KOREAN VALUE-ADDED AGRICULTURAL PRODUCT MARKETERS: AN ANALYSIS OF IMPORT AND EXPORT MARKET ACTIVITIES

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ESSAY ONE

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AN OVERVIEW OF THE KOREAN FOOD PROCESSING INDUSTRY

ABSTRACT

This study introduces an overview of the Korean food processing industry and food trade situation. It includes an overview of the Korean economy and the food processing industry, the consumption of processed food, international trade for processed food, institutional aspects of the Korean food processing industry, and the present status of the food processing industry in Korea.

This study found that the structure of the food processing industry should be adjusted to the economic sized firms; the Korean food processing industry and government must develop a higher level of food production technology; the Korean government needs a policy that is aimed at price stabilization and a suitable allocation between imported and domestic raw materials; the Korean processed food industry must develop greater variety and higher quality food to compete with processed food imports; the food processing industry and government must pursue diversification and maintain a positive attitude for exploring international markets to increase exports of Korean processed food products.

AN OVERVIEW OF THE KOREAN FOOD PROCESSING INDUSTRY

Introduction

The Republic of Korea (ROK) was one of the poorest countries in the world before the 1960s. However, Korea has achieved successful economic development since the initiation of the First Five-Year Economic Development Plan in 1962. In 1965, Korea had per capita Gross National Product (GNP) of U.S. $87. In 1980, per capita GNP was U.S. $4,994 and by the end of 1995 it was U.S. $10,076. This is an increase of more than 100 times in the last 30 years. In other words, the Korean economy grew at an average annual rate of about 9 percent during the period. This development has provided a foundation for enlarging the Korean food processing industry. Changing economic and social factors, such as increases in per capita incomes, industrialization, urbanization, and working women have contributed to a higher demand for many "Value-Added" food products. This situation will likely continue in the future. However, Korea will have to lift many trade barriers because of the Uruguay Round (U.R.) agreement, and as a result, Korea may import more raw agricultural products and processed food. Because of accelerated import liberalization, the trade competition among countries will increase. These changing economic and social factors, and the changing international trade environments are the most challenging factors facing the Korean food processing industry.

In the 1990s, the Korea experts point out that the Korean food processing industry has many problems. Among them are insufficient recognition of its importance,

inconsistent policies, and weak production and market structure. These problems are great stumbling blocks in competition with foreign food companies which are hurrying to penetrate into the Korean market. Therefore, Korea must mature its food processing industry by centring it around consumer desire and utilizing it to stimulate exports of processed food products to survive changing trade environments. In the long run, there is realizable potential for Korea to simultaneously increase bulk commodity imports and processed food product exports to increase "value-adding" nationally.

The principal objective of this study is to provide an overview of the Korean food processing industry and food trade situation. Other objectives of this paper are to identify the "value-added" agricultural products currently being produced in Korea, to determine the importance of food processing to the Korean economy, and to categorize the firms into groups based on product size and import and export market activity.

This paper will discuss the following areas: First, value-added agricultural products currently being produced and imported in Korea are identified, and the export potential of their respective enterprises is evaluated. Second, market growth patterns concerning specific value-added products are investigated. Finally, market information concerning the food processing industry in Korea is provided. The underlying intent of this research is to provide as much accurate information as possible so that managers in industry, government, and international trade can effectively use the information provided for future import and export policies.

Overview of Korean Economy and the Food Processing Industry

Korean Economic Growth and the Food Processing Industry

This section briefly reviews the history of Korean economic growth and the food processing industry in Korea for the last half century. The low value food grain products, (rice and other grains), soybeans, and fish, were dominant Korean foods for hundreds of years. After the liberation from Japanese colonial rule (1945) and the Korean War (1950-1953), the economic situation of Korea was not conducive to agricultural development, and also, Korea could not solve the food grain self-sufficiency problem by herself. In the meanwhile, the Korean government asked the United States for surplus agricultural products such as wheat flour, powdered milk, and sugar. Thus, food, particularly bakery products and milk, began to be produced to feed the hungry and starving survivors of the Korean War (Kim, 1995).

Food grain self-sufficiency has been the major target of Korean agricultural policy since the initiation of the First Five-Year Economic Development Plan in 1962. The Korean government constructed many factories and contributed to the development of roads, hospitals, schools, bridges, and country food-processing establishments included in the plan. Therefore, Korean food quality and quantity improved remarkably during this period.

In the 1970s, due to the continuance of Five-Year Economic Plans, the Korean economy grew rapidly and its per capita GNP reached over U.S. $1,000 up from U.S. $87 in The Third Five-Year Economic Development Plan (1972-1976) gave its highest priority to the achievement of self-sufficiency in rice production by 1976 (Choo & Lee,

1976). However, along with increased GNP, people's food consumption pattern changed strikingly preferring high value-added foods. For example, the consumption of meat products was suddenly an increasing trend. In addition, the Korean government and local entrepreneurs invested in construction to develop modern food processing factories.

As per capita GNP in Korea increased to U.S. $2,242 in 1985 and to U.S. $ 10,076 in 1995, personal income and living standards continued to improve. Therefore, Koreans consumed higher quality foods and more kinds of food in their improved living level. Furthermore, consumers became clearly aware of the importance of diet and nutrition during this decade. The food processing industries developed and introduced new food products to satisfy consumer desire and satisfaction.

Korean food processing industries will face new challenging tasks because of accelerated import liberalization toward raw agricultural products and processed food products from foreign countries in the 1990s. In addition, they must develop new food products to meet consumer desire for higher quality and greater variety in the processed foods that can be exported.

Role of the Food Processing Industry in Korea

Value-Added

The best overall indicator of the economic contribution of food processing to the Korean food system is in the value-added sector. One way of defining value-added is as the sum of all payments to all factors of production utilized by the industry (Conner, 1988).

According to the National Account published by The Bank of Korea, the food and beverages value-added production portion of the total Gross Domestic Products (GDP) was only 2.69 percent (U.S. $ 8.2 billion) in 1995 (Table 1-1). This direct contribution is an estimate because it does not consider the indirect contribution of value-added products to GDP and it avoids the problem of double counting inherent in sales measures. Although the direct contribution of the industry to the general economy was insignificant, the indirect effects of value-added generated from inter-industry interactions proved to be far more important. Further, the industry could be rightly assessed by its role in stabilizing the economy, not only for stable economic growth but also against inflation (Seo et.al., 1990).

Employment

Another way of showing the relative importance of food processing in the Korean

Table 1-1. Trends of Production Value-added and Employment in the Korean Food and Beverage Industry, 1975 - 1995.

	1975	1980	1985	1990	1995	%
Value-added (U.S. $Billion)						
Total Industry	89.9	95.2	109.1	225.8	305.5	100.0
Manufacturing	18.3	25.3	31.7	73.1	99.4	32.5
Food & Beverage	3.2	3.9	3.9	6.9	8.2	2.69
Employment (thousands of persons)						
Total Industry	11,629	13,683	14,970	18,085	20,377	100.0
Manufacturing	2,175	2,995	3,504	4,911	4,773	23.4
Food & Beverage	131	161	177	198	198	0.97

Source: 1) National Account, The Bank of Korea, various issues.
2) Report on Industrial Census (whole country), National Statistical Office, Republic of Korea, various issues.
Note: Value-added in 1990 is constant in value, and the $ values are the author's calculations.

food system is by employment. The employment figures are in many ways more revealing and, like value-added, involve little or no double counting.

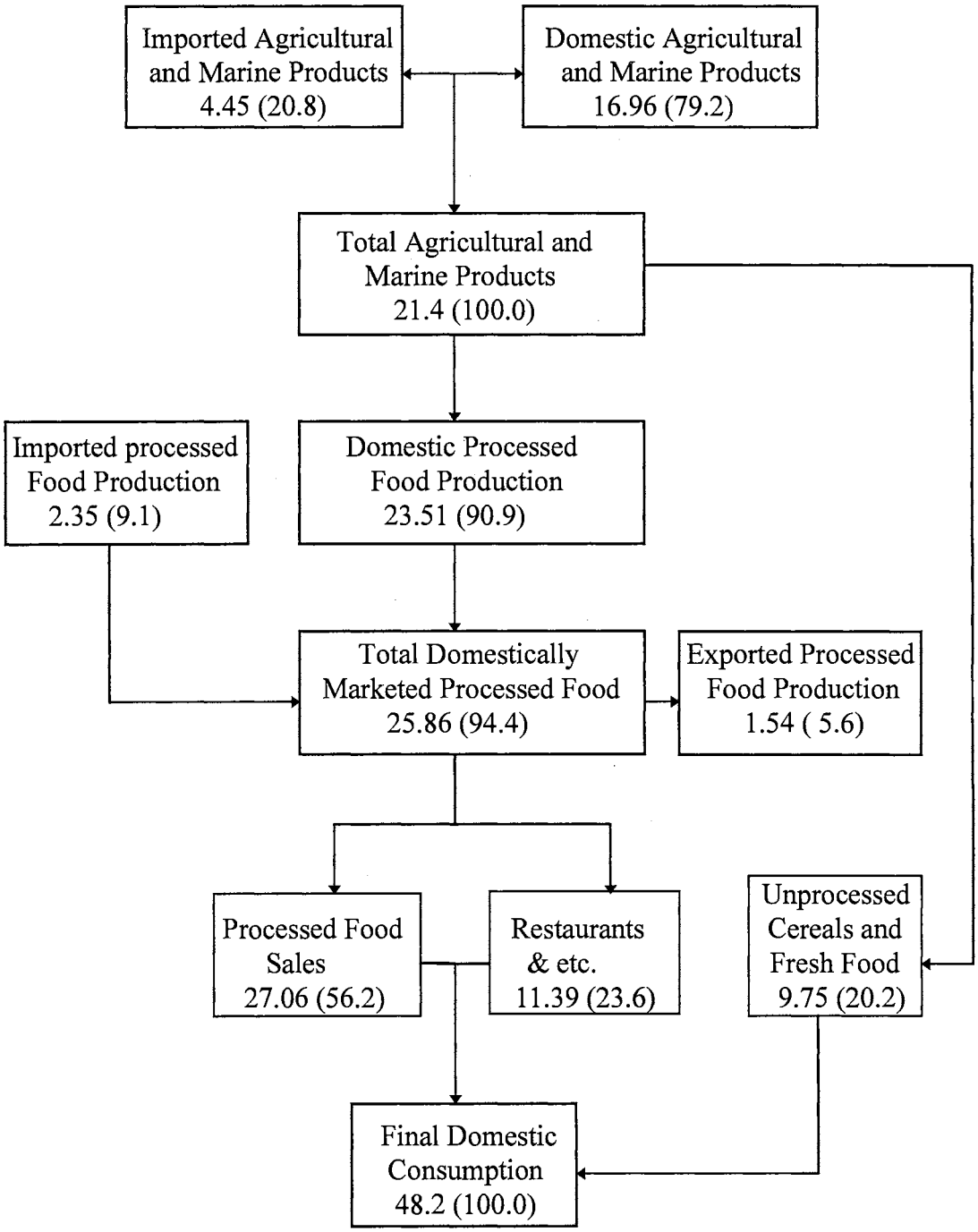
In 1995, the number of employees in the food and beverages industry is 0.97 percent of the total employees in Korea (20,377,000 workers) and 23.4 percent of total employees in total manufacturing (4,773,000 workers). It increased about 66.2 percent compared to 1975 and the number of employees increased to 67,000 workers in the food and beverage industry between 1975 and 1995 (Table 1-1).

Channels of Distribution

An important distinction among processed food products is the type of distribution channels employed in marketing the products. This distinction is important for several reasons. First, different marketing channels serve different sets of customers (or demand segments). By implication, methods of importing, and methods of persuading, and servicing customers vary systematically by channel type. Second, although some industries utilize only one type of marketing channel, most industries face the possibility of distributing their product through alternative distribution channels. Otherwise identical products distributed via two channels interact in two different markets (where a "market" is the place where a group of sellers meet and exchange with a group of buyers). Finally, food processing companies (or the major divisions of diversified companies) tend to specialize in only one marketing channel. Indeed, to be financially successful, a food processor must specialize in a channel, if only to become intimately familiar with the customers, selling methods, and strategies of major competitors (Conner, 1988).

Figure 1-1. Major Marketing Channels for Food Products.

(U.S. $Billion of 1988 Shipment)



Source: 1988 Input-Output Table, The Bank of Korea, 1990.

Note: Figures in parentheses are percent, and $ values are author's calculations. Figure 1-1 was developed from the original by Kim (1995).

Although the following breakdown of channel types represents an oversimplification, the five types delineated make a fine point of departure. Figure 1-1 shows the relative size of the five major marketing channels for processing foods, measured in 1988 producer value of shipments at all levels of the food system.

The industry does play a pivotal role in developing the agricultural and marine products sectors. Based on the 1988 input-output table of The Bank of Korea, almost 80 percent of the agricultural and marine products consumed as food were processed. The total agricultural and marine products were $21.4 billion in 1988, which is 44.4 % of the direct purchases of the total final domestic consumption of $48.2 billion. The value-added through the marketing channels for food products was $26.8 billion.

The smallest marketing channels available to processors are the routes to and from the rest of the world. Imports are 9.1 percent of the total domestically marketed processed food productions and exports are 5.6 percent.

Selling in export markets requires a host of specialized marketing institutions unique to this channel: freight forwarders, custom forms, methods of avoiding foreign exchange risks, unfamiliar safety and labelling regulations, and so forth. Internationally traded food products involve a mixture of consumer and industrial products (Connor 1988).

The processed food sales of the total domestically marketed processed food constitute by far the largest distribution channel, 56.2 percent of total final domestic consumption. The second largest of the three marketing channels for the total domestically marketed processed food involves restaurants etc. (23.6 percent). The third largest marketing channel, cereals and fresh food, accounts for 20.2 percent of total final

domestic consumption. Otherwise, one-fourth of total final domestic consumption is in the form of "producer goods," semi-processed ingredients sold to other manufacturers, and over three-fourths of it is finished consumer goods and kitchen-ready foods.

Overview of the Food Processing Industry

Growth of the Food Processing Industry

GNP, all manufacturing, and the value-added food products and beverages industry generated $ 330.8 billion, $ 134.3 billion, and $ 10.82 billion of value-added in 1993. For the period of 1975 - 1993, GNP, all manufacturing, the value-added food products and beverages industry increased 15.8 times, 197.5 times, and 90.2 times (Table 1-2).

In 1993, the share of the value-added food products and beverages industry in GNP is 3.3 percent, and the share of the value-added food products and beverages industry in all manufacturing is 8.1 percent.

However, since all manufacturing and the value-added food products and beverages industry with less than 5 workers was not included, the sizes of the value-added food products and beverages industry will be increased more.

The share of the value-added food products and beverages industry in GNP increased very much during 1975 - 1985 from 0.6 percent in 1975 to 4.5 percent in 1985. After this period, it is decreasing slowly, and the ratio of it is 3.3 percent in 1993. Otherwise, the share of the value-added food products and beverages industry in all manufacturing decreased from percent in 1975 to 8.1 percent in 1993. Thus, the value-added food products and beverages industry increased very much in absolute value but

Table 1-2. Share of GNP in Value-Added for Food Products and Beverages in Selected Years, 1975 - 1993. (Units: U.S. $Billion, %)

Year	GNP($) (A)	All Manufacturing (B)	Food & Beverages (C)	(C / A)	(C / B)
1975	20.9	0.68	0.12	0.6	24.0
1980	60.5	0.80	0.30	0.5	16.7
1985	89.7	30.04	4.15	4.5	13.8
1990	251.8	98.79	7.81	3.3	7.9
1991	292.0	113.52	9.10	3.3	8.3
1992	305.7	121.79	10.15	3.3	8.3
1993	330.8	134.30	10.82	3.3	8.1
'93/'75	15.8	197.50	90.20		

Source: 1) Major Statistics of Agriculture, Fishery, and Forestry, Ministry of Agriculture and Fishery, Republic of Korea, various issues.
2) Report on Industrial Census (whole country), National Statistical Office, Republic of Korea, various issues.
Note: The $ values are the author's calculations.

the share of the value-added food products and beverages industry in GNP and all manufacturing is decreasing. The situation is that the Korean economy has developed mainly in the heavy-industry and service portion. Please note, the food processing industry is an often overshadowed component of the Korean economy despite its significant contribution to people's health and the increasing importance of diet and nutrition.

Structure of the Food Processing Industry

The structure of the country's food processing industry is summarised in Table 1-3. It has the changes in the number of establishments with more than 5 workers, number of employees, value of gross output, and value-added.

The Korean "total manufacturing" category reported the number of establishments

Table 1-3. Growth of Food Processing Establishments with 5 Workers or More, Selected Years, 1975 - 1993.

Industry Branch and Year	No. of Establishments (Unit)	No. of Employees (1,000)	Value of Gross Output ($Billion)	Value-added ($Billion)
All Manufacturing				
1975	22,787	1,420	36.65	0.58
1980	30,823	2,014	54.98	1.80
1985	44,037	2,437	86.54	30.04
1990	68,690	3,013	246.29	98.79
1992	74,679	2,801	298.13	121.79
1993	88,864	2,885	316.70	134.30
Food & Beverages				
1975	3,881	150	8.13	0.12
1980	4,617	181	11.78	0.30
1985	4,659	197	16.64	4.15
1990	4,638	207	23.96	7.81
1992	5,044	197	24.10	10.15
1993	5,792	199	25.90	10.82

Source: Report on Industrial Survey (whole country), National Statistical Office, Republic of Korea, various issues.
Note: The $ values are the author's calculations.

and employment at approximately 88,864 and 2,885,000 and had a value of gross output figure of billion and a value-added figure of $134.33 billion in 1993. Otherwise, the food and beverage industry showed the number of establishments, employment, value of gross output, and value-added at 5,792, 199,000, 25.9 billion, and 10.82 billion.

The number of establishments and employees of the food and beverage industry posted increasing trends between 1980 and 1993. However, the values of gross output and value-added estimates in 1975 registered strong increases from $8.13 billion to $25.9 billion and from $0.12 billion to $10.82 billion by 1993.

In Table 4-1, a characteristic feature of Korean food manufacturing plants is that numerous small-scale units operate under the shadow of a few large-scale units.

According to the 1994 Report on Industrial Census (whole country), of the registered 5,044 food processing establishments, 36.5 percent employed between 5 and 9 workers; 56 percent employed 10-99 workers; 3.9 percent employed 100-199 workers; 1.8 percent employed 200-299 workers; 1.1 percent employed 300-499 workers and only 0.7 percent employed 500 or more workers. It is interesting to note that the number of food processing establishments employing 5 to 99 workers represented over 92.5 percent of the total. Therefore, the majority of the food firms are small in scale in terms of numbers of

Table 1-4. Structure of Food Processing Establishments with 5 Workers or More, by Number of Workers, 1992.

	Number of Workers						
	Total	5-9	10-99	100-199	200-299	300-499	500&over
Number of Establishments							
Total Manufacturing	74,679	27,128	43,541	2,256	732	458	564
Percent	100.0	36.3	58.2	3.0	1.1	0.6	0.8
Food & beverage	5,044	1,840	2,824	197	90	56	37
Percent	100.0	36.5	56.0	3.9	1.8	1.1	0.7
Gross Output ($billion)							
Total Manufacturing	287.69	7.28	73.62	31.01	19.86	20.52	135.41
Percent	100.0	2.5	25.6	10.8	6.9	7.1	47.1
Food & beverage	24.10	0.46	6.39	4.28	4.21	3.96	4.80
Percent	100.0	1.9	26.5	17.8	17.5	16.4	19.9
Value-Added ($billion)							
Manufacturing	121.79	3.65	32.57	13.27	8.43	9.19	54.69
Percent	100.0	3.0	26.8	10.8	6.9	7.6	44.9
Food & beverage	10.15	0.18	2.36	1.81	1.74	1.94	2.12
Percent	100.0	1.8	23.3	17.8	17.1	19.1	20.9

Source: Report on Industrial Survey (whole country), National Statistical Office, Republic of Korea, 1994.
Note: The $ values are the author's calculations.

employees. The large manufacturing unit, 500 or more workers, contributed the large value in terms of gross output and value-added, respectively 47.1 and 44.9 percent of the total of all manufacturing.

In the food and beverage industry, the largest units (500 or more workers) contributed and 20.9 percent of the total gross output and value-added, respectively (Table 1-4). Small units with 5-9 workers contributed only 1.8 percent of the total value-added productivity of factory workers (food processing plants included).

In general, the productivity of factory workers (food processing plants) in terms of value added, the small units with 5-9 workers contributed only 1.8 percent of the total. As the number of factory workers increases, the level of productivity per worker increases until an optimum size is attained, after which a workers' productivity level diminishes (Paek, 1978).

In 1991, the total gross output and value-added of the food and beverage industry group, included in the division of industry by classification in Korea, were $22.6 and $9.1 billion respectively in Table 1-5. The leading food and beverage manufacturing groups based on total gross output and value-added was manufacturers of meat, fruits, vegetable and fat products, accounting for 26.6 percent of the total gross output and 19.0 percent of total value-added in 1991.

The manufacturing of dairy products made up the smallest portion, providing for percent of the total gross output and 12.7 percent of the total value-added respectively. Other industry groups (based on the percentage of total gross output) are manufacture of other food products (26.6 percent), grain mill products and starches (20.0 percent), and manufacturing of beverages (17.8 percent) (Table 1-5).

Table 1-5. The Size of Food and Beverage Manufacturing, 1991. (Units: U.S. $Billion)

Cord	Group of industry	Gross output (A)	Value-added (B)	(B)/(A)
151	Manufacture of meat, fruits, vegetable and fats	5.11 (22.6)	1.73 (19.0)	33.8 %
152	Manufacture of dairy products	2.93 (13.0)	1.16 (12.7)	39.6 %
153	Grain mill products and starches	4.50 (20.0)	1.40 (15.3)	31.0 %
154	Manufacture of other food products	6.01 (26.6)	2.73 (30.0)	45.4 %
155	Manufacture of beverages	4.03 (17.8)	2.09 (23.0)	52.0 %
Total		22.60 (100)	9.10 (100)	

Source: Report on Industrial Survey (whole country), National Statistical Office, Republic of Korea, 1992.
Note: The $ values are the author's calculations.
Table 1-5 was developed from the original by Choi (1993).

The leading food and beverage industry groups in terms of value-added are manufacturing of beverages (23.0 percent), manufacturing of meat, fruit, vegetable and fats percent), grain mill products and starches (15.3 percent), manufacturing of dairy products (12.7 percent), and manufacturing of other food products (30.0 percent), (Table 5-1). The manufacturing of beverages generated $2.09 billion of value-added in 1991, which accounted for 23.0 percent of the food and beverage manufacturing industry's total value-added of $9.10 billion in Table 1-5. Although the manufacturing of beverages ranks third in terms of the gross output, the group ranks first based on value-added, excluding manufacturing of other food products.

Considering the ratio of value-added to gross output, the highest industry is manufacturing of beverages (52.0 percent), and the second industry is manufacturing of dairy products (39.6 percent). Manufacturing of meat, fruit, vegetables and fats (33.8 percent) and grain mill products and starches (31.0 percent), and manufacturing of other

Table 1-6. The Size of Main Selected Agricultural Processing Food Industry, 1991.
(Units: U.S. $Million)

Cord	Sub-sub-group of industry	Gross output (A)	Value-added (B)	(A)/(B)
15131	Processing of fruit and vegetables	653.5	136.3	20.9 %
1513	Canning of fruit and vegetables	112.1	50.0	44.6 %
15142	Manufacturing of vegetable oils and fats	40.5	17.8	43.8 %
1544	Macaroni, noodles, and similar products	1008.0	315.2	31.3 %
15454	Soy source and soy bean paste	214.3	97.8	45.7 %
15455	Manufacturing of brewer's requisites	10.7	6.8	64.2 %
15492	Manufacturing of prepared tea	65.6	31.8	48.5 %
15494	Bean curd and similar products	101.0	43.5	43.1 %
15495	Manufacturing of ginseng products	356.3	112.9	31.7 %
15496	Malt extracts and prepared products	69.1	50.6	73.2 %
15497	Manufacturing of prepared health foods	64.9	40.5	62.4 %
Total		2,808.4	977.0	

Source: Report on Industrial Survey (whole country), National Statistical Office, Republic of Korea, 1992.
Note: The $ values are the author's calculations.
Table 1-6 was developed from the original by Choi (1993).

food products 45.4 percent) follow in order (Table 1-5).

The total gross output and value-added of the main selected agricultural processing food and industries are $2,808.4 million and $977.0 million in 1991 (Table 1-6). Among the selected agricultural processing food industries, the leading product groups based on the gross output are macaroni, noodles, and similar products, processing of fruits and vegetables, manufacturing of ginseng products, and soy source and soy bean paste.

The processing of macaroni, noodles, and similar products generated $1,008.0 million of gross output in 1991. The fruit and vegetable processing group created $653.5 million of gross output. The manufacturing of ginseng products and the processing of soy source and soy bean paste had $356.3 million and $214.3 million respectively.

In addition, the leading groups in term of value-added are the macaroni, noodles,

and similar products and the processing of fruit and vegetables in 1991. The macaroni, noodles, and similar products industry and processing of fruit and vegetables accounted for $315.2 million and $136.3 million respectively (Table 1-6).

Considering the ratio of value-added to gross output, the leading groups are malt extracts and prepared products (73.2 percent), manufacturing of brewer's requisites (64.2 percent), and manufacturing of prepared health foods (62.4 percent) separately. Therefore, these health food industry groups are high value-added.

Role of Korean Processed Foods in International Markets

There are no data available on the total value of food processing shipments world-wide. However, the Organization for Economic Co-operation and Development (OECD) provides a Structural Analysis (STAN) industrial database. This internationally comparable time series currently covers 20 countries (19 OECD countries plus The Republic of Korea) for all manufacturing industries (Henderson et. al., 1996). Data for the food and beverage industry (reasonably comparable to the Korean food processing industry) are consistently defined across all countries.

In 1992, the gross output of processed food for all 20 countries totalled $1.5 trillion. The food processing sector, with shipments of $384 billion, accounted for 26 percent of the total (Table 1-7). Output from the Korean food processing industry included the beverages (adjusted for OECD-plus-Korea (OECDK) total across all countries. The U.S. had the largest gross output, followed by Japan, Germany, France, and the United Kingdom at $384 billion, $155 billion, $118 billion, and $93 billion, respectively. The Korean food processing industry accounted for 8.3 percent of total

Table 1-7. Output and Employment in Food Processing, Korea and the OECD, 1992.

Region/country	Gross output (shipments)	Share of total manufacturing	Total employment	Gross output per employee
	$Billion	percent	Thousand	Thousand
OECD plus Korea	1,502.0	13.5	8,199.0	183.2
Korea	24.0	8.3	197.0	122.6
United States	384.0	13.5	1,615.0	237.7
Japan	281.0	9.8	1,772.0	158.8
Germany	155.0	11.3	841.0	184.0
France	118.0	16.7	561.0	210.1
United Kingdom	93.0	16.3	559.0	165.6
Canada	39.0	14.8	223.0	177.1
Australia	26.0	20.8	88.0	137.3

Sources: 1) ERS tabulation of OECD data (from Henderson et. al., 1996).
2) Report on Industrial Survey (whole Country, National Statistical Office, Korea, 1992.
Note: The Korean Data was calculated.

Korean manufacturing output, and this is the lowest percent of the food processing industries' share of total manufacturing output in the OECD. The average employment of food processing plants in Korea is smaller than in other OECD countries, and Korean food processing plants' share of total Korean employment was only 2.4 percent with total employment of 197,000. Gross output in the Korean food processing industry was approximately $123,000 per person in 1992, compared with $183,000 per person across all OECD countries. Gross output per employee in the Korean food processing industry was much less than in most of the other major food processing countries, namely: U.S. ($238,000), France ($210,000), Germany ($184,000), United Kingdom ($166,000), and Japan ($159,000).

Consumption of Processed Foods

Food Expenditure

National Food Expenditure

Growth in food consumption is primarily dependent upon changes in population and income level, and relative food prices. Total Korean food expenditures have shown steady real growth over the last twenty years, due to an increased demand for higher-priced processed and convenience foods as per capita income rises. Another factor may be that higher wage rates make servants more expensive so convenience foods may be substituted for servants. Western influences cause more people to need to "eat-out."

According to the 20th annual report on family income and expenditure survey by the National Statistical Office, Korean consumers spent a total of $39.5 billion of their personal disposable income on food (excluding alcoholic beverages) in 1990 (Table 1-8).

Family Food Expenditure

Another way of appreciating the changes in the pattern of consumption of

Table 1-8. The Food Expenditure of the Whole Country. (Unit: U.S. $ Billion)

	1975	1980	1985	1990	'75 / '90
All food and beverages	4.8	17.7	15.5	39.5	8.23
All food	4.7	11.1	14.8	37.7	8.02
Beverages (excluding alcohol)	0.1	0.7	0.7	1.8	18.00

Source: Annual Report on Family Income and Expenditure Survey, National Statistical Office, Republic of Korea, various issues.
Note: The $ values are the author's calculations.

Table 1-9. Monthly Food Consumption of Average Family and Ratio of Expenditure on Processed Foods in Household Food Consumption.

Item	1980	1985	1990	1995
Total consumption expenditure (A): ($)	272.8	356.1	956.0	1634.0
Of which: food expenditure (B): ($)	118.3	133.6	306.7	470.6
Percentage of each food item				
Processed foods	23.8	27.0	30.9	24.4
Cereals	32.4	26.4	17.5	11.2
Fresh foods	40.1	39.1	31.2	32.5
Eating-out	3.7	7.5	20.4	31.9
Total	100.0	100.0	100.0	100.0
Engel's coefficient (B / A): (%)	42.9	37.5	32.0	28.8
Average size of family (number of persons)	4.6	4.2	4.0	3.7

Source: Annual Report on Family Income and Expenditure Survey, National Statistical Office, Republic of Korea, various issues.
Note: The $ values are the author's calculations.
Table 1-9 was developed from the original by Kim (1995).

processed foods in the country during the 1980-95 period is to examine the food consumption of the average Korean family and the ratio of the expenditures on processed foods in total household food consumption. The expenditures for food consumption of an average family monthly is $470.60 in 1995. Table 1-9 reveals the following pattern: i) the expenditures (otherwise known as Engel's coefficient); ii) expenditures for eating-out increased the most (from 3.7 percent of food expenditures in 1980 to 20.4 percent of food expenditures in 1990 and on to percent in 1995); iii) consumption of processed foods increased slightly; iv) the share of food expenditures accounted for cereal consumption decreased from 32.4 percent to only 11.2 percent; and v) the share of fresh foods decreased from 40.12 to 32.5.

Per Capita Food Expenditure

In Table 1-10, the trends of per capita disposable income and expenditure for food and non-food from 1970 to 1990 are presented. The Koreans' per capita disposable income has increased in real terms in the last twenty years. With this increase in income, expenditure on food has also increased, but the share of food expenditure out of disposable income became smaller as the Engel's coefficient shows in Table 1-10.

From 1970 to 1990 expenditure on food increased by 125 percent. The average annual growth rate of food consumption recorded 5.95 percent per annum which is lower than the average annual growth rate of per capita disposable income by 16.4 percent.

Trend in Per Capita Consumption of Foods

According to the food balance sheet published by the Korean rural economic institute, the Korean dietary pattern has changed significantly in terms of volume and quality during the last 23 years due to higher income and a more westernized diet.

Table 1-10. Trends of Per Capita Disposable Income and Expenditure. (Unit: U.S. $)

	1970	1975	1980	1985	1990	'90 /'70
Per Capita Disposable Income	1415	1752	1981	1975	4880	3.45
Per Capita Expenditure						
Total (A)	1240	1276	1317	1309	2204	1.78
Food (B)	652	659	636	524	815	1.25
Non-Food	588	616	682	786	1389	2.36
Engel's Coefficient	52.6	51.7	48.2	40.0	37.0	

Source: Korea Statistical Yearbook, The Korean Statistical Association, various issues.
Note: 1) The values are in 1985 constant value and Engel's coefficient is (B / A) * 100.
2) The $ values of $ are the author's calculations.

As shown in Table 1-11, the most significant characteristic is the increase in animal product consumption, and generally per capita total cereals consumption decreased while that of wheat increased. This reflects the trend of westernization in the Korean dietary pattern. Per capita consumption of rice has been in a declining trend and that trend will continue in the future despite its being one of the staple foods. It is forecasted that per capita consumption of rice will decline further to the level of 92-94kg and 85-88kg in the year 2000 and 2004, respectively (Korean Rural Economic Institute).

The traditional Korean diet includes rice, barley, cabbage, radishes, etc. In general, the consumption of relatively expensive food materials (higher valued products) such as meat, milk, fresh fruits and vegetables has increased. Per capita beef and pork consumption has increased by 3.7 to 4.9 times and the consumption of fruits and vegetables grew by about 3.9 to 32.9 times. Comparing Japanese per capita total meat consumption of 29.9kg in 1993, with increasing trend of meat consumption in Korea

Table 1-11. Trends of Per Capita Per Year Net Food Supply in Korea. (Unit: Kg)

	1970	1975	1980	1985	1990	1992	'92/'70
Cereals	216.1	193.0	185.0	185.4	175.5	175.4	0.9
Rice1	33.8	119.9	132.9	128.1	120.8	115.2	0.9
Wheat	18.8	30.1	29.4	32.0	29.7	32.6	2.2
Starchy Roots	38.4	35.1	22.5	11.9	11.0	12.6	0.1
Meats	8.4	9.3	13.9	16.5	23.6	27.3	4.6
Beef	1.6	2.1	2.6	2.9	4.1	5.1	3.7
Pork	3.6	2.8	6.3	8.4	11.8	13.1	4.9
Fruits	12.0	14.0	16.3	26.6	29.0	38.6	3.9
Vegetables	65.6	62.5	120.6	98.6	132.6	134.7	2.9
Milk	3.8	4.5	10.8	23.1	31.8	34.4	16.4
Fish & Seafood	25.7	29.9	27.0	37.2	36.2	40.0	2.2
Oil and Fats	1.5	2.7	5.1	9.2	14.3	13.9	34.8

Source: Food Balance Sheet, Korea Rural Economic Institute, 1994.

(27.3kg, 1992). If Korea follows Japan, the rate of per capita consumption of fruits and vegetables will be declining in the future (Lee, 1996). The consumption of milk and oil and fats has increased by 16.4 and 34.8 times with remarkable speed, and the consumption of fish almost doubled in 23 years. Fish and seafood have been the main food in Korea because Korea has the sea on three sides, and since they are primary sources of protein which is low in fat, their consumption will not diminish further because of their importance in the Korean diet.

There have been changes in the trend of per capita daily nutrient intake between 1970 and 1992. Even though there is a reduction of cereal consumption, the primary source of energy, daily energy intake tended to increase somewhat because of the increasing amount of food consumed. The total calorie intake was 2,533 kcal in 1970 and 2,912 kcal in 1992 (in Table 1-12). The total protein intake tended to increase with the increase in animal product consumption from 73.9g in 1965 to 90g in 1992. Also, during the same years, fat intake increased about 3.1 times because of an increase in meat consumption, which is the primary source of fat. Calcium, iron, and vitamin A and C intake also showed an increasing trend.

Table 1-12. Trends of Per Capita Daily Nutrient Intake.

	1970	1975	1980	1985	1990	1992	'92/'70
Energy (Kcal)	2,533	2,390	2,485	2,687	2,853	2,912	1.2
Protein (g)	73.9	71.1	73.6	86.6	89.3	90	1.2
Fat (g)	23.8	27.4	36.6	51.8	72.2	73.6	3.1
Calcium (mg)	395	495	511	413	495	536	1.4
Iron (mg)	16.3	15.5	12.6	26.9	26.6	24.6	1.5
Vitamin A (IU)	4,761	2,779	3,037	3,046	4,296	5,019	1.1
Niacin (mg)	24.5	23.5	23.4	18	20	18.5	0.8
Vitamin C (mg)	69	74	125	95.6	123.8	135.5	1.9

Source: Food Balance Sheet, Korea Rural Economic Institute, 1994.

International Trade for Processed Food

This section parallels data presented on trade for the food processing industries. Data sources on processed food imports and exports are muddled, mainly because of different definitions of what constitutes processed versus unprocessed products. In this report, the Standard Industrial Classification (SIC) definition will be followed as closely as possible, but some products remain difficult to classify.

Exports and Imports of Processed Foods

Recent data on Korean exports and imports of processed foods and beverages is given in Table 13-1. In 1977, imports were $151.8 million and exports approached $799.4 million, leaving a trade surplus of $627.6 million. However, in 1993 there is a trade deficit of over $419 million. Korea has had a trade deficit in processed foods for the past seventeen years (Table 1-13). This trade deficit will increase more in the future because of the Uruguay Round (U.R.) agreement. In 1977, the main Korean imports were edible oil ($77.8 million), grain mill ($18.8million), fish ($12.8 million), and other foods ($25.4 million). In contrast, notice the changing of the ranking of the value of imports of processed foods between 1977 and 1993. The principal Korean imports in 1993 were fish ($473.8 million), meat ($407.7 million), fruit and vegetables ($246.5 million), edible oil ($219.5 million), bakery and noodles ($136.1 million), and other foods ($547.7 million) in 1993. These six industries accounted for percent of 1993 Korean processed food imports. According to Table 1-13, the imports of meat and bakery and noodles increased 426.9 and 559.9 times respectively over the 17 year period.

Table 1-13. Exports and Imports of Processed Foods and Beverages, 1977 and 1993.
(Unit: U.S. $Million)

Processed Food	Imports			Exports			Trade Balance	
	1977	1993	'93/'77	1977	1993	'93/'77	1977	1993
Food	148.6	2,155.1	14.5	798.1	1,775.1	2.2	649.5	-130
Milk	7.8	84.1	10.9	0.06	34.3	553.7	-7.74	-49.8
Meat	1.0	407.7	426.9	0.002	82.2	41104	-0.998	-325.5
Fish	12.8	473.8	3.7	638.7	1,147.4	1.8	625.9	673.6
Fruit and Vegetables	3.1	246.5	78.8	74.0	88.6	1.2	70.9	-157.9
Edible Oil	77.8	219.5	2.8	2.1	4.5	2.1	75.7	-215
Grain mill	18.8	2.4	0.1	12.7	1.7	0.2	-6.1	-0.7
Bakery & Noodles	0.3	136.1	559.9	19.1	174.7	9.1	18.8	38.6
Food Additives	1.8	37.3	21.2	2.3	18.8	8.2	0.5	-18.5
Other foods	25.4	547.7	21.6	49.2	222.9	4.5	23.8	-324.8
Beverages	3.2	103.8	32.1	1.3	64.8	50.9	-1.9	-39
Alcoholic Beverages	3.2	83.1	25.7	1.0	31.5	33.1	-2.2	-51.6
Nonalcoholic Beverages	0.0	20.7	0.0	0.3	33.3	103.7	0.3	12.6
Total	151.8	2,258.9	14.9	779.4	1839.9	2.4	627.6	-419

Source: Statistical Yearbook of Foreign Trade, Korean Customs Administration, Korea Customs Research Institute, Republic of Korea, various issues.

Food and beverage exports increased from $799.4 million in 1977 to $1839.9 million in 1993, an increase of 2.4 times. In 1977, the main exports were fish ($638.7 million), fruit and vegetables ($74.0 million), and other foods ($49.2 million). However, the principal Korean exports in 1993 were fish ($1,147.3 million), bakery and noodles ($ 174.7 million), fruit and vegetables ($88.6 million), meat ($82.2 million), and other foods ($222.9 million).

The fishing industry alone accounted for 62 percent of the total Korean processed food exports in 1993. Exports of milk and meat increased by 553.7 and 41,104 times

each from 1977 to 1993. In addition, Korea has a net trade surplus in fish, bakery and noodles, and non-alcoholic industries only, whereas trade deficits exist in all another food industries.

In Table 1-14, the top 10 major processed food final products exported from 1980 to 1995 are shown. The chewing gum products topped the list with U.S. $70.3 million in 1995, and instant noodle products were second U.S. $69.4 million. Otherwise, the ginseng products are not only 4th on the list with U.S. $34.8 million but are also ranked 9th and 10th in the group with U.S. $ 10.1 million and U.S. $ 4.3 million, respectively, for a total of U.S. $ 49.2 million. Another leading processed food export is a Korean traditional food, *kim-chi*. It ranked 3rd among the top 10 export commodities, garnering U.S. $ 50.9 million in 1995.

Putting ginseng and *kim-chi* aside, it is easy to understand that all the other final

Table 1-14. List of 10 Major Export Processed Food Final Products (Unit: U.S. $Million)

Name of Products	1980	1985	1990	1995	Main Countries of Destination
Chewing gum	11.73	10.18	16.52	70.3	Hong Kong, USA
Instant noodle	11.53	10.84	33.25	69.4	USA, Canada, Russian
Kim-chi	2.98	0.87	14.78	50.9	Japan
White *Ginseng* extract	10.85	6.00	42.88	34.8	Hong Kong, Japan
Beverage fruit juice	0.01	1.01	13.84	24.0	Russian
Cocoa powder	0.04	0.00	9.99	16.9	Japan
Beer made from malt	0.02	1.21	7.26	16.0	Hong-Kong
Instant coffee	0.004	0.04	5.48	13.3	Russian, Taiwan
Ginseng tea	4.48	5.72	9.24	10.1	USA, Japan
Beverage-based *ginseng*	0.03	1.21	4.04	4.3	Japan
Total	32.034	37.08	157.28	336.1	

Source: Statistical Yearbook of Foreign Trade, Korean Customs Administration, Korea Customs Research Institute, Republic of Korea, various issues.
Note: Table 1-14 was developed from the original by Kim (1995).

product exports depended on the value-added concept, i.e., they are all finished products from imported raw materials, including the second-ranked instant noodle made largely of wheat flour and condiments (Kim, 1995).

In Table 1-15, the top 10 major processed food final product imports from 1980 to 1995 are shown. The importation of fruits and vegetables also posted steady increases due in large measure, perhaps, to the import liberalization move that the government made quite recently. And of course, the country is dependent upon large annual imports of cane and beet sugar. The importation of non-alcoholic beverages in both volume and value was not considerable but that of alcoholic beverages rose consistently. Along with the government's import relaxation for tobacco recently, both the quantity and value of tobacco importation increased remarkably (Kim, 1995).

Table 1-15. List of 10 Major Import Processed Food Final Products (Unit: U.S. $Million)

Name of Products	1980	1985	1990	1995	Main Countries of Supply
Filtertip cigarettes	0.07	0.35	103.90	300.6	USA, Japan
Scotch whisky	0.63	1.37	27.50	119.8	United Kingdom
Roughly distilled alcohol for beverages	0.00	8.15	19.67	42.5	U.A.S.
Chocolate and chocolate confectionery	0.13	0.76	18.81	22.1	USA
Whey powder	3.94	5.67	12.09	17.4	Netherlands, France
Cocoa powder	2.06	2.25	9.97	13.6	Netherlands
Pineapple juice	0.22	0.21	9.92	1.5	Thailand
Fruit cocktail	0.43	0.95	8.29	19.6	Philippines
Mixed seasoning	0.18	1.04	6.49	14.9	Japan. UK
Instant coffee	0.15	0.08	5.96	7.9	USA
Total	7.81	20.83	220.60	559.9	

Source: Statistical Yearbook of Foreign Trade, Korean Customs Administration, Korea Customs Research Institute, Republic of Korea, various issues.
Note: Table 1-15 was developed from the original by Kim (1995).

As a matter of fact, the importation of filter tip cigarettes in 1995 topped the list of the 10 major import commodities into the country at an estimated value of U.S. $ 300.6 million. Ironically enough, the second and third leading imported final products, which are not even food items (like cigarettes), were valued at U.S. $ 119.8 million and U.S. $ 42.5 million.

Institutional Aspects of the Korean Food Processing Industry

The major organizations that are concerned with the food processing industry may be roughly divided into public and private sectors. The public category, aside from the Ministry of Agriculture, Forestry and Fisheries (MAFF) and the Ministry of Health and Social Affairs (MHSA), is represented by the Korea Food Development Institute (KFDI) that is charged with the responsibility of developing strategies for food processing industries. On the other hand, the private sector counterpart is the Korean Food Research Institute (KFRI) that is financed by the Korean Food industry Association. The KFRI's main function is to collect and generate data on food information, which are food consumption, production, and trade statistics, for distribution to members of the association (Kim, 1995).

On a wider scale, the public support to the cause of food processing in the ROK rests with the MAFF and the MHSA. The former is primarily concerned with the production of quality crops, livestock and marine products and is partially authorized to issue permits to potential food processor operators. The MHSA, on the other hand, is basically concerned with the health and hygienic aspects of food processing (Kim, 1995).

In 1993, a law was passed in the ROK to enhance the development of agricultural

product processing as a measure of increasing the value-added aspect of processing agriculture and fisheries raw materials (Kim, 1995).

The Present Status of the Food Processing Industry in Korea

Superiority of Small-scale Unit Operation

The number of food processing plants employing 5 to 99 workers counted by the Mining and Industry Census in 1992 is 4,664 plants. It was 92.5 percent of the total. Further, if the number of food processing plants with less than 5 workers is included, the percentage is greater. The same ratio for total manufacturing as a whole was 94.6 percent. Thus, a major characteristic feature of Korean food manufacturing plants and all manufacturing is numerous small-scale operating units. In general, the Korean food processing industry is not taking advantage of the economies of large scale operation. Therefore, the structure of the food processing industry should be adjusted since the large-sized firms which employ larger numbers of workers are more cost-efficient.

Low Level of Technology

Compared with the current advancement in food technology in Japan, the Republic of China or Hong Kong, food processors in the ROK are probably some years behind particularly regarding the technology level in small-scale or traditional operations. Efficiency operation, automation and high-speed technology should make food processing in the ROK accelerate faster than it does now (Kim, 1995). Therefore, the Korean food processing industry and the government must strive to develop a higher level

of food production technology.

The Extension of Raw Material Imports

The importation of raw materials was strictly restricted by the government until the end of 1980. However, since 1989, Korea has continually taken steps to open its agricultural markets in line with an import liberalization schedule. As a result, the agricultural import liberalization ratio has increased to 84.9 percent in 1990 (Kim, 1995). Furthermore, the agricultural imports of Korea will increase more as a result of the U.R. agreement demanding the elimination of non-tariff barriers through tariffication as well as the reduction of internal supports to agricultural products. Therefore, the processed food industry in Korea will be able to import raw materials and will not be dependent upon domestic agricultural products for low level prices and large quantities. For this reason, the government needs a policy that is aimed at stabilization of prices and a suitable allocation between imported and domestic raw materials. In addition, as imports of raw commodities increase, the Korean food processing industry and government must conduct research regarding foreign agricultural products, collecting information on prices, quantities produced, marketing channels, and international trade.

The Increasing of Processed Food Imports

Competition from processed food imports will increase because of import liberalization and changes in the food consumption pattern of Koreans. As competition from imports of processed food increases, the consumption of domestic processed food will reduce, and the quantities of processed food will decrease also. Therefore, the

Korean processed food industry must develop greater variety and higher quality food to compete with the foreign food processing companies. Furthermore, Korea must explore the international market to increase exports of Korean processed food.

A Negative Attitude toward Exploration of International Markets

In these days, the world trade order is being newly shaped by multilateralism for the emerging of the World Trade Organization (WTO), and there are the regional economic blocks such as the EU, APEC, NAFTA and others to consider at the same time.

Korea is traditionally a natural resource poor country. Therefore, the Korean government, from the early stage of economic development in the 1960s, has adopted an export promotion policy in which much of the raw materials imported from foreign countries are exported in final form after value-added, processes are completed.

The Korean food processing industry must maintain a positive attitude and explore markets for possible exports of processed foods. Also, the Korean government should consider supporting all such efforts made by the processing industry.

Summary and Conclusions

The food processing industry utilizes factory systems to add economic value by transforming agricultural and marine products for export and domestic consumption. Adding value to farm and fish products and other material ingredients is the way in which the food processing industries contribute to national economies.

The food processing industry has historically developed along with economic growth. Thus, as remarkable economic development has occurred in Korea, there are

accompanying economic and social changes in Korea such as increases in per capita incomes, industrialization, urbanization, an increase in employment of women and so on. Therefore, the demand for many processed foods has increased and the consumers are looking for a higher quality level, and more kinds of processed foods in Korea. In addition, the changing international trade environment for the U.R. agreement raises challenging tasks for the Korean food processing industry.

The direct contribution of the food processing industry seems insignificant since the value-added of food and beverages is only 2.69 percent of the total Gross Domestic Products (GDP), as $8.2 billion in 1995, and the number of employees in the food and beverages industry is only 0.97 percent of the total employees in Korea (20,377,000 workers). However, the industry is rightly assessed in its role of stabilizing the economy, not only for stable economic growth but also stabilization against inflation when one accounts for the indirect effects of income and employment generated from inter-industry interactions. The marketing channels in the food processing industry play a pivotal role in developing the agricultural and marine products sectors because in 1988 almost 80 percent of agricultural and marine products consumed as food were processed.

The structure of Korea's food processing industries includes 5,792 establishments, 199,000 workers, $25.9 billion in gross output, and $10.82 billion in value-added in 1993. Otherwise, a characteristic feature of the Korean food manufacturing industry is that numerous small-scale units operate because the number of food processing establishments employing 5 to 99 workers represented over 92.5 percent of total.

The role of the Korean food processing industry in international markets is only 1.6 percent of the total output in OECD.

For consumption of processed foods, the total national expenditure for food and beverages was $39.5 million in 1990. In addition, the expenditures for food consumption of an average family per month is $470.6 in Korea.

The trade balance for processed foods showed a surplus of $647.6 million in 1977 but a trade deficit higher than $419 million in1993.

The institutional aspect of the food processing industry includes three public institutions, namely the Ministry of Agriculture, Forestry and Fisheries (MAFF), the Ministry of Health and Social Affairs (MHSA), and the Korea Food Development Institute (KFDI). On the other hand, the private sector counterpart is the Korean Food Research Institute (KFRI), financed by the Korean Food industry Association.

Problems of the food processing industry include: small-scale unit operations, a low level of technology, an increase in raw material imports, an increase in processed foods imports, and a negative attitude toward exploring the international markets.

In conclusion, the Korean food processing industry has been neglected by the government and private investors. The Korean government should consider pursuing solutions to some problems in the food processing industry to enhance nutritional values and meet consumers' desire as they look for safe, good quality food. First, the structure of the food processing industry should be adjusted to more large-sized firms. Second, the Korean food processing industry and government must develop a higher level of food production technology for more good quality food products and to survive the competition in international markets. Third, as imports of raw commodities from foreign countries increase, the Korean government needs a policy that is aimed at price stabilization and a suitable allocation between imported and domestic raw materials.

Then, the government and the food processing industry must have a positive attitude toward increased use of imported agricultural products in value-added manufactures. Fourth, the Korean processed food industry must develop greater variety and higher quality food to compete with processed food imports. Fifth, to survive in international food markets in the WTO organization, the food processing industry and government must pursue diversification and maintain a positive attitude for exploring international markets to increase exports of Korean processed food products.

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Appendix Table 1-1. The Standard Industrial Classification (SIC) Codes for Food Products and Beverages.

Cord (Division, Group, Sub-group, Sub-sub-group of Industry),	Product Description
D	Manufacturing
15	Food products and beverages
151	Food products and beverages
1511	Processing and preserving of meat
15111	Slaughtering of livestock
15112	Slaughtering of poultry
15119	Processing preserving of meat, N.E.C.
1512	Processing and preserving of fish
15121	Fish fillets and similar products
15122	Fish cake and similar products
15123	Manufacture of smoked, cooked fish
15124	Fish and fish products-frozen
15125	Fish and fish products-dried
15126	Fish and fish products-salted
15129	Processing and preserving of fish
1513	Processing of fruit and vegetable
15131	Canning of fruit and vegetable
15132	Pickling of fruit s and vegetables
15239	Other processing of fruits and vegetables
1514	Vegetable and animal oils and fats
15141	Manufacture of animal oils and fats
15142	Manufacture of vegetable oils and fats
15143	Edible refined oil and processed oils
152	Manufacture of dairy products
1520	Manufacture of daily products
15201	Manufacture of fluid milk
15202	Condensed, dry and sugared milk
15203	Manufacture of fermented milk
15204	Ice-cream and other ice cakes
15205	Butter and cheese
153	Grain mill products, starches
1531	Grain mill products
15311	Husking of cereals
15312	Milling of cereals
15313	Blended and prepared flours
15314	Manufacture of cereal cooking foods
15319	Manufacture of grain mill product, N.E.C.
1532	Manufacture of starches and maltose
15321	Manufacture of starch products
15322	Sugars
1533	Manufacture of prepared animals feeds
15330	Manufacture of prepared animals feeds
154	Manufacture of other food products
1541	Manufacture of bakery products
15411	Fresh or frozen bakery products
15412	Manufacture of rice cake
15413	Manufacture of dry bakery products
15419	Manufacture of bakery products, N.E.C.

Cord (Division, Group, Sub-group, Sub-sub-group of Industry),	Product Description
1542	Manufacture of sugar
15422	Sugars
1543	Cocoa, chocolate and sugar confectionery
15430	Cocoa, chocolate and sugar confectionery
1544	Macaroni, noodles, and similar products
15440	Macaroni, noodles, and similar products
1545	Condiments and food additive products
15451	Natural processed spice crops
15452	Condiments, refined or fermented
15453	Condiments, prepared or blended
15454	Soy source and soy bean paste
15455	Manufacture of brewer's requisites
15459	Other condiments and food additive
1548	Processing of food
15481	Husking of cereals for the trade
15482	Milling of cereals for the trade
15483	Freezing of food
15489	Processing of food, N.E.C.
1549	Manufacture of food products, N.E.C.
15491	Manufacture of prepared coffee
15492	Manufacture of prepared tea
15493	Prepared soups and homogenized food
15494	Bean curd and similar products
15495	Manufacture of ginseng products
15496	Malt extracts and prepared products
15497	Manufacture of prepared health food
15498	Processing preserving of seaweed
15449	Manufacture of food products, N.E.C.
155	Manufacture of beverages
1551	Rectifying and blending of spirits
15511	Distilling of ethyl alcohol
15512	Manufacture of soji
15513	Distilling of fermented cereals
15514	Manufacture of liqueur
15519	Distilling and blending spirits, N.E.C.
1552	Fermented alcoholic beverage
15521	Manufacture of rice wine
15522	Manufacture of refined rice wine
15523	Manufacture of fruit wine
15529	Fermented alcoholic beverage, N.E.C.
1553	Manufacture of malt liquors and malt
15531	Manufacture of malt
15532	Manufacture of malt liquors
1554	Manufacture of ice and soft drinks
15541	Manufacture of ice, except dry ice
15542	Manufacture of carbonated waters
15549	Other ice and soft drinks

Source: Report on Industrial Survey (whole country), National Statistical Office, Korea, 1994.

Appendix Table 1-2. Won (Korean Money Unit) per U.S. Dallas ($)

Year	Won per U.S.($)
1965	271.78
1966	271.18
1967	274.60
1968	281.50
1969	304.45
1970	316.65
1971	373.30
1972	398.90
1973	397.50
1974	484.00
1975	484.00
1976	484.00
1977	484.00
1978	484.00
1979	484.00
1980	659.90
1981	700.50
1982	748.80
1983	795.50
1984	827.40
1985	890.20
1986	861.40
1987	792.30
1988	684.10
1989	679.60
1990	716.40
1991	760.80
1992	788.40
1993	808.10
1994	788.10
1995	774.70

Source: International Monetary Fund (IMF), International Financial Statistics Year book, various issues.
Note: Won per U.S. ($) is the value of the end of year.

ESSAY TWO

KOREAN IMPORT DEMAND FOR WHEAT, SOYBEANS, AND CORN 1970-1995

KOREAN IMPORT DEMAND FOR WHEAT,
SOYBEANS, AND CORN 1970-1995

ABSTRACT

The purpose of this study was to econometrically determine the factors which affected per capita, market (total), and import demands for wheat, soybeans, and corn in Korea between 1970 and 1995, and to test of misspecification for these models.

The empirical results showed that per capita demand market (total), and import demands for wheat, soybeans, and corn in Linear and Log-linear models are dependent upon traditional economic variables. In the misspecification tests, the per capita wheat demand and the total soybeans demand in the log-linear model are severely misspecified.

This study concluded that the wheat, soybeans, corn demands in Korea are dependent upon on feed grain needs for meat production and flour for human consumption. Furthermore, these commodities are in demand to produce the value-added food goods in addition to feed grain by the Korean food processing industries.

KOREAN IMPORT DEMAND FOR WHEAT, SOYBEANS, AND CORN 1970-1995

Introduction

In Republic of Korea the leading imported grains are wheat, corn, and soybeans. In 1994, Korea imported 6,050,000 tons of wheat (U.S. $795 million), 8,428,000 tons of corn (U.S. $ 1,455 million), and 1,467,000 tons of soybeans (U.S. $ 455 million) (Ministry of Agriculture Forestry and Fisheries, Dept. of Grain Policy, Grain Policy Data, 1996). From Korean Grain Policy data in 1996, there are self-sufficiency ratios for wheat of 0.38 percent, for corn of 0.8 percent, and for soybeans of 9.9 percent. In accord with this, Korean wheat, corn, and soybean supplies almost entirely depend on the international market.

Under these circumstances, it is important to understand the economic interactions that exist in the marketing channels for importing grains for domestic consumption. Many import demand models have been studied estimating either aggregate import demand or import demand by commodity to examine the affecting factors. These studies analyze import behavior with single import demand equations or single supply and demand equations. These import demand equations, derived from utility maximization or arbitrarily specified, have distributed lag structures or partial adjustment forms. However, these studies did not show the results of misspecification tests, whether the models violated the assumptions of normality, linearity, homoskedasticity, parameter stability and independence for the model. The misspecification tests are important because if the assumptions are violated, the Ordinary Least Square (OLS) estimators may be biased, inconsistent, and imprecise.

An import demand model is useful to trade analysts interested in dynamic grain trade models. Models are also useful to policy makers, since they provide an analytical framework within which to view the effects of changes in Korean agricultural production and consumption policy from an international viewpoint.

This study has an overall objective of analyzing the economic factors that particularly influence the Korean market for those commodities. The specific objectives include the following analysis of per capita demand , market (total) demand, and import demand on wheat, soybeans, and corn by: 1) developing a theoretical framework and constructing models explaining the interrelationships which characterize the Korean market; 2) econometrically estimating the factors which influence Korean commodity demands between 1970 and 1995; 3) measuring the elasticities of the respective income, price, and other variables which affected these demands; and 4) testing the model for violations of the underlying assumptions in the linear regression models.

Literature of Import Demand

In this section, the theory underlying import demand, and the estimation method for import demand will be reviewed.

Theoretical Determinants

Dependent Variables

Wheat, soybeans, and corn. Wheat, soybeans and corn imported by country i, as the dependent variable, have been estimated by several researchers (Abbott 1979, Arnade

and Dixit 1981, Chambers and Just 1981, Jabara 1982, Kim 1986, Davidson and Arnade 1987, Alston, Carter, Grenn and Pick 1990, Kim 1994).

Abbott (1979) developed an alternative equation determining net trade behavior which can be used to estimate import demand parameters, test hypotheses concerning the relevance of assumptions made in the standard models of trade determination, and suggest refinements in such models. He used two commodities, wheat and feed grains, in Argentina and thirty-two countries or regions, using annual data from 1951 to 1973. Arnade and Dixit (1981) estimated wheat and soybean import demand equations for countries with diverse inflation rates. They chose five countries: Brazil, Mexico, Spain, Japan, and Taiwan with data covering the late 1960's to the early 1980's. Chambers and Just (1981) concentrated on the markets for the three most important U.S. agricultural exports - - wheat, corn, and soybeans. Their primary concerns were the effect of the U.S. dollar devaluation in the early 1970's using quarterly data for the period 1969(I)-77(II). Jabara (1982) analyzed the import behavior of selected middle-income developing countries. She calculated the available information about import behavior of developing countries through estimation of parameters for key variables which determine import demand among middle-income developing countries. Pooled cross-section and time series data were used to estimate equations for twenty middle-income developing countries from 1976 to 1979. Kim (1986) presented a model whereby government pricing policies are directly affected by the government expenditures for consumers' and producers' subsidies. Mexico, whose traditional corn exports have been declining since 1970, was required to import substantial amounts of corn since 1973. Therefore, time series data from 1973-1982 was used. Halbrendt and Gempesaw (1990) examined the

impacts of China's historical and anticipated future reforms on its domestic wheat economy and the import demand for wheat. Specifically, their paper attempts to assess China's wheat policies before and after the reform of 1978 and to forecast domestic wheat production, consumption, and imports. For estimation, they used annual time-series data covering the period 1960-87. Alston, Cater, Grenn, and Pick (1990) tested the Armington assumptions of homotheticity and separability with data from the international cotton and wheat markets. They analyzed wheat imports for five nations: China (1972-1984), Brazil (1970-1985), Egypt (1971-1985), U.S.S.R. (1972-1984), and Japan (1960-1985). Kim (1994) determined whether the model as one system captures enough information to explain the international and domestic marketing situations of wheat, soybeans and corn in Korea. He used the time series data 1970-1992.

Main Selected Independent Variables

Foreign exchange. The foreign exchange expenditures on imports of a commodity may work through the government's control mechanism. That is, when foreign exchange receipts are low, a country may be more willing to accept a high consumer price and be less willing to spend foreign exchange to lower that price. It also may alter its control over the producer price, depending upon its foreign exchange flows (Abbott, 1979). Islam (1978) developed the hypothesis that a significant proportion of government interference in rice importing is motivated by a desire to conserve foreign reserves. Kim (1986) examined formally the effects of Mexican government price policies and financial constraints on grain import demand. He considered that the foreign exchange allotments are key government policy variables which must be incorporated into the estimation of

import demand functions. Chambers and Just attempted to develop a model which considers exchange rate adjustment as a monetary effect with adequate flexibility in specification, which reflects exchange rate effects on the domestic sector as well as the foreign sector of the U.S. agricultural sector.

Inflation. Henry (1978) studied the response of imports of Ghana and Nigeria the U.S. to the rate of inflation that prevailed in the United States from 1967 to 1976. Basically, he hypothesized that the U.S. rate of inflation significantly affected the level of imports of Ghana and Nigeria to the United States and therefore accounted for a considerable proportion of the variation of their imports from U.S. over the period. Arnade and Dixit (1981) tested for the impact of inflation on import demand functions. Import prices in such models are usually deflated by the buyers' CPI to account for the absence of money illusion. Imports are now defined as the excess of domestic demand over domestic supply. An import demand for a real good is:

$$IM = X_1 (P_1/CPI, P_2/CPI, Y/CPI) - S_1(P_1/CPI.....W_i/CPI)$$

where IM is imports of a good, S_1 is supplies of the good, and W_i represents the $_i$th input price.

GNP, GDP, and POP. Leong and Elterich (1985) employed the Gross National Product (GNP) as an independent variable to estimate Japanese per capita demand, import demand, and the domestic supply function in Japan. Kargbo and Henneberry (1992) used real per capita GNP as a proxy for total expenditure by an individual for the estimation. The per capita demand for beef in Hong Kong is dependent upon the real

retail price of beef, the real retail price of pork (a substitute), the real retail price of rice (a complement), and real per capita Gross Domestic Production (GDP) (Seleka and Henneberry 1993). Curry and Henneberry (1993) developed an aggregate import demand model to estimate total agricultural import demand for twelve countries.

Price factors. Khan and Ross (1975) included the price of the domestic competing product in his model. The quantity demanded of the i^{th} import commodity is related to its own price relative to the price of the domestic competing commodity and to the level of domestic real income. John Mutti (1977) used the theoretical model that consumer demand theory suggests (the equilibrium model where the constant elasticity of demand approximation is used). The model of Hamilton (1980) has the form

$$Q_{mi} = f(P_{di}, P_{mi}, A_i)$$

where Q_{mi} is the volume of imports, P_{di} is the unit price of the domestic nonperfect substitute, P_{mi} is the unit price of the imported commodity i, and Ai is a variable reflecting the level of economic activity in the economy. It is found that price elasticites of commodities produced within the same industry and between commodity groups are significantly different in several cases. They found the Swedish economy is comparatively sensitive to changes in relative price on the import side. The functional form of Salas (1982) is

$$M = (Q, P^M, P^D),$$

where M is import demand in real terms, Q is real national income or some 'proxy' variable, P^M is the price of imported goods, P^D is the price of domestic goods that are

potential import substitutes.

Estimation Method

Ordinary Least Square (OLS)

OLS is used as an appropriate method to estimate the parameters of the per capita demand and supply equation, and is the most popular estimation method. Therefore, the OLS estimation method has been used by many economists: (Khan 1975; Khan and Ross 1975, 1977; Murry and Ginman 1976; Mutti 1977; Henry 1978; Islam 1978; Abbott 1979; Hamilton 1980; Biswas and Ram 1980; Arnade and Dixit 1981; Jabara 1982; Salas 1982; Melo and Vote 1982; Thursby and Thursby 1983; Arize and Afifi 1987; Kim 1986; Davidson and Arnade 1987; Arize and Afifi 1987; Ito, Chen and Peterson 1990; Kargbo 1992; Seleka and Henneberry 1993; Curry and Heneberry 1993; Henley and Henneberry 1993).

Model

Linear Model

The linear model is used as an appropriate model to estimate the parameters of the import demand equation, and is the most popular estimation model. Therefore, linear estimation models have been used by many researchers: (Islam 1978; Abbott 1979; Chambers and Just 1981; Jabara 1982; Kim 1986; Davidson and Arnade 1987; Kondoh and Lin 1991; Jones and Hennberry 1993; Curry and Heneberry 1993; Henley and Henneberry 1993).

Jabara (1982) employed the following linear equation form:

$$WMit = \alpha + \beta_1 POP_{it} + \beta_2 Y_{it} (IMC_{it}) + \beta_3 WST_{it-1} + \beta_4 PM_{it} (WP_{it}) + \beta_5 PRODW_{it} + \beta_6 PS_{it} + \beta_7 FAID_{it} + \varepsilon_{it}$$

for i =1....n countries and t =1...4 years. WM_{it} is a total concessional and commercial wheat imports by country $_i$; POP_i, population in country i; Y_i, per capita gross national product in country i; IMC_i, import capacity in country i; WST_{it-1} carry-in wheat stocks in country i; PM_i, consumer price of wheat in country i; WP_i is the world price of wheat in country i; $PRODW_i$, production of wheat in country i; PS_i, consumer price index in country i, 1975=100; $FAID_i$, concessional wheat shipments to country i; ε_i is a random error term.

Henley and Henneberry (1995) drived the linear model:

$$NPCIP_t = \beta_0 - \beta_1 RWPP_t + \beta_2 RWPB_t - \beta_3 RWPOT_t + \beta_4 PCGNP_t - \beta_5 PCPROD_t + \beta_6 D_1 + U_t$$

where $NPCIP_t$ = Net per-capita imports of pork in Mexico in metric tons; $RWPP_t$ = Real wholesale price of imported pork in Mexico in dollars per metric ton; $RWPB_t$ = Real wholesale price of imported beef in Mexico in dollars per metric ton; $RWPOT_t$ = Real wholesale price of imported potatoes in Mexico in dollars per metric ton; $PCGNP_t$ = Real per capita Gross National Product (GNP) in Mexico in U.S. dollars; $PCPROD_t$ = Per-capita production of pork in Mexico; D_1 = A dummy variable for imports in years when imports of pork were zero; t = Year; U = Random disturbance term

Log-linear Model

Log-linear estimation model have been used by many economists: (Khan 1975;

Khan 1977; Murry and Ginman 1976; Mutti 1977; Henry 1978; Hamilton 1980; Biswas and Ram 1980; Arnade and Dixit 1981; Salas 1982; Melo and Vote 1982; Reed and Schnept 1982; Thursby and Thursby 1983; Leong and Esterich 1985; Arize and Afifi 1987; Kim 1986; Davidson and Arnade 1987; Arize and Afifi 1987; Ito, Chen and Peterson 1990; Kargbo and Henneberry 1992; Seleka and Henneberry 1993).

MELO and VOGT (1982) estimated the following log-linear import demand model:

$$\log M_{it}^{d} = \alpha_{0i} + \alpha_{1i} \log (PM_i / PD_i)_t + \alpha_{2i} \log Y_t + u_t$$

where M_{it}^{d} is quantity demanded of the i^{th} import commodity, PM_i is the price of the i^{th} import commodity, PD_i is the price of the i^{th} domestic commodity, Y_t is real gross domestic product, and u_i is a random disturbance. α_{1i} is the relative price elasticity of demand for commodity i ($\alpha_{1i} <= 0$), and α_{2i} is the real income elasticity.

Murray and Ginman (1976) made the log-linear import demand function:

$$\ln(Q) = \beta_0 + \beta_1 \ln(Y) + \beta_2 \ln(P_m) + \beta_3 \ln(P_d) + u$$

where $\beta_1, \beta_2,$ and β_3 are the income, import price and domestic price elasticity of demand for imports, respectively.

Theory

Domestic Demand Function

Market Demand[1]

The ordinary demand function (Marshallian demand function) of individuals gives the quantity of a good that they will buy as a function of commodity prices and their income.

Suppose there are n goods (denoted by X_i, i = 1,..., n) with prices P_i, i = 1,..., n. Assume also there are m individuals in the market. Then the $_j$th individual's demand for the $_i$th good will depend on all prices and on ij, the income of this person. Those can be denoted by

$$X_{ij} = X_{ij}(P_1, \ldots\ldots, P_{n,}, I_j) \tag{2.1}$$

where $i = 1,\ldots, n$ and $j = 1,\ldots, m$.

Using these individual demand functions, market demand concepts are provided by the following definitions. The market demand function for a particular good (X_i) is the sum of each individual's demand for that good:

$$X_i = \sum_{j=1}^{m} X_{ij} = X_i(P_1, \ldots\ldots, P_n, I_1, \ldots\ldots, I_m) \tag{2.2}$$

Utility Maximization[2]

Individuals are assumed to behave as if they maximized utility subject to a budget

[1] This section was taken from Walter Nicholson (1991).
[2] This section was taken from Tebogo B. Seleka (1991).

constraint. Mathematically, an individual consumer maximizes U (X_1, X_2 ,....., X_n) subject to a constant budget that $\sum_{i=1}^{n} P_i X_i = Y^0$. This constrained utility maximization is achieved by setting up the Lagrange function (L) where

2.3 $$L = U(X_1, X_2, \ldots\ldots, X_n) + \lambda [Y^0 - \sum_{i=1}^{n} P_i X_i]$$

First order partial derivatives for equation 2.3 are set equal to zero as in 2.4 (a)

2.4 (a) $$\partial L / \partial X_i = fi - \lambda Pi = 0 \quad \text{for } i = 1, \ldots\ldots, n$$

2.4 (b) $$\partial L / \partial \lambda = Y^0 - \sum_{i=1}^{n} P_i X_i = 0$$

where $f_i = \partial U / \partial X_i$. Setting first order partial derivatives equal to zero (as indicated in 2.4 (a)) and simultaneously solving the n+1 partial derivatives for X_i yields the ordinary demand function for good $_i$ as a function of its own price, other prices and income. That is,

2.5 $$X_i = X_i (P_i, P_j, Y) \quad j = 1, \ldots\ldots, n; \; i \neq j$$

The relationship of the demand for Xi with P_i, P_j and Y may be determined by the signs of the first order partial derivatives of equation 2.4 with respect to P_i, P_j and Y. If $\partial X_i / \partial P_i < 0$, quantity of X_i demanded decreases as a result of increases in the price of X_i (own price). If $\partial X_i / \partial P_j < 0$, X_i and X_j are said to be gross complements (they are consumed together). If $\partial X_i / \partial P_j > 0$, X_i and X_j are gross substitutes (either X_i or X_j is consumed at a

point in time instead of the other). If $\partial X_i/\partial P_j = 0$, X_i and X_j are unrelated. If X_i is a normal good, $\partial X_i/\partial Y > 0$, meaning that as income increases more of X_i is demanded.

As usual the second-order condition can also be expressed as a condition involving the bordered Hessian.

$$\begin{vmatrix} 0 & -P_1 & -P_2 \\ -P_1 & U_{11} & U_{12} \\ -P_2 & U_{21} & U_{22} \end{vmatrix} > 0, \qquad \begin{vmatrix} 0 & -P_1 & -P_2 & -P_3 \\ -P_1 & U_{11} & U_{12} & U_{13} \\ -P_2 & U_{21} & U_{22} & U_{23} \\ -P_3 & U_{31} & U_{32} & U_{33} \end{vmatrix} < 0,$$

The same pattern holds for an arbitrary number of factors. The analogous second-order condition for a regular local minimum is that the same set of determinants must all be negative.

Domestic Supply Function[3]

Supply Function

At this section, the domestic supply (production) function is explained because it has an effect on import demand. The objective of the firm is to maximize output (or cost minimization for a dual problem). Mathematically, the relationship between inputs and outputs in a production function is given by the form.

2.6 $$Q = f(X_1, \ldots\ldots, X_n)$$

where Q represents the firm's output, X_i is the quantity of input i used in the production process. The definition of the production function is that the firm's production function

[3] This section was taken from Hal R. Varian (1992)

for a particular good, Q, shows the maximum amount of the good that can be produced using alternative combinations of input (X_i).

Output Maximization[4]

The firm would like to obtain the greatest possible output for given cost outlay. The function is expressed

2.7 $$V = f(X_1, X_2) + \mu (C^0 - r_1x_1 - r_2x_2 - b)$$

where $\mu \neq 0$ is an undetermined Lagrange multiplier, and set the partial derivatives of V with respect to x_1, x_2, and μ equal to zero:

2.8(a) $$\partial V/\partial x_1 = f_1 - \mu r_1 = 0$$

2.8(b) $$\partial V/\partial x_2 = f_2 - \mu r_2 = 0$$

2.8(c) $$\partial V/\partial \mu = C^0 - r_1x_1 - r_2x_2 = 0$$

If divide the first and second, $f_1/r_1 = f_2/r_2$. First-order conditions state that the ratio of the MPs of X_1 and X_2 must be equated with the ratio of their prices.

Solving the first two equation for μ, $\mu = f_1/ r_1 = f_2/ r_2$. The contribution to output of the last dollar expended upon each input must equal μ .

Second-order conditions require that the relevant bordered Hessian determinant be positive:

$$\begin{vmatrix} f_{11} & f_{12} & -r_1 \\ f_{21} & f_{22} & -r_2 \\ -r_1 & -r_2 & 0 \end{vmatrix} > 0$$

The second-order condition may be utilized to demonstrate that the rate of change

[4] This section was taken from Henderson and Quandt (1988)

of the slope of the tangent to an isoquant must be positive ($d^2x_2/dx_1^2 > 0$) at the point of tangent with an isocost line.

Import Demand[5]

An import demand function can be derived mathematically. Two import demand functions are broadly expressed into perfect substitutes and imperfect substitutes (Gardiner and Carter, 1988; Leamer and Stern, 1970; and Thursby and Thursby, 1988). If perfect substitutability between imported and domestic products is assumed, import demand is the residual between domestic demand and supply. That is,

2.9 $Mk = Dk (Pc, P_1, ..., Pn, Y, Ods) - Sk (Ps, R_1, ... , Rn, Y, Oss)$

where Mk represents imports of product K, Dk (*) denotes domestic demand of product K, Pc is the consumer price of product K in the importing country, Pi's re[resent prices of complements and substitutes in the importing country, Y is income in the importing country, Ods represents other demand shifting variables such as population. Sk(*) denotes domestic supply of product K, Ps is the domestic supply price, Ri's represent factor prices, and Oss is other supply shifting variables such as commodity stocks carryied from the pervious year. Assuming efficiency, no trade barriers, and no domestic pricing polices, Pc = Ps = Pwk, where Pwk is the world price of product K.

These assumptions imply that equation 2.10 may be rewritten as

2.10 $Mk = Dk (Pwk, P_1, ..., Pn, Y, Ods) - Sk (Pwk, R_1, ... , Rn, Y, Oss)$

which suggests that the import demand model under perfect substitutability is given by

[5] This section was taken from Tebogo B. Seleka (1991)

2.11 $Mk = Mk (Pwk, P_1, ..., Pn, Y, Ods, R_1, ... , Rn, Y, Oss)$

Equation 2.11 suggests that the quantity of product K imported is a function of the world prices (Pwk), demand shifters (P_1, ... , Pn, Y, and Ods), and supply shift (R_1, ... , Rn, and Oss). It can be shown and mathematically that $\delta Mk/\delta Pwk < 0$ and $\delta Mk/\delta Pi < 0$ if Pi is the price of a compliment, $\delta Mk/\delta Pi > 0$ if Pi is the price of a substitute, $\delta Mk/\delta Y > 0$ if K is a normal good, and $\delta Mk/\delta Ri > 0$ since an increase in factor costs leads to a decrease in domestic supply, which results in an increase in excess demand.

If imperfect substitutability between the imported and domestic product is assumed, imports are no longer the residual between domestic demand and supply since the products are non-homogeneous. This means that consumers maximize U(Mk, Qdk, qi, ..., qn)

subject to $PwkMk + PdkQdk + \sum_{i=1}^{n} Piqi = Y^0$ where Mk is the quantity of the imported product (grain), Pwk is the world price of the imported product, Qdk is the quantity of domestic product (grain) demanded, Pi represents prices of other products, qi represents quantities demanded of other products, and Y^0 denotes the importer's income. From constrained utility maximization it may be shown that the import demand model in this case is given by

2.12 $Mk = Mk (Pwk, Pdk, P_1, ..., Pn, Y)$

The assumption of equation 2.12 is that the domestic product is a substitute for the imported product, meaning that $\delta Mk/\delta PDk > 0$. Therefore the prices of the domestic products (Pdk) enter the model the same way as the prices of other products (Pi's). That is from a constrained utility maximization. The signs of other partial derivatives are as

presented earlier.

Misspecification Testing

As econometricians know, misspecification arises from the violation of the assumptions underlying the linear regression model. The causes of misspecification are departure from normality, linearity, homoskedasticity, parameter stability and independence (autocorrection). When all of the assumptions underlying a linear regression model are true, OLS yields the best linear unbiased estimators, and test statistics are valid. If one or more assumptions are violated, OLS estimators may be biased, inconsistent, and/or imprecise. Then, policy recommendations may be misleading, and the test statistics are invalid.

Model Assumptions

Let us consider the linear regression model (LRM), $Y_t = \beta' X_t + \varepsilon_t$ t=1,.....,T. here Y_t and ε_t are 1*1 and B and Xt are k*1. The assumptions underlying the LRM are:

(1) Normality: $D(Y_t / \beta' X_t ; \theta) \sim$ Normal: The distribution of Y_t conditional on X_t is normal, where $\theta \equiv (\beta, \sigma^2)$;

(2) Functional Form: $E(Y_t / X_t = x_t) = \beta' X_t$: if the functional form of the conditional mean is known and linear, then $E(\varepsilon_t) = 0$;

(3) Homoskedasticity

(i) Static: the conditional variance, $var(Y_t / X_t = x_t)$ does not depend on the x_t ;

(ii) Dynamic: $var(Y_t / X_t = x_t)$ does not depend on the past history of ut, yt, or xt;

(4)Parameter Stability: $\theta \equiv (\beta, \sigma^2)$ is stable. The parameters of the conditional

mean and conditional variance do not vary with time;

(5) Independence: $Y \equiv (Y_1, Y_2, \ldots\ldots Y_T)$ is an independent sample drawn sequentially from $D(Y_t / \beta' X_t ; \theta)$, t=1, 2, ..., T;

(6) Weak Exogeneity: X_t is weakly exogenous with respect to θ, t = 1,....., T. The marginal distribution of X_t does not contain relevant information for estimation of θ. Thus, it can be ignored;

(7) No Perfect Collinearity: Rank(X) = k with T>k, where k is the number of regressors. Failure of this assumption indicates that the sample information in X is inadequate for the estimation of the statistical parameters β and σ^2. If assumptions (1)-(7) hold, Ordinary Least Square (OLS) estimators of β, and σ are best, linear, and unbiased; $\beta\hat{}$ is normally distributed; and $T\sigma\hat{}^2$ is distributed χ^2. Of these distributed; (1) - (5) are directly testable, but (6) and (7) are difficult to test. However, exogenity can be tested indirectly by testing assumptions (1)-(3) and (5) (McGuirk and et.al., 1993).

Misspecification tests can be classified as individual tests and joint tests. Individual tests are a single model assumption, and joint tests are a comprehensive set of individual tests. Joint tests can check simultaneously for parameter stability, appropriateness of functional form and independence. However, the validity of these tests requires that the assumptions of normality, stability variance and homoskedasticity will be met.

Empirical Model and Data

This section presents the model estimation, misspecification test, and the data used in estimating this study.

Model Estimation

Per Capita (Individual) Demand Estimation

The Ordinary Least Squares (OLS) was used to estimate the linear model (2.13, 2.14, and 2.15) and log-linear model (2.16, 2.17, and 2.18) using time series data from 1970 to 1995.

2.13 $PCWt = \alpha_0 + \alpha_1 RGRPt + \alpha_2 RGSPt + \alpha_3 PCRt + \alpha_4 PCFt + \alpha_5 Yt + Ut$

2.14 $PCSt = \beta_0 + \beta_1 RGSPt + \beta_2 RGCPt + \beta_3 PCCt + \beta_4 PCMt + \beta_5 Yt + Ut$

2.15 $PCCt = \gamma_0 + \gamma_1 RGCPt + \gamma_2 RGSPt + \gamma_3 PCSt + \gamma_4 PCMt + \gamma_5 Yt + Ut$

2.16 $\ln PCWt = \alpha_0 + \alpha_1 \ln RGRPt + \alpha_2 \ln RGSPt + \alpha_3 \ln PCRt + \alpha_4 \ln PCFt + \alpha_5 \ln Yt + Ut$

2.17 $\ln PCSt = \beta_0 + \beta_1 \ln RGSPt + \beta_2 \ln RGCPt + \beta_3 \ln PCCt + \beta_4 \ln PCMt + \beta_6 \ln Yt + Ut$

2.18 $\ln PCSt = \gamma_0 + \gamma_1 \ln RGCPt + \gamma_2 \ln RGSPt + \gamma_3 \ln PCSt + \gamma_4 \ln PCMt + \gamma_6 \ln Yt + Ut$

The coefficientes of equation 2.13, 2.14, and 2.15 with linear models are slopes, and the coefficientes of equation 2.16, 2.17, and 2.18, with log-linear models are elasticities.

2.19 $RGRPt = (NGRPt / CPIt) * 100$

where RGRPt is the real government rice purchasing price in Korean 1,000wons per 80 kilograms, NGRPt is the nominal government rice purchasing price in Korean 1,000wons per 80 kilograms, and CPI is the consumer price index (1990=100).

2.20 $RGSPt = (NGSPt / CPIt) * 100$

where RGSPt is the real government soybean purchasing price in Korean 1,000wons per 75 kilograms, NGSPt is the nominal government rice purchasing price in Korean 1,000wons per 75kilograms.

2.21 $$RGCPt = (NGCPt / CPIt) * 100$$

where RGSPt is the real government corn purchasing price in Korean 1,000wons per 75 kilograms NGSPt is the nominal government corn purchasing price in Korean 1,000wons per 75 kilograms.

2.22 $$Yt = (GNPt / CPIt) * 100$$

where Yt is the real per capita gross national production in Korean wons.

Domestic Market Demand Estimation

The Ordinary Least Squares (OLS) was used to estimate the linear model (2.23, 2.24, and 2.25) and log-linear model (2.26, 2.27, and 2.28) using time series data from 1970 to 1995.

2.23 $DWt = \alpha_0 + \alpha_1 RGCPt + \alpha_2 TDRCt + \alpha_3 POPt + Ut$

2.24 $DSt = \beta_0 + \beta_1 RGCPt + \beta_2 TDFPt + \beta_3 GDPt + \beta_4 POPt + Ut$

2.25 $DCt = \gamma_0 + \gamma_1 RGSPt + \gamma_2 TDFPt + \gamma_3 GDPt + \gamma_4 POPt + Ut$

2.26 $Ln\ DWt = \alpha_0 + \alpha_1 lnRGCPt + \alpha_2 lnTDRCt + \alpha_3 ln\ POPt + Ut$

2.27 $Ln\ DSt = \beta_0 + \beta_1 ln\ RGCPt + \beta_2 lnTDFPt + \beta_3 lnGDPt + \beta_4 lnPOPt + Ut$

2.28 $Ln\ DCt = \gamma_0 + \gamma_1 lnRGSPt + \gamma_2 lnTDFPt + \gamma_3 lnGDPt + \gamma_4 lnPOPt + Ut$

Import Demand Estimation

The Ordinary Least Squares (OLS) was used to estimate the linear model (2.29, 2.30, 2.31), and log-linear model (2.32, 2.33, and 2.34) using time series data from 1970 to 1995.

2.29 $MWt = \alpha_0 + \alpha_1 RWIPt + \alpha_2 TDFPt + \alpha_3 FEt + \alpha_4 WSTt_{-1} + \alpha_5 TDMCt + Ut$

2.30 $MSt = \beta_0 + \beta_1 RSIPt + \beta_2 TDFPt + \beta_3 FEt + \beta_4 SSTt_{-1} + \beta_4 TDMCt + Ut$

2.31 $MCt = \gamma_0 + \gamma_1 RCIPt + \gamma_2 TDFPt + \gamma_3 FEt + \gamma_4 CSTt_{-1} + \gamma_5 TDMCt + Ut$

2.32 $\text{Ln MWt} = \alpha_0 + \alpha_1 \text{lnRWIPt} + \alpha_2 \text{lnTDFPt} + \alpha_3 \text{lnFEt} + \alpha_4 \text{lnWSTt-}_1 + \alpha_5 \text{lnTDMC} + Ut$

2.33 $\text{Ln MSt} = \beta_0 + \beta_1 \text{lnRSIPt} + \beta_2 \text{lnTDFPt} + \beta_3 \text{lnFEt} + \beta_4 \text{lnSSTt-}_1 + \beta_5 \text{lnTDMCt} + Ut$

2.34 $\text{Ln MCt} = \gamma_0 + \gamma_1 \text{lnRCIPt} + \gamma_2 \text{lnTDFPt} + \gamma_3 \text{lnFEt} + \gamma_5 \text{lnCSTt-}_1 + \gamma_5 \text{lnTDMCt} + Ut$

The coefficientes of equation 2.29, 2.30, and 2.31 with linear models, are slopes and the coefficientes of equation 2.32, 2.33, and 2.34, with log-linear models are elasticities.

2.35 $$\text{RWIPt} = (\text{NWIPt} / \text{CPIt}) * 100$$

where RWIP is the real import price of wheat in U.S. dollars per ton, NWIP is the nominal import price of wheat in U.S. dollars per ton, and CPI is the Korean Consumer Price Index (1990=100).

2.36 $$\text{RSIPt} = (\text{NSIPt} / \text{CPIt}) * 100$$

where RSIP is the real import price of soybean in U.S. dollars per ton, NSIP is the nominal import price of soybean in U.S. dollars per ton.

2.37 $$\text{RCIPt} = (\text{NCIPt} / \text{CPIt}) * 100$$

where RCIP is the real import price of corn in U.S. dollars per ton, NCIP is the nominal import price of corn in U.S. dollars per ton.

Misspecification Tests

Individual Misspecification Tests

Normality. The chi-squared test and Kolmogorov test have poor power properties and should not be used when testing for normality. The Shapiro Wilk W test is good for testing only when sample size T<50. The third sample moment $\sqrt{b_1}$ and the fourth sample moment (b_2) tests, and the D'Agostino-Pearson K_2 test are excellent tests. D'Agostino-Pearson K_2 test is an Omnibus test in that it is able to detect deviations from normality due to either skewness or kurtosis. Sample estimates of $\sqrt{\beta_1}$ and β_2 could be used to describe a non-normal distribution and also used as the bases for tests of normality. Let $\sqrt{b_1}$ and b_2 be the sample estimates of $\sqrt{\beta_1}$ and β_2. The value of $\sqrt{b_1}$ and b_2 are close to 0 and 3 respectively, and indicate normality.

(i) Test of Skewness

Ho: $\sqrt{b_1} = 0$ (errors are not skewed), Ha: $\sqrt{b_1} \neq 0$

At the significant 5 %, $Z_{0.025} = 1.96$. If $|Z(\sqrt{b_1})|$ is less than 1.96, do not reject Ho. That is, error terms are normally distributed.

(ii) Test of Kurtosis

Ho: $b_2 = 3$, (Errors are normal), Ha: $b_2 \neq 3$

At the significant 5 %, $Z_{0.025} = 1.96$. If $|Z(b_2)|$ is less than 1.96, do not reject Ho.

(iii) Test of Omnibus

Ho: $\sqrt{b_1} = 0$ and $b_2 = 3$, (errors are normal)

Ha: $\sqrt{b_1} \neq 0$ or $b_2 \neq 3$

At the omnibus test, $K^2 = Z^2(\sqrt{b_1}) + Z^2(\sqrt{b_2})$ is distributed $\chi^2_{(2)}$. Adjusted $\alpha = m\,\alpha$

= 2(0.05) = 0.1, then the right-tail critical values for $\chi^2_{(2)}$, DF 2, is 4.6. Therefore, if *p*-value is less than 4.6, then Ho was not rejected.

If the normality assumption is invalid, (a) postulate a more appropriate distribution for $D(Y_t / \beta' X_t ; \theta)$ (Go back to theory), or (b) Use a normalizing transformation (secondary). The most common transformation is the Box-Cox transformation.

Functional form. The functional form assumed is linear. Therefore, it is testing for non-linearity. If this assumption is invalid, $E(Y_t / X_t = x_t) = \beta' X_t$, and $cov(X_t, \varepsilon_t) \neq 0$, then all OLS properties are lost.

Ho: $E(Y_t / X_t = x_t) = \beta' X_t$, (The functional form is linear)

Ha: $E(Y_t / X_t = x_t) = h(X_t)$

(i) Kolmogorov-Gabor (KG) test

This test is based on the KG polynomial in the x's. Under this approach, the alternative functional form is

$$Yt = \beta_0' X_t + \gamma_2' \psi_{2t} + \gamma_3' \psi_{3t} + \varepsilon_t$$

where, ψ_{2t} includes the second order terms XitXjt, i >= j i, j =2,3,.....,k.

Ho: $\gamma_2' = 0$ and $\gamma_3' = 0$, Ha: $\gamma_2' \neq 0$ and $\gamma_3' \neq 0$

After using an F-type test, if *p*-value is less than $\alpha = 0.05$, then Ho is rejected, and it is concluded that the functional form is not linear.

(ii) Regression specification error test (RESET)

After estimating the original model (Ho) the predicated values of the dependent variable are determined. For RESET(2), run the following regression (H_1):

$$Yt = \beta_0' X_t + \gamma_2' y^{\wedge 2}_t + \varepsilon_t$$

where $^{\wedge}y^2_t$ is the square of the estimated.

After using an F-Statistic, if *p*-value of DF is less than $\alpha = 0.05$, then Ho is rejected, and it is concluded that the functional form is not linear.

If the linearity assumption is invalid, (a) all results of the misspecification test should be considered simultaneously because the assumptions are closely interrelated (example: Non-normality can lead to non-linearity); (b) postulate a general distribution for $D(Y_t / \beta' X_t ; \psi)$ and derive the specific form of the conditional expectation $E(Y_t / X_t = x_t) = h(X_t)$ (that is, go back to theory); (c) use some normalizing transformation on the original variables Yt and Xt so as to ensure that the transformed variables are jointly normal.

Homoskedasticity. When this assumption is invalid, parameter estimates lose their Best Linear Unbiased Estimator (BLUE), efficiency, and asymptotic efficiency properties.

(i) Static Homoskedasticity

We can use the White(KG2) and RESET- type tests. First, after runing the original model and getting the residuals (ε_t), run the following artificial regression:

$$\varepsilon^{\wedge 2}_t = \alpha + \Delta' \psi_t + \nu_t$$

For RESET- type test, $\psi_t = y^{\wedge 2}_t$. For the White test, ψ_t includes a KG2 polynomial in x's.

Use F-test to assess the significance of Δ'

Ho: $\gamma_2 = 0$, (No static heteroskedasticity), Ha: $\gamma_2 \neq 0$,

where γ_2 = coefficient of $y^{\wedge 2}_t$ in the artificial regression of ε_t.

After using an F-type test, if P-value is less than $\alpha = 0.05$, then Ho is rejected, and it is concluded that there is static heteroskedasticity.

(ii) Dynamic homoskedasticity

The dynamic homoskedasticity test used is a system autoregressive conditional heteroskedasticity (ARCH) test. We can run the same artificial regression as in the static case with $\psi_t = y^{\wedge 2}_t$.

Ho: $\gamma_2 = 0$, (No dynamic heteroskedasticity), Ha: $\gamma_2 \neq 0$,

where γ_2 = coefficient of $\varepsilon^{\wedge 2}_{t-1}$ in the artificial regression of ε_t.

After using an F-type test, if P-value is less than $\alpha = 0.05$, then Ho is rejected, and it is concluded that there is static heteroskedasticity.

If the assumption of homoskedasticity is invalid, (a) diagnose the source giving rise to it (that is, go back to theory) and respecify the statistical model; (b) If heteroskedasticity is ccompanied by non-normality and/or non-linearity, the obvious way to proceed is to seek an appropriate normalizing, variance-stabilizing transformation; (c) an alternative is to postulate a non-normal distribution and process to derive the conditional mean and conditional variance.

Parameter stability. This research used a Chow test to see if β differs between the first and second half of the sample. The Chow test assumes equal variances in the two periods as the F-test of variance equality. For F- test for equal variance (σ) (Chow-test),

Ho: $\sigma_1^2 = \sigma_2^2$ (The variance in the first half of the sample is the same as that of the second half)

Ha: $\sigma_1^2 \neq \sigma_2^2$

After using an F-type test, if *p*-value is less than $\alpha = 0.05$, then Ho is rejected, and it is

concluded that the variance in the first half of the sample is the same as that of the second half. For F- test for equal mean (β),

Ho: $\beta_1 = \beta_2$ (where β_1 and β_2 are vectors of slopes in the first and second half of the sample, respectively)

Ha: $\beta_1 \neq \beta_2$

After using an F-type test, if *p*-value is less than $\alpha = 0.05$, then Ho is rejected, and it is concluded that the means are not stable over time.

Independence (Autocorrelation). Independence is examined by assessing the significance of γ in the auxiliary regression,

$$\varepsilon\hat{}_t = \beta_0' X_t + \gamma\varepsilon_{t-1} + \nu_t$$

using a t-type test. This t-type test, a special case of the Lagrange Multiplier (LM) test proposed by Breusch and Godfrey (1978), is more convenient than the Durbin Watson (D.W.) because it can be used to test for autoregressive or moving average errors of any order, whether or not the regressors include lagged dependent variables (McGuirk and et al, 1993).

Ho: $\gamma = 0$ (where γ is the coefficient of $\varepsilon\hat{}_{t-1}$ in the regression of $\varepsilon\hat{}_t = \beta_0' X_t + \gamma\varepsilon_{t-1} + \nu_t$, no autocorrelation)

Ha: $\gamma \neq 0$

After using a t-type test, if the *p*-value is less than $\alpha = 0.05$, then Ho is rejected, and it is concluded that there is autocorrelation. Then, look for missing variables in the model (for example some lagged price variables).

Joint Test

The Joint misspection tests examined in this paper assess the relevance of model assumptions about the conditional mean $E(Y_t / X_t = x_t) = \beta' X_t$, and variance σ^2.

Conditional mean test using RESET2. The joint conditional mean test simultaneously assesses stability of β, functional form, and independence. It is based on the auxiliary regression

$$\varepsilon\hat{}_t = \beta_0' X_t + \Gamma_P' \psi^P_t + \Gamma_F' \psi^F_t + \Gamma_I' \psi^I_t + \nu_t$$

where ψ^P_t is the vector of a variable that is a model of a structural change or the way in which β changes, and ψ^F is the vector of a variable that permits the conditional mean to be nonlinear in X, and ψ^I_t is the vector of a variable that allows for temporal or spatial dependence.

Ho: $\Gamma_P = \Gamma_F = \Gamma_I = 0$ (The coefficients are stable and, linear in functional form and independent of time)

Ha: Not Ho, and adjusted $\alpha = 1 - (1-0.05)^3 = 0.1426$

From a separate F-type test, if the *p*-value is less than the adjusted $\alpha = 0.1426$, then Ho is rejected, and it is concluded that the hypotheses of independence, stability, and linearity are rejected respectively.

Conditional variance test using RESET2. The joint conditional variance test checks for dynamic and static heteroskedasticity as well as for the stability of σ^2. This test is based on the auxiliary regression

$$\varepsilon\hat{}_t = \beta_0' X_t + \Gamma_P' \psi^P_t + \Gamma_S' \psi^S_t + \Gamma_D' \psi^D_t + \nu_t$$

where ψ^P_t is the vector of a variable that models changes in σ^2, and ψ^S is the vector of a variable that allows for static heteroskedasticity, and ψ^D_t is the vector of a variable that allows for dynamic heteroskedasticity, respectively.

Ho: $\Gamma_P = \Gamma_S = \Gamma_D = 0$ (The coefficients are stability of σ^2, linear static and dynamic heteroskedasticity, and linear functional form and independent of time)

Ha: Not Ho, and adjusted $\alpha = 1 - (1-0.05)^3 = 0.1426$

From a separate F-type test, if the *p*-value is less than the adjusted $\alpha = 0.1426$, then Ho is rejected, and it is concluded the stability of σ^2, static and dynamic heteroskedasticity, and linear functional form and independent of time.

Data Source

The time series data used in this study was obtained mainly from Korean government data sources as follows: (Ministry of Agriculture Forestry and Fisheries, Dept. of Grain Policy, Grain Policy Data, 1988.4 and 1996.6) and (Ministry of Agriculture Forestry and Fisheries, Agriculture Forestry and Fisheries Major Statistics, 1987 and 1996). Other sources included the International Financial Statistic Year Book (May, 1996) by published by International Monetary Fund (IMF) and the FAO's trade year book. The time period of the study covers 1970 through 1995 using annual data by calendar year.

Empirical Results

The parameter estimates and statistical measures, and misspecification tests for per capita models through 2.13 and 2.18, market models between 2.23 and 2.28 and import models from 2.29 to 2.34 are presented in table 2.1 through table 2.6.

Per Capita Demand (Individual Demand)

Wheat

The parameter estimates and statistical measures for the per capita demand model are presented in Table 2-1. As indicated by the t-values in parentheses beside the parameter estimates, RGSP, PCF, and Y estimates are statistically significant at ten percent or better in the linear model, and only the PCF estimate is statistically significant at ten percent in the log-linear model. The linear model is better than the log model in the case of per capita demand for wheat. The coefficient of RGSP indicates that a one percent increase in the government's real purchasing price of soybeans leads to a 0.14 percent decrease in per capita consumption of wheat. It indicates that soybeans are a substitute good for wheat in Korea. Furthermore, a one percent increase in the per capita consumption of flour (PCF) shows a 2.87 percent and a 0.3 percent increase in per capita consumption of wheat in the linear model and in the log-model, respectively, and a one percent increase in the per capita income (Y) shows a 0.002 percent increase in per capita consumption of wheat. This relationship implies that wheat is a normal good in Korea. Other variables are insignificant statistically at ten percent or better in both models. Otherwise, the R^2 of 0.46 and 0.38 in both models indicates that the independent variables

explain about 46 and 38 percent of the variation in the per capita consumption of wheat. The Durbin Watson (D.W.) values of 1.78 and 1.38 in both models are inconclusive regarding the presence of first order autocorrelation.

Soybeans

All parameter estimates are statistically significant at five percent or better in the linear and log-linear models. The per capita consumption of soybeans depends on the statistically significant coefficients of RGSP, RGCP, PCC, PCM, and Y. The coefficient of RGSP, the own price for soybeans as the government's purchasing real price of soybeans, is a positive value. It means that soybeans in Korea are a giffen good because if the price of soybeans increases, the demand for soybeans also increases. If the per capita consumption of corn and meat increases, the per capita consumption of soybeans also increases more. This means that the increasing of the per capita soybeans consumption is very deep relationship to product feed grain in Korea. In addition, soybeans are an inferior good because the coefficients on income in both models are negative values. The R^2 of 0.88 and 0.88 in both models are comparatively high. The D.W. values of 1.63 and 1.61 in both model a are inconclusive regarding the presence of first order autocorrelation.

Corn

RGCP and PCS estimates are statistically significant at five percent with the linear model, and only the PCS estimate is statistically significant at five percent in the log-

linear model. The coefficient of RGCP, the own price for corn as the government's real purchasing price of corn, is a positive value. It means that corn is the same as soybeans and is a giffen good in Korea because if the price of corn increases, the demand for corn also increases. If the per capita consumption of soybeans increases, corn consumption increases more. The R^2 values are 0.75 and 0.80 in both models. The D.W. value of 1.24 for the linear model is inconclusive regarding the presence of first order autocorrelation, and its value of 0.92 in the log-linear model is rejected with no autocorelation in the null hypothesis, therefore, the error term in this model is autocorelated.

Market (Total) Demand

Wheat

The parameter estimates and statistical measures for the market demand model are presented in Table 2-2. As indicated by the t-statistics, in parenthesis beside the parameter estimates, POP parameter estimate is statistically significant at five percent in both models. This means that the total demand for wheat in Korea depends on the population. The coefficient of the log POP indicates that the POP elasticity of the total demand is 3.849, meaning that a one percent increase in population results in a 3.849 percent decrease in total demand for wheat in Korea. The R^2 are 0.68 and 0.74 in both models respectively. Otherwise, the D.W. value of 2.02 in the linear model indicates no evidence of first order autocorrelation. However, the D.W. value of 1.74 in the log-linear model is inconclusive regarding the presence of first order autocorrelation.

Soybeans

The TDFP and GDP parameter estimates in the linear model and RGCP and TDFP parameter estimates in the log-linear model are statistically significant at five percent in the total demand for soybeans. The total demand of soybeans depends on TDFP and GDP in the linear model. The feed production in Korea uses a large quantity soybeans as raw material, and as the GDP increases, the total demand for soybeans decreases, then soybeans are an inferior good in Korea. In addition, RGCP and TDFP parameter estimates in the log-linear model are important parameters to estimate the total demand for soybeans. The coefficient of RGCP indicates that a one percent increase in the government's real purchasing price of soybeans leads to a 0.56 percent decrease in total consumption of soybeans. It indicates that corn is a complementary good for soybeans in Korea. As the R^2 are 0.98 and 0.98 in both models respectively, these values are very high. Otherwise, the D.W. value of 1.95 in the linear model indicates no evidence of first order autocorrelation. However, the D.W. value of 0.89 in shows that the error term is aotocorrelated in the log-linear model.

Corn

All coefficients of the market demand in the linear model and TDFP and POP coefficients in the log-model are statistically significant at five percent or better. The coefficient of RGSP indicates that soybeans are a substitute good for corn. Corn is used as a raw material for feed grain production in Korea as raw material, and as the GDP increases, the total demand for corn increases, then corn is a normal good in Korea.

However, as the population increases, the total demand for corn decreases. The R^2 are and 0.98 in both models respectively. Otherwise, the D.W. value of 2.08 in the linear model indicates no evidence of first order autocorrelation. However, the D.W. value of 1.54 in the log-linear model is inconclusive regarding the presence of first order autocorrelation.

Import Demand

Wheat

The parameter estimates and statistical measures for import demand are presented in Table 2-3. All the coefficients of the import demand, except the FE coefficient, in both models carry signs which are consistent with economic theory. All parameter estimates are statistically significant at five percent or better. The coefficient on RWIP indicates that a one percent increase in the real import price of wheat leads to a 0.494 percent decrease in the quantity of wheat imports. As total domestic feed production (TDFP) increases, the quantity of wheat imports decreases in Korea, and as the total domestic meat consumption (TDMC) increases, wheat import demand increases. Furthermore, the coefficient of LWS, the supply side parameter, shows that a one percent increase in wheat stocks carried from the previous year leads to a 0.265 percent decrease in the quantity of wheat imports. The R^2 are 0.86 and in both models respectively. Otherwise, the D.W. values of 1.44 and 1.79 in both models are inconclusive regarding the presence of first order autocorrelation.

Soybeans

The RSIP and TDFP coefficients in both models are statistically significant at ten percent, and TDMC coefficient in the log-model is statistically significant at five percent. The coefficient of RSIP indicates that a one percent increase in the real import price of soybeans leads to a 0.393 percent decrease in the quantity of soybeans imported. As total domestic feed production (TDFP) increases, the quantity of soybeans imported increases in Korea, and as total domestic meat consumption increases, soybean import demand decreases. Otherwise, the coefficient of LSS, parameter of supply side, shows that a one percent increase in soybean stocks carried from the previous year leads to a 0.027 percent decrease in the quantity of soybean imports. The R^2 are 0.96 and 0.97 in both models respectively. Otherwise, the D.W. value of 2.23 in the linear model indicates no evidence of first order autocorrelation. However, the D.W. value of 1.54 in the log-linear model is inconclusive regarding the presence of first order autocorrelation.

Corn

The TDFP coefficient in the linear model is statistically significant at ten percent, and the TDFP and FE coefficient in the log-linear model are statistically significant at five percent. The import demand for corn in the log-linear model depends on the TDFP and FE coefficients. That is, a one percent increase in the TDFP leads to a 1.66 percent increase in the quantity of corn imports, and a one percent increase in the FE leads to a 0.92 percent decrease in the quantity of corn imports. The R^2 are 0.94 and 0.98 in both models respectively. Otherwise, the D.W. values of 2.29 and 2.25 in both model

respectively indicate no evidence of first order autocorrelation.

Results of Misspecification Tests

Misspecification Tests of the Per Capita Demand Model

The results (p-values) from the misspecification tests of the per capita demand model are reported in table 2-4.

Wheat

The p-values of per capita wheat demand in the linear and log-linear model indicate a possible violation of the parameter stability (mean) assumption in individual tests, and the joint equation conditional-mean test suggests that the misspecification problems came from parameter stability (p-values = 0.0921) and functional form (linearity) (p-values = 0.0012). In the log-linear model, the equation system tests of individual misspecification indicate possible problems with misspecified functional form, misspecified static heteroskedasticity, autocorrelation, and parameter stability (mean). And the equation joint conditional-mean test suggests that the misspecification problems arise from autocorrelation (p-values = 0.0482) and functional form (p-values = 0.0012). The equation system test of the wheat log-linear model results confirm that the model is severely misspecified.

Soybeans

The p-values of per capita soybean demand in the linear and log-linear models

indicate a possible violation of parameter stability (mean) assumptions in individual tests, and the equation joint conditional-mean test suggests that the misspecification problem comes from time trending parameter (p-values = 0.015). Furthermore, in the log-linear model, the equation joint conditional-variance test suggests that the misspecification problems come from parameter stability (p-values = 0.0740) and functional form (p-values = 0.0350).

Corn

The equation joint conditional-mean test suggests that the misspection problems come from the functional form (p-values = 0.0963). The equation joint conditional-variance test suggests that the misspection problem comes from parameter instability (p-values = 0.0704) in the linear model. In addition, The p-values of per capita corn demand in the log-linear model indicate possible violation of the autocorrelation assumption in individual tests, and the equation joint conditional-mean test suggests that the misspecification problem comes from functional form (p-values = 0.055).

Misspecification Tests of Market (Total) Demand Model

The results (p-values) from the misspection tests of the total demand model are reported in table 2-5.

Wheat

The p-values of total wheat demand in the linear and log-linear models indicate a possible violation of the parameter stability (variance) assumption in individual tests, and

the equation joint test supports no problems in both models.

Soybeans

The *p*-values of total soybean demand in the linear model indicate a possible violation of the parameter stability (variance) assumption in individual tests, and the equation joint test supports no problem. However, the *p*-values of total soybean demand in the log-linear model indicate possible violation of functional form and autocorrelation assumptions in individual tests, and the equation joint conditional-mean test suggests that the misspecification problem comes from the functional form (*p*-values = 0.0004). Then, the equation system test of soybean log-linear model results confirm that the model is severely misspecified.

Corn

The *p*-values of total corn demand in the linear and log-linear models indicate possible violation of the parameter stability (variance) and parameter stability (mean) assumptions in individual tests, and the equation joint test supports no problem except autocorrelation in the linear model.

Misspecification Tests of Import Demand Model

The results (*p*-values) from the misspecification tests of the import demand model are reported in table 2-6.

Wheat

The *p*-values of wheat import demand in the linear model indicate a possible violation of parameter stability (mean) assumptions in individual tests, and the equation joint conditional-mean test suggests that the misspecification problem comes from the functional form (*p*-values = 0.0017). Otherwise, the *p*-values of wheat import demand in the log-linear model indicate possible violation of functional form and parameter stability (mean) assumptions in individual tests, and the equation joint test supports no problem.

Soybeans

The *p*-values of soybean import demand in the linear model indicate a possible violation of the parameter stability (variance) assumptions in individual tests, and the equation joint test supports no problem. Otherwise, the *p*-values of soybean import demand in the log-linear model indicate possibly no violation of all assumptions in individual tests. However, the equation joint conditional-variance test indicates a possible violation of all assumptions.

Corn

The *p*-values of corn import demand in the linear model indicate a possible violation of the parameter stability (variance) assumptions in individual tests, and the equation joint test supports no problem. Furthermore, the *p*-values of corn import demand in the log-linear model indicate possibly no violation of all assumptions in the individual and joint tests. This model is perfect with no problems in all assumptions in misspecification tests.

Summary and Conclusions

The purpose of this study was to econometrically determine the factors which affected per capita, market, and import demands for wheat, soybeans, and corn in Korea between 1970 and 1995, and to test for misspecification for these models.

The empirical results showed that per capita demand for wheat in Korea is dependent upon the government's real purchasing price of soybeans (RGSP), per capita consumption of flour (PCF), and real per capita gross national production (Y) variables in the linear model and the per capita consumption of flour (PCF) variable in the log-linear model. And the per capita demand for soybeans depends upon the government's real purchasing price of soybeans (RGSP), government's real purchasing price of corn (RGCP), per capita consumption of corn (PCC), per capita consumption of meat (PCM), and real per capita gross national production (Y) coefficients in both models. Otherwise, the per capita demand for corn is dependent upon the government's real purchasing price of corn (RGCP), and the per capita consumption of soybeans (PCS) estimates in the linear model and the per capita consumption of soybeans (PCS) estimate in the log-linear model.

The total quantity of wheat demanded was found to be dependent upon the total population in Korea (POP) parameter in both models. And the total quantity of soybeans demanded was found to be dependent upon the total domestic feed production (TDFP) and gross domestic production (GDP) parameters in the linear model and government's real purchasing price of corn (RGCP) and gross domestic production (GDP) parameters in the log-linear model. In addition, the total quantity of corn demanded was found to be

dependent upon the government's real purchasing price of soybeans (RGSP), total domestic feed production (TDFP), gross domestic production (GDP), and total population in Korea (POP) parameters in the linear model and total domestic feed production (TDFP) and total population in Korea (POP) parameters in the log-linear model.

The import demand for wheat depended upon the real import price of wheat (RWIP), domestic feed production (TDFP), wheat stocks carried from the previous year (LWS), and total domestic meat consumption (TDMC) coefficients in both models. And the import demand for soybeans depended upon the real import price of soybeans (RSIP), and domestic feed production (TDFP) coefficients in the linear model and real import price of soybeans (RSIP), domestic feed production (TDFP), and total domestic meat consumption (TDMC) coefficients in the log-linear model. Furthermore, the import demand for corn depended upon the domestic feed production (TDFP) coefficient in the linear model and domestic feed production (TDFP) and nominal Korean won per SDR (FE) coefficients in the log-model.

Next, the misspecification tests of the per capita wheat demand in the log-linear model showed the model is severely misspecified. In addition, the misspecification tests of the total soybean demand in the log-linear model results confirm that the model is severely misspecified. Otherwise, the corn import demand in the log-linear model has no problems in all assumptions in misspecification tests.

In conclusion, the wheat, soybean, and corn demands in Korea are dependent upon feed grain needs for meat production and flour for human consumption. Furthermore, these commodities are in demand to produce the value-added food goods in addition to feed grain by the Korean food processing industries.

Limitations of the Study

This study analyzed three demand models, which are per capita, market (total), and import model, on wheat, soybeans, and corn between 1970 and 1995 in Korea. Furthermore, this study estimated the economic factors that particularly influence the Korean market for those commodities. In addition, this study showed the results of misspecification tests. However, the misspecification tests show the model of the per capita wheat demand and the total soybean demand in the log-linear model indicate some misspecification. The model misspecification may be caused by many kinds of problems, for example choices of independent variables and data. To solve these data problems, further research is suggested.

Table 2-1. Parameter Estimates and Statistical Measures of the Per Capita Demand for Grain in Korea

		Linear Model[a]	Log-linear Model[b]
Wheat	RGRP	-0.141 (-1.032)	0.164 (0.412)
	RGSP	-0.140 (1.699)*	-0.004 (-0.015)
	PRC	-0.165 (-1.258)	-0.286 (-0.467)
	PFC	2.872 (3.390)**	0.296 (2.031)*
	Y	0.002 (1.809)*	0.058 (0.631)
	Constant	34.57 (2.071)*	4.352 (1.569)
	R-Sq. 0.46	DW^I 1.78 DF 20	R-Sq. 0.38 DW^I 1.38 DF 20
Soybeans	RGSP	4.775 (3.916)**	0.508 (2.415)**
	RGCP	-12.53 (-3.160)**	-0.510 (-2.403)**
	PCC	0.791 (2.552)**	0.232 (2.148)**
	PMC	0.358 (2.608)**	0.589 (2.842)**
	Y	-1.481 (-2.460)**	-0.417 (-2.233)**
	Constant	4.214 (3.916)**	0.139 (0.393)
	R-Sq. 0.88	DW^I 1.63 DF 20	R-Sq. 0.88 DW^I 1.61 DF 20
Corn	RGCP	6.682 (2.521)**	0.503 (1.151)
	RGSP	-0.383 (-0.378)	0.429 (0.982)
	PSC	0.311 (2.552)**	0.810 (2.148)**
	PMC	-0.019 (-0.192)	-0.552 (-1.247)
	Y	0.097 (0.226)	0.409 (1.079)
	Constant	-1.771 (-2.203)**	0.880 (1.383)
	R-Sq. 0.75	DW^I 1.24 DF 20	R-Sq. 0.80 DW^R 0.92 DF 20

Note: + a) The coefficients in the linear model are the constant slope values.
+ b) The coefficients in the log-linear model are the constant elasticity values.
+ Durbin-Watson (DW) is the test for autocorrelation.
+ $D.W^N$ is no autocorrelated error term. DW^R is autocorrelated error term. DW^I is inconclusive.
+ D.F. is degrees of freedom
+ t-values are in parentheses beside the estimated coefficients.
+ * Statistically significant at 10%
+ ** Statistically significant at 5% or less

Table 2-2. Parameter Estimates and Statistical Measures of the Market Demand for Grain in Korea

		Linear Model[a]	Log-linear Model[b]
Wheat	RGCP	-49.090 (-1.109)	-0.541 (-1.371)
	TDRC	-0.819 (-1.346)	-1.004 (-1.081)
	POP	0.289 (5.795)**	3.849 (6.220)**
	Constant	-3237.1(-1.531)	-22.54 (-4.221)**
		R-Sq. 0.68 DW^N 2.02 DF 22	R-Sq. 0.74 DW^I 1.74 DF 22
Soybeans	RGCP	-5.685 (-1.509)	-0.560 (-2.722)**
	TDFP	0.578 (10.580)**	0.640 (6.855)**
	GDP	-0.003 (-4.461)**	0.103 (0.628)
	POP	0.001 (0.098)	0.153 (0.220)
	Constant	318.9 (0.978)	1.065 (0.165)
		R-Sq. 0.98 DW^N 1.95 DF 21	R-Sq. 0.98 DW^R 0.89 DF 21
Corn	RGSP	25.14 (1.924)*	-0.048 (-0.122)
	TDFP	1.688 (3.355)**	1.181 (5.980)**
	GDP	0.015 (2.172)**	0.319 (1.173)
	POP	-0.218 (-2.531)**	-2.018 (-1.741)*
	Constant	5217.9(1.983)*	17.10 (1.666)*
		R-Sq. 0.97 DW^N 2.08 DF 21	R-Sq. 0.98 DW^I 1.54 DF 21

Note: + a) The coefficients in the linear model are the constant slope values.
+ b) The coefficients in the log-linear model are the constant elasticity values.
+ Durbin-Watson (DW) is the test for autocorrelation.
+ DW^N is no autocorrelated error term. DW^R is autocorrelated error term. DW^I is inconclusive.
+ DF is degrees of freedom
+ t-values are in parentheses beside the estimated coefficients.
+ * Statistically significant at 10%
+ ** Statistically significant at 5% or less

Table 2-3. Parameter Estimates and Statistical Measures of the Import Demand for Grain in Korea

		Linear Model[a]	Log-linear Model[b]
Wheat	RWIP	-3567.7 (-2.613)**	-0.494 (-3.449)**
	TDFP	-3.050 (-3.414)**	-0.764 (-2.226)**
	FE	1785.5 (0.947)	0.739 (1.500)
	WST	-4.655 (-3.856)**	-0.265 (-1.968)*
	TDMC	14.977 (4.849)**	1.096 (1.998)*
	Constant	1097600 (1.159)	12.29 (5.083)**
	R-Sq. 0.86	DW^I 1.44 DF 19	R-Sq. 0.85 DW^I 1.79 DF19
Soybeans	RSIP	-484.2 (-1.927)*	-0.393 (-1.811)*
	TDFP	0.357 (1.839)*	2.491 (4.371)**
	FE	518.7 (1.576)	-0.353 (-0.571)
	SST	-0.661 (-0.818)	-0.027 (-0.211)
	TDMC	-0.336 (-0.638)	-1.381 (-2.218)**
	Constant	-2169.7 (-0.009)	0.547 (0.124)
	R-Sq. 0.96	DW^N 2.23 DF 19	R-Sq. 0. 97 DW^I 1.54 DF 19
Corn	RCIP	32.427 (0.010)	-0.086 (-0.386)
	TDFP	2.354 (2.062)*	1.660 (6.207)**
	FE	-2857.2(-1.368)	-0.920 (-2.290)**
	CST	0.357 (0.318)	-0.001 (0.013)
	TDMC	1.185 (0.394)	-0.118 (-0.274)
	Constant	705510(0.542)	-0.819 (-0.228)
	R-Sq. 0.94	DW^N 2.29 DF 19	R-Sq. 0.98 DW^N 2.25 DF 19

Note: + a) The coefficients in the linear model are the constant slope values.
+ b) The coefficients in the log-linear model are the constant elasticity values.
+ Durbin-Watson (DW) is the test for autocorrelation.
+ DW^N is no autocorrelated error term. DW^R is autocorrelated error term. DW^I is inconclusive.
+ DF is degrees of freedom
+ t-values are in parentheses beside the estimated coefficients.
+ * Statistically significant at 10%
+ ** Statistically significant at 5% or less

Table 2-4. Korean Grain Per Capita Models: The *p*-values for Equation System Misspecification Tests

	Wheat		Soybeans		Corn	
	Linear	Log-linear	Linear	Log-linear	Linear	Log-linear
Individual Tests						
Normality						
Skewness	-0.5546*	0.6847*	-0.5642*	-1.8185*	-0.0574*	-0.1485*
Kurtosts	0.0608*	-0.8173*	0.3705*	1.4663*	-1.6343*	-1.5020*
Omnibus (a)	0.3108*	1.1362*	0.4556*	5.4569*	2.6742*	2.2777*
Functional Form						
KG2	0.0128	0.0093	0.0203	0.0016	0.2936*	0.1286*
Reset2	0.6607*	0.0043	0.3866*	0.9379*	0.0026	0.0002
Heteroskedasticity						
Static Reset2	0.1642*	0.0739	0.9236*	0.5882*	0.7422*	0.9858*
White	0.0128	0.0093	0.0203	0.0016	0.2936*	0.1286*
Dynamic	0.1385*	0.2029*	0.3866*	0.9856*	0.6887*	0.3239*
Autocorrelation	0.8030*	0.0800	0.4920*	0.4410*	0.1050*	0.0160
Parameter Stability						
Variance	0.9298*	0.8721*	0.4172*	0.6397*	0.3424*	0.3571*
Mean	0.0278	0.0029	0.0339	0.0104	0.1172*	0.0290
Joint Tests (b)						
Overall Mean Test	0.0048	0.0029	0.0107	0.8612*	0.1336	0.0250
Parameter Stability	0.0921	0.8220*	0.0015	0.6770*	0.6209*	0.2836*
Functional Form	0.0005	0.0012	0.9307*	0.7475*	0.0963	0.0550
Autocorrelation	0.4373*	0.0482	0.4802*	0.4633*	0.3205*	0.3908*
Overall Variance Test	0.5284*	0.6910*	0.9077*	0.1640*	0.2953*	0.2644*
Parameter Stability	0.7782*	0.6275*	0.5613*	0.0740	0.0704	0.2759*
Functional Form	0.7126*	0.4957*	0.8952*	0.0350	0.2248*	0.3790*
Autocorrelation	0.2820*	0.3974*	0.6768*	0.9459*	0.4532*	0.1504*

Note: + * is that each Ho did not reject at the statistically significant 5% except (a) and (b).

+ (a) At the omnibus test, $K^2 = Z^2(\sqrt{b_1}) + Z^2(\sqrt{b_2})$ is distributed $\chi^2_{(2)}$, adjusted $\alpha = m\alpha = 2(0.05) = 0.1$, then the right-tail critical values for $\chi^2_{(2)}$, df 2, is 4.6. Therefore, if *p*-value is less than 4.6, then Ho was not rejected.

+ (b) At the Joint test, adjusted $\alpha = 1 - (1-0.05)^3 = 0.1426$. Therefore, if *p*-value is less than 0.1426, reject Ho.

Table 2-5. Korean Grain Market Models: The *p*-values for Equation System Misspecification Tests

	Wheat		Soybeans		Corn	
	Linear	Log-linear	Linear	Log-linear	Linear	Log-linear
Individual Tests						
Normality						
Skewness	0.5755*	-0.3438*	-1.0190*	0.6173*	-1.0190*	-1.2099*
Kurtosts	1.3309*	0.4231*	1.7298*	0.2609*	1.7298*	1.3006*
Omnibus (a)	2.1025*	0.2972*	4.0305*	0.4491*	4.0305*	3.1556*
Functional Form						
KG2	0.9676*	0.9090*	0.5399*	0.0000	0.0000	0.0141
Reset2	1.3293*	2.3576*	1.2409*	0.0000	0.2296*	0.1330*
Heteroskedasticity						
Static Reset2	0.0006	0.0205	0.0009	0.2292*	0.1253*	0.0805*
White	0.9676*	0.9093*	0.5399*	0.0000	0.0000	0.0140
Dynamic	0.1094*	0.4050*	0.0716*	6.6324*	0.4420*	0.6013*
Autocorrelation	0.6780*	0.6980*	0.5930*	0.0000	0.5930*	0.3720*
Parameter Stability						
Variance	0.0000	0.0037	0.0018	0.4597*	0.0022	0.9496*
Mean	0.8899*	0.7947*	0.1885*	0.1743*	0.6602*	0.0202
Joint Tests (b)						
Overall Mean Test	0.9337*	0.8585*	0.8209*	0.0001	0.6686*	0.8012*
Parameter Stability	0.7649*	0.4541*	0.5613*	0.9225*	0.3780*	0.6540*
Functional Form	0.7114*	0.9896*	0.9011*	0.0004	0.2282*	0.7502*
Autocorrelation	0.6705*	0.6291*	0.5249*	0.3060*	0.9971*	0.3627*
Overall Variance Test	0.8360*	0.9786*	0.6762*	0.6811*	0.3215*	0.7129*
Parameter Stability	0.8879*	0.7179*	0.4747*	0.6330*	0.8933*	0.3850*
Functional Form	0.3766*	0.8704*	0.3379*	0.7890*	0.4577*	0.8693*
Autocorrelation	0.8348*	0.9189*	0.5507*	0.4190*	0.0711	0.4332*

Note: + * is that each Ho did not reject at the statistically significant 5% except (a) and (b).

+ (a) At the omnibus test, $K^2 = Z^2(\sqrt{b_1}) + Z^2(\sqrt{b_2})$ is distributed $\chi^2_{(2)}$, adjusted $\alpha = m\alpha = 2(0.05) = 0.1$, then the right-tail critical values for $\chi^2_{(2)}$, df 2, is 4.6. Therefore, if *p*-value is less than 4.6, then Ho was not rejected.

+ (b) At the Joint test, adjusted $\alpha = 1 - (1-0.05)^3 = 0.1426$. Therefore, if *p*-value is less than 0.1426, reject Ho.

Table 2-6. Korean Grain Import Model: The *p*-values for Equation System Misspecification Tests

	Wheat		Soybeans		Corn	
	Linear	Log-linear	Linear	Log-linear	Linear	Log-linear
Individual Tests						
Normality						
Skewness	0.1995*	0.5201*	-0.8321*	-0.5447*	-0.1927*	1.7474*
Kurtosts	-0.9117*	0.1430*	2.2573	0.0646*	-7.3376	0.0646*
Omnibus (a)	0.0585*	0.2910*	5.7875	0.3009*	53.878	0.3009*
Functional Form						
KG2	0.8710*	0.0270	0.1461*	0.1725*	0.0554*	0.9768*
Reset2	0.0000	0.0000	4.6180*	1.6516*	14.682*	21.835*
Heteroskedasticity						
Static Reset2	0.2748*	0.4759*	0.1241*	0.4616*	0.0020	0.4358*
White	0.0585*	0.0272	0.1461*	0.1725*	0.3680*	0.9768*
Dynamic	0.3564*	0.6591*	0.8752*	0.9095*	0.0346	0.7296*
Autocorrelation	0.2420*	0.7480*	0.5540*	0.7530*	0.1660*	0.4060*
Parameter Stability						
Variance	0.0553*	0.9593*	0.0080	0.9075*	0.0001	0.1249*
Mean	0.0015	0.0102	0.8424*	0.1905*	0.9903*	0.7142*
Joint Tests (b)						
Overall Mean Test	0.0038	0.1997*	0.6731*	0.2505*	0.2166*	0.5190*
Parameter Stability	0.8739*	0.8955*	0.3102*	0.0566*	0.2051*	0.9632*
Functional Form	0.0017	0.0564*	0.4178*	0.6352*	0.7995*	0.2856*
Autocorrelation	0.1599*	0.5868*	0.4856*	0.7445*	0.0630*	0.2631*
Overall Variance Test	0.8975*	0.2521*	0.6630*	0.0041	0.6311*	0.7503*
Parameter Stability	0.8788*	0.1486*	0.4832*	0.0073	0.9775*	0.7454*
Functional Form	0.6333*	0.7827*	0.6480*	0.0204	0.4903*	0.6390*
Autocorrelation	0.5411*	0.1097*	0.9558*	0.0014	0.4523*	0.4607*

Note: + * is that each Ho did not reject at the statistically significant 5% except (a) and (b).

+ (a) At the omnibus test, $K^2 = Z^2(\sqrt{b_1}) + Z^2(\sqrt{b_2})$ is distributed $\chi^2_{(2)}$, adjusted $\alpha = m\,\alpha = 2(0.05) = 0.1$, then the right-tail critical values for $\chi^2_{(2)}$, df 2, is 4.6. Therefore, if *p*-value is less than 4.6, then Ho was not rejected.

+ (b) At the Joint test, adjusted $\alpha = 1 - (1-0.05)^3 = 0.1426$. Therefore, if *p*-value is less than 0.1426, reject Ho.

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Appendix Table 2-1. List of Variables used in Regression Demand Model (Per Capita, Market (Total), and Import)

Variables	Definition	Unit
PCR:	Per capita consumption of wheat in kg.	kg./year
PCW:	Per capita consumption of wheat in kg.	kg./year
PCS:	Per capita consumption of soybeans in kg.	kg./year
PCC:	Per capita consumption of corn in kg.	kg./year
PCF:	Per capita consumption of flour in kg.	kg./year
PCM:	Per capita consumption of meat in kg.	kg./year
RGWP:	Government's real purchasing price of wheat in 76.5kg.	1,000 wons/76.5kg.
RGRP:	Government's real purchasing price of rice in 80kg.	1,000 wons/80kg.
RGCP:	Government's real purchasing price of corn in 75kg.	1,000 wons/75kg.
RGSP:	Government's real purchasing price of soybeans in 75kg.	1,000 wons/75kg.
NGWP:	Government's nominal purchasing price of wheat in 76.5kg.	1,000 wons/76.5kg.
NGRP:	Government's nominal purchasing price of rice in 80kg.	1,000 wons/80kg.
NGCP:	Government's nominal purchasing price of corn in 75kg.	1,000 wons/75kg.
NGSP:	Government's nominal purchasing price of soybeans in 75kg.	1,000 wons/75kg.
Y:	Real per capital Gross National Production (GNP)	1.000 wons
DW:	Total domestic wheat consumption in metric ton	1,000 ton/year
DS:	Total domestic soybeans consumption in metric ton	1,000 ton/year
DC:	Total domestic corn consumption in metric ton	1,000 ton/year
TDRC:	Total domestic rice consumption in metric ton	1,000 ton/year
TDMC:	Total domestic meat consumption in metric ton	1,000 ton/year
TDFP:	Total domestic feed production in metric ton	1,000 ton/year
GDP:	Gross Domestic Production	billion wons
POP:	Total population in Korea	1,000 Persons
MW:	Total imports of wheat	1,000 ton/ year
MS:	Total imports of soybeans	1,000 ton/ year
MC:	Total imports of corn	1,000 ton/ year
RWIP:	Real import price of wheat	U.S. $ / ton
RSIP:	Real import price of soybeans	U.S. $ / ton
RCIP:	Real import price of corn	U.S. $ / ton
NWIP:	Nominal import price of wheat	U.S. $ / ton
NSIP:	Nominal import price of soybeans	U.S. $ / ton
NCIP:	Nominal import price of corn	U.S. $ / ton
FE:	Nominal Korean won per SDR, end of period	wons/ SDR
SST_{t-1}:	Soybeans stocks carried from the previous year	1,000 tons
WST_{t-1}:	Wheat stocks carried from the previous year	1,000 tons
CST_{t-1}:	Corn stocks carried from the previous year	1,000 tons
Ut:	Random disturbances	
t:	Year	

Appendix Table 2-2. Macroeconomic Data

Year	Population (1000 persons)	GDP (billion won in 1990 price)	SDR (won/SDR)	Per Capita GNP 1,000wons	CPI (Korea) (1990 = 100)
1970	32,241	33,853	310.56	86.2	12.1
1971	32,883	36,966	347.15	103.7	13.7
1972	33,505	39,164	392.89	124.8	15.3
1973	34,103	44,812	398.32	157.1	15.8
1974	34,692	48,358	404.47	218.2	19.6
1975	35,281	51,806	484.00	285.5	24.6
1976	35,849	58,485	484.00	385.9	28.4
1977	36,412	64,376	484.00	497.7	31.3
1978	36,969	70,627	484.00	649.1	35.8
1979	37,534	75,987	484.00	821.8	42.3
1980	38,124	74,345	607.43	965.6	54.5
1981	38,723	79,338	681.03	1,170.9	66.1
1982	39,326	85,130	731.08	1,296.8	70.8
1983	33,916	95,155	775.75	1,563.0	73.3
1984	40,406	104,808	805.98	1,763.0	75.0
1985	40,806	111,330	870.02	1,952.0	76.8
1986	41,184	124,194	881.45	2,264.0	78.9
1987	41,622	138,499	822.57	2,647.0	81.3
1988	42,031	154,111	731.47	3,138.0	87.1
1989	42,449	163,950	671.46	3,498.0	92.1
1990	42,869	179,539	707.76	4,165.0	100.0
1991	43,296	195,936	733.35	4,957.0	109.3
1992	43,748	205,860	780.65	5,546.0	116.1
1993	44,195	217,699	802.67	6,008.0	121.7
1994	44,642	236,376	803.45	6,805.0	129.3
1995	45,093	257,537	771.27	7,739.0	135.1

Source: 1) IMF, Statistical Year Book 1996, International Financial Statistics.
2) Ministry of Agricultural Forestry and Fisheries. Agricultural Forestry and Fisheries Major Statistics, 1987, 1993, and 1997.

Appendix Table 2-3. Per Capita Consumption of each Commodity (Unit: kg)

Year	Rice	Wheat	Soybeans	Corn	Flour	Meat
1970	136.4	26.1	5.3	1.1	5.95	5.2
1971	134.8	32.0	5.4	1.4	5.51	5.2
1972	134.5	34.9	5.1	1.8	6.72	5.5
1973	129.4	34.6	5.6	2.1	6.28	5.5
1974	127.8	24.3	5.4	2.2	3.47	5.8
1975	123.6	29.5	6.4	2.4	4.13	6.4
1976	120.1	30.2	6.4	2.9	4.42	6.8
1977	126.4	30.3	6.2	3.3	5.51	8.1
1978	134.7	30.5	7.0	2.8	5.55	10.1
1979	135.6	30.6	7.2	2.9	5.04	11.3
1980	132.4	29.4	8.0	3.1	4.50	11.3
1981	131.4	30.9	8.2	2.9	5.20	10.2
1982	130.0	29.7	8.5	3.2	5.20	12.2
1983	129.5	30.6	8.2	2.5	5.00	13.3
1984	130.1	32.1	8.3	2.3	4.50	13.9
1985	128.1	32.1	9.3	3.1	4.30	14.4
1986	127.7	31.5	8.9	2.8	4.10	14.3
1987	126.2	32.9	7.9	2.9	3.90	15.7
1988	122.2	33.9	8.3	3.1	3.20	17.0
1989	121.4	32.2	8.7	3.1	3.20	18.2
1990	119.6	29.8	8.3	2.7	3.10	19.9
1991	116.3	31.2	8.3	2.8	3.40	21.8
1992	112.9	32.6	7.9	2.8	3.20	23.9
1993	110.2	29.9	7.8	3.1	3.20	24.3
1994	108.3	32.5	8.9	3.0	3.30	25.8
1995	106.5	33.9	9.0	3.3	3.20	27.4

Source: Ministry of Agricultural Forestry and Fisheries. Dept. of Grain Policy, Grain Policy Data, 1987, 1993, and 1997.

Appendix Table 2-4. Domestic Demand of each Commodity and Domestic Feed Production (Unit: 1,000ton)

Year	Wheat	Soybean	Corn	Rice	Meat	Feed
1970	1,421	266	333	4,394	165	190
1971	1,656	281	365	4,777	170	285
1972	2,033	261	465	4,362	185	319
1973	1,896	298	437	4,296	187	461
1974	1,497	291	594	4,641	200	492
1975	1,704	372	697	4,699	225	489
1976	1,816	418	894	4,646	245	661
1977	1,981	437	1,353	5,045	301	862
1978	1,691	538	1,890	5,784	375	1,098
1979	1,741	675	2,914	6,764	429	1,311
1980	1,924	733	2,517	5,402	433	1,410
1981	2,098	727	2,533	5,366	394	1,420
1982	1,950	792	2,930	5,404	443	1,518
1983	1,924	907	4,228	5,303	530	1,752
1984	2,720	960	3,305	5,540	564	1,851
1985	2,988	1,130	3,245	5,501	593	2,272
1986	3,315	1,247	3,749	5,805	601	2,339
1987	4,129	1,225	4,654	5,617	669	2,516
1988	4,198	1,298	4,971	5,611	729	2,535
1989	2,602	1,232	5,983	5,602	786	2,753
1990	2,005	1,254	6,425	5,445	860	2,839
1991	4,228	1,202	5,561	5,490	950	3,053
1992	4,056	1,503	6,209	5,526	1,064	3,333
1993	3,981	1,274	6,520	5,510	1,086	3,094
1994	6,058	1,347	5,678	5,414	1,160	3,373
1995	3,335	1,558	8,046	5,536	1,249	3,639

Source: Ministry of Agricultural Forestry and Fisheries. Dept. of Grain Policy, Grain Policy Data, 1987, 1993, and 1997.

Appendix Table 2-5. Government's Purchasing Price of Wheat, Rice, Corn, and Soybeans and Importing Price of Wheat, Soybeans, and Corn

(Unit: Won and U.S. $)

Year	Wheat (76.5kg)	Rice (80kg)	Corn (75kg)	Soybeans (75kg)	Wheat (U.S.$/ton)	Soybeans (U.S.$/ton)	Corn (U.S.$/ton)
1970	2,573	5,150	2,625	5,060	70.4	121.7	71.9
1971	3,268	7,000	3,284	6,327	60.4	123.0	72.2
1972	4,248	8,750	3,710	8,750	60.2	143.5	60.4
1973	4,673	9,888	4,081	9,625	107.4	225.8	100.4
1974	6,074	11,377	5,655	13,331	223.5	302.5	144.3
1975	7,417	15,760	6,995	16,490	199.9	239.7	160.9
1976	8,863	19,500	8,324	19,624	154.7	268.8	131.4
1977	10,901	23,200	10,950	24,380	129.5	290.7	118.9
1978	14,191	26,000	12,640	28,130	124.0	268.7	117.0
1979	16,868	30,000	13,275	32,350	169.0	311.8	128.6
1980	20,247	36,600	15,300	40,500	189.0	295.7	134.9
1981	22,784	45,750	17,475	52,160	204.0	347.1	180.1
1982	25,908	52,160	18,750	55,970	181.0	275.3	140.8
1983	25,908	55,970	18,750	55,970	179.0	263.8	140.5
1984	26,100	55,970	19,313	57,675	161.9	314.7	161.5
1985	28,032	57,650	20,288	60,563	149.6	255.0	130.7
1986	28,333	60,530	21,510	64,200	127.2	226.4	105.1
1987	27,191	64,160	24,525	76,900	102.7	186.3	89.4
1988	27,191	73,140	27,975	84,600	126.9	276.9	111.8
1989	30,879	84,840	31,050	93,075	189.0	320.6	141.9
1990	33,698	95,020	31,050	93,075	176.6	264.4	135.1
1991	32,724	106,390	32,603	97,725	122.0	265.4	125.4
1992	35,490	113,840	34,125	102,375	147.7	256.7	128.6
1993	36,772	120,670	34,125	102,375	139.8	257.0	114.2
1994	36,204	126,700	34,125	102,375	129.8	119.3	119.3
1995	38,222	126,700	34,125	102,375	177.3	131.7	131.7

Source: Ministry of Agricultural Forestry and Fisheries. Dept. of Grain Policy, Grain Policy Data, 1987, 1993, and 1997.

Note: The government's purchasing prices of wheat price from 1984 to 1995 were estimated by whole price of wheat because government did not buy wheat during that period.

Appendix Table 2-6. The Imported Quantity of Wheat, Soybeans, and Corn and Carried Stocks of Wheat, Soybeans and Corn from the Previous Year

(Unit: 1,000 ton)

Year	Wheat	Soybeans	Corn	Wheat Stocks	Soybeans Stocks	Corn Stocks
1970	1,254	36	284	286	7	32
1971	1,384	61	315	338	6	46
1972	1,778	31	422	262	18	64
1973	1,772	73	456	156	10	85
1974	1,427	66	573	132	9	158
1975	1,584	61	532	136	30	198
1976	1,857	119	890	113	38	91
1977	1,979	151	1,370	236	50	147
1978	1,587	223	1,791	279	59	248
1979	1,652	422	2,881	211	63	262
1980	1,810	417	2,234	164	103	329
1981	2,095	529	2,355	142	44	195
1982	1,940	536	2,814	196	62	171
1983	1,861	724	4,167	252	63	200
1984	2,648	694	3,233	304	127	256
1985	2,996	885	3,035	249	87	275
1986	3,443	944	3,697	268	96	198
1987	4,223	1,313	4,792	401	27	278
1988	4,243	1,130	5,236	499	132	529
1989	2,292	932	5,528	546	167	921
1990	2,239	1,092	6,198	237	106	572
1991	4,524	912	5,438	472	196	466
1992	3,926	1,231	6,386	694	110	466
1993	4,470	1,113	6,418	495	94	718
1994	6,124	1,299	5,322	916	109	708
1995	2,860	1,435	8,879	910	231	434

Source: Ministry of Agricultural Forestry and Fisheries. Dept. of Grain Policy, Grain Policy Data, 1987, 1993, and 1997.

Appendix 2-7. Key Features of Selected Import Demand Articles from Economics Journal & Research Publication

No	Author	Journal & Research Publication	Year	Commodity	Country	Estimation Method & Model	Year (Data)
1	Mohsin. S. Khan	Review of Econ. & State	1975	M_{it}^{d} is quantity demand of the i^{th} import commodity.	Venezuela	OLS, Log-linear	1953 - 1972
2	T. Murray & P. Ginman	Review of Econ. & State.	Feb. 1976	Q is the value of Canadian imports Q is the value of U. S. import	Canadian U. S.	OLS Log-linear OLS Log-linear	1950 - 1964 quarterly 1961 - 1968
3	M. Goldstein & Mohsin S. Khan	Review of Econ. & Stat.	Aug. 1976	X_t is the quantity of export P_{xt} is price of export	Belgium and 7 countries	FLEL & 2SLS, Log-linear	1955 - 1970 quarterly
4	John Mutti	Souhern Econ.	July 1977	M is the quantities of imports Q is the compacting domestic production sold in the U.S.	U. S. U.S.	OLS, Double-log OLS, Double-log	1958 - 1972 1958 - 1972
5	M. Khan & K. Ross	Journal of Int'l Econ.	1977	M_d is quantity imports demanded	U. S. &	OLS, Log-linear 13 countries	1960 - 1972
6	C. Michal Henry	The Review of Black political Economy	1978	Mit is the real value of imports of country i in year t	Ghana & Nigeria	OLS, Log-liner	1967 - 1976
7	Badrul Islam	A.J.A.E.	Aug. 1978	Rice	India Korea Malaysia Pakistan Philippines Srilanka	OLS, Linear OLS, Linear OLS, Linear OLS, Linear OLS, Linear OLS, Linear	1953 - 1970 1955 - 1972 1955 - 1972 1953 - 1979 1953 - 1970 1953 - 1970
8	Philip L. Abbott	A.J.A.E.	Feb. 1979	Wheat & Feed Grain	Argentina and 32 countries	OLS, Linear	1951 - 1973
9	Carl Hamilton	Scand. Journal of Econ.	1980	Qmi is the volume of import	Swedish	OLS, Linear	1960 - 1975
10	B. Biswas & R. Ram	The India Econ. Journal	1980	Food grain	India	OLS, Linear	1951 - 1975

No	Author	Journal & Research Publication	Year	Commodity	Country	Estimation Method & Model	Year (Data)
11	C. Arnade & P. Dixit	Economic Research	July 1981	I_m is Soybeans imports	Span	OLS, Linear	1970 - 1985
				I_m is Soybeans imports	Mexico	OLS, Linear	1970 - 1983
				I_m is Soybeans imports	Japan	OLS, Linear	1970 - 1985
				I_m is Soybeans imports	Taiwan	OLS, Linear	1970 - 1985
12	R. G. Chamber & Richard E. Just	A.J.A.E.	Aug. 1978	Wheat, Corn, Soybeans	U. S.	3SLS, Linear	quarterly 1969 - 1977
13	Cathy. L. Jabara	ERS staff Report	1982	Wheat	19 countries	OLS, linear	1976 - 1979
14	Javier Salas	Journal of Develop	1982	M is import demand in real terms (Capital, intermediate, goods)	Mexican	OLS, Log-linear	1969 - 1975
15	Oscar Melo &	Journal of Develop. Michael G. Vote	1982	Mit^d is quality demand of the i^{th} import commodity	Venezuela	OLS, Log-linear	1959 - 1978
16	Reed & Schnept	S.J.A.E.	July 1982	Tobacco	EEC & Non-EEC	S.U.R.	1959 - 1978
17	Jerry Thursby & Marie Thursby	The Review of Econ. & Stat.	1983	Q is quantity of imports	Canada	OLS, Linear & Double log	1957 - 1977
					Germany	"	1960 - 1978
					Japan	"	1957 - 1977
					U. Kingdom	"	1957 - 1977
					U.S.	"	1955 - 1978
18	Y. C. Leong & G. J. Esterich	Univ. of Delaware	Feb. 1985	Broilers	Japan	2SLS & OLS	1974 - 1982
19	C. S. Kim	USDA/ERS Staff Report	Aug. 1986	Corn	Mexico	OLS, Linear	1973 - 1982
20	Davidson & Arnade	ERS Staff Report	1987	Wheat	Japan & 18 countries	OLS, Linear	1968 - 1983
21	A. Arize & Rasoul Afifi	Journal of post Keynesian Econ.	Summer, 1987	M_i is quantity of wheat imported	Algeria & 29 countries	OLS, &2SLS Log-linear	1960 - 1982

No	Author	Journal & Research Publication	Year	Commodity	Country	Estimation Method & Model	Year (Data)
22	Halbrendt & Gempesaw	A.J.A.E.	May, 1990	M is quantity of wheat import	China	OLS, SCM. (Stoch. Coeff. Reg.)	1960 - 1987 1960 - 1984
23	Julian M. Alston Colin A. Carter Richard Green & Daniel Pick	A.J.A.E.	May, 1990	Wheat	Japan Brazil Egypt USSR China	Armington & AIDS Double log-linear	1960 - 1985 1970 - 1985 1971 - 1985 1972 - 1984 1972 - 1984
				Corn	France Italy Honking Taiwan		1969 - 1984 " " 1962 - 1986
24	Shoichi Dean T. C. & Wesley Peterson	Agricultural Economics	1990	Rice	Thailand & 5 countries	OLS Armington	1962 - 1986
25	Jung-hee Lee & D. Henneberry	S.J.A.E.	Dec. 1991	Wheat	Korean & 6 countries	OLS, Linear	1970 - 1988
				Beef	Korean & 6 countries	OLS, Linear	1978 - 1988
26	A. Kondoh & Y. N. Lin	Mississippi State Univ.	Oct. 1991	Soybeans	Japan	2SLS, Linear	1978 - 1988
27	Joseph M. K.	Food Policy	1992	Mt is the per capital quantity of meat imported	Sierra Leone	OLS, Log-linear	1978 - 1988
28	Argela Dzata & D. Henneberry	Ph. D. Dissertation Oklahoma State Univ.	1992	Live Cattle	Mexico	OLS & 2SLS	1970 - 1990
29	Seung-R. Jang & W. Ku	N. Darcota	July 1992	Beef, Pork & Poultry	Japan	AIDS	1973 - 1990
30	T. B. Seleka &	Journal of Int'l Food	1993	Beef	Honking	OLS, Double	1970 - 1988

No	Author	Journal & Research Publication	Year	Commodity	Country	Estimation Method & Model	Year (Data)
31	K. Jones & D. Henneberry	Oklahoma Current Farm Economics	Sept. 1993	Fertiliser	Mexico	OLS, Linear	1973 - 1989
32	K. Curry & D. Heneberry	Oklahoma Agricultural Expert. Station	Jan. 1993	I_m is agricultural import volume	Japan & 29 countries	OLS, Linear	1974 - 1990
33	Hae H. Kim D. Henneberry	Ph. D. Dissertation Oklahoma State Univ.	1993	Wheat, Corn, Soybeans	Korea	2SLS & 3SLS	1970 - 1992
34	Joe Henley & D. Henneberry	Journal of Int'l Food & Agribusiness	1995	Pork	Mexico	OLS, Linear	1973 -1990

ESSAY THREE

EXPORT BEHAVIOR OF KOREAN FOOD PROCESSING FIRMS

EXPORT BEHAVIOR OF KOREAN
FOOD PROCESSING FIRMS

ABSTRACT

This research tries to determine what causes a Korean firm to switch from being a non-exporter to an exporter. The firms were surveyed to determine the factors that cause them to move from one type of trading group to another (e.g. non-exporter to exporter).

This study found that a manager can be successful in international exporting if a firm diversifies its business, develops its foreign markets, and seeks market security. Also, the sum of the firm's exports is dependent on the length of exporting experience and the number of employees. In addition, Korean food processing firms have some exporting obstacles which arise from the nature of their product itself, receiving payment for their product, difficulty in understanding foreign business practices, and different consumer preferences and product standards. Furthermore, managers should try to increase their firm's growth and profits, actively explore new product ideas, design and produce promotion materials in another languages, develop the technology needed for foreign markets, and advertise in foreign newspapers or broadcasting, then they can expand their exporting experience. Finally, the Korean government can help with trade shows and information on exchange rates, financing, and licensing for Korean food processing firms, and this would promote more international exports.

EXPORT BEHAVIOR OF KOREAN FOOD PROCESSING FIRMS

Introduction

Meeting in Marrakesh, Morocco, on April 15, 1994, the leaders from more than 117 countries signed the Final Act of the General Agreement on Tariffs and Trade (GATT) at the Uruguay Round (U.R.) negotiations. As the most comprehensive and ambitious GATT agreement ever completed, the U.R. agreement is expected to create increased competition and resource reallocation in Korea. The food industry, a consumer industry which has been neglected by the government, is pursuing diversification of business after the GATT agreement.

In the 1980's, "value-added" agricultural products proved to be among the United State's most resilient agricultural exports. Compared to bulk commodities, "Value-added" products have been less vulnerable to market fluctuations. In this regard, the promotion and export of "Value-added" agricultural products has had beneficial implications for the national economy. To the extent that business activities associated with "Value-added" production increase, additional employment and income are generated. It is important to understand how commodities can be imported and how "Value-added" products can be consumed and exported more competitively.

Korea has achieved successful economic development since the 1960s. This development has provided a foundation for enlarging the Korean "Value-added" market for food products. Changing economic and social factors such as increases in per capita incomes, industrialization, urbanization, and working women have contributed to a higher demand for many "Value-added" food products. This situation will likely continue in the

future. Moreover, Korea will lift many trade barriers because of the GATT, and Korea may import more agricultural products. Also, the experts point out that the Korean food industry has a lot of problems. Among them are insufficient recognition of its importance, inconsistencies of policies, and weak production and market structure. These problems are stumbling blocks in the competition with foreign food companies which are penetrating the Korean market. Therefore, the Korean "Value-added" food product industry must mature and stimulate exports of processed food products to survive changing trade environments. In the long run, there is potential for Korea to simultaneously increase bulk commodity imports and "Value added" product exports.

The objective of this research is to determine what causes a Korean firm to switch from being a non-exporter to an exporter. This will contribute to a better understanding of the export market activities of "Value-added" agricultural trade based industry in Korea. Korean agricultural trade policy makers and negotiators should keep track of the changing structure and recent developments in the "Value-added" export market for agricultural products from Korea because market development efforts can be improved through better addressing the needs of this group. The firms were surveyed to determine the factors that cause them to move from one type of trading group to another (e.g. non-exporter to exporter).

A mail survey was used as a research methodology. Korean companies involved in "Value-added" agricultural product exports were targeted. This research is divided into the following basic tasks: (1) design the survey instruments, (2) mailing and response coding, (3) computerizing the data, (4) evaluation of survey and data responses, (5) development of publications, and (6) report the results.

Export Behavior

The export behavior of firms relates to the supply side of international trade. A substantial body of literature has developed on the subject since the early 1960s. The main focus of this chapter is to identify and study the factors involved in the export behavior of firms. The factors are as follows: export decision process, perceived obstacles to exporting, firm's size, export models, export profiles, government assistance, management.

Export Decision Process

The export decision process is the process by which firms decide whether or not to export. Simpson and Kujawa (1974) studied the assumption of "home economics" and seek to profile the export decision-maker by inquiring (1) into his perceptions of the risk and cost/benefit relationships associated with exporting and (2) into his reaction to various hypothesized export stimuli.

The "internal stimuli" were identified in open-ended interviews during a pre-study of twenty Tennessee manufacturers and are as follows: 1) Excess capacity 2) Production of a (domestically) seasonal product 3) Entry of competitors into export markets and 4) Profit motivation. Of the exporting firms, 21 percent indicated that profit motives were of prime consideration. Other internal stimuli studied, such as seasonal products and competition, were apparently inconsequential for both exporters and non-exporters alike. Other "external" stimuli were identified in the pre-study which could assume somewhat less objective-oriented behavior motivation. These are: 1) Trade mission activities 2) Trade fairs 3) U.S. Department of Commerce activity 4) Sales agent activity 5) Fortuitous

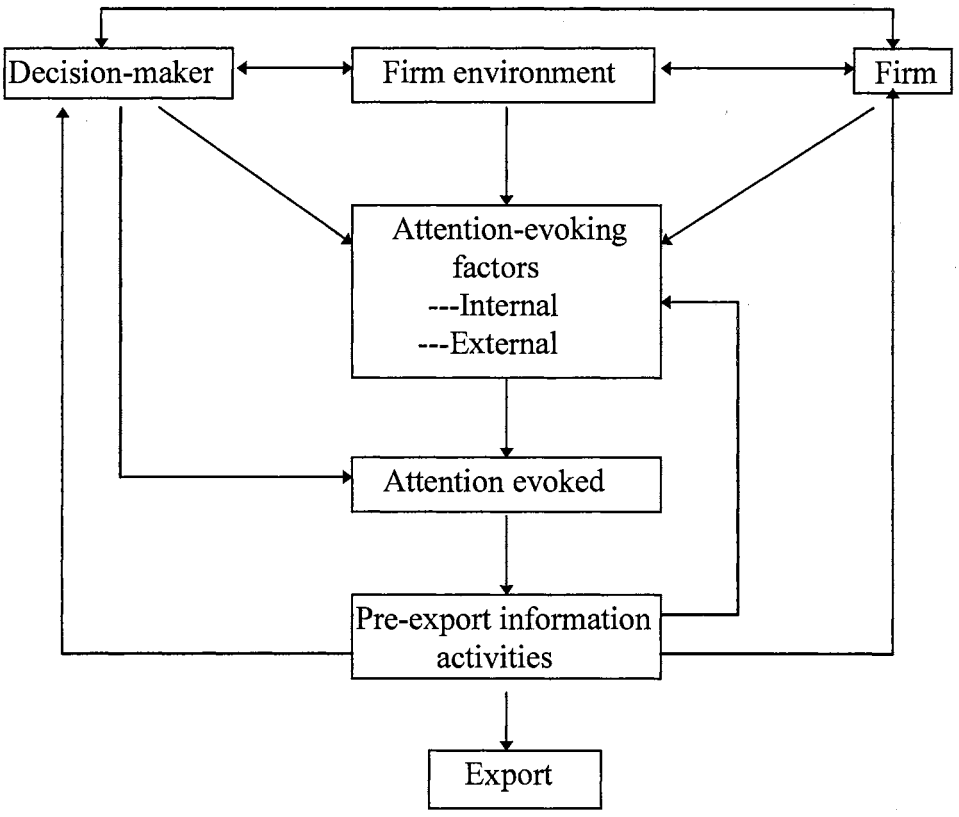
orders from foreign customers. Furthermore, these "environmental" factors are: 1) Perception of risk in the export market vs. risk in the domestic market 2) Amount of international travel 3) Level and type of education 4) Expropriations 5) Foreign exchange and related controls 6) Communication barriers 7) Profit perception, domestic vs. export 8) General cost perception; domestic vs. export, plus specific cost variables including: a) executive time b) packaging c) insurance d) clerical time e) product adaptations, and f) shipping.

Simpson and Kujawa (1974) conducted interviews with 120 manufacturing firms located in Tennessee. Based on the results of this study, as developed from the stratified sample of exporting and non-exporting firms, decision-makers of small and medium-size did not act directly to enter export markets to any large degree or to systematically originate investigations of foreign markets. All exporting firms and 54 percent of the non-exporting firms included in the study were exposed to stimuli which were external to the firm. Thus, an external stimulus was found to be a significant but not sufficient condition for initiation of exports.

Bilkey (1978) presented the idea that the initiation of the export process has tended to focus on the effects of change-agents, both external and internal. External change-agents include chambers of commerce, industrial associations, banks, government agencies, and other firms. In addition, the internal factors that influence the export decision process are the attitudes of top management, the position of the primary product in its life cycle, the desire to increase long term profits and growth, and production capacity in excess of domestic demand (Simpson and Kujawa, 1974). Of these, the attitudes and experiences of decision makers in top management are generally held to be the most important (Bilkey,

1978; Ali and Swiercz, 1991). Members of top management that have studied foreign language, traveled or lived overseas, and consider themselves long term planners or are willing to accept higher levels of risk and are more likely to have a positive attitude toward international business dealings (Bilkey, 1978; Wiedersheim-Paul, Olson, and Welch, 1978). Also, Wiedersheim-Paul, Olson, and Welch (1978) subscribe to the idea that especially important factors in the process of the export decision are the characteristics of the decision-maker, the enterprise environment, the extra-regional expansion of the firm,

Figure 3-1. Factors Affecting the Pre-Export Activities of the Firm



Source: Adapted from F. Wiedershem-Paul, H.C. Olson, L. C. Welch (1978), "Pre-Export Activity: The First Step in Internationalization

and information. Figure 3-1 details in schematic form the process of the export decision. Basically it suggests that different kinds of attention-evoking factors are exposed to the decision-maker. The type and amount of attention and how exporting is perceived by the decision-maker is to a considerable extent dependent upon three factors: the decision-maker, the environment of the firm, and the firm itself-plus the interaction among these factors.

Perceived Obstacles to Exporting

Many studies focused on perceived serious obstacles (or barriers) to exporting, the apparent rationale being that a government could stimulate exporting by removing those obstacles, which usually are institutional and infrastructural. Bilkey and Tesar (1975) found that non-exporting firms perceived significantly more serious obstacles to exporting than did exporting firms. The most frequent serious obstacles to exporting reported by U.S. firms in the empirical studies are: insufficient finances, foreign government restrictions, insufficient knowledge about foreign selling opportunities, inadequate product distribution channel abroad, and a lack of foreign market connections (Bilkey, 1978). Non-exporters typically view exporting as more time consuming, costly and risky than doing business at home, therefore they expect it to be less profitable for their operation. They therefore have no motivation to export (Wiedersheim-Paul, Olson, and Welch, 1978). This, to a smaller degree, is the view of some companies that do export. The fact that they continue to export despite these difficulties indicates that foreign markets can provide higher returns to offset the increased costs and risk. Many non-exporting firms also feel that domestic demand is sufficient for their current production, and consequently see no need to explore other

markets (Overman and Tweeten, 1993). A lack of market information is another major barrier to export markets. The unavailability or high cost of market information is particularly difficult for small businesses to overcome, because they do not have a broad operational base over which to spread their investment in market research (Seringhaus and Rosson, 1988). Blan-Byford (1994) reported that even firms that are highly motivated and have adequate market information frequently lack the resources necessary to penetrate foreign markets. Success in foreign markets requires a sizable investment of time as well as money, to develop knowledge and experience, to travel and transport goods, to make and maintain contacts, and so on. Again, this barrier is especially difficult for small operations to overcome, but is one of the major thrusts of many export encouraging policies.

Firm Size

Many economists suggested that a firm's size is a critical issue determining its propensity to export, however, empirical findings on this issue have been mixed. Bilkey and Tesar (1977) explored the meaningfulness of a "stages" model for examining export behavior, particularly of small and medium-sized firms. To test the above model, questionnaires were mailed to a sample of 816 Wisconsin firms in April, 1974. The analytical methodology involved treating each stage of the export development process as the dependent variable of a multiple regression equation. This study indicated that small and medium-sized firms can export successfully. Exporting is not limited to large firms.

Cavusgil (1984) attempted to delineate differences among exporting firms when firms are classified by their degree of internationalization. In this study, when firm size was measured by the number of full-time employees and related to internationalization stages,

no statistically significant relationship emerged. When firm size was measured by annual sale, however, there was a statistically significant relationship at 0.001 level.

Ali and Swiercz (1991) reported the relationship between firm size, as measured by sales volume, export experience, and export attitudes. Four hypotheses are tested using data from 195 mid-western (Kansas, Missouri, and Nebraska) manufacturing firms. Their results showed that the firm size did not exert a significant influence on attitudes toward international business. Therefore, managers in small, medium, and large firms hold similar attitudes toward exporting. However, firm's size significantly related to perceptions of required skills and abilities. In addition, international experience, unlike size, did exert an influence on attitudes toward exporting.

Charlet and Henneberry (1991) summarized the export market activities of Oklahoma food processing companies. Nineteen companies were identified for the case study interview process. These companies were selected based on the export feasibility of their products. Trade show participation is regarded as an integral component of export success. In this study, 50% of the small and medium-sized companies had participated in an international trade show. In both the small and medium-sized groups, one company out of 6, an average of 17%, reported activities related to export marketing analysis. Of the larger firms 71%, and of the medium-sized firms 83%, said they would not seek outside financing should international sales increase, whereas 67% of the smaller firms indicated that adequate financing could be a potential problem. A majority of the companies in this survey (63%) had not traveled overseas. However, four of the seven large firms did report overseas travel in conjunction with international marketing efforts.

Export Model

Bilkey (1978) showed that a basic modeling question is whether a firm's export behavior should be formulated in terms of a multi-activity model, incorporating all alternative activities of a firm (developing exports, expanding domestic markets, increasing product lines, etc.), or in terms of a single activity model (developing exports only).

Bilkey (1978) reported that Etgar and McConnel (1976) formulated a static cause and effect model in the form of an equation, with independent variables on the right:

3-1 $$B = \phi (E, I, C)$$

where B represents a vector of export related behavioral decision; E represents a group of internal and external environmental factors (location of markets, technological factors, institutional factors, behavioral forces, economic forces, and legal-political influences); I represents a group of information stimuli (from mass media, personal contacts, and previous experience); and C represents the information processing complex (including learning and choice constructs).

Bilkey and Tesar (1977) formulated a stages model to which the following generalized multiple regression equation was fitted. The coefficients differed at each stage because of the experience gained from the preceding stages, as

3-2 $$A = a + bE - cI + dF + eM$$

where A is the firm's export activity for the stage in question; E is management's expectations regarding the benefits of exporting after it has been developed; I is the inhibitors (mainly serious infrastructural and institutional obstacles) that management

perceives to initiating exporting; F is the facilitators (unsolicited orders, information, subsidies, infrastructural and institution aids, etc.) management's perceives to initiating exporting; and M is the quality and dynamism of the firm's management plus the firm's organizational characteristics that affect exporting. Small case letters are coefficients.

Bilkey and Tesar (1977) studied the export development process of firms and concluded that development tends to occur in the following stages.

Stage one. Management is not interested in exporting; would not even fill an unsolicited export order.

Stage two. Management would fill an unsolicited export order, but makes no effort to explore the feasibility of exporting.

Stage three. (which can be skipped if unsolicited export orders are received). Management actively explores the feasibility of exporting.

Stage four. The firm exports on an experimental basis to some psychologically close country.

Stage five. The firm is an experienced exporter to that country and adjusts exports optimally to changing exchange rates, tariffs, etc.

Stage Six. Management explores the feasibility of exporting to other countries that are psychologically further away.

Stage Seven. Management explores the feasibility of moving production facilities to the countries to which they currently export.

And so on.

Additional propositions in this model are: that the determinants of firms' behavior are

ascertainable empirically, and that they may differ from one export stage to another. While not all firms will progress through all of the above stages, generally the stages that do occur will proceed in this order. Stage Four refers to a "psychologically close" country, which indicates that the home and foreign countries are similar in language, culture, education, business practices, and industrial development, although not necessarily geographically (Bilkey and Tesar, 1977). The result of this study is that a multiple regression analysis was made first of Stage Three (exploring the feasibility of exporting). The independent variable was whether management had explored the feasibility of exporting. More meaningful correlations were found with managemental profit or other expectations regarding the effect of exporting on their firm. The highest partial correlation was with whether or not management normally planned for exporting; the next highest partial correlation was with management's perceptions of their firms' competitive advantages. The overwhelmingly most important single determinant of whether or not those firms entered Export Stage Four and exported experimentally was the receipt or non-receipt of an unsolicited initial export order. The next most important determinant was the quality and dynamism of the firm's management.

Export Profiles

Cavusgil, Bilkey, and Tesar (1979) showed that export profiles are combinations of objective characteristics associated with exporting or with non-exporting. This note presents empirically derived exporters' profiles and evidence regarding their correspondence with firms' actuarial export behavior. They used an exploratory path model of export behavior developed from the profile data. They found that 96% of Wisconsin

firms with the following characteristics had very favorable expectations regarding the effect of exporting on the firm's growth: planned for exporting, gross sales greater than $1 million, and favorable expectations regarding the effects of exporting on the firm's market development. Alternatively, only 5% of the firms with the following characteristics exported: neutral or unfavorable expectations regarding the effects of exporting on the firm's growth, did not systematically explore the feasibility of exporting, and placed a low value on growth.

Government Assistance

Governments may benefit from export activities through increased employment and economic development that directly and indirectly creates increased revenues, hence most governments employ an active strategy to improve their competitiveness in the international marketplace (Blan-Byford, 1992). Seringhaus and Rossen (1986) studied the role and impact of government export marketing support specifically. The major focus of their study was on methodological and measurement issues that appear to have a confounding effect and may account for broad equivocality of the findings in many of the studies. An evaluation paradigm is developed and applied to the research reviewed. Overman (1992) studied Ohio's agribusiness export promotion: export promotion assistance for non-exporters, promotion of successful export techniques, relationship between exporting and firm size, and export promotion policy. This study surveyed approximately 1,000 Ohio agribusiness and food processors and found that little use of government export promotion services was indicated by respondents. Nonetheless, all firms regardless of export status, were receptive to export promotion by the State of Ohio.

Management

Bilkey (1978) described Simpson's (1974) finding that 69% of the non-exporters admitted that they had opportunities to export in a study of 50 exporting and 70 non-exporting Tennessee manufacturing firms. He concluded that their real reason for not doing so was managerial apathy. Studies using this approach found that exporting firms tended to have better management than did the non-exporting firms (Bilkey and Tesar, 1977). Also, they analyzed the relationships of the firm's accounting to their stage in the export process. It found that the quality of management varied directly with whether or not the firm initiated experimental exporting (this is defined later as Export Stage Four) but varied inversely with the percent of sales exported by experienced exporters (defined later as Export Stage Five). A hypothesis for rationalizing the latter is that at more advanced stages of the internationalization process of firms, the better managers tended to have established production facilities abroad and therefore exported less than the poorer managers who had not developed foreign production facilities.

Madsen (1988) studied successful export marketing management giving some empirical evidence. The article reports results of a cross-sectional empirical export performance study. The main purpose of the study was to identify critical success factors in exporting. The focus is on experienced exporters, that is, firms that are in the medium stages of the international process. This study found important conceptual variables relating to exporting marketing policy, firm characteristics, and market characteristics.

Methodology

This chapter will outline the survey instrument used to study Korean food processors, and review the statistical and analytical techniques used to evaluate the survey responses.

The Survey

A mail survey of food processors in Korea was the primary data source for this study. The population studied was derived randomly from 2,316 listed the classified directory of Korean Food Manufacturers 1995 (published by the Korean Food Manufacturer's Association).

The survey instrument was constructed between May and June, 1996. On July 23, 1996, 1,113 surveys (Appendix 3-2) were mailed with a cover letter (Appendix 3-1) and a postage paid return envelope. A second, identical survey (Appendix 3-2), cover letter and a postage paid return envelope were mailed on October 1, 1996, to 60 firms to elicit more responses. November 15, 1996, was the last day that responses were accepted. The survey questions consist of three sections. The first section is based on a basic profile of the firm, and the second section is the attitudes toward international trade of the firm. The third section is the attitudes toward exporting.

Basic Profile of the Firm

Questions on the basic profile of the firm obtained information about the company's founding year, total sales, and number of employees in In addition, questions on basic profiles of the firm included the primary products, firm ownership, company's headquarters

and plant location, firm's goals and plans, and the whether the founders still own the company.

The information obtained from the questions about basic profiles of the firm are used to test hypotheses about the differences between exporters and non-exporters. For example, this study hypothesizes that the experience to export is not influenced by the firm's size. More precisely:

Ho: Exporting experience of firms is not related to the total sales.

Ho: Exporting experience of firms is not related to the terms of number of employees.

Attitudes toward International Trade

Questions about attitudes toward international trade show information about international activities (international business experience, the view about international trade, investment in international trade activities, attendance at international show or seminar, the number of people dedicated to international trade activities, and location of processing plants in foreign countries).

The international activities section is used to test hypotheses about the difference between exporters and non-exporters. For example, this study hypothesizes that exporting and non-exporting firms are not involved in international activities. More precisely:

Ho: Exporting experience of firms is not related to international business experience.

Ho: Exporting experience of firms is not related to management views about international trade.

Attitudes toward Exporting

In the case of exporters, questions about attitudes toward exporting elicited the information about exporting activities (exporting experience, exports sales, the main country to export, major obstacles in exporting, and reasons for exporting). In case of non-exporters, questions on attitudes toward exporting were the primary reasons for non-exporting and inquiring about those considering exporting now or in the future. In the case of exporters and non-exporters, questions on attitudes toward exporting requested information about managerial attitudes toward exporting, international trade techniques, and the types of government help suggested or desired.

The attitudes toward exporting are used to test hypotheses about the difference between exporters and non-exporters. For example, this study hypothesizes that exporting and non-exporting firms are not involved in managerial attitudes toward exporting, international trade techniques, and the types of government helping. More precisely:

Ho: Exporting experience of firms is not involved in terms of managerial attitudes toward exporting.

Ho: Exporting experience of firms is not involved in terms of international trade techniques.

Testing Hypotheses

These hypotheses can be tested using statistical inference. All statistical analyses will be conducted using the SHAZAM version 7.0 statistical package on a personal computer. The following explanation is taken from Mendenhall, et. al., (1986) and the SHAZAM version 7.0 Statistics manual (1993).

The null hypothesis, Ho is the conjecture the researcher desires to test, its opposite is the alternative hypothesis, Ha. A test statistic corresponding with the structure of the null hypothesis is calculated. Associated with the test statistic is a rejection region. If the calculated value of the test statistic falls within the rejection region, the null hypothesis is rejected and the alternative hypothesis is accepted. Otherwise, the null hypothesis is not rejected.

A single linear hypothesis has the general form:

Ho: $\beta_k = \beta_{k0}$

In the example above $\beta_{k0}=1$. The t- statistic is:

$$t = \hat{\beta}_k - \beta_{k0} / SE(\hat{\beta}_k) \sim t_{(N-K)}$$

where $SE(\hat{\beta}_k)$ is the estimated standard error of $\hat{\beta}_k$. In this case the test statistic values satisfy: t^2 = F statistic = Wald χ^2 statistic. Note that in general the Wald χ^2 statistic is equivalent to the F statistic multiplied by the number of hypotheses q and is distributed χ^2 with q degrees of freedom.

Logit Regression Model

The following explanation is taken from J. S. Cramer (1990) and the SHAZAM version 7.0 Statistics manual (1993).

The Role of the Logit Model

The logit model is the natural complement of the regression model in case of regress and is not a continuous variable but a state which may or may not obtain, or a category in a

given classification. When such variables occur among the regressors of a regression equation, they can be dealt with by the introduction (0,1) dummy variables, but when the dependent variable belongs to this type, the regression model breaks down. In this case of qualitative dependent variables the logit model provides a ready alternative.

The Logit Model for a Single Attribute

This study examines the firm exporting example more closely. The relation of firm exporting to firm total sales can be observed in a sample survey among firms. The independent variable is firm total sales, which is continuous, and the dependent variable Y is a scalar which can take only two values, conventionally assigned the values 0 and 1, and defined as

3.3 $Y_i = 1$ if firm i exports its products

3.4 $Y_i = 0$ otherwise

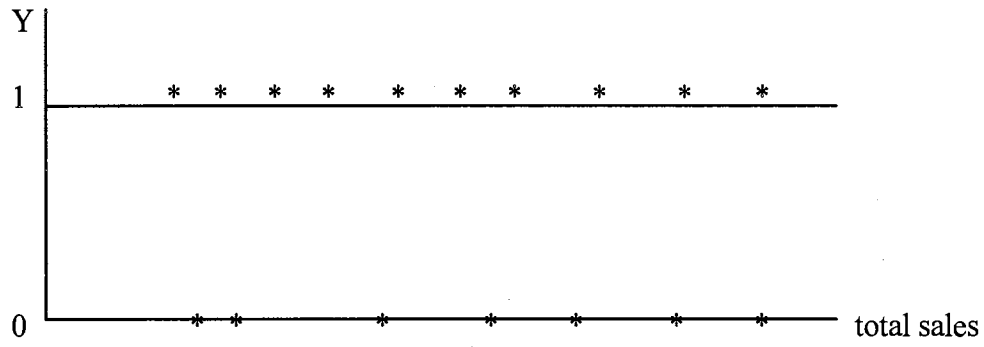
When these values are plotted against total sales Xi for a sample of firms we obtain the scatter diagram of Fig 3-2. Cramer (1990) represented that a regression line could be fitted to these data by the usual technique, but the underlying model that makes sense of this exercise does not apply. One may of course even in this case still define a linear relationship, and make it hold identically by the introduction of an additive disturbance ε_i, as in

3-5 $$Y_i = \alpha + \beta X_i + \varepsilon_i$$

Otherwise, the natural approach to the data of Fig 3-2 is to regard Y_i as a discrete

random variable, and to make the probability of Yi = 1, not the value of Yi itself, a suitable function of the regressor

Fig 3-2 The Firm Exporting as a Function of Firm Total Sales in a Sample of Firms



X. This leads to a probability model which specifies the probability of a certain response as a function of the stimulus, as in

3-6 $$P_i = P_r (Y_i = 1) = P (X_i, \theta)$$

3-7 $$Q_i = P_r (Y_i = 0) = 1 - P (X_i, \theta) = Q (X_i, \theta)$$

Then, regression equation (3-3) may be briefly revived by specifying

3-8 $$P (X) = \alpha + \beta X$$

which is the linear probability model.

The Multinominal Logit Model

The multinomial model extends the logit to more than two states. Multinomial probability models apply to any number of distinct states. Instead of the simple (0,1)

dichotomy there are S possible states with index $s = 1, 2, \ldots\ldots, S$. These states are distinct and exhaustive, for example, they cover all possibilities, if necessary by the introduction of a residual category (Cramer, 1990).

In addition, Cramer (1990) described as follows: A multinomial probability model then assigns probability model P_{is} to the events 'case *i* is in state *s*' and these probabilities are determined by *k* characteristic attributes of *i* that are arranged in the vector x*i*. To record such events we define a random vector y*i* of *S* elements with a single non-zero element equal to one, and a similar vector *ls* that has one in the *S*th place and zeros everywhere else. The event 'case *i* is in state *s*' is then denoted as

3-9 $$Y_i = ls$$

with probability

3-10 $$Pi_s = P_r (Y_i = ls) \qquad \text{for all } s = 1, 2, \ldots\ldots, S$$

A multinomial probability model defines these probabilities as functions of the xi and of unknown parameters θ ,

3-11 $$P_{is} = P_s (x_i, \theta)$$

For future reference we may arrange these probabilities in a vector of S elements, as in

3-12 $$P_i = P (x_i, \theta)$$

Obviously we require that

3-13 $$P_s (x_i, \theta) \geq 0$$

3-14 $$\sum_{s} P_s (x_i, \theta) = 1$$

for all conceivable x and all admissible θ - in fact, these conditions define what θ are admissible.

SHAZAM Output in Logit Model

In the Logit models, an Index I is created which is a linear function of the right-hand side variables, so for observation t:

3-15 $$I_t = X'_t \beta$$

The index i, which has a range from minus infinity to plus infinity, is then translated to a 0-1 range by the use of a cumulative density function. In the Logit model, an equivalent Index can be defined but the logistic function is used to model the dependent variable:

3-16 $$P_t = F(I_t) = F(X'_t \beta) = 1 / 1+\exp(-X'_t \beta)$$

Following Judge, et al., (1988) the LOG of LIKELIHOOD FUNCTION (L(β)) for Logit is given in cases by

3-17 $$L(\beta) = \sum_{t=1}^{T} \{Y_t \ln [F(X'_t \beta)] + (1-Y_t) \ln[1-F(X'_t \beta)]\}$$

A test of the null hypothesis that all the slope coefficients are zero can be carried out using the likelihood ratio procedure. If S is the number of successes ($Y_t = 1$) observed in N observations, then for Logit model, the maximum value of the log likelihood function under the null hypothesis is:

3-18 $$L(0) = S \ln(S/N) + (N-S) \ln(N-S/N)$$

The above statistical equation is printed on the SHAZAM output as LOG-LIKELIHOOD FUNCTION WITH CONSTANT TERM ONLY (L(0)) or as LOG-LIKELIHOOD (0). If all coefficients except the intercept are zero the LIKELIHOOD RATIO TEST statistic 2[L(β) - L(0)] has an asymptotic $\chi^2_{(k-1)}$ distribution.

Various measures of the fit of the model are provided by the SHAZAM version 7.0 statistical package (1993). The likelihood ratio test is of the hypothesis that the probability of the observed results given the parameter estimates is equal to 1, and thus the model fits perfectly. The likelihood ratio statistic has a chi-squared distribution with a degree of freedom equal to the number of observations minus the number of coefficients, not including the constant. A significance level greater than 0.1 indicates the model fits well. The goodness of fit statistic (Mcfadden R-square) has an F-distribution with a degree of freedom equal to the number of observations minus the number of coefficients, not including the constant. A significance level greater than 0.1 indicates the model fits reasonably well.

Estimate Model

For an evaluation of the survey data responses, the regression analysis of this research was derived from Logit and the Ordinary Least Squares (OLS) regression model. The first multiple Logit regression analysis was made as follows as equation 3-19. The dependent variable (EXE) is whether the firm has experience of exporting (1 = Yes, 0 = No). The independent variables are ENO, SALE, OWN, AC1, AC4, and AC6.

3-19 $$EXE = \Phi (ENO, SALE, OWN, AC1, AC4, AC6)$$

where ENO is the number of employees (categorized as follows: 1=<50; 2=51-150; 3=151-300; 4=301- 500; 5=> 500); SALE is the total sales ($) of firm; OWN is whether the founder still owns the company (1 = Yes, 0 = No); AC1 is whether the firm develops the new product (1 = Yes, 0 = No); AC4 is whether the firm diversifies into other businesses (1 = Yes, 0 = No); AC6 is whether the firm develops foreign markets (1 = Yes, 0 = No).

The second multiple Logit regression analysis was made as follows as equation 3-20. The dependent variable (EXE) is whether the firm has experience of exporting (1 = Yes, 0 = No). The independent variables are the firm's goals, as follows GO1, GO2, GO3, and GO4.

3-20 $$EXE = \Phi (GO1, GO2, GO3, GO4)$$

where GO1 is high profit rate on investment; GO2 is high growth rate; GO3 is development security of their markets and GO4 is their contribution to the development of the Korean economy.

The third multiple Logit regression analysis was made as follows as equation 3-21. The dependent variable (EXE) is whether the firm has the experience of exporting (1 = Yes, 0 = No). The independent variables are TE, TP, TI, EE, and TEN.

3-21 $$EXE = \Phi (TE, TP, TI, EE, TEN)$$

where TE is whether the managers have international business experience (1 = yes, 0 = no); TP is the firm's view of the future concerning international trade (categorized as follows: 1 = with optimism; 2 = with guarded optimism; 3 = with pessimism); TI is the percentage of the firm's gross income to spend on international trade activities (categorized as follows: 0 = 0, 1 ≤ 10%; 2 = 11-20%; 3 ≥ 25%); EE is the attending times in an international show or

seminar (categorized as follows: 0 = 0, 1 = one time; 2 = two times; 3 = three times; 4 = more than times); TEN is the number of people who are dedicated in the international trade of their product (categorized as follows: 0 = 0, 1 ≤ 10; 2 = 11-20; 3 = 21-30).

The first multiple OLS regression analysis was made as follows as equation 3-22. The dependent variable (EXSEL) is the sum of the firm's exports in 1995 ($1,000). The independent variables are EXC1, EFS, and EXH.

3-22 $$EXESEL = \Phi (EXC1, EXH, ENO)$$

where EXC1 is the main country to receive the export firm's product (categorized as follows: as close to Korea, lower number for example, Japan = 1, China = 2,....., so on); EXH is the length of exporting experience (categorized as follows: 1<1year; 2 = 1-3; 3 = 3-5; 4 ≤5 year); and ENO is the number of employees (categorized as follows: 1=<50; 2=51-150; 3=151-300; 4=301- 500; 5=> 500).

The second multiple OLS regression analysis was made as follows as equation 3-23. The dependent variable (EXSEL) is the sum of the firm's exports in 1995 ($1,000). The independent variables are the firm's major obstacles in exporting as follows, EXO1, EXO4, EXO5, EXO6, and EXO7.

3-23 $$EXESEL = \Phi (EXO1, EXO4, EXO5, EXO6, EXO7)$$

where EXO1 is the nature of their product itself; EXO4 is payment received for their product; EXO5 is the difficulty in understanding foreign business practices; EXO6 is different product standards and consumer standards in foreign countries which make Korean products unsuitable for export; and EXO7 is the difficulty in collecting money from foreign markets.

The forth multiple logit regression analysis was made as follows as equation 3-24. The dependent variable (EXE) is whether the firm has experience of exporting (1 = Yes, 0 = No). The independent variables are the firm's managerial attitudes toward exporting as follows, EXI4, EXI5, EXI6, and EXI8.

3-24 $$EXE = \Phi (EXI4, EXI5, EXI6, EXI8)$$

where EXI4 is that exporting could make a major contribution to a firm's growth; EXI5 is that exporting could make a major contribution to a firm's profits; EXI6 is that firm always tries to fill export orders; and EXI8 is that firm is actively exploring the idea of new products.

The fifth multiple logit regression analysis was made as follows as equation 3-25. The dependent variable (EXE) is whether the firm has experience of exporting (1 = Yes, 0 = No). The independent variables are the firm's international trade techniques as follows, EXT2, EXT3, and EXT4.

3-25 $$EXE = \Phi (EXT2, EXT3, EXT4)$$

where EXT2 is promotion materials in other languages; EXT3 is to develop technology for foreign markets; and EXT4 is advertisement in foreign newspapers or broadcasting.

The sixth multiple logit regression analysis was made as follows as equation 3-26. The dependent variable (EXE) is whether the firm has experience of exporting (1 = Yes, 0 = No). The independent variables are the types of government help as follows, EXG2, EXG4, and EXG5.

3-26 $$EXE = \Phi (EXG2, EXG4, EXG5)$$

where EXG2 is trade shows, both organized and subsidized by the government; EXG4 is trade leads; and EXG5 is information on exchange rates, financing, and licensing.

Survey and Empirical Results

Survey Response

In total, 1,173 survey form were mailed on July 23, 1996. By November 15, 1996, 104 responses were received, of which 87 were useable. Of the unusable responses, 4 indicated that the firm was no longer in business, and 13 provided insufficient information. In addition, 15 postcards were returned as improperly addressed. Thus, the total response rate to the survey was about 7.4 percent, a total of 87 Korean food processing firms have participated in the survey. This response rate was unfavorable relative to similar studies. The response rate was low because we could not do a second mailing. Therefore, the data base for this investigation is derived from mailing a survey form with 87 Korean food processing firms.

The most basic information revealed by the survey response involves exporting experience, which currently export or have exported (exporter) and have never exported (non-exporter). Table 3-1 shows that 72.4 % of the total number of returned forms were

Table 3-1. Survey Response of Exporting Experience.

Export Status	Exporters	Non-Exporters	Total
Number returned	63	24	87
Percent of total	72.4%	27.6%	100%

Note: The numbers in data set are the responses.

from firms involved with international sales, while 27.6 % of the respondents indicated that they had never exported their product. This proportion of exporters to non-exporters corresponds very highly with studies from Kansas, Missouri, and Oklahoma states in the U. S. (Blan-Byford and Heneverry, 1994). They reported that the proportion of exporters varied from state to state, with 26.5% of the food processors from Missouri classified as exporters, while only 12.4 % of Kansas firms and 9.2% of those from Oklahoma were so classified.

Data Analysis

Basic Profile of the Firm

Firm's history. The question one at first section is what year was the company founded. The oldest company was founded in 1926, and the company with the shortest history was founded in 1995. Since the mean value of this variable is 1981, this reveals that Korean food processing firms have a short history.

Firm's size. Table 3-2 presents the numbers of employees and total sales ($) as the measure of the firm's size between exporters and non-exporters. All of the responding food processing firms in Korea are small in size regarding of the numbers of employees and total sales ($). The first set of data shows that exporters and non-exporters are small in terms of full time employees, as 54 % of all respondents in the range of less than 50, and firms that have exporting experience are more distributed as large sizes than firms with the non-exporting experience. While the second set of data represents the total sales of exporting and non-exporting firms. Of all the respondents, 63.4 percent indicated less

Table 3-2. Number of Employees and Total Sales Between Exporters and Non-exporters.

Classification	Exporters	Non-exporters	Total
Number of Employees			
1 - 50	26 (30.0)	21(24.1)	47 (54.0)
51 - 150	17 (19.6)	3 (3.5)	20 (23.0)
151 - 300	6 (6.9)	0 (0.0)	6 (6.9)
301 - 500	4 (4.6)	0 (0.0)	4 (4.6)
Over 500	10 (11.5)	0 (0.0)	10 (11.5)
Total Sales ($)			
Less than 1millions	11 (12.7)	11(12.7)	22 (25.4)
1 - 10 millions	22 (25.3)	11(12.7)	33 (38.0)
11 - 50 millions	15 (17.3)	2(0.02)	17 (19.3)
51 - 100 millions	4 (4.6)	0 (0.0)	4 (4.6)
More than 100 millions	11 (12.7)	0 (0.0)	11 (12.7)

Note: The numbers in data set are the responses, and the parentheses are percentages.

than 10 million in terms of total sales. This means that exporting firms and non-exporting firms are small in size, while exporting firms are also larger in size than non-exporting firms in terms of total sales.

Firm's ownership. Table 3-3 shows the types of firms' ownership. The corporation and private corporation have many responses as exporting firms, as 25 and 23, respectively. Also, in non-exporting firms, the two types of firms' ownership have many responses, as 7 and 10, separately. In addition, 79.3 % of total firms is "Yes", and 20.7 % of it is "No" in the question as to whether the founders still own the company. This means that Korean food processing firms have a short history.

Firm's location. Table 3-4 presents the exporting and non-exporting firms' location

Table 3-3. Firm's Ownership.

Types	Exporting Firm	Non-exporting Firm	Total
Sole proprietorship	7	4	11
Partnership	5	0	5
Corporation	25	7	32
Public corporation	2	1	3
Private corporation	23	10	33
Cooperative	1	2	3
Total	63	24	87

Note : The numbers in data set are the responses.

of headquarters and plants. 58.7% of total headquarters are located in urban, and 41.3% are located in small towns. Otherwise, almost 50.6% and 49.4% of total plants are located in urban areas and small towns respectively. This means that headquarters and plants of Korean food processing firms are located throughout the whole country. However, 51.7% and 41.4% of the total headquarters and plants of the exporting firms are located in urban areas, respectively. In contrast, the non - exporting firms are located more in small towns than in urban sites. Therefore, the firms which are located in urban areas have more exporting experience firms located in small towns. Otherwise, 55 and 8 of exporting firms are located in the same place between headquarters and plants separately but 2 and 22 of exporting firms are located in the same place between headquarters and plants, respectively. This means that firms located in the same place between headquarters and plants have more exporting experience than do not.

Normal plan in their firm's activity. Table 3-5 shows firm's normal activities for growing their company. Korean food processing firms include in their normal plan (such as

Table 3-4. Firm's Location.

Types	Exporters Headquarters	Exporters Plant	Non- exporters Headquarters	Non- exporters Plant
Urban	45 (51.7) [a]	36 (41.4)	6 (7.0)	8 (9.2)
Small town [b]	19 (21.7)	27 (31.0)	17 (19.6)	16 (18.4)
Same Place [c]	55 (Yes)	8 (No)	2 (Yes)	22 (No)

Note: (a) The numbers in data set are the responses, and the parentheses are percentages.
(b) Small town is that city has less than 50,000 population.
(c) The headquarters and plant are located in same place.

new product and domestic and foreign market) development and expansion of their market share. However, they do not have much interest in diversification into other businesses and greater national distribution activities. Generally speaking, exporting firms normally plan for company growth more than non-exporting firms.

Attitudes toward International Trade

Table 3-6 reports that of all the respondents, 63.3 percent indicated their firms have international business experience. The exporting firms have more international business

Table 3-5. Firm's Normal Plan.

Activity Types	Exporters Yes	Exporters No	Non- exporters Yes	Non- exporters No	Total Yes	Total No
New product development	61	2	22	2	83	4
New Market development	57	6	22	2	79	8
Expansion of your market share	53	10	20	4	73	14
Diversification into other businesses	31	32	12	12	43	44
Greater national distribution	35	28	13	11	48	39
Development of foreign markets	48	15	13	11	61	26

Note : The numbers in data set are the responses.

experience than non-exporting firm.

Table 3-7 shows that a great majority (73.5%) of firms view the future of their product with optimism and guarded optimism, while 26.6 % were pessimistic about the future of their primary product. The exporters viewed the future of their product with optimism (15%) and guarded optimism (42.5%), but a smaller percentage (15%) were pessimistic. However, of the non-exporters only 2.3 % viewed the future of their product with optimism, but a larger percentage (11.5%) were pessimistic.

Table 3-6. International Business Experience.

Classification	Exporters	Non- exporters	Total
Yes	52 (59.8)	3 (3.5)	55 (63.3)
No	11 (12.6)	21 (24.1)	32 (36.7)

Note: The numbers in data set are the responses, and the parenthesis are percentages.

Table 3-7. Concern for International Trade.

Classification	Exporters	Non- exporters	Total
With Optimism	13 (15.0)	2 (2.3)	15 (17.3)
With Guarded Optimism	37 (42.5)	12 (13.7)	49 (56.2)
With Pessimism	13 (15.0)	10 (11.5)	23 (26.5)

Note: The numbers in data set are the responses, and the parentheses are percentages.

Table 3-8 shows that of all responses 87.3 percent indicated their firms spent less than 10% of their gross income in international trade activities. Otherwise, 12.7 % of total exporters spent more than 11% of their gross income in international trade activities. This means that exporters spent more of their gross income than non-exporting firms.

Table 3-8. Spending of Firm's Gross Income for International Trade Activities.

Classification	Exporters	Non- exporters	Total
0 %	7 (8.1)	16 (18.4)	23 (26.5)
1-10 %	45 (51.6)	8 (9.2)	53 (60.8)
11 - 20 %	9 (10.4)	0 (0.0)	9 (10.4)
More than 25%	2 (2.3)	0 (0.0)	2 (2.3)

Note: The numbers in data set are the responses, and the parentheses are percentages.

Table 3-9 shows that exporting firms are more likely to attend trade shows or seminars, while half of the non-exporting firms that responded do not attend them at all.

Table 3-10 shows that of all respondents, 91.9 % employs less than 10 persons for international trade. Otherwise, exporting firms are more likely to employ people for international trade than non-exporting firms do.

Table 3-9. Trade Shows or Seminar Attendence for Each Year.

Classification	Exporters	Non- exporters	Total
0 time	6 (6.9)	12 (13.8)	18 (20.7)
1 time	12 (13.8)	6 (6.9)	18 (20.7)
2 times	10 (11.5)	4 (4.6)	14 (16.1)
3 times	17 (19.5)	2 (2.3)	19 (21.8)
More than 5 times	18 (20.7)	0 (0.0)	18 (20.7)

Note: The numbers in data set are the responses, and the parentheses are percentages

Table 3-10. Number of Employees for International Trade.

Classification	Exporters	Non- exporters	Total
0	12 (13.7)	21 (24.1)	33 (37.8)
1 - 10	44 (50.6)	3 (3.5)	47 (54.1)
11 - 20	6 (6.9)	0 (0.0)	6 (6.9)
21 - 30	1 (1.2)	0 (0.0)	1 (1.2)

Note: The numbers in data set are the responses, and the parentheses are percentages.

Table 3-11. Division and Processing Plants in a Foreign Country.

Types	Country	Responses
Division	China	4
	United States	2
	Japan	2
	Thailand	1
Plants	China	5
	India	1
	NewZealand	1

Note : The numbers in data set are the responses.

Table 3-11 shows that Korean food processing firms have international divisions and processing plants in foreign countries. They have the most international divisions and processing plants in China, as 4 and 5, respectively. This means that Korean food processing firms founded their international divisions and plants in a country near Korea, and it is just starting to invest in foreign countries. In the question asking which firms will have international divisions and processing plants in a foreign country in the future, 33 responses are "Yes"; in 1 year (2), in 2 years (15), in 3years (13) , and in 4 years (3), respectively, and 44 responses are "No." This means that Korean food processing firms will found divisions and plants in a foreign country actively in 2 to 3 years.

Attitudes toward Exporting

All respondents export their products to 16 countries, but table 3-12 shows five main countries. Japan (30) and Taiwan (17) are the main countries which import Korean food products.

Table 3-12. Five Main Countries to Export.

Country	Responses
Japan	30
Taiwan	17
Singapore	6
India	6
Philippine	4

Table 3-13 shows the lengths of time Korean food processing firms has been exporting. The firms which have been exporting of more than 5 years are 25 respondents (39.7 %).

Table 3-13. Exporting Length.

Classification	Responses
Less than 1 year	9
1 - 3 years	15
3 -5 years	14
More than 5 years	25

Table 3-14. Firms' Exporting Methods.

Classification	Responses
First, Exporting Method	
A local trade seminar	4
A government sponsored exhibition at an overseas show	6
A staff member with international experience	14
An unsolicited order from abroad	22
A general trading company	7
A broker or export consultant	37
Now, Exporting Method	
Exporting themselves	31
A brokers or Exporters	28
A general trading company	5

Note: Total respondents exceed 63 (100%) because respondents were encouraged to indicate all appropriate answers.

Table 3-14 reports the firms' first and continuing methods of exporting. Thirty-seven initially used a broker or import consultant, 22 answered initially used an unsolicited order from abroad, and 14 initially used a staff member with international experience. But 31 answered now exporting for themselves, and whereas 28 utilize brokers or exporters now.

According to the survey responses from exporting firms, motivating factors for exporting are in Table 3-15. Thirty-nine are motivated by increased profits, 41 are motivated by increased total sales, whereas 38 seek to establish a long-term market share by exporting

Table 3-15 Firms' Primary Reasons for Exporting.

Classification	Responses
To increase profits	39
To increase sale	41
To utilize excess capacity	3
To establish long term market share	38

Note: Total respondents exceed 63 (100%) because respondents were encouraged to indicate all appropriate answers.

Table 3-16. Non- Exporting Firms' Considering to Export in the Future.

Classification	Responses
Yes	23 (67.7)
No	11 (32.3)
Total	34 (100)
in 1 year	3 (13.1)
in 2 years	7 (30.4)
in 3 years	10 (43.4)
in 4 years	3 (13.1)
Total	23 (100)

Note: The numbers in data set are the responses, and the parentheses are percentages.

Table 3-16 shows the non-exporting firm's considering to export their products in the future. Of all non-exporting firms, 67.7 % will consider to export their products within 4 years.

Mean Analysis

Table 3-17 reports an analysis of variables which are firms' goals between exporters and non-exporters. Exporters had a higher weighted mean level of high growth rate (GO2) and a contribution to the development of the Korean economy (GO4) than did the non-exporters. However, non-exporters had a higher weighted mean level of high profit rate on investment (GO1) and development security of their markets (GO3). The MANOVA table is used to test the hypothesis that the means of all K variables are equal. The F-values of the exporters and non-exporters in the ANOVA table are 7.1881 and 10.816 respectively.

Table3-18 shows the primary reasons that a firm does not export their products.

Table 3-17. Comparison of Weighted Mean Responses of Significant Firms' goals between Exporters and Non-exporters[(a)]

Variable Name	Exporting Mean Response[(b)]	Non-exporting Mean Response[(b)]	Difference [(c)]	Wald $\chi^2_{(1)}$	P- value
GO1	4.1587	4.1667	-0.0080	0.1074	0.7431
GO2	4.1429	4.0833	0.0596	0.7985	0.3716
GO3	4.2857	4.6250	-0.3393	3.3134* *	0.0687
GO4	3.4921	3.4583	0.0338	0.0201	0.8872
F-value[(d)]	7.1881*	10.816**			

Note: + ** is significant at 5%., and * is significant at 10%
+ (a) There were 63 exporters and 24 non-exporters in these groups
+ (b) These responses were allowed on a five point ordinal scale (1 = less important, and 5 = very important).
+ (c) Difference is the mean of exporters minus the mean of non-exporters.
+ (d) Overall MANOVA F (3, 63) = 8.53; significant at $P < 0.05$ in case of Exporting firm.
Overall MANOVA F (3, 24) = 8.59; significant at $P < 0.05$ in case of Non-exporting firm.

Table 3-18. Weighted Mean Responses of the Primary Reasons in Non-Exporters.[a]

Variable Name	Non-Exporting Mean Response
EXNC1	2.5588
EXNC2	2.5882
EXNC3	2.7059
EXNC4	3.1765
EXNC5	2.9412
EXNC6	3.0588
EXNC7	3.0588
F-value[b]	21.033**

Note: + ** is significant at 5%.
+ (a) There were 34 non-exporters in these groups
+ (b) Overall MANOVA F (6, 34) =3.51; significant at $P < 0.01$
+ These responses were allowed on a five point ordinal scale (1 = strongly disagree , and 5 = strongly agree).

The mean response of all variables is not larger.

Table 3-19. Comparison of Weighted Mean Responses of Significance in Firms' Managerial Attitudes toward Exporting between Exporters and Non-exporters.[a]

Variable Name	Exporting Mean Response[b]	Non-exporting Mean Response[b]	Difference [c]	Wald $\chi^2_{(1)}$	P-value
EXI1	4.1746	3.2917	0.8830	0.3168	0.5736
EXI2	3.9841	3.6667	0.3174	0.0462	0.8298
EXI3	4.0635	3.2917	0.7718	0.3973	0.5285
EXI4	3.8254	3.1667	0.1187	2.6933*	0.1008
EXI5	3.6667	3.2083	0.4584	1.6345	0.2011
EXI6	4.1746	3.1250	1.0496	2.0014	0.1572
EXI7	3.5873	2.7083	0.8790	0.3215	0.5707
EXI8	3.6667	3.0833	0.5834	2.8648*	0.0906
EXI9	2.9841	3.2083	-0.2242	0.2678	0.6049
F-value[d]	6.4664**	0.7106			

Note: + ** is significant at 5%, and * is significant at 10%
+ (a) There were 63 exporters and 24 non-exporters in these groups
+ (b) These responses were allowed on a five point ordinal scale (1 = strong disagree, and 5 = strong agree).
+ (c) Difference is the mean of exporters minus the mean of non-exporters.
+ (d) Overall MANOVA F (8, 63) = 2.02 ; significant at $P < 0.05$ in case of Exporting firm.
Overall MANOVA F (8, 24) = 2.36; significant at $P < 0.05$ in case of Non-exporting firm.

Table 3-19 reports an analysis of variables which are managerial attitudes toward exporting between exporters and non-exporters. Exporters had a higher weighted mean level of all variables except EXI9 variable, which exporting is not different from doing business locally, than did the non- exporters. However, non-exporters had only a higher weighted mean level of EXI9 variable. This means that exporting firms' managers agree more strongly about attitudes toward exporting than non-exporting firms' managers. Otherwise, the F-values of the exporters and non-exporters in the ANOVA table are 6.4664 and 0.7106 respectively.

Table 3-20 shows an analysis of variables which are firms' international trade techniques employed by exporters and non-exporters. Exporters had a higher weighted

Table 3-20. Comparison of Weighted Mean Responses of Significance in Trade Techniques between Exporters and Non-exporters.[a]

Variable Name	Exporting Mean Response[b]	Non-exporting Mean Response[b]	Difference [c]	Wald $\chi^2_{(1)}$	P-value
EXT1	3.5397	3.0833	0.4564	0.7415	0.3892
EXT2	3.0476	2.6250	0.4226	2.2867*	0.1305
EXT3	3.3968	2.5000	0.8968	4.9372**	0.0263
EXT4	2.6190	2.0833	0.5357	1.6615	0.1974
EXT5	3.1111	2.7917	0.3194	0.9468	0.3305
EXT6	3.7143	3.1250	0.5893	0.3002	0.5838
EXT7	2.8730	2.5000	0.3730	1.1514	0.2833
EXT8	3.6825	2.2500	0.4325	0.7263	0.3941
EXT9	3.1429	2.7500	0.3929	0.2789	0.5975
F-value[d]	5.9077**	1.4055			

Note: + ** is significant at 5%, and * is significant at 15%
+ (a) There were 63 exporters and 24 non-exporters in these group
+ (b) These responses were allowed on a five point ordinal scale (1 = least important, and 5 = most important).
+ (c) Difference is the mean of exporters minus the mean of non-exporters.
+ (d) Overall MANOVA F (8, 63) = 2.02 ; significant at $P < 0.05$ in case of Exporting firm.
Overall MANOVA F (8, 24) = 2.36; significant at $P < 0.05$ in case of Non-exporting firm.

mean level of all variables than did the non-exporters. This means that exporting firms were more concerned about the firms' international trade techniques. Otherwise, the F-values of the exporters and non-exporters in ANOVA table are 5.9077 and 1.4055 respectively.

Table 3-21 shows an analysis of variables involving the government helping between exporters and non-exporters. Non-exporters had a higher weighted mean level of all variables than did the exporters. This means that non-exporting firms agree more strongly about the government's helping for exporting. Otherwise, the F-values of the exporters and non-exporters in the ANOVA table are 2.6602 and 0.9739 respectively.

Regression Model Analysis

Table 3-21. Comparison of Weighted Mean Responses of Significant in Government Helping between Exporters and Non-exporters.[a]

Variable Name	Exporting Mean Response[b]	Non-exporting Mean Response[b]	Difference [c]	Wald $\chi^2_{(1)}$	P-value
EXG1	4.2063	4.5417	-0.3354	0.7537	0.3853
EXG2	3.9683	4.2500	-0.2817	1.8379	0.1752
EXG3	4.2381	4.5000	-0.2619	1.3774	0.2406
EXG4	3.8571	4.0417	-0.1846	2.1764*	0.1402
EXG5	3.6984	4.0417	-0.3433	1.2499	0.2636
EXG6	4.2063	4.4583	-0.2520	0.1454	0.7030
F-value[d]	2.6602**	0.9739			

Note: + ** is significant at 5%, and * is significant at 15%
+ (a) There were 63 exporters and 24 non-exporters in these groups
+ (b) These responses were allowed on a five point ordinal scale (1 = least important, and 5 = most important).
+ (c) Difference is the mean of exporters minus the mean of non-exporters.
+ (d) Overall MANOVA F (5, 63) = 3.17; significant at $P < 0.05$ in case of Exporting firm.
Overall MANOVA F (5, 24) = 3.90; significant at $P < 0.05$ in case of Non-exporting firm.

Table 3-22. Affected Factors in Exporting Experience - Variables in Basic Profile of the Firm in Logit Regression Model (I).

Variable	Estimated Coeff.	T-Ratio	Wald $\chi^2_{(1)}$	P-value
ENO	1.8824	2.5589**	6.5482**	0.0105
SALE	1.1899	2.1287**	4.5313**	0.0333
OWN	-0.7457	-0.7260	0.5270	0.4679
AC1	1.1290	0.7920	0.6273	0.4284
AC4	-1.0675	-1.6976*	2.8819*	0.0896
AC6	1.0606	1.6420*	2.6961*	0.1006

Note: + ** is significant at 5%., and * is significant at 10%
+ Log- Likelihood Function = -35.787; Log- Likelihood(0) = -51.243; Likelihood Ratio test = 30.9122 with 6 d.f. They are the significant at 1%.
+ Maddala R^2 = 0.30; Cragg-Uhler R^2 = 0.43; Mcfadden R^2 = 0.30; Chow R^2 = 0.32

Table 3-22 shows the affected factors in a firm's exporting experience in equation 3-19. The performance of the variables for the number of employees and total sales was the same as in the logistic regressions made with larger firms more likely to express interest in exporting. In addition, if the firm diversifies into other businesses or the firm develops the foreign markets, these firms have exporting experience are more than those who do not.

Table 3-23 shows the affected factors in a firm's exporting experience in equation 3-20. The independent variable GO3 which is development security is the significant variable affected in the dependent variable (EXE) which is whether the firm has experience at exporting (1 = Yes, 0 = No).

Table 3- 24 shows the affected factors in a firm's exporting experience in equation 3-21, in the Logit regression model. The performance of the variables for international business experience and number of employees for international trade for their products made more exporting behavior than did not. However, the variables as the view the

Table 3-23. Affected Factors in Exporting Experience - Variables in Basic Profile of the Firm in Logit Regression Model (II).

Variable	Estimated Coeff.	T-Ratio	Wald $\chi^2_{(1)}$	P-value
GO1	0.1058	0.3277	0.1074	0.7431
GO2	0.2925	0.8936	0.7985	0.3716
GO3	-0.6578	-1.8203**	3.3134**	0.0687
GO4	-0.0221	-0.1419	0.0201	0.8872

Note: + ** is significant at 5%.
+ Log- Likelihood Function = - 49.282; Log- Likelihood(0) = -51.243;
Likelihood Ratio test = 3.92326 with 4 d.f. They are the significant at 1%.
+ Maddala R^2 = 0.05; Cragg-Uhler R^2 = 0.06; Mcfadden R^2 = 0.03; Chow R^2 = 004

Table 3-24. Affected Factors in Exporting Experience - Variables in Attitudes toward International Trade in Logit Regression Model.

Variable Name	Estimated Coeff.	T-Ratio	Wald $\chi^2_{(1)}$	P-value
TE	1.9358	2.2249**	5.5901**	0.0180
TP	-0.2230	-0.4080	0.2962	0.5863
TI	0.3306	0.4487	0.0133	0.9081
EE	0.2298	0.6882	0.7383	0.3902
TEN	1.9293	2.1540**	5.8848**	0.0150
FP	- 2.6869	-1.6843*	2.8369*	0.0921

Note: + ** is significant at 5%., and * is significant at 10%
+ Log- Likelihood Function = -25.616; Log- Likelihood(0) = -51.243; Likelihood Ratio test = 51.255 with 6 d.f. They are the significant at 1%.
+ Maddala R^2 = 0.45; Cragg-Uhler R^2 = 0.64; Mcfadden R^2 = 0.50; Chow R^2 = 0.57

future of concerning international trade (TP), the investment for international activities (TI), and the times attending an international show or seminar (EE) did not have an affect in a firm's exporting experience.

Table 3-25 shows the affected factors in a firm's exporting sales in equation 3-22, in the OLS regression model. The export sales of Korean processed food affected the exporting length variable (EXH) and the number of employee (ENO) .

Table 3-26 shows the affected factors in a firm's exporting sales in equation 3-23,

Table 3-25. Affected Factors in Exporting Sales - Variables in Attitudes toward Exporting in OLS Regression Model (I).

Variable Name	Estimated Coeff.	T-Ratio	P-value
EXCI	- 0.0521	-0.4773	0.635
EXH	0.5194	2.2210**	0.031
ENO	0.5308	2.9840**	0.004

Note: + ** is significant at 5%.,
+ $R^2 = 0.26$; Adj-$R^2 = 0.22$; D. W. = 2.1 with d.f. 53 that is no autocorrelated error term

Table 3-26. Affected Factors in Exporting Sales - Variables in Attitudes toward Exporting in OLS Regression Model (II).

Variable Name	Estimated Coeff.	T-Ratio	P-value
EXO1	1.1310	2.065**	0.044
EXO4	1.7275	1.951*	0.057
EXO5	-1.6900	-1.749*	0.086
EXO6	-0.7865	-1.386	0.172
EXO7	4.8973	2.574**	0.013

Note: + ** is significant at 5%., and * is significant at 10%
+ $R^2 = 0.28$; Adj-$R^2 = 0.19$; D. W. = 2.16 with d.f. 50 that is no autocorrelated error term

in the OLS regression model. The dependent variable, EXSEL, the sum of firm's exports in 1995 ($1,000), affected EXO1, the nature of their product itself, EXO4, receiving payment for their product, EXO5, difficulty in understanding foreign business practices, EXO6, different product standards and consumer standards in foreign countries which make Korean products unsuitable for export, EXO7, difficulty in collecting money from foreign markets.

Table 3-27 shows the affected factors which are in a firm's exporting experience in equation 3-24. The independent variables EXI4 (Exporting could make a major contribution to my firm's growth), EXI5 (Exporting could make a major contribution to my

firm's profits), and EXI8 (My firm is actively exploring the idea of new products) which are the significant variables affected in the dependent variable (EXE) which is whether the firm has the experience of exporting (1 = Yes, 0 = No).

Table 3-28 shows the affected factors which are in a firm's exporting experience in equation 3-25. The independent variables EXT2 (promotion materials in other languages), EXT3 (to develop technology for foreign markets), and EXT4 (advertisement in foreign newspapers or broadcasting) which are the significant variables affected in the dependent variable (EXE) which is whether the firm has the experience of exporting (1 = Yes, 0 = No).

Table 3-27. Affected Factors in Exporting Experience - Variables in Managerial Attitudes toward Exporting in Logit Regression Model.

Variable Name	Estimated Coeff.	T-Ratio	Wald $\chi^2_{(1)}$	P-value
EXI4	-0.86598	-2.1123	4.4617**	0.0347
EXI5	0.51485	1.4407	2.0755*	0.1497
EXI6	-0.38692	-1.2409	1.5399	0.2146
EXI8	0.65529	2.1599	4.6650**	0.0308

Note: + ** is significant at 5%., and * is significant at 15%
+ Log- Likelihood Function = -46.458; Log- Likelihood(0) = -51.243; Likelihood Ratio test = 9.57141 with 4 d.f. They are the significant at 1%.
+ Maddala R^2 = 0.1; Cragg-Uhler R^2 = 0.15; Mcfadden R^2 = 0.09; Chow R^2 = 0.10

Table 3-28. Affected Factors in Exporting Experience - Variables of Trade Techniques in Logit Regression Model.

Variable Name	Estimated Coeff.	T-Ratio	Wald $\chi^2_{(1)}$	P-value
EXT2	0.3723	1.5416	2.3765*	0.1232
EXT3	-0.6949	-2.4772	6.1366**	0.0133
EXT4	0.4412	1.7495	3.0608*	0.0802

Note: + ** is significant at 5%., and * is significant at 15%
+ Log- Likelihood Function = -46.994; Log- Likelihood(0) = -51.243; Likelihood Ratio test = 8.49785 with 3 d.f. They are the significant at 1%.
+ Maddala R^2 = 0.09; Cragg-Uhler R^2 = 0.14; Mcfadden R^2 = 0.08; Chow R^2 = 0.09

Table 3-29. Affected Factors in Exporting Experience - Variables in Government Help in Logit Regression Model.

Variable Name	Estimated Coeff.	T-Ratio	Wald $\chi^2_{(1)}$	P-value
EXG2	-0.45438	- 1.5509	2.4054 *	0.1209
EXG4	0.45096	1.2715	1.6167	0.2036
EXG5	-0.55913	- 1.6423	2.6971**	0.1005

Note: + ** is significant at 10%., and * is significant at 15%
+ Log- Likelihood Function = -47.355; Log- Likelihood(0) = -51.243; Likelihood Ratio test = 7.777 with 3 d.f. They are the significant at 1%.
+ Maddala R^2 = 0.09; Cragg-Uhler R^2 = 0.12; Mcfadden R^2 = 0.08; Chow R^2 = 0.09

Table 3-29 shows the affected factors which are in a firm's exporting experience in equation 3-26. The independent variables EXG2 (trade shows), and EXG5 (information on exchange rates, financing, and licensing) which are the significant variables affected in the dependent variable (EXE) which is whether the firm has the experience of exporting (1 = Yes, 0 = No).

Summary and Conclusions

This research studied the export behavior of both exporting and non-exporting Korean food processing firms. The most basic information revealed by the survey responses involves exporting experience of firms which currently export, have exported (exporter), or have never exported (non-exporter). This study surveyed 1,173 Korean food processing firms with a response rate of 7.4 percent. Of the respondents, 72.4 % had experience exporting their products, and 27.6 % did not have exporting experience.

Basic Profile of the Firm

Clear differences exist between exporting and non-exporting respondents. Exporters were significantly larger than non-exporters in terms of both total sales and number of employees. Moreover, exporting firms are more often located in urban areas than in small towns, and headquarters and plants are more often proximate than not. In addition, exporting firms' normal plan includes more activity than non-exporting firms generally.

In the mean test, exporters had a higher weighted mean level of high growth rate and contribution to the development of the Korean economy than did the non-exporters. However, non-exporters had a higher weighted mean level of high profit rate on their investment and development security of their markets.

In the regression test, the number of employees and total sales variables affect the firm's exporting experience. That is, that is larger firms are more likely to express interest in exporting. Otherwise, if the firm diversifies into other businesses or develops foreign markets, these firms are more likely to have exporting experience than not. In addition, development security of their market is a significant variable affected in the firm's exporting experience.

Attitudes Toward International Trade

The exporting firms have more international business experience than a non-exporting firm, and the exporting firms have more optimism about the future of their products and guarded optimism than non-exporting firms. In addition, generally, the exporting firms have more positive attitudes toward international trade such as spending of

firm's gross income for international trade activities, attending trade shows or seminars, and the number of employees dedicated to international trade than non-exporting firms. Otherwise, some Korean food processing firms founded their international divisions and plants in a country near Korea, while it is in its start-up stage of investment in a foreign country, and some other Korean food processing firms will found the division and plants in a foreign country actively in 2 to 3 years.

In the regression test, firms which have international business experience, many employees for international trade, and international divisions and plants in a foreign country have more exporting experience than firms which do not have international business experience.

Attitudes toward Exporting

Korean food processing firms export their products to 16 countries, and almost 62% of the total number of exporting firms have been the exporting more than 3 years. The Korean food processing firms' exporting ways include a broker, exporters consultant, and exporting themselves mainly. Furthermore, the firms' primary reasons for exporting include to increase profits, to increase total sales and to establish their long term market share. Otherwise, 67.7 % of total non-exporting firms are considering exportation of their products within 4 years.

In the mean tests, the exporting firms' managers agree more strongly about attitudes toward exporting than non-exporting firms' managers, and the exporting firms are using the international trade techniques more importantly than the non-exporting firms. Otherwise, the non-exporting firms agree more strongly that government help is needed to

export their products.

In the regression tests, the export sale of Korean processed food was affected by the exporting length variable and the number of employees. Also, exporting obstacles include: the nature of the products themselves, receiving payment for their product, difficulty in understanding foreign business practices, and different standards of both products and consumers affected the export sales of Korean food processing firms. Otherwise, the exporting firms' experience is affected by variables in managerial attitudes toward exporting as follows: exporting could make a major contribution to my firm's growth; exporting could make a major contribution to my firm's profits; and my firm is actively exploring the idea of new products. In addition, the variables such as promotion materials in an other language, developing technology for foreign markets, and advertisements in foreign newspapers or broadcasting influenced a firm's exporting experience. Furthermore, the independent variables such as trade shows, information on exchange rates, financing, and licensing are the significant variables affecting exporting experience.

In conclusion, the results show that a manager can be successful in international exporting if a firm has economic size, diversifies business, develops their foreign markets and security of their market. Also, the sum of firm's exports is dependent on the length of exporting experience and the number of employees. In addition, Korean food processing firms have some exporting obstacles which are the nature of their product itself, receiving payment for their product, difficulty in understanding foreign business practices, and different product consumer and standards. Therefore, if Korean food processing firms can solve these obstacles, a firm also can have more exporting experience. Furthermore, if

managers try to increase their firm's growth and profits, actively explore the ideas of new products, design and produce promotion materials in an other language, develop technology for foreign markets, and advertise in foreign newspapers or broadcasting, then they can have expand their exporting experience. Finally, the Korean government can help with trade shows and information on exchange rates, financing, and licensing for Korean food processing firms, and this promote more international exports.

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Appendix: 3-1 First Cover Letter

July 23, 1996

To whom it may concern;

I am writing to ask your assistance in completing the enclosed questionnaire. As you know recently, the trend of world trade is leading towards the World Trade Organization (WTO). I have a keen interest in the export behavior of Korean food processing firms in the international market. Therefore, as a graduate student at the Department of Agricultural Economics, Oklahoma State University, I have chosen to research the development of Korean exportation activities. Hence, I am trying to discover information about the Korean food markets and the exporting activities of Korean food processing firms.

It will only take a few minutes to complete this questionnaire and drop it back in the mail. There is a postage-paid envelope enclosed for your convenience. A form for your name and address, if you would like a copy of final results, is also enclosed. All identities of individual firms and responses will be completely confidential. It is my hope that your assistance can in turn help your own exportation efforts in the future. I truly appreciate your help with this survey.

If you have any questions about the survey form, please contact me at (02-597-0091)

Thank you for your time and effort

Sincerely

Byung-Ok Im

Appendix 3-2. The Survey Form

I. Basic profile of the firm

1. What year was the company founded ?

_____

2. How many employees does your company have ?

1) 1 - 50 2) 51 -150 3) 151-300
4) 301- 500 5) Over 500

3. What was your company's total sales volume in 1995 ?

($) _____

4. What form of ownership applies to your company ?

1) Sole proprietorship 2) Partnership
3) Public corporation 4) Private corporation
5) Co-operative 6) Corporation

5. Where are your company's headquarters and plant located ?

Headquarters _____ Plant _____

6. Do the founders still own the company ?

1) Yes 2) No

7. For each of the following types of goals, indicate the number that expresses its current importance to your firm. (1 = least important, ..., 5 = most important)

1) High profit rate on investment	1	2	3	4	5
2) High growth rate	1	2	3	4	5
3) Development security of your markets	1	2	3	4	5
4) Contribution to the development of the Korean economy	1	2	3	4	5

8. Does your firm normally plan for any of the following activities ?
(Yes = 1, No = 0)

1) New product development ( )
2) New market development ( )
3) Expansion of your market share ( )
4) Diversification into other businesses ( )
5) Greater national distribution ( )
6) Development the foreign markets ( )

II. Attitudes toward international trade

9. Do you (the manager) have international business experience.

1) Yes 2) No

10. How do you view the future of your company concerning international trade ?

1) With optimism 2) With guarded optimism 3) With pessimism

11. What percentage of your gross income is spent in international trade activities ?

1) 0 % 2) 1-10 % 3) 11 - 20 % 4) More than 25%

12. How many times per year does someone from your company attend international trade shows or seminars ?

1) 0 time 2) 1 time 3) 2 times 4) 3 times 5) More than 5 times

13. How many people are dedicated to the international trade of your product ?

1) 0 2) 1 - 10 3) 11 - 20 4) 21 - 30

14. Does your company have separate divisions or processing plants for international trade in a foreign country

1) Yes A separate division _____

A processing plant _____

2) No

15. If, No, will your company eventually have separate divisions or processing plants in a foreign country ?

1) Yes 1) in 1 year 2) in 2 years 3) in 3 years 4) in 4 years

2) No

III. Attitudes toward exporting

16. Do you currently, or have you ever, exported ?

1) Yes: We currently export our products. ( )
2) Yes: We have exported in the past. ( )
3) No: We have never exported. ( )

*** If you answered "Yes," please answer 17-24, and if you answered "No," please answer 25 -26

17. What was the sum of your company's exports in 1995 ?
(Please report in thousands of dollars)

$ _____

18. What is the main country to which you export?

_____ and _____

19. What percentage of your product sales are in domestic and foreign markets ?

1) Domestic ( ) % 2) Foreign ( ) %

20. How long have you been exporting ?

1) Less than 1 year 2)1 - 3 years 3) 3 - 5 years 4) More than 5 years

21. What led to your first export sale ? (Circle all that apply)

1) A local trade seminar ( )
2) A government sponsored exhibition at an overseas show ( )
3) A staff member with international experience ( )
4) An unsolicited order from abroad ( )
5) A general trading company ( )
6) A broker or export consultant ( )
7) Other (please specify):_____

22. How does your company export its products ?

1) We export the products ourselves ( )
2) We have used a brokers or Exporters ( )
3) We have used a general trading company ( )

23. What have been your major obstacles in exporting ? (Circle all that apply)

1) The nature of your product itself (Perishable, culturally unique, etc.) ( )
2) Developing the market for your product ( )
3) Exchange rate, financing problems ( )
4) Receiving payment for your product ( )
5) Difficulty in understanding foreign business practices ( )
6) Different product standards and consumer standards in foreign countries which make Korean products unsuitable for export ( )
7) Difficulty in collecting money from foreign markets ( )
8) Difficulty in obtaining adequate representation in foreign markets ( )
9) Other (please specify):_____

24. What are your primary reasons for exporting ? (Circle all that apply)

1) To increase profits ( )
2) To increase sales ( )
3) To utilize excess capacity ( )
4) To establish long term market share ( )
5) Other (please specify):_____

25. Please rank the primary reasons that you do not export your product.
(1 = strongly disagree, ..., 5 = strongly agree)

1) Not interested in exporting.	1	2	3	4	5
2) You produce a perishable product.	1	2	3	4	5
3) Concerns about exchanges rates, financing, licensing.	1	2	3	4	5
4) Cost of developing market or attending overseas shows.	1	2	3	4	5
5) You produce a culturally unique product.	1	2	3	4	5
6) Concerns about receiving payment for your product.	1	2	3	4	5
7) Limited experience in exporting.	1	2	3	4	5

8) Other (please specify):_____

26. Are you now, or have you ever considered exporting ?

1) Yes 1) in 1 year 2) in 2 years 3) in 3 years 4) in 4 years

2) No

Please answer all of questions with 27 - 29

27. What are your firm's managerial attitudes toward exporting ?
(1 = strongly disagree, ..., 5 = strongly agree)

1) Exporting is a desirable task for my firm.	1	2	3	4	5
2) My firm has exportable products.	1	2	3	4	5
3) My firm is planning on increasing its exports in the future.	1	2	3	4	5
4) Exporting could make a major contribution to a firm's growth.	1	2	3	4	5
5) Exporting could make a major contribution to a firm's profits.	1	2	3	4	5
6) My firm always tries to fill export orders.	1	2	3	4	5
7) My firm is actively seeking new foreign markets for our current products.	1	2	3	4	5
8) My firm is actively exploring the idea of new products.	1	2	3	4	5
9) Exporting is not different from doing business locally.	1	2	3	4	5

28. Which of the following international trade techniques do you employ ?
(1 = least important, ..., 5 = most important)

1) You research the foreign market.	1	2	3	4	5
2) You have promotion materials in other languages.	1	2	3	4	5
3) You have developed technology for foreign markets.	1	2	3	4	5
4) You advertise in foreign newspapers or broadcasting.	1	2	3	4	5
5) You adapt to the product and consumer standards for foreign markets.	1	2	3	4	5
6) You customize product packaging for markets in other countries.	1	2	3	4	5
7) You attend explanation meetings about foreign investments.	1	2	3	4	5
8) You attend the exhibitions about food marketing, both domestic and foreign.	1	2	3	4	5
9) You invest for exporting in the future.	1	2	3	4	5

10) Other (please specify):_____

29. Please rank the types of government help that would be most useful
(1 = least important, ..., 5 = most important)

1) Financial support from the government for exporting.	1	2	3	4	5
2) Trade shows, both organized and subsidized by the government	1	2	3	4	5
3) Foreign market information	1	2	3	4	5
4) Trade leads	1	2	3	4	5
5) Information on exchange rates, financing, licensing, etc.	1	2	3	4	5
6) Simplify the administrative procedure for exporting	1	2	3	4	5

7) Other (please specify): _____

Appendix 3-3. The Results of Response in the Survey Form
(The parentheses are responses)

I. Basic profile of the firm

1. What year was the company founded ?

Min. (1926), Max. (1995), Mean (1981)

2. How many employees does your company have ?

1) 1 - 50 (47) 2) 51 -150 (20) 3) 151-300 (6)
4) 301- 500 (4) 5) Over 500 (10)

3. What was your company's total sales volume in 1995 ?

($) Min. (0.03 million), Max. (516 million)

4. What form of ownership applies to your company ?

1) Sole proprietorship (11) 2) Partnership (5)
3) Public corporation (3) 4) Private corporation (33)
5) Co-operative (3) 6) Corporation (32)

5. Where are your company's headquarters and plant located ?

Headquarters: Urban (50), Small town (37), Plant: Urban (44), Small town (43)

Headquarters and plants are located in same place. Yes(77), No(10)

6. Do the founders still own the company ?

1) Yes (69) 2) No (18)

7. For each of the following types of goals, indicate the number that expresses its current importance to your firm. (1 = least important, ..., 5 = most important)

1) High profit rate on investment	1(0)	2(3)	3(17)	4(30)	5 (37)
2) High growth rate	1(0)	2(1)	3(21)	4(31)	5 (34)
3) Development security of your markets	1(0)	2(2)	3(6)	4(16)	5 (53)
4) Contribution to the development of the Korean economy	1(0)	2(10)	3(40)	4(22)	5 (15)

8. Does your firm normally plan for any of the following activities ?
(Yes = 1, No = 0)
1) New product development: Yes (83), No (4)
2) New market development: Yes (79), No (8)
3) Expansion of your market share: Yes (73), No (14)
4) Diversification into other businesses: Yes (43), No (14)
5) Greater national distribution: Yes (48), No (39)
6) Development the foreign markets: Yes (61), No (26)

II. Attitudes toward international trade

9. Do you (the manager) have international business experience.
1) Yes (54) 2) No (33)

10. How do you view the future of your company concerning international trade ?

1) With optimism (16) 2) With guarded optimism (49) 3) With pessimism (22)

11. What percentage of your gross income is spent in international trade activities ?

1) 0 % (23) 2) 1-10 % (53) 3) 11 - 20 % (9) 4) More than 25% (2)

12. How many times per year does someone from your company attend international trade shows or seminars ?

1) 0 time (18) 2) 1 time (18) 3) 2 times (14) 4) 3 times (20) 5) More than 5 times (17)

13. How many people are dedicated to the international trade of your product ?

1) 0 (33) 2) 1 - 10 (47) 3) 11 - 20 (6) 4) 21 - 30 (1)

14. Does your company have separate divisions or processing plants for international trade in a foreign country

1) Yes (10) A separate division: Chain (4), U.S. (2), Japan (2), Thailand (1)

A processing plant: Chain (5), India (1), NewZealand (1)

2) No (77)

15. If, No, will your company eventually have separate divisions or processing plants in a foreign country ?

1) Yes (33) 1) in 1 year (2) 2) in 2 years (15) 3) in 3 years (13) 4) in 4 years (3)

2) No (54)

III. Attitudes toward exporting

16. Do you currently, or have you ever, exported ?

1) Yes: We currently export our products.
2) Yes: We have exported in the past. Yes (77)
3) No: We have never exported. No (10)

*** If you answered "Yes," please answer 17-24, and if you answered "No," please answer 25 -26

17. What was the sum of your company's exports in 1995 ?
(Please report in thousands of dollars)

Min. ($ 10), Max. ($ 50,000)

18. What is the main country to which you export?

Japan (30), Taiwan (17), Singapore (6), India (6), Philippines (4)

19. What percentage of your product sales are in domestic and foreign markets ?

1) Domestic ( ) % 2) Foreign ( ) %

20. How long have you been exporting ?

1) Less than 1 year (9) 2)1 - 3 years (15) 3) 3 - 5 years (14) 4) More than 5 years (25)

21. What led to your first export sale ? (Circle all that apply)

1) A local trade seminar (4)
2) A government sponsored exhibition at an overseas show (6)
3) A staff member with international experience (14)
4) An unsolicited order from abroad (22)
5) A general trading company (7)
6) A broker or export consultant (37)
7) Other (please specify):_____

22. How does your company export its products ?

1) We export the products ourselves (31)
2) We have used a brokers or Exporters (28)
3) We have used a general trading company (5)

23. What have been your major obstacles in exporting ? (Circle all that apply)

1) The nature of your product itself (Perishable, culturally unique, etc.) (18)
2) Developing the market for your product (39)
3) Exchange rate, financing problems (16)
4) Receiving payment for your product (6)
5) Difficulty in understanding foreign business practices (6)
6) Different product standards and consumer standards in foreign countries which make Korean products unsuitable for export (17)
7) Difficulty in collecting money from foreign markets (1)
8) Difficulty in obtaining adequate representation in foreign markets (21)
9) Other (please specify):_____

24. What are your primary reasons for exporting ? (Circle all that apply)

1) To increase profits (39)
2) To increase sales (41)
3) To utilize excess capacity (3)
4) To establish long term market share (38)
5) Other (please specify):_____

25. Please rank the primary reasons that you do not export your product.
(1 = strongly disagree, ..., 5 = strongly agree)

1) Not interested in exporting.	1(12)	2(2)	3(13)	4(3)	5(4)
2) You produce a perishable product.	1(13)	2(5)	3(6)	4(3)	5(7)
3) Concerns about exchanges rates, financing, licensing.	1(9)	2(5)	3(6)	4(10)	5(2)
4) Cost of developing market or attending overseas shows.	1(7)	2(2)	3(8)	4(10)	5(7)
5) You produce a culturally unique product.	1(10)	2(7)	3(1)	4(3)	5(13)
6) Concerns about receiving payment for your product.	1(8)	2(2)	3(9)	4(8)	5(7)
7) Limited experience of in exporting.	1(3)	2(2)	3(11)	4(6)	5(12)

8) Other (please specify): _____

26. Are you now, or have you ever considered exporting ?

1) Yes (23) 1) in 1 year (3) 2) in 2 years(7) 3) in 3 years(10) 4) in 4 years(3)

2) No(11)

Please answer all of questions 27 - 29

27. What are your firm's managerial attitudes toward exporting ?
(1 = strongly disagree, ..., 5 = strongly agree)

1) Exporting is a desirable task for my firm.	1(6) 2(7) 3(14) 4(20) 5(40)
2) My firm has exportable products.	1(5) 2(5) 3(21) 4(19) 5(37)
3) My firm is planning on increasing its exports in the future.	1(6) 2(6) 3(20) 4(18) 5(37)
4) Exporting could make a major contribution to a firm's growth.	1(11) 2(7) 3(17) 4(19) 5(33)
5) Exporting could make a major contribution to a firm's profits.	1(8) 2(12) 3(23) 4(13) 5(31)
6) My firm always tries to fill export orders.	1(6) 2(7) 3(16) 4(20) 5(38)
7) My firm is actively seeking new foreign markets for our current products.	1(11) 2(9) 3(29) 4(15) 5(23)
8) My firm is actively exploring the idea of new products.	1(10) 2(6) 3(25) 4(22) 5(24)
9) Exporting is not different from doing business locally.	1(13) 2(13) 3(34) 4(11) 5(16)

28. Which of the following international trade techniques do you employ ?
(1 = least important, ..., 5 = most important)

1) You research the foreign market.	1(12) 2(11) 3(16) 4(25) 5(23)
2) You have promotion materials in other languages.	1(18) 2(15) 3(22) 4(19) 5(13)
3) You have developed technology for foreign markets.	1(13) 2(13) 3(25) 4(20) 5(16)
4) You advertise in foreign newspapers or broadcasting.	1(29) 2(19) 3(18) 4(11) 5(10)
5) You adapt to the product and consumer standards for foreign markets	1(15) 2(13) 3(28) 4(17) 5(9)
6) You customize product packaging for markets in other countries.	1(23) 2(28) 3(20) 4(6) 5(11)
7) You attend explanation meetings about foreign investments.	1(18) 2(19) 3(24) 4(17) 5(9)
8) You attend the exhibitions about food marketing, both domestic and foreign	1(9) 2(9) 3(23) 4(16) 5(30)
9) You invest for exporting in the future.	1(17) 2(10) 3(25) 4(23) 5(12)
10) Other (please specify): _____	

29. Please rank the types of government help that would be most useful
(1 = least important, ..., 5 = most important)

1) Financial support from the government for exporting.	1(56) 2(11) 3(13) 4(3) 5(4)
2) Trade shows, both organized and subsidized by the government	1(6) 2(3) 3(13) 4(24) 5(41)
3) Foreign market information	1(46) 2(30) 3(7) 4(0) 5(4)
4) Trade leads	1(2) 2(5) 3(20) 4(32) 5(28)
5) Information on exchange rates, financing, licensing, etc.	1(6) 2(6) 3(17) 4(29) 5(29)
6) Simplify the administrative procedure for exporting	1(5) 2(2) 3(9) 4(19) 5(52)
7) Other (please specify): _____	

Appendix Table 3-4. List of Variables Used in Mean Analysis

Variables	Definition
In question 25, please rank the primary reasons that you do not export your product. (1 = strongly disagree, ..., 5 = strongly agree)	
EXNC1	Not interested in exporting.
EXNC2	You produce a perishable product.
EXNC3	Concerns about exchanges rates, financing, licensing.
EXNC4	Cost of developing market or attending overseas shows.
EXNC5	You produce a culturally unique product.
EXNC6	Concerns about receiving payment for your product.
EXNC7	Limited experience in exporting.
In question 27, what are your firm's managerial attitudes toward exporting ? (1 = strongly disagree, ..., 5 = strongly agree)	
EXI1	Exporting is a desirable task for my firm.
EXI2	My firm has exportable products.
EXI3	My firm is planning on increasing its exports in the future.
EXI4	Exporting could make a major contribution to a firm's growth.
EXI5	Exporting could make a major contribution to a firm's profits.
EXI6	My firm always tries to fill export orders.
EXI7	My firm is actively seeking new foreign markets for our current products.
EXI8	My firm is actively exploring the idea of new products.
EXI9	Exporting is not different from doing business locally.
In question 28, which of the following international trade techniques do you employ ? (1 = least important, ..., 5 = most important)	
EXT1	You research the foreign market.
EXT2	You have promotion materials in other languages.
EXT3	You have developed technology for foreign markets.
EXT4	You advertise in foreign newspapers or broadcasting.
EXT5	You adapt to the product and consumer standards for foreign markets.
EXT6	You customize product packaging for markets in other countries.
EXT7	You attend explanation meetings about foreign investments.
EXT8	You attend the exhibitions about food marketing, both domestic and foreign
EXT9	You invest for exporting in the future.
In question 29, please rank the types of government help that would be most useful (1 = least important, ..., 5 = most important)	
EXG1	Financial support from the government for exporting.
EXG2	Trade shows, both organized and subsidized by the government
EXG3	Foreign market information
EXG4	Trade leads
EXG5	Information on exchange rates, financing, licensing, etc.
EXG6	Simplify the administrative procedure for exporting

VITA

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