firms classified as manufacturers in the processed food and beverage industry categories used in this study was created. These data were obtained from the *Guide to Canadian Manufacturers* (Statistics Canada, catalogue 32-250). This list provided a reference to identify firms producing in more than one industry and/or in more than one province.

Each trademark was then allocated or sorted by the commodity or "ware" and then by the province(s) in which the firm: a) is classified as being a manufacturer of that type of commodity; and (if the firm is not a classified as being a manufacturer of that commodity), b) the trademark is allocated to:

(i) the appropriate industry category, and then to

(ii) the province(s) in which the manufacturing firm is located.

So, for example, when a firm registering a trade-mark is listed as being located in more than one province, the trade-mark is sorted first according to the type of ware(s) being trade-marked. If it is a "processed meat" product, for example, then it is allocated to the processed meat and fish industry category: hence the wares act as the primary determining factor. Secondly, the processed meat trademark is then allocated to the province(s) in which the firm is listed as a being processed meat manufacturing company. If the firm is not classified as processed meat company, but as a processed cereals and grain company for example (i.e., similar to the Quaker Oats problem), then the trademark is allocated to the province(s) in which the firm is manufacturing.

Finally, when firms use one trademark name to protect a number of commodities, classified under different SIC industries, one trade-mark is allocated to each industry for which a ware has been identified. They are then sorted according to the province(s) in which the firm is classified as manufacturing that (those) type of wares; and secondly to the province(s) in which the firm is manufacturing (if it is not classified as manufacturing those type of wares).

Approximately 4000 new food and beverage trademark applications have been gathered in total; that is, approximately 800 applications per annum, on average. The results are summarized in Appendix 6.

5.2 Methodology

To determine the statistical significance of the different exogeneous and endogeneous industry characteristics on influencing market shares in the Pacific Rim, the empirical model specified in equation (4.7) is estimated using the Generalized Least Squares estimating regression technique. Employing both cross-sectional and time-series data risks introducing heteroscedasticity (unequal variance of the error terms) and autocorrelation (correlation between the error terms over time) into the empirical regression analaysis. These conditions violate two of the critical, basic assumptions of the classical linear regression model. Specifically, these violations are:

$$E(\epsilon_{it}^2) = \sigma_i^2 \qquad \textit{heteroskedasticity;}$$
$$E(\epsilon_{it}\epsilon_{jt}) = \sigma_{ij} \qquad \textit{auto-correlation.}$$

In the condition of heteroscedasticity or autocorrelation, use of the common Ordinary Least Squares (OLS) estimating technique, yields coefficient estimates, that, while still unbiased and consistent, are no longer efficient (i.e., have minimum variance). Hence, "the confidence intervals based on the estimators will be unnecessarily wide and the tests of significance less powerful" (Gujarati, p.342). This is because the variance-covariance matrix of the disturbance vector is incorrect. In such case, the method of OLS is no longer a suitable estimating technique. One common approach to overcome this is to employ the method of generalized least squares (GLS).

The GLS method estimates a new variance-covariance matrix by "making use of the information (in the heteroscedasticity case) that some disturbances are likely to be large because their variances are large, or the information (in the auto-correlated disturbances case)

that when, for example, one disturbance is large and positive, then another disturbance is likely to be large and positive" (Kennedy, p.114). Hence, "instead of minimizing the sum of squared residuals [as is the case with OLS], an appropriately *weighted* sum of squared residuals is minimized" (Ibid.).

Separate regressions are then run, using domestic sales, total Pacific Rim exports, and Pacific Rim market shares as alternative competitiveness indicators, or dependent variable measures. As discussed in Chapter Two, it is believed that determinination of the factors that influence competitiveness in the domestic market may provide some insight into the "general" (i.e., including export market) competitiveness influences. Moreover, the "richness" of the domestic market data (since the dependent and independent variables are largely derived from the same Statistics Canada firm survey questionnaires) permits some simple analyses to ensure correct model specification.

In the total exports and export market share analyses, separate regressions are carried out for the Japan, Hong Kong, Taiwan, P.R.C., South Korea, and Singapore markets. In addition, a regression is also undertaken using U.S. export market data, for comparison purposes. To the extent that the significant lack of non-zero dependent variable (or export) statistics, exhibited in the research data at hand, may limit the explanatory capabilities of the independent variables, and hence significantly reduce the usefulness of the results of this study, alternative specifications of the export and export market share data are employed.

The domestic market, export, and export market share regressions are organized into three sets. Specifically, these are as follows:

Regression Set 1: ***Provincial Industry Domestic Shipments and Value-Added Sales.*** Two separate regressions are first run using the method of GLS on both domestic shipments (i.e., total plant sales) and value-added (i.e., sales less the cost of materials and supplies used) as alternative dependent variables. Domestic shipments reflect total industry sales, whereas value-added reflects only that portion of industry sales to which the firms actually manufactured or added value. Domestic shipment and value-added data are obtained from the Statistics Canada, Cat. No. 31-203, *Annual Survey of Manufacturers.*

The same models are then run, however this time the OLS estimating technique is employed. Comparing OLS coefficient estimates with GLS estimates enables one to check for correct specification of the model. Despite the fact the method of OLS is expected to be inefficient in the presence of the data used for this study, both the OLS and GLS procedures should yield "qualitatively" similar results. That is, if GLS produces "generally large and positive" coefficient estimates, in a correctly specificied model, OLS should yeild the same.

In the final component of Regression Set 1, the provincial industry and time dummy variables are excluded from the the original GLS domestic sales models discussed above. This is carried out simply for interest and comparison purposes; exclusion of the "fixed effects" represented by the dummy variables should result in biased coefficient estimates, if there are in fact fixed regional, industry and time effects.

Regression Set 2: ***Provincial Industry Pacific Rim Exports.*** Analysis of the statistical significance of the explanatory variables on total exports to the Pacific Rim, by provincial industry, is then carried out in Regression Set 2. Five alternative specifications of this model are employed; the latter four of which aim to address the typically "thin" or scant value of exports by various provincial industries in various years. Each of these alternative models are

discussed in turn below.

Provincial Industry Exports, Using Exchange Rates. Exchange rates are not included in the base export model since the analysis is limited to five years of data, in which case exchange rates must therefore be aggregated to an annual level. Hence, this is likely to reduce the explanatory capabilities of these data. There is some interest, however, to determining the explanatory powers exchange rates may pose, in comparison to the time dummy variables, in determining exports in the Pacific Rim. For this reason, the above Provincial Industry Exports Model is re-specified, using exchange rates in place of the time dummy variables.

Aggregated Dependent Variable Specification: "Stacked" Aggregated Exports. In this regression, each of the six *Asian* Pacific Rim market export data (i.e., excluding the U.S.), are "stacked" atop one another, in order to create an (export) dependent variable with 750 observations (as opposed to 125). The interest in this approach lie in determining the effect that enriching the dependent variable data, by significantly increasing the degrees of freedom, might have on the explanatory capabilities of the independent variables. Moreover, Pacific Rim market dummy variables (i.e., a dummy variable for each Japan, Hong Kong, Taiwan, China, South Korea, and Singapore markets) are introduced in this model. To this extent, exchange rates are included in place of the time dummies, for the purpose of attempting to maintain relatively the same degrees of freedom. The reason for introducing the market dummy variables is simply to ascertain the influence any one market may be imposing on the regression as a whole.

Alternative Dependent Variable Specification: Summed Export Data. As an alternative approach to account for thinness in the dependent variable data, the export market data (excluding the U.S.A.) are summed together. That is, rather than analyzing provincial industry exports to specific Pacific Rim markets, provincial industry exports to the entire (or "summed") Pacific Rim market is studied. This approach is an attempt to enrich the "quality" of the export data.

Two separate summed dependent variables are specified in this case: the first includes Japan, along with Hong Kong, Taiwan, China-mainland, South Korea, and Singapore; the second specification omits the Japanese export statistics.

Alternative Explanatory Variable Specifications: National (Canadian) Industry Exports to Pacific Rim Markets. In this national exports model, all explanatory variables pertaining to the same industries, across all of the five provinces, each year, are summed together. Similarly, the corresponding exports to these explanatory variables are summed. This then creates a proxy of total "Canadian" industry characteristics to explain Pacific Rim exports. This is an important methodological approach to take since many of the empirical competitiveness studies undertaken to date employ highly aggregated, national-level data. Yet, at the same time, the direction of the literature is towards more disaggregated, regional or (ideally) firm level analyses.

Regression Set 3: ***Export Market Shares.*** This set of regressions closely mimics those regressions carried out in Regression Set 2 above; Pacific Rim market shares, however, are specified in place of total Pacific Rim export market sales. The alternative specifications of the market share regressions include: *Provincial Industry Market Shares: Using Exchange Rates*; *National (Canadian) Industry Market Share* in Pacific Rim Markets; and *"Stacked" Aggregated Export Market Shares.*

6.0 RESULTS AND ANALYSES

6.1 Statistical Analysis of the Variables

Table 6.1 below provides an overview of the descriptive statistics that have been generated for each of the specified variables.

Table 6.1 Variable Statistics

NAME	#	MEAN	ST. DEV	VARIANCE	MINIMUM	MAXIMUM
MSJA	125	1.3843	4.3799	19.184	0	41.912
MSHK	125	0.3659	1.0615	1.1268	0	8.0121
MSTA	125	3.8593	21.537	463.85	0	186.48
MSCH	125	2.2538	10.021	100.41	0	99.433
MSSK	125	0.4303	2.0330	4.1330	0	18.168
MSSI	125	0.1219	0.3202	0.1025	0	2.3779
logXPJA	125	5.0266	3.4117	11.640	0	12.252
logXPHK	125	3.0758	2.7687	7.6659	0	9.8718
logXPTA	125	2.8648	2.8193	7.9486	0	11.407
logXPCH	125	2.8402	3.0283	9.1704	0	9.6773
logXPSK	125	1.3247	2.3481	5.5137	0	9.3603
logXPSI	125	2.3327	2.2199	4.9279	0	7.1467
logWR	125	2.5712	0.1995	0.0398	2.1360	3.0641
logCR	125	4.1351	1.1218	1.2585	1.0986	6.1399
logLP	125	4.0835	0.4783	0.2287	3.3378	5.3619
logTM	125	3.5197	1.0927	1.1941	0	5.3230
logNC	125	11.885	0.9729	0.9466	10.357	13.378
logship	125	13.440	1.1587	1.3426	10.944	15.222
logvalad	125	12.492	1.1470	1.3157	9.8521	14.557

"MS" = market share; "XP" = exports; "log" = logged variable; "ship" = domestic shipments; and "valad" = domestic shipments in terms of dollars of value-added sales.

Table 6.1 shows no apparent outliers or errors within the data set. Further statistical analysis of the explanatory variables reveals "moderate" correlation exists between the following variables:

- LP and WR, labour productivity and wage rates: +0.63
- TM and CR, new product innovations and industry concentration: +0.61

- NC and CR, capital expenditures and industry concentration: +0.62
- BEV and WR, the beverage industry dummy and wage rates: -0.85
- BEV and LP, the beverage industry dummy and labour productivity: +0.75

(The complete correlation matrix of variables is provided in Appendix 7.)

While the linear relationship between these explanatory variables is less than perfect (i.e., <1), the standard errors (estimated in the regressions discussed below) are small, and hence we can expect that the coefficients are nonetheless estimated efficiently.

6.2 Regression Analysis

Tables 6.1, followed by Tables 6.2A through 6.3B present the results of the regressions estimated in this study. These are discussed in turn below.

Regression Set 1: Domestic Shipments and Value-added Sales (Table 6.1).

The results of the (GLS run) domestic industry shipments and value-added model reveal generally significant and correctly signed variables. In the shipments model, the wage rate, industry concentration, and labour productivity variables all possess positive and statistically significant coefficient estimates. In the value-added model, the estimated coefficient on the trademark variable is also shown to be statistically signifcant in explaining changes in value-addded sales. Furthermore, the regional dummy variables, AB, ON, and QU, the industry dummy variable, MF, and the time dummies, dT90, dT91, and dT92 also exhibit significant coefficient estimates. The results suggest, however, that changes in shipments and value-added are not at all explained by changes in new capital expenditures (NC).

Since the wage rate variable, as specified, does not account for differences in the quality of labour, theoretically a significant, positively-signed wage rate coefficient could be considered to be "picking up" the influence of industries with high skilled labour. That is to

say, the results suggest that industries with high skilled labour tend to have higher domestic sales --both in terms of total shipment dollars and in terms of total dollars of value-added sales. The significant and positively signed industry concentration variable suggests that the tendency towards less concentrated, or alternatively, more competitive industries significantly explains increases in total industry shipments and value added sales. Further, industries with higher labour productivity and those exhibiting more innovative tendencies (as exhibited by the trademark variable, TM), also generally tend to play a role in explaining changes in domestic sales of the specific industries considered. The trademark variable in the domestic shipments model, however, is not statistically significant, but with a t-statistic of 1.45, the variable is explaining some (although minimal) changes in domestic shipments.

The relative inelasticities of the industry concentration, labour productivity, and trademark variables, as exhibited by the respective coefficients, indicate that domestic shipments and value-added are relatively unresponsive to changes in the number of firms in an industry, the productivity of labour, and the number of new products developed. This stands to reason since a percent change in the sales generated by an additional percent change in the number of firms, units of output per hour worked, or by an percent change in the number of new products developed in the industry, while significant, will likely be small relative to the existing total industry sales. The relatively large coefficient on the wage rate variable, while still inelastic, however, suggests that industry sales are 'less unresponsive' to increases in labour quality.

The highly significant and positively signed Alberta, Ontario, and Quebec provincial dummy variable coefficient estimates, and the MF-industry dummy variables suggest that other regional and industry specific factors, not identified in the model, also influence domestic sales. Further, the elasticity exhibited by the Ontario regional dummy implies that,

Table 6.1 Provincial Industry Domestic Shipments and Value-Added Sales: Comparison of GLS and OLS Regression Results

$$\log SALES_{ijt} = \beta_1 + \beta_2 logWR_t + \beta_3 logCR_{ijt} + \beta_4 logLP_{ijt} + \beta_5 logTM_{ijt} + \beta_6 logNC_{ijt} + \sum_{i=2}^{5} \gamma DP_i + \sum_{j=2}^{5} \delta DI_j + \sum_{k=1}^{5} \rho DT_t + \epsilon_{ijt}$$

WR	CR	LP	TM	NC	dBC	dAB	dON	dQU	dMF	dCG	dOTH	dBEV	dT89	dT90	dT91	dT92	CONST
1 a) Shipments - Domestic (GLS)						Buse [1973] R^2 = 0.9652			F stat 174.465*								
0.788	0.591	0.188	0.045	-0.001	0.145	0.379	1.284	0.715	0.759	-0.18	-0.153	0.11	-0.012	-0.089	-0.077	-0.035	7.463
(2.84)	**(6.81)**	**(2.38)**	(1.45)	(0.03)	(1.30)	**(3.48)**	**(6.79)**	**(4.24)**	**(6.00)**	(1.29)	(1.45)	(0.85)	(0.65)	**(3.41)**	**(2.40)**	(1.04)	**(8.87)**
1 b) Value-Added - Domestic (GLS)						Buse [1973] R^2 = 0.973			F stat 227.09*								
0.937	0.516	0.515	0.091	-0.006	0.189	0.253	1.402	0.857	0.494	-0.171	-0.118	0.036	-0.015	-0.061	-0.01	0.066	4.997
(3.07)	**(5.73)**	**(5.80)**	**(3.02)**	(0.15)	**(1.72)**	**(2.58)**	**(7.12)**	**(4.85)**	**(3.69)**	(1.19)	(1.11)	(0.28)	(0.69)	**(2.18)**	(0.29)	**(1.93)**	**(5.28)**
2 a) Shipments - Domestic (OLS)						R^2= 0.9387	R^2 Adj.= 0.9289			F stat = 96.359*							
1.52	0.656	0.776	0.092	-0.027	0.14	0.214	0.811	0.458	0.885	-0.33	-0.472	0.732	-0.022	-0.139	-0.098	-0.001	3.544
(2.75)	**(4.55)**	**(5.05)**	(1.31)	(0.34)	(0.75)	**(1.58)**	**(2.39)**	**(1.54)**	**(3.69)**	(1.27)	**(3.04)**	**(2.92)**	(0.25)	(1.50)	(1.00)	(0.01)	**(2.19)**
2 b) Value-Added - Domestic (OLS)						R^2=0.9388	R^2 Adj.= 0.9291			F stat = 96.523*							
1.809	0.550	0.964	0.077	-0.021	0.03	0.011	1.073	0.74	0.563	-0.287	-0.322	0.624	-0.009	-0.089	-0.002	0.087	1.378
(3.32)	**(3.87)**	**(6.36)**	(1.12)	(0.27)	(0.16)	(0.08)	**(3.21)**	**(2.53)**	**(2.38)**	(1.12)	**(2.10)**	**(2.53)**	(0.11)	(0.98)	(0.02)	(0.97)	(0.86)

Additional Comparison: no time dummies

WR	CR	LP	TM	NC	CONST
Shipments - Domestic (GLS)					Buse [1973] R^2 = 0.7639 F stat = 77.016**
1.071	0.834	0.078	0.039	0.054	6.197
(4.01)	**(17.19)**	**(2.06)**	(1.44)	(0.98)	**(8.14)**
Value-Added - Domestic (GLS)					Buse [1973] R^2 = 0.8376 F stat = 122.784**
1.008	0.756	0.454	0.084	0.124	3.207
(3.77)	**(18.27)**	**(4.98)**	**(2.67)**	**(4.16)**	**(4.30)**

Figures in parentheses represent t-statistics (in absolute values), rounded to the nearest 2 decimal places, using standard rounding practices

* significant at the calculated 17 and 107 degrees of freedom.

** significant at the calculated 15 and 119 degrees of freedom.

given the cumulative existence of related regional data, changes in this variable evokes a responsive change in domestic sales. This is likely due to the large size of the Ontario market, when it exports, relative to the other provinces.

The one variable which does not prove to significantly explain changes in domestic output, is that of new capital expenditures. While it is assumed that new capital expenditures reflect industry profitability, and therefore should be an important determinant, the non-significance of the capital expenditure coefficient is not completely unexpected, since the data for this variable is specified at a total, provincial "food and beverage" industry level, rather than at the same 3-digit level of detail which the other variables are specified. The degree to which this variable has been aggregated then, hinders its ability to explain changes in the more disaggregated, 3-digit industry data.

The high Buse R^2[25] regression coefficients suggests that changes in total industry shipments and in value-added are significantly explained by changes in the explanatory variables identified. Furthermore, the significant F-statistics associated with each of these regressions indicates that, jointly, the explanatory variables (excluding the constant) do explain the variation in industry shipment dollar and in industry value added shipment dollars.

Comparing the regressions estimated using GLS, to the same regressions using OLS, in Table 6.1, reveals "qualitatively" similar results. The sign and general size of the coeficient estimates in the GLS models are paralled by the same coeficient estimates in the OLS models. These results indicate that the model is correctly specified. Since we expect

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[25] Following the discussion in Judge, Griffiths, Hill, Lutkepohl, and Lee (1985) the Buse R2 [1973] goodness of fit measure will be "between zero and one and is monotonically related to the F statistic" (pp.477-78). Furthermore, it is interesting to note that the same regressions were run using the OLS technique (although the results are not provided here) with similar regression coefficient estimates being calculated.

the OLS estimates to be biased as a result of heteroskedasticity and auto-correlation, however, direct comparison of the t-statistics is not possible. Comparison of the two coefficients of determination (Buse R^2 and R_2 or R^2-Adjusted), while not directly comparable, given the different methods of calculation, can very generally be compared since both attempt to measure the proportion of the variation in the dependent variable associated with variation in the explanatory variables. In either the GLS or OLS approaches, the results in Table 6.1 show very high coefficients of determination, thus indicating correctly specified models, with dependent variables that explain a very high proportion of the variation in the competitiveness measures.

In the final component of Regression Set 1, the provincial industry and time dummy variables are excluded from the GLS domestic sales models. The results show lower R^2 estimates and highly significant, i.e., t-statistics of 17.19 and 18.27, on the industry concentration coefficients in shipments and value-added sales models respectively. The lower R^2 estimates suggest that, despite the exclusion of the dummy variables, the explicit independent variables (i.e., the trade, I.O., and firm strategy variables) identified do explain a siginificant proportion of the variation in the competitiveness measure(s). This has important implications in terms of the confidence it indicates in the model's specification: that being that it is correct. Furthermore, the new capital expenditures variable (NC) proves to be stastically significant in the non-dummy value-added model, whereas this is not the case in the value-added model, whereby the dummy variables or "fixed effects" are included. These results do lend support to the presupposition that exclusion of the fixed effects accounted for by the dummy variables do result in biased coefficient estimates. However, to the extent that the model is comprised of only five explicit non-dummy variables, the ability to identify the

true biasedness imposed upon these estimates is limiting.

Regression Set 2: Provincial Industry Pacific Rim Exports Model (Tables 6.2).

The Buse R^2 coefficients in each export model, excluding South Korea, suggest that a significant proportion of the variation in exports is being explained by changes in the explanatory variables considered. In addition, the calculated F-statistics for the Japan, Hong Kong, Taiwan, China, Singapore, and U.S.A. models indicate that, jointly, the explanatory variables considered do significantly explain the variation in exports to these regions.

Results of the exports model (Table 6.2A below) reveal few statistically significant coeficient estimates arising from the trade, I.O., or firm strategy explanatory variables. In the Japan exports model, decreasing firm concentration (i.e., increases in the number of firms in an industry) and increasing capital expenditures are shown to explain some of the increases in provincial industry exports to Japan. Declining relative wage rates, however, and increasing firm concentration (or a decrease in the number of firms) explains increases in exports to Taiwan; and, increasing wage rates, or an increase of skilled labour, corresponds to an increase in exports to China. None of the explicit RHS explanatory variables (i.e, trade, I.O. or firm strategy variables), however, are stastically significant in explaining changes to exports in Hong Kong, South Korea, Singapore or even the U.S.A. markets.

Explanatory powers are evident, however, in a noticeable number of the regional and industry dummy variables. These dummies exhibit highly significant and highly elastic coeficient estimates. In particular, the B.C. regional dummy variable proves to be very consistently significant. In each of the Pacific Rim and U.S.A. export regressions, the B.C. dummy is attributed with a high t-statistic, and a large and positive coefficient estimate.

Table 6.2A Provincial Industry Exports to Pacific Rim and U.S.A. Markets: Regression Results

$$logE_{ijkt} = \beta_1 + \beta_2 logWR_t + \beta_3 logCR_{ijt} + \beta_4 logLP_{ijt} + \beta_5 logTM_{ijt} + \beta_6 logNC_{ijt} + \sum_{i=2}^{5} \gamma DP_i + \sum_{j=2}^{5} \delta DI_j + \sum_{t=2}^{5} \rho DT_t + \epsilon_{ijt}$$

WR	CR	LP	TM	NC	dBC	dAB	dON	dQU	dMF	dCG	dOTH	dBEV	dT89	dT90	dT91	dT92	CONST
Exports - Japan				Buse [1973] R^2 = 0.9014			F stat = 57.568*										
0.344	1.238	0.333	0.184	0.449	5.253	-0.168	-1.034	-3.072	2.228	-1.333	0.875	-0.852	0.201	-0.025	0.123	0.17	-8.873
(0.13)	**(1.54)**	(0.45)	(0.56)	**(1.57)**	**(4.84)**	(0.21)	(0.59)	**(1.98)**	**(1.88)**	(1.07)	(1.11)	(0.75)	(0.80)	(0.08)	(0.35)	(0.50)	(1.25)
Exports - H.K.				Buse [1973] R^2 = 0.838			F stat = 32.552*										
-1.690	0.497	0.847	0.056	0.195	4.643	0.845	1.886	-0.787	2.214	-0.957	-0.109	-0.736	-0.137	-0.008	0.241	0.121	-2.037
(0.80)	(0.88)	(1.38)	(0.21)	(0.75)	**(5.53)**	(1.26)	(1.38)	(0.64)	**(2.42)**	(0.92)	(0.17)	(0.87)	(0.42)	(0.24)	(0.62)	(0.34)	(0.35)
Exports - Taiwan				Buse [1973] R^2 = 0.7413			F stat = 18.036*										
-7.786	-3.12	0.464	0.227	0.000	7.371	2.504	9.636	5.887	7.773	7.486	4.481	2.998	0.044	-0.295	-0.64	-0.361	23.667
(2.40)	**(3.13)**	(0.47)	(0.56)	(0.00)	**(4.94)**	**(2.65)**	**(4.28)**	**(2.86)**	**(4.86)**	**(4.00)**	**(3.80)**	**(1.95)**	(0.13)	(0.83)	(1.62)	(0.93)	**(2.55)**
Exports: China				Buse [1973] R^2 = 0.8253			F stat = 29.741*										
8.206	-0.389	0.555	-0.106	-0.043	5.594	0.865	3.624	3.299	3.482	1.587	3.382	-2.52	0.545	0.479	0.36	0.623	-22.078
(3.19)	(0.56)	(1.26)	(0.41)	(0.16)	**(4.58)**	(1.19)	**(2.01)**	**(2.15)**	**(2.77)**	(1.04)	**(4.08)**	**(1.99)**	**(2.32)**	**(1.78)**	(1.27)	**(2.31)**	**(3.15)**
Exports: South Korea				Buse [1973] R^2 = 0.3028			F stat = 2.733										
1.066	-0.106	-0.174	0.025	-0.047	1.640	0.167	1.839	0.428	0.772	1.108	0.085	-0.427	0.025	0.024	-0.044	0.025	-1.261
(0.68)	(0.27)	(0.63)	(0.25)	(0.39)	**(2.42)**	(0.45)	**(1.72)**	(0.51)	(0.85)	(1.05)	(0.14)	(0.62)	(0.17)	(0.15)	(0.25)	(0.14)	(0.32)
Exports: Singapore				Buse [1973] R^2 = 0.6055			F stat = 9.661*										
-2.212	-0.442	0.147	0.016	-0.195	4.438	0.692	4.871	2.199	1.031	-0.026	1.125	0.186	0.57	0.499	0.101	0.583	8.127
(0.92)	(0.59)	(0.22)	(0.06)	(0.66)	**(3.91)**	(0.82)	**(2.68)**	(1.29)	(0.81)	(0.02)	(1.21)	(0.18)	**(2.24)**	(1.62)	(0.28)	(1.65)	(1.23)
Exports - U.S.A				Buse [1973] R^2 = 0.9014			F stat = 17.026*										
3.919	0.952	-0.026	0.038	-0.061	3.147	-0.124	0.129	-3.36	0.441	-1.572	1.047	-5.365	-0.056	0.392	0.616	0.52	-5.578
(1.30)	(1.10)	(0.03)	(0.10)	(0.16)	**(3.36)**	(0.16)	(0.08)	**(2.17)**	(0.36)	(1.30)	(1.35)	**(3.82)**	(0.18)	(0.94)	(1.41)	(1.26)	(0.68)

Figures in parentheses represent t-statistics (in absolute values), rounded to the nearest 2 decimal places, using standard rounding practices
* significant at the calculated 17 and 107 degrees of freedom.

An additional, important observation of the regression results exhibited in Table 6.2A is that coefficient estimates determined to be statistically significant do vary from one export market to another. Moreover, the sign of a particular significant variable may vary for different markets. For example, the processed meat and fish industry dummy is significant and positively-signed in the Japan, Hong Kong, Taiwan, and China export market models, hence explaining changes in total industry exports to these markets. This variable does not, however, prove to significantly explain changes in exports to South Korea, Singapore, or the United States markets. In addition, the estimated coefficients on the wage rates and industry concentration variables are significant and negatively-signed in the Taiwan export market model, while only wage rates are significant, yet positively signed, in the China model. The observed results suggest that competitiveness-influencing factors or determinants depend on the particular market(s) in question.

Secondly, the dummy variables (and in particular, the B.C. regional dummy) suggest that other influences, not accounted for by the explicit independent variables specified, are important in explaining changes in competitiveness measures. There is some concern, as well, however, that the lack of non-zero statistics occuring in the export market data (recall Appendices 2 and 3) may be inhibiting the explanatory capabilities of the independent variables specified, and hence affecting the above results. In Tables 6.2C, 6.2D, and 6.2E below, alternative specifications of the independent and dependent variable data are undertaken in attempt to account for this possibility. First, however, in Table 6.2B which follows, exchange rates are used in place of the time dummy variables in order to determine if the one specification is more "revealing" than the other.

Table 6.2B Provincial Industry Exports to Pacific Rim and U.S.A. Markets: Regression Results Using Exchange Rates

$$logE_{ijkt} = \beta_1 + \beta_2 logXR_t + \beta_3 logWR_t + \beta_4 logCR_{ijt} + \beta_5 logLP_{ijt} + \beta_6 logTM_{ijt} + \beta_7 logNC_{ijt} + \sum_{i=2}^{5} \gamma DP_i + \sum_{j=2}^{5} \delta DI_j + \epsilon_{ijt}$$

XR	WR	CR	LP	TM	NC	dBC	dAB	dON	dQU	dMF	dCG	dOTH	dBEV	CONST
Exports - Japan				Buse [1973] R^2 = 0.9099			F stat = 79.331*							
0.338	-0.109	1.432	0.126	-0.011	0.417	4.917	-0.253	-0.957	-3.234	2.071	-1.405	1.289	-0.19	-4.964
(0.25)	(0.05)	**(2.02)**	(0.18)	(0.04)	**(1.67)**	**(5.31)**	(0.34)	(0.62)	**(2.32)**	**(1.95)**	(1.23)	(1.29)	(0.19)	(0.59)
Exports - H.K.				Buse [1973] R^2 = 0.8456			F stat = 43.020*							
-0.727	-1.395	0.313	0.645	0.124	0.078	4.83	0.968	2.487	-0.284	2.327	-0.761	-0.045	-0.774	-1.776
(0.53)	(0.69)	(0.61)	(1.07)	(0.55)	(0.36)	**(6.20)**	**(1.54)**	**(1.97)**	(0.25)	**(2.62)**	(0.76)	(0.07)	(0.98)	(0.29)
Exports: Taiwan				Buse [1973] R^2 = 0.7018			F stat = 18.495*							
0.179	-7.476	-2.443	0.219	0.033	0.193	6.547	2.003	8.143	4.474	6.853	6.400	4.104	3.233	21.029
(0.06)	**(2.36)**	**(2.82)**	(0.24)	(0.09)	(0.45)	**(4.78)**	**(2.29)**	**(3.98)**	**(2.45)**	**(4.81)**	**(3.77)**	**(3.61)**	**(2.23)**	**(1.59)**
Exports: China				Buse [1973] R^2 = 0.7942			F stat = 30.313*							
-0.769	7.241	-0.384	0.572	-0.223	-0.017	5.78	0.929	3.922	3.341	3.637	1.873	3.623	-1.905	-20.59
(1.47)	**(2.77)**	(0.57)	(1.33)	(1.00)	(0.06)	**(4.83)**	(1.37)	**(2.25)**	**(2.24)**	**(2.89)**	(1.25)	**(4.44)**	(1.54)	**(2.86)**
Exports: South Korea				Buse [1973] R^2 = 0.3016			F stat = 3.393*							
0.027	1.066	-0.099	-0.161	0.008	-0.019	1.59	0.16	1.825	0.381	0.805	1.100	0.123	-0.389	-1.452
(0.04)	(0.77)	(0.27)	(0.67)	(0.11)	(0.21)	**(2.45)**	(0.45)	**(1.81)**	(0.48)	(0.92)	(1.09)	(0.21)	(0.64)	(0.24)
Exports: Singapore				Buse [1973] R^2 = 0.623			F stat = 12.985*							
1.242	-1.111	0.058	0.106	-0.16	0.054	3.814	0.146	3.513	0.978	0.341	-0.716	1.119	0.031	2.967
(1.01)	(0.50)	(0.08)	(0.17)	(0.76)	(0.21)	**(3.52)**	(0.19)	**(2.04)**	(0.61)	(0.28)	(0.49)	(1.18)	(0.03)	(0.47)
Exports - U.S.A.				Buse [1973] R^2 = 0.7299			F stat = 21.229*							
-3.692	3.519	0.356	0.049	0.265	-0.213	3.755	0.29	1.388	-2.222	1.154	-0.871	1.373	-5.613	-1.433
(0.65)	(1.20)	(0.45)	(0.06)	(0.77)	(0.60)	**(4.21)**	(0.39)	(0.89)	**(1.55)**	(1.01)	(0.77)	**(1.82)**	**(4.10)**	(0.19)

Figures in parentheses represent t-statistics (in absolute values), rounded to the nearest 2 decimal places, using standard rounding practices
* significant at the calculated 14 and 110 degrees of freedom.

Provincial Industry Exports, Using Exchange Rates

Comparing the results presented in Table 6.2B with those in Table 6.2A, very little difference is seen to exist between the two model specifications. A non-significant exchange rate variable commonly coincides with non-significant time-dummy variables, except in the case of China and Singapore, where significant coefficient estimates on the time-dummy variables are not matched by significant exchange rate coefficient estimates. This would suggest that something other than the annual exchange rate is embedded in the time dummy. Hence, this observation warrants specifying the model to include the time dummy variables wherever possible.

Of the three "alternative specification" models which follow, time dummy variables are specified in two of these models. As discussed in Section 5.2, in the "stacked aggregated exports" specification (Table 6.2C), exchange rates are still included in the model, in place of the time dummies, since Pacific Rim export market dummies have been introduced, and the intention is to attempt to maintain relatively the same degrees of freedom. Again, the reason for introducing the market dummy variables is to determine the influence any one market may be imposing on the regression as a whole.

Table 6.2C Provincial Industry "Stacked" Aggregrated Exports to Pacific Rim and U.S.A. Markets: Regression Results

$$STACKED\ logE_{ijkt} = \beta_1 + \beta_2 logWR_t + \beta_3 logCR_{ijt} + \beta_4 logLP_{ijt} + \beta_5 logTM_{ijt} + \beta_6 logNC_{ijt} + \sum_{i=2}^{5} \gamma DP_i + \sum_{j=2}^{5} \delta DI_j + \sum_{t=2}^{5} \rho DT_t + \epsilon_{ijt}$$

WR	XR	CR	LP	TM	NC	dBC	dAB	dON	dQU	dMF	dCG	dOTH	dBEV	JA	HK	TA	CH
													SI	CONST			
Exports - Pacific Rim: Japan, H.K., Taiwan, China, S.Korea, & Singapore													Buse [1973] R^2 = 0.8105		F stat = 164.283*		
(sample size = 750)																	
-0.186	-0.012	-0.350	0.031	-0.031	0.044	5.119	0.640	3.759	1.391	2.581	0.888	1.217	-0.049	2.525	0.303	0.090	-0.907
													-0.204	0.744			
(0.28)	(0.05)	**(1.75)**	(0.17)	(0.51)	(0.75)	**(14.44)**	**(3.17)**	**(7.30)**	**(3.13)**	**(6.34)**	**(1.90)**	**(4.12)**	(0.15)	**(5.19)**	(0.26)	(0.10)	(0.68)
													(0.13)	(0.30)			

Figures in parentheses represent t-statistics (in absolute values), rounded to the nearest 2 decimal places, using standard rounding practices
* significant at the calculated 17 and 107 degrees of freedom.

Table 6.2D Provincial Industry Sum of Exports to Pacific Rim and U.S.A. Markets: Regression Results

$$\sum_{i=1,\ j=1}^{5} logE_{ijkt} = \beta_1 + \beta_2 logWR_t + \beta_3 logCR_{ijt} + \beta_4 logLP_{ijt} + \beta_5 logTM_{ijt} + \beta_6 logNC_{ijt} + \sum_{i=2}^{5} \gamma DP_i + \sum_{j=2}^{5} \delta DI_j + \sum_{t=2}^{5} \rho DT_t + \epsilon_{ijt}$$

WR	CR	LP	TM	NC	dBC	dAB	dON	dQU	dMF	dCG	dOTH	dBEV	T89	T90	T91	T92	CONST
Exports - Japan, H.K., Taiwan, China, S.Korea, & Singapore Buse [1973] R^2 = 0.8129 F stat = 27.343*																	
-1.706	0.395	1.378	0.374	-0.052	4.525	0.419	0.511	-0.931	3.016	0.685	0.449	-1.179	0.270	-0.410	-0.399	-0.307	1.721
(0.84)	(0.63)	**(2.65)**	**(1.90)**	(0.28)	**(5.65)**	(0.65)	(0.39)	(0.78)	**(3.03)**	(0.70)	(0.65)	(1.26)	**(1.67)**	**(1.88)**	**(1.61)**	(1.18)	(0.33)
Exports - H.K., Taiwan, China, S.Korea, & Singapore (i.e., excluding Japan) Buse [1973] R^2 = 0.7628 F stat = 20.243*																	
0.701	-0.274	1.501	0.254	-0.169	5.135	2.036	3.648	2.481	2.943	1.853	0.797	-3.059	0.314	-0.506	-0.627	-0.528	-3.24
(0.31)	(0.44)	**(2.69)**	(1.05)	(0.67)	**(5.68)**	**(3.41)**	**(2.69)**	**(2.03)**	**(3.17)**	**(1.97)**	(1.28)	**(3.09)**	(1.24)	**(1.68)**	**(1.99)**	**(1.69)**	(0.52)

Figures in parentheses represent t-statistics (in absolute values), rounded to the nearest 2 decimal places, using standard rounding practices
* significant at the calculated 17 and 107 degrees of freedom.

Alternative Dependent Variable Specifications: "Stacked" Aggregated Exports and Summed Export Data

In Tables 6.2C and 6.2D above, the results of two regressions using alternative dependent variable specifications are given. In the first regression, each of the six *Asian* Pacific Rim market export data (i.e., excluding the U.S.), have been "stacked" atop one other, in order to create a model with 750 observations, as opposed to 125. The results show very little significant influence by the independent variables considered in this study. Only the estimated coefficient on the industry concentration variable is shown to explain a fairly significant proportion of the variation in exports (i.e., a t-statstic of 1.75). The sign on this coefficient estimate is negative, and the size (0.350) indicates its inelastic responsiveness. That is to say, the results suggest that relatively concentrated industries (i.e., industries with few, or monopolistic firms) generally explain increases in exports to markets in the Pacific Rim, yet a percent increase in exports is relatively unresponsive to a corresponding percent decrease in the number of firms.

The estimated coefficients on the provincial and industry dummy variables --excluding the beverage industry dummy, however--- are all very significant and generally very elastic. Again, the BC dummy variable, relative to the other regional dummy variables, and relative to the industry dummy variables, reveals a highly significant t-statistic (14.44) and a highly elastic coefficient estimate (5.119). The Ontario regional dummy and the meat & fish industry dummy are also highly statistically significant and very elastic; in comparison to the BC dummy, however, Ontario and meat & fish exhibit relatively less powerful explanatory capabilities. As discussed earlier, the continued significance exhibited by the dummy variable estimates imply that something specific to the region or industry, but not explicitly accounted for in the model is important in explaining export sales.

Of the Pacific Rim market dummy variables included in this model (i.e., the Japan dummy, Hong Kong, Taiwan, China, and Singapore dummies), only Japan proves to be significant (t-statistic of 5.19). This coefficient estimate is 2.525, which suggests that this market is highly responsive. Given the size and wealth of this market, the results would appear to be accurate. That is to say that one would assume that the value of a contract awarded to export a certain processed agri-food product to Japan would be significant, relative to the value of a similar contract to any of the other Pacific Rim markets, because of the number of consumers in Japan and the price these consumers are typically prepared to pay.

In Table 6.2D, the Asian Pacific Rim market export data are summed together. While not increasing the number of observations, this approach is meant to enrich the quality of these data. Two separate summed dependent variables are specified in this case: the first includes Japan, along with Hong Kong, Taiwan, China-mainland, South Korea, and Singapore; the second excludes the Japanese statistics. The results of the first model indicate that increased labour productivity, new product innovations, and factors embedded in the BC dummy and the meat & fish industry dummy variables significantly explain increases in exports to all of the six Pacific Rim markets combined. On the other hand, increases in labour productivity and factors embedded in most all of the regional, industry, and time dummy variables (excluding only the Other Processed Food Industry dummy and the 1989 time dummy) significantly explain increases in exports the five Pacific Rim markets (i.e., excluding Japan).

Interestingly, the coefficient of determination is higher in that model in which Japan is included, yet fewer explanatory variables are identified as being statistically significant in determining changes in exports. Moreover, only the BC dummy and the meat & fish industry dummy are shown to be significant in this model. Looking back at Tables 2.2, 2.3 and

Appendices 2 and 3, suggests that perhaps B.C.'s meat & fish industry exports to Japan (and likely, quite predominantly, the province's *fish* exports) are "overpowering" or masking the influence of other variables or factors; this is, of course, despite the fact that the variables are specified in logarithms.

Table 6.2E National (Canadian) Industry Exports to the Pacific Rim Markets: Regression Results

$$logE_{kt} = \beta_1 + \beta_2 logWR_t + \beta_3 logCR_t + \beta_4 logLP_t + \beta_5 logTM_t + \beta_6 logNC_t + + \sum_{j=2}^{5} \delta DI_j + \sum_{t=2}^{5} \rho DT_t + \epsilon_{ijt}$$

WR	CR	LP	TM	NC	dMF	dCG	dOTH	dBEV	T89	T90	T91	T92	CONST
Exports - Japan			Buse [1973] R^2 = 0.992			F stat = 104.65*							
1.083	3.795	-0.226	0.651	0.834	-0.841	-5.838	-2.751	0.427	-0.082	-0.846	-0.013	0.067	-27.390
(0.28)	**(2.20)**	(0.13)	**(1.76)**	**(2.70)**	(0.32)	**(1.95)**	**(1.81)**	(0.35)	(0.57)	**(3.21)**	(0.04)	(0.22)	**(2.60)**
Exports - H.K.			Buse [1973] R^2 = 0.921			F stat = 9.86*							
0.812	6.466	6.927	1.130	0.230	-1.687	-9.617	-7.824	-8.705	0.720	-0.506	0.388	1.228	-56.334
(0.06)	(1.11)	(1.36)	(0.91)	(0.18)	(0.20)	(0.98)	**(1.60)**	**(2.28)**	(1.31)	(0.66)	(0.32)	(1.19)	(1.53)
Exports - Taiwan			Buse [1973] R^2 = 0.9007			F stat = 7.67*							
-21.330	-25.058	2.215	3.431	-1.586	36.781	40.599	20.380	3.673	0.907	-0.646	-2.426	-2.326	153.920
(1.34)	**(3.90)**	(0.31)	**(2.39)**	(1.33)	**(3.71)**	**(3.69)**	**(3.78)**	(0.75)	**(1.52)**	(0.62)	**(1.95)**	**(1.90)**	**(3.90)**
Exports - China			Buse [1973] R^2 = 0.9254			F stat = 10.49*							
-3.725	-8.968	9.275	-0.225	-0.281	19.037	20.752	7.576	-5.523	0.041	-0.506	-1.528	-1.696	36.991
(0.34)	**(1.89)**	**(1.83)**	(0.23)	(0.30)	**(2.70)**	**(2.59)**	**(1.81)**	(1.44)	(0.11)	(0.68)	**(1.67)**	**(1.88)**	(1.23)
Exports - S.Korea			Buse [1973] R^2 = 0.8621			F stat = 5.29*							
8.349	8.055	-0.062	1.499	-0.561	-8.285	-12.993	-11.187	-8.039	1.566	0.927	1.360	1.620	-48.041
(0.37)	(0.93)	(0.01)	(0.78)	(0.865)	(0.65)	(0.84)	(1.31)	(1.02)	**(2.06)**	(0.73)	(1.26)	(1.12)	(0.80)
Exports - Singapore			Buse [1973] R^2 = 0.8625			F stat = 5.309*							
31.384	-4.699	-8.232	-0.791	0.310	0.441	4.607	6.776	-3.749	0.954	1.748	0.747	0.779	20.360
(2.95)	(1.12)	**(1.73)**	(0.78)	(0.36)	(0.07)	(0.64)	**(2.06)**	(1.26)	**(2.31)**	**(2.57)**	(0.80)	(0.92)	(0.78)

Figures in parentheses represent t-statistics (in absolute values), rounded to the nearest 2 decimal places, using standard rounding practices
* significant at the calculated 13 and 11 degrees of freedom.

Table 6.3A Provincial Industry Market Share in Pacific Rim and U.S.A. Markets: Regression Results

$$\frac{E_{ijkt}}{Imp_{jkt}} = \beta_1 + \beta_2 logWR_t + \beta_3 logCR_{ijt} + \beta_4 logLP_{ijt} + \beta_5 logTM_{ijt} + \beta_6 logNC_{ijt} + \sum_{i=2}^{5} \gamma DP_i + \sum_{j=2}^{5} \delta DI_j + \sum_{t=2}^{5} \rho DT_t + \epsilon_{ijt}$$

WR	CR	LP	TM	NC	dBC	dAB	dON	dQU	dMF	dCG	dOTH	dBEV	dT89	dT90	dT91	dT92	CONST
Market Share - Japan				Buse [1973] R^2 = 0.6359			F stat = 10.993*										
-0.184	0.092	0.657	0.089	0.155	4.851	0.109	-0.56	-0.494	0.492	0.013	-0.123	-0.369	-0.023	-0.161	-0.096	-0.148	-4.371
(0.10)	(0.22)	(1.30)	(0.51)	(0.98)	**(8.93)**	(0.31)	(0.64)	(0.63)	(0.61)	(0.01)	(0.23)	(0.44)	(0.12)	(0.67)	(0.39)	(0.67)	(0.88)
Market Share - H.K.				Buse [1973] R^2 = 0.1335			F stat = 0.970										
-0.038	0.023	-0.004	-0.01	-0.024	0.413	0.038	0.153	-0.013	0.139	0.01	0.068	0.042	0.021	0.009	0.002	0.065	0.301
(0.10)	(0.22)	(0.05)	(0.35)	(0.90)	**(1.70)**	(0.36)	(0.56)	(0.06)	(0.60)	(0.04)	(0.46)	(0.24)	(0.80)	(0.25)	(0.03)	**(1.52)**	(0.31)
Market Share - Taiwan				Buse [1973] R^2 = 0.0658			F stat = 0.443										
-3.5	-1.099	0.144	0.224	-0.028	2.486	1.374	2.737	2.004	2.585	2.214	1.825	1.307	-0.28	-0.423	-0.528	-0.379	10.082
(1.11)	(1.15)	(0.17)	(0.70)	(0.09)	**(1.61)**	(1.35)	(1.24)	(1.01)	(1.40)	(1.16)	**(1.56)**	(0.90)	(0.92)	(1.10)	(1.18)	(0.85)	(1.20)
Market Share - China				Buse [1973] R^2 = 0.166			F stat = 1.252										
2.844	0.605	1.18	0.006	0.125	3.785	-0.356	-0.87	-1.14	-0.598	-1.867	-1.529	-2.604	0.003	-0.426	-0.341	-0.255	-13.574
(0.68)	(0.57)	(1.07)	(0.02)	(0.32)	**(2.27)**	(0.35)	(0.36)	(0.53)	(0.27)	(0.78)	(1.03)	(1.25)	(0.01)	(0.87)	(0.66)	(0.51)	(1.18)
Market Share - South Korea				Buse [1973] R^2 = 0.079			F stat = 0.540										
0.125	0.001	-0.063	-0.005	0.02	0.1	0.016	0.082	0.002	0.076	-0.008	-0.029	-0.044	-0.026	0.011	0.077	0.02	-0.263
(0.28)	(0.00)	(0.59)	(0.14)	(0.54)	(0.42)	(0.11)	(0.26)	(0.00)	(0.25)	(0.03)	(0.15)	(0.62)	(0.66)	(0.21)	(1.30)	(0.33)	(0.22)
Market Share - Singapore				Buse [1973] R^2 = 0.483			F stat = 5.879*										
-0.189	-0.022	0.067	0.011	-0.029	0.219	0.022	0.232	0.104	0.097	0.055	0.07	0.042	0.05	0.014	-0.017	0.023	0.513
(1.44)	(0.65)	(1.44)	(0.71)	(1.36)	**(3.78)**	(0.55)	**(2.30)**	(1.22)	**(1.55)**	(0.79)	(1.49)	(0.63)	**(2.36)**	(0.70)	(0.75)	(1.05)	(1.22)
Market Share - U.S.A.				Buse [1973] R^2 = 0.4325			F stat = 4.797*										
-0.716	-1.523	1.361	0.35	-0.397	13.559	2.416	5.889	2.964	4.192	6.295	4.084	0.258	-0.263	-0.877	-0.834	0.254	2.069
(0.10)	(0.92)	(0.74)	(0.57)	(0.42)	**(5.07)**	**(1.59)**	(1.26)	(0.83)	(1.42)	**(1.73)**	**(1.77)**	(0.09)	(0.34)	(0.98)	(0.83)	(0.29)	(0.11)

Figures in parentheses represent t-statistics (in absolute values), rounded to the nearest 2 decimal places, using standard rounding practices
* significant at the calculated 17 and 107 degrees of freedom.

Table 6.3B Provincial Industry "Stacked" Aggregrated Market Share Exports to Pacific Rim and U.S.A. Markets: Regression Results

$$STACKED\ logE_{ijkt} = \beta_1 + \beta_2 logWR_t + \beta_3 logCR_{ijt} + \beta_4 logLP_{ijt} + \beta_5 logTM_{ijt} + \beta_6 logNC_{ijt} + \sum_{i=2}^{5} \gamma DP_i + \sum_{j=2}^{5} \delta DI_j + \sum_{t=2}^{5} \rho DT_t + \epsilon_{ijt}$$

WR	XR	CR	LP	TM	NC	dBC	dAB	dON	dQU	dMF	dCG	dOTH	dBEV	JA	HK	TA	CH
													SI	CONST			
													(0.13)	(0.30)			
Market Share - Pacific Rim: Japan, H.K., Taiwan, China, S.Korea, & Singapore Buse [1973] R^2 = 0.1088 F stat = 4.693*																	
(sample size = 750)																	
0.075	-0.089	-0.017	0.328	0.018	0.063	1.558	0.024	-0.072	-0.053	0.549	0.145	0.151	-0.290	0.084	0.308	0.404	0.286
													0.364	-2.748			
(0.20)	(0.52)	(0.15)	**(3.39)**	(0.47)	**(1.86)**	**(6.34)**	(0.18)	(0.28)	(0.23)	**(2.32)**	(0.63)	(1.01)	**(1.64)**	(0.28)	(0.40)	(0.70)	(0.33)

Figures in parentheses represent t-statistics (in absolute values), rounded to the nearest 2 decimal places, using standard rounding practices
* significant at the calculated 17 and 107 degrees of freedom.

Table 6.3C National (Canadian) Industry Market Share in Pacific Rim and U.S.A. Markets: Regression Results

$$\frac{E_{kt}}{Imp_{kt}} = \beta_1 + \beta_2 logWR_t + \beta_3 logCR_t + \beta_4 logLP_t + \beta_5 logTM_t + \beta_6 logNC_t + + \sum_{j=2}^{5} \delta DI_j + \sum_{t=2}^{5} \rho DT_t + \epsilon_{ijt}$$

WR	CR	LP	TM	NC	dMF	dCG	dOTH	dBEV	T89	T90	T91	T92	CONST
Market Share - Japan					Buse [1973] R^2 = 0.8289			F stat = 4.10					
-0.078	2.196	-1.010	0.169	0.109	-2.935	-3.918	-1.826	0.864	-0.112	-0.299	-0.029	0.074	-11.000
(0.03)	**(1.72)**	(0.88)	(0.65)	(0.37)	**(1.59)**	**(1.85)**	**(1.78)**	(1.12)	(1.02)	**(1.65)**	(0.12)	(0.35)	**(1.51)**
Market Share - H.K.					Buse [1973] R^2 = 0.8429			F stat = 4.53*					
0.068	0.232	0.048	-0.007	0.016	-0.046	-0.316	-0.176	-0.069	0.011	0.000	0.027	0.046	-1.578
(0.16)	(1.04)	(0.31)	(0.15)	(0.37)	(0.15)	(0.83)	(0.84)	(0.44)	(0.54)	(0.01)	(0.62)	(1.08)	(1.01)
Market Share - Taiwan					Buse [1973] R^2 = 0.7093			F stat = 2.06					
-9.631	-6.367	-0.937	0.635	-0.094	11.091	10.146	5.696	3.763	-0.042	0.250	-0.611	-0.461	42.995
(0.93)	(1.42)	(0.20)	(0.70)	(0.11)	**(1.71)**	(1.38)	(1.48)	(0.99)	(0.15)	(0.34)	(0.73)	(0.56)	**(1.57)**
Market Share - China					Buse [1973] R^2 = 0.6155			F stat = 1.33					
4.918	2.997	3.527	-0.345	-0.153	-0.724	-3.788	-3.336	-4.220	-0.234	-0.581	-0.300	-0.299	-25.077
(0.67)	(1.02)	(1.18)	(0.55)	(0.34)	(0.17)	(0.75)	(1.25)	**(1.75)**	(0.88)	(1.32)	(0.60)	(0.57)	(1.27)
Market Share - S.Korea					Buse [1973] R^2 = 0.5573			F stat = 1.07					
-1.241	-0.378	0.239	0.081	-0.042	0.906	0.675	0.186	0.125	0.061	-0.011	-0.044	-0.039	2.700
(0.93)	(0.70)	(0.47)	(0.74)	(0.51)	(1.18)	(0.74)	(0.38)	(0.27)	(1.33)	(0.15)	(0.52)	(0.43)	(0.77)
Market Share - Singapore					Buse [1973] R^2 = 0.7686			F stat = 2.81					
0.740	-0.156	-0.155	0.015	0.039	0.061	0.152	0.169	-0.144	0.009	0.022	0.007	0.011	0.010
(2.42)	(1.20)	(1.13)	(0.44)	(0.90)	(0.30)	(0.70)	**(1.86)**	**(1.96)**	(0.67)	(1.08)	(0.19)	(0.42)	(0.01)
Market Share - U.S.A.					Buse [1973] R^2 = 0.776			F stat = 27.343					
10.691	-4.971	-3.073	3.483	0.877	2.363	4.936	2.934	-5.975	-0.181	-1.547	-1.061	-0.308	-1.351
(0.66)	(0.64)	(0.53)	**(2.08)**	(0.51)	(0.22)	(0.37)	(0.43)	(1.12)	(0.27)	**(1.78)**	(0.63)	(0.22)	(0.03)

Figures in parentheses represent t-statistics (in absolute values), rounded to the nearest 2 decimal places, using standard rounding practices
* significant at the calculated 17 and 107 degrees of freedom.

Regression Set 3: Export Market Share Regressions

The coefficient of determination in the market share regression (Buse R^2) pertaining to each market regression, except Japan, is noticeably low. Hence, very little of the variation in market share in Hong Kong, Taiwan, China, South Korea, Singapore, or the U.S.A. is explained by variations in the explanatory variables considered. In fact, the results in Tables 6.3 reveal very few of the explanatory variables as being statistically significant. Hence, the results suggest that changes in market shares of processed food and beverage industry categories, in individual Pacific Rim markets, are typically not explained by either of the exogeneous or endogeneous factors included in the study.

The only coefficient estimate that does reveal some degree of consistency in statistical significance is the B.C. dummmy variable. In the Japan, Singapore, and U.S.A. model runs, the positively signed B.C. dummy is highly significant (i.e., t-statistics of 8.93, 3.78, and 5.07 respectively). This suggests that certain factors "embedded within" the B.C. dummy variable, but not explicitly identified in the model, are positively influencing shares in these Pacific Rim markets. Moreover, in the Japan, China, and U.S.A. market models the coefficients of the B.C. dummy variables are very large and positive, implying that the onset of a relative change, specific to the B.C. region, evokes a responsive absolute change in Japanese and U.S.A. market shares.

A final note of interest is the changing sign on the estimated coefficients of some of the variables in the market share models (e.g., alternative positive and negatively signed coefficients of the industry concentration proxy (CR) variable). Although insignificant, these differences do begin to suggest that changes in different factors my influence individual export markets differently.

7.0 CONCLUSION

Significant export opportunities are seen to exist for the B.C. agri-food industry in Pacific Rim markets. There is, however, a lack of understanding of the driving factors behind the industry's ability to be "competitive" (i.e., profitably gain and maintain market share) in these regions. The purpose of this study has been to attempt to develop an understanding of those factors or characteristics which influence the B.C. industries' competitiveness in the Pacific Rim. Specifically, the interest has been to determine the influence of exogenous factors, as suggested in the traditional comparative cost and industrial organization doctrines, and endogenous factors, suggested in business school and, now, competitiveness literatures.

Using cross-sectional, time series data, systematic differences amongst related industries in B.C. and four other Canadian provinces are studied to explain changes in export market share and changes in total exports to Japan, Hong Kong, Taiwan, China, South Korea, Singapore and the United States. Converse to what is suggested in the literature, the findings show no statistical consistency in the explanatory capabilities of comparative cost, industrial organization, or firm strategy variables in explaining competitiveness in Pacific Rim markets. Rather, it appears that export success of the provincial industries is due to many unique factors at the firm or provincial level. While low wage rates and industries with few or monopolistic firms explain changes in exports to Taiwan, high wage rates (or skilled labour) explain changes in exports to China. On the other hand, changes in labour productivity and new product innovations are shown to be statistically significant in explaining changes in exports to the sum total of the Pacific Rim countries. Yet, when Japan is excluded from the "total" Pacific Rim market, only changes in labour productivity significantly explain changes in Pacific Rim exports. Moreover, analysis of the sum of all of the five province's industry exports to the individual Pacific Rim countries (i.e., a proxy for "Canadian industry" exports)

shows that less concentrated or more competitive industry structures and new product innovations explain changes in exports to Japan, while only competitive industry structures explain changes in market share in Japan; less concentrated industries and new product innovations, explain changes in exports to Taiwan; concentrated industries significantly explain changes in exports to China; and high wage rates (or skilled labour) and low labour productivity explain changes in exports to Singapore.

Despite these findings, which differ depending on the particular export market in question, the regional dummy variables, most notably the B.C. regional dummy, proves to be very consistent in explaining export market competitiveness. The consistent statistical significance exhibited by the B.C. dummy coefficient estimates, compared to other regional and industry dummy estimates, and compared to the non-dummy explanatory variables, suggests that there are regional influences which impact on exports and export market shares of processed food and beverages to the Pacific Rim. As Kennedy notes, "The dummy variable coefficients reflect ignorance -- they are inserted merely for the purpose of measuring shifts in the regression line arising from unknown variables" (p.222). Hence, these findings indicate that an important variable, explaining B.C.'s significance in these markets has not been correctly addressed by the model. Since it is only the B.C. regional dummy variable, and not any of the industry dummy variables, nor the remaining regional variables, that is so consistently significant throughout all of the export and export market share models, one is left to infer that export successs is due to many unique factors at the B.C. firm and/or B.C. provincial level.

In terms of policy implications, these findings would suggest that any program or policy which increases the access, opportunities, or abilities of B.C. exporting firms to make business contacts/connections in the Pacific Rim markets would increase industry export

capability. This parallels what is currently discussed in business magazines and on radio and television talk shows, etc.; that is, "getting out there, or going to the markets, and getting immersed in the culture and business practices" is what matters most. Hence, neither the relative comparative cost advantages between firms, industries or nations, nor the industrial structure of the domestic markets in which firms operate, nor the "innovativeness" or other such specific firm strategies will be solely and consistently responsible for their competitive export success. These theories would imply that B.C. and other Canadian firms need merely wait for the markets to come to them, attracted to the comparative advantages offered. The findings in this study indicate, however, that gaining and maintaining shares in the Pacific Rim markets instead requires that domestic firms might be more well advised to aggressively search out their markets, and that firms in British Columbia, for reasons not wholly clear, are already at an advantage.

REFERENCES

Abbott, Philip C., and Maury E. Bredahl. "Competitiveness: Definitions, Useful Concepts, and Issues." In *Competitiveness in International Food Markets*, eds. M.E. Bredahl, P.C. Abbott, and M.R. Reed. Boulder CO: Westview Press, 1994.

Agriculture Canada. Task Force on Competitiveness in the Agri-food Industry. *Growing Together: Report to Ministers of Agriculture.* Ottawa: Agriculture Canada, June 1991.

Agriculture Canada. *Framework for Analyzing the Competitiveness of the Agri-food Sector.* Working Paper APD. 3-93. Ottawa: Agriculture Canada, June 1993.

Ash, Ken and Lars Brink. *The Role of Competitivness in Shaping Policy Choices.* A Working Paper. APD. 92-5. Ottawa: Agriculture Canada, 1992.

Ash, Ken and Lars Brink. "Assessing the Role of Competitivness in Shaping Policy Choices: A Canadian Perspective." In *Competitiveness in International Food Markets*, eds. M.E. Bredahl, P.C. Abbott, and M.R. Reed. Boulder CO: Westview Press, 1994.

Asian Development Bank. *Key Indicators of Developing Asian and Pacific Countries.* Volume XXIV. Oxford University Press, 1993.

Bain, J.S. *Barriers to New Competition.* Cambridge, Mass.: Harvard University Press, 1956.

Beck, Nuala. *Shifting Gears: Thriving in the New Economy.* Toronto: Harper Collins, 1992.

Belassa, Bela. "An Empirical Demonstration of Classical Comparative Cost Theory," *Review of Economics and Statistics.* Volume 45. Cambridge, Mass.: Harvard College, 1963.

Bredahl, Maury E., Philip C. Abbott, and Michael R. Reed. *Competitiveness in International Food Markets.* Boulder CO: Westview Press, 1994.

Buzzell, Robert D., Bradley T. Gale and Ralph G.M. Sultan. "Market Share - A Key to Profitability," *Harvard Business Review.* Volume 53, January-December. Boston, Mass.: Harvard College, 1975.

Canadian Intellectual Property Office (CIPO). *Trademarks Journal.* Ottawa. Weekly editions, 1988-1992.

Caves, Richard E., Michael E. Porter, A. Michael Spence, and John T. Scott. *Competition in the Open Economy - A Model Applied to Canada.* Cambridge, Mass.: Harvard University Press, 1980.

Chamberlin, E.H. *The Theory of Monopolistic Competition.* Cambridge, Mass.: Harvard University Press, 1933.

D'Cruz and Rugman (1992) *New Compacts for Canadian Competitiveness.* A study commissioned by Kodak Canada Inc., and published as part of the Kodak Series. Kodak Canada Inc., Toronto Ontario, 1992.

Gruber, William H. and Raymond Vernon. "The Technology Factor in a World Trade Matrix," *The Technology Factor in International Trade.* edited by Raymond Vernon. New York: National Bureau of Economic Research, 1970.

Gujarati, Domadar N. *Basic Econometrics.* Second Edition. New York: McGraw-Hill Publishing Company, 1988.

Hazeldine, Tim. "Market Mass Competitiveness in the Canadian Food Industry." In *Competitiveness in International Food Markets*, eds. M.E. Bredahl, P.C. Abbott, and M.R. Reed. Boulder CO: Westview Press, 1994.

Heckscher, Eli F. and Bertil Ohlin. *Heckscher-Ohlin Trade Theory.* eds. Harry Flam and June M. Flanders. Cambridge, Mass.: The MIT Press, 1991.

Ho Fan and John Beghin. "Declining U.S. Tobacco Exports to Australia: A Derived Demand Approach to Competitiveness," *International Agricultural Trade Research Consortium,* Working Paper #94-3. Paris, France.

International Monetary Fund. *International Financial Statistics.* May 1994.

Judge, George G., R. Carter Hill, William E. Griffiths, Helmut Lutkepohl, and Tsoung-Chao Lee. *Introduction to The Theory and Practice of Econometrics.* New York: John Wiley and Sons Inc., 1982.

Kaldor, N. "The Effect of Devaluations or Trade in Manufacturers." In *Future Essays in Applied Economics*, London: Duckworth, 1978.

Kennedy, Peter. *A Guide to Econometrics.* Third Edition. Cambridge, Massachusetts, MIT Press., 1992.

Kmenta, J., *Elements of Econometrics*, Second Edition, Macmillan, 1986.

Krugman, Paul R., and Maurice Obstfeld. *International Economics Theory and Policy.* 2nd edition.

Leontief, W.W. "Domestic Production and Foreign Trade: The American Capital Position Reexamined." *Econ. Int.* 7(1954):3-32.

MacDougall, G.D.A. "British and American Exports: A Study Suggest by the Theory of Comparative Costs." *Economic Journal.* Volume 61. New York: The Macmillan Company, 1951.

McCorriston, Steve and Ian Sheldon. "International Competitivness: Implications of New International Economics." In *Competitiveness in International Food Markets*, eds. M.E. Bredahl, P.C. Abbott, and M.R. Reed. Boulder CO: Westview Press, 1994.

Nemetz, Peter N. The Pacific Rim. Second Edition. The University of British Columbia Press, 1990.

Pool, John Charles and Stephen C. Stamos. International Economics Theory, Policy, and Practice. Toronto: Lexington Books, 1990.

Porter, Michael E. *Competitive Strategy*. New York: The Free Press, 1980.

Porter, Michael E. *Competitive Advantage*. New York: The Free Press, 1985.

Porter, Michael E. *The Competitive Advantage of Nations*. New York: The Free Press, 1990.

Porter, Michael E. "The Competitive Advantage of Nations". *Harvard Business Review*. March-April 1990. Number 2. Boston, Mass: Harvard College, 1990a.

Ricardo, David. *Principles of Political Economy*. edited by Piero Pasraffa. Oxford, Great Britain: Alden Press, 1975.

Rosenberg, Nathan. "Comments" (on Michael Bruno's paper, "Development Policy and Dynamic Comparative Advantage.") In *The Technology Factor in International Trade*, edited by Raymond Vernon. New York: Columbia University Press, 1970.

Sawyer, Malcolm C. *The Economics of Industries and Firms*. 2nd edition. London, England: Croom Helm Ltd., 1985.

Schoeffler, Sidney, Robert D. Buzzell, and Donald F. Heany. "Impact of Strategic Planning on Profit Performance," *Harvard Business Review*. Volume 52, March-April. Boston Mass.: Harvard College, 1974.
Smith, Adam. *The Wealth of Nations*. New York: Random House, 1987.

Statistics Canada. *Annual Survey of Manufacturers*. Catalogue #31-203. Ottawa.

Statistics Canada. *Canadian Economic Observer: Historical Statistical Supplement, 1992/93*. Catalogue No. 11-210, Vol.7. Ottawa, July 1993.

Statistics Canada. *Guide to Canadian Manufacturers*. Catalogue 32-250. Ottawa.

Statistics Canada, *Exports by Countries* (Quarterly, January-December issues). Catalogue No. 65-003, Ottawa, 1989, 1990, 1991, 1992, and 1993.

Statistics Canada. *World Trade Database* 1980-1991 (on CD-ROM). Ottawa, Ontario, March 1993.

Toffler, Alvin. Power Shift. Bantam: New York, 1990.

van Duren, Erna, Larry Martin, and Randall Westgren. "Assessing the Competitiveness of Canada's Agri-food Industry. Canadian Jouranl of Agricultural Economics 39: 727-738, 1991.

van Duren, Erna, Larry Martin, and Randall Westgren. "A Framework for Assessing National Competitiveness and the Role of Private Strategy and Public Policy." In *Competitiveness in International Food Markets*, eds. M.E. Bredahl, P.C. Abbott, and M.R. Reed. Boulder CO: Westview Press, 1994.

Vernon, Raymond. "International Investment and International Trade in the Product Cycle." *Quarterly Journal of Economics*. New York: Harper Collins, 1966.

APPENDIX 1. Selected Definitions of Competitiveness

The following list of definitions are meant to provide an overview of the diversity of interpretations of the term "competitiveness". These definitions are taken from lists provided in Ash and Brink (1992; Appendix 1), and in Abbott and Bredahl, (1994).

- *Competitiveness is "the ability of a nation to produce, distribute, and service goods in the international economy in competition with goods and services produced in other countries and to do so in a way that earns a rising standard of living" (Scott and Lodge, 1985).*

- *Competitiveness is the "...ability to deliver goods and services at the time, place and form sought by overseas buyers at prices as good or better than those of other potential suppliers whilst earning at least opportunity cost returns on resources employed" (Freebairn, 1986).*

- *Competitiveness is "a national ability to produce and market products in international trade while earning a level of returns to the resources (both human and physical) used to produce those products which is at least comparable to what those resources could earn in alternative activities" (Langley, 1986).*

- *What we should mean by competitiveness, and thus the principal goal a of our economic policy, is the ability to sustain, in a global economy, an acceptable growth in the real standard of living of the population with an acceptably fair distribution, while efficiently providing employment for substantially all who can and wish to work, and doing so without reducing the growth potential in the standard of living of future generations (Landau, 1992, p.6).*

- *"Competitiveness can be broadly defined as the ability to sell commodities to overseas buyers at prices as low as or lower than those of other potential suppliers while earning at least opportunity cost returns on domestic resources used to produce and market these commodities" (Vollrath, 1989)*

- *"For a firm, competitiveness is the ability to design, develop, manufacture and market products at home and in other nations in competition with other firms. For a nation, it means doing all this without a decline in the real standards of living of its citizens." (U.S. Congress, Office of Technology Assessment (1988,p.25), quoted in Industry, Science and Technology Canada, 1991, p.3)*

- *Competitiveness is the "...ability to design, produce and market goods and services, the price and non-price characteristics of which form a more attractive package than those of competitors" (IMD and World Economic Forum, 1990).*

- *"The only meaningful concept of competitiveness at the national level is national productivity" (Porter, 1990).*

- *"Competitiveness is the ability to profitably gain and maintain market share in the domestic and/or export market" (Task Force on Competitiveness in the Agri-Food Industry, 1990)*

- *"Competitiveness is a structural quality built into [a country's] public and private institutions and ultimately woven into its social, economic and political fabric. [...]*

  Competitiveness depends on competition, and economic efficiency and innovation are the result" (Purchase, 1991).

- *"National competitiveness is better defined by reference to broader indicators that show the extent to which a country's involvement in global markets through trade, investment, and technology flows to growth in real income" (Economic Council of Canada, 1992).*

APPENDIX 2. Provincial Domestic Shipments and Pacific Rim Exports, 1988-1992, by Industry Category

('000 Real 1990 $ Cdn.)

2. A Total Provincial Shipments and Exports of Processed Meat and Fish Products ('000 Real 1990 $Cdn.)

	No. of Estab.	Domestic Shipments	Value-Added	Japan	H.K.	Taiwan	P.R.C.	S. Korea	Singapore	U.S.A.
British Columbia										
1988	118	1,562,706.0	503,740.4	207,906.0	9,654.7	4,893.9	15,697.9	3.2	141.8	56,683.2
1989	121	1,502,932.0	431,518.3	229,521.2	6,355.0	5,039.8	6,068.3	339.7	177.7	517,166.1
1990	115	1,551,000.0	463,800.0	140,755.8	5,244.3	89,926.8	2,767.0	2,759.6	418.2	22,460.0
1991	109	1,428,883.0	439,204.5	179,629.7	7,012.0	64,263.0	944.4	5,655.6	204.4	25,483.3
1992	112	1,418,937.0	435,074.6	153,910.9	16,859.8	47,998.8	6,548.9	4,790.6	46.0	39,247.9
Alberta										
1988	80	2,589,989.0	365,786.6	69.0	298.2	0.0	254.1	0.0	0.0	2,358.0
1989	78	2,594,764.0	314,031.4	157.1	0.3	161.9	778.4	0.0	0.0	14,616.2
1990	79	2,811,400.0	360,300.0	20.7	163.3	234.8	0.0	0.0	0.0	32,513.3
1991	74	2,375,758.0	376,231.1	2,218.0	2,907.4	0.0	0.0	0.0	0.9	1,610.7
1992	69	2,156,250.0	391,138.1	15,785.9	154.9	6.7	0.0	0.0	0.0	2,075.9
Manitoba										
1988	47	696,919.7	178,767.9	192.8	0.2	0.0	0.0	0.0	0.0	7,434.2
1989	45	582,722.5	147,644.0	138.0	64.6	0.0	0.0	0.0	0.0	3,212.2
1990	41	501,800.0	159,500.0	222.1	128.9	0.0	9.8	0.0	0.0	6,514.5
1991	42	418,750.0	131,628.8	90.1	272.0	0.0	375.7	0.0	41.4	8,273.9
1992	39	368,470.1	108,675.4	2,705.8	56.6	0.0	0.0	0.0	16.5	17,984.4
Ontario										
1988	246	4,080,418.0	1,009,351.0	4,622.3	844.4	989.4	175.9	234.8	372.6	13,031.6
1989	249	3,940,314.0	946,911.0	8,207.6	326.0	367.9	106.7	61.0	248.9	2,547.0
1990	236	3,706,600.0	927,900.0	12,224.4	248.7	438.2	0.0	0.0	216.8	5,158.9
1991	220	3,308,428.0	909,185.6	2,522.6	216.7	236.5	0.0	306.1	11.3	12,078.2
1992	212	3,387,780.0	889,272.4	1,492.0	108.3	355.4	114.9	267.6	6.0	17,295.3
Quebec										
1988	209	2,836,854.0	648,844.9	99.9	10.3	120.9	64.5	0.0	710.2	300.4
1989	201	2,671,937.0	605,340.3	114.9	0.8	114.6	347.9	2.9	17.4	343.1
1990	225	2,649,200.0	657,100.0	619.8	2.3	0.0	371.8	64.0	8.9	1,814.5
1991	217	2,633,902.0	715,909.1	121.8	267.6	199.2	45.3	54.1	0.0	2,689.0
1992	206	2,503,731.0	668,470.1	213.6	77.2	185.0	60.8	0.0	0.0	241.4

APPENDIX 2 (continued)

2. B Total Provincial Shipments and Exports of Processed Fruit and Vegetable Products ('000 1990 $Cdn

	No. of Estab.	Domestic Shipments	Value-Added	Japan	H.K.	Taiwan	P.R.C.	S. Korea	Singapore	U.S.A.
British Columbia										
1988	34	279,317.9	94,389.4	3,624.7	982.6	0.0	43.1	46.4	16.5	20,995.7
1989	34	254,555.0	105,026.2	3,277.7	277.1	19.4	764.9	428.8	90.6	16,738.7
1990	34	256,200.0	91,100.0	2,145.6	126.3	60.5	507.8	64.0	152.5	16,555.4
1991	32	236,931.8	92,992.4	1,513.0	236.1	23.7	134.8	0.0	110.2	8,691.4
1992	27	243,283.6	99,533.6	837.5	247.6	28.4	42.3	29.6	241.0	13,645.3
Alberta										
1988	8	72,057.2	22,992.3	0.0	15.5	14.9	0.0	0.0	0.0	330.4
1989	11	92,146.6	27,225.1	34.2	20.8	107.4	0.0	0.0	24.7	533.5
1990	10	56,600.0	21,300.0	0.0	0.4	0.0	0.0	0.0	92.6	448.3
1991	10	107,102.3	42,140.2	0.0	0.0	4.2	0.0	0.0	23.7	1,149.3
1992	11	105,503.7	34,141.8	0.0	0.0	5.2	0.0	0.0	15.7	58.4
Manitoba										
1988	5	203,080.3	116,171.6	0.3	2.8	37.9	0.0	0.0	0.0	183.0
1989	4	156,300.0	79,800.0	0.0	0.0	44.0	0.0	0.0	3.9	0.0
1990	4	141,856.1	75,947.0	0.0	0.0	415.5	0.0	0.0	0.0	939.9
1991	3	104,244.4	56,110.1	124.9	0.0	0.0	0.0	0.0	0.0	0.0
1992				0.0	0.0	10.1	0.0	0.0	0.0	0.0
Ontario										
1988	103	1,919,802.0	885,478.5	149.2	18.4	9.5	1,424.5	0.0	0.0	4,764.1
1989	96	1,880,733.0	798,743.5	383.6	89.5	0.0	2,210.4	0.0	0.0	3,931.7
1990	90	1,871,800.0	803,900.0	159.3	19.3	15.3	189.4	10.2	37.7	6,370.1
1991	80	1,815,530.0	871,401.5	164.6	99.9	142.6	0.0	0.0	0.0	7,545.9
1992	79	1,752,052.0	825,000.0	497.4	188.8	0.0	0.0	13.9	50.7	6,318.8
Quebec										
1988	63	477,117.7	206,820.7	61.3	7.4	0.0	0.0	147.8	41.3	61.2
1989	58	467,958.1	210,261.8	371.1	0.0	8.1	0.0	0.0	13.6	15.5
1990	68	481,300.0	209,700.0	10.5	42.8	2.6	0.0	0.0	1.0	79.5
1991	61	417,140.2	175,094.7	0.0	69.9	0.0	0.0	0.0	0.0	82.2
1992	62	380,037.3	154,384.3	0.0	5.2	0.0	0.0	15.2	1.2	11.7

APPENDIX 2 (continued)

2. C Total Provincial Shipments and Exports of Processed Cereal and Grain Products ('000 1990 $Cdn)

	No. of Estab.	Domestic Shipments	Value-Added	Japan	H.K.	Taiwan	P.R.C.	S. Korea	Singapore	U.S.A.
British Columbia										
1988	88	395,819.6	143,454.3	7,929.9	28.9	22.5	19,304.5	0.0	0.0	37,375.1
1989	93	436,858.6	148,691.1	9,670.9	819.5	2,207.1	7,407.4	0.0	11.7	30,783.9
1990	90	422,100.0	170,900.0	5,373.1	715.0	51.6	4,635.9	2,513.4	24.2	52,023.6
1991	87	382,291.7	153,787.9	8,501.3	741.0	26.0	1,607.7	0.0	7.0	66,572.2
1992	86	414,272.4	170,522.4	10,118.8	234.3	17.3	6,894.8	116.3	92.0	145,547.4
Alberta										
1988	123	565,676.6	144,554.5	600.5	1.5	112.6	0.0	16.6	0.0	2,015.1
1989	133	829,528.8	189,633.5	13.2	33.4	0.0	0.0	12,736.9	0.0	2,749.3
1990	123	737,300.0	198,100.0	491.5	0.0	0.0	0.0	0.0	0.0	183.7
1991	122	706,155.3	201,704.5	52.4	0.0	0.0	0.0	0.0	0.0	6,323.3
1992	119	755,690.3	201,492.5	1,185.8	119.8	312.3	0.0	0.0	0.0	13,968.9
Manitoba										
1988	61	291,529.2	84,048.4	101.4	0.0	22.0	0.0	118.0	231.4	372.2
1989	64	293,926.7	85,130.9	31.4	0.0	5.7	0.0	0.0	448.7	154.3
1990	57	256,700.0	88,900.0	0.0	0.0	45.5	0.0	0.0	551.8	2,381.8
1991	58	230,871.2	86,742.4	0.0	0.0	607.8	165.3	0.0	0.0	741.2
1992	55	233,582.1	76,679.1	0.0	0.0	128.6	33.4	0.0	23.2	518.2
Ontario										
1988	367	3,736,524.0	1,310,891.0	68.7	59.8	0.0	0.0	0.0	0.0	1,394.1
1989	385	3,249,319.0	1,273,613.0	170.4	44.2	0.0	11.1	62.6	33.0	1,279.9
1990	366	3,033,300.0	1,327,000.0	540.7	397.8	122.4	547.0	344.0	17.8	1,622.8
1991	341	2,786,837.0	1,224,527.0	127.4	168.6	45.3	849.4	1,269.0	133.1	8,209.9
1992	334	2,954,478.0	1,422,015.0	241.0	429.7	10.5	163.8	187.8	78.5	3,744.1
Quebec										
1988	365	1,864,356.0	667,656.8	0.0	0.0	31.8	17.4	7.0	0.0	0.0
1989	360	1,774,660.0	622,827.2	0.0	0.4	34.9	1.6	0.0	0.0	0.0
1990	464	1,818,900.0	690,500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991	399	1,580,682.0	618,560.6	0.0	0.0	4.4	0.0	0.0	0.0	7.3
1992	387	1,622,481.0	648,787.3	0.0	0.0	0.0	14.4	0.0	0.0	10.1

APPENDIX 2 (continued)

2. D Total Provincial Shipments and Exports of Other Processed Food Products ('000 Real 1990 $Cdn

	No. of Estab.	Domestic Shipments	Value-Added	Japan	H.K.	Taiwan	P.R.C.	S. Korea	Singapore	U.S.A.
British Columbia										
1988	65	292,409.2	131,133.1	10,832.8	133.9	0.0	334.4	0.0	55.2	45,164.2
1989	70	284,607.3	121,047.1	11,732.1	589.3	304.5	0.0	14.5	182.1	92,459.8
1990	64	143,200.0	65,400.0	3,705.7	477.2	275.5	2,177.2	0.0	217.9	93,407.3
1991	63	127,462.1	55,587.1	9,601.6	183.4	396.2	0.0	11.0	34.8	95,623.3
1992	55	168,470.1	67,164.2	2,865.2	770.5	1,343.6	0.0	1.9	837.0	115,118.9
Alberta										
1988	37	306,160.6	108,910.9	94.2	101.5	1,560.1	0.0	0.0	6.0	1,625.3
1989	43	335,288.0	115,811.5	71.1	617.0	0.0	72.7	0.0	0.0	208.5
1990	36	282,400.0	117,200.0	55.2	0.0	0.0	112.5	0.0	61.5	80.9
1991	35	336,363.6	155,397.7	109.1	0.0	0.0	153.6	0.0	39.9	161.6
1992	32	339,552.2	161,100.7	17.8	0.0	0.0	91.9	2.8	99.7	108,757.9
Manitoba										
1988	24	130,803.1	49,505.0	555.7	1,163.5	24.4	0.0	0.0	0.0	22,675.0
1989	24	135,078.5	47,644.0	371.3	0.0	0.0	0.0	0.0	0.0	30,367.1
1990	23	147,700.0	58,600.0	303.1	0.0	5.1	0.0	0.0	0.3	1,058.4
1991	20	146,969.7	54,166.7	426.6	0.0	9.0	0.0	0.0	0.0	510.5
1992	18	124,347.0	54,104.5	398.3	17.9	413.5	82.7	0.0	28.4	674.5
Ontario										
1988	216	3,737,624.0	1,789,989.0	438.8	167.9	237.6	512.4	0.0	64.9	964210.9
1989	213	3,578,115.0	1,684,817.0	856.9	22.3	11.5	475.7	0.0	1,391.3	50,189.9
1990	204	3,434,400.0	1,639,100.0	561.4	314.3	5.8	79.7	14.9	20.3	39,049.8
1991	200	3,374,527.0	1,721,875.0	719.2	58.7	90.2	626.3	0.0	0.0	177,157.1
1992	189	3,551,679.0	1,827,425.0	394.5	236.6	393.6	583.8	11.5	38.2	160,885.6
Quebec										
1988	155	777,777.8	365,896.6	665.1	2.9	566.4	20.3	0.0	22.3	100.1
1989	156	1,196,754.0	593,193.7	73.0	5.3	0.0	124.7	0.0	152.4	9,713.1
1990	185	1,197,400.0	616,000.0	2,341.9	34.1	0.0	203.9	0.0	27.0	91.3
1991	168	1,189,015.0	635,890.2	224.6	89.2	11.4	67.2	0.0	179.8	355.0
1992	160	1,208,862.0	630,503.7	682.3	0.0	0.0	149.9	0.0	5.9	102.3

APPENDIX 2 (continued)

2. E Total Provincial Shipments and Exports of Beverage Products ('000 Real 1990 $Cdn

	No. of Estab.	Domestic Shipments	Value-Added	Japan	H.K.	Taiwan	P.R.C.	S. Korea	Singapore	U.S.A.
British Columbia										
1988	32	518,701.9	253,465.3	54,066.1	22.9	6.9	0	0.0	0.0	88,592.1
1989	34	494,240.8	262,513.1	12,452.4	145.6	57.5	6.6	0.0	3.0	33,734.3
1990	33	492,800.0	242,600.0	7,308.6	0.0	79.2	0.0	0.0	8.0	31,501.9
1991	33	508,049.2	276,041.7	11,393.7	11.4	0.0	0.0	0.0	49.0	34,805.2
1992	35	754,850.7	399,440.3	13,597.4	0.0	2,205.1	377.8	0.0	835.6	103,023.1
Alberta										
1988	25	459,295.9	230,693.1	0.0	0.0	0.0	20.8	0.0	0.0	0.0
1989	26	403,350.8	186,282.7	5,522.5	0.0	0.0	0.0	0.0	0.0	266.5
1990	24	398,200.0	206,400.0	27.3	87.5	0.0	211.6	0.0	0.0	0.0
1991	21	417,803.0	230,871.2	171.4	0.0	0.0	0.0	0.0	0.0	0.0
1992	21	412,500.0	236,287.3	60.8	0.0	0.0	8.6	0.0	0.0	0.0
Manitoba										
1988	10	191,859.2	99,229.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989	11	170,052.4	94,031.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990	9	152,600.0	87,800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1991	8	143,939.4	79,924.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1992	8	174,347.0	97,481.3	0.0	0.0	0.0	0.0	0.0	9.3	36.0
Ontario										
1988	99	2,979,208.0	1,725,633.0	68.2	0.0	43.4	0	9.3	36	0.0
1989	94	2,770,995.0	1,629,005.0	132.0	329.8	257.3	74.9	0.0	68.8	31.0
1990	87	2,507,600.0	1,528,500.0	172.3	0.0	178.6	0.0	0	68.3	3,616.6
1991	72	2,491,856.0	1,538,163.0	0.0	177.0	357.7	420.9	18.6	57.2	2,004.9
1992	65	2,502,892.0	1,640,112.0	0.0	185.0	40.0	0.0	0.0	58.8	47.6
Quebec										
1988	76	1,680,528.0	1,017,602.0	33.9	0.0	0.0	3	0	0.2	0.0
1989	66	1,621,990.0	1,005,131.0	0.2	0.0	0.0	24.0	0.2	44.2	0.0
1990	70	1,579,300.0	1,029,400.0	15.6	17.8	0.0	31.5	0.0	10.0	3,674.9
1991	64	1,421,307.0	892,424.2	0.0	41.4	0.0	0.0	0.0	0.0	0.0
1992	54	1,488,526.0	999,626.9	89.6	0.0	15.4	48.2	0.0	9.7	617.0

APPENDIX 3. Provincial Market Shares in the Pacific Rim 1988 - 1992, by Industry Category

('000 1990 $ Cdn.)

	Japan	Hong Kong	Taiwan	P.R.C.	S. Korea	Singapore	U.S.A.
B.C. Processed Meat & Fish Products							
1988	1.10E-02	5.85E-03	1.59E-02	9.94E-02	1.57E-05	1.38E-04	4.96E-03
1989	1.31E-02	3.93E-03	1.01E-02	4.62E-02	1.35E-03	1.75E-04	5.12E-02
1990	8.21E-03	3.01E-03	1.86E-01	5.51E-03	9.90E-03	4.39E-04	2.26E-03
1991	1.02E-02	3.89E-03	1.27E-01	1.17E-03	1.82E-02	1.95E-04	2.63E-03
1992	7.55E-03	8.01E-03	8.88E-02	5.94E-03	8.80E-03	4.09E-05	3.93E-03
Alberta Processed Meat & Fish Products							
1988	3.66E-06	1.81E-04	0.00E+00	1.61E-03	0.00E+00	0.00E+00	2.06E-04
1989	8.95E-06	1.77E-07	3.23E-04	5.93E-03	0.00E+00	0.00E+00	1.45E-03
1990	1.21E-06	9.37E-05	4.87E-04	0.00E+00	0.00E+00	0.00E+00	3.27E-03
1991	1.26E-04	1.61E-03	0.00E+00	0.00E+00	0.00E+00	9.03E-07	1.66E-04
1992	1.01E-03	7.36E-05	1.24E-05	0.00E+00	0.00E+00	0.00E+00	2.08E-04
Manitoba Processed Meat & Fish Products							
1988	1.02E-05	1.23E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.51E-04
1989	7.86E-06	4.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.18E-04
1990	1.30E-05	7.40E-05	0.00E+00	1.96E-05	0.00E+00	0.00E+00	6.55E-04
1991	5.11E-06	1.51E-04	0.00E+00	4.64E-04	0.00E+00	3.94E-05	8.55E-04
1992	1.72E-04	2.69E-05	0.00E+00	0.00E+00	0.00E+00	2.35E-05	1.80E-03
Ontario Processed Meat & Fish Products							
1988	2.45E-04	5.11E-04	3.21E-03	1.11E-03	1.14E-03	3.64E-04	1.14E-03
1989	4.68E-04	2.02E-04	7.35E-04	8.12E-04	2.43E-04	2.45E-04	2.52E-04
1990	7.13E-04	1.43E-04	9.09E-04	0.00E+00	0.00E+00	2.27E-04	5.19E-04
1991	1.43E-04	1.20E-04	4.68E-04	0.00E+00	9.83E-04	1.07E-05	1.25E-03
1992	9.51E-05	5.14E-05	6.57E-04	1.04E-04	4.91E-04	8.56E-06	1.73E-03
Quebec Processed Meat & Fish Products							
1988	5.30E-06	6.25E-06	3.92E-04	4.08E-04	0.00E+00	6.93E-04	2.63E-05
1989	6.55E-06	5.15E-07	2.29E-04	2.65E-03	1.17E-05	1.72E-05	3.39E-05
1990	3.62E-05	1.32E-06	0.00E+00	7.40E-04	2.30E-04	9.30E-06	1.82E-04
1991	6.91E-06	1.48E-04	3.94E-04	5.60E-05	1.74E-04	0.00E+00	2.78E-04
1992	1.36E-05	3.67E-05	3.42E-04	5.51E-05	0.00E+00	0.00E+00	2.42E-05

APPENDIX 3 (continued)

	Japan	Hong Kong	Taiwan	P.R.C.	S. Korea	Singapore	U.S.A.
B.C. Processed Fruit & Vegetable Products							
1988	1.20E-03	5.95E-04	0.00E+00	3.90E-04	3.65E-04	1.95E-05	4.38E-03
1989	1.01E-03	1.71E-04	1.13E-04	4.67E-03	3.12E-03	1.13E-04	3.50E-03
1990	7.05E-04	7.25E-05	2.65E-04	2.20E-03	5.75E-04	2.07E-04	3.39E-03
1991	4.87E-04	1.31E-04	1.06E-04	3.15E-04	0.00E+00	1.23E-04	1.94E-03
1992	3.37E-04	3.50E-04	1.40E-04	1.32E-04	4.71E-04	4.00E-04	2.63E-03
Alberta Processed Fruit & Vegetable Products							
1988	0.00E+00	9.36E-06	9.12E-05	0.00E+00	0.00E+00	0.00E+00	6.89E-05
1989	1.05E-05	1.28E-05	6.25E-04	0.00E+00	0.00E+00	3.09E-05	1.12E-04
1990	0.00E+00	2.53E-07	0.00E+00	0.00E+00	0.00E+00	1.26E-04	9.17E-05
1991	0.00E+00	0.00E+00	1.86E-05	0.00E+00	0.00E+00	2.63E-05	2.57E-04
1992	0.00E+00	0.00E+00	2.58E-05	0.00E+00	0.00E+00	2.60E-05	1.12E-05
Manitoba Processed Fruit & Vegetable Products							
1988	8.59E-08	1.67E-06	2.31E-04	0.00E+00	0.00E+00	0.00E+00	3.82E-05
1989	0.00E+00	0.00E+00	2.56E-04	0.00E+00	0.00E+00	4.87E-06	0.00E+00
1990	0.00E+00	0.00E+00	1.82E-03	0.00E+00	0.00E+00	0.00E+00	1.92E-04
1991	4.02E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1992	0.00E+00	0.00E+00	4.97E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ontario Processed Fruit & Vegetable Products							
1988	4.96E-05	1.12E-05	5.78E-05	1.29E-02	0.00E+00	0.00E+00	9.94E-04
1989	1.18E-04	5.53E-05	0.00E+00	1.35E-02	0.00E+00	0.00E+00	8.22E-04
1990	5.24E-05	1.11E-05	6.69E-05	8.21E-04	9.14E-05	5.11E-05	1.30E-03
1991	5.30E-05	5.54E-05	6.35E-04	0.00E+00	0.00E+00	0.00E+00	1.69E-03
1992	2.00E-04	2.67E-04	0.00E+00	0.00E+00	2.20E-04	8.41E-05	1.22E-03
Quebec Processed Fruit & Vegetable Products							
1988	2.04E-05	4.50E-06	0.00E+00	0.00E+00	1.16E-03	4.87E-05	1.28E-05
1989	1.14E-04	0.00E+00	4.71E-05	0.00E+00	0.00E+00	1.71E-05	3.23E-06
1990	3.46E-06	2.45E-05	1.15E-05	0.00E+00	0.00E+00	1.29E-06	1.63E-05
1991	0.00E+00	3.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-05
1992	0.00E+00	7.29E-06	0.00E+00	0.00E+00	2.42E-04	1.92E-06	2.26E-06

APPENDIX 3 (continued)

	Japan	Hong Kong	Taiwan	P.R.C.	S. Korea	Singapore	U.S.A.
B.C. Processed Cereal & Grain Products							
1988	4.93E-03	5.47E-05	3.46E-05	1.28E-02	0.00E+00	0.00E+00	3.75E-02
1989	5.49E-03	1.66E-03	3.44E-03	4.45E-03	0.00E+00	1.46E-05	2.83E-02
1990	3.23E-03	1.54E-03	1.10E-04	2.97E-03	9.41E-04	3.93E-05	5.03E-02
1991	4.73E-03	1.54E-03	4.77E-05	1.01E-03	0.00E+00	1.27E-05	6.42E-02
1992	3.70E-03	5.24E-04	3.73E-05	1.52E-02	1.97E-04	2.70E-04	1.20E-01
Alberta Processed Cereal & Grain Products							
1988	3.73E-04	2.84E-06	1.73E-04	0.00E+00	4.74E-06	0.00E+00	2.02E-03
1989	7.50E-06	6.78E-05	0.00E+00	0.00E+00	3.52E-03	0.00E+00	2.53E-03
1990	2.95E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-04
1991	2.92E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.10E-03
1992	8.85E-04	2.68E-04	6.72E-04	0.00E+00	0.00E+00	0.00E+00	1.15E-02
Manitoba Processed Cereal & Grain Products							
1988	6.30E-05	0.00E+00	3.39E-05	0.00E+00	3.38E-05	2.80E-04	3.74E-04
1989	1.78E-05	0.00E+00	8.97E-06	0.00E+00	0.00E+00	5.57E-04	1.42E-04
1990	0.00E+00	0.00E+00	9.74E-05	0.00E+00	0.00E+00	8.99E-04	2.30E-03
1991	0.00E+00	0.00E+00	1.11E-03	1.04E-04	0.00E+00	0.00E+00	7.15E-04
1992	0.00E+00	0.00E+00	2.77E-04	7.37E-05	0.00E+00	4.08E-05	4.26E-04
Ontario Processed Cereal & Grain Products							
1988	4.27E-05	1.13E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-03
1989	9.67E-05	8.97E-05	0.00E+00	6.70E-06	1.73E-05	4.10E-05	1.18E-03
1990	3.25E-04	8.54E-04	2.62E-04	3.50E-04	1.29E-04	2.89E-05	1.57E-03
1991	7.09E-05	3.49E-04	8.31E-05	5.35E-04	5.49E-04	2.40E-04	7.92E-03
1992	1.80E-04	9.61E-04	2.25E-05	3.62E-04	3.18E-04	1.38E-04	3.08E-03
Quebec Processed Cereal & Grain Products							
1988	0.00E+00	0.00E+00	4.90E-05	1.15E-05	1.99E-06	0.00E+00	0.00E+00
1989	0.00E+00	7.12E-07	5.45E-05	9.44E-07	0.00E+00	0.00E+00	0.00E+00
1990	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1991	0.00E+00	0.00E+00	8.04E-06	0.00E+00	0.00E+00	0.00E+00	7.05E-06
1992	0.00E+00	0.00E+00	0.00E+00	3.19E-05	0.00E+00	0.00E+00	8.32E-06

APPENDIX 3 (continued)

	Japan	Hong Kong	Taiwan	P.R.C.	S. Korea	Singapore	U.S.A.
B.C. Other Processed Food Products							
1988	4.16E-03	1.58E-04	0.00E+00	8.79E-04	0.00E+00	6.96E-05	6.41E-03
1989	5.02E-03	7.66E-04	1.40E-03	0.00E+00	2.44E-05	3.11E-04	1.38E-02
1990	1.98E-03	6.05E-04	1.18E-03	5.85E-03	0.00E+00	3.65E-04	1.48E-02
1991	5.17E-03	2.19E-04	1.49E-03	0.00E+00	2.42E-05	6.34E-05	1.66E-02
1992	1.19E-03	8.45E-04	4.20E-03	0.00E+00	3.50E-06	9.89E-04	1.79E-02
Alberta Other Processed Food Products							
1988	3.62E-05	1.20E-04	7.95E-03	0.00E+00	0.00E+00	7.58E-06	2.31E-04
1989	3.04E-05	8.02E-04	0.00E+00	2.67E-04	0.00E+00	0.00E+00	3.12E-05
1990	2.95E-05	0.00E+00	0.00E+00	3.02E-04	0.00E+00	1.03E-04	1.28E-05
1991	5.87E-05	0.00E+00	0.00E+00	4.09E-04	0.00E+00	7.26E-05	2.80E-05
1992	7.37E-06	0.00E+00	0.00E+00	1.57E-04	5.16E-06	1.18E-04	1.69E-02
Manitoba Other Processed Food							
1988	2.14E-04	1.38E-03	1.24E-04	0.00E+00	0.00E+00	0.00E+00	3.22E-03
1989	1.59E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.55E-03
1990	1.62E-04	0.00E+00	2.17E-05	0.00E+00	0.00E+00	5.56E-07	1.68E-04
1991	2.30E-04	0.00E+00	3.37E-05	0.00E+00	0.00E+00	0.00E+00	8.85E-05
1992	1.65E-04	1.96E-05	1.29E-03	1.41E-04	0.00E+00	3.36E-05	1.05E-04
Ontario Other Processed Food Products							
1988	1.69E-04	1.99E-04	1.21E-03	1.35E-03	0.00E+00	8.18E-05	1.37E-01
1989	3.66E-04	2.90E-05	5.30E-05	1.74E-03	0.00E+00	2.38E-03	7.52E-03
1990	3.00E-04	3.98E-04	2.46E-05	2.14E-04	2.68E-05	3.40E-05	6.19E-03
1991	3.87E-04	7.01E-05	3.39E-04	1.67E-03	0.00E+00	0.00E+00	3.07E-02
1992	1.64E-04	2.59E-04	1.23E-03	9.97E-04	2.15E-05	4.51E-05	2.50E-02
Quebec Other Processed Food Products							
1988	2.56E-04	3.44E-06	2.89E-03	5.33E-05	0.00E+00	2.82E-05	1.42E-05
1989	3.12E-05	6.91E-06	0.00E+00	4.57E-04	0.00E+00	2.60E-04	1.45E-03
1990	1.25E-03	4.32E-05	0.00E+00	5.48E-04	0.00E+00	4.51E-05	1.45E-05
1991	1.21E-04	1.06E-04	4.28E-05	1.79E-04	0.00E+00	3.27E-04	6.15E-05
1992	2.83E-04	0.00E+00	0.00E+00	2.56E-04	0.00E+00	7.02E-06	1.59E-05

APPENDIX 3 (continued)

	Japan	Hong Kong	Taiwan	P.R.C.	S. Korea	Singapore	U.S.A.
B.C. Beverage Products							
1988	4.19E-02	4.93E-05	6.56E-05	0.00E+00	0.00E+00	0.00E+00	1.87E-02
1989	7.80E-03	2.78E-04	3.91E-04	1.48E-04	0.00E+00	1.03E-05	7.65E-03
1990	3.71E-03	0.00E+00	3.56E-04	0.00E+00	0.00E+00	2.51E-05	6.75E-03
1991	5.45E-03	1.73E-05	0.00E+00	0.00E+00	0.00E+00	1.47E-04	8.62E-03
1992	6.32E-03	0.00E+00	5.86E-03	5.37E-03	0.00E+00	2.16E-03	2.19E-02
Alberta Beverage Products							
1988	0.00E+00	0.00E+00	0.00E+00	7.17E-04	0.00E+00	0.00E+00	0.00E+00
1989	3.46E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.04E-05
1990	1.39E-05	1.47E-04	0.00E+00	3.88E-03	0.00E+00	0.00E+00	0.00E+00
1991	8.19E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1992	2.83E-05	0.00E+00	0.00E+00	1.22E-04	0.00E+00	0.00E+00	0.00E+00
Manitoba Beverage Products							
1988	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1989	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1990	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1991	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1992	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ontario Beverage Products							
1988	5.29E-05	0.00E+00	4.13E-04	0.00E+00	8.87E-05	1.10E-04	0.00E+00
1989	8.27E-05	6.29E-04	1.75E-03	1.66E-03	0.00E+00	2.32E-04	7.03E-06
1990	8.76E-05	0.00E+00	8.03E-04	0.00E+00	0.00E+00	2.15E-04	7.75E-04
1991	0.00E+00	2.70E-04	1.42E-03	7.40E-03	1.27E-04	1.72E-04	4.97E-04
1992	0.00E+00	2.38E-04	1.06E-04	0.00E+00	0.00E+00	1.52E-04	1.01E-05
Quebec Beverage Products							
1988	2.63E-05	0.00E+00	0.00E+00	1.04E-04	0.00E+00	4.71E-07	0.00E+00
1989	1.43E-07	0.00E+00	0.00E+00	5.32E-04	2.00E-06	1.49E-04	0.00E+00
1990	7.91E-06	3.00E-05	0.00E+00	5.79E-04	0.00E+00	3.16E-05	7.87E-04
1991	0.00E+00	6.31E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1992	4.16E-05	0.00E+00	4.10E-05	6.85E-04	0.00E+00	2.51E-05	1.31E-04

APPENDIX 4. Concordances Between S.I.C., H.S., and SITC-2 Classification Systems

Appendices 4.A - 4.E below provide an overview of the1980 Canadian Standard Industrial Classification (SIC)[1], the Harmonized System of Commodity Classification (H.S.)[2], the Standard International Trade Classification, Revision 2 (SITC-2)[3] concordances used in this thesis.

4.A PROCESSED MEATand FISH PRODUCTS INDUSTRY (MF)

H.S.	H.S. Commodity Description
02	
0201	meat of bovine animals, fresh or chilled
0202	meat of bovine animals, frozen
0203	meat of swine, fresh, chilled or frozen
0204	meat of sheep or goats, fresh, chilled or frozen
0205	meat of horses, mules or hinnies, fresh, chilled or frozen
0206	edible offal of bovine animals, swine, sheep, goats, horses, asses, mules or hinnies, fresh, chilled or frozen
0207	meat and edible offal, of poultry
0208	other meat and edible meat offal, fresh, chilled or frozen
0209	pig fat free of lean meat and poultry fat (not rendered), fresh, chilled, frozen, salted, in brine, dried or smoked meat and edible meat ofal, salted, in brine, dried or smoked;
0210	edible flours and meals of meat or meat offal
03	
0302.70	livers and roes – of herring and other fish
0303	fish, frozen, excluding fish fillets and other fish meat of heading No. 0304
0304	fish fillets and other fish meat (whether or not minced), fresh, chilled, or frozen
0305	fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption
0306	crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption
(0306.21)	
(0306.22)	
0307	molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine;
(0307.10.10)	
(0307.10.21)	
(0307.21)	
(0307.31)	
(0307.41)	
(0307.51)	
(0307.60)	
(0307.91)	
flours, meals and pellets of aquatic invertebrates other than crustaceans, fit for human consumption	
05	
0502.10.10	pigs', hogs' or boars' bristles and hair and waste thereof, not processed
0503.00.91	horse hair and horsehair waste, not proecessed
0504	guts, bladders and stomachs of animals (other than fish), whole and pieces thereof (e.g., sausage casings)
0505	skins and other parts of birds, with their feathers or down (i.e., feathers of a kind used for stuffing; feather meal for the manufacture of animal feed)
0506	ossein and bones treated with acid for the use in the manufacture of gelatin and other products; bone meal for the manufacture of animal feed.
0507	ivory, tortoise-shell, whalebone hair, horns, antlers, hooves, nails, clsws and beaks, wnworked or simply prepared but not cut to shape; powder and waste of these products
0508	coral and similar materials, unworked or simply prepared but not otherwise worked; shells of molluscs, crustaceans or echinodersm and cuttle-bone, unwroked or simply prepared but not cut to shape, powder and waste thereof
(0508.00.1)	
0510	glands and other animal products used in the preparation of pharmaceutical products, fresh, chilled, frozen or otherwise provisionally preserved (excludin urine)
(0510.00.12)	
0511	animal products not elsewhere specified or included (e.g., fish, crustaceans, molluscs, or other aquatic invertebrates for bait; meat waste and scrap for animal feed)
(0511.10)	
(0511.99.40)	
16	
1601	sausages and similar products, of meat offal or blood; food preparations based on these products
1602	other prepared or preserved meat, meat offal or blood (e.g., poultry liver paste; canned turkey; turkey pies; turkey cooked, in rolls or in pieces; canned ham; boiled, ready-to-serve ham; luncheon meats; other canned meats; beef stews; or beef prepared meals)
(1602.31.1)	

[1] Source: Statistics Canada. Cat. No. ???

[2] Source: Stats Canada? 1987? Note that determination of the correct H.S. commodity codes, in addition to a provision of their descriptions, are necessary for determination and collection of industry export data (see Stats. Can, Cat. No. 65-00X?) and of industry trademark data.

[3] Source: U.N. International Trade Code Classification Index. 1983?. Note that the SITC-2 codes are necessary for determination and collection of import data (i.e., from the respective Pacific Rim countires/regions under study); this data is used to calculate market share.

H.S.	H.S. Commodity Description
(1602.31.99)	
(1602.39.1)	
(1602.49.10)	
(1602.50.19)	
(1602.50.29)	
(1602.50.90)	
(1602.90.10)	
(1602.90.90)	
1603	extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates, canned or otherwise
1604	prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs (includes fish whole or in pieces, but not minced; pickled herrings; kipper snacks; sandines, anchovies, etc.)
1605	crustaceans, molluscs and other aquatic invertebrates, prepared or preserved
Other	
1302.31.10	agar-agar, crude
1302.39.10	carrageenan (Irish moss extract)
1501	lard; other pig fat and poultry fat, rendered whether or not pressed or solvent-extracted
1502	fats of bovine animals, sheep or goats, raw or rendered, whether or not pressed or solvent-extracted
1503	lard stearin, lard oil, oleostearin, oleo-oil and tallow oil, not emulsified or mixed or otherwise prepared
1504	fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified
1505	wool grease and fatty substances derived therefrom (including lanolin)
1506	other animal fats and oils and their fractions, whether or not refined, but not chemically modified
2301.10	flours, meals and pellets, of meat or meat offal, greaves (tankage for feeding, or otherwise)
4101	raw hides and skins of bovine or equine animals (fresh, or salted, dried, limed, pickled or otherwise preserved, but not tanned, parchment-dressed or further prepared), whether or not dehaired or split
4102	raw skins of sheep or lambs
4103	other raw hides and skins

SITC-2 Commodity Codes (and Descriptions) Corresponding to the Above

0111 Meat of bovine animals, fresh, chilled or frozen
0113 Meat of swine, fresh, chilled or frozen
0112 Meat of sheep and goats, fresh, chilled or frozen
0115 Meat of horses, asses, mules and hinnies, fresh, chilled or frozen
0116 Edible offals of bovine, swine sheep, goats, horses, asses, mules and hinnies
0114 Poultry, dead (i.e., fowls, ducks, geese, turkeys, and guinea fowls) and edible offals thereof (except liver), fresh, chilled, or frozen
0118 Other fresh, chilled or frozen meat or edible meat offals
0121 Bacon, ham and other dried, salted or smoked meat of domestic swine
0129 Meat and edible offals, n.e.s., salted, in brine, dried or smoked

0341 Fish, fresh (live or dead) or chilled (excluding fillets)
0342 Fish, frozen (excluding fillets)
0343 Fish fillets, fresh or chilled
0344 Fish fillets, fresh or chilled
0350 Fish fillets, frozen
0360 Crustaceans and molluscs, whether in shell or not, fres (live or dead), chilled, frozen, salted, in brine or dried; crustaceans, in shell, simply boiled in water

0141 Meat extracts and meat juices; fish extracts
0142 Sausages and the like, of meat meat offal or animal blood
0149 Other prepared or preserved meat or met offals
0371 Fish, prepared or preserved, n.e.s. (including caviar and caviar substitutes)
0372 Crustaceans and molluscs, prepared or preserved, n.e.s.

4.B PROCESSED FRUIT AND VEGETABLE PRODUCTS INDUSTRY (FV)

H.S.	H.S. Commodity Description
20	
2001*	vegetables, fruit, nuts and other edible parts of plants, prepared or preserved by vinegar or acetic acid (includes pickled cucumbers, onions, olives, relishes, and others).
(2001.90.10)	
2002	tomatoes prepared or preserved otherwise than by vinegar or acetic acidd (e.g., whole or in pieces, canned; canned tomatoe paste, tomato pulp and puree; etc.)
2003	mushrooms and truffles, prep. or preser. otherwise than by vinegar or acetic acid (eg., canned, frozen, dried)
2004	other vegetables prepared or preserved otherwise than by vinegar or acetic acid, frozen (e.g., frozen french frie potatoes; beans, corn, peas, asparagus, etc. and mixtures thereof, frozen)
2005*	other vegetables prepared or preserved otherwise than by vinegar or acetic acid, not frozen (e.g., canned potatoes; potato salad, not in airtight containers; canned/bottled sauerkraut; canned peas, baked, canned beans, etc.; pimento, horseradish; and mixtures of vegetables (including salads))
(2005.20.30)	
(2005.80.90)	
2007*	jams, fruit jellies, marmalades, fruit or nut puree, and fruit or nut pastes, being cooked preparations, whether or not containing added sugar or other sweetening matter
(2007.99.3)	
2008*	fruit, nuts and other edible parts of plants, otherwise prepared or preserved, whether or not containing added sugar or other sweetening matter or spirit, not elsewhere specified or included
(2008.11)	
(2008.19)	
2009	fruit juices (including grape must) and vegetable juices, unfermented and not containing added spirit, whether or not containing added sugar or other sweetening matter (includes frozen, bottled, dehydrated juices)
Other	
0710	vegetables (uncooked or cooked by steaming or boiling in water), frozen (includes: french frie potatoes, and beans, peas, etc.)
0711	vegetables provisionally preserved (for example, by sulphur dioxide gas, in brine, in sulphur water or in other preservative solutions), but unsuitable in that state for immediate consumption —includes onions, olives, capers, cukes, and other vegetables and mixtures of vegetables
0712	dried vegetables, whole, cut, sliced, broken or in powder, but not further prepared (includes: potatoes whether or not cut or sliced but not further prepared; onion powder and other dehydrated onion products, dehydrated mushrooms, dried garlic, tarragon, sweet marjoram and savory)
0803.00.20	dried bananas
0804.10.20	dried dates
0804.20.20	dried figs
0804.30.20	dried pineapples
0804.40	avacados, fresh or dried
0804.50.20	dried guavas
0805.10.20	dried mandarines (including tangerines and satsumas); dried clementines
0805.30.20	dried lemons (citrus limon, citrus limonum) and limes (citrus aurantifolia)
0805.40	grapefruit, fresh or dried
0805.90.20	other dried fruit
0806.20	dried grapes
0811*	blueberries, cherries, cranberries, apples, uncooked or cooked by steaming or boiling in water, frozen, whether or not containing added sugar or other sweetening matter — excluding nuts
(0811.90.60)	
0812	fruit and nuts provisionally preserved (eg. by sulphur dioxide gs, in brine, in sulphur water or in other preservative solutions), but unsuitable in that state for immediate consumption (e.g., cherries, strawberries, melons, apples, etc.)
0813*	apricots, prunes, apples, and other fruit dried; mixtures of nuts or dried fruits
(0813.50.10)	
(0813.50.30)	
0814	peel of citrus fruit or melons (including watermelons), fresh, frozen, dried or provisionally preserved in sulphur water or in other preservative solutions
1212.30	apricot, peach or plum stones and kernels
2103*	sauces and preparations therefor; mixed condiments and mixed seasonings
(2103.30)	
(2103.90.1)	
(2103.90.30)	
2104.10.10	soups and broths and preparations therefor, in airtight containers
2106.90.92	mincemeat, canned
2202.10.9	yyyy
2202.90.10	yyyy
2209	vinegar and substitutes for vinegar obtained from acetic acid

SITC-2 Commodity Codes (and Descriptions) Corresponding to the Above.

0565
0582
0583
0589
0585

4.C PROCESSED CEREAL AND GRAIN PRODUCTS INDUSTRY (CG)

H.S.	H.S. Commodity Description
19	
1901.20	preparations for infant use, based on malt extract dairy-related foods
1901.20	cereal cake mixes; doughnut, pancake and pastry mixes, prepared; other doughs
1904	prepared foods obtained by the swelling or roasting of cereals (e.g., rice preparations; rolled oats cereal, unprepared; instant rice; etc.)
1905*	bread, pastry, cakes, bisucuits and other bakers' wares, whether or not containing cocoa (includes crisp bread, gingerbread and the like; sweet bisucuits; ice cream cones; graham wafers; products made from waffles or wafers; rolls, buns; pizza crusts and other pizza*; pies (other than fruit pies) cooked, doughnuts, & quiche)
(1905.30.22)	
(1905.40)	
(1905.90.51)	
(1905.90.70)	
(1905.90.9)	
23	
2302*	bran, sharps and other residues, whether or not in the form of pellets, dereived from the sifting, milling or other working of maize (corn), wheat, or other cereals
(2302.20)	
2304	oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of soyabean oil
2305	oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of ground-nut oil
2306*	oil-cake and other solid residues, whether or not ground or in the form of pellets, resulting from the extraction of vegetable fats or oils of: cotton seeds, linseed, sunflower seed, rape or colza seed, coconut or copra, or palm nuts.
2309	preparations of a kind used in animal feeding: e.g., dog or cat food, biscuits or other concentrates; other animal feeds (complete), milk replacers, micro premixes, macro premixes, feed supplements, minerals; and other: bird and rabbit feed, etc.
Other	
1101	wheat or meslin flour (hard spring, durum (semolina and flour), whole wheat or graham)
1102*	cereal flours other than of wheat or meslin (e.g., rye flour, corn flour)
(1102.30)	
1103*	groats and meal of oats, for feed use; corn meal and corn grits used other than for the manufacture of streamlets, for puffing and corn flour, respectively; cereal groats, meal and pellets, of buckwheat
(1103.12.20)	
(1103.13.11)	
(1103.13.20)	
(1103.14)	
1208	flours and meals of soya beans, and other oil seeds or oleaginous fruits, other than those of mustard
1214.10	lucerne (alfalfa) meal and pellets (forage product)
1214.90.40	grass meal (forage product)
1507	soya-bean oil and its fractions, whether or not refined, but not chemically modified
1508.10	ground-nut oil and its fractions, crude
1509.10	virgin olive oil and its fractions
1512.11	crude sunflower-seed or safflower oil and fractions thereof
1515.21	crude corn oil and its fractions
1513.11	crude coconut (copra) oil and its fractions
1513.21	crude palm kernel or babassu oil and fractions thereof
1514.10	crude rape or colza, or mustard seed oil
1515.11	crude linseed oil and its fractions
1515.30.10	crude castor oil and its fractions
1515.40	tung oil and its fractions
1515.60	jojoba oil and its fractions
1515.90.10	illipe butter, shea butter and oiticica oil and their fractions
1515.90.20	cashew nut shell oil and its fractions
1515.90.31	crude wheat germ oil
1515.90.40	cocoa butter equivalent
1905.90.82	communion wafers

SITC-2 Commodity Codes (and Descriptions) Corresponding to the Above

0460 Meal and flour of wheat and flour of meslin (includes flour of wheat or of meslin; groats, meal and pellets, of wheat)
0470 Other cereal meals and flours (includes cereal flours other than of wheat or of meslin; cereal groats, meal and pellets other than of wheat)
0482 Malt, roasted or not (including malt flour)
0488 Malt extract; preparations of flour, meal, starch or malt extract, of a kind used as infant food or for dietetic or culinary purposes, containing less than 50% by weight of cocoa
0564 Flours, meals and flakes of potatoes, fruits and vegetables, n.e.s. (including sago and tapioca)
0481 Cereal grains, worked or prepared in a manner not eslewhere specified ("prepared breakfast foods")
0484 Bakery products (e.g., bread, biscuits, cakes) and other baked goods made from flour or starch pastes (e.g., communion wafers)
0814 Flours and meals, of meat, offals, fish, crustaceans or molluscs, unfit for human consumption; greaves
0812 Bran, sharps and other residues derived from the sifting, milling or working of cereals or of leguminous vegetables
0819 .93 Food wastes and prepared animal fees, n.e..s. (in particular, beet-pulp, bagasse and other wastes of sugar manufacture; brewing and distilling dregs and waste; residues of starch manufacture and similar residues
0813 .31 oil cake and other residues (except dregs) resulting from the extraction of vegetable oils of soya beans
0813 .32 of groundnuts
0813 .33 of cotton seeds, linseed, sunflower seeds, rape seeds, coconut (copra), palm nuts and kernels, etc.
0819 .94 wine lees; argol

H.S.	H.S. Commodity Description
0819	.99 sweetened forage; other preparation of a kind used in animal feeding, n.e.s.

4.D OTHER PROCESSED FOOD PRODUCTS INDUSTRY (OTH)

H.S.	H.S. Commodity Description
09	
0901.12	coffee, not roasted, decaffeinated
0901.21	coffee, roasted, not decaffeinated
0901.22	coffee, roasted, decaffeinated
0901.40	coffee, substitutes containing coffee
0902.	tea, whether or not flavoured. *Note: see exclusions below
(0902.10)	
(0902.20)	
(0902.30.9)	
0903	mate
0904	pepper, (includes chilli peppers, and paprika), crushed or ground
(0904.11)	
0905	vanilla
0906	cinnamon and cinnamon-tree flowers, crushed or ground
(0906.10)	
0907	cloves, crushed or ground
(0907.00.10)	
0908	nutmeg, mace and cardamoms, crushed or ground
(0908.10.10)	
(0908.20.10)	
(0908.30.10)	
0909	seeds of anise, badian, fennel, coriander, cumin or caraway, juniper berries, crushed or ground
(0909.10.10)	
(0909.20.10)	
(0909.30.10)	
(0909.40.10)	
(0909.50.10)	
0910	ginger, thyme, bay leaves, & other spices, crushed or ground; saffron, turmeric (curcuma), curry and other spices
(0910.10.10)	
(0910.40.10)	
(0910.91.10)	
(0910.99.1)	
(0910.99.91)	
11	
1102.30	rice flour
1103.12.20	groats and meal of oats, for food use
1103.13.11	groats and meal streamlets, of corn, for puffing
1103.13.20	corn grits for use in the manufacture of corn flour
1103.14	groats and meal of rice
1104	cereal grains otherwise worked (e.g., hulled, rolled, flaked, pearled sliced), or germs of these cereals of barley, oats, corn, rye, wheat, etc.)
1105	flour, meal, flakes, granules, and pellets of potatoes
1106	flour and meal of dried peas, chickpeas (garbanzos), and beans; flour and meal of sago and cassava
1107	malt, whether or not roasted, screened or unscreened
1108	starches of wheat, corn, potato, manioc (cassava), rice, sago, arrowroot; inulin
1109	wheat gluten,whether or not dried
17	
1701	cane sugar, beet sugar, brown sugar, granulated sugar, icing sugar
1702	other sugars, including glucose and glucose syrup, corn syrup, fructose, invert sugar, colouring caramels etc., but not including lactose and lactose syurp, or maple sugar or maple syrup
(1702.10)	
(1702.20)	
18	
1803	cocoa paste, whether or not defatted
1804	cocoa butter, fat and oil
1805	cocoa powder, not containing added sugar or ther sweetening matter
1806	chocolate and other food preparations containing cocoa (e.g., chocolate powder, chocolate crumb, chocolate in blocks, slabs or bars, other chocolate confectionery, boxed chocolates, chocolate coated nuts, instant chocolate, hot chocolate (powder)
Other	
0407.00.90	birds' eggs, preserved or cooked
0408	bird's eggs, not in shell, and egg yolks, fresh, dried, cooked by steamining or by boiling in water, moulded, frozen or otherwise preserved, whether or not containing added sugar or other sweetening matter
0409.00.10	natural honey, pasteurized
0410	edible products of animal origin, not elsewhere specified or included
0801.10	coconuts, fresh or dried, whether or not shelled or peeled
0801.20.20	brazil nuts, shelled

H.S.	H.S. Commodity Description
0801.30.20	cashew nuts, shelled
0802.12	almonds, shelled
0802.22	hazelnuts or filberts, shelled
0802.32	walnuts, shelled
0802.40.20	chestnuts, shelled
0802.50.20	pistachios, shelled
0802.90.12	pecans, shelled
0802.90.92	other nuts, shelled
0811.90.60	nuts, uncooked or cooked by steaming or boiling in water, frozen, whether or not containing added sugar or other sweetening matter
0813.50.10	mixtures of nuts
0813.50.30	mixtures of nuts and dried fruits
1006.30	semi-milled or wholly milled rice, whether or not polished or glazed, includes parboiled, long, med, & short grains
1006.40	broken rice
1202.20	ground nuts, not roasted or otherwise cooked, shelled, whether or not broken
1203	copra
1210.20	hop cones, ground, powdered or in the form of pellets; lupulin
1212.92	sugar cane, fresh or dried
1212.99	other
1302.12	vegetable saps and extracts of liquorice
1302.13	vegetable saps and extracts of hops
1302.20	pectin substances, pectinates and pectates
1404.90.10	vegetable flour
1508.90	peanut oil, and other ground nut oil and its fractions, refined
1509.90	olive oil and its fractions, not virgin
1510	other oils and their fractions, obtained solely from olives, whether or not refined, but not chemically modified
1511	palm oil and its fractions, whether or not refined, but not chemically modified
1512.19	sunflower seed and safflower oils and fractions thereof, whether or not refined, but not chem. modified
1512.29	other
1513.19	coconut oil and its fractions, refined
1513.29	palm kernel or babassu oil and fractions thereof, refined
1514.90	rape, colza or mustard oil and fractions thereof, refined
1515.19	linseed oil, deodorized or refined
1515.21	maize (corn) oil and its fractions, crude
1515.29	maize (corn) oil and its fractions, deodorized or refined
1515.50	sesame oil and its fractions, crude or refined
1515.90.91	other oils, crude
1516	animal or vegetable fats and oils and their fractions, partly or wholly hydrogenated, inter-esterified, re-esterified or elaidinised, whether or not refined, but not further prepared.
1517	margarine, excluding liquid margarine; imitation lard, shortening, blended salad oils, etc.
1602.31.1	prepared meals of turkeys
1602.31.99	other preserved products of turkey
1602.39.1	prepared meals and other preserved products of ducks, geese, and guineau fowls
1602.49.10	prepared meals of swine (including mixtures)
1602.50.19	other prepared meals (apart from stews) of bovine animals
1602.50.29	other preserved preparations of bovine animals (apart from luncheon meats, corned beef, etc), in airtight containers.
1602.50.90	other preserved preparations of bovine, animals, not necessarily in airtight containers
1602.90.10	prepared meals of meat offal or blood
1602.90.90	other prepared meals of meat offal or blood, not necessarily in airtight containers
1902*	
1905.90.70	pretzels
1905.90.8 (1905.90.82)	rice paper, sealing wafers, and cheese sticks
1905.90.9	corn based food snacks; other food snacks
1901.10	preparations for infant use, put up for sale
1901.20.12	bread and batter mixes and doughs
1901.20.14	pizza mix, complete
1901.90.2	food preparations of flour, meal, starch or malt extract
1901.90.31	prepared pudding
1902	uncooked pasta, containing eggs or nt, fresh, frozen, or dried
1902.20	stuffed pasta, whether or not cooked or otherwise prepared
1902.30	other pasta, with or without meat, in or not in airtight container
1902.40	couscous
1903	tapioca and substitutes therefor prepared from starch, in the form of flakes, grains, pearls, siftings, etc.
1905.30.22	waffles, pre-cooked, frozen
1905.90.51	frozen pizza
2001.90.10	fruit and nuts, prepared or preserved by vinegar or acetic acid
2005.20.30	potatoe chips, flakes, frills
2006	fruit, nuts, fruit-peel and other parts of plants, preserved by sugar (drained, glace or crystallized)
2007.99.3	nut puree and nut pastes
2008.11	peanut butter and other ground nuts
2008.19	almonds, pistachio nuts, cashews, pecans, walnuts, pignolia nuts, macadamia nuts, etc.; and mixtures of two or more kinds of nuts, ground-nuts or seeds.

H.S.	H.S. Commodity Description
2101	yeasts (active or inactive); prepared baking powders
2101.10	instant coffee
2101.20	instant tea; tea extracts, essences and preparations
2101.30	roasted chicory and other roasted coffee substitutes, and extracts, essences and concentrates thereof
2103.30	mustard flour and meal and prepared mustard
2103.90.1	mayonnaise and salad dressing
2103.90.30	sauces for meat and fish
2104	
(2104.10.10)	
2105.00.30	
2106.90.6	sweets, gums and the like, containing synthetic sweetening agents
2106.90.91	popcorn, popped (excluding candied)
2202.90.90	other non-alcoholic beverages, aside from nectars, chocolate partially skimmed milk, eggnog, & non-alcoholic beer.
2302.20	bran, sharps, and other residues, whether or not in the form of pellets, derived from the sifting, milling or working of riced
2303.10	residues and starch manufacture and similar residues (e.g., gluten meal, corn gluten feed, etc.)
2303.20	beet pulp, bagasse and other waste of sugar manufacture
2303.30.20	malt sprouts, from brewing or distilling dregs and waste
2306.90.10	oil cake and other solid residues, whether or not ground in the form of pellets, resulting from the extraction of maize (corn)
2501.00.20	table salt, made by an admixture of other ingredients when containing 90% or more pure sodium chloride
3502.10	egg albumin
3503.00.1	edible gelatin

SITC-2 Commodity Codes (and Descriptions) Corresponding to the Above

0611 sugars, beat and cane, raw, solid
0612 refined sugars and oather products or refining beet and cane sugar, solid
0619 other sugars; sugar syrups; artificial honey (whether or not mixed with natural honey); caramel
0615 molasses, whether or not decolourized
0620 sugar confectionery (except chocolate confectionery) and other sugar prepartions
0721 cocoa beans, whole or broken, raw or roasted
0723 cocoa powder, unsweetened
0722 chocolate and other food prepartions containing cocoa, n.e.s.
0730 chocolate and other food preparations containing cocoa, n.e.s.
0980 edible products and preparations, n.e.s.
0712 extracts, essences or concentrates of coffee and preparations with a basis of those extracts, essences or concentrates; roasted chicory and other roasted coffee substitutes and extracts, essences and concentrates thereof

4.E BEVERAGE PRODUCTS INDUSTRY (BEV)

H.S.	H.S. Commodity Description
22*	
2201	mineral waters and aerated waters, natural or otherwise, not containing added sugar or other sweetening matter nor flavoured
(2201.90)	
2202*	mineral waters and aerated waters, containing added sugar or other sweetening matter or flavoured (includes carbonated soft drinks; and non-alcoholic beer)
(2202.10.9)	
(2202.90)	
2203	beer (bottled, canned, draught, other), made from malt
2204	sparkling wine, champagne; red wine, white wine, grape must
2205	vermouth and other wine of fresh grapes
2206	other fermented beverages (cider, perry, mead); mixtures of fermented beverages (prune wine, perry sparkling); and mixtures of fermented beverages and non-alcholic beverages, not elsewhere specified or included (ginger beer and herbal beer; wine, beer, cider and other coolers)
2207	ethyl alcohol and other spirits, undenatured, of any strength
2208	spirits obtained by distilling grape wine or grape marc; whiskies (rye, scotch, Irish, bourbon, etc); rum and tafia; gin and geneva; vodka, tequila, liquers, spirit coolers, spirit fruit juices; angostura bitters
Other	
1901.90.10	malt extract
2106.90.31	soft drink syrup
2106.90.32	soft drink concentrates
2106.90.33	low calorie carbonated soft drink postmixes
2106.90.34	regular carbonated soft drink postmixes
2303.30.10	brewers' and distillers' spend grains
2303.30.90	other brewing and distilling dregs and waste (aside from 2303.30.10 and malt spouts)
2307	wine lees; argol

SITC-2 Commodity Codes (and Descriptions) Corresponding to the Above

1110 non-alcoholic beverages, n.e.s. (including waters, including spa waters and aerated waters; ice and snow; lemonade; flavoured spa waters; and flavoured aerated waters, and other non-alcoholic beverages, n.e.s.)
1123 beer made from malt (including ale,stout and porter)

APPENDIX 5. Correlations Between Number of Establishments and Industry Concentration Ratios [1]

Canadian Industry (4-digit SIC)	CR4	CR6	CR8	Observations
Meat and Meat Products (1011)	-.80	-.89	-.92	17
Poultry Products Industry (1012)	-.88	-.77	-.72	15
Fish Products Industry (1021)	-.07	-.4	-.67	15
Canned & Preserved Fruit & Veg.(1031)	+.04	+.26	+.02	13
Frozen Fruit and Vegetable (1031)	-.08	-.03	+.70	13
Cereal Grain Flour Industry (1051)	---	---	---	4
Prep. Flour Mixes & Cereal Foods (1052)	---	---	---	4
Feed Industry (1053)	+.82	+.75	+.76	15
Vegetable Oil Mills (1061)	+.34	-.69	+.69	17
Biscuit Industry (1071)	-.91	-.94	-.89	17
Bread and Other Bakery Products (1072)	---	---	---	4
Cane and Beet Sugar Industry (1081)	-.2	+.57	na	17
Chewing Gum Industry (1082)	---	---	---	4
Sugar & Chocolate Confectionery (1083)	---	---	---	4
Tea and Coffee Industry (1091)	---	---	---	4
Dry Pasta Products Industry (1092)	---	---	---	4
Potato Chip, Pretzel & Popcorn (1093)	---	---	---	4
Other Food Products Ind. NEC (1098)	---	---	---	4
Soft Drink Industry (1111)	-.68	-.87	-.93	17
Distillery Products Industry (1121)	-.76	-.26	+.77	17
Brewery Products Industry (1131)	-.05	+.12	+.54	17
Wine Industry (1141)	-.3	-.90	+.6	14

Source:

Statistics calculated from bi-annual (1954-80) and annual (1980-86) data. *Industrial Organization and Concentration in the Manufacturing, Mining and Logging Industries: Unconsolidated Enterprise Concentration Data*, (special request), Analysis and Development Div., Stats. Canada.

1 Data are expressed as correlation coefficients of the number of establishments and CR4, CR6, and CR8 industry concentration ratios.

APPENDIX 6. Summary of Trademark Application Data

Province: Year - # of trademarks

Meat & Fish	Fruits & Veg.	Cereals & Grains	Other Processed Foods	Beverages
BC: 88-24	BC: 88-14	BC: 88-10	BC: 88-19	BC: 88-118
89-19	89-12	89-13	89-17	89-51
90-36	90-18	90-15	90-41	90-92
91-22	91-16	91-16	91-35	91-97
92-21	92-14	92-24	92-24	92-63
AB: 88-09	AB: 88-01	AB: 88-10	AB: 88-25	AB: 88-73
89-20	89-08	89-29	89-11	89-42
90-46	90-08	90-25	90-19	90-57
91-20	91-08	91-37	91-11	91-57
92-29	92-03	92-23	92-13	92-55
MB: 88-08	MB: 88-04	MB: 88-19	MB: 88-41	MB: 88-45
89-15	89-01	89-47	89-19	89-17
90-34	90-01	90-69	90-19	90-28
91-12	91-10	91-74	91-23	91-50
92-8	92-03	92-47	92-22	92-51
ON: 88-53	ON: 88-46	ON: 88-93	ON: 88-164	ON: 88-188
89-71	89-43	89-126	89-138	89-152
90-96	90-71	90-205	90-204	90-148
91-60	91-54	91-185	91-190	91-110
92-67	92-35	92-144	92-162	92-76
QU: 88-23	QU: 88-23	QU: 88-57	QU: 88-114	QU: 88-165
89-25	89-18	89-59	89-63	89-90
90-42	90-29	90-99	90-77	90-95
91-48	91-30	91-106	91-73	91-110
92-37	92-23	92-91	92-75	92-76

APPENDIX 7. Correlation Matrix of Variables (Based on 125 Observations)

LWR	1.0000																
LCR	-0.11492	1.0000															
LLP	**0.63037**	-0.31750	1.0000														
LTM	0.37022	**0.61993**	0.28821	1.0000													
LNC	0.04025	**0.62016**	0.06452	0.56411	1.0000												
BC	0.14147	-0.02836	-0.09019	-0.13060	-0.28304	1.0000											
AB	-0.00834	-0.22254	0.01156	-0.29382	-0.39327	-0.25000	1.0000										
ON	0.17239	0.43609	0.13383	0.51765	0.70220	-0.25000	-0.25000	1.0000									
QU	-0.23060	0.36435	-0.02578	0.22832	0.39398	-0.25000	-0.25000	-0.25000	1.0000								
MF	-0.10261	0.26433	-0.53982	-0.09586	0.016726	-0.41633E-17	-0.41633E-17	0.41633E-17	0.	1.0000							
CG	-0.04989	0.40825	-0.29293	0.13093	0.01694	0.69389E-17	-0.41633E-17	0.41633E-17	-0.11102E-16	-0.25000	1.0000						
OTH	-0.35013	0.50406E-01	0.13981	0.09227	-0.06754	-0.97145E-17	0.69389E-17	-0.69389E-17	-0.55511E-17	-0.25000	-0.25000	1.0000					
BEV	**0.85099**	-0.28755	**0.74808**	0.37092	0.01694	-0.55511E-17	-0.55511E-17	0.55511E-17	0.	-0.25000	-0.25000	-0.25000	1.0000				
T89	0.01591	0.02677	-0.04353	-0.08595	0.09141	0.	0.	0.	0.	0.	0.	0.	0.	1.0000			
T90	-0.01058	0.01189	0.06089	0.08388	-0.00831	0.	0.	0.	0.	0.	0.	0.	0.	-0.25000	1.0000		
T91	-0.025626	-0.016114	0.016832	0.083106	-0.13605	0.	0.	0.	0.	0.	0.	0.	0.	-0.25000	-0.25000	1.0000	
T92	-0.56488E-02	-0.40366E-01	-0.23300E-01	-0.18684E-01	-0.50723E-02	0.	0.	0.	0.	0.	0.	0.	0.	-0.25000	-0.25000	-0.25000	1.0000

logWR logCR logLP logTM logNC
dBC dAB dON dQU dMF
dCG dOTH dBEV T89 T90
T91 T92