MARKET CONCENTRATION OF THE PROCESSED FOOD IN KOREA

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Keywords
processed food market, food processing industry, market structure, market concentration, CR4, CR10, monopoly, oligopoly

Abstract
In Korea, processed food markets have various shapes of structure: the markets of ice cream, special dietary food, noodles, sugar are highly concentrated, while the markets of gimchi, pickles, and ice are not very concentrated. The level of market concentration changes over time. These market structures and structural changes cause impacts on related industries as well as own industries. For the more successful policies, the paper suggests three ideas: to realize that each food processing industry has a different industry structure, to understand the relationship between the food processing industry and upstream and downstream industries and to take into account opinions from various sources before adopting new policies.

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I. Introduction

In 2006, the Korean food processing industry, which has continuously grown, employed 295 thousand workers and earned about 52 trillion won[1] in total sales.[2] This industry is quite relevant to upstream and downstream industries which include the agricultural sector. The growth of food processing industry stimulates the expansion of other industries, and the change in the structure of processed food market works as one of main causes impacting other sectors. For example, increasing market concentration in a processed food market strengthens the bargaining power of major food processors against their business partners in upstream and downstream industries.

The increasing importance of food processing industry and processed food market makes government pay more attention to this sector. In particular, the new Korean government viewed the food industry, including the food processing industry, as one of essential industries for economic development, and changed the name of "Ministry of Agriculture and Forestry" to "Ministry for Food, Agriculture, Forestry and Fisheries."

In the 1990s, some researchers embarked on a research to analyze the food processing industry in Korea, but only a small number of studies focused on the food processing industry. Baek (1992) analyzed the structure of Korean food processing industry by measuring the level of market concentration and productivity. Kim (2003) studied the effect of increasing market power of major food processors. Shin et al. (2002) analyzed the factors causing the growth of the Korean food processing industry with input-output tables in 1985, 1990, and 1995. Kim et al. (2007) estimated GDP and the number of employees in the agribusiness sector including the food processing industry. Previous research was usually concerned about the overall discussion of the food processing industry or the food industry, but rarely analyzed the structure of the food processing industry and the market concentration of the processed food market.

The main goal of this paper is to grasp an overview of the current status of the Korean food processing industry and the processed market and to analyze their structures. For more specific discussion, the paper also measures the

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[1] The Korean-U.S. exchange rate for 2007 is "1 dollar = 955.51 won."

[2] Data from Korea National Statistical Office (employees) and Bank of Korea (sales).

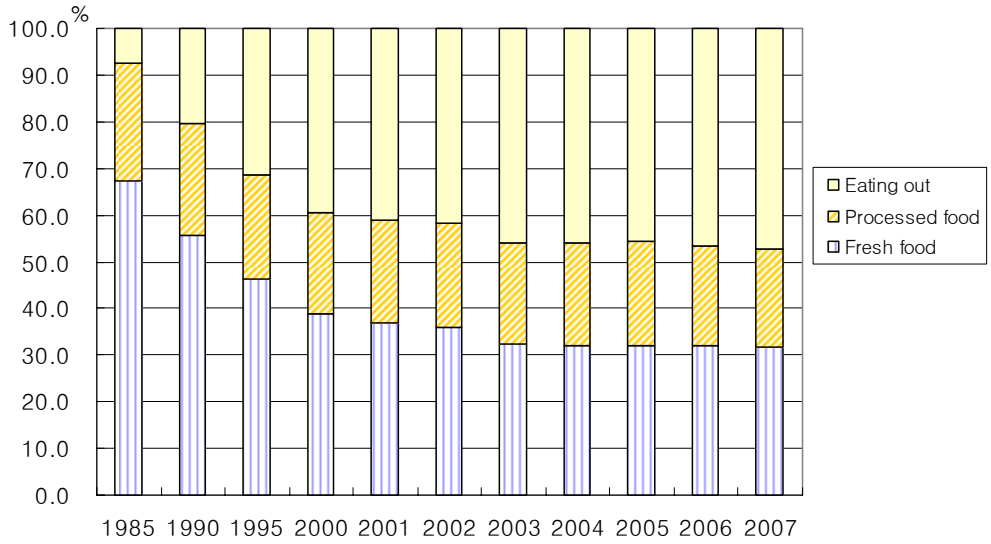
level of market concentration (CR_4 and CR_{10}) of the processed food market and discusses its effect on the market and other related industries.

II. Overview of Food Processing Industry and Processed Food Market in Korea

1. Environment of Korean Food Processing Industry and Market

The Korean food processing industry and the processed food market have been affected by the environment, including changes in food consumption. In Korea, the total expenditure for food consumption per household increased from 118,898 won in 1985 to 567,658 won in 2007. The structure of food consumption also changed, as shown in Figure 1. The proportion of expenditure for fresh food consumption dramatically decreased from 67% in 1985 to 32% in 2007, and the proportion of expenditure for processed food consumption slightly decreased from 25% in 1985 to 21% in 2007. However, the proportion of expenditure for eating out increased about six times from 8% in 1985 to 47% in 2007.

FIGURE 1. Portion of expenditure for food (per household)



Source: Korea National Statistical Office (www.kosis.kr)

These changes in the proportions result from several factors: more working women due to urbanization and/or industrialization, smaller number of household members and others.

One thing remarkable is the change of processed food consumption in Korea. The expenditure for processed food increased about two times from 80,196 won in 1985 to 179,676 won in 2007, but the proportion of expenditure decreased by 16%. The available explanations might come from two contradictory factors: advantage of saving time for cooking by consuming processed food and concerns about the potential threat to health. Recently, the healthy food (or "slow food") are more attractive to Korean consumers than convenient food (or "fast food").

Another change in the environment of the Korean food processing industry and the market is the increasing import of foreign food, which makes the competition in the markets harsher. According to Table 1, total value of import increased about two times from 4 billion dollars in 2000 to 7.6 billion dollars in 2006. When comparing the changes in the import of agricultural · forest food and processed food, Table 1 shows that the import of processed food increased at a higher speed. This implies that foreign exporters are focusing on

TABLE 1. Import of food in Korea

unit: case, ton, thousand dollar

		2000	2001	2002	2003	2004	2005	2006
Total	Case	133,761	147,742	166,723	185,299	191,152	208,488	231,316
	Quantity	10,350,534	10,514,267	10,487,775	11,118,937	11,442,996	11,248,266	11,216,258
	Value	4,036,497	4,282,715	4,621,414	5,801,381	6,070,848	7,005,231	7,582,253
Processed Food	Case	70,474	84,080	97,344	110,816	110,967	126,420	141,474
	Quantity	2,640,189	2,851,150	2,968,110	3,118,087	3,432,415	3,554,102	3,706,986
	Value	1,786,830	2,052,392	2,270,464	3,070,556	2,703,101	3,663,821	3,459,744
Food Additives	Case	21,632	22,456	24,758	25,767	27,613	28,227	30,038
	Quantity	109,949	120,139	129,597	140,400	162,956	167,172	172,740
	Value	301,534	345,483	367,650	387,169	418,247	475,370	469,812
Container· Packages	Case	20,249	19,425	21,158	20,056	20,256	20,790	24,161
	Quantity	161,482	158,179	187,441	192,210	169,723	178,299	188,785
	Value	404,189	380,114	440,874	435,992	452,044	529,478	603,967
Agricultural ·Forest Products	Case	21,406	21,781	23,463	28,660	32,316	33,051	35,643
	Quantity	7,438,914	7,384,799	7,202,627	7,668,240	7,677,902	7,348,692	7,147,745
	Value	1,543,944	1,504,727	1,542,426	1,907,664	2,497,456	2,336,561	3,048,728

Source: Korean Food & Drug Administration, Food and Drug Statistical Yearbook.

exporting processed foods, which offers more value added with longer use-by dates, and thus the Korean food processing industry may face a worse market environment than agricultural · forest food growers in the future.

Table 1 also shows that the increase in the value of imports was larger than the increase in the quantity of imports. For example, the value of imported processed foods increased by 94% between 2000 and 2006, while the quantity of imported processed foods increased by 40%. Moreover, the value of imported agricultural · forest foods increased twofold from 1.5 billion dollars in 2000 to 3 billion dollars in 2006, while the quantity of imported agricultural · forest foods slightly decreased from 7.4 million tons in 2000 to 7.2 million tons in 2006. Therefore, the value per unit of imported foods becomes larger, which implies that foreign exporters started to export more valued-added foods to Korea.

Next, Table 2 shows the change in the import of major processed foods in Korea. In Table 2, meat products, edible fat and oil, bean curd or jellies, and gimchi · pickle show a big increase in the value of imports. The increase of imported edible fat and oil results from the change of food trend. Recently, more Korean people eat fried food or salads cooked with edible oil. The consumption of processed foods with edible oil or fat, such as snacks or noodles (ramen), also increased. The recent increase of bean curd or jellies and gimchi · pickles is the result of increased imports from China. Usually, Chinese bean curd or jellies and gimchi · pickles, which are processed with inexpensive raw materials and labor, are sold at lower prices in the Korean market, but some products cause food safety problems.

However, decreases in the import of ginseng products and beverages are reported. In the case of ginseng products, Korean ginseng has the best quality in the world, which guarantees the comparative advantage of quality. Korean beverages, such as some fruit juice, are generally processed with imported concentrates, which offers prices low enough to compete with imported beverages.[3]

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[3] In fact, except mandarin juice and some apple juice, most fruit juices are processed with imported concentrates.

TABLE 2. Import of major processed foods

unit: thousand dollar, %

	2000	2001	2002	2003	2004	2005	2006	Change (00~06)
Fish products	98,386	109,539	123,179	116,808	109,444	154,822	424,408	331.4
Edible fat & oil	32,115	35,549	48,498	60,969	227,959	398,862	370,499	1,053.7
Alcoholic liquor	208,006	248,354	366,054	1,050,929	284,014	926,439	325,836	56.6
Confectioneries	133,838	169,469	189,818	203,181	208,218	279,637	256,143	91.4
Gimchi · pickles	17,855	25,933	29,337	52,947	94,547	133,610	159,103	791.1
Condiments	83,506	84,721	91,266	102,934	111,803	128,532	141,474	69.4
Dried & sliced fish and shellfish products	30,212	41,075	65,566	71,816	77,224	87,060	104,234	245.0
Tea	26,991	28,787	35,352	45,227	257,450	67,254	60,979	125.9
Beverages	120,235	16,830	132,631	102,775	88,429	67,870	53,747	-55.3
Sugar	13,067	14,915	16,863	23,072	31,065	36,937	48,010	267.4
Noodles	26,765	27,551	61,943	31,465	37,036	42,116	46,443	73.5
Meat products1)	214	62	1,618	9,336	17,174	32,633	45,167	21,006.1
Bean curd or jellies	206	80	968	978	815	1,135	2,349	1,040.3
Ice cream	397	867	788	625	373	269	1,023	157.7
Ginseng products	2,535	4,153	3,467	4,856	944	447	211	-91.7

Note 1) Miscellaneous products. Main meat products are managed by Ministry for Food, Agriculture, Forestry and Fisheries.

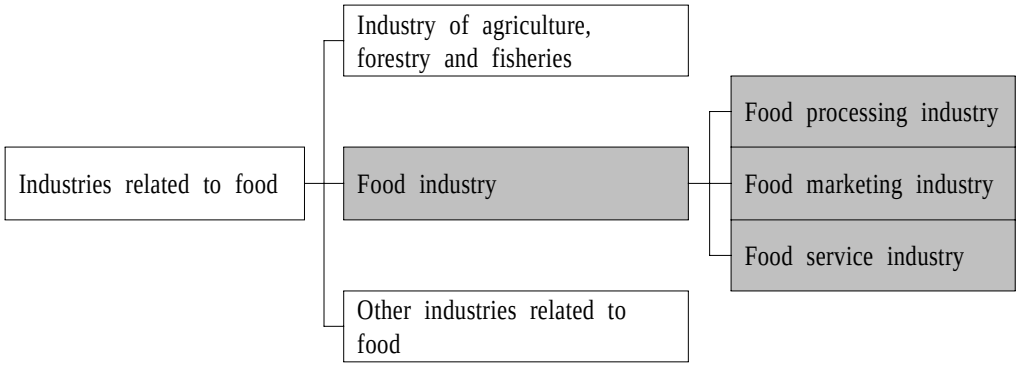
Source: Korean Food & Drug Administration, Food and Drug Statistical Yearbook.

2. Current Status of Food Processing Industry

2.1. Definition and Scope of Food Industry and Food Processing Industry

Korean researchers couldn't find a unified definition and/or scope of food industry yet. Generally, food industry includes food processing industry, food marketing industry, and food service industry, as suggested at Figure 2. (Lee et al. (2001) and Hwang et al. (2005)).

FIGURE 2. Food industry and food processing industry



According to the recent definition by the government, food industry might be defined as "an industry related to the processing, manufacturing, storing, marketing, cooking, and consuming of foods." Food processing industry, which is the sub-industry of food industry, is an industry processing raw materials from agriculture, forestry, or fishery to produce processed foods.

Table 3 shows the production of major processed foods in the Korean market. In 2006, the most sold processed food was ramen (noodle), the sales of which was about 1 trillion won. Soda and sea products were also sold much in the market.

The most exported processed foods were sea products and sugar, the sales of which were 207 million dollars and 143 million dollars in 2006, respectively. In particular, Korean sea products usually have the comparative advantage of quality with inexpensive price in the Japanese market, and sugar, processed with cheap foreign raw materials, has the comparative advantage of price in the world markets.

TABLE 3. Production of major processed foods (Top 20 in 2006)

unit: ton, thousand won, dollar

Rank	Product group	Product	Production	Sales	Export
1	Noodles	Ramen	347,420	1,092,328,499	37,120,201
2	Beverages	Soda	1,143,634	948,937,676	13,031,992
3	Processed seafood in general	Sea products	227,466	929,054,753	206,966,568
4	Beverages	Juice	962,909	920,873,870	26,654,392
5	Beverages	Other beverages	666,903	834,940,721	22,852,541
6	Processed non-seafood in general	Other processed products	405,766	716,293,940	89,491,979
7	Other foods	Wheat flour	1,692,198	694,476,305	3,518,117
8	Confectioneries	Chocolate	116,890	665,114,599	22,107,715
9	Confectioneries	Cookie	253,684	640,139,557	1,625,472
10	Sugar	Sugar	1,265,125	636,805,111	143,157,722
11	Tea	Instant Coffee	177,445	599,959,808	16,015,999
12	Confectioneries	Snack	145,276	588,654,112	14,544,790
13	Condiments	Sauce	197,914	544,509,674	6,158,152
14	Condiments	Compounded Condiments	117,674	543,133,077	14,866,840
15	Confectioneries	Biscuit	116,372	536,893,154	10,034,977
16	Gimchi · pickles	Bae-Choo Gimchi	296,343	488,871,172	83,599,717
17	Confectioneries	Cake	67,088	463,058,314	513,735
18	Noodles	Cup ramen	87,116	425,750,594	25,865,858
19	Ice cream	Ice bar	170,222	381,510,694	815,744
20	Edible fat & oil	Soy oil	314,228	352,398,238	1,504,695

Note: Meat products are excluded.

Source: Korean Food & Drug Administration, Production record of food and food additive, 2006

2.2. Status of Food Processing Industry in the Korean Market

As shown at Table 4, the importance of food industry among Korean industries slightly shrank. The share of GDP of food industry in the whole Korean industry decreased from 3.9% in 1990 to 3.7% in 2005. However, the share of GDP of agriculture, forestry and fisheries decreased much more than the food industry. In addition, the share of the food industry's GDP in the industries related to food dramatically increased from 24.2% in 1990 to 40.1% in 2005.

The shape of changes in the share of the food processing industry's GDP is similar to the changes of the food industry. The share of GDP of the

food processing industry in the whole industry decreased by 26% from 1.9% in 1990 to 1.4% in 2005, but the share of the industries related to the food industry increased by 31% from 11.6% in 1990 to 15.2% in 2005.

These changes in the shares of GDP suggest that the food industry, including the food processing industry, has emerged as one of main sources for the growth of the Korean economy. In fact, the industry of agriculture, forestry and fisheries is not the main industry in the food sector any more. The new Korean government realized this importance of the food industry and has introduced various policies to develop the food processing and service industry as well as other related industries.

TABLE 4. Share of Food Industry and Food Processing Industry

unit: %

	1990		1995		2000		2003		2005	
	Share[1)]	Share[2)]	Share[1)]	Share[2)]	Share[1)]	Share[2)]	Share[1)]	Share[2)]	Share[1)]	Share[2)]
Industry of agriculture, forestry and fisheries	55.1	8.8	48.6	6.3	42.2	4.8	37.4	3.7	36.2	3.3
Food industry[3)]	24.2	3.9	31.2	4.0	37.0	4.2	39.9	3.9	40.1	3.7
Food processing industry	11.6	1.9	13.4	1.7	14.8	1.7	14.7	1.5	15.2	1.4
Food service industry	12.6	2.0	17.7	2.3	22.1	2.5	25.2	2.5	24.8	2.3

Note 1) Share of GDP in industries related to food
2) Share of GDP in the whole industry in Korea
3) excluding marketing industry
Source: Kim et al (2007). Modified.

III. Structure of Major Food Processing Industry and Market Concentration

1. Characteristics of Korean Food Processing Industry

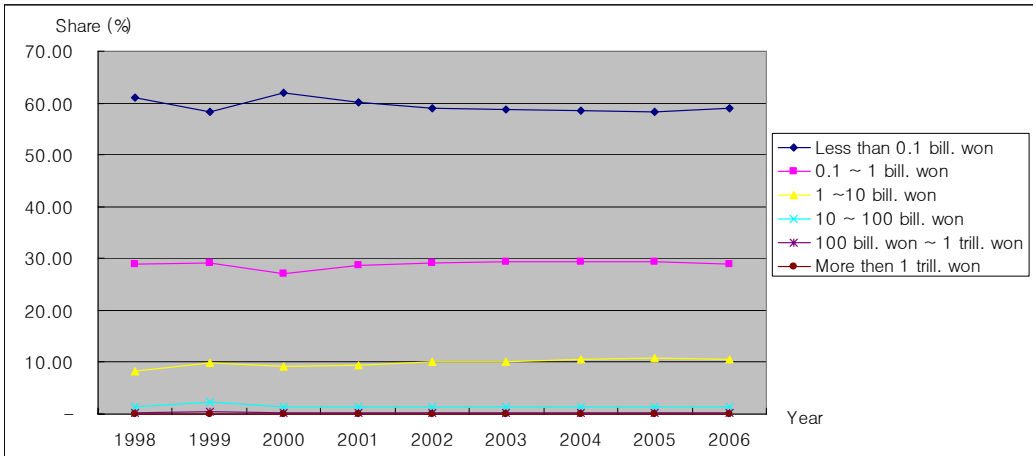
The Korean food processing industry usually consists of small-size enterprises. Figure 3 shows that the proportion of food processors with sales of less than 0.1 billion won each accounted for around 60% from 1998 to 2006. The proportion of food processing companies with sales between 0.1 billion won and

1 billion won was about 30%. The proportion of medium- and large-size food processing companies with sales of more than 1 billion won was only 10%. In particular, a very small number of enterprises reported sales of more than 1 trillion won: one food processing company (Nongshim) in 2000 and three others (Nongshim, CJ, Lotte Chilsung) in 2006.

Figure 3 also shows that the proportion of food processors in each group rarely fluctuates over time in Korea, but there was an increase or a decrease in the proportion of enterprises between 1999 and 2000. The proportion of small-size food processors has decreased, while the proportion of midium-size enterprises has increased. These changes in the proportion of two groups suggest the structural change of the food processing industry.

The structural change of the Korean food processing industry may result in affecting the business environment of food processors. As presented at Table 5, the sales per food processor with less than 0.1 billion won in sales showed a 4% decrease from 26 million won in 2000 to 25 million won in 2006. However, the sales per food processor with sales of more than 1 trillion won increased by 27% from 1.02 trillion won in 2000 to 1.3 trillion won in 2006. The decreasing sales of small-size food processors and the increasing sales of large-size food processors implies that the larger enterprises have had more advantages in business, such as the economy of scale, in the Korean market.

FIGURE 3. Sales of food processing industry (Share of number of food processors)



Source: Korean Food & Drug Administration, Production record of food and food additive, each year.

TABLE 5. Sales of food processing industry (Sales per enterprise)

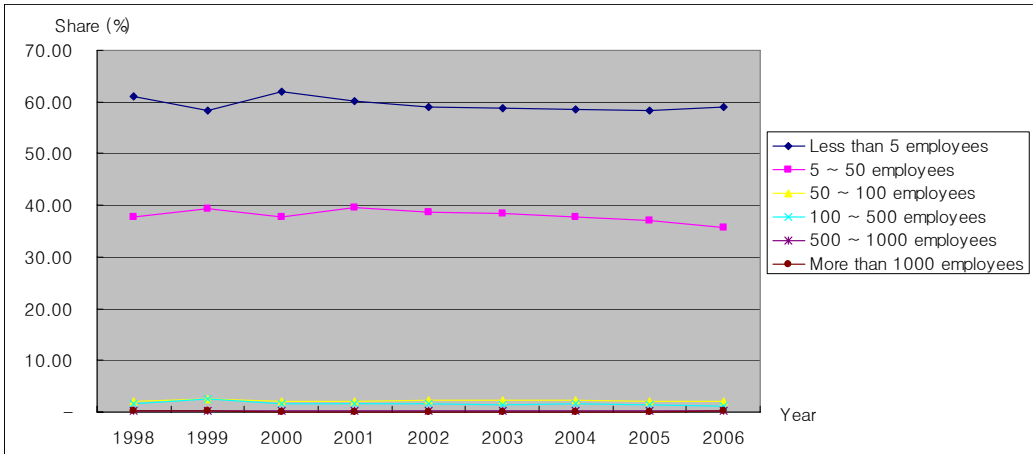
unit: billion won

	1998	2000	2001	2002	2003	2004	2005	2006	Change
Less than 0.1 bill.	30	26	26	26	26	26	25	25	-16
0.1~1 bill.	342	339	342	340	342	351	346	350	2
1~10 bill.	2,880	2,899	2,892	2,932	2,908	2,904	2,826	2,844	-1
10~100 bill.	27,265	27,296	25,167	27,403	25,570	26,279	28,066	27,645	1
100 bill.~1 trill.	271,299	246,016	217,588	227,163	252,171	223,331	235,285	261,737	-4
More than 1 trill.	-	1,017,392	1,046,510	1,167,954	1,340,836	1,262,415	1,193,283	1,287,464	27[1)]

Note 1) Change between 2000 and 2006.
Source: Korean Food & Drug Administration, Production record of food and food additive, each year.

The shape of changes in the proportion of food processors classified by the number of employees is similar to the shape discussed above at Figure 3. Figure 4 shows that the proportion of enterprises with less than 5 employees is around 60%, and the proportion of enterprises with less than 50 employees is about 95%. The proportion of food processors with more than 1,000 employees is less than 0.5%, even though the number of food processors increased two times from 26 in 1998 to 55 in 2006.

FIGURE 4. Numbers of employees in food processing industry (Share of the number of enterprises)



Source: Korean Food & Drug Administration, Production record of food and food additive, each year.

Table 6 shows the sales per food processor with different numbers of employees. The average sales per food processor with less than 5 workers increased by 42% from 67 billion won in 1998 to 96 billion won in 2006. These increasing sales per enterprise are common among food processors that hire less than 100 workers. However, food processors with many employees report decreases in sales. In particular, food processors hiring 500~1,000 workers report a 44% decrease in sales per enterprise.

These changes in the sales per food processor with different numbers of employees might suggest that the Korean food processing industry couldn't benefit from the advantages of a labor intensive industry any more. In fact, many Korean food processors have moved their plants to other countries that offer inexpensive labor, or they depend more on machinery for production through lay-offs.

TABLE 6. Sales of food processing industry (Sales per enterprise)

unit: billion won

	1998	2000	2001	2002	2003	2004	2005	2006	Change
Less than 5[1)]	67	62	67	70	73	72	75	96	42
5~50	706	841	794	849	847	895	935	1,006	42
50~100	5,828	6,478	6,269	6,130	5,907	6,960	6,561	6,895	18
100~500	19,522	32,762	30,693	31,557	31,229	35,271	35,410	18,569	-5
500~1000	109,094	170,962	188,752	189,111	173,365	182,761	183,678	60,594	-44
More than 1000	243,798	350,653	357,149	365,534	420,671	439,340	396,974	224,866	-8

Note 1) Number of employees per enterprise

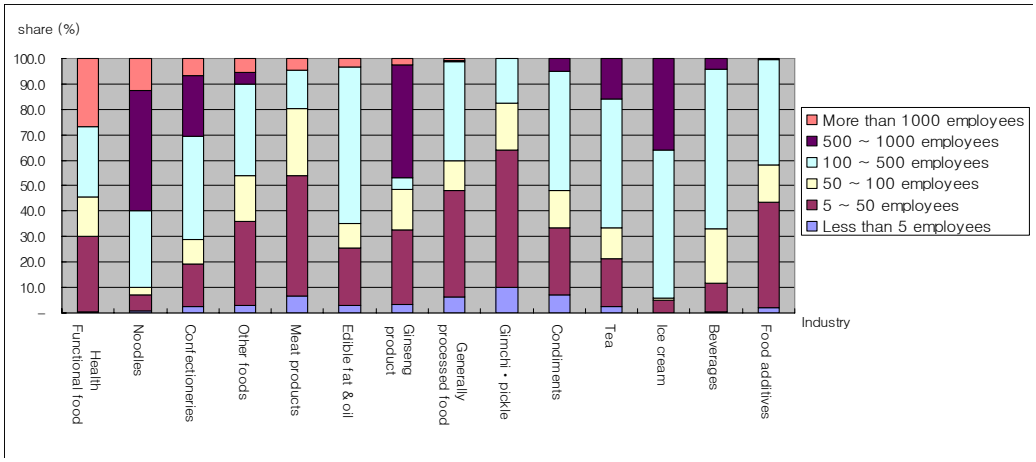
Source: Korean Food & Drug Administration, Production record of food and food additive, each year.

Figures 5 and 6 show the number of employees per enterprise for major food processors. Figure 5 reports that health functional foods, noodles, confectioneries, and other foods command big numbers of employees. In particular, about 27% of enterprises in the health functional food industry hire more than 1,000 workers, and 60% of enterprises in the noodles industry hire more than 500 employees.

Figure 6 shows that ice, soybean curd, dried & sliced fish, and shellfish products command small numbers of employees. For example, 25% of food processors in the soybean curd industry hire less than 5 employees.

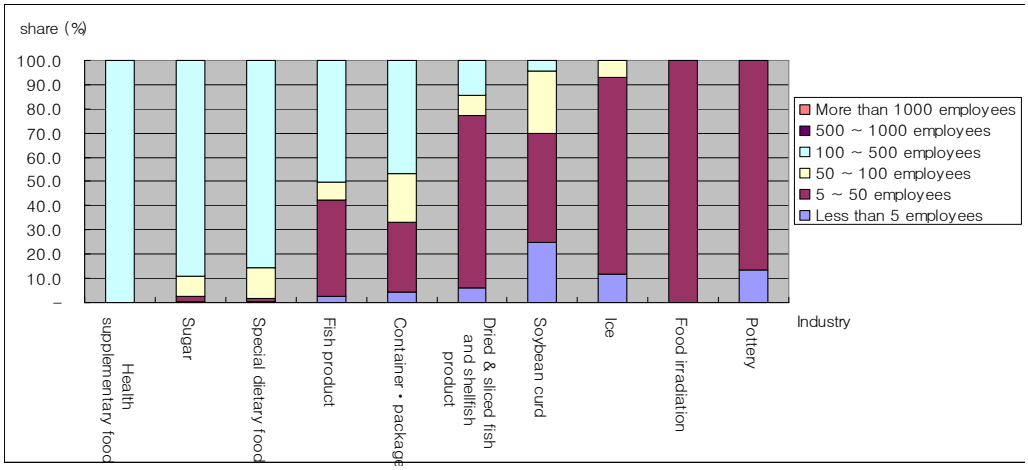
These various sizes in the hiring among food processors result from the characteristics of the food processing industry and business environment. For instance, a large size of employment might imply that the industry is still labor intensive and/or market growth can be expected.

FIGURE 5. Number of employees per food processor (2006): More than 500 employees



Note: Meat products are excluded.
Source: Korean Food & Drug Administration, Production record of food and food additive, 2006.

FIGURE 6. Number of employees per food processor (2006): Less than 500 employees



Note: Meat products are excluded.
Source: Korean Food & Drug Administration, Production record of food and food additive, 2006.

2. Market Concentration of Major Processed Food Markets

In order to evaluate the level of market concentration, researchers usually measure CR_i[4], Herfindahl index or Lorenz-Muenzer index. In this paper, CR_4 and CR_{10} are measured and the levels of market concentration of Korean food processing industries are discussed.

2.1. Market Concentration of Top 4

Table 7 shows the value of CR_4 in each food processing industry. In 2006, highly concentrated markets of processed food with CR4 of over 50% were the markets of ice cream (91.7%), special dietary food (86.6%)[5], noodles (79.5%), sugar (71.6%), tea (68.0%), soda (63.0%), ginseng products (55.2%) and edible fat & oil (53.7%).

On the other hand, the levels of market concentration of some markets are low. The CR_4 of the gimchi · pickle market is around 10%, and the CR_4s of the markets of dried & sliced fish, shellfish products, generally processed food[6], and soybean curd are about 20%. The markets with a medium level of market concentration with the values of CR_4 between 30% and 40% are the markets of meat products[7], other food[8], fish products, confectioneries, and condiments[9].

The comparison between the group of markets with high CR_4 and the group of markets with low CR_4 showcases the characteristics of food processing industries in Korea. Intuitively, Korean food processing markets with high CR_4 are dominated by a few large-size food processors, and have less labor-intensive

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[4] CR_i is the sum of market shares of top i enterprises. For example, CR_4 is the sum of market shares of top 4 enterprises.

[5] The major products of special dietary food are powdered milk for infants or babies, special food for controlling weight, special food for medical purpose and others.

[6] The major products in generally processed food are processed grains, processed fruits, processed vegetables, processed sea food and others.

[7] The major products in meat products are processed pork (Bo-Ssam, Jok-Bal) and processed chicken and others.

[8] The major products in other food are retort food (fast food), processed nuts, cereals and others.

[9] The major product in condiments are soybean paste, hot pepper paste, soy sauce, ketchup and others.

and more developed industries. However, processed food markets with low CR_4 have more labor-intensive and less developed industries with many small- or medium-size food processors.

The values of CR_4 at Table 7 are spread wide, which implies that Korean processed markets have various levels of market concentration. In particular, some processed food markets are very highly concentrated.

TABLE 7. Market concentration of major processed food market (CR_4)

unit: %

Product	1998	1999	2000	2001	2002	2003	2004	2005	2006
Ice cream	78.5	75.2	72.8	85.1	81.3	84.8	81.0	82.2	91.7
Special dietary food	74.8	77.9	71.0	60.3	55.4	62.9	64.3	79.8	86.6
Noodles	75.6	79.7	78.6	81.1	80.7	82.7	86.0	81.3	79.5
Sugar	73.2	69.1	67.7	70.7	68.9	70.2	69.6	70.4	71.6
Tea	79.1	73.3	72.7	68.6	66.6	64.4	67.4	64.1	68.0
Soda	65.2	64.9	67.8	69.5	62.9	63.6	64.7	63.6	63.0
Ginseng products	62.9	64.2	47.9	63.3	59.7	63.3	58.4	56.5	55.2
Edible fat & oil	59.0	56.2	55.5	53.1	56.3	56.9	58.5	56.1	53.7
Condiments	40.9	38.6	35.3	37.9	39.0	36.1	38.8	37.3	44.7
Confectioneries	40.9	44.1	42.0	44.8	42.5	42.1	43.3	40.0	41.4
Fish products	39.2	38.1	39.6	38.2	42.4	42.1	41.7	41.5	41.0
Other food	29.1	27.5	28.0	29.1	32.5	23.4	43.7	38.3	40.3
Food additives	40.6	39.9	46.8	38.0	38.8	44.1	42.2	39.6	35.6
Meat products	52.3	46.2	39.6	43.9	36.2	29.9	31.8	21.6	30.9
Soybean curd	20.5	23.0	25.1	29.2	32.2	28.0	33.0	32.3	26.5
Generally processed food	27.4	22.8	18.3	22.5	22.3	21.5	21.9	17.6	21.5
Dried & sliced fish and shellfish products	14.0	15.6	17.8	17.1	22.0	26.3	29.8	23.7	20.8
Ice	20.9	14.7	13.8	13.3	12.6	12.4	14.3	12.6	11.7
Gimchi · pickles	11.6	12.3	15.1	20.6	21.9	19.6	20.6	15.3	9.6
Health functional food	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Note: Meat products are excluded.

Source: Korean Food & Drug Administration, Production record of food and food additive, each year.

Table 8 shows the Korean markets controlled by a few food processors. According to the "Monopoly Regulation and Fair Trade Act" of Korea, an enterprise controlling a market is defined as an enterprise that satisfies two conditions: the sales of one product per enterprise is over 50 billion won and the market share of top one enterprises is over 50% or the market share of top three enterprises is over 75%.[10]

As presented in Table 8, the markets of ice cream, noodles and special dietary food have food processors with a power to control the market. In particular, the ice cream market has the most enterprises controlling the market: Lotte Confectionery, Lotte Samkang, and Haitai Confectionery & Foods. In the noodles market, the market share of top one enterprise, Nongshim, is over 50%, and thus this market is one of the most concentrated processed markets in Korea.

TABLE 8. Markets controlled by major enterprises (Monopoly or oligopoly)

unit: billion won, %

Market	Major enterprise	Sales	Market concentration
Ice cream	Lotte Confectionery	138,531	36.3
	Lotte Samkang	123,442	32.4
	Haitai Confectionery & Foods	57,944	15.2
	Binggrae[1)]	29,763	7.8
	Hyojawon[1)]	8,380	2.2
Noodles	Nongshim	1,025,096	52.8
	Ottogi[1)]	237,765	12.2
	Samyang Foods[1)]	151,675	7.8
	Ottogi Ramen[1) 2)]	129,941	6.7
	Korea Yakult[1)]	104,800	5.4
Special dietary food	Maeil Dairies	83,850	32.4
	Namyang Dairy Products	81,573	31.5
	Dr. Chung's Food[1)]	32,676	12.6
	Pasteur Milk[1)]	25,779	10.0
	Ildong Foodis[1)]	15,770	6.1

Note 1) Enterprise which doesn't satisfy all the criteria of an enterprise controlling the market.

2) Ottogi is mother company of Ottogi Ramen.

Source: Korean Food & Drug Administration, Production record of food and food additive, 2006. (Modified)

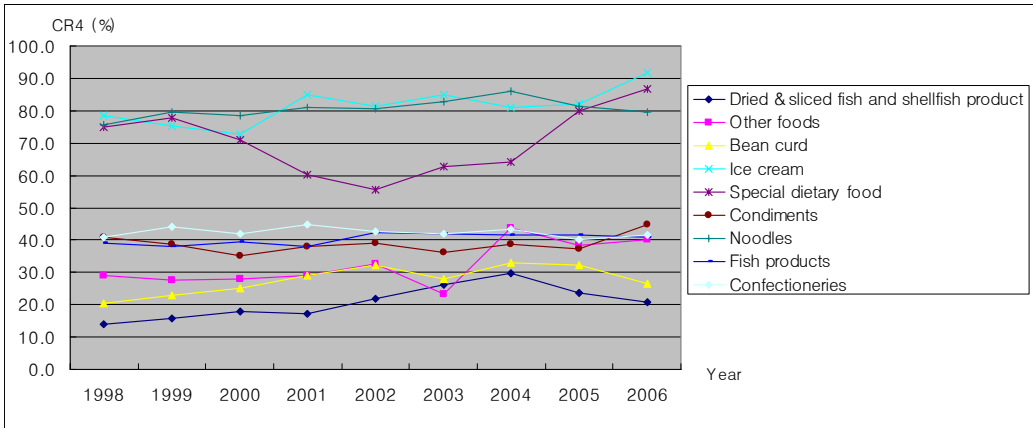
[10] However, the enterprise with a market share of less than 10% is not defined as an enterprise controlling the market, even though this enterprise belongs to the top three.

The level of market concentration in the Korean processed food market has changed over time. Figure 7 shows that the CR_4 of the dried & sliced fish and shellfish product market increased at the fastest speed from 14.0% in 1998 to 20.8% in 2006. The values of CR_4 of the other foods market and the bean curd market also increased by 38% and 30%, respectively. These markets have been more competitive due to the entry of large- or medium-size food processors that started to lead the markets. For example, the Korean bean curd was supplied by many small-size producers before "Pulmuone," which is the number one bean curd producer in Korea dominating the market and excluding other competitors.

While most of CR_4 of processed markets show a continuous increase, the CR_4 of the special dietary food market decreased after 1999, and then increased after 2002, which may have resulted from the stiff competition among enterprises. For instance, Maeil Dairies, which was the number 4 in 1998, was ranked as the leader in the market after 2004, and other major special dietary food processors competed for the number two, three and four.

On the other hand, the CR_4 of confectioneries market rarely showed fluctuation between 1998 and 2006. In this market, Lotte Confectionery holds the position of number one with a large market share (30%), and Haitai Confectionery & Foods and Orion competed for the number two with similar market shares.

FIGURE 7. Change of CR_4 of major processed food market: Increasing CR_4

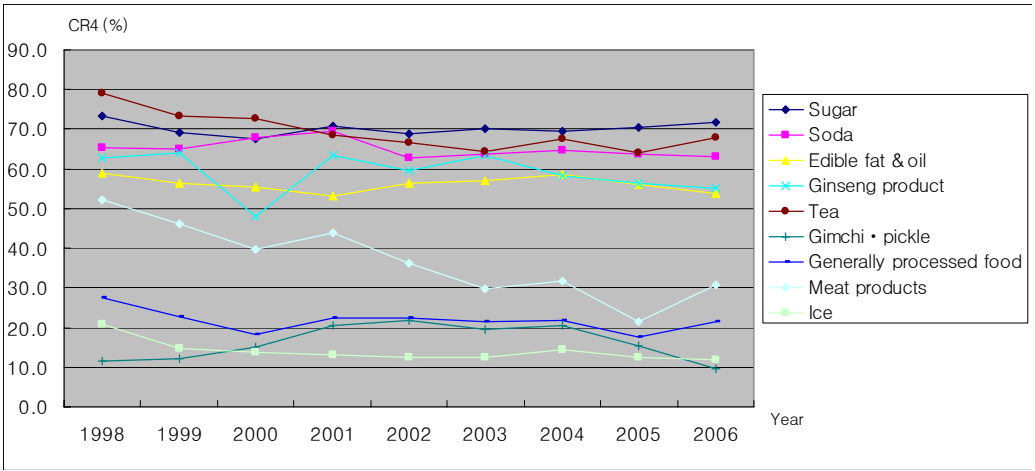


Note: Meat products are excluded.
Source: Korean Food & Drug Administration, Production record of food and food additive, each year.

Figure 8 shows the markets with decreasing CR_4 over time. The CR_4 of the ice and meat product markets decreased by about 40% between 1998 and 2006, showing that these markets are typical markets de-concentrated. In particular, the market concentration of the ice market might have resulted from the withdrawal of the biggest ice maker, Heung-Hwha Ice Making, in 1998. In the meat products market, the entry of many restaurant franchise enterprises[11] made the level of market concentration lower.

However, the CR_4 of the market of sugar, soda, edible fat & oil decreased by less than 10% between 1998 and 2006. These markets are usually controlled by a few major enterprises and have high barriers of entry.

FIGURE 8. Change of CR_4 of major processed food market: Decreasing CR_4



Note: Meat products are excluded.
Source: Korean Food & Drug Administration, Production record of food and food additive, each year.

2.2. *Market Concentration of Top 10*

The shape of market concentration presented by the values of CR_{10} is similar to the one described in the previous discussion of CR_4. According to Table 9, the market shares of top 10 food processors were high in the markets of special dietary food, sugar, ice cream, and noodles, which is similar to the results

[11] The entry of Won & Won and Jangchungdong Wangjokbal is one of good examples.

shown at Table 7. The values of CR_{10} in these four markets were over 90%. However, the markets of gimchi · pickles and ice have the lowest levels of market concentration of top 10 enterprises (17.7 for gimchi · pickle market and 25.6 for ice market).

TABLE 9. Market concentration of major processed food markets (CR_{10})

unit: %

Products	1998	1999	2000	2001	2002	2003	2004	2005	2006	change
Special dietary food	93.6	91.8	87.7	80.5	77.2	80.1	82.8	98.7	98.4	5.1
Sugar	98.6	98.0	93.7	98.5	98.2	98.2	97.9	98.0	98.2	-0.4
Ice cream	90.1	87.4	86.5	95.8	94.5	93.6	94.4	92.5	97.2	7.8
Noodles	82.3	87.4	86.5	87.5	86.9	87.0	89.6	90.2	90.3	9.8
Soda	81.4	78.7	83.1	83.0	80.0	80.6	81.0	81.4	81.9	0.6
Edible fat & oil	84.5	82.9	80.0	82.2	85.6	82.5	84.1	84.4	80.8	-4.3
Tea	88.8	86.0	83.5	79.8	77.9	75.9	75.7	72.3	75.6	-14.8
Ginseng products	77.0	75.6	56.6	71.5	66.8	70.7	66.7	66.1	67.1	-12.8
Confectioneries	66.5	69.6	66.6	66.1	68.2	64.9	67.4	63.8	64.2	-3.5
Other food	44.2	40.3	41.5	41.8	53.1	36.2	61.8	55.2	63.3	43.2
Fish products	63.3	60.1	60.5	60.4	63.3	64.1	62.3	59.9	60.0	-5.2
Condiments	62.1	59.9	54.9	53.5	54.7	54.2	53.1	52.4	55.1	-11.3
Meat products	76.9	67.1	61.3	61.4	60.1	48.3	49.6	39.3	50.4	-34.5
Food additives	53.0	51.4	58.0	51.6	51.4	56.0	54.4	51.4	49.5	-6.6
Soybean curd	27.8	32.2	36.2	40.5	42.8	41.6	46.5	47.1	41.5	49.4
Dried & sliced fish and shellfish products	28.9	30.1	31.7	30.9	36.5	41.0	44.4	37.8	37.1	28.7
Generally processed food	41.2	34.7	30.8	34.8	33.6	28.7	34.4	28.6	32.2	-21.8
Ice	32.9	28.2	27.0	27.5	25.7	27.0	29.3	27.3	25.6	-22.2
Gimchi · pickles	19.8	21.5	21.6	28.2	28.8	27.4	28.3	24.2	17.7	-10.7
Health functional food	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Note: Meat products are excluded.
Source: Korean Food & Drug Administration, Production record of food and food additive, each year.

The patterns of change of CR_{10} are also similar to the case of CR_4. However, the increase rates of CR_{10} of the market of dried & sliced fish and shellfish product and soybean curd are larger than the increase rate of CR_4. In particular, the CR_{10} of the soybean curd market increased by 50% from 1998 to 2006, while the increase rate of CR_4 was 30%.

IV. Implications and Suggestions

1. Implications

The analyses and discussions in the previous chapter show that Korean food processing industries are usually consisted of small-size enterprises. The proportion of food processors with sales below 0.1 billion won and the proportion of food processors with less than 5 employees are about 60%. However, some food processing markets show a high level of market concentration. For example, the values of CR_4 and/or CR_{10} of the ice cream, special dietary food, noodles and sugar markets are high, which means that these markets are highly concentrated.

In addition, the CR_4 and CR_{10} have been changed over time. The changes of market concentration cause impact on related industries as well as own industries. First of all, increasing market concentration boosts competition among leading enterprises and the withdrawal of small-size enterprises, which result in the structural change of industry. The leading food processors in the more concentrated market have stronger bargaining power against business partners in upstream or downstream industries, and thus they start claiming more profitable conditions of transaction. Enterprises in the food processing market with a larger value of CR_4 or CR_{10} also tend to establish vertical integration for more efficiency and larger business size, which is often reported in the meat processing industry.

2. Suggestions for Government

In 2008, the new government viewed food industry as one of main sources for the growth of Korean economy, and reorganized the Ministry of Agriculture and Forestry into the Ministry for Food, Agriculture, Forestry and Fisheries. This reorganized ministry is supposed to focus on developing the food industry, including the food processing industry. For more effective policy making of the Korean government, a few suggestions can be presented.

First of all, the Korean government needs to realize that each food processing industry has a different industry structure. As shown at Table 7,

some industries, such as the ice cream industry, have a highly concentrated market, while other industries, including the gimchi · pickle industry, experience a low level of market concentration. Therefore, the government should introduce different policies for each one of industries. For instance, previous support policies, such as policies to support small enterprises producing traditional food, should not be adopted for the whole food processing industry. The government may need to think about introducing policies for anti-monopoly or anti-oligopoly in highly concentrated markets.[12]

Next, the government should understand the relationship between the food processing industry and upstream and downstream industries. Since the food processing industry is located between the first and third industries, which include farming and food marketing respectively, the structural changes of the food processing industry or the processed food market cause impact on other industries. In particular, there is a high possibility of conflict between these industries: such as trouble between farmers and food processing companies. The government needs to start preparing profitable policies to solve these problems.

Finally, the Korean government should positively take into account the opinions of various groups before adopting new policies for the food processing industry or the processed food market. Management of the food processing industry and the processed food market is newly taken up by the Ministry for Food, Agriculture, Forestry and Fisheries, causing concerns among farmers on one hand and drawing support from food processing companies on the other. Specifically, farmers worry that the new ministry will consider them less important even though the minister promises to support the farming industry. In order to introduce and adopt successful policies, the government needs to reach the consensus of various groups.

V. Conclusion

This paper provides a picture of the food processing industry and the processed food market in Korea by analyzing the structural change of the processed food market based on the evaluation of market concentration. The results of measur-

[12] Basically, Fair Trade Commission is responsible for these policies.

ing CR_4 and CR_{10} show that the markets of ice cream, special dietary food, noodles, and sugar are highly concentrated, while the markets of gimchi · pickels and ice are not very concentrated. The level of market concentration of processed food markets has changed over time. Some processed food markets, including the market of dried and sliced fish, shellfish products, other food, and soybean curd, have kept going to become oligopoly or monopoly markets. These market structures and structural changes have impact on related industries as well as own industries.

The new government viewed the food industry as one of main sources for the growth of Korean economy and changed the name of the Ministry of Agriculture and Forestry to the Ministry for Food, Agriculture, Forestry and Fisheries. For more successful policies for the food processing industry and/or the processed food market in Korea, three suggestions may be presented: to realize that each food processing industry has a different industry structure, to understand the relationship between the food processing industry and upward and downward industries, and to take into account the opinions of various groups before adopting new policies.

Only a very small number of studies have discussed the Korean food processing industry or the processed food market, even though the importance of doing research on the topic has been emphasized. The findings and discussions presented in this paper may be a baseline for further research and policy development.

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