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# Critical Loss Analyses in Korean Liquor Mergers

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## Abstract

The SSNIP (Small but Significant Nontransitory Increase in Price) test is a well-known conceptual framework of market definition for competition policies in most countries. Critical loss analysis is a practical method that implements the principle of SSNIP test in a quantitative way to determine whether the relevant market for an antitrust case should be enlarged or not. The method and empirical results have been successfully adopted in defining markets relevant to Korean merger cases in soju and beer industries (Moohak-Daesun in 2002 and Hite-Jinro in 2005), providing useful references for the Korean Court and Fair Trade Commission. This paper introduces the actual applications of critical loss analyses in these cases and remarks on several issues brought in the course of applications.

**Keywords:** merger, market definition, SSNIP, critical loss, Korean liquor industry

## 1. Introduction

The SSNIP test is a well-known conceptual framework of market definition for the purpose of competition policies in most countries. Critical loss analysis is a practical method which implements the principle of SSNIP test in a quantitative way to determine whether the relevant market for an antitrust case should be enlarged or not. The method has been referred to in many antitrust court cases as well as US and UK competition authorities' guidelines of market definition. Critical loss analysis is now popular among experts on competition policies in Korea since it has been successfully adopted in economics analyses of recent two merger cases in soju and beer industries.<sup>1</sup>

<sup>1</sup> Soju is popular liquor in Korea which is a kind of spirit with alcoholic content of about 20–22%. There are two kinds of soju—distilled and diluted. Popular one in Korea is the diluted, which are made by diluting alcohol essence extracted from grains—ethanol made from rice, barley, corn, etc. The sales of diluted soju in 2004 were about 2.34 trillion won. Total liquor sales were 6.64 trillion won in 2004. Hence, diluted soju accounts for 35.2% of total liquor markets. On the other hand, beer whose sales were 3.45 trillion won in 2004 accounts for 52%.

The first case is a horizontal merger between two local soju producers in 2002; Moohak, a dominant producer in Kyungnam province, attempted a hostile takeover of Daesun, a dominant producer in adjacent Busan area, through gathering shares.<sup>2</sup> The two producers were dominant in each region and almost close to monopolistic position with market shares more than 80%. If the geographic market was defined as the whole country, they were just fringe firms with national market shares less than 10%, while Jinro was a dominant producer with national market share more than 50%. Hence, geographic market definition is critical in evaluating anticompetitive effects of the attempted merger. Defining the relevant markets as the two regions, Korea Fair Trade Commission (KFTC afterward) made an injunctive order of shares disposal in 2003. The defendant, Moohak, appealed to the second court against the KFTC decision. Jeon submitted an economic analysis which implemented critical loss analysis using a consumption survey data.<sup>3</sup> The result confirmed the KFTC's market definition. The case is regarded as a landmark in antitrust enforcement in Korea in that it was the first case where economic analyses were critically important in the court decision making. That is, two parties submitted their own economic analyses on the relevant geographic market. Seoul High Court, evaluating the confronting economic analyses, made a final decision upholding the KFTC's decision in 2004.

The second case is Hite-Jinro merger in 2005; Hite and Jinro were dominant companies in the Korean beer and soju market, respectively—each with market share more than 50%. The case attracted much public attention since the merger deal amounted to 3.41 trillion won, which was unprecedented at the time. Moreover, competing companies in both beer and soju markets strongly opposed to the merger, alleging its anticompetitive effects. Their arguments were twofold. First, the demand-side substitutability between beer and soju is so high that they constitute a single product market relevant to antitrust merger evaluation, called “pub alcoholic drink.” If that is the case, anticompetitive effects are out of question. Second, regardless of the definition of the relevant product market, concerns may still remain due to leverage or portfolio effects; i.e., it was alleged that the combined company could take advantage of dominance in one product market and exclude competitors in another market by using unfair methods such as exclusive tying or predatory bundling. Also, Hite-Jinro merger included a horizontal merger since Hite had a subsidiary local soju producer in Chonbuk. The anticompetitiveness of the horizontal merger depended upon the relevant geographic range of soju market. Jeon et al. submitted to KFTC economic analyses on the relevant market definitions and the possibility of anticompetitive effects.<sup>4</sup> We applied basically the same method of market definition as that of the previous Moohak-Daesun merger case. KFTC, concurring to most of our analyses as far as market definitions were concerned, concluded that beer and soju markets were separate product markets and that the geographic market relevant to the horizontal soju merger was basically country wide. Accordingly, KFTC approved the merger with some transitory corrective remedies attached.

<sup>2</sup> Administrative districts of South Korea are a capital city, six broad cities, and nine provinces. Busan and Kyungnam are a broad city and a province, respectively, and both southeastern.

<sup>3</sup> The main results of the analysis were introduced in [1]. Section 3 in this paper was based on it.

<sup>4</sup> The main results of the analysis were introduced in [2]. Section 4 in this paper was based on it.

The following section discusses the SSNIP test as a well-known principle of market definition for competition policies and explains critical loss analysis that implements the SSNIP test practically. In Sections 3 and 4, actual applications of critical loss analyses in the Moohak-Daesun and Hite-Jinro cases are introduced. The author was involved with the two cases as a principal economic expert and submitted the relevant economic reports to the court in the first case and KFTC in the second case. The court and KFTC agreed upon the author's arguments. The two sections in the paper are based on the author's analyses and the court and KFTC's judgments on the two cases. The last section concludes by remarking on several issues brought on in the course of the applications.

## 2. SSNIP test and critical loss analysis

Article 2.8 of the Korea Monopoly Regulation and Fair Trade Act (KMRFTA) defines the relevant market as "the range of transactions where there exist or may exist competitive relations in terms of objects, stages, or regions of trade," and KFTC merger guideline articulates it as "the set of products or the whole geographic area into which a representative consumer can switch his/her purchases in response to the small but significant and nontransitory increase in prices of the specific products or regions holding other prices constant."

The spirit is the same with SSNIP test on which antitrust enforcement agencies in the USA, EU, and many other countries base their market definition.<sup>5</sup> According to the US horizontal merger guideline in [4], a market is defined as "a product or a group of products and a geographic area in which it is produced or sold, such that a hypothetical profit maximizing firm, not subject to price regulation, that was the only present or future producer or seller of those products in that area likely would impose a small but significant and nontransitory increase in price, assuming the terms of sale of all other products are held constant." EU guideline in [5] specifies the question to be answered as "whether the parties' customers would switch to readily available substitutes or to suppliers located elsewhere in response to a hypothetical small (in the range 5–10%), permanent relative price increase in the products and areas being considered. If substitution would be enough to make the price increase unprofitable because of the resulting loss of sales, additional substitutes and areas are included in the relevant market. This would be done until the set of products and geographic areas is such that small, permanent increases in relative prices would be profitable."

There exists a subtle difference between market definition in Korea and that in USA. In the former, a market is defined in a consumer's perspective as the largest range where he/she can switch his/her purchases in response to SSNIP ("a representative consumer version"). In the latter, it is defined in a producer's perspective as the smallest range where he/she can make profits by SSNIP ("a hypothetical monopolist version"). The representative consumer version may imply a smaller market than the hypothetical monopolist version. The reason is as follows. The representative consumer version considers only substitution effect and includes products

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<sup>5</sup> For SSNIP test in the historical context, see [3].

or regions which are close substitutes in the relevant market. On the other hand, the hypothetical monopolist version considers price effect, i.e., both substitution and income effects. Even if all close substitutes are included, a hypothetical monopolist may not be able to increase price profitably because of the negative income effect in case of normal goods. Hence, the range of the relevant market should be enlarged further under the hypothetical monopolist version.<sup>6</sup> However, it seems that the hypothetical monopolist version is more appropriate from anti-monopoly perspective, since we are concerned about the price increase regardless of its sources. Another advantage of the monopolist version is its practicality; the definition implies the critical level of sales loss that can be compared with actual sales loss after a price increase, which is the idea of critical loss analysis.

While SSNIP test is a conceptual framework of market definition for competition policies, critical loss analysis is a practical method of implementing it in real cases. The analytical method, since it was first introduced by [6], has been tried in many US antitrust cases.<sup>7</sup> Among enforcement agencies, UK OFT and US DOJ and FTC mention explicitly the method as a useful tool in their market definition guidelines. In Korea, Jeon introduced critical loss analysis first in an economic analysis of the geographic market definition relevant to Moohak-Daesun merger (see [1]). Seoul High Court in 2004 (case number 2003nu2252) endorsed it as “an effective and appropriate method for defining the relevant geographic market as economic analysis which applies ‘SSNIP’ method systematically into practical cases.” Consequently, Jeon et al. applied the method again in market definitions relevant to Hite-Jinro merger, and KFTC in 2006 (decision number 2006-009) concurred with them.

Critical loss analysis
Actual sales loss after SSNIP <
Critical sales loss for SSNIP
⇒ Profitability of SSNIP by a hypothetical monopolist
No further market expansion

Table 1. Framework of critical loss analysis.

The idea of critical loss analysis is simple. Profitability of a price increase depends on the amount of consequent sales loss. “Critical loss for X-% price increase” is defined as the maximum percentage loss of sales volume that would not result in profit loss for X-% price increase. To put it another way, critical loss is the minimum percentage loss of sales volume

<sup>6</sup> I presume here normal goods with negative income effect. Discussions must be reversed in case of inferior goods.  
<sup>7</sup> There are many examples of its applications, such as FTC v. Tenet Health Care [186 F.2d 1045 (8th Cir, 1999)], USA v. Mercy Health Services [902 F.Supp.968 (N.D. Iowa 1995)], California v. Sutter Health System [130 F. Supp. 2d 1109 (N.D. Cal. 2001)], USA v. SunGuard Data Sys., Inc. [172 F. Supp. 2nd 172 n.21 (D.D.C. 2001)], and FTC v. Swedish Match [131 F.Supp. 2nd 151 (D.D.C. 2000)]. Especially in Swedish match, both enforcement agencies and defendants tried to define the relevant market based on their own critical loss analyses, and the court, reviewing them, suggested its own interpretations. See [7].



that would result in profits decrease. That is, if actual sales loss is larger (smaller) than critical loss, then the price increase will lead to profit decrease (increase).<sup>8</sup>

**Table 1** summarizes the method of market definition using critical loss analysis.<sup>9</sup>

If actual sales loss after a SSNIP is less than critical loss corresponding to the SSNIP, then a hypothetical monopolist can make more profits by such a SSNIP, which implies that the relevant market should be confined there with no need of further expansion. It is because there are no closely substitutable products or regions to which consumers can switch their current purchases in response to a SSNIP. On the other hand, if actual sales loss after a SSNIP is more than the critical loss, then a hypothetical monopolist cannot make more profits by such a SSNIP. This implies that the relevant market should be expanded to include next available substitutes. Market definition according to critical loss analysis starts from considering a set of products and regions for which anticompetitive concerns are raised. Compare actual sales loss with critical loss repetitively until there is no need for further expansion where actual loss is less than critical loss. That is, the relevant market is the smallest market for which a hypothetical monopolist can make more profits by a SSNIP.

Denoting critical loss by  $CL$ , we have a very simple relationship of such dependence as follows:  $CL = (X/(X + M))$ .<sup>10</sup> Critical loss corresponding to  $X$ -% price increase depends on  $X$ . The larger a price increase is, the greater sales loss a hypothetical monopolist can endure without incurring profits loss. Another important determinant price-cost margin,  $M = ((P - C)/P)$  where  $P$  is unit price and  $C$  is marginal or incremental cost. For a high rate of margins, each sale lost entails a relatively large loss of profit. Hence, a high rate of margins implies a small level of critical loss.<sup>11</sup>

### 3. Geographic market definition in Moohak-Daesun merger

#### 3.1. Brief introduction of Moohak-Daesun case

In January 2003 the KFTC made an order that Moohak dispose all stocks of Daesun it purchased in 2002,<sup>12</sup> since the acquisition would restrain competition seriously in local soju markets of Busan and Kyungnam regions and infringe Article 7.1 of KMRFT Act. Daesun, the acquired one, commanded monopolistic position in Busan area with 84.4% market share in 2001, while Jinro, the largest soju producer in the country, had only 7.2% share in the region. On the other

<sup>8</sup> Notice that I adopt a breakeven version of critical loss rather than a profit-maximization version. The former is more often used in practices because of its simplicity and independence of the shape of demand curve.

<sup>9</sup> If we reinterpret sales loss due to price change as price elasticity of demand, critical loss analysis becomes critical elasticity analysis.

<sup>10</sup> For the derivation, see [8].

<sup>11</sup> In interpreting the implication of a high rate of margins, we should be careful of the well-known cellophane fallacy. That is, if high current margins are due to monopoly power or collusion, a simple conversion of critical loss may mislead to an enlarged market definition. Then the starting price in calculating margins should be adjusted to a counterfactual competitive price.

<sup>12</sup> Moohak and its owner purchased Daesun's stocks by 41.21% from June 2002 to December 2002. See KFTC Decision 2003-027.

hand, the acquirer, Moohak, was in a monopolistic position in Kyungnam area with 84.3% market share in 2001, while other producers’ market shares were insignificant except Daesun’s 12.9% share in the region.

The KFTC defined the geographic market relevant to Moohak-Daesun merger as diluted soju in Busan and Kyungnam.<sup>13</sup> Given this market definition, the combined company achieves 91.5% share in Busan and 97.2% share in Kyungnam, and the merger meets the conditions for presumption of competitive concerns in Article 7.4.1 of KMRFT. Moreover, according to KFTC, there exist de facto entry restrictions, although not de jure ones, in the soju industry; it takes long time and enormous costs in building up brand recognition in soju market. In addition, soju producers are not allowed to engage in wholesaling. Hence, new entrants have difficulties in establishing distribution channels, since incumbent distributors already maintain long-term relationships with Moohak and Daesun in the areas.<sup>14</sup> Moohak appealed against the KFTC decision to Seoul High Court. But the second court reaffirmed it. The case is now regarded as a landmark in antitrust enforcement in Korea in that two parties submitted economic analyses which supported their own views on the relevant geographic market, and the court resorted to economic analyses in reaching the decision (see [1]).

In order to address Moohak-Daesun case properly, we should understand the consumers’ strong loyalty to their local products in Busan and Kyungnam. Daesun in Busan gained market share by more than 20% in 1997, while Jinro, which is a nationally dominant producer, lost market share by almost 20%. Daesun strengthened its market dominance afterward and maintained around 85% share in 2000s.

	1996	1997	1998	1999	2000	2001	2002	2003
Daesun	53.5	73.9	79.8	81.5	83.9	85.0	85.7	86.9
Moohak	2.8	5.1	7.2	7.9	7.9	7.1	6.5	6.6
Jinro	37.3	18.0	9.7	7.4	6.7	6.6	6.7	5.2

Source: Korean Liquor Manufacturers Association.

**Table 2.** Trend of market shares in Busan (sales, %).

The situation in the Kyungnam region was similar. Moohak gained market share by more than 10% since 1998, while Jinro lost share by the corresponding amount. Moohak have maintained a strong market position afterwards, even though Daesun shaded its market share a little bit recently.

<sup>13</sup> The product market is confined to “diluted” soju, but not distilled one. Diluted soju is produced by some process of diluting ethanol made from grains such as rice, barley, and corn.

<sup>14</sup> Other defenses of efficiency and failing firm were not relevant in this case.

	1996	1997	1998	1999	2000	2001	2002	2003
Moohak	68.2	68.9	81.1	84.0	85.3	83.5	82.1	81.8
Daesun	8.1	10.2	9.7	10.9	10.7	13.0	13.9	14.2
Jinro	21.7	20.3	9.1	5.1	4.0	3.4	4.0	4.0

Source: Korean Liquor Manufacturers Association.

**Table 3.** Trend of market shares in Kyungnam (sales, %).

To understand the persistent dominance of local products and the huge shifts of market shares in these as shown in **Tables 2** and **3**, we should consider the history of regulation in local soju markets and the political power shift among regions in Korea. A regulation of mandatory purchase of local products more than 50% onto wholesalers had been introduced in order to protect local soju producers since mid-1970s. The regulation was abolished in 1992 and revived in June 1996 and finally declared illegal in December 1996 by the constitutional court. Interestingly, local characteristic has strengthened after the final abolishment of mandatory purchase of local products. First of all, local producers, confronted with more competitive pressures since mid-1990s, made greater survival efforts. Especially Daesun initiated such efforts by lowering prices and introducing new products with less alcoholic contents.<sup>15</sup> Moreover, the regionalism in Busan and Kyungnam became stronger after the shift of political power from their regions to another.<sup>16</sup> It seems that people in these regions became more cohesive in their regional compassion, and such political atmosphere strengthened the consumers' loyalty to local soju products.<sup>17</sup>

Generally the small but significant price increase in SSNIP test is in the range of 5–10%. But when there are a large number of consumers who are loyal to a given product, we may have to consider higher price increases as well. To be more precise, consider the following numerical example. There are 100 consumers in a region who have unit demands for a product. The current price for the product is \$100, and the cost is \$70. All consumers are now using the product. There are two groups of consumers: 30 price-sensitive consumers who will switch to another substitutable product if the price increases by 5% and 70 loyal consumers who stick to the product unless the price increases by more than 20%. In this situation, a hypothetical monopolist of the product cannot make more profits by a price increase of 5% or 10%:

Current profits: \$3000 [= (100 – 70) × 100]

Profits after 5% price increase: \$2450 [= (105 – 70) × 70]

Profits after 10% price increase: \$2800 [= (110 – 70) × 70].

<sup>15</sup> For example, it introduced a new product of low-alcohol soju with alcohol content of 23% which was less than the contemporary standard 25% and lowered its price by 9.5% in 1996.

<sup>16</sup> The power base of President Park Jung Hee (1961–1978), Chun Doo Hwan (1981–87), Roh Tai Woo (1988–1992), and Kim Young Sam (1993–1997) was all Youngnam regions (Busan, Kyungnam, and Kyungbuk). On the other hand, Kim Dae Jung (1998–2002) based his power on Honam regions (Chonnam and Chonbuk).

<sup>17</sup> Choi et al. in [9] try to explain the persistence of market dominance in the Korean soju industry with local identity rooted in the past regulation and its strengthenment due to the change in political power configuration.



Nonetheless, the monopolist can earn more profits by a price increase of 15 or 20%:

Profits after 15% price increase: \$3150 [= (115 – 70) × 70]

Profits after 20% price increase: \$3500 [= (120 – 70) × 70].

Of course, the monopolist will increase the price by 20%. In that case, the market should be confined to the product and not be extended further. However, if we considered only 5–10% range of price increases in the SSNIP test, we might end up with extending the market by including next available substitute products or regions. Given the possibility that the hypothetical monopolist can exploit market power by a large price increase such as 20%, the danger of expanding the relevant market is serious.

### 3.2. Critical loss analysis

To determine whether Busan and Kyungnam are the geographic market of diluted soju relevant to Moohak-Daesun merger, we have to estimate and compare the critical and actual loss of regional sales corresponding to various levels of SSNIP.

#### 3.2.1. Estimation of margins and critical loss

Proper margins, in an economic sense, are the difference between price and marginal cost. But average variable cost is used for marginal cost in practice because of measurement difficulties:

$$M = \frac{\text{price} - \text{marginal cost}}{\text{price}} \cong \frac{\text{price} - \text{average variable cost}}{\text{price}}$$

Using accounting data, the above rate of margins is measured approximately by

$$M \cong \frac{\text{sales} - \text{variable costs such as material and labor costs}}{\text{sales}}$$

Among various concepts of profit/loss in an income statement, operating profits are the most relevant in calculating margins. The operating profits of Moohak and Daesun in 2002 are as follows<sup>18</sup>:

The rate of operating profits, 27.1%, is considerably high in comparison with the food and drink industry average of 7.3% as well as the whole manufacturing industry average of 6.7%.

To convert operating profits into margins, we should deduct fixed parts from sales costs and marketing and administration costs in **Table 4**. The fixed components in sales cost are “rent” and “depreciation,” and those in marketing and administration cost are “rent,” “depreciation,” “intangible assets deduction,” “taxes and charges,” “insurance,” and “membership fees.”

<sup>18</sup> We used data in 2002, the year of stock acquisition. But the results do not change materially even if we use data in 2001 or 2003.

Deducting these fixed costs from total costs, we can estimate the margins of Moohak and Daesun in 2002 (**Table 5**).

	Moohak	Daesun	Moohak + Daesun
Sales (A)	78,432	75,283	153,715
Sales cost (B)	42,868	38,809	81,677
Marketing and administration cost (C)	17,548	12,864	30,412
Operating profits (A – B – C)	18,016	23,610	41,625
Operating profits ratio ((A – B – C)/A)	23.0%	31.4%	27.1%

Source: Companies' annual report.

**Table 4.** Income statements of Moohak and Daesun in 2002 (mil. won, %).

	Moohak	Daesun	Moohak + Daesun
Sales (A)	78,432	75,283	153,715
Variable sales costs (B')	39,996	36,616	76,612
Variable marketing and administration cost (C')	16,173	11,870	28,043
Margins ratio ((A – B' – C')/A)	28.4%	35.6%	31.9%

Source: Companies' annual report.

**Table 5.** Margins of Moohak and Daesun in 2002 (mil. won, %).

The other party on Moohak's side commented that the estimated ratio of margins, 31.9%, was misleadingly too low. They contended that fixed components should be defined as those which do not depend on operation level in one year and accordingly regarded "wages and salaries," expenses for "training," "advertising," and "maintenance" should be regarded as fixed costs as well as "rent," "depreciation," "intangible asset deduction," "taxes and charges," "insurance," and "membership fees."<sup>19</sup> But Seoul High Court decision in 2004 made it clear that those costs such as labor, advertising, and maintenance are not easily regarded as fixed during the significant period over which monopoly power can be exercised (the relevant time horizon should not be confined to the period of one year).

Given  $M = 31.9\%$ , critical losses corresponding to various levels of SSNIP,  $X = 5\%$ ,  $10\%$ ,  $15\%$ , and  $30\%$ , are calculated by the formula of  $CL = (X/(X + M))$  (**Table 6**).

<sup>19</sup> Including all those components as fixed, they estimated the margins as high as 47.1%. Even with such a high estimate, the actual losses are less than the critical losses for 15% and 30% increases in price, and the relevant market should be confined to local regions, for consumption in dining/drinking houses. On the other hand, the actual losses are greater than the critical losses for 5–30% increases in price, and the relevant geographic market may be enlarged, for consumption in retailing shops. Hence, the results with large fixed costs and high margins may be mixed. As a comparison, the results with our estimated margins of 31.9% imply consistently a narrow local market for all price increases above 10% as shown in **Tables 7** and **8**.

	$X = 5\%$	$X = 10\%$	$X = 15\%$	$X = 30\%$
Critical loss	13.6%	23.9%	32.0%	48.5%

**Table 6.** Critical losses for the estimated margins of 31.9%.

We will consider high levels of SSNIP such as 15% and 30% as well as conventional 5% and 10%. Such consideration is warranted by heterogeneous composition of consumers with loyal majority and price-sensitive minority in Busan and Kyungnam. As shown by the previous numerical example, dominant local companies may disregard price-sensitive consumers and employ a high price strategy for loyal consumers in the circumstance. The possibility of high price strategy has significant implications on geographic market definition discussed in the following.

*3.2.2. Estimation of actual sales loss and geographic market definition*

We used a survey data of consumers' choice of soju products in Busan and Kyungnam, estimated consumers' purchase substitution in response of price changes, and consequent actual sales loss. The sample size is 1042, and the sampling error is 3.03.<sup>20</sup> The number of consumers whose favorite soju was either Daesun or Moohak was 945. They were questioned whether they would switch consumption into Jinro if the price of "Dasesun's C1" or "Moohak's White" relative to the price of "Jinro's Chamiseul" increased in each of two places—"dining/drinking houses" (e.g., restaurants or pubs) and "retailing shops" (e.g., convenience stores or supermarkets). The amounts of soju consumption in two places are said to be comparable in terms of quantities. But soju prices in the former are almost three times higher than those in the latter. Also it may be the case that consumption behavior might be different in two places since people usually drink together with others in the former while buying for in-house consumption in the latter. However, it turned out that the results based on the data of the former were very similar to those on the data of the latter.

This analysis starts from an integrated region of Busan and Kyungnam, and consider whether the relevant geographic market should be enlarged further or not. If a hypothetical monopolist in Busan and Kyungnam could increase profits by an SSNIP, then the geographic expansion of the relevant market is not necessary. If that is the case, it is not necessary to consider whether the market should be separated into each of Busan and Kyungnam since anticompetitive concerns on Moohak-Daesun merger are serious enough as long as the relevant market is local, regardless of whether the relevant market is Busan and Kyungnam separate or combined.

**Table 7** and **8** summarizes the results of our critical loss analyses.

<sup>20</sup> Gallup Korea conducted a survey in 2004 in Busan and parts of Kyungnam province—Yongsan, Kimhae, and Masan; Busan is Daesun's base, Yongsan adjacent to Busan is where Daesun has strength, Kimhae is a competing field of Daesun and Moohak, and Masan is Moohak's base.

	Actual loss vs. critical loss	Enlarge the geographic market beyond Busan and Kyungnam?
5% increase	14.6 > 13.6%	Yes
10% increase	19.9 < 23.9%	No
15% increase	23.2 < 32.0%	No
30% increase	34.5 < 48.5%	No

**Table 7.** Critical loss analyses with data of dining/drinking houses.

	Actual loss vs. critical loss	Enlarge the geographic market beyond Busan and Kyungnam?
5% increase	15.8 > 13.6%	Yes
10% increase	21.0 < 23.9%	No
15% increase	25.5 < 32.0%	No
30% increase	43.4 < 48.5%	No

**Table 8.** Critical loss analyses with data of retailing shops.

We obtain similar estimates of actual losses and the same results of critical loss analyses, with data of retailing shops.

The above results show that a hypothetical monopolist in Busan and Kyungnam region could not increase profits by a low SSNIP of 5%, but could do so by higher SSNIPs such as 10%, 15%, and even 30%. This is because there are two groups of consumers in the region—a large group of price-insensitive consumers who are loyal to local products and a small group of price-sensitive ones; a monopolist can opt for a high price strategy to exploit loyal consumers, taking the risk of losing price-sensitive customers. To conclude our critical loss analyses, our results indicate that the geographic market of diluted soju product relevant to Moohak-Daesun merger is confined to the local area within Busan and Kyungnam province and not extended to the country as a whole.

How sensitive are the above results to the breakdown of loyal and price-sensitive consumers? To address this question, it is helpful to interpret the critical analyses above in a reverse way. From **Tables 7** and **8**, we know that the critical percentage of “strongly” loyal consumers who would stick to local soju unless the price increase is higher than 30% is 51.5%. On the other hand, the actual percentage of such loyal consumers is 65.5% with the data of dining/drinking houses and 56.6% with the data of retailing shops. If we regard the consumers who would stick to local soju unless the price increase is higher than 10% as “broadly defined” loyal consumers, then the critical percentage of such loyal consumers is 76.1%, while the actual percentage of loyal consumers is 80.1% with the data of dining/drinking houses and 79.0% with the data of retailing shops. Hence, regardless of the criterion of loyalty, and the place of consumption, the hypothetical monopolist has the sufficient percentage of consumers to exploit their loyalty with price increases higher than 10%.

We can confirm the locality of the relevant geographic market with the complimentary analysis of LIFO-LOFI indexes.<sup>21</sup> LIFO defined by regional production's share in regional total consumption for a give product is 94.6%, while LOFI defined by regional consumption's share in regional production for a give product is 99.3%. A high ratio of LIFO means "Little In From the Outside," while a high ratio of LOFI means "Little Out From the Inside." It is a rule of thumb that LIFO and LOFI about as high as 75–90% are regarded as implying the establishment of regional market.

### 3.3. Implications for anticompetitive effects of Moohak-Daesun merger

The market definition in antitrust cases is a starting point of analyzing anticompetitive effects of mergers and consequent dominant position. The Korean competition law presumes "a combination of enterprises" as "practically suppressing competition in any particular business area" if all of the following conditions in Article 7.4 are met:

- a. The combined company is in a dominant position in the relevant market; i.e., its market share is 50% or more, or CR-3 is 75% or more except that its market share is less than 10%.
- b. The combined market share is the largest in the relevant market.
- c. The difference between the combined market share and the next largest market share is 25% or more.

Denoting the largest, the second largest, and the third market share by  $s_1$ ,  $s_2$ , and  $s_3$ , respectively, we can recapitulate the above presumptive conditions as follows: the combined market share should be  $s_1$  and should satisfy either (i) or (ii):

$$s_1 \geq 50\%, \text{ and } s_1 \geq (4/3)s_2$$

$$10\% \leq s_1 \leq 50\%, s_1 + s_2 + s_3 \geq 75\%, \text{ and } s_1 \geq (4/3)s_2$$

The impact of the Moohak-Daesun merger on market concentration hinges critically on the range of relevant geographic market (Table 9).

	Busan (BS)	Kyungnam (KN)	BS + KN	Korea
Daesun (DS)	85.7%	13.9%	50.6%	7.8%
Moohak (MH)	6.5%	82.1%	44.0%	7.5%
DS + MH	92.2%	96.0%	94.6%	15.3%
Jinro	6.7%	4.0%	5.0%	53.7%

Source: Korean Liquor Manufacturers Association.

**Table 9.** Market shares of Moohak-Daesun in 2002.

<sup>21</sup> The indexes of LIOF and LOFI were first formalized by [10]. Recently, they often have been used for geographic market definition in US hospital mergers: e.g., USA v. Rockford Memorial Hospital [717 F. Supp. 1251 (N.D. Ill. 1989)], FTC v. Freeman Hospital [911 F. Supp. 1213 (W.D. MO. 1995)], FTC v. Butterworth Health Corp. [946 F. Supp. 1285 (W.D. Mich. 1996)], and USA v. Long Island Jewish Medical Center [983 F. Supp. 121 (E.D.N.Y. 1997)].



If the relevant market is confined to Busan, Kyungnam, or the integrated region of BS + KN, it is obvious that the merger meets the conditions of presumption on suppression of competition according to KMRFTA. In fact, the market gets close to monopoly. On the other hand, if the market is national, then the merger does not belong to even the range of concerns about possible restraint on competition according to KFTC's guideline.

## 4. Market definitions in Hite-Jinro merger

### 4.1. Brief description of related events

Hite bought 52.1% shares of Jinro's stocks in August 2005. The size of Hite was 1852 bil. won and 861 bil. won in terms of assets and sales, respectively, in 2004. Its main product was beer, and the national share in beer market was 60.2% in 2004. On the other hand, the size of Jinro was 923 bil. won and 693 bil. won in terms of assets and sales, respectively, in 2004. Its main product was soju, and the national share in soju market was 55.8% in 2004. Hite has a subsidiary soju company, Hitejujo, which had a national market share of 1.5%. Even though Hitejujo is not a significant producer in the national soju market, it has the largest market share of 50.6% in Chonbuk province where Jinro is the second largest with 42.5% in 2004.<sup>22</sup>

Competitive concerns about Hite-Jinro merger and problems of the relevant market definition were twofold: one for a merger between Hite beer and Jinro soju and another for a merger between Hitejujo soju and Jinro soju. For the first one, the parties opposing the merger, especially OB beer which almost halves Korean beer market with Hite, alleged that beer and soju are substitutes so close that they constitute a single product market relevant to the merger, the so-called pub alcoholic drink. If that is the case, the merger would be very difficult to go through since it would be a horizontal merger with a significant increase in concentration (Table 10).

	Sales (mil. won)	Share
Hite*	837,598	34.0%
Jinro	613,254	24.9%
OB**	543,313	22.1%
Others***	468,245	19.0%
Total	2,462,410	100.0%

\*Hite beer + Hitejujo soju.

\*\*OB beer + Cass beer (both brands belong to the same company).

\*\*\*All others are local soju producers such as Moohak, Daesun, and Keumbokju.

Source in [11]. Sales are in terms of net sales amount before taxes.

**Table 10.** "Pub alcoholic drink" market in 2004.

<sup>22</sup> Hite and Jinro sell spring water, but the market is very competitive in that they are just two among many producers with market shares of 6.2% and 10.5%, respectively. No competitive concerns were raised in that regard.

On the other hand, if beer and soju are regarded as separate products, the merger is basically conglomerate. In that case, there still may remain some anticompetitive concerns since both beer and soju companies share the same channels of wholesale distribution. But the anticompetitive allegations will be sagging.

The second horizontal part of the merger was not a big issue since Hitejujo was a relatively small company. But an interesting issue here was whether the relevant geographic market was confined to the local province of Chonbuk or extended nationwide. Recall that the geographic soju market relevant to Moohak-Daesun merger was confined to the local areas of Busan and Kyungnam. If the geographic market was defined locally in this case too, e.g., as Chonbuk, then the horizontal merger would create a virtual monopoly in the region; the combination of Hitejujo and Jinro would have a market share of 92.8% in Chonbuk. On the other hand, if the relevant market is national, market concentration does not change consequentially.

In this case, Jeon et al. submitted to KFTC economic analyses on behalf of Hite (see [2]). They defined the relevant product market for the first conglomerate case as two separate markets of beer and soju and the relevant geographic market for the second horizontal one as the national market in soju excluding some southern regions. On the other hand, Ryu and Yi in [10] in behalf of OB Beer Company contended that the relevant product market was a single market of beer and soju, the so-called pub alcoholic drinks. Interestingly, both parties applied the same method of market definition—critical loss analysis. However, their estimates of actual and critical losses were different, which led to conflicting conclusions on the relevant product market definition.

Reviewing both parties' economic analyses, Korea Fair Trade Commission adopted the market definitions by Jeon et al. KFTC final decision in 2006 was to allow the merger with some behavioral remedies attached. The remedies included a price cap of  $RPI + 5\%$  on Hite and Jinro's beer and soju, the division of marketing workforce and organization of Hite and Jinro for five years, and the provision of some arrangements by Hite itself that would ensure it not to commit exclusionary practices in the future.

## 4.2. Critical loss analysis for product market definition

In the following, I summarize the part of Jeon et al.'s analyses on the definition of product market relevant to Hite-Jinro merger.

### 4.2.1. Estimation of margins and critical loss

We can apply the same method of calculating margins of soju and beer industries as was introduced in the previous section. The rate of margins in soju industry was calculated with income and cost statements of Jinro in 2003 and 2004 (**Table 11**).

	Jinro (03)	Jinro (04)	Jinro (03 + 04)
Sales (A)	615,973	693,053	1,309,026
Variable sales costs (B')	317,187	338,827	656,014
Variable market and administration costs (C')	134,736	126,373	261,109
Margin ratio $((A - B' - C')/A)$	26.6%	32.9%	29.9%

Source: Jinro's annual report.

**Table 11.** Margins of Jinro in 2003 and 2004 (mil. won, %).

Given Jinro's dominant position in soju industry, we may regard the estimated rate of margins, 29.9%, as the representative one for soju industry. Incidentally, it is not much different from 27.1% that we obtained previously for Moohak-Daesun case.

Since beer industry is a duopoly, we use the data of Hite and OB in calculating margins (**Table 12**).

	Hite (03 + 04)	OB (03 + 04)	Hite + OB (03 + 04)
Sales (A)	1,683,146	1,209,923	2,893,069
Variable sales costs (B')	721,850	471,604	1,193,455
Variable marketing and administration costs (C')	478,914	417,495	896,409
Margin ratio $((A - B' - C')/A)$	28.7%	26.5%	27.8%

Source: Companies' annual report.

**Table 12.** Margins of Hite and Jinro in 2003 and 2004 (mil. won, %).

The estimated rate of margins for beer industry, 27.8%, is slightly lower than that for soju industry, 29.9%.

On the other hand, Ryu and Yi in [10] estimated the rates of margins for soju and beer industries as 52.6% and 53.2%, respectively. The difference comes from their classification of fixed costs and, more fundamentally, their perspective of "nontransitory" period in SSNIP. They contended that fixed components should be defined as those which are fixed regardless of operation level within the period of one year, and accordingly regarded "wages and salaries," expenses for "training," "advertising," and "maintenance" should be regarded as fixed costs as well as "rents," "depreciation," "intangible assets deduction," "taxes and charges," "insurance," and "membership fees." As noted before, Seoul High Court in regard to Moohak-Daesun case decided that those costs such as labor, advertising, and maintenance are not easily regarded as fixed during the significant period over which monopoly power can be exercised. Concurring to this decision, KFTC rebutted the high estimates of margins by Ryu and Yi; "they made an error of overestimating margins by regarding the time horizon dividing variable and

fixed costs as one year rather than a significant period for exercising monopoly power, and consequently overestimating variable costs.”

Given rate of margins ( $M$ ) and price increase ( $X$ ), critical loss ( $CL$ ) is derived from  $CL = (X / (X + M))$ . For soju industry with  $M = 29.9\%$ , critical losses corresponding to  $X = 5\%$  and  $10\%$  are (Table 13):

	$X = 5\%$	$X = 10\%$
Critical loss	14.3%	25.0%

Table 13. Critical losses for soju industry.

For beer industry with  $M = 27.8\%$ , they are (Table 14):

	$X = 5\%$	$X = 10\%$
Critical loss	15.3%	26.5%

Table 14. Critical losses for beer industry.

Notice that we considered only 5% and 10% levels of SSNIP in this case. This is because we expect that consumer loyalty is usually associated to specific brands within a product, but not to a product as a whole. That is, consumers may be loyal to some specific brand in comparison with all other brands in a product, but not loyal to a specific product in comparison with all other products. Hence we do not expect that there are a small group of price-sensitive consumers and a large group of loyal consumers for soju product or beer product as a whole. Moreover, we have to consider high level of SSNIP only if a hypothetical monopolist cannot make profits with 5–10% price increases. But the hypothetical monopolist can make profits with the normal 5–10% SSNIP in the present context, and we do not have to consider a higher level of price increase.

4.2.2. Estimation of actual sales loss and geographic market definition

Jeon et al. used Gallup Korea’s survey data in estimating actual sales losses that result from increases in prices of soju and beer. Ryu and Yi instead used weekly date of sales in discount stores with bar codes. As KFTC decision noted, the data have a serious sample selection bias in that discount stores account for only 5% of total sales of soju and beer, and consumers who purchase soju and beer in discount outlets do not represent the whole population. Especially, the characteristics of consumers using discount outlets such as Carrefour may be different from those of usual consumers who buy soju and beer in drinking/dining places and other retail shops. On the other hand, a survey data can avoid such selection bias by constructing a sample which reflects the population of soju and beer consumers in terms of sex, age, education, job, income, region, etc. Gallup Korea conducted the survey with a sample of 1603 soju consumers and 1547 beer consumers in such a way that avoided selection bias.

**Table 15** and **16** summarizes the results of our critical loss analyses:

	Actual loss vs. critical loss	Enlarge the product market beyond soju?
5% price increase	$5.6 < 14.3\%$	No
10% price increase	$10.6 < 25.0\%$	No

**Table 15.** Critical loss analysis for soju product.

	Actual loss vs. critical loss	Enlarge the product market beyond beer?
5% price increase	$13.2 < 15.3\%$	No
10% price increase	$22.1 < 26.5\%$	No

**Table 16.** Critical loss analysis for beer product.

These results show that product markets relevant to Hite-Jinro merger are two separate ones of soju and beer, not an integrated one of “pub alcoholic drink.” A hypothetical monopolist of soju (beer) product can implement 5% and 10% price increases profitably. This means that soju and beer are not so close substitutes that both constitute a single product market in antitrust perspective.

Reinterpreting the actual losses in **Tables 15** and **16** in terms of elasticities, the price elasticity of soju is about 1.1 and that of beer is about 2.2–2.6. Previous empirical studies using actual data of soju and beer consumption shows the robustness of the results based on survey data.<sup>23</sup> Chung in [12] found that the own price elasticity of soju is in the range of 0.58–1.18 and that of beer is in the range of 0.94–1.31. And another Chung in [13] estimated the price elasticities of soju and beer as about 0.75–0.85 and 1.3–1.6, respectively. Given these estimates, our survey results seem to overstate consumers’ response to price increases a little bit. However, the differences may not be so huge as to discredit the survey results after all. Furthermore, the critical loss analyses with the empirically estimated elasticities would support the conclusion even more strongly that soju and beer markets should be defined separately.

#### 4.3. Critical loss analysis for geographic market definition

Given that soju and beer are separate products from a perspective of competition policy, Hite-Jinro merger is basically conglomerate. However, the merger contains a horizontal part since Hite has a subsidiary soju company, Hitejujo, in Chonbuk. Competitive evaluation of the horizontal part hinges on definition of the relevant geographic market. In the following I summarize the part of Jeon et al. on the definition of geographic soju market relevant to the horizontal merger between Hitejujo and Jinro. The starting point of analysis is Chonbuk area

<sup>23</sup> Unfortunately, we cannot cross-check the robustness of the results in **Tables 7** and **8** and **Tables 19** and **20** with empirical estimation of demands for disaggregated soju brands, not a whole soju product. That is mainly because it is not easy to obtain disaggregated data, and prices of all soju brands vary similarly without meaningful cross-sectional variances.



for which competitive concerns about the merger might be raised, and then it will be checked whether the relevant market should be enlarged further.

#### 4.3.1. Estimation of margins and critical loss

We estimated the margins in the same way as before, in this case with Hitejujo and Jinro which account for more than 90% of sales in Chonbuk—42.5 and 50.6% in 2004, respectively (Table 17).

	Hitejujo (03 + 04)	Jinro (03 + 04)	Hitejujo + Jinro (03 + 04)
Sales (A)	37,054	1,309,026	1,346,080
Variable sales costs (B')	17,894	656,014	673,909
Var. Mkt and Adm costs (C')	12,411	261,109	275,780
Margin ratio $((A - B' - C')/A)$	18.2%	29.9%	29.4%

Source: Companies' annual report.

**Table 17.** Margins of Hitejujo and Jinro in 2003 and 2004 (mil. won, %).

The margins of Hitejujo were lower than those of other soju producers, which was due to large expenses of marketing and administration. But the margins of the combined company were close to the average of soju industry since Hitejujo was very small in comparison with Jinro.

Critical losses,  $CL = (X/(X + M))$ , for  $M = 29.4\%$  and  $X = 5\%, 10\%, 20\%, 30\%$ , and  $40\%$  are as follows (Table 18):

	$X = 5\%$	$X = 10\%$	$X = 20\%$	$X = 30\%$
Critical loss	14.5%	25.5%	40.5%	50.5%

**Table 18.** Critical losses for the combined company of Hitejujo and Jinro.

We consider here high levels of SSNIP such as 20 and 30% in order to see whether there are a considerable number of consumers who show strong loyalty to local products as in the Moohak-Jinro case.

#### 4.3.2. Estimation of actual sales loss and geographic market definition

Gallup Korea conducted a survey in 2005 with consumers in Chonbuk area for the analysis of their choice of soju products. The sample was selected to represent the average behavior of soju consumption in terms of sex, age, and regions, and the final 810 consumers were screened who responded that they usually consumed "Hite 2" (Hitejujo's brand name) or "Chamisle" (Jinro's brand name).<sup>24</sup>

The results of critical loss analyses are (Tables 19 and 20):

	Actual loss vs. critical loss	Enlarge the geographic market beyond Chonbuk?
5% increase	21.8 > 14.5%	Yes
10% increase	36.1 > 25.4%	Yes
20% increase	57.4 > 40.5%	Yes
30% increase	57.9 > 50.5%	Yes

**Table 19.** Critical loss analyses with data of dining/drinking houses.

	Actual loss vs. critical loss	Enlarge the geographic market beyond Chonbuk?
5% increase	20.7 > 14.5%	Yes
10% increase	37.0 > 25.4%	Yes
20% increase	52.2 > 40.5%	Yes
30% increase	54.9 > 50.5%	Yes

**Table 20.** Critical loss analyses with data of retailing shops.

These results show that Chonbuk consumers would switch their purchase of soju from their current main favorite brands to others to the extent that the relevant geographic market should not be confined to the Chonbuk region.

It still remains the issue of how far the geographic market should be enlarged, i.e., whether it is the country as a whole or some regions are excluded. To make a definite conclusion on this issue, we have to conduct further critical loss analyses. Instead, we made a tentative suggestion that the geographic market might be nationwide, excluding some southern regions such as Busan, Kyungnam, Kyungbuk, Chonnam, and Jeju. The main reason is that each of those regions has a dominant local producer and consumers with strong loyalty to a local product. Moreover, their current soju sales in Chonbuk are negligible. The KFTC also defined the geographic market relevant to the merger between Hitejujo and Jinro as “the country except Busan, Kyungnam, Kyungbuk, Chonnam, and Jeju.”

It is to be noted that the market definition in an antitrust case is case-specific. In other words, it depends on a starting point of analysis, which is a product or a region for which competitive concerns are raised. The previous market definition in Moohak-Daesun was confined to Busan and Kyungnam since consumers in the region did not switch much their purchase from local products to products in other regions, e.g., Hitejujo and Jinro, in response to local price increases. On the other hand, there would be nothing wrong if the geographic market relevant to Hitejujo-Jinro had been extended to the whole country even including Busan and Kyungnam, even though it did not actually go that far. This does not involve any inconsistency, since consumers in two regions could have different preferences.

<sup>24</sup> Sampling error is 3.44% from 95% confidence interval.

Besides conducting critical loss analyses, we observe two facts that differentiate Hitejujo-Jinro from Moohak-Daesun. First, LIFO index in Chonbuk was only 42.5%, while that in Busan-Kyungnam was 94.7%. Compared to the conventional standard of 75–90% of LIFO-LOFI test, 40% must be too low. Second, there is a common pricing constraint in soju industry in that producers should apply the same wholesale price in the country. This suggests another basis of the national market in this case. One of the merging companies, Jinro, is a national producer which cannot raise soju price in Chonbuk without risking sales losses in other regions. On the other hand, both Moohak and Daesun are local producers which had virtually no other regions to consider in setting prices.

It is worthwhile to elaborate a bit more on why opposite conclusions were arrived at with respect to expanding the geographic market in the two cases of Moohak-Daesun and Hitejujo-Jinro. Notice that we tried to apply the same methods of critical loss analysis: e.g., the same classification of variable vs. fixed costs in deriving margins and the same construction of questionnaire in conducting surveys. Hence, the opposite results in two cases were tied to the idiosyncratic nature of the two geographic regions rather than the application of the test. People in Busan-Kyungnam have strong loyalty to their local brands, which have been rooted in the past history of local purchase requirement regulation and the political atmosphere aforementioned. On the other hand, people in Chonbuk are not so loyal to their local soju firms which are not indigenous anymore. Hitejujo and Jinro are hardly regarded as Chonbuk-based since Hite, a national beer company, acquired the former indigenous Chungbuk soju and Jinro is a national soju company. Furthermore, political regionalism in Chonbuk has not been as keen as Busan and Kyungnam since Chonbuk has never been a power center in recent Korean political history.

#### 4.4. Implications for anticompetitive effects of Hite-Jinro merger

Since beer and soju are separate products, Hite-Jinro merger is a conglomerate one. KFTC considered four possible anticompetitive effects of the conglomerate merger in this case: (i) excluding competitors, (ii) strengthening entry barriers, (iii) limiting potential competitors, and (iv) raising prices. To alleviate concerns, the merger was given conditional approval. The imposed conditions of corrective measures included a price cap of  $RPI + 5\%$  on Hite and Jinro's beer and soju, division of marketing workforce and organization of Hite and Jinro for five years, and some self-arrangement of not committing exclusionary practices in the future.

The first two concerns stem from the fact that beer and soju producers share the same distribution channels of liquor wholesale: Hite and Jinro accounted for 34.5% and 22.1% of liquor wholesalers' sales in 2004. It was alleged that the combination of two dominant companies in beer and soju could enhance its bargaining power against wholesalers and press them to influence final demands in favor of its brands. Moreover, strongholds of the two companies were different; Hite was dominant in southern provinces while Jinro was in Seoul and its adjacent regions. So the leverage effect of expanding monopoly powers across regions through tying or bundling was worried about by competitors of Hite and Jinro in beer and soju markets.

<sup>25</sup> On the other hand, the defending party argued that pushing wholesalers or leveraging cannot be effective in the long run and that the ultimate determinant of final demands is consumer

preference.<sup>26</sup> Jeon et al. conducted an econometric study which rejected the existence of leverage effects in previous mergers in beer and soju market (see [2]). The third concern of eliminating potential competitors is an often-claimed anticompetitive effect of conglomerate mergers. Lastly, the concern about raising prices is peculiar for conglomerate mergers. KFTC considered beer and soju as exerting some competitive constraints, even though it defined the two as different products. This sounds contradictory since market definition is nothing but a consideration of competitive constraints. A more practical basis for this concern was that the acquirer expended too much—over \$3 billion dollars for the deal—and that it could not but increase product prices in order to resolve financial difficulties. Given the sunken nature of financial costs for the merger deal, the last concern does not seem to be warranted.

On the other hand, the KFTC did not consider the horizontal merger between Hitejujo and Jinro as restraining competition materially in the soju product market. Given the geographic market definition of the country as a whole except for five regions (Busan, Kyungnam, Kyungbuk, Chonnam, and Jeju), the market share of Hitejujo was merely 2.5%. The KFTC's merger guideline stipulates that anticompetitive concerns are insignificant if the gain of market share after the merger is less than 5% in the relevant market.

## 5. Conclusion

### 5.1. Recommendation

Several issues have been raised in the course of applying critical loss analysis in merger cases of Moohak-Daesun and Hite-Jinro. First of all, estimation of margins using accounting data involves some degree of discretionary or ad hoc classification of fixed and variable costs. The parties who defend an enlarged market definition argue for more fixed costs, and vice versa; it is because the larger the portion of fixed costs, the higher the rate of margins, and hence the lower the level of critical loss. The most controversial and significant components are labor costs and advertising expenses. The arguments of those who regard them as fixed are as follows: the time horizon in the SSNIP test is one year, and hiring regular workers and expensing advertising budgets do not vary in accordance of output changes within one year. But Seoul High Court and the KFTC interpreted the time horizon appropriate for SSNIP test as a significant period over which monopoly power can be exercised, which is not be confined to only one year. Given that, labor and advertising costs are not necessarily fixed.

Second, we used survey data in estimating price elasticities of consumer demand and actual losses corresponding to various levels of price increase in the SSNIP test. Economists usually prefer using actual historical data in estimating demands rather than resorting to survey data. However, in many cases we have data problems; data with the necessary degree of desegregation, time span, and representativeness are not available. Recent spread of bar code scanning

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<sup>25</sup> See [14] for discussions of portfolio effects.

<sup>26</sup> Recent development in soju market seems to confirm this argument. Doosan recently emerged as a strong rival to Jinro with more than 10% market share in Seoul and its vicinities.

system in retailing shops, and consequent availability of POS (Point of Sale) data, is a promising development that may resolve data problems in the future.<sup>27</sup> But there are still many cases, such as Moohak-Daesun and Hite-Jinro, where POS data have a serious problem of sample selection bias in that they constitute a small portion of population data, and sample characteristics do not reflect those of the entire population. In such cases, a well executed survey can be a useful alternative source of data. Survey data are often discredited because questions tend to predetermine answers and that respondents tend to overstate (or understate) their responses. But questions in our survey are so straightforward that they do not risk predetermining answers; the questions simply ask how consumers will change purchases in cases of price increases. There still remains a problem of overstatement (or understatement) tendency. We have to take it into an appropriate account in drawing conclusions. Our results had considerable margins so that the conclusions were robust even after accounting such a tendency.

Third, we considered high price increases of 15 and 30% in the SSNIP test as well as conventional 5 and 10% in the Moohak-Daesun case. It was due to the fact that there were two groups of consumers in the regions—a price-sensitive one and another with loyalty to local brands. In such case, there is a concern that a local monopolist can exploit captured brand-loyal consumers by a high price strategy even though he cannot make profits with low prices. Of course, the usual criterion of 5–10% in the SSNIP test will be sufficient in most of cases where there are not many brand-loyal consumers.

Fourth, there is a subtle issue of how we should account income effect in price effects in hypothetical monopoly test. If the spirit is to include close demand substitutes in a relevant market, then we may have to focus substitution effect in price effects and to give less weight to actual losses due to income effect. On the other hand, if the spirit is to identify a set of products and regions for which a monopolist can exercise market power, then we have to consider both substitution and income effects equally. US and EU guidelines are not clear about which is the right perspective, while the current version of the KFTC merger guideline seems to be based on the former.

The last remark is on case specificity and possible asymmetry of market definition. That is, market definition in antitrust cases is case-specific; it depends on the starting point of analysis, from which we check whether the relevant market should be enlarged further. There would be nothing wrong if the geographic market relevant Moohak-Daesun was confined to Busan and Kyungnam, while the market relevant to Hitejujo and Jinro had been extended to the whole country including Busan and Kyungnam. Similarly, there would be nothing wrong if a critical loss analysis starting from soju product implied that soju was a separate market while an analysis starting from beer product had implied that beer and soju were in the same market, even though it did not turn out that way. Such possibilities do not involve any inconsistency, since consumers in two regions, or of two products, could have different preferences, and their consumption behaviors could result in asymmetric cross-elasticities.

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<sup>27</sup> POS data have already played an important role in antitrust econometrics in a well-known US merger case of Staples-Office Depot in 1997 and a recent Korean retailing merger case of Eland-Carrefour in 2006. See [15] and [16].



## 5.2. Further study

Critical loss analysis is a convenient tool for practical market definition, and it proved to be very useful and successful in the two cases examined in the paper. Unfortunately, however, there are not many industries for which the analysis can be actually implemented. Soju and beer industries in Korea are rather special in that companies in these industries focus on basically one liquor business, which enable us to calculate the ratio of margins with public accounting data. Also there are not many different products in the industries, for which we can survey consumers' purchasing behavior. On the other hand, it is practically impossible to conduct critical loss analysis for industries with too many businesses and products, for example, retailing or banking industry. For those industries, the SSNIP test will remain just as a conceptual framework without a quantitative support of critical loss analysis.

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