RURAL ECONOMY

Competitiveness of Canadian Agri-food Exports Against Competitors in Asia: 1980-97

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Project Report 01-01
AARI Project #99M431

Project Report

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Abstract

      Asia is the second largest market for the Canadian agri-food exports after the United States market. The competition in Asia has become more intensive in recent years as the agri-food sector in developed nations such as Australia, Canada, Europe, and the United States has increasingly relied on exports for growth because of their own slow-growing domestic food consumption. How did the performance of Canadian agri-food exports to Asia measure up to the performances of its main competitors? This research attempts to identify Canada's competitiveness in agri-food exports to Asia, relative to Canada's main competitors.

      The analysis is based on the 1980-97 trade data from the World Trade Analyzer (WTA), produced by the International Trade Division of Statistics Canada. According to their average market shares during the 1980-97 period, Canada's main competitors in Asia are the United States, Europe, Australia, China, Thailand, Malaysia, Taiwan, Indonesia and New Zealand. To assess each country's competitiveness, this research applies the Constant Market Share (CMS) model. The change in each country's exports is primarily divided into the structural and the competitive effects. The exporting country with larger competitive effect is considered to be more competitive. The key results are:

- All exporting countries increased their agri-food exports to Asia during the 1980-97 period. The increase in their exports to Asia can be primarily attributed to the structural effect - particularly to the large increase of total Asian agri-food imports (growth effect).

- Canada ranked second after China in terms of competitive effect during the 1980-1997 period. Indonesia and Thailand also exhibit strong competitiveness in Asia. Canada's traditional competitors such as the United States, Europe, Australia, and New Zealand were found to be non-competitive.

- Compared with other competitors in the Asian market, Canada exhibit two areas of weakness. First, Canada did not concentrate their agri-food exports to Asia on fast-growing commodities such as consumer-ready products. Second, Canada's competitiveness was deteriorated in the processed intermediate

goods in Korea and South Asia, the consumer-ready goods in Japan and Asia 7, and the bulk commodities in Taiwan.

If Asia was considered to be a target region for Canadian agri-food exports, one would need not only to know the exporting strategies that will be adopted by countries such as the United States, Europe, Australia, and New Zealand, but also those adopted by countries such as China, Indonesia and Thailand. In order for Canada to maintain and improve its export performance in Asia in the future, it will be most effective if Canada could increase its market shares of processed intermediate goods in Korea and South Asia, the consumer-ready goods in Japan and Asia 7, and the bulk commodities in Taiwan.

1. Background

The agri-food industry in Canada is export-oriented and a significant component of the Canadian economy. In 1997, about one third of the primary and processed agri-food production in Canada was exported and the total export value of agri-food products accounted for approximately 7 percent of Canada's total export of goods. As such, the export performance of the Canadian agri-food industry plays an important role in the Canadian economy. Asia is the second largest market for Canadian agri-food exports. Between 1980 and 1997, about 28 percent of the total agri-food exports in Canada went to Asia. In recent years, agri-food exports from Canada to Asia increased rapidly. In nominal terms, the total export value of Canadian agri-food products to Asia increased from US $2.1 billion in 1980 to US $ 4.6 billion in 1997. Did this increase reflect Canada's rising export competitiveness in Asia? If so, to what extent? These questions are important given the increased competition among export suppliers to maintain and increase their market shares in the Asian market. Such competition has become even more intensive in recent years as the agri-food sector in developed nations such as Australia, New Zealand, Europe, and the United States has increasingly relied on exports for growth because of their own slow-growing domestic food consumption.

2. Objectives

The objective of this research is to identify Canadian competitive position in agri-food exports to Asia using Statistics Canada's trade data from 1980-97. The resulting information could help Canada's agri-food industry and policy makers gain a better understanding of Canada's competitive position against its main competitors and determine what actions should be taken to maintain and improve Canada's export

performance in the Asian agri-food import market.

3. Data and Product Classification

The data are obtained from the World Trade Analyzer (WTA)[1], produced by the International Trade Division of Statistics Canada. WTA, a replacement product for the previous World Trade Database, is constructed from the trade data that each country reported to the United Nations. The current (1999) WTA contains eighteen years (1980-97) of annual export and import values by countries and commodities. The WTA, based on the Standard International Trade Classification (SITC), provides the data at the total and 1-4-digit SITC levels.

To aid in interpretation of the CMS decomposition results later, some aggregations are in order. As in Wang's (1997) study, Canada's and its main competitors' agri-food exports are grouped into four broad categories in terms of their factor-intensity, degree of processing, and readiness for direct consumption on the basis of 4-digit SITC level data. The four categories are bulk commodities, processed intermediate goods, horticultural products and consumer-ready goods. Bulk commodities include grain, oilseed, and plant-based fibers such as cotton, raw rubber and non-manufactured tobacco; processed intermediate products include flour, feed, live animals, animal fats/oil, and animal-based fiber such as wool; horticultural products include fresh fruits, vegetables, and flowers; and consumer-ready products include preserved vegetables, fish, fruits and nuts, fresh and frozen meats, eggs, dairy products, processed

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[1]Designed with ORACLE software, the WTA is an all-in-one analytical tool, allowing users to produce tables and graphs in the chosen aggregation level. Agri-food products are defined as SITC sections 0,1,2, and 4.

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meats, manufactured tobacco, and beverages[2]. Based on their relative importance to Canada's exports in agri-food products, individual countries are grouped into one of five destination markets: Japan, Hong Kong and Taiwan, Korea, Asia7 (including Indonesia, Malaysia, Thailand, Philippines, Singapore, Burma and Vietnam) and South Asia (including all regions/countries except the above regions/countries in Asia).

4. The Pattern of Canadian Agri-food Exports to Asia

4.1 Canadian Agri-food Exports

To the World: With the increase of total Canadian agri-food exports to the world, exports of consumer-ready goods, processed intermediate goods and horticultural products in Canada increased gradually between 1980 and 1997 except bulk commodities; which fluctuated around US$ 5 billion (Figure 1). Between 1980 and 1997, 41.8 percent of total agri-food exports in Canada went to the United States, followed by Asia at 27.7 percent. Europe and South & Central America ranked third and fourth with 10.5 percent and 7.5 percent of Canadian agri-food exports, respectively (Chart 1). Among the exports of total agri-food products from Canada to the world, on average, bulk commodities and consumer-ready goods had almost the same export shares[3], being 39.5 percent and 40.4 percent, respectively (Chart 2). Processed intermediate goods accounted for 16.4 percent of total Canadian agri-food exports, ranking third. Exports of Canadian horticultural products accounted for the least of total agri-food exports in Canada, at 3.8 percent.

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[2] The detailed 4-digit SITC codes under each category are in appendix 1.

[3] The export share for a category of product was calculated as a ratio of Canada's export value in the category of product to the world over total Canada's export value in agri-food products to the world.

Figure 1 Canadian Agri-food Exports to the World: 1980-97
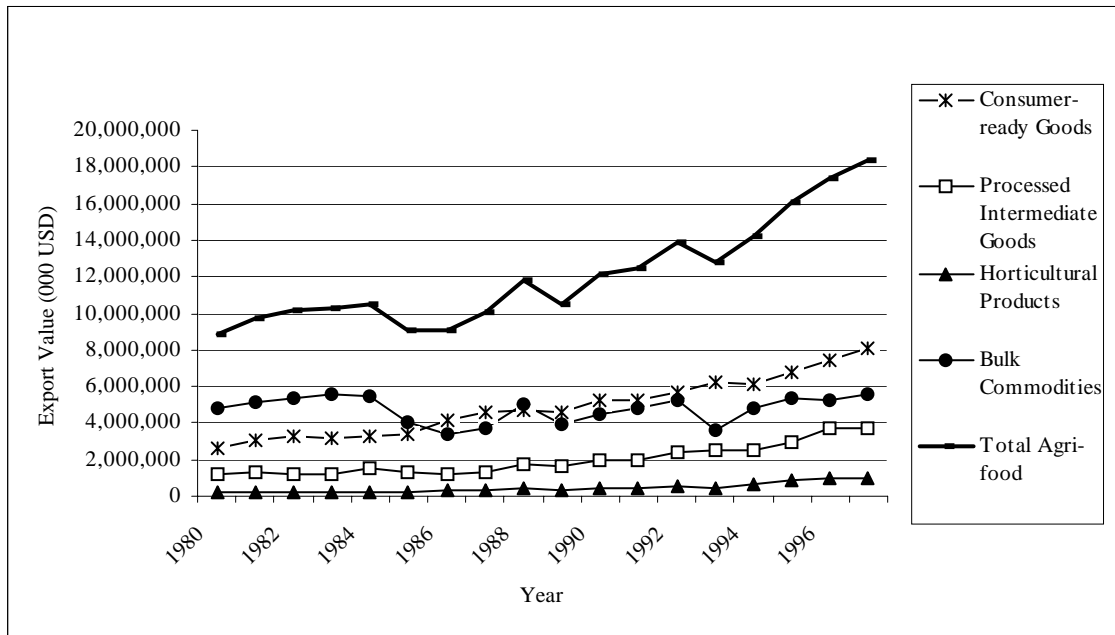
**Chart 1 Average Export Share* of Canadian Agri-food to the World
by Destination: 1980-97**
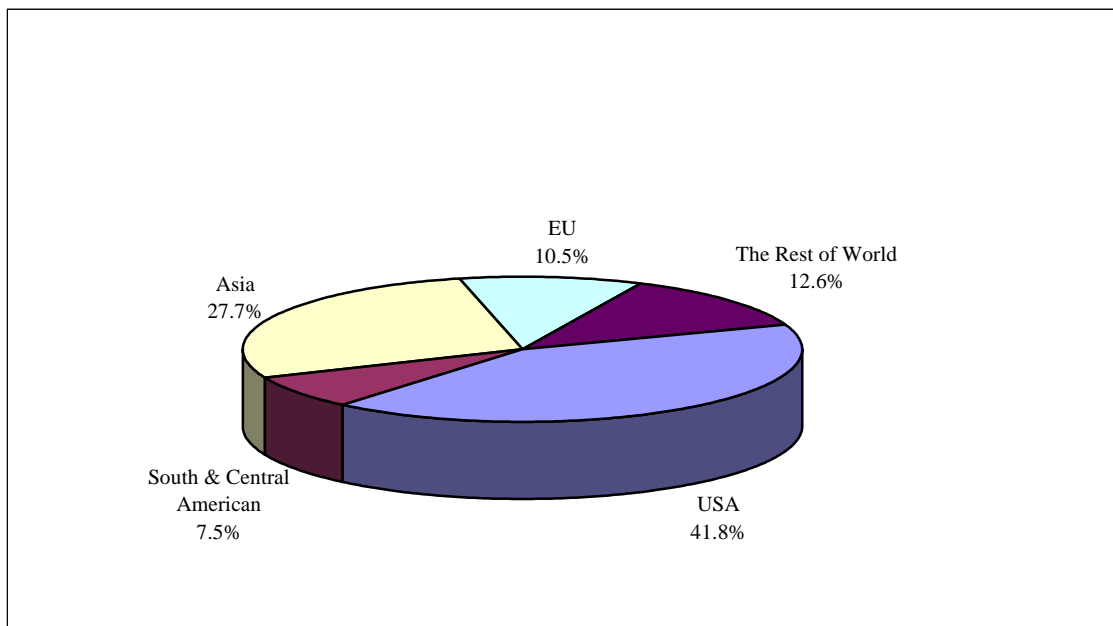
To Asia: Compared with those from Canada to the world, exports of total agri-food from Canada to Asia increased but fluctuated largely between 1980 and 1997. This fluctuation was mainly caused by the fluctuating exports of bulk commodities to Asia (Figure 2). Similar to those from Canada to the world, exports of the other three commodity categories (consumer-ready goods, processed intermediate goods and horticultural products) to Asia increased steadily over the period. In terms of commodity composition, however, exports from Canada to Asia are quite different from exports to the world during the period of 1980-97. First, exports of bulk commodities accounted for 64 percent of total Canadian agri-food exports to Asia, while exports of bulk commodities accounted for 40 percent of total Canadian agri-food exports to the world (Chart 2). Second, exports of Canadian consumer-ready goods accounted for 22 percent of total Canadian agri-food exports to Asia, while exports of Canadian consumer-ready goods accounted for 40 percent of total Canadian agri-food exports to the world (Chart 2). The differences suggest that Canadian agri-food exports to Asia are more bulk commodity-oriented than its exports to the world.

Between 1980 and 1997, Japan was the largest Asian market for Canadian agri-food exports. More than 50 percent of Canadian agri-food exports went to Japan from 1980 to 1997 (Chart 3). South Asia was its second largest export market, accounting for 33.3 percent. Hong Kong and Taiwan together constituted its third largest export market, on average, taking 5.5 percent of total Canadian agri-food exports. Asia 7 and Korea ranked fourth and fifth, respectively.

Chart 2 Canadian Agri-food Exports to the World and to Asia by Commodity Type
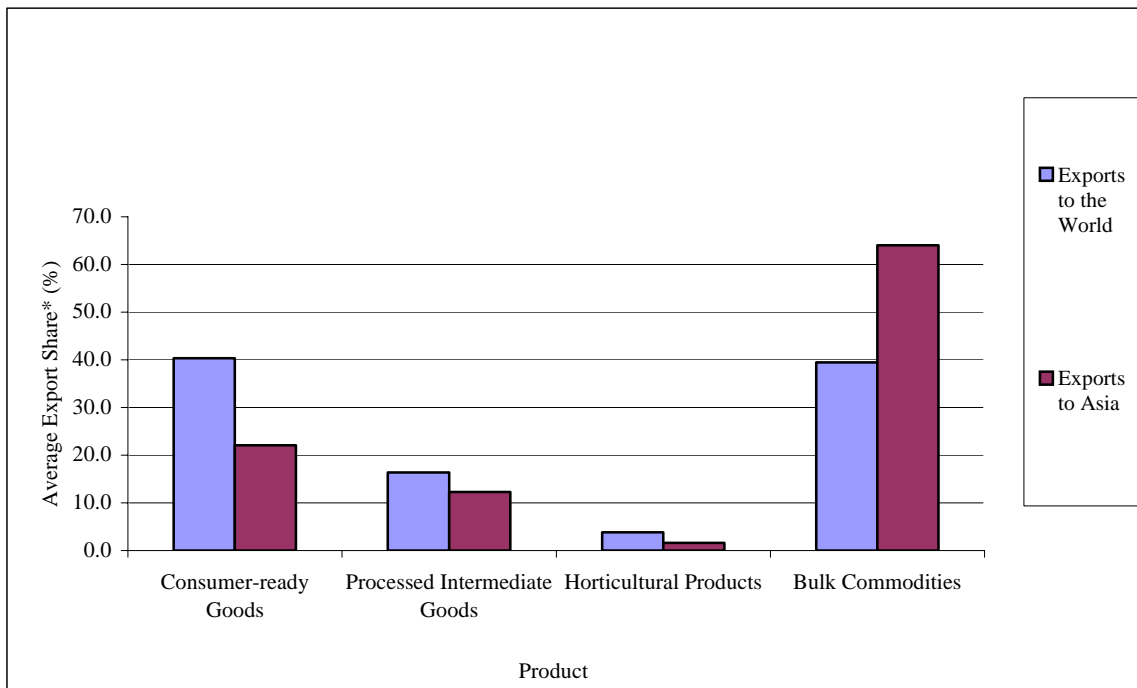
Figure 2 Canadian Agri-food Exports to Asia: 1980-97
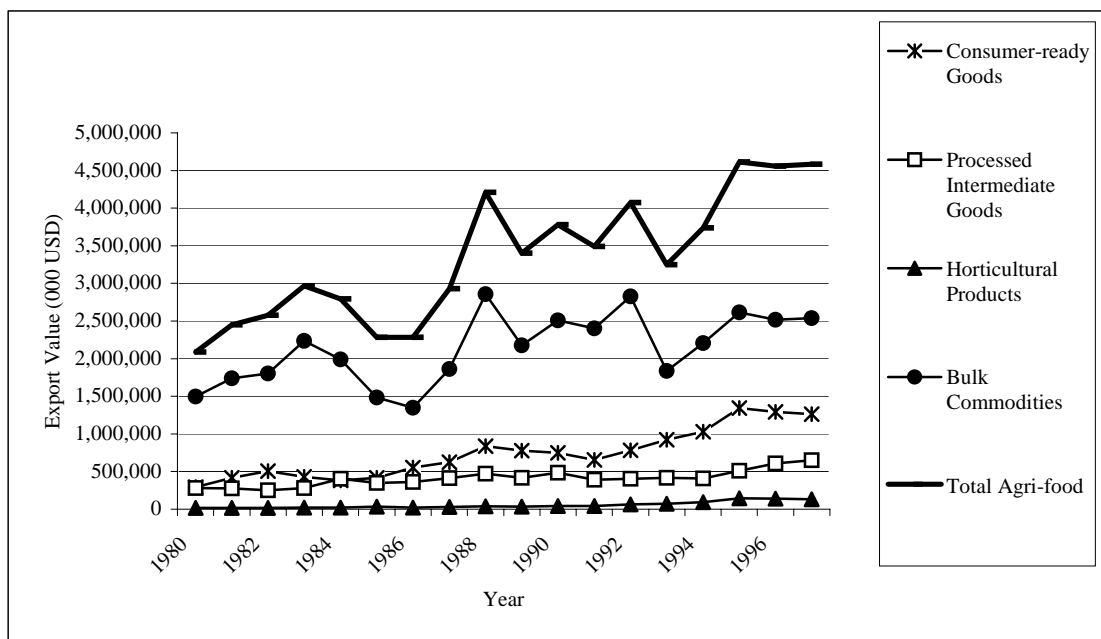
4.2 Main Competitors in Asia

During the 1980-97 period, Asia was the main export market for agri-food in the world, occupying 25.6 percent of the total world agri-food exports. To identify Canada's main competitors in the Asian market, the average market shares[4] of the main export suppliers to Asia in the 1980-97 period were calculated. The market share of total Canadian agri-food exports to Asia was about 5.4 percent of the total world agri-food exports to Asia (Chart 4). Canada's main competitors in the Asian market were the United States, Europe, Australia, China, Thailand, Malaysia, Taiwan, New Zealand and Indonesia; their market shares being 33.8 percent, 18.6 percent, 9.8 percent, 9.7 percent, 7.0 percent, 5.2 percent, 4.3 percent, 3.2 percent and 3.0 percent, respectively.

5. Method for Assessing Export Competitiveness

Many studies have assessed the competitiveness of Canadian agri-food sectors (Amanor et al 1992, Brinkman 1987, Coffin et al 1993, Martin et al 1990, Townshend et al 1991). These studies have focused on identifying measures and determinants of Canadian competitiveness in specific agri-food sectors. Though competitiveness has been used in many different ways in the literature, a definition which is often adopted in Canadian studies is the one defined in "Task Force on Competitiveness in Agri-food Industries" (1991) by Agriculture Canada. Competitiveness is defined as the sustained ability to profitably gain and maintain market share in the domestic and/or export market. Van Duren et al (1991) formed a framework for measuring and diagnosing the

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[4] Average market share was calculated as a ratio of an exporting region's export value in total agri-food to Asia over total import value of agri-food from all sources to Asia.

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Chart 3 Average Export Share* of Canadian Agri-food to Asia by Destination 1980-97

Japan
51.4%

Hongkong &Taiwan
5.5%

Korea
4.7%

Asia7
5.1%

South Asia
33.3%
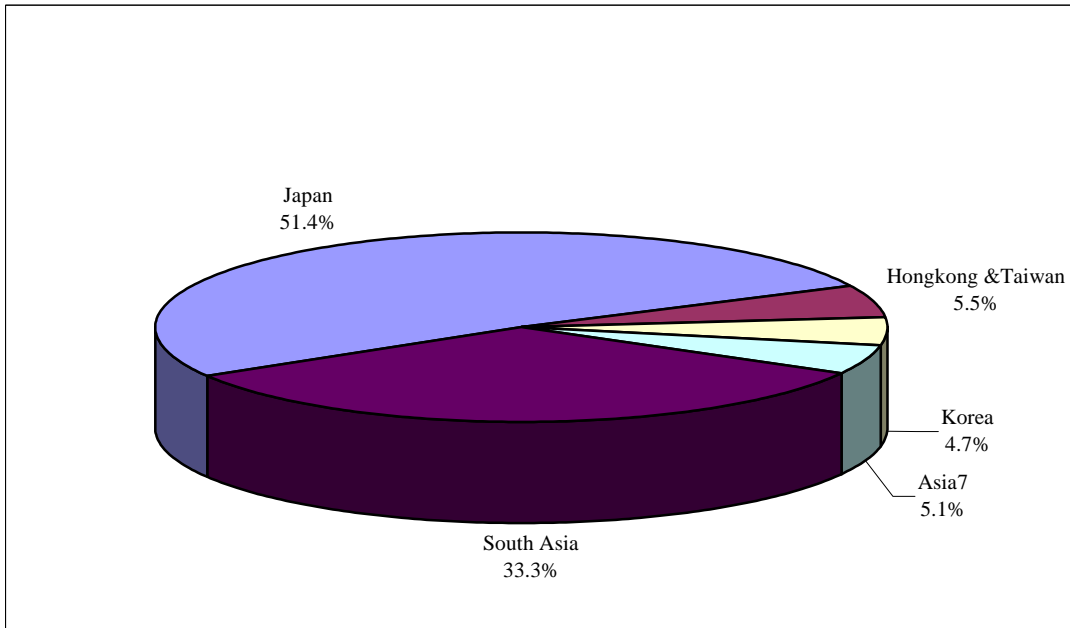
Chart 4 Average Market Share* of Canada's and its Main Competitors' Agri-food Export in Asia: 1980-97

USA
33.8%

Indonesia
3.0%

Malaysia
5.2%

Thailand
7.0%

Taiwan
4.3%

China
9.7%

EU
18.6%

Australia
9.8%

New Zealand
3.2%

Canada
5.4%
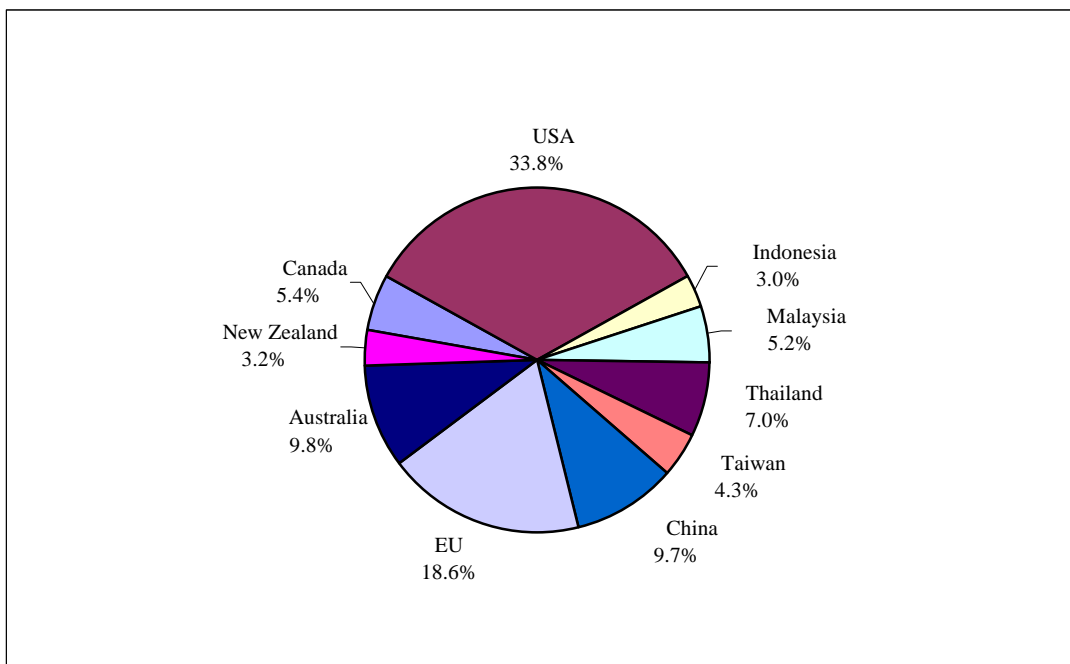
competitiveness of a firm or industry in the national or international position. Implementation of the framework, however, requires formidable data that are often difficult to obtain. With the absence of the data necessary to assess the export competitiveness of the Canadian agri-food exports in Asia, one might rely on changes in the Canadian market shares as *ex post* reflections of changes in competitiveness (Bowen and Pelzman 1984). Although changes in market shares are not entirely determined by changes in competitiveness, they nonetheless provide an accepted measure of changes in an exporting region's competitiveness *vis-à-vis* the world market. To infer an exporting region's competitiveness from changes in its exports, this research uses the Constant Market Share (CMS) model[5].

Chart 5 presents a two-level CMS decomposition[6]. In the first level, the CMS model decomposes the change in exports into three components: the structural effect, the competitive effect, and the second-order effect. With the second-level decomposition, the structural effect is further decomposed into the growth effect, the market effect, the commodity effect and the interaction effect; the competitive effect is split into the general competitive effect and the specific competitive effect; and the second-order effect is divided into the pure second-order effect and the dynamic structural effect. The interpretations of these decomposition items are provided in Table 1.

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[5] Some recent applications include Jepma (1986), Bowen and Pelman (1984), Fagerberg and Sollie (1987), Feldman (1994), Ahmadi-Esfahani (1995), Ahmadi-Esfahani and Jensen (1994), and Lloyd and Toguchi (1996). The detailed CMS formulas used in the report are provided in appendix 2.
[6] The formulas for the two-level CMS decomposition are provided in Appendix 2.

Chart 5 The Two-level Decomposition of the Change in Exports
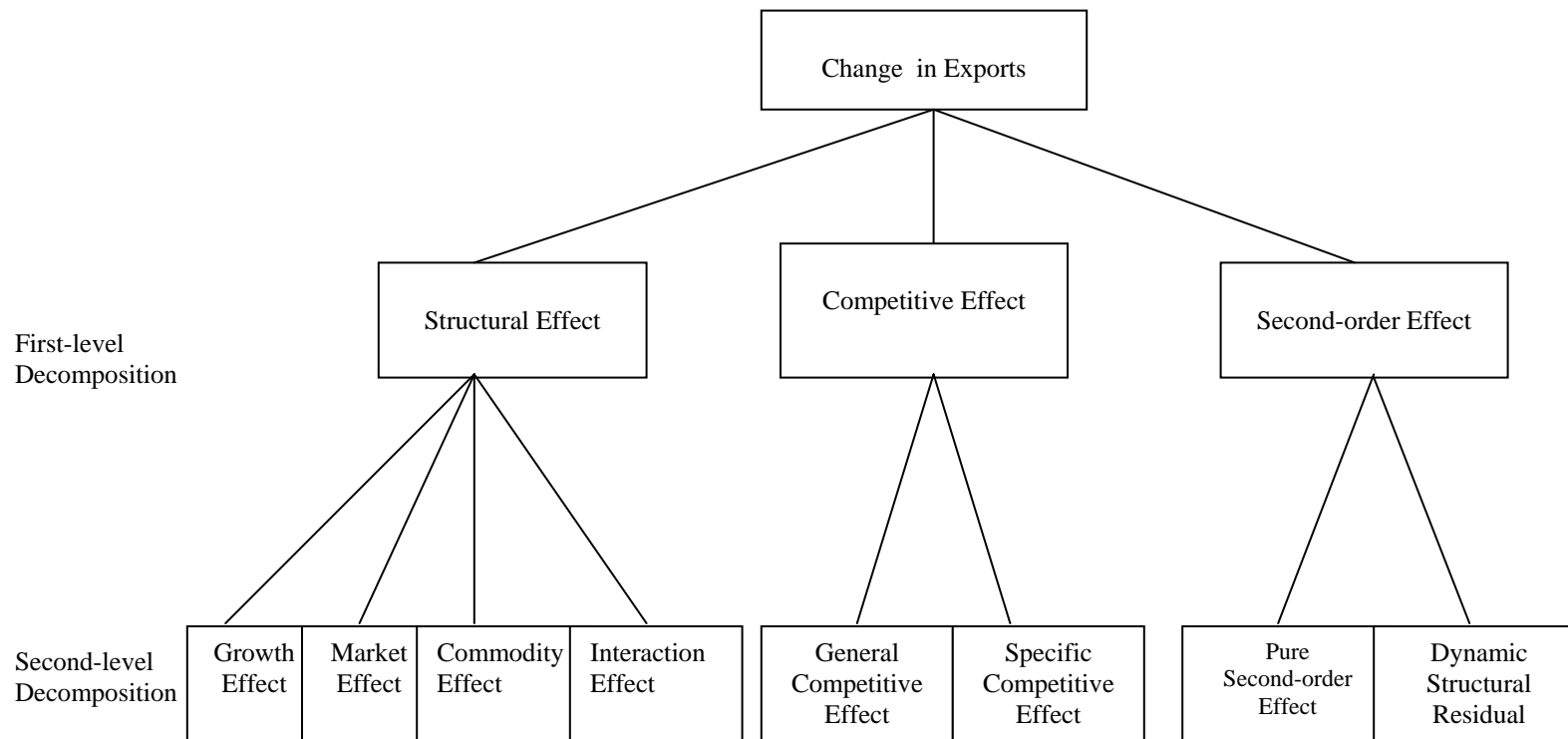
Table 1 Interpretations for the Two-level CMS Decomposition Items

Decomposition Items	Interpretation
Change in Exports	The change in an exporting region's export value in agri-food product
The First-level Decomposition	
Structural Effect	The change in exports due to the change in the Asian agri-food imports.
Competitive Effect	The change in exports due to the change in the exporting region's competitiveness.
Second-order Effect	The change in exports due to the interaction of the change in an exporting region's competitiveness and the change in the Asian agri-food imports.
The Second-level Decomposition	
Growth Effect	The change in exports due to the change in the total Asian agri-food imports.
Market Effect	The change in exports due to the market distribution of an exporting region's agri-food exports to Asia.
Commodity Effect	The change in exports due to the commodity composition of an exporting region's agri-food exports to Asia.
Interaction Effect	The change in exports due to the interaction of the market distribution effect and the commodity composition effect.
General Competitive Effect	The change in exports due to the change of an exporting region's competitiveness in its total agri-food exports to the total Asian agri-food market.
Specific Competitive Effect	The change in exports due to the change of an exporting region's competitiveness in its exports of specific commodities to specific Asian markets.
Pure Second-order Effect	The change in exports due to the interaction of an exporting region's export competitiveness and the total Asian agri-food imports.
Dynamic Structural Residual	The change in exports due to the interaction of an exporting region's export competitiveness and imports of specific commodities in specific Asian markets.

To assess Canada's competitive position, this study relies on the competitive effect in the first-level CMS decomposition and its two components (the general competitive effect and the specific competitive effect) obtained from the second-level CMS decomposition. The competitive effect measures an exporting region's overall competitiveness, which is caused by the change in an exporting region's general competitive effect and specific competitive effect. The general competitive effect is caused by the change in an exporting region's market share of the total agri-food product in the total Asian market. The specific competitive effect is a result of the change in an exporting region's market shares of specific commodities in specific Asian destinations.

6. Decomposition Procedures and Results

6.1 Decomposition Procedures

The CMS decomposition was carried out yearly, so that the end of the period in each decomposition becomes the beginning of the next period. A simple average of the yearly decomposition results was then used to represent the chosen period. Using this method, the year chosen as the beginning of the overall period does not dominate the results. As the above competitiveness is measured in absolute values, it cannot be used to compare competitors directly due to the different export size among competitors. To derive relative measures, the competitiveness measures were divided by the change in an exporting region's exports. The relative measures indicate the percentage change in an exporting region's exports attributed to the percentage change of an exporting region's competitiveness. An exporting region is regarded as having a stronger competitiveness in the Asian import market if its relative competitiveness measure is positive and larger. A

similar procedure is also applied to the rest of the decomposition items to obtain the relative contribution of each component to the changes in exports.

6.2 The Results of the CMS Decomposition

The average results of the yearly CMS decomposition of the change in agri-food export values to Asia from 1980-97 for Canada and its main competitors are provided in Table 2. On average, all ten exporters increased their agri-food exports to Asia during that period. The results in the first level CMS decomposition indicate that the increase in their exports to Asia can be mainly attributed to the structural effects. In terms of percentage, the contribution of the structural effects to the increase in exports ranged from 73 percent (Thailand) to 466 percent (Taiwan). The second level CMS decomposition results further indicate that, for most exporting regions except Taiwan, the positive structural effects were mainly caused by the growth effects. In terms of percentage, the contributions of the growth effects to the increase in exports ranged from 73 percent (Thailand) to 381 percent (Taiwan). That is, a large part of all suppliers' export growth during the 1980-97 period can be attributed to the increase in the level of Asian agri- food imports, averaging 6 percent during the period. In contrast, the average growth rate of the world agri-food imports was 4.6 percent during the same period.

The Market Effect and the Commodity Effect

The market effect reflects the impact of an exporting region's market distribution on its export performance. Among the ten suppliers to Asia, both the United States and Europe had a negative market effect, though the negative market effect was rather small for the United States. This implies that Europe did not concentrate its exports on fast-

Table 2 The Average Results of the Yearly CMS Decomposition of the Change in Export Value

Items	Canada		US		EU		Australia		New Zealand	
	Average	%	Average	%	Average	%	Average	%	Average	%
Change in Export Value	146891	100.0	932654	100.0	661950	100.0	270554	100.0	118715	100.0
First-level Decomposition										
Structural Effect	146081	99.4	927921	99.5	693049	104.7	255170	94.3	140392	118.3
Competitive Effect	45398	30.9	-63786	-6.8	-18823	-2.8	-23789	-8.8	-12289	-10.4
Second-order Effect	-44588	-30.4	68519	7.3	-12276	-1.9	39174	14.5	-9388	-7.9
Second-level Decomposition										
Growth Effect	187922	127.9	1115512	119.6	664454	100.4	305031	112.7	113214	95.4
Market Effect	11118	7.6	-9297	-1.0	-76585	-11.6	699	0.3	8791	7.4
Commodity Effect	-35083	-23.9	-181283	-19.4	75738	11.4	-42230	-15.6	20802	17.5
Structural Interaction Effect	-17876	-12.2	2989	0.3	29443	4.4	-8330	-3.1	-2415	-2.0
General Competitive Effect	-42326	-28.8	-226735	-24.3	12284	1.9	-37332	-13.8	5348	4.5
Specific Competitive Effect	87724	59.7	162949	17.5	-31107	-4.7	13543	5.0	-17637	-14.9
Pure Second-order Effect	-1889	-1.3	37998	4.1	-6953	-1.1	-295	-0.1	1218	1.0
Dynamic Structural Residual	-42699	-29.1	30520	3.3	-5323	-0.8	39469	14.6	-10606	-8.9

(Continued)

Items	Indonesia		China		Thailand		Malaysia		Taiwan	
	Average	%	Average	%	Average	%	Average	%	Average	%
Change in Export Value	154921	100.0	506687	100.0	328331	100.0	182560	100.0	48780	100.0
First-level Decomposition										
Structural Effect	118948	76.8	392031	77.4	242632	73.9	206702	113.2	227445	466.3
Competitive Effect	39560	25.5	159459	31.5	76766	23.4	-21252	-11.6	-182106	-373.3
Second-order Effect	-3587	-2.3	-44803	-8.8	8933	2.7	-2891	-1.6	3442	7.1
Second-level Decomposition										
Growth Effect	109836	70.9	367598	72.5	242961	74.0	179226	98.2	185993	381.3
Market Effect	4535	2.9	24983	4.9	2831	0.9	25027	13.7	7390	15.1
Commodity Effect	2879	1.9	-6269	-1.2	8469	2.6	5520	3.0	46012	94.3
Structural Interaction Effect	1698	1.1	5718	1.1	-11628	-3.5	-3070	-1.7	-11950	-24.5
General Competitive Effect	48305	31.2	155677	30.7	75393	23.0	-2591	-1.4	-130008	-266.5
Specific Competitive Effect	-8745	-5.6	3782	0.7	1374	0.4	-18661	-10.2	-52098	-106.8
Pure Second-order Effect	-3239	-2.1	-10264	-2.0	9551	2.9	-1044	-0.6	-6515	-13.4
Dynamic Structural Residual	-348	-0.2	-34538	-6.8	-618	-0.2	-1846	-1.0	9957	20.4

growing markets. Markets can be grouped into fast growing markets (where their agri-food imports are growing at a rate above the average growth rate of the total Asian agri-food imports), medium growing markets (where their agri-food imports are growing at the same growth rate as that of the total Asian agri-food imports) and slow growing markets (where their agri-food imports are growing at at a rate below the average growth rate of the total Asian imports). In the five Asian destinations, Korea, Hong Kong/Taiwan and Asia 7 were rapid growing markets with average growth rates of 8.7 percent, 8.1 percent and 7.5 percent respectively; Japan was a medium growing market with an average growth rate of 6.2 percent; and South Asia was a slow growing market with an average growth rate of 4.6 percent over this period (the average growth rate of the total Asian agri-food imports was 6 percent). Table 3 shows the market distribution of the ten exporters in the five Asian destinations. Europe concentrated more than half of its agri-food exports to Asia on South Asia. Such unfavorable market distribution in Europe retarded its agri-food exports to Asia.

The commodity effect was significantly negative for Canada, the United States and Australia, and positive for Taiwan, Europe and New Zealand. This indicates that Canada, the United States and Australia did not concentrate their agri-food exports to Asia on fast-growing commodities, whereas Taiwan, Europe and New Zealand did. Among the four categories of commodity, consumer-ready goods were fast-growing commodities with an average growth rate of 8.1 percent, bulk commodities were slow-growing commodities with an average growth rate of 2.6 percent and horticultural products and processed intermediate goods were medium-growing commodities with the same growth rate of 6.4 percent. Table 4 presents the average shares of the ten suppliers'

**Table 3 The Average Share of Ten Competitors' Agri-food Exports to Asia
By Destination During the1980-97 Period (%)**

Destination	Canada	U.S.	Europe	Australia	New Zealand	Indonesia	Malaysia	Thailand	Taiwan	China
Korea	4.7	10.3	3.5	6.7	7.1	5.8	6.6	5.4	2.5	6.8
Hongkong/Taiwan	5.5	13.7	10.9	10.0	12.1	10.3	5.8	10.2	5.0	35.8
Asia 7	5.1	5.3	10.4	17.5	18.7	22.7	35.8	21.6	11.9	14.2
Japan	51.4	49.3	23.7	38.3	33.4	45.3	10.3	42.1	77.9	39.1
South Asia	33.3	21.5	51.5	27.6	28.7	15.9	41.5	20.7	2.7	3.9
Asia	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

**Table 4 The Average Share of Ten Competitors' Agri-food Exports to Asia
by Commodity Type During the 1980-97 Period (%)**

| Commodity	Canada	U.S.	Europe	Australia	New Zealand	Indonesia	Malaysia	Thailand	Taiwan	China
Bulk Commodities	64.0	42.2	6.9	23.2	.3	18.1	19.0	24.0	1.0	12.8
Horticultural Products	1.6	5.5	3.0	3.7	7.1	4.7	2.5	5.1	7.1	12.8
Processed Intermediates Goods	12.3	16.6	17.1	31.2	30.9	24.4	61.1	23.0	10.2	22.8
Consumer-ready Goods	22.1	35.8	72.9	41.9	61.6	52.8	17.4	47.9	81.6	51.7
Total Agri-food	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

agri-food exports to Asia by commodity. Canada and the United States concentrated more on bulk commodities (the slowest-growing commodities), which accounted for 64 percent and 42.2 percent of their total agri-food exports to Asia, respectively. In contrast, Taiwan, Europe and New Zealand concentrated more on consumer-ready products (the fastest-growing commodities), which occupied 81.6 percent, 72.9 percent and 61.6 percent of their total agri-food exports to Asia, respectively. Such favorable commodity composition in Taiwan, Europe and New Zealand contributed positively to their agri-food exports to Asia. Taiwan particularly benefited, which resulted in an increase of 94.3 percent in Taiwan's agri-food exports to Asia during this period.

The Competitive Effects

In China, Canada, Indonesia and Thailand, the competitive effect contributed positively to the increase in their exports to Asia, while in the United States, Europe, Australia, New Zealand, Malaysia and Taiwan it contributed negatively to the increase in their exports (Chart 6). In other words, while China, Canada, Indonesia and Thailand were competitive, the United States, Europe, Australia, New Zealand, Malaysia and Taiwan were not. Among the four strong competitors, China ranked first with 32% of its agri-exports to Asia attributed to the increased competitiveness, Canada second with 31%, Indonesia third with 26%, and Thailand fourth with 23%. Among the developed economies considered in the study, only Canada was competitive in its agri-food exports to Asia. Among the ten suppliers, Taiwan's export competitiveness in Asia deteriorated most and contributed negatively to the increase of its agri-food exports to Asia by 373%.

Chart 6 The Magnitudes of Ten Exporters' Competitive Effects in Asia (%)
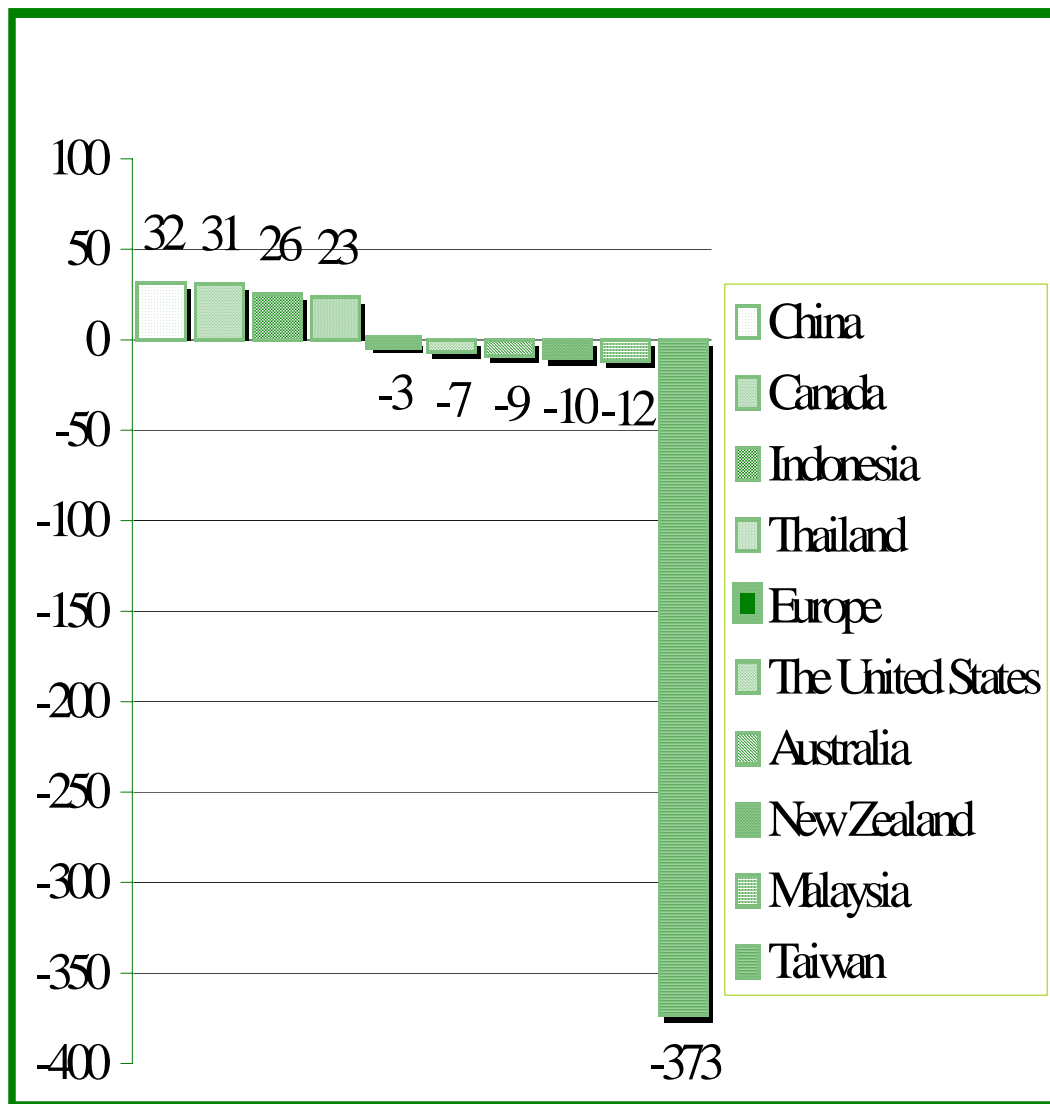
It is interesting to note that Canada was competitive in terms of the specific competitive effect, but not competitive in terms of the general competitive effect, though the latter effect was smaller than the former effect. The negative general competitive effect for Canada implies that Canada was able to increase the export competitiveness of specific commodities in specific destinations. By examining the changes in Canada's market shares in each category of commodity in each destination, it was found that, for Canada, the deterioration in general competitiveness was mainly a result of the decline in the market shares of the processed intermediate goods in Korea and South Asia, the consumer-ready goods in Japan and Asia 7, and the bulk commodities in Hong Kong/Taiwan.

Like Canada, the United States and Australia were also competitive in terms of the specific competitive effect, but not competitive in terms of the general competitive effect. However, their general competitive effect was larger than their specific competitive effect, which made them non-competitive in the Asian markets. In the United States, the deterioration in general competitiveness was mainly a result of the decline in the market shares of the processed intermediate goods in Korea and South Asia, the consumer-ready goods in Asia 7, the horticultural products in Japan, and the bulk commodities in Japan, Korea and South Asia. In Australia, the deterioration in competitiveness was primarily a result of the decline in the market shares of the consumer-ready products in all the destinations except the Hong Kong and Taiwan and the processed intermediate goods in Japan, Hong Kong/Taiwan and Korea.

In contrast to the competitive patterns of Canada, the U.S., and Australia, Europe, New Zealand and Indonesia were competitive in terms of the general competitive effect,

but non-competitive in terms of the specific competitive effect. For Europe, the decline in specific competitiveness was mainly a consequence of the decline in the market shares of consumer-ready goods in South Asia, from 24.9 percent in 1980 to 19.9 percent in 1997 (Figure 3). For New Zealand, it was mainly due to the decline in market shares of processed intermediate goods and consumer-ready goods in the five destinations. For Indonesia, it was largely due to the decline in the market shares of bulk commodities in Asia 7 and horticultural products in Japan, Hong Kong/Taiwan and Korea over this period.

While China and Thailand were strong in their general and specific competitiveness, Malaysia and Taiwan were weak in both areas. For Malaysia, the decline in its competitiveness primarily resulted from the declines in the market shares of bulk commodities in all five destinations. For Taiwan, the dramatic decline in its competitiveness was because it was not able to maintain its market shares of all four commodities in Asia after 1991 (Figure 4). This may have been caused by the appreciation of the New Taiwan Dollar and the decline of the comparative advantage in its agri-food industry over the past decade. By the 1980s, the enormous trade surpluses accompanying Taiwan's rapid growth in exports led to dissatisfaction among its trading partners, so the New Taiwan Dollar began to appreciate quickly. During this period, other developing countries had learned from the successful experience of the Asian "Little Dragon" economies, including Taiwan. One after another, they switched to export expansion policies and joined the global competition to produce labor-intensive products. For this very reason, Taiwan's traditional labor-intensive products quickly lost their competitiveness (Government Information Office, Republic of China). Another factors

Figure 3 European Market Shares in the Five Destinations from 1980-1997
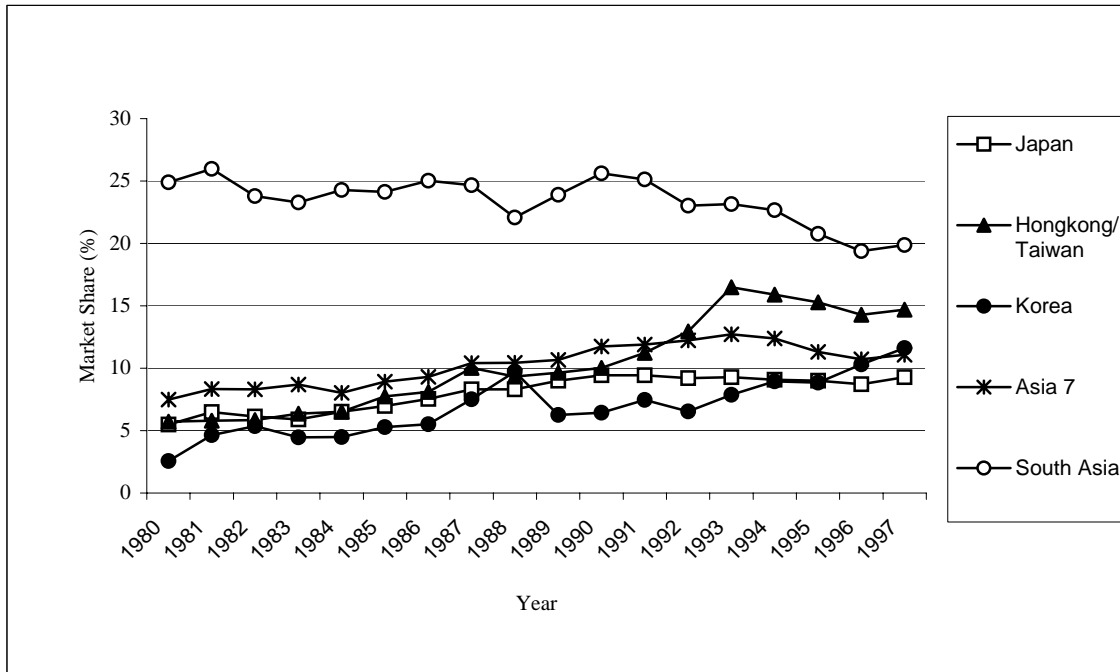
Figure 4 Taiwan's Market Shares by Commodity Type in Asia from 1980-1997
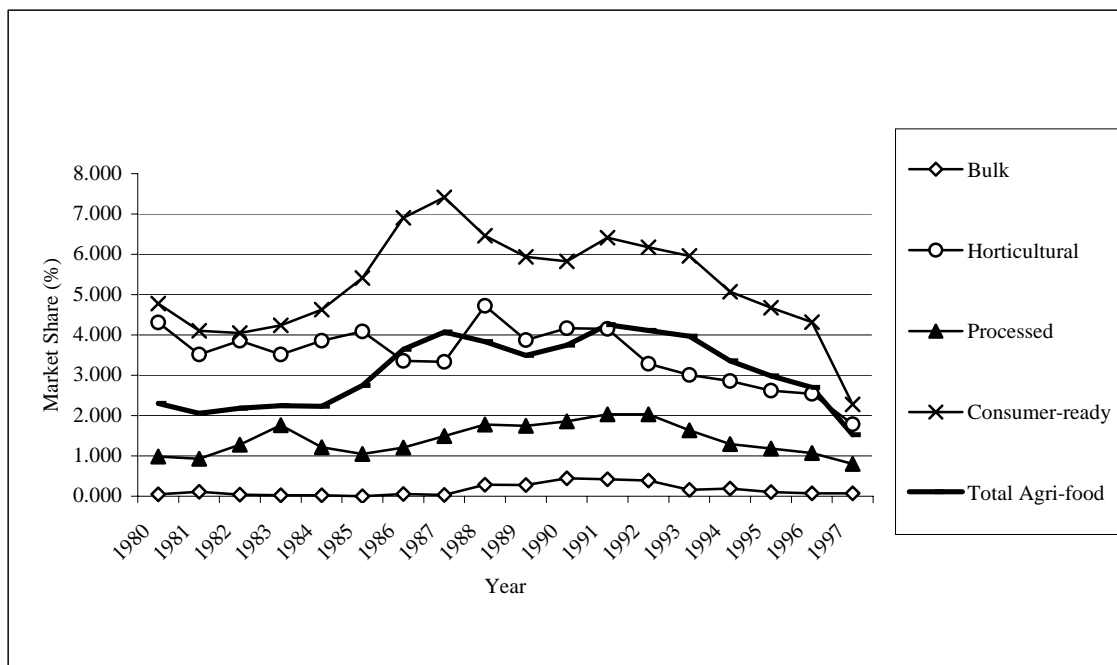
contributing to Taiwan's lost competitiveness may have been Asia's financial crisis. In addition, an outbreak of hoof and mouth disease in 1997 may significantly affected Taiwan's agri-food exports since Taiwan exported large amounts of frozen pork. For example, its exports of frozen pork to Asia accounted for one quarter of its total agri-food exports to Asia during this period. With the outbreak of that Hoof and Mouth disease, pork exports from Taiwan to Asia decreased from US$1.6 billion in 1996 to US$0.3 billion in 1997.

7. Conclusion and Implications

Between 1980 and 1997, Canada and its main competitors were able to increase their agri-food exports to Asia. The increase was mainly attributed to the rapid growth of the Asian agri-food imports during the period. Canada appeared to be very competitive in the Asian market, ranking the second after China in terms of its overall competitiveness. Canada's traditional competitors - the United States, Europe, Australia, and New Zealand - were found non-competitive in the Asian agri-food importing market. Although the recent Asian financial crisis is likely to slow down the growth of agri-food import demand in Asia, its adverse effect on the Canadian agri-food exports to Asia should be smaller than that on the agri-food exports to Asia from the United States, Europe, Australia, and New Zealand. Strong competition to Canada in the Asian agri-food import market came from countries like China, Indonesia and Thailand. If Asia is considered to be a target region for Canadian agri-food exports, and Canada wants to maintain or improve its competitive position, one needs not only to know the exporting strategies that will be adopted by countries such as the United States, Europe, Australia,

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and New Zealand, but also those adopted by countries such as China, Indonesia and Thailand. Compared with its strong competitors in the Asian market, Canada lacked general competitiveness in the Asian agri-food market. In order for Canada to maintain and improve its overall export performance in Asia in the future, it would be most effective if Canada could increase its market shares of processed intermediate goods in Korea and South Asia, consumer-ready goods in Japan and Asia 7, and bulk commodities in Taiwan.

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Appendix 1 4-Digit SITC Codes under Each of the Four Categories

Bulk Commodities	Processed Intermediates Goods	Consumer-ready Goods	Horticulture Products
0411-2, 041X, 0421, 042X, 0430, 0440, 0451, 0452, 0459, 045X, 1211, 121X, 2222-6, 222X, 2231-5, 2238-9, 223X, 22XX, 2320, 2631, 2640, 2651.	0011-5, 0019, 001X, 0422, 0460, 0470, 0481-2, 0711, 0721-3, 0811-4, 0819, 081X, 0913-4, 1212-3, 2111-2, 2114, 2116-7, 2119, 211x, 2120, 21XX, 2632, 2633, 2634, 2652, 2654-55, 2659, 2681-3, 2685-7, 268X, 2911, 2819, 291X, 2922-3, 4111, 4113, 411X, 4232-6, 4239, 423X, 4241-5, 4249, 424X, 42XX, 4311, 4312-4, 431X.	0111-6, 0118, 011X, 0121, 0129,012X,0141-2, 0149, 014X, 01XX, 0223-4,022X, 0230, 0240, 0251-2, 025X, 02XX, 0341-4, 034X, 0350, 0371, 0372, 037X, 03XX, 0483, 0484, 0488,, 048X, 04XX, 0541, 0546, 0548, 054X, 0561, 0564-5, 056X, 0577, 057X, 0582-3, 0585-6, 0589, 058X, 05XX, 0611-2, 0615, 0619, 061X, 0620, 06XX, 0712, 071X, 0730, 0741, 0742, 074X, 0751, 0752, 07XX, 0980, 09XX, 1110, 1121-4, 112X, 11XX, 1221, 1222, 1223, 122X, 12XX, 2927.	0341,0343, 034X, 0360, 0542, 0544-45, 0571-6, 0579, 0616, 2221, 2924-6, 2929, 292X.

Appendix 2 The CMS Formulas

The formula in the first level is:

$$\Delta q = \underset{\text{Structural Effect}}{\sum_i \sum_j s_{ij}^0 \Delta Q_{ij}} + \underset{\text{Competitive Effect}}{\sum_i \sum_j Q_{ij}^0 \Delta s_{ij}} + \underset{\text{Second-order Effect}}{\sum_i \sum_j \Delta s_{ij} \Delta Q_{ij}}$$

(1)

The formula (1) can be further decomposed into the following components:

$$\Delta q = \underset{\text{Growth Effect}}{s^0 \Delta Q} + \underset{\text{Market Effect}}{(\sum_i \sum_j s_{ij}^0 \Delta Q_{ij} - \sum_i s_i^0 \Delta Q_i)} + \underset{\text{Commodity Effect}}{(\sum_i \sum_j s_{ij}^0 \Delta Q_{ij} - \sum_j s_j^0 \Delta Q_j)}$$

$$+ \underset{\text{Structural Interaction Effect}}{\left[\left(\sum_i s_i^0 \Delta Q_i - s^0 \Delta Q\right) - \left(\sum_i \sum_j s_{ij}^0 \Delta Q_{ij} - \sum_j s_j^0 \Delta Q_j\right)\right]} + \underset{\text{General Competitive Effect}}{\Delta s Q^0}$$

$$+ \underset{\text{Specific Competitive Effect}}{\left(\sum_i \sum_j \Delta s_{ij} Q_{ij}^0 - \Delta s Q^0\right)} + \underset{\text{Pure Second-order Effect}}{(Q^1 / Q^0 - 1)\sum_i \sum_j \Delta s_{ij} Q_{ij}^0}$$

$$+ \underset{\text{Dynamic Structural Residual}}{\left[\sum_i \sum_j \Delta s_{ij} \Delta Q_{ij} - (Q^1 / Q^0 - 1)\sum_i \sum_j \Delta s_{ij} Q_{ij}^0\right]}$$

(2)

where q is an exporting region's total exports of agri-food products to Asia; s is an exporting region's market share of agri-food exports in total Asian market; s_j is an exporting region's market share of agri-food exports in destination j; s_i is an exporting region's market share of commodity i in total Asian market; s_{ij} is an exporting region's market share of commodity i in destination j; Q is total Asian imports of agri-food products; Q_j is total agri-food imports in destination j; Q_i is total Asian imports of commodity i; Q_{ij} is total imports of commodity i in destination j; Δ represents the change in the two periods; superscript 0 is the initial year; 1 is the terminal year; subscript i represents export commodities (here, bulk commodities, processed intermediate goods, horticultural products and consumer-ready goods); and j represents export destinations (here, Japan, Hong Kong and Taiwan, Korea, Asia7, and South Asia).