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Ex-post Examination of Business Combination: Impacts on Retail Prices

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Abstract

In this paper, we analyzed the impact of business combination on retail prices between manufacturers of consumer goods on the basis of the retail scanner data collected from large-scale retail stores. The analysis was conducted for merger examples in flavor seasonings, sugar, and instant noodles markets in accordance with the ex-post evaluation method of Ashenfelter and Hosken (2008) for horizontal mergers in the U.S. As a result, it is found that, in all markets, the retail prices of each product have been trending higher as a whole after business combination and also the weighted price level of business-combined companies had been raised more than a price level rise in the markets due to business combination. In addition, the prices of primary brands of one of the business-combined companies were raised due to business combination, while the prices of brands of the other company had remained unchanged or lowered.

Keywords: business combination, ex-post examination, household flavor seasoning, instant noodles, sugar
JEL classification: G34, K21, L16, L41

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Ex-post Examination of Business Combination: Impacts on Retails Prices

1. Ex-post Examination of Business Combination

In recent years, ex-post evaluation of business combination has been attracting attention particularly in two aspects. First, it has gained attention from the viewpoint of antitrust economic analysis. At the U.S. Federal Trade Commission (FTC), Coate and Heimert (2009) have analyzed ex-post examination of business combination together with the analysis of efficiency. The European Commission is also conducting ex-post examination of regulations on business combination by LEAR (2006). Thus, a policy for regulations on business combination has been evaluated by the authorities of various countries. In addition, Merger Analysis and Enforcement was featured in the 2009 spring edition of the Competition Policy International, and papers presented in the publications by Ashenfelter et al. (2009), Carlton (2009), Gotts and Rill (2009), and Kovacic (2009) pointed out that ex-post examination of business combination, which is yet to be conducted, is important to determine the efficiency of a policy for regulations on business combination.

Second, ex-post evaluation of business combination has gained attention from the viewpoint of quantitative analysis of the industrial organization theory. Angrist and Pischke (2010), who overviewed the progress of positive economics since the criticism[1] of Leamer (1983), argued the importance of studies that are based on research designs. These arguments are that ex-post examination is also important for a policy for regulations on business combination as true effects could be identified by eying cause-and-effect relations based on data collected systematically.[2] And it is concluded that the effect of business combination should be analyzed through a simpler and easier to understand method. For example, in the business combination of BP Amoco/ARCO, the analysis by Hastings (2004) on the effect of a long-term lease of 260 ARCO brand gas stations to the competitor Thrifty concluded that prices rise as the market becomes more competitive as a result of the analysis of the trend in prices based on the appropriate selection of a control group.

In this paper, we conduct the post-examination of business combination by analyzing how retail prices of goods in the market to be analyzed have changed before and after business combination.

As a previous study with a similar perspective, Fukamachi et al. (2003) describes that in case of an analysis using price data, it is desirable to use the prices used in actual transactions but the

[1] A criticism of Leamer (1983) that only a slight change of assumption will significantly change many factual conclusions, or a criticism that outcomes should be unstable as researchers continue changing assumptions and models until conclusions they wish.

[2] However, Leamer (2010), Keane (2010), Sims (2010), and Nevo and Whinston (2010) in the feature provided criticism from the various aspects below:
(i) Random examinations are difficult in an oligopolistic market, (ii) a merger is endogenous in an attempt for companies to respond to a change in the market so an advantage in structural estimation is large, and (iii) the availability of data remains problematic.

availability of the data is a challenge. So, their survey on trends in the market had been conducted using aggregated data. Izumida et al. (2006) implemented a market definition analysis of butter and margarine based on scanner data. As a result, this analysis suggested that large price elasticity, which is broader than one that combines butter and margarine, was found.

Other than the above, the example of analysis in the U.S. pointed out that the estimation of impacts of business combination on prices has been made only in comparatively few studies despite the fact that regulations on business combination are a major achievement of the execution of anti-trust laws (Ashenfelter and Hosken (2008)). There are several analyses as follows (referred by Ashenfelter and Hosken (2008)): Examples include a study on mergers of airline companies by Borenstein (1990), and a study on mergers of banks by Focarelli and Panetta (2003), which concluded that anticompetitive effects by mergers would disappear in three years due to an increase of efficiency.[3] The major industry for which impacts of other mergers on prices have been examined is the oil-related industries, including a study by Hastings and Gilbert (2005) in addition to the earlier-cited studies by Hastings. McCabe (2002) studied mergers between publishing companies of academic journals.

The study by Ashenfelter and Hosken (2008) analyzing manufacturers of consumer goods specified five business combinations as follows: the acquisition of Tambrands (manufacturer of female sanitary goods) by Proctor and Gamble, the acquisition of the breakfast syrup business of Kraft's Log Cabin by (Mrs. Butterworth's) Aurora Food, the acquisition of Quaker State automotive oil by Pennzoil, the acquisition of the branded serial business of Ralcorp by General Mills, and the business combination of the distilled liquor business of Guinness and Grand Metropolitan.

This paper measures the changes in prices on the basis of the retail scanner data using the evaluation method for the effect of horizontal mergers of the U.S. by Ashenfelter and Hosken. This paper also applies the method to the changes in sales and shares of business-combined companies, thereby, examining the effect brought about by business combination from various aspects. This paper analyzes the business combinations of the following two consumer goods. The first analysis includes the acquisition of shares of Yamaki Co., Ltd. (Yamaki) by Ajinomoto Co., Inc. (Ajinomoto).[4] The next analysis is conducted for sugar (Mitsui Sugar Co., Ltd.,[5] 2005).[6] The third analysis is the acquisition of stock of Myojo Foods Co., Ltd. (Myojo) by Nissin Foods Co., Ltd.

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[3] Impacts of mergers on prices have been discussed concerning an Upward Pricing Pressure also in the revised merger guidelines of the U.S.

[4] According to the website of the company, a capital and business alliance was concluded between two companies on February 1, 2007, and Ajinomoto will acquire 33.4% of the outstanding shares of Yamaki around March 2007 by an increase of capital through a subscription for new shares based on allocation of new shares to a third party and transfer of shares. <http://www.ajinomoto.co.jp/press/2007_02_01.html>

[5] New Mitsui Sugar, Taito, and K.S. announced that they concluded a merger agreement with the merger date of April 1, 2005.< http://www.mitsui-sugar.co.jp/investor/pdf/20040408_gappei.PDF>

[6] Other than this case, we tried to discuss a capital alliance between Kirin Group and Kyowa Hakko Group, and cooking oil (Nisshin OilliO Group, 2002) and flour (NITTO FUJI FLOUR MILLING CO.,LTD., 2006), but analysis was difficult due to the availability of data, so we analyzed the business combination of mainly two products.

(Nissin) regarding instant noodles (including pillow-type and cup-type).[7]

The following Section 2 addresses the outline of flavor seasonings and sugar. Section 3 explains a measurement model, and Section 4 shows the estimation results. Section 5 summarizes and concludes.

2. Outline of Market

1) Household flavor seasoning

The business combination to be analyzed in the household flavor seasoning market is the plan of Ajinomoto to acquire the shares of Yamaki.[8]

The subject transaction areas for the screening of business combination by the Japan Fair Trade Commission include (1) flavor seasonings and liquid flavor seasonings and (2) sauce for noodles etc.[9] Business-combined companies are both manufacturing and selling flavor seasonings so this business combination has an aspect of a horizontal combination. In addition, Ajinomoto is selling to Yamaki "monosodium glutamate" and "nucleic acid seasonings" (inosinic acid + guanylic acid sodium salt) used for materials for flavor seasonings and sauces for noodles etc., as umami seasonings. So, this combination also has an aspect of a vertical business combination. Because of this, in screening this business combination, a horizontal combination and vertical combination are discussed. As a result of the screening, the Japan Fair Trade Commission concluded that this business combination would not cause a substantial restriction on competitions in a certain transaction field.

Specifically, in the field other than household flavor seasonings, Yamaki has only a few shares and an increase of its share due to business integration is small. It was concluded that the field other than household flavor seasonings would not cause a substantial restriction on a certain transaction field. As for household flavor seasonings, the Japan Fair Trade Commission made careful

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[7] Nissin acquired the whole share of Myojo on December, 2006. See the following website: <http://www.nissinfoods-holdings.co.jp/english/corp/history.html>

[8] The screening of the business combination is governed by Article 10 of the Anti-Monopoly Act. This section is based on the information posted on the website of Japan Fair Trade Commission. <http://www.jftc.go.jp/ma/jirei2/H18jirei1.html>

[9] The product description are as follows (by the above JFTC's website):
"Flavor seasonings refer to the product that was produced by the needs seeking to easily create flavors close to natural soups without taking time to make soup stock and for which flavor materials such as dried bonito flakes are pulverized and flavors such as salt, etc., are mixed.

Both flavor seasonings and liquid flavor seasonings are seasonings to make soup stock. Flavor seasonings are granules or powders, and therefore, turned into soups in the hot water, while liquid flavor seasonings are liquid so they can be used as liquid soup in unchanged form. Accordingly, in cooking foods, liquid flavor seasonings have higher workability than flavor seasonings but their cost per unit used is high.

Sauces for noodles, etc., are liquid flavors produced by adding soy sauce and sweet cooking rice wine to materials used for flavor seasonings. They are used mainly for sauces for soba and udon noodles, as well as Japanese boiled foods and sauteed foods. "

evaluations on the (1) decreasing market scale, (2) market share/HHI (Herfindahl-Hirschman Index), (3) substitutability of a product between business-combined companies (products of Ajinomoto were presumed to have high substitutability with products of makers other than Yamaki, and may have a certain substitutability also with Yamaki products, but the degree of substitutability with Yamaki is presumed to be smaller than that with products of other companies), (4) trends in declining prices, (5) competitors who are taking competitive actions, (6) supply capacity of competitors (competitors are considered having supply capacity), and (7) existence of competitive pressures from adjacent markets of sauces for noodles etc., and miso with soup stock. As a result, the commission concluded that competitions in a certain field would not be restricted by independent actions by combined companies and/or by coordinated actions between combined companies and their competitors. In this market, through this business combination, combined companies have a combined share of about 70% with the share ranked first. The HHI after this business combination amounts to approximately 5,200, an increase of about 900.

2) Sugar

As for sugar, New Mitsui Sugar, Taito, and KS merged in April 2005. This merger is not referred to in the examples of major business combinations of the Japan Fair Trade Commission. The degree of sugar shipment concentration (CR5～CR10) is tend to decrease, but comparatively high level.[10] As for the purpose of this merger, the company announced in its brief materials that "The best measure to respond to severe environment is to strengthen corporate competitiveness as a solid company which jointly uses a spoon brand, for example the establishment of an effective production structure on a nationwide scale through the enhancement of nationwide sales channels and unification of sales policies. We have concluded that this great integration of the Mitsui Group will lead to the creation of a true order and stability in the industry and, therefore, have decided on this merger." In the analysis of this business combination, New Mitsui Sugar, Taito, and KS. prepared the price indexes of 90, 26, and 10 items of product, respectively.

3) Instant noodles

Regarding instant noodles, Nissin acquired the stock of Myojo on December 2006.

The specific field of trades for the screening of business combination by the Japan Fair Trade Commission include (1) pillow-type instant noodles, (2) cup-type instant noodles, (3) cup-type soup with noodles, (4) chilled noodles, and (5) frozen noodles, from the viewpoint of the forms of the products. The competitive conditions in markets related to the particular field of trade with one another were taken into consideration.[11] The Japan Fair Trade Commission considered the

[10] CR4, as of cumulative share ratio of top four companies, is 75.8 (2003), 62.3(2008). See the following website <http://www.jftc.go.jp/katudo/ruiseki/ruisekidate1920.html>.

[11] The main instant noodles' product description are as follows (by the Nissin's website):

business-combination from the viewpoints factors in deciding substantial restraint of competition both through unilateral conduct and coordinated conduct: From the former viewpoints, (i) there are several rival firms with market share 10% above, (ii) rival firms have enough available capacity, (iii) large scale retailers as the consumer have strong bargaining power, (iv) there is much competitive pressure from related particular field of trade, etc. From the latter viewpoints, (i) more than sixty firms including small and medium firms have been entered into the markets, (ii) large scale retailers as consumers have strong bargaining power, (iii) price cut incentive is large due to the short product life cycle, (iv) rival firms have enough available capacity, (v) there is much competitive pressure from related particular field of trade, etc. As a result of the screening, the Japan Fair Trade Commission concluded that this business combination would not cause a substantial restriction on competitions in a certain transaction field. In the pillow-type instant noodles market, through this business combination, combined companies have a combined share of about 35% with the share ranked first. The HHI after this business combination amounts to approximately 2,400, an increase of about 500. In the cup-type instant noodles market, a combined share is about 60% with the share ranked first, and the HHI is about 3,500 an increase about 800.[12]

3. Measurement Model

The measurement model used in this paper compares monthly changes in retail prices of business-combined groups and those of others before and after the date of mergers based on the studies by Ashenfelter and Hosken (2008). The issue to be addressed facing when estimating the effect of business combination regarding prices is a method for controlling factors other than mergers which change depending on the time to evaluate the effect from the use of quantitative data. A method that was used to control these factors is to estimate a "difference-in-difference" and focus on both changes of the subject group and control group.[13]

We made estimates using the following regression:

$$(1) \quad p_{i,j,t} = \alpha_{i,j,t} + \sum_{k=2}^{12} m_k k_{i,j,t} + \beta_{11}(\text{postmerger}_{i,j,t}) + \beta_{12}(\text{postmerger}_{i,j,t}) * (\text{Merging Party Product}_i) + \varepsilon_{i,j,t},$$

" Sales of pillow-type instant noodles in Japan were robust, boosted by a campaign by NISSIN FOOD PRODUCTS CO., LTD. offering its mainstay product Chicken Ramen for ¥35 (special offer limited to 10 million servings) to commemorate the 100th anniversary of the birth of the late founder Momofuku Ando. As a result, net sales of pillow-type instant noodles increased by 0.7% year on year to ¥58,859 million (U.S.$633 million)." < http://www.nissinfoods-holdings.co.jp/english/corp/biz.html>

[12] See the Japan Fair Trade Commission's website: < http://www.jftc.go.jp/ma/jirei2/H18jirei2.html>.

[13] As pointed out by Hosken et.al (2002), price changes for weekly data may not be evaluated appropriately due to special sales of retail stores or other reasons. Considering this, in this paper, we defined the price calculation period as a month, and the price of certain goods in a certain month as a monthly average unit price. The monthly average unit price is obtained by dividing total sales amount by total sales quantity of the product.

i refers to a product number, j and t represents a regional number, and a period number, respectively. $\alpha_{i,j,t}$ shows the effects of a product and a specified product in the region and a period. $k_{i,j,t}$ shows an index (dummy variable) of 1 in the relevant month and 0 in other months. Postmerger$_{i,j,t}$ shows an index of 0 before business combination and 1 after business combination. Merging Party Product$_i$ shows an index of 1 for a product of the producer and 0 for others. $\varepsilon_{i,j,t}$ represents an error term. The dependent variable price $p_{i,j,t}$ shows a price index (proportion of price) weighted by sales.

The fixed-effect term ($\alpha_{i,j,t}$) considers the product that remains at a price level permanently different in a different region. This means that a specific price change in a certain month is controlled by an effect of each month (m_k). The coefficient β_{11} provides a trend in the price changes of each product after business combination, and coefficient β_{12} provides price changes of each product of the business-combined company after the trend in price changes of each product has been controlled.[14]

We made estimates of trends in sales (sales amount) before and after business combination using the following regression:

$$(2) \quad T_{i,j,t} = \alpha_{i,j,t} + \sum_{k=2}^{12} m_k k_{i,j,t} + \beta_{21}(\text{postmerger}_{i,j,t}) + \beta_{22}(\text{postmerger}_{i,j,t}) * (\text{Merging Party Product}_i) + \varepsilon_{i,j,t}.$$

The explanatory variables $\alpha_{i,j,t}$, $k_{i,j,t}$, postmerger$_{i,j,t}$, Merging Party Product$_i$, and $\varepsilon_{i,j,t}$ are the same as those in (1) above. The coefficient β_{21} provides a trend in changes of sales of each product after business combination, and coefficient β_{22} provides price changes of each product of the business-combined company after the trend in price changes of each product has been controlled.

The dependent variable price $p_{i,j,t}$ shows a sales index (proportion of sales) weighted by sales.

We made estimates of changes of the amount-based share of each company caused by business combination using the following regression:

$$(3) \quad s_{i,j,t} = \alpha_{i,j,t} + \beta_{31}(\text{postmerger}_{i,j,t}) + \beta_{32}(\text{postmerger}_{i,j,t}) * (\text{Merging Party Product}_i) + \varepsilon_{3i,j,t}.$$

The explanatory variables $\alpha_{i,j,t}$, postmerger$_{i,j,t}$, Merging Party Product$_i$, and$\varepsilon_{i,j,t}$ are the same as those in (1) above. As the sales share of each company is divided by the total monthly volume, a specific effect in a certain month considered being removed in advance. Because of this, the panel estimate

[14] Although Ashenfelter and Hosken uses the private label as a control group, we simply use all other products than merging parties as a control group.

does not include a monthly dummy in the model. The coefficient β_{31} provides a trend in share changes of each product after business combination, and coefficient β_{32} provides price changes of each product of the business-combined company after the trend in price changes of each product has been controlled.

The dependent variable price $s_{i,j,t}$ shows a sales share.

Both these estimates (2) and (3) allow us to analyze, by extracting the development of the business-combined company before and after business combination how the sales and shares of combined companies have developed in the entire market movement.

The data used here are the total POS data of more than 600 stores in eight regions (Hokkaido, Tohoku, North Kanto, the metropolitan area, Hokuriku, Tokai, Kinki, Chugoku, Shikoku, and Kyusyu) and consist of weekly sales and quantity. For an estimate, the weekly sales were integrated into monthly sales. Household flavor seasonings have more than 3,000 items out of which the items of Ajinomoto and Yamaki were 106 and 131, respectively, from the beginning of January 2006 to the end of December 2009 for each JAN code.[15] As for sugar, the data are the similar one with 850 items from January 2004 to December 2007. As for instant noodles, we integrate the pillow-type instant noodles and cup-type instant noodles for the analysis, and the date of 2,200 items are the monthly one from January 2005 to December 2008 for each JAN code.

4. Estimation Results

1) Household flavor seasonings

We explain the estimate methods on the basis of data for household flavor seasonings relating to this business combination as follows. According to the fixed effect model that is appropriate based on the Hausman test, the estimate on price indexes of Ajinomoto and Yamaki products using the fixed effect model are shown in Table 1. Because observations of individual panel estimate are aggregated by its products and products are sold area, the number of observations is proportional to the number of items. But that does not reflect the difference between sales of goods. Therefore, we have made estimates of the panel over the observation period, weighted by sales of the product. This Table shows that the coefficient is positive and significant for the term concerning an increase of prices after business combination (post-merger) and the coefficient is also positive and significant for the crossterm concerning products combined after the business combination of Ajinomoto and Yamaki. That is, it follows that the market price level of the products of each company has trended to rise through business combination and the product prices of the combined companies have also been raised. This result support short-run pricing increase effect of Focarelli and Panetta (2003).

[15] Data were purchased from a data provide company.

(Table 1)

These results can also be confirmed by the movement of the price index of the following brand-by-brand product. Figure 1 shows the estimate of the price index of Ajinomoto products, which are compared with all products, and Figure 2 shows the estimate of the price index of Yamaki products. The crossterm coefficient of Ajinomoto is positive and highly significant, while that of Yamaki is negative and highly significant. It follows that Ajinomoto has raised its price level above the price level of all products, while Yamaki has lowered its price level below that of all products. One possibility that is implied by this findings is that merging parties review the product positioning and differentiate their products in order to not only avoid cannibalization but also make new consumers (See Gandhi, et al., (2008), Sweeting (2010).). In particular, among the differentiated product, less expensive product (Yamaki) was less expensive, by contrast more expensive product (Ajinomoto) more expensive. This business combination may leads to the party to obtain more consumer surplus rather than before by extending differentiated products line-up. We have made estimates of the panel reflected the effect of Ajinomoto (larger market share) raised price rather than that of Yamaki (smaller market share) lowed its price due to the estimation weighted by gross sales price of the product .

(Figure 1 and Figure 2)

The Figure 1 shows the comparison of price indexes between all products and Ajinomoto products, and Figure 2 shows the comparison of price indexes between all products and Yamaki products. These tables show trends in the total price weighted by the share of the price index of each product to the entire sales amount of the company for each product in the base month.[16] As shown in Figure 1, the relative price level of Ajinomoto products in the base time declined compared with all products or was maintained shortly after the business combination, but rose after several months of the business combination, and thereafter, the price level also remained at larger than 1 (relatively higher). The relative price level of Yamaki products began to decline shortly after the business combination, and thereafter, remained at smaller than 1 (relatively lower). This gap of timing between the Ajinomoto's price increasing and the Yamaki's price decreasing is something caused by strategic behavior of the merging party.

[16] We prepared the following price index. For example, first, as the monthly price index of a certain company (Ajinomoto etc,), the weekly average prices are turned into monthly average prices, and the price of the base month for each item and the price of the comparison month are indexed. These indexes represent those of the month. Then, around the time the year is over, the base month is revised in each January of the following year.

The trends in the retail price levels of business-combined companies are shown above, and then Ashenfelter and Hosken (2008) provided an implication of the price level through an ex-post examination. In this study, we evaluated the trends in sales and shares of the business-combined companies by the same method, in addition to the examination of this price level. Through this method, for example, whether or not combined companies have market power to increase sales by raising the retail price level, and how the market share has changed through the business combination are shown.

The estimate results are shown in Tables 2 below:

(Table 2)

The table shows that the term (post-merger) of the entire sales of each company is positive and highly significant in the market after business combination, showing an increase in sales. However, the term (crossterm) of change of the sales of the combined companies shows a negative and highly significant coefficient, thereby, we can find that sales of the business-combined companies have decreased. In a change in the share as well, the term of the market share of each company shows a positive and highly significant coefficient as a result of the business combination, and the business combination has increased the share of each company though it is very small. Accordingly, we can point out that the number of brands may have slightly decreased though the numbers have not changed significantly. In contrast, the term (crossterm) of change in the share of the business-combined companies shows a negative and highly significant coefficient, and a decrease in the shares of the combined companies as a result of the business combination. That is, it follows that this business combination has increased the sales level of non-merging firms in the entire market, but has decreased the total sales of both companies compared with those before the business combination and has also reduced the share of the combined companies.

2) Sugar

The results of these panel estimates are shown in Table 3[17]. A fixed effect model is adopted based on Houseman test. The price level after the business combination shows a positive and highly significant coefficient, and the crossterm also shows a positive and highly significant coefficient, which are considerably large coefficients. Namely, this table shows that, with this business combination, the price level rose in the entire market and the combined companies also could have raised the price level.

(Table 3)

[17] As mentioned household flavor seasoning, we estimate the weighted sales values.

The outline of trends in the price index of all sugar products and the price indexes of New Mitsui Sugar, Taito, and KS can be understood in Figure 3, Figure 4, and Figure 5. The prices of New Mitsui Sugar rose more than those of all products after several months to about one year of the business combination. In contrast, the prices of Taito lowered.

(Figure 3, Figure 4, and Figure 5)

The trends in retail price levels of the business-combined companies are shown above, and the trends in their sales and shares are shown in the following Table 4.

(Table 4)

According to the table, clear effects are not seen as the sales of non-merging firms show a negative and insignificant coefficient, but the term (crossterm) of change in sales of the business-combined companies shows a negative and highly significant coefficient. As for changes in the share of each company, the term of the share of each company in the market shows a positive and highly significant coefficient as a result of business combination. Thus, we can point out that the share may have increased though very small as a whole and the number of brands may have slightly decreased without a significant change. On the other hand, the crossterm, which shows the effect of the combined companies, shows a negative and highly significant coefficient. These tables show that, with this business combination, the sales of combined companies fell below the total sales of three companies before the business combination, and also the share after the business combination fell below the total value before the business combination.

3) Instant noodles

The results of these panel estimates are shown in Table 5[18]. A fixed effect model is adopted based on Houseman test. The price level after the business combination shows a negative and highly significant coefficient, and the crossterm also shows a positive and highly significant coefficient, which are considerably large coefficients. Namely, this table shows that, with this business combination, the price level lowered in the entire market though, the combined companies could have raised the price level.

(Table 5)

[18] As mentioned household flavor seasoning, we estimate the weighted sales values.

The outline of trends in the price index of all sugar products and the price indexes of Nissin and Myojo can be understood in Figure 6 and Figure 7. The prices of Nissin lowered more than those of all products after several months to about one year of the business combination. In contrast, the prices of Myojo rose

(Figure 6 and Figure 7)

The trends in retail price levels of the business-combined companies are shown above, and the trends in their sales and shares are shown in the following Table 6

(Table 6)

According to the table, the coefficient of sales of firms in the market show a negative and significant, but the term (crossterm) of change in sales of the business-combined companies shows a positive and highly significant coefficient. As for changes in the share of each company, the term of the share of each company in the market shows are not clear in the coefficient as a result of business combination. Thus, we cannot point out that the share may have increased though very small as a whole and the number of brands may have slightly decreased without a significant change like household flavor seasonings and sugar. These tables show that, with this business combination, the sales of combined companies increased in the total sales of merged companies before the business combination, and it is not clear that the share after the business combination rose or lowered the total value before the business combination.

5. Consideration

Estimate results include the follow facts:
i) In the markets of flavor seasoning, sugar, and instant noodles which are the subjects of this study, the weighted average price level of the business-combined companies has been raised from the previous level, and the rise has been higher than the rise in the retail price level in the markets.
ii) The following facts are found in the details of each business-combined company: The facts, which are also pointed out by Ashenfelter and Hosken (2008) in their oil example, show examples of the business combinations for both household flavor seasonings and sugar show that the business combination raised the price of the corporate brand of one of the business-combined companies and has not changed or somewhat lowered such price of the other combined company, particularly, showing a raise in the price of the brand of the company with a large market share, which is

generally deemed to be influential, and a trend to keep the price of the other company.[19]
iii) In contrast, the business combination reduced the sales and shares of the combined companies below the arithmetic total value before business combination. Therefore, in these business combinations, it is not considered that market power has been exercised and that the markets have been substantially restricted competition.

The above implies that business combination may have reduced competitive pressure due to a reduction in the number of competitors and raised the price level in the entire market, which may have led to an increase in the market power of the combined companies and a price raise at a level higher than that in the market. However, therewith, a business-stealing effect could have taken place between combined companies, and the sales and the share of sales of each company could have been reduced in an oligopolistic competitive equilibrium. It may be considered that profits of combined companies cannot always increase (may decrease) through business combination and the price setting behavior associated, therewith, unless the business combination improves efficiency to a certain degree.

We consider that the study of Ashenfelter and Hosken (2008) focused primarily on trends in prices, while the above is shown as a result of the fact that examination of sales and shares before and after business combination allowed us to comprehend the impact on the entire corporate strategy in the wake of business combination and understand the impact of business combination from more various aspects. Through this study, we were able to quantitatively confirm the basic principle of the theory of industrial organization, and show that a key to the corporate strategy for business combination/purpose of regulations on business combination is the increase of efficiency and the examination thereof is important. This is one of the contributions of this study.

We would like to point out that one of the priority of merger control policy is the unilateral effect. The reason is that the result of this study validate that ex-post merger examination of price effect shows that 0.13 – 4% points increasing in merged party's price level than overall market price level through difference-in-difference analysis. In addition, it goes without saying that, for corporations, only a business combination to enhance efficiency is a target business combination. However, also from the view point of the competitive policy and social welfare, the enhancement of efficiency is called on in the business combination so it is desirable that the achievement of business combination is returned to the market through competitions, for example, in the form of a price reduction. Further, discussions on a method for quantitatively measuring such approaches in the screening of business combination are a future challenge.

Analyzing the situation before and after of business combination can not deal with

[19] It is suggested that the need for merger control to examine the effects on product composition and positioning that a merger may cause. Because some of the consumers may benefit whereas the others may be hurt.

accomplishment of efficiency increasing. In general, these two timings of effects between accomplishment of merger and accomplishment of efficiency increasing are different, and therefore, it should be noted that ex-post examination data here are only those to measure the short-time price effect of consumer goods in business combination (As this concern, see Ashenfelter and Hosken (2008).).

In addition, another point to be noted in this study is that this study is designed to analyze retail prices, which are not trading prices of makers, and therefore, price strategies of wholesalers and retailers may be reflected in the analysis. Such effects are considered to have been randomized or averaged through the collection of weekly price information from many large-scale retailers across Japan, but it should be noted that they are not handling direct trading data.

If business combination provides the possibility of a fall in sales or shares, why do companies attempt to combine businesses? The reason for it may be that efficiency is expected to be enhanced as cited in the press releases on mergers in the area of sugar. It may be a significant challenge in ex-post examination to, in some way or the other, consider the enhancement of efficiency concerning such issues through business combination, and seek to take a measure to quantitatively understand the effect of the entire public welfare provided by business combination. Including this idea, this study focuses on the analysis of two business combinations by manufacturers of consumer goods due to availability of data, and in the future, it is desirable to increase analysis in the field of consumer durable goods, intermediate goods, capital goods, etc.

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Dependent variable: Pijt						
	Coef.	Std. Error	t	p-value	Confidence interval	
m2	-0.0017	0.0011	-1.56	0.119	-0.0039	0.0005
m3	-0.0066	0.0011	-5.9	0.000	-0.0088	-0.0044
m4	-0.0040	0.0011	-3.54	0.000	-0.0062	-0.0018
m5	-0.0075	0.0011	-6.6	0.000	-0.0097	-0.0053
m6	-0.0084	0.0011	-7.35	0.000	-0.0106	-0.0061
m7	-0.0091	0.0011	-7.96	0.000	-0.0113	-0.0068
m8	-0.0075	0.0011	-6.6	0.000	-0.0098	-0.0053
m9	-0.0117	0.0011	-10.2	0.000	-0.0139	-0.0094
m10	-0.0144	0.0011	-12.61	0.000	-0.0167	-0.0122
m11	-0.0136	0.0011	-11.88	0.000	-0.0159	-0.0114
m12	-0.0111	0.0012	-9.64	0.000	-0.0133	-0.0088
postmerger	0.0016	0.0006	2.76	0.006	0.0005	0.0028
crossterm	0.0039	0.0012	3.33	0.001	0.0016	0.0061
_cons	-0.0059	0.0008	-7.17	0.000	-0.0075	-0.0043
sigma_u	0.0904					
sigma_e	0.0741					
rho	0.5980	(fraction of variance due to u_i)				

Table 1: Panel Estimation on Ex-post Merger in Household Flavor Seasoning

Dependent variable (Pijt) is rate of changing of average price of the month to average price of January, 2006, goods by goods, area by area, weighted by sales share, respectively. The variables m2-m12 are month dummies referred to January, and postmerger is a dummy that takes 1 after the business combination. The variable of crossterm is an estimator of difference-in-difference of effect on retail price by the business combination.

Dependent variable: Monthly total sales (in thousand yen)						
	Coef.	Std. Error	t	p-value	Confidence interval	
m2	-5.65	0.628	-9.00	0.00	-6.88	-4.42
m3	-5.90	0.628	-9.39	0.00	-7.13	-4.67
m4	-7.19	0.632	-11.38	0.00	-8.43	-5.95
m5	-5.78	0.632	-9.15	0.00	-7.02	-4.54
m6	-3.67	0.632	-5.81	0.00	-4.91	-2.43
m7	-2.58	0.632	-4.08	0.00	-3.82	-1.34
m8	-5.52	0.632	-8.74	0.00	-6.76	-4.29
m9	-6.71	0.632	-10.62	0.00	-7.95	-5.47
m10	-0.33	0.632	-0.52	0.60	-1.57	0.91
m11	2.34	0.632	3.70	0.00	1.10	3.58
m12	9.09	0.632	14.38	0.00	7.85	10.33
postmerger	1.18	0.302	3.89	0.00	0.58	1.77
crossterm	-3.29	0.858	-3.84	0.00	-4.98	-1.61
_cons	29.87	0.466	64.04	0.00	28.96	30.79
sigma_u	111.50					
sigma_e	91.85					
rho	0.60	(fraction of variance due to u_i)				
fixed effect model						

Dependent variable: Monthly total shares						
	Coef.	Std. Error	t	p-value	Confidence interval	
postmerger	0.00000	9.81E-07	1.98	0.047	2.29E-08	3.87E-06
crossterm	-0.00002	2.86E-06	-5.78	0.000	-0.0000221	-0.0000109
_cons	0.00009	7.64E-07	122.48	0.000	0.0000921	0.0000951
sigma_u	0.00038					
sigma_e	0.00031					
rho	0.60703	(fraction of variance due to u_i)				
fixed effect model						

Table 2: Panel Estimation on Sales and Share of Sales on Ex-post Merger in Household Flavor Seasoning

Each variable's explanation is the same as Table 1.

Dependent variable: Pijt						
	Coef.	Std. Error	t	p-value	Confidence interval	
m2	0.0064	0.0026	2.49	0.013	0.0014	0.0114
m3	-0.0031	0.0026	-1.22	0.223	-0.0082	0.0019
m4	0.0180	0.0026	7	0.000	0.0130	0.0230
m5	0.0047	0.0026	1.81	0.071	-0.0004	0.0097
m6	0.0233	0.0026	9.02	0.000	0.0183	0.0284
m7	0.0093	0.0026	3.61	0.000	0.0043	0.0144
m8	0.0066	0.0026	2.56	0.010	0.0016	0.0117
m9	0.0071	0.0026	2.73	0.006	0.0020	0.0121
m10	-0.0023	0.0026	-0.9	0.370	-0.0074	0.0028
m11	0.0032	0.0026	1.24	0.215	-0.0019	0.0083
m12	0.0048	0.0026	1.87	0.062	-0.0002	0.0099
postmerger	0.0528	0.0013	40.31	0.000	0.0502	0.0554
crossterm	0.0384	0.0027	14.37	0.000	0.0332	0.0437
_cons	-0.0093	0.0019	-4.89	0.000	-0.0130	-0.0056
sigma_u	0.0818					
sigma_e	0.1094					
rho	0.3586	(fraction of variance due to u_i)				
fixed effect model						

Table 3: Panel Estimation on Ex-post Merger in Sugar

Dependent variable (Pijt) is rate of changing of average price of the month to average price of January, 2004, goods by goods, area by area, weighted by sales share, respectively. Each variable's explanation is the same as Table 1.

Dependent variable: Monthly total sales (in thousand yen)						
	Coef.	Std. Error	t	p-value	Confidence interval	
m2	-3.23	1.638	-1.97	0.05	-6.44	-0.02
m3	-1.20	1.638	-0.73	0.46	-4.41	2.01
m4	-6.23	1.638	-3.81	0.00	-9.45	-3.02
m5	6.22	1.652	3.76	0.00	2.98	9.46
m6	8.60	1.652	5.21	0.00	5.37	11.84
m7	3.46	1.652	2.09	0.04	0.22	6.70
m8	-1.79	1.652	-1.09	0.28	-5.03	1.44
m9	-6.34	1.652	-3.84	0.00	-9.58	-3.10
m10	8.38	1.652	5.07	0.00	5.14	11.61
m11	5.37	1.652	3.25	0.00	2.13	8.61
m12	15.16	1.652	9.17	0.00	11.92	18.39
postmerger	-0.74	0.895	-0.82	0.41	-2.49	1.02
crossterm	-21.79	2.176	-10.01	0.00	-26.06	-17.53
_cons	47.76	1.237	38.59	0.00	45.33	50.18
sigma_u	180.77					
sigma_e	105.05					
rho	0.75	(fraction of variance due to u_i)				
fixed effect model						

Dependent variable: Monthly Total Shares						
	Coef.	Std. Error	t	p-value	Confidence interval	
postmerger	0.00003	8.06E-06	3.84	0.000	0.0000151	0.0000467
crossterm	-0.00021	0.0000204	-10.32	0.000	-0.0002504	-0.0001705
_cons	0.00049	6.07E-06	80.09	0.000	0.0004743	0.0004981
sigma_u	0.00185					
sigma_e	0.00098					
rho	0.77946	(fraction of variance due to u_i)				
fixed effect model						

Table 4: Panel Estimation on Sales and Share of Sales on Ex-post Merger in Sugar

Each variable's explanation is the same as Table 1.

Dependent variable: Pijt						
	Coef.	Std. Error	t	p-value	Confidence interval	
m2	0.0045	0.0004	11.12	0	0.0037	0.0052
m3	0.0074	0.0004	18.51	0	0.0066	0.0082
m4	0.0080	0.0004	19.92	0	0.0072	0.0088
m5	0.0073	0.0004	18.27	0	0.0065	0.0081
m6	0.0073	0.0004	18.31	0	0.0065	0.0081
m7	0.0082	0.0004	20.41	0	0.0074	0.0090
m8	0.0105	0.0004	26.15	0	0.0097	0.0113
m9	0.0134	0.0004	33.49	0	0.0126	0.0142
m10	0.0146	0.0004	36.36	0	0.0138	0.0153
m11	0.0147	0.0004	36.64	0	0.0139	0.0155
m12	0.0151	0.0004	34.75	0	0.0142	0.0159
postmerger	-0.0023	0.0008	-2.91	0.004	-0.0039	-0.0008
crossterm	0.0023	0.0013	1.82	0.069	-0.0002	0.0048
_cons	0.0831	0.0005	81.44	0	0.0822	0.0840
sigma_u	0.3264					
sigma_e	0.0558					
rho	0.9716	(fraction of variance due to u_i)				
fixed effect model						

Table 5: Panel Estimation on Ex-post Merger in Instant Noodles

Dependent variable (Pijt) is rate of changing of average price of the month to average price of each year, goods by goods, area by area, weighted by sales share, respectively. Each variable's explanation is the same as Table 1.

Dependent variable: Monthly total sales (in thousand yen)						
	Coef.	Std. Error	t	p-value	nfidence interval	
m2	-3964.634	3056.286	-1.3	0.195	-9954.917	2025.649
m3	12572.79	3056.286	4.11	0	6582.51	18563.08
m4	-3245.46	3056.286	-1.06	0.288	-9235.743	2744.823
m5	-10194.85	3056.286	-3.34	0.001	-16185.14	-4204.572
m6	-27558.54	3056.286	-9.02	0	-33548.82	-21568.26
m7	-28443.11	3056.286	-9.31	0	-34433.39	-22452.83
m8	-23870.88	3056.286	-7.81	0	-29861.16	-17880.6
m9	-10718.11	3056.286	-3.51	0	-16708.4	-4727.832
m10	-108.6637	3056.286	-0.04	0.972	-6098.947	5881.619
m11	24.43606	3056.286	0.01	0.994	-5965.847	6014.719
m12	33282.63	3311.856	10.05	0	26791.43	39773.83
postmerger	-23534.44	5852.94	-4.02	0	-35006.14	-12062.75
crossterm	68902.19	10809.03	6.37	0	47716.63	90087.75
_cons	175835.8	3482.723	50.49	0	169009.7	182661.9
sigma_u	738672.13					
sigma_e	205919.74					
rho	0.92789099	(fraction of variance due to u_i)				
fixed effect model						

Dependent variable: Monthly Total Shares						
	Coef.	Std. Error	t	p-value	Confidence interval	
postmerger	-2.50E-26	1.63E-17	0	1	-3.19E-17	3.19E-17
crossterm	6.21E-26	3.35E-17	0	1	-6.57E-17	6.57E-17
_cons	0.0004406	7.91e-18 5	6.00E+12	0	0.0004406	0.0004406
sigma_u	0.00195018					
sigma_e	6.39E-16					
rho	1	(fraction of variance due to u_i)				
fixed effect model						

Table 6: Panel Estimation on Sales and Share of Sales on Ex-post Merger in Instant Noodles

Each variable's explanation is the same as Table 1.

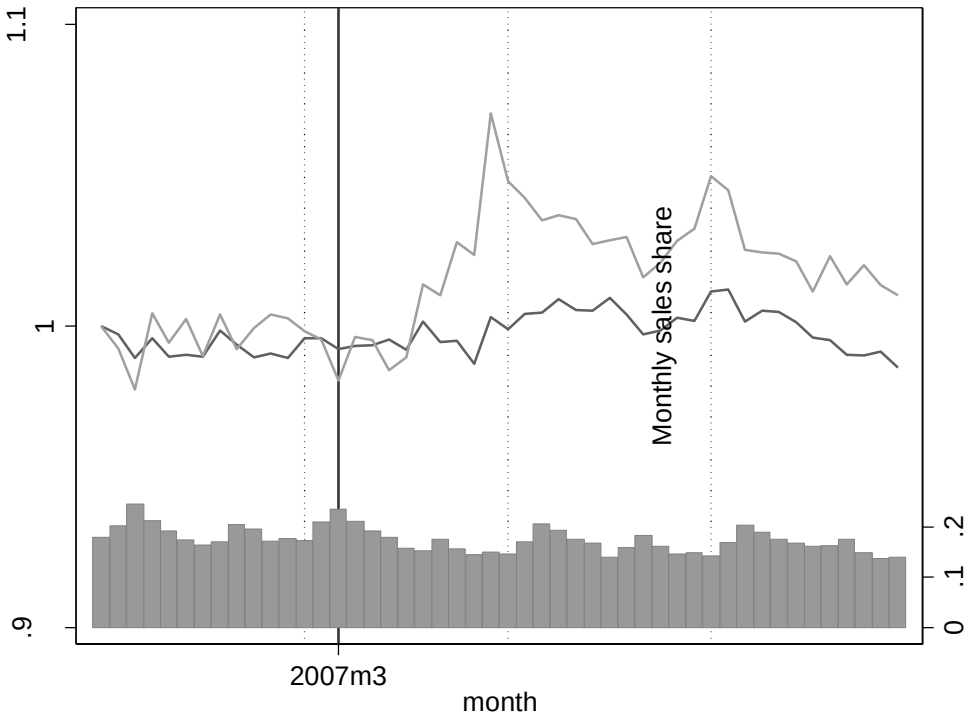

Figure 1: Laspeyres price index and Monthly Share of Sales (Ajinomoto)

The Black line is Laspeyres price index of household flavor seasoning overall, and the gray line is Laspeyres price index of products provided by Ajinomoto (The left axis scale). Both the January 2006 base period. The bar graph describes the trend in market share in the monthly sales of Ajinomoto (right axis scale). The black vertical line shows a timing that was made the business combination.

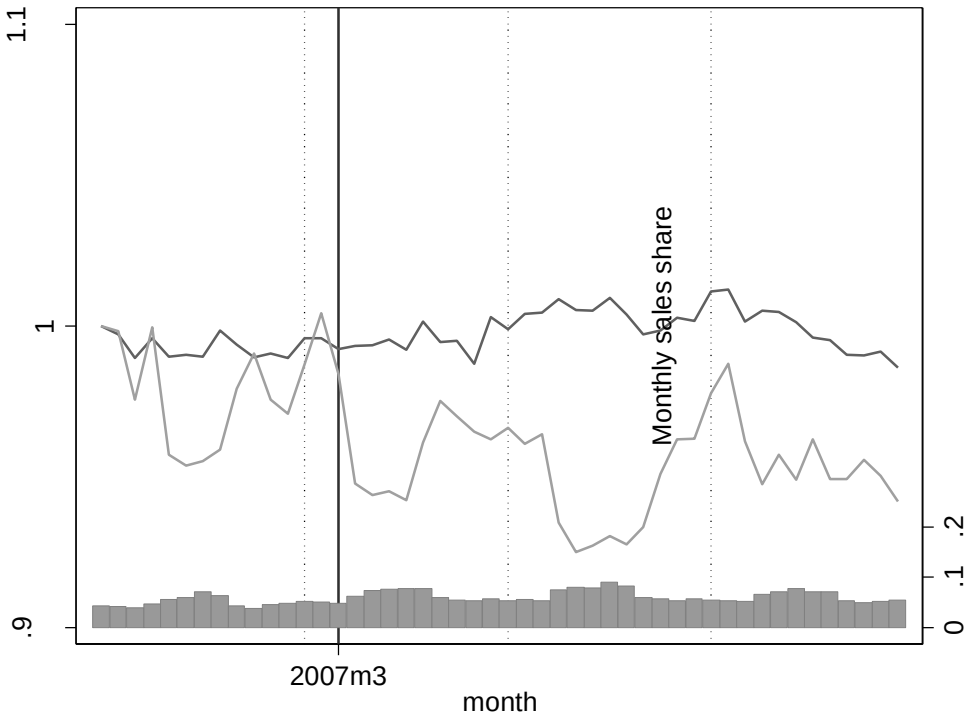

Figure 2: Laspeyres price index and Monthly Share of Sales (Yamaki)

The Black line is Laspeyres price index of household flavor seasoning overall, and the gray line is Laspeyres price index of products provided by Yamaki (The left axis scale). Both the January 2006 base period. The bar graph describes the trend in market share in the monthly sales of Yamaki (right axis scale). The graph legends is the same as Figure 1.

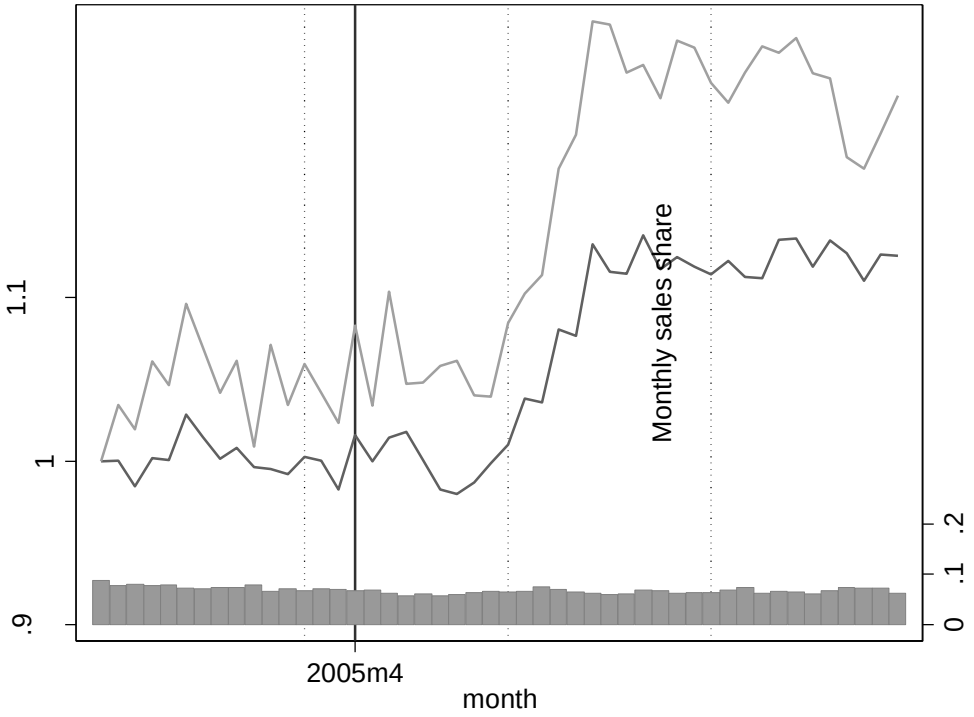

Figure 3: Laspeyres price index and Monthly Share of Sales (New Mitsui Sugar)
The Black line is Laspeyres price index of sugar overall, and the gray line is Laspeyres price index of products provided by New Mitsui Sugar (The left axis scale). Both the January 2004 base period. The bar graph describes the trend in market share in the monthly sales of New Mitsui Sugar (right axis scale). The graph legends is the same as Figure 1.

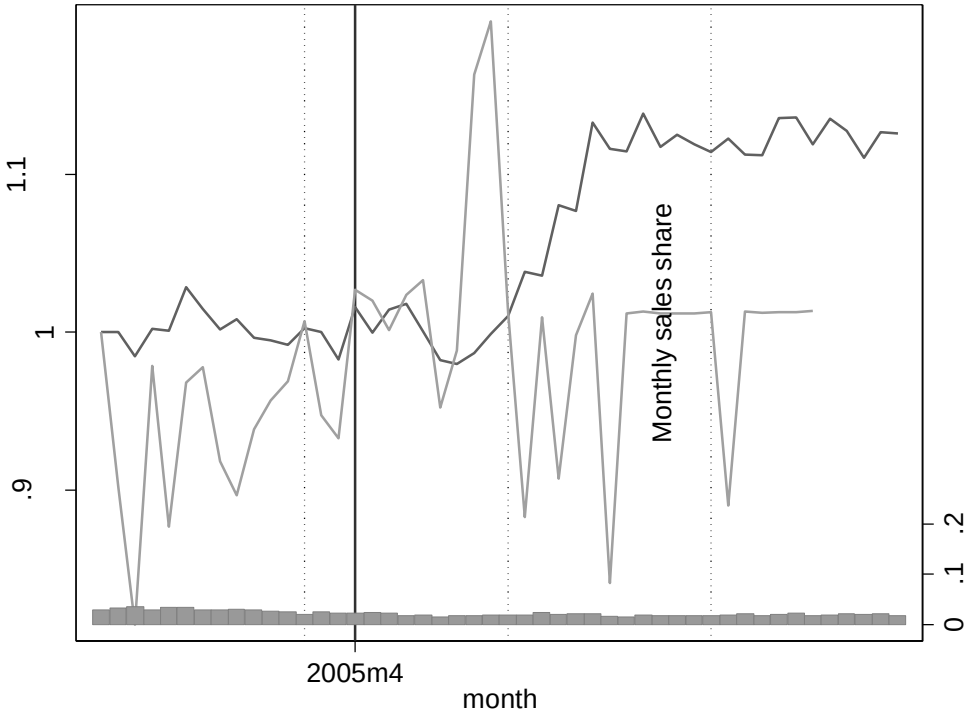

Figure 4: Laspeyres price index and Monthly Share of Sales (Taito)

The Black line is Laspeyres price index of sugar overall, and the gray line is Laspeyres price index of products provided by Taito (The left axis scale). Both the January 2004 base period. The bar graph describes the trend in market share in the monthly sales of Taito (right axis scale). The graph legends is the same as Figure 1.

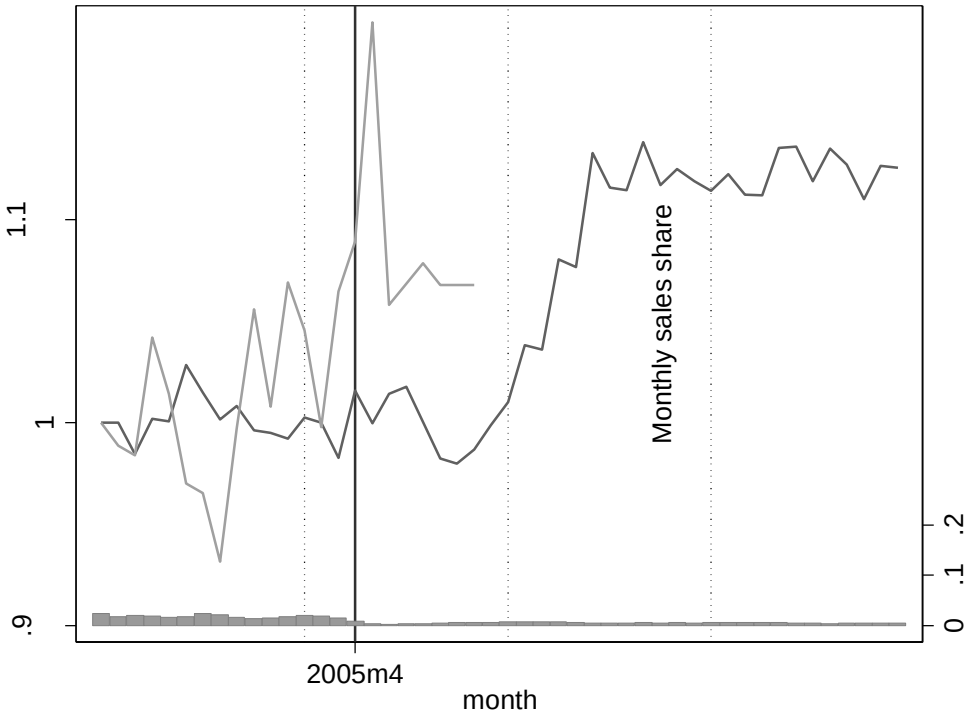

Figure 5: Laspeyres price index and Monthly Share of Sales (KS)

The Black line is Laspeyres price index of sugar overall, and the gray line is Laspeyres price index of products provided by KS (The left axis scale). Both the January 2004 base period. The bar graph describes the trend in market share in the monthly sales of KS (right axis scale). The graph legends is the same as Figure 1.

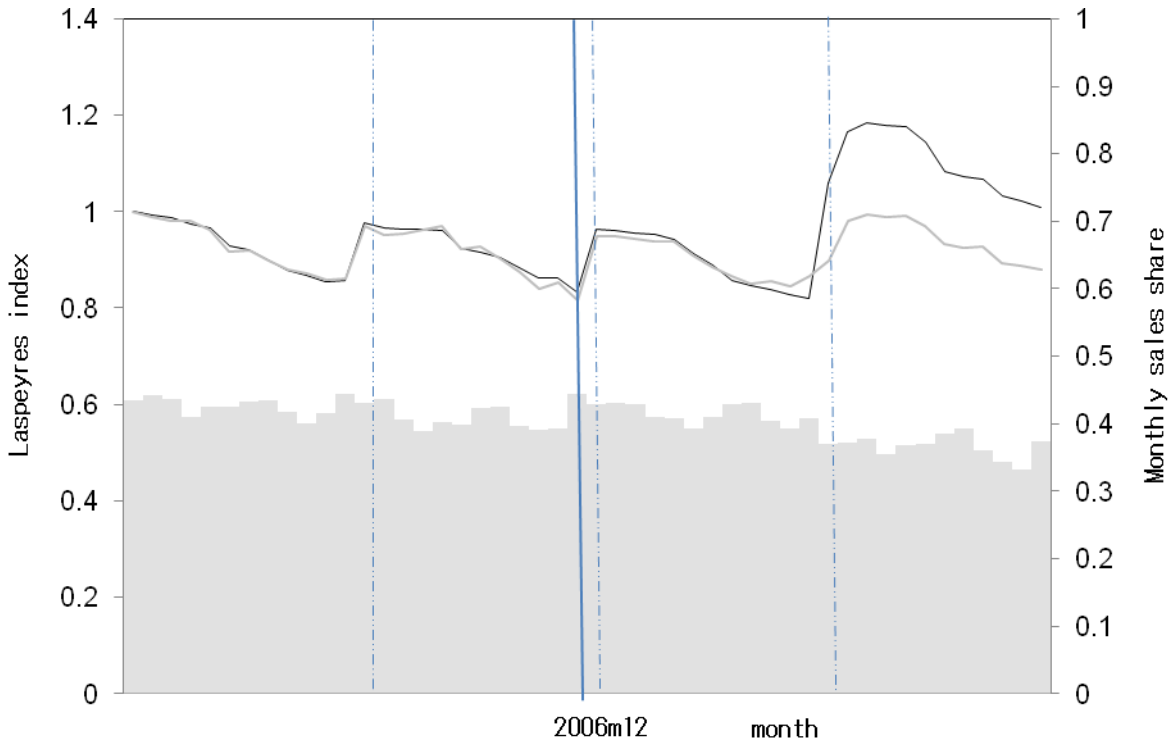

Figure 6: Laspeyres price index and Monthly Share of Sales (Nissin)

The Black line is Laspeyres price index of instant noodles overall, and the gray line is Laspeyres price index of products provided by Nissin (The left axis scale). Both the January 2005 base period. The bar graph describes the trend in market share in the monthly sales of Nissin (right axis scale). The graph legends is the same as Figure 1.

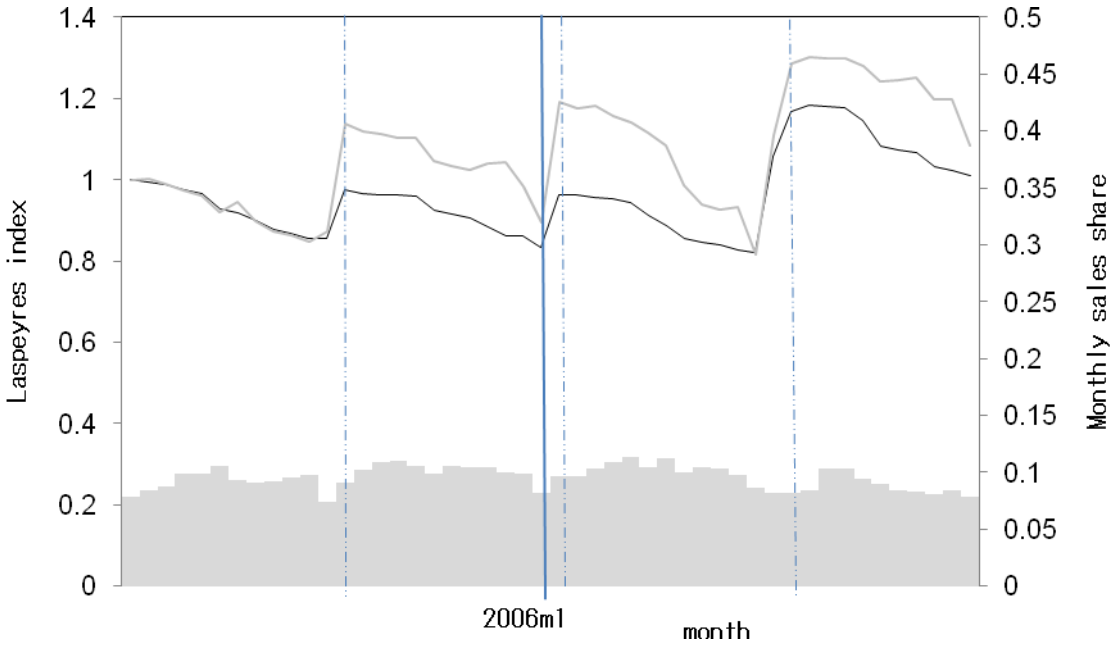

Figure 4: Laspeyres price index and Monthly Share of Sales (Myojo)

The Black line is Laspeyres price index of instant noodles overall, and the gray line is Laspeyres price index of products provided by Myojo (The left axis scale). Both the January 2005 base period. The bar graph describes the trend in market share in the monthly sales of Myojo (right axis scale). The graph legends is the same as Figure 1.