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1. Introduction

The powerful earthquake that hit Japan on March 11, 2011, not only devastated towns and villages in the northeastern region, but also caused disrupted economic activities, affecting millions of firms and households far beyond the disaster-stricken areas. There has been a systematic effort to assess the direct damages caused by the Great East Japan Earthquake; however, few studies have attempted to empirically examine its economic consequences beyond the northeastern regions.

In particular, during the week immediately following March 11, the media widely reported severe shortages of essential goods—most notably, oil, batteries, flashlights, rice, bottled water, and toilet paper—in the areas that were not directly affected by the disaster. In Tokyo and other eastern cities, people encountered empty shelves, long waiting lines, and quantity restrictions (such as "one item per customer") in major supermarkets. As the shortage of goods became a national concern, on March 14, the minister of consumer affairs made a public plea to refrain from "hoarding." The shortages were primarily demand driven, specifically, a sudden increase in consumer demand as households faced greater future uncertainty with continuing aftershocks and unfolding nuclear power plant failures. At the same time, there were supply-side shocks to many commodities—most notably, milk, yogurt, fermented soybeans, and bottled water—due to

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damaged production facilities, disrupted supply chains, and power shortages, resulting in large excess demand for the affected goods.

Even though anecdotal evidence abounds, we know very little about the actual effects of the 3/11 disaster on consumer behavior. To what extent did consumers increase their purchase after the earthquake? If the excess demand was resolved through some mechanisms of rationing, then did it create any discrepancy between those consumers who could stockpile goods and those who could not? In this paper, we take advantage of high-frequency micro panel data provided by Intage to investigate the short-run effects of the 3/11 earthquake on household purchasing patterns. To our knowledge, this is the first study to empirically examine the short-run effects of a large disaster on consumer behavior.

The main findings of the paper are as follows:

(1) In the eastern prefectures not directly affected by the disaster, household expenditure on storable foods rose sharply in the week following March 11. However, the spike in the expenditure was temporary.

(2) Despite the excess demand induced by the disaster, the food price index increased slowly and modestly. In other words, household expenditures in the eastern area increased, not owing to higher prices, but primarily owing to larger quantities purchased.

(3) We use a model of consumer purchase with inventory to investigate the effects of the disaster on stockpiling behavior. We find that the number of major tremors experienced by households had *negative* effects on the likelihood of making any purchase in the week following March 11 but *positive* effects on the amount of purchase in that week conditional on making a purchase. We also find that, compared to the average household, households with a young child had a *lower* likelihood of making any purchase in response to the disaster, while an increase in food expenditure in response to the disaster was *smaller* for households with a working wife.

(4) Although we cannot distinguish households who intended not to purchase any foods from those who intended but could not, our results suggest that households with higher opportunity costs of shopping were more likely to be "rationed out" and could not purchase foods. In other words, the disaster and resulting shortages of essential goods might have increased the discrepancy between those households who were able to stockpile foods and those who could not.

The rest of the paper is structured as follows: in Section 2, we describe the Great East Japan Earthquake and show the geographical distribution of its seismic impact; in Section 3, we present the data; in Section 4, we examine the responses of commodity prices to the disaster; in

Section 5, after introducing an inventory model of consumer purchase, we provide empirical analyses of household purchasing behavior; and Section 6 concludes this paper.

2. The Geography of the Great East Japan Earthquake

A powerful earthquake hit the northeastern region of Japan on Friday, March 11, 2011, at 2:46 pm. According to a seismic intensity measure defined by the Japan Meteorological Agency, Miyagi, the prefecture closest to the epicenter, recorded the maximum intensity of 7 (equivalent to magnitude 9.0 on the Richter scale). It was the fourth largest earthquake in the world since 1900. In Fukushima, Ibaraki, and Tochigi, the recorded intensity was the second highest, higher than 6 on the Richter scale. The seismic intensity in Tokyo was higher than 5. Although Tokyo escaped direct damages, about 20% of the workers in central Tokyo could not return to their homes on the day of the earthquake owing to disrupted transportation services.

As the epicenter was 130 km from the seashore, within 40 minutes enormous tsunami followed the earthquake and devastated the Pacific coastal areas of the Iwate, Miyagi, and Fukushima prefectures. Because of the failures of the nuclear power plants in Fukushima and the resulting electric power shortages, the government announced (and partially implemented) scheduled rolling blackouts in the areas that were supplied electricity by the Tokyo Electric Power Company from March 14 to March 28.

After the huge earthquake on March 11, numerous large aftershocks hit the eastern part of Japan. **Figures 1-(a)** to **1-(c)** show the number of "major" tremors, defined by a tremor of seismic intensity greater than 3, in two-week intervals in each prefecture.[1] Note that, as we define Week 2 as the second week of January 2011 starting with Friday (i.e., Friday, January 7–Thursday, January 13), March 11 (Fri.) corresponds to the first day of Week 11.

Figure 1-(a) shows the number of major tremors in Weeks 8 and 9, representative weeks before the 3/11 earthquake, indicating that only two prefectures experienced major tremors. The frequency skyrocketed in Weeks 11 and 12, and almost all prefectures in eastern Japan experienced more than 10 major tremors in these two weeks (see **Figure 1-(b)**). In Iwate, Miyagi, Fukushima, and Ibaraki, more than 20 major tremors were observed in Week 11 alone. By contrast, the western half of Japan experienced no tremors greater than intensity 3. As shown in **Figure 1-(c)**, many eastern prefectures continued to experience major aftershocks in Weeks

[1] The data on the frequency and intensity of tremors were obtained from the Japan Meteorological Agency. The weekly frequency of major tremors is reported in **Appendix Table A1**.

13 and 14.

As shown above, the intensity and the frequency of the 3/11 earthquake and its aftershocks differed substantially across prefectures. In the subsequent analysis, we take advantage of the geographical heterogeneity of the major aftershocks. For the purpose of analysis, we define three areas, “Directly Affected Area,” “East,” and “West,” as shown in **Figure 2**. “Directly Affected Area” consists of four prefectures, Iwate, Miyagi, Fukushima, and Ibaraki, that received major damages from the earthquakes, tsunami, and nuclear power plant failures. In the following consumer behavior analysis, we exclude “Directly Affected Area” as consumers in this area were under extreme conditions. “East,” our treatment region, consists of seven prefectures that were *not* directly affected by the disaster, but nonetheless experienced at least one major tremor in Weeks 11 and 12 and were subject to rolling blackouts, including Tokyo, Kanagawa, Chiba, Yamanashi, Gunma, Saitama, and Shizuoka. “West,” our control region, consists of all prefectures that experienced no major tremor in Weeks 11 and 12, including Fukui, Toyama, Shiga, Mie, and all prefectures to the west of Mie, excluding Okinawa. Regression analysis using prefecture-level data below are performed with the data for all prefectures except “Directly Affected Area” and Okinawa.

3. Data

In this paper, we use two data sets, consumer panel data (hereafter SCI) and retail panel data (hereafter SRI) provided by Intage, a leading market research company in Japan, to support research on the impact of the 3/11 earthquake.

SCI contains the daily shopping information of approximately 12,000 households, randomly selected from all prefectures (except Okinawa) in Japan. The sample households are restricted to married couples. Using a barcode reader, households are asked to scan the barcode of every commodity they purchase, and scanned data are automatically transmitted to Intage’s datacenter. In SCI, for every commodity purchased, we can observe: (1) Japanese Article Number (JAN), a unique commodity identifier, (2) date of purchase, (3) price and quantity, and (4) store name from which the commodity was purchased. The data cover more than 10,000 commodities in 214 commodity categories comprising 146 categories of processed foods (e.g., rice, pasta, milk, sugar, condiments, and canned or frozen foods) and 68 categories of basic goods (e.g., toiletries, kitchen equipment, and cleaning tools).[2] Fresh foods (e.g., meat, fish, and vegetables) without

[2] Abe and Niizeki (2010) provide detailed comparisons between SCI and official consumption surveys (based on diaries) and show that the two datasets exhibit similar age-consumption patterns in most

barcodes are excluded. We can also observe basic households characteristics, such as the ages of husband and wife, household income, education, household size and composition, and the prefecture of residence. The data is for the period from January 1 to May 31, 2011

SRI contains weekly transaction data from approximately 2,600 retail stores located in all prefectures in Japan. It covers multiple types of retail stores, including general merchandise stores, convenient stores, discount stores, drug stores, and individual stores. In SRI, for each store and for each commodity, we can observe (1) JAN, a unique commodity identifier, (2) week of transaction, (3) total quantity sold, (4) total sales, (5) store location, and (6) store type. In addition, we obtain more detailed commodity information for five categories (rice, cup noodles, natto, milk, yoghurt, and bottled water). The data corresponds to the period from the first week of January (Week 1) to the last week of May 2011 (Week 22). We drop Week 1 observations from our sample, as household expenditures deviate from normal patterns during the New Year holidays in Japan.

4. The Short-run Responses of Expenditures and Prices

To check whether consumers increased their purchases in response to the 3/11 earthquake, we first look at the movements of household expenditures using SCI daily data. In **Figure 3**, we plot the average household food expenditure (expressed in 1,000 yen) in "East" and "West," as defined above, from January 8 to May 22. Throughout the sample period, in both East and West, we observe a spike in food expenditures on every weekend. In East, food expenditures fell sharply on March 11, then rose dramatically during three days after the earthquake, from March 12 (Sat.) to 14 (Mon.), and then declined to a level below the pre-disaster average during the rest of March. By contrast, in West, food expenditure patterns change little before and after March 11.

Next, in **Figure 4**, using SCI weekly data, we compare the movements of food expenditures in four major prefectures—Hokkaido, Tokyo, Osaka, and Fukuoka (see **Appendix Figure 1** for their locations. For each prefecture, we normalize the average expenditure in the pre-disaster weeks (Weeks 2–10) to be unity. In Tokyo, the expenditure in Week 11 (March 11–17) increased by 22% compared to the pre-disaster average and then declined to a level lower than the pre-disaster level for many weeks. Although the expenditures in Hokkaido and Osaka exhibit similar patterns, their changes were modest in comparison to Tokyo. In Fukuoka, which is about 1,000 km away from the epicenter, the average expenditure did not respond to the earthquake.

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categories.

Although not shown in **Figure 4**, in the directly affected prefectures such as Iwate and Miyagi, household expenditures fell in Week 11 and declined further in Week 12, showing patterns that were different from the rest of Japan. It suggests that consumers in the directly stricken areas had difficulty in purchasing enough goods to maintain a pre-disaster level of consumption. Owing to a large decline in the number of sample households reporting the data after March 11 in these prefectures, it is difficult to examine their conditions in detail.

According to **Figures 3** and **4**, household expenditures surged immediately in response to the 3/11 disaster in the eastern prefectures outside the Directly Affected Area. However, this per se is not an evidence of "hoarding" behavior, since a surge in expenditures could result from higher prices. Therefore, it is important to investigate changes in commodity prices.[3]

When constructing a price index, we need to compute the rate of price change for each commodity. That is, for both base and comparison weeks, we need information on commodity prices. Unfortunately, the sample size of SCI was not large enough to compute category-level price index, as we encountered zero transactions for many commodities. Therefore, we used the SRI data to construct a price index at the category level.

Using the SRI weekly data, we computed the Fisher price index for foods in the four major prefectures, using Week 2 as the base week.[4] As shown in **Figure 5**, in Tokyo, the food price index increased by 1.4% in Week 11 when the average food expenditure rose by 21% according to **Figure 4**. The food price index in Tokyo increased by 5.0% by Week 13 and subsequently began to decline, but remained at a slightly higher level than the pre-disaster level during the rest of the sample period. In Hokkaido, the food price rose by 1.0% in Week 11, when the food expenditure rose by 12%. In Osaka and Fukuoka, there is no clear change in the food price levels. In other words, despite the presence of excess demand for a wide range of goods after the disaster, commodity prices responded only slowly and to a small extent.

More detailed analysis revealed that within-store commodity prices increased only by a maximum of 4–5% even for those commodity categories for which excess demand was large (e.g., cup noodles, milk, and bottled water).[5] This indicates that retail stores tended not to raise

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[3] In a separate paper, we examine the effects of the 3/11 disaster on commodity prices in detail using SCI and SRI data. See Abe, Moriguchi, and Inakura (2012) for more analysis.

[4] We follow Ivancic et al. (2011) when constructing Fisher, Laspeyres, and Paasche price indexes. See **Appendix Figure 2** for the comparisons of the three indexes.

[5] The results are reported in Abe, Moriguchi, and Inakura (2012).

their commodity prices despite the sudden increase in demand, and chose rationing by queue or quantity restrictions to allocate scarce commodities to their customers. As many consumers shifted their demand to stores with higher prices[6] or to similar but higher-priced commodities, category-level prices increased more than commodity-level prices for these categories with large excess demand.

In **Table 1**, we compare the change in the food price index from Week 10 to Week 11 in "East" and "West" (For robustness, the results for Laspeyres, Paasche, and Fisher price indexes are shown). The weekly inflation rate in food price in East, measured by Laspyres price index, was 1.9%, while that in West was -0.5%. The two rates, however, are not significantly different in the statistical sense. When we categorize foods into "staple" foods (rice, bread, noodles, flour, and pancake mix) and "non-staple" foods (all the rest), the inflation rate of staple foods was significantly higher in East (4.4%) than in West (-4.5%) when measured in Paasche index. There was no significant difference in the inflation rates of non-staple foods. Although we observe a significant difference in some cases, overall, the rate of price increase in East was rather small and not much higher than that in West.

5. The Effects of the 3/11 Disaster on Household Expenditure Patterns

5.1 A Model of Consumer Purchase with Inventory

In the previous section, we observed that the responses of commodity prices to the 3/11 shocks were surprisingly modest. In other words, the surge in household expenditures in Week 11 observed in East was primarily due to an increase in the quantity purchased. To understand households' short-run responses to the disaster better, we consider a dynamic model of consumer purchase with inventory, developed by Erdem et al. (2003) and Hendel and Nevo (2006a, b). In this model, a good is assumed to be storable and consumers decide the timing and the amount of purchase given a stochastic price process. For storable goods, because the time of consumption can differ from the time of purchase, the expenditures tend to concentrate during the period of low prices. A simulation by Erdem et al. (2003) using the data for ketchup shows that consumer expenditures surge during bargain sales and fall in subsequent periods. High frequency data, such as ours, are particularly useful in investigating consumers' stockpiling behavior.

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[6] Many commodities are sold at different prices across stores. In general, convenience stores charge higher prices than discount stores for the same commodity.

To see if such a model is applicable to our data, we first compare actual household expenditures on storable goods and non-storable goods. In **Figures 6-(a)** to **6-(f)**, we show the movements of expenditures on six food categories in East in contrast to West. As before, we normalize the average expenditure in Weeks 2–10 to be unity. Of the six categories, rice, cereal, and flour are storable, while bread, tofu, and ham are perishable. Compared to West, the household expenditures on storable foods in East show a clear *spike* in Week 11 and then a decline to a level *lower* than the pre-disaster average. This is consistent with the predictions of the inventory model of consumer purchase described above. For perishable foods, the household expenditures in East increased only slightly in Week 11.

In the following analysis, rather than focusing on a specific commodity category and developing a nonlinear dynamic model, we analyze a composite good by aggregating commodity categories and conduct a reduced form analysis.[7] To be concrete, we analyzed three composite goods, namely, all foods, staple foods (rice, bread, cereal, noodles, flour, pancake mix), and non-staple foods. **Table 2** provides descriptive statistics of weekly expenditures on these goods from Week 2 to Week 21. Most notably, the average expenditure on staple foods in East rose by 61% from 800 yen to 1,287 yen in Week 11 (March 11–17). Not only the level, but also the variance of household expenditures on staple foods increased in Week 11, suggesting that the heterogeneity across households increased after the disaster (see **Appendix Table 2**).

Table 3 provides the covariance structures of the weekly changes in the expenditures of foods, staple foods, and non-staple foods. For all goods, the autocorrelation with its first lag is about -0.5, suggesting strong negative relationships between current and future expenditure growths. Note that, if expenditure follows a random walk, the first autocorrelation should be zero. The negative autocorrelations shown in **Table 3** are similar to those obtained by Erdem et al. (2003) in their model. In the following analysis, we treat the three composite goods (foods, staple foods, and non-staple foods) as storable goods, and use a model of home inventory.

5.2 Estimating the Effects of the 3/11 Disaster on Stockpiling Behavior

Previous research on the determinants of optimal home inventory (Erdem et al., 2003; Hendel and Nevo, 2006a, b) has focused on the effects of uncertainty about future prices. In the case of the 3/11 disaster, however, we expect sudden and profound shifts in households' perception of

[7] Existing studies, such as Erdem et al. (2003) and Hendel and Nevo (2006b), focus on a few categories, such as ketchup or detergent and estimate dynamic consumer choice using a nonlinear model. To implement this, however, we need information on the dynamic processes of multiple commodity prices and unobservable preference shocks.

future uncertainty after the disaster. In the days following March 11, it must be noted that: (1) numerous aftershocks were raising the fear of future major earthquake; (2) nuclear power plant accidents were still unfolding with consecutive hydrogen explosions on March 12, 14, and 15; (3) to prevent major electric power failures, the government released a daily schedule for rolling blackouts, creating much confusion; and (4) the shortages of essential goods were widely reported with a rumor of people engaging in "hoarding." We assume that all of these factors influenced consumers' subjective assessments over future uncertainty and led them to re-optimize the level of inventory to maintain a sufficient level of future consumption.[8]

First, we postulate that a household's subjective assessment of future uncertainty increases with the number of major tremors experienced. If so, the households experiencing more tremors would raise their optimal inventory level to a greater extent and increase their expenditures accordingly. To test this hypothesis, we use prefecture-level variations in the weekly frequency of major tremors of intensity greater than 3 (presented in **Appendix Table 1**). It is important to emphasize that in the subsequent regression analyses, we drop observations after Week 11. As we have shown, many eastern prefectures continued to experience major aftershocks in Week 12 and beyond (see **Figure 1-(c)**), which in itself should further increase household expenditures in these prefectures. At the same time, however, there are strong negative autocorrelations in expenditure growths (see **Table 3**) indicating that those households that increased expenditures in Week 11 should reduce expenditures in Week 12. As a result, without knowing the level of home inventory in Week 11, we cannot identify the effects of major tremors in Week 12. As we drop the observations in Weeks 12–21 from the following analyses, we focus on the effects of the major tremors on the expenditure increase in Week 11.

As the base specification, we estimate the following equation regarding the change in weekly expenditure, ΔE_{it}, of household *i* in week *t* ($t = 4, 5, \ldots, 11$):

$$\Delta E_{it} = c^E + \alpha_1^E Tremors_{it} + \beta^E X_{it} + T_t + \varepsilon_{it}^E \tag{1}$$

where *c* is a constant, $Tremors_{it}$ is the square root of the number of major tremors household *i* experienced in week *t*; X_{it} is a vector of household characteristics (household income, wife's age and work status, household size and composition); and T_t is time effects captured by week

[8] According to an internet survey conducted by Prof. Shigeo Tachiki of Doshisha University in April 2011 among 3,643 consumers (all residing outside the disaster-stricken areas) who increased the volume of purchase of some goods during the week following March 11, 48% replied that the reason for this behavior was "to prepare for power shortages and water supply disruptions" (multiple answers allowed), 32% said it was "to prepare for future disaster evacuation," 31% said it was "to feel assured in fear of future disaster," and 25% said that it was "to increase stockpiles for new disaster." About 10% replied that they increased purchases because they felt anxious on hearing about other people hoarding.

dummies.

Next, we investigate the heterogeneity across households in purchasing behavior after the disaster. Recall that the price index did not increase much in Week 11. This suggests that temporary excess demand induced by the disaster was resolved mainly through quantity adjustments, most notably, "rationing by waiting" and "quantity restrictions."[9] Under these allocation mechanisms, we expect that households with lower opportunity costs of shopping can purchase a higher quantity of scarce commodities (by lining up or visiting many stores). In a recent study, Aguiar and Hurst (2007) show that the opportunity costs of shopping play a major role in optimal consumption decisions by using husband's retirement status as a proxy for the opportunity costs. In our analysis, we focus on two variables: the presence of an infant and the wife's work status. We postulate that households with at least one infant (child of age 0–3) have higher opportunity costs of shopping than those without. Similarly, we postulate that households with a wife working *full-time* have higher opportunity costs of shopping than those with a wife not working or working part-time.[10]

To further investigate household purchasing behavior, we introduce two additional variables: shopping frequency and shopping interval. Shopping frequency is the number of purchases a household makes in a week (see **Appendix Table 3** for descriptive statistics). Because we observe only the date of purchase and the name of store from which the purchase was made, however, we compute shopping frequency assuming that a household makes purchases from the same store only once a day. Moreover, note that if a household visited a store but did not make any purchases (this may happen when goods are sold out), then it is not counted as shopping.

Shopping interval is measured in weeks and captures the number of weeks that passed since the last purchase (see **Appendix Table 4** for descriptive statistics). If a household purchases food every week, the interval is one. However, for storable foods, especially rice and pasta, many households do not make purchases every week. In general, a longer shopping interval is associated with a higher likelihood of purchase in the current week. As such, it is important to control for shopping interval while analyzing the effects of the disaster on subsequent shopping behavior.

To investigate household heterogeneity in response to the disaster, we estimated the following equation:

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9 For recent empirical analysis of rationing by queuing, see Batabyal and DeAngelo (2012).

10 According to the 2005 Census data, 50% of married women under the age of 35 in Japan do not have any paid job—a remarkably high number for developed countries.

$$\Delta E_{it} = c^E + \left(\alpha_1^E + \alpha_2^E Infant_i + \alpha_3^E Fulltime_i + \alpha_4^E Shopping_{it}\right) \times Tremors_{it} + \beta^E X_{it} + T_t + \varepsilon_{it}^E, \qquad (2)$$

where $Infant_i$ and $Fulltime_i$ are dummy variables that indicate the presence of an infant and a wife working full-time in household *i*, respectively, and $Shopping_i$ is the number of purchases (shopping trips) made by household *i* in week *t*. We interact each of these variables with the number of tremors experienced by household *i*.

Table 4 presents descriptive statistics of the variables used in the regressions. In our sample, 12.5% of households have an infant and 14.5% of households have a wife working full-time. The average household purchases foods 3.0 times per week, while the average shopping interval for foods is 1.36 weeks or 9.5 days (note that if all households make purchases every week, the interval would be 1.0). It is important to note that the standard deviations for both shopping frequency and shopping interval are large, indicating that there is great heterogeneity across households in their purchasing patterns.

The estimation results for the three goods (all foods, staple foods, non-staple foods) are reported in **Table 5**. In almost all specifications, the number of major tremors has large, positive, and significant effects on the changes in expenditures. (The effects for non-staple foods are smaller and less significant than those for staple goods.) That is, households who experienced more major aftershocks in Week 11 stockpiled more food. On examining the effects of household characteristics in specification (10), the wife's work status and the presence of an infant have little effect on the expenditures for staple goods in the pre-disaster weeks. The coefficients of the interaction terms, *Infant*×*Tremors* and *Fulltime*×*Tremors*, however, are large, negative and significant. It shows that, compared to the average household that increased the weekly expenditure on staple foods by 66 yen in response to major tremors, the households with a working wife and those with an infant increased their expenditures only by 30 yen and 39 yen, respectively. The coefficient of *Fulltime*×*Tremors* is smaller in specification (10) compared to specification (9), suggesting that the households with a working wife did not increase their expenditures on staple foods in Week 11 as much partly because they had lower frequency of shopping. The same is true for non-staple foods. For the households with an infant, by contrast, the results for staple foods and non-staple foods seem qualitatively different.

5.3 Considering the Extensive and Intensive Margins of Purchasing Behaviors

To see the changes in purchasing patterns more clearly, we decompose the changes in expenditures in Week 11 into extensive and intensive margins. Consider a household that usually purchases rice every other week. If the household purchased rice in Week 10, the next purchase would not occur in Week 11. If the 3/11 disaster suddenly raised the desired level of rice inventory, however, the household would purchase rice in Week 11. In this case, an increase in the expenditure happens through a change in extensive margin. By contrast, consider a household that usually purchases rice every week. Then, to raise the level of rice inventory after the disaster, the household will increase the weekly expenditure in Week 11. In this case, an increase in the expenditure happens through a change in intensive margin.

For extensive margin, we estimate the following equation:

$$\begin{aligned} S_{it} &= c^S + \left(\alpha_1^S + \alpha_2^S Infant_i + \alpha_3^S Fulltime_i + \alpha_4^S Interval_{it}\right) \times Tremors_{it} \\ &+ \beta^S X_{it} + \delta^S Interval_{it} + H_i + T_t + \varepsilon_{it}^S, \end{aligned} \tag{3}$$

where S_{it} is extensive margin defined by an indicator variable that takes unity when positive expenditure is observed for household i in week t; $Interval_{it}$ is shopping interval defined by the number of weeks since the last purchase made for household i in week t; and H_i is household fixed effects.[11] Shopping frequency is not included because it perfectly predicts the dependent variable, extensive margin.

Intensive margin is defined by:

$$G_{it} = \frac{E_{it} - E_{ik<11}\left[E_{ik} \middle| S_{ik} = 1\right]}{E_{ik<11}\left[E_{ik} \middle| S_{ik} = 1\right]},$$

where E_{it} is expenditure and S_{it} is extensive margin of household i in week t. The denominator is the average of weekly expenditures conditional on positive expenditure during the pre-disaster weeks (Weeks 4–11). The numerator is the gap between the actual expenditure of household i in week t and the conditional average. For intensive margin, we estimate the following equation:

$$\begin{aligned} G_{it} &= c^G + \left(\alpha_1^G + \alpha_2^G Infant_i + \alpha_3^G Fulltime_i + \alpha_4^G Shopping_{it} + \alpha_5^G Interval_{it}\right) \times Tremors_{it} \\ &+ \beta^G X_{it} + \gamma^G Shopping_{it} + \delta^G Interval_{it} + T_t + \varepsilon_{it}^G, \end{aligned} \tag{4}$$

where I_{it} is shopping interval defied above and $Shopping_{it}$ is shopping frequency defined by the number of purchases made by household i in week t.

The descriptive statistics of extensive and intensive margins are provided in **Appendix Tables 5** and **6**. With respect to extensive margins, in East, observe that the ratio of households making

[11] We use a linear probability model with household fixed effects rather than a probit model.

any purchase of foods was 80% in Week 10 and declined to 77% in Week 11, while no such decline was observed in West. With respect to intensive margins, for staple foods in Week 11, we observe not only a large spike in East but also a smaller but clear increase in West.

Table 6 presents the estimation results of extensive margins. In all specifications, the number of major tremors has *negative* effects on extensive margins[12]. It implies that the 3/11 disaster reduced the probability of households making any purchase. According to specification (3), for staple foods, an increase in the square root of tremors by one reduces the probability of shopping in Week 11 by 1.2%, while an increase in shopping interval by one week increases the probability of shopping by 7.2%. When the interaction term *Interval*×*Tremors* is added in specification (4), its coefficient is negative and significant. This means that the 3/11 disaster dampened the positive effects of shopping interval on the probability of shopping. When we examine household characteristics in specifications (7)–(12), the coefficient of *Infant*×*Tremors* is negative and significant in most specifications, while the coefficient of *Fulltime*×*Tremors* is not significantly different from zero in all specifications.[13] In other words, the households with an infant exhibited a greater reduction in the probability of shopping for both staple and non-staple foods in Week 11 in response to the disaster. To summarize, the 3/11 disaster reduced the likelihood of making any purchase in Week 11 for all households on average, and this effect was stronger for the households with an infant (but not for the households with a working wife).

The estimation results of intensive margins are reported in **Table 7**. In sharp contrast to the extensive margins, in all specifications, the effects of the number of major tremors on intensive margins are *positive*, large, and significant. In other words, conditional on households making a purchase in Week 11, expenditure was higher for the households experiencing major tremors. In specification (3), for staple foods, an increase in the square root of tremors by one increases the expenditures in Week 11 by 9.6%, while an increase in shopping interval by one week increases the probability of shopping by 2.7%. For all foods in specifications (7) and (8), the coefficient of *Infant*×*Tremors* is positive and significant, while that of *Fulltime*×*Tremors* is negative and significant. When we decompose foods into staple and non-staple foods, the coefficient of *Infant*×*Tremors* is effectively zero for staple foods (see specifications (9) and (10)), but positive and significant for non-staple foods (see specifications (11) and (12)). By contrast, the

[12] Although the effect of tremors turns positive in specifications (4) and (10), it does not imply that the disaster raised the probability of shopping. Rather, the negative effect of the interaction term *Interval*×*Tremors* dominates the effect of tremors, as the minimum value of shopping interval is one.
[13] Note that, because we include household fixed effects, the effects of household characteristics are identified only through the interaction terms.

coefficients of *Fulltime*×*Tremors* are negative but not significant for both staple and non-stale foods. These results suggest that, in response to tremors, conditional on household making a purchase, the households with an infant increased the expenditure on non-staple foods (but not on staple foods) more than the average household did, whereas the households with a working wife increased their food expenditures to a smaller extent than the average households.

To summarize our regression results, the experience of major tremors has *positive* impacts on the change in the average expenditure in Week 11 and on the expenditure conditional on making a purchase, but negative impacts on the probability of making a purchase during Week 11. Together, it implies that after the disaster some households did not make any purchase of foods at all while other households went shopping and purchased more foods than the pre-disaster level. Unfortunately, we cannot distinguish from the data whether those households who did not make any purchases did so because (a) they did not need to shop, (b) they could not go shopping (due to higher opportunity costs), or (c) they went shopping but could not buy desired goods (because they were sold out). Upon looking into household heterogeneity in response to the disaster, we find that, for the households with a wife working full-time, their probability of purchasing any foods in Week 11 in response to tremors was no lower than the average households, but conditional of purchasing, the increases in their food expenditure were smaller in general. For the households with an infant, they were more likely to make no purchase in Week 11 in response to major tremors, but conditional on purchasing, their expenditures on non-staple goods were greater. Assuming that these households have higher opportunity costs of shopping or higher costs of searching for goods, they most likely fall in the category (b) or (c). If a number of households were "rationed out" despite their willingness to purchase being high, it may have important welfare implications.

6. Concluding Remarks

One year has passed since the Great East Japan Earthquake, and yet, we are far from understanding its wide and profound impact on the Japanese economy. The number of serious empirical studies on the subject has been limited, owing largely to the difficulty in obtaining data. In this paper, we use rich high-frequency micro data to investigate the short-run effects of the 3/11 disaster on consumer purchasing behavior. We find strong evidence of stockpiling, but at the same time, our results suggest that the disaster might have created a measurable discrepancy between households who could stockpile staple foods and those who could not.

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Table 1: Comparisons of Changes in Price Indexes in Week 11

		East	West	t-statistics
Foods	Laspyres	0.0186	-0.0045	1.35
		(0.016)	(0.007)	
	Paasche	0.0266	-0.0057	1.40
		(0.021)	(0.008)	
	Fisher	0.0226	-0.0051	1.40
		(0.018)	(0.007)	
Staple Foods	Laspyres	0.0376	-0.0185	1.34
		(0.037)	(0.021)	
	Pasache	0.0441	-0.0451	1.72*
		(0.045)	(0.026)	
	Fisher	0.0408	-0.0316	1.56
		(0.041)	(0.023)	
Non Staple Foods	Laspyres	0.0147	0.0014	1.22
		(0.009)	(0.006)	
	Pasache	0.0207	0.0063	1.52
		(0.008)	(0.005)	
	Fisher	0.0177	0.0039	1.42
		(0.008)	(0.005)	

Note: Standard deviations are in parentheses.
t-statistics for the mean differences between East and Western part of Japan are reported.
*: significant at 10 %.
The base period for the Laspyres index is Week 9.
Staple foods include rice, bread, noodle, cereal, flour, and pancake mix.

Table 2: Descriptive Statistics of Weekly Expenditures on Foods

Week	East							West							All						
	N	Mean			Std.dev			N	Mean			Std.dev			N	Mean			Std.dev		
		Foods	Staple	Else	Foods	Staple	Else		Foods	Staple	Else	Food	Staple	Else		Foods	Staple	Else	Food	Staple	Else
2	3853	3504	726	2777	3291	1127	2681	5063	3228	667	2561	3074	1011	2530	11312	3336	689	2647	3149	1055	2583
3	3853	3580	729	2852	3340	1050	2767	5063	3476	697	2779	3174	1048	2611	11312	3533	716	2816	3271	1082	2696
4	3853	3716	744	2972	3582	1099	2978	5063	3583	712	2871	3415	1016	2856	11312	3644	726	2918	3458	1066	2883
5	3853	4189	838	3351	3994	1240	3294	5063	3818	754	3065	3499	1077	2914	11312	3967	789	3178	3725	1179	3069
6	3853	3780	760	3020	3620	1056	3028	5063	3438	706	2731	3251	1055	2677	11312	3568	720	2848	3398	1057	2817
7	3853	3687	773	2915	3532	1134	2878	5063	3512	711	2801	3409	1189	2793	11312	3606	743	2863	3459	1169	2825
8	3853	3719	785	2933	3535	1133	2868	5063	3510	733	2778	3269	1111	2696	11312	3590	751	2839	3405	1141	2777
9	3853	4325	892	3433	4064	1292	3345	5063	3987	798	3189	3707	1204	3067	11312	4100	830	3270	3869	1285	3196
10	3853	3672	800	2872	3471	1164	2800	5063	3382	712	2671	3245	1072	2610	11312	3485	737	2749	3317	1097	2691
11	3853	4472	1287	3184	4492	1780	3256	5063	3472	793	2679	3318	1139	2672	11312	3922	1013	2908	3913	1533	2955
12	3853	3477	880	2598	3762	1458	2860	5063	3366	730	2636	3341	1103	2738	11312	3391	785	2606	3502	1275	2767
13	3853	3790	826	2964	4143	1453	3299	5063	3736	774	2963	3761	1267	3057	11312	3741	790	2950	3920	1334	3156
14	3853	3236	649	2587	3353	1007	2773	5063	3129	655	2474	3213	1198	2600	11312	3170	650	2519	3268	1137	2670
15	3853	3640	740	2900	3539	1127	2881	5063	3309	678	2631	3213	1062	2644	11312	3445	702	2743	3359	1153	2727
16	3853	3595	749	2846	3463	1131	2786	5063	3441	709	2732	3214	1017	2665	11312	3496	721	2775	3310	1075	2708
17	3853	3799	784	3015	3757	1154	3074	5063	3698	759	2939	3473	1154	2863	11312	3716	761	2955	3596	1169	2959
18	3853	3738	764	2975	3961	1255	3278	5063	3512	731	2780	3653	1163	2983	11312	3610	740	2871	3793	1198	3119
19	3853	3483	703	2780	3473	1044	2844	5063	3356	690	2665	3315	1042	2731	11312	3396	692	2704	3346	1062	2742
20	3853	3681	750	2931	3446	1115	2815	5063	3419	707	2712	3246	1016	2683	11312	3514	726	2788	3334	1142	2716
21	3853	4019	828	3191	3857	1153	3149	5063	3767	772	2995	3472	1095	2877	11312	3827	786	3041	3608	1140	2961
Total	77060	3755	800	2955	3707	1218	2997	101260	3507	724	2783	3374	1105	2773	226240	3603	753	2849	3514	1175	2861

Note: Staple foods include rice, bread, noodle, cereal, flour, and pancake mix.
The 3/11 is the first day of Week 11.

Table 3: Covariance Structure of Change Rate of Expenditures in Weeks 2-10 before 3/11

Foods

	dln(Expense)	dln(Expense)[-1]	dln(Expense)[-2]	dln(Expense)[-3]	dln(Expense)[-4]	dln(Expense)[-5]
dln(Expense)	0.6525	-0.3491	0.0219	-0.0118	0.0208	-0.0046
dln(Expense)[-1]	-0.5402	0.6399	-0.3415	0.0309	-0.0061	0.0077
dln(Expense)[-2]	0.0338	-0.5339	0.6393	-0.3577	0.0265	0.0032
dln(Expense)[-3]	-0.0181	0.0478	-0.5546	0.6508	-0.3516	0.0200
dln(Expense)[-4]	0.0320	-0.0094	0.0412	-0.5418	0.6471	-0.3440
dln(Expense)[-5]	-0.0072	0.0120	0.0049	0.0310	-0.5336	0.6421

Number of observarions = 16726

Staple Foods

	dln(Expense)	dln(Expense)[-1]	dln(Expense)[-2]	dln(Expense)[-3]	dln(Expense)[-4]	dln(Expense)[-5]
dln(Expense)	1.3806	-0.7584	0.0671	-0.0452	0.0722	-0.0296
dln(Expense)[-1]	-0.5532	1.3613	-0.7372	0.0755	-0.0328	0.0396
dln(Expense)[-2]	0.0494	-0.5463	1.3374	-0.7458	0.0735	-0.0194
dln(Expense)[-3]	-0.0331	0.0556	-0.5546	1.3521	-0.7458	0.0792
dln(Expense)[-4]	0.0529	-0.0242	0.0547	-0.5518	1.3508	-0.7481
dln(Expense)[-5]	-0.0217	0.0292	-0.0144	0.0587	-0.5545	1.3477

Number of observarions = 11267

Non-Staple Foods

	dln(Expense)	dln(Expense)[-1]	dln(Expense)[-2]	dln(Expense)[-3]	dln(Expense)[-4]	dln(Expense)[-5]
dln(Expense)	0.7081	-0.3702	0.0191	-0.0203	0.0290	-0.0041
dln(Expense)[-1]	-0.5299	0.6890	-0.3627	0.0296	-0.0123	0.0116
dln(Expense)[-2]	0.0272	-0.5244	0.6943	-0.3837	0.0232	0.0060
dln(Expense)[-3]	-0.0287	0.0424	-0.5475	0.7072	-0.3793	0.0180
dln(Expense)[-4]	0.0410	-0.0177	0.0332	-0.5368	0.7060	-0.3720
dln(Expense)[-5]	-0.0059	0.0167	0.0086	0.0256	-0.5304	0.6967

Number of observarions = 16538

Note: The first differences in household expenditures on foods, staple foods, and non-staple foods.
The upper triangle shows the variance and covariance, while the lower triangle shows the correlation.
The sample period covers Week 2-10.

Table 4: Descriptive Statistics

	N	Mean	St.d.	Min	Max
Sqrt (Frequency of Tremors)	88496	0.1728	0.6511	0	4.7958
Infant Dummy	88496	0.1246	0.3303	0	1
Fulltime Dummy	88496	0.1445	0.3516	0	1
Number of Shoppings	88496	2.9550	2.5751	0	23
Δshoppings	88496	-0.0427	2.3417	-19	19
Shopping Interval of					
Foods	88496	1.3607	1.0562	1	10
Staple Foods	88496	1.5558	1.2695	1	10
Non Staple Foods	88496	1.3654	1.0601	1	10
Tremors×Infant	88496	0.0212	0.2363	0	4.7958
Tremors×Fulltime	88496	0.0230	0.2441	0	4.7958
Tremors×Δshoppings	88496	-0.0185	1.5601	-48	34.8569
Tremors× Interval of					
Foods	88496	0.2487	1.3269	0	47.9583
Staple Foods	88496	0.2895	1.5691	0	47.9583
Non Staple Foods	88496	0.2496	1.3310	0	47.9583

Note: Sample statistics of the variables used in Tables 5, 6 and 7.
Sample Periods: Week 4 - 11.
Number of tremors is the number of major tremors (more than 3 in seismic scale) observed in each prefecture each week.
See the main text for definitions of other variables.

Table 5: The Effects of The 3/11 Disaster on the First Differences in Expenditures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Δ Foods	Δ Foods	Δ Staple	Δ Staple	Δ Non Staple	Δ Non Staple	Δ Foods	Δ Foods	Δ Staple	Δ Staple	Δ Non Staple	Δ Non Staple
Week 11	-120.0**	-120.5**	23.94	23.99	-144.0***	-144.5***	-120.7**	-49.01	23.83	38.62**	-144.6***	-87.62**
	(57.50)	(57.51)	(21.32)	(21.33)	(47.14)	(47.15)	(57.51)	(44.15)	(21.33)	(19.69)	(47.15)	(37.45)
Tremor	68.55***	68.77***	52.73***	52.70***	15.82	16.07	83.88***	97.41***	62.68***	66.34***	21.20	31.07*
	(25.16)	(25.17)	(8.843)	(8.843)	(20.81)	(20.82)	(28.13)	(21.65)	(9.923)	(9.193)	(23.24)	(18.48)
Infant × Tremor							16.56	13.88	-26.25	-27.09*	42.81	40.98
							(50.16)	(42.13)	(17.19)	(16.22)	(41.08)	(35.02)
Fulltime × Tremor							-128.3**	-69.14	-50.11**	-36.49*	-78.14*	-32.64
							(57.46)	(45.57)	(21.12)	(19.68)	(47.46)	(38.75)
Δ Shopping Frequency × Tremor								-10.65		4.256		-14.91*
								(9.169)		(3.639)		(7.789)
Infant Dummy		-5.136		-0.242		-4.894	-8.061	-20.64	4.232	1.597	-12.29	-22.24
		(44.43)		(14.73)		(36.88)	(45.53)	(34.75)	(15.04)	(13.92)	(37.84)	(29.50)
Fulltime Dummy		-11.23		-2.474		-8.758	9.434	10.07	5.608	5.721	3.826	4.346
		(38.27)		(13.58)		(31.49)	(39.52)	(30.33)	(13.94)	(12.88)	(32.56)	(25.69)
Δ Shopping Frequency								1,077***		227.2***		849.8***
								(6.292)		(2.490)		(5.307)
Constant	40.97	66.55	-5.760	-2.950	46.73	69.50	64.37	45.34	-4.505	-8.537	68.88	53.88
	(34.57)	(61.77)	(12.60)	(21.23)	(28.76)	(51.85)	(61.82)	(47.49)	(21.25)	(19.85)	(51.88)	(40.88)
Model	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
HH Characteristics	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	88,496	88,496	88,496	88,496	88,496	88,496	88,496	88,496	88,496	88,496	88,496	88,496
R-squared	0.008	0.009	0.003	0.003	0.008	0.008	0.009	0.419	0.003	0.145	0.008	0.384

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Dependent variables are the first differences in expenditures.

Tremor is the square root of the number of major tremors.

Sample Periods: Weeks 4 - 11 in 2011.

Sample Places: All prefectures in Japan except the directly damaged prefectures and Okinawa.

HH Characteristics: Dummies for the size of households, dummies for six income categories, dummies for eight categories of wife's age, infant dummy, and fulltime-working wife dummy.

Staple food include rice, bread, noodles, cereal, flour, and pancake mix.

Week dummies are included in all the specifications. Week 4 = base week. March 11 is the first day of Week 11.

Table 6: The Effects of The 3/11 Disaster on the Extensive Margins of Expenditures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Extensive Margin: Foods	Extensive Margin: Foods	Extensive Margin: Staple	Extensive Margin: Staple	Extensive Margin: Non Staple	Extensive Margin: Non Staple	Extensive Margin: Foods	Extensive Margin: Foods	Extensive Margin: Staple	Extensive Margin: Staple	Extensive Margin: Non Staple	Extensive Margin: Non Staple
Week 11	-0.0333***	-0.0339***	-0.0342***	-0.0352***	-0.0351***	-0.0357***	-0.0333***	-0.0339***	-0.0343***	-0.0352***	-0.0351***	-0.0357***
	(0.00541)	(0.00543)	(0.00624)	(0.00626)	(0.00547)	(0.00548)	(0.00541)	(0.00543)	(0.00624)	(0.00626)	(0.00547)	(0.00548)
Tremor	-0.0179***	-0.00318	-0.0117***	0.00330	-0.0175***	-0.00189	-0.0158***	-0.00207	-0.00978***	0.00430	-0.0155***	-0.000860
	(0.00247)	(0.00300)	(0.00281)	(0.00339)	(0.00248)	(0.00299)	(0.00263)	(0.00306)	(0.00299)	(0.00347)	(0.00264)	(0.00307)
Infant×Tremor							-0.0152**	-0.0108*	-0.0143**	-0.0103	-0.0139**	-0.00917
							(0.00629)	(0.00632)	(0.00658)	(0.00662)	(0.00629)	(0.00631)
Fulltime×Tremor							-0.00158	-0.00147	-0.00129	-0.000556	-0.00205	-0.00189
							(0.00610)	(0.00608)	(0.00684)	(0.00684)	(0.00612)	(0.00609)
Interval× Tremor		-0.0101***		-0.00882***		-0.0107***		-0.00984***		-0.00861***		-0.0105***
		(0.00121)		(0.00106)		(0.00117)		(0.00122)		(0.00108)		(0.00118)
Shopping Interval	0.0654***	0.0691***	0.0721***	0.0752***	0.0667***	0.0706***	0.0654***	0.0690***	0.0721***	0.0752***	0.0667***	0.0705***
	(0.00262)	(0.00273)	(0.00202)	(0.00209)	(0.00261)	(0.00272)	(0.00262)	(0.00273)	(0.00202)	(0.00209)	(0.00261)	(0.00272)
Constant	0.743***	0.738***	0.634***	0.629***	0.738***	0.733***	0.743***	0.738***	0.633***	0.629***	0.738***	0.733***
	(0.00439)	(0.00447)	(0.00435)	(0.00439)	(0.00440)	(0.00448)	(0.00439)	(0.00447)	(0.00435)	(0.00439)	(0.00440)	(0.00448)
Model	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects
HH Characteristics	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Observations	88,496	88,496	88,496	88,496	88,496	88,496	88,496	88,496	88,496	88,496	88,496	88,496
R-squared	0.027	0.027	0.030	0.030	0.027	0.028	0.027	0.028	0.030	0.030	0.027	0.028

Note: Robust standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$
Dependent variables are the dummy variables for positive expenditures.
See the note for Table 5 for the detailed explanations.

Table 7: The Effects of The 3/11 Disaster on The Intensive Margins of Expenditures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Intensive Margin: Foods	Intensive Margin: Foods	Intensive Margin: Staple	Intensive Margin: Staple	Intensive Margin: Non Staple	Intensive Margin: Non Staple	Intensive Margin: Foods	Intensive Margin: Foods	Intensive Margin: Staple	Intensive Margin: Staple	Intensive Margin: Non Staple	Intensive Margin: Non Staple
Week 11	-0.0134	-0.0136	0.129***	0.130***	-0.0329***	-0.0331***	-0.0134	-0.00840	0.130***	0.135***	-0.0330***	-0.0284***
	(0.00869)	(0.00868)	(0.0152)	(0.0152)	(0.00890)	(0.00890)	(0.00868)	(0.00796)	(0.0152)	(0.0149)	(0.00890)	(0.00827)
Tremor	0.0399***	0.0398***	0.0962***	0.0960***	0.0266***	0.0266***	0.0399***	0.0383***	0.0993***	0.0761***	0.0258***	0.0212**
	(0.00405)	(0.00405)	(0.00766)	(0.00766)	(0.00404)	(0.00404)	(0.00439)	(0.00975)	(0.00828)	(0.0142)	(0.00440)	(0.00878)
Infant×Tremor							0.0208*	0.0190*	-0.00719	-0.0101	0.0251**	0.0235**
							(0.0113)	(0.0109)	(0.0210)	(0.0209)	(0.0112)	(0.0108)
Fulltime×Tremor							-0.0176*	-0.0101	-0.0218	-0.0151	-0.0145	-0.00776
							(0.00963)	(0.00902)	(0.0195)	(0.0191)	(0.00922)	(0.00874)
Interval×Tremor								-0.000952		0.0157		0.00223
								(0.00818)		(0.00989)		(0.00705)
ΔShopping Frequency ×Tremor								-0.000975		0.00333		-0.00260*
								(0.00137)		(0.00267)		(0.00135)
Infant Dummy		-0.00355		-0.00848		-0.00128	-0.00661	-0.00721	-0.00747	-0.00869	-0.00498	-0.00551
		(0.00722)		(0.0118)		(0.00741)	(0.00729)	(0.00662)	(0.0118)	(0.0115)	(0.00750)	(0.00689)
Fulltime Dummy		-0.00474		-0.00211		-0.00495	-0.00217	-0.00119	0.00105	0.00286	-0.00284	-0.00182
		(0.00522)		(0.00860)		(0.00538)	(0.00534)	(0.00485)	(0.00866)	(0.00844)	(0.00552)	(0.00508)
Shoppings Interval	0.0363***	0.0380***	0.0268***	0.0274***	0.0327***	0.0344***	0.0380***	-0.0660***	0.0274***	-0.0370***	0.0345***	-0.0660***
	(0.00294)	(0.00297)	(0.00331)	(0.00336)	(0.00295)	(0.00298)	(0.00297)	(0.00292)	(0.00336)	(0.00342)	(0.00298)	(0.00298)
ΔShopping Frequency								0.0911***		0.0744***		0.0881***
								(0.000726)		(0.00126)		(0.000754)
Constant	-0.0686***	-0.0881***	-0.0715***	-0.0765***	-0.0604***	-0.0838***	-0.0879***	0.0119	-0.0768***	-0.0194	-0.0835***	0.0131
	(0.00581)	(0.0111)	(0.00854)	(0.0177)	(0.00594)	(0.0114)	(0.0111)	(0.0102)	(0.0177)	(0.0173)	(0.0114)	(0.0106)
Model	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS	OLS
HH Characteristics	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	72,377	72,377	64,606	64,606	72,117	72,117	72,377	72,377	64,606	64,606	72,117	72,117
R-squared	0.007	0.007	0.014	0.014	0.005	0.006	0.007	0.192	0.014	0.066	0.006	0.169

Note: Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Dependent Variables are the ratio of the gap between actual and average expenditures divided by the average expenditures. Observations with zero expenditures are excluded.

See note for Table 5 for more detailed explanations.

Figure 1-(a): The Frequency of Major Tremors in Weeks 8-9

Figure 1-(b): The Frequency of Major Tremors in Weeks 11-12

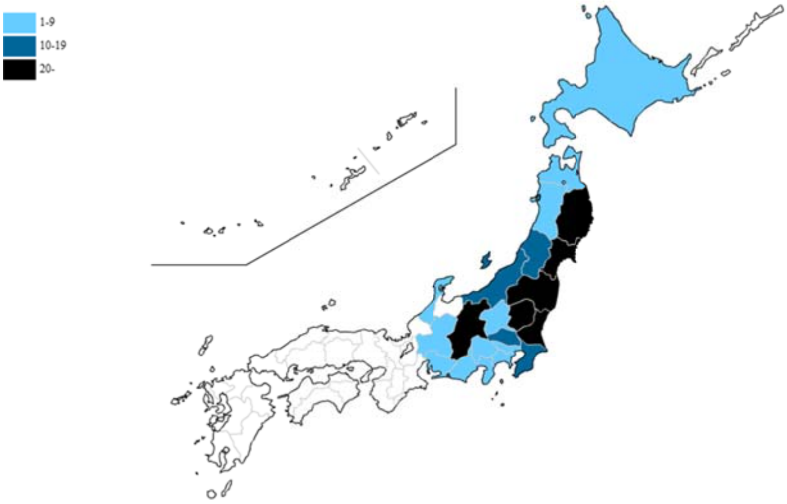


Figure 1-(C): The Frequency of Major Tremors in Weeks 13-14

Figure2: The Area Classification

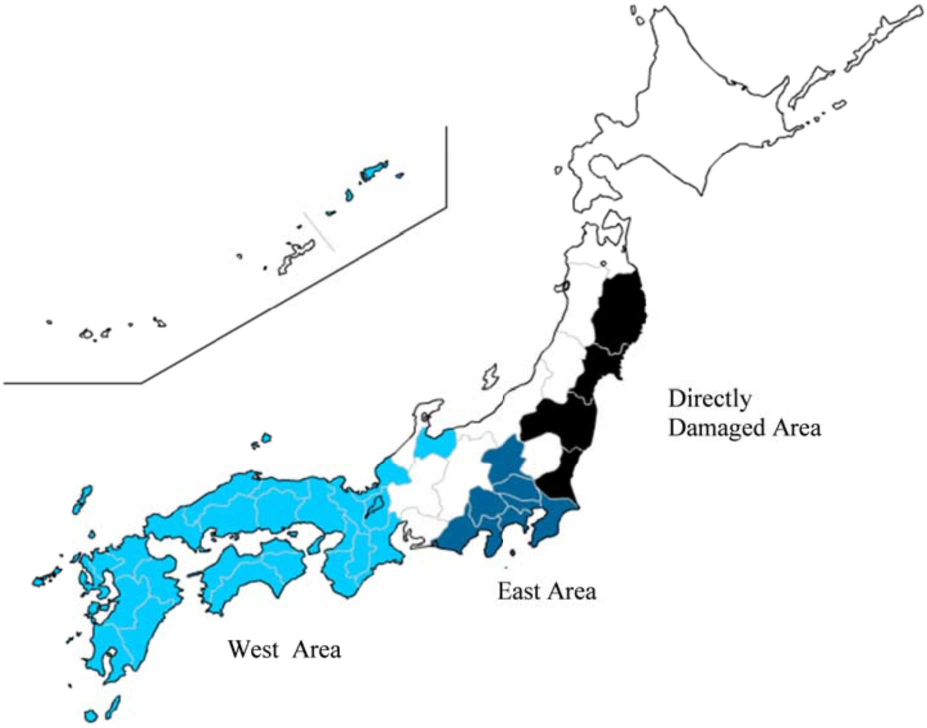


Figure 3: Daily Expenditures on Foods

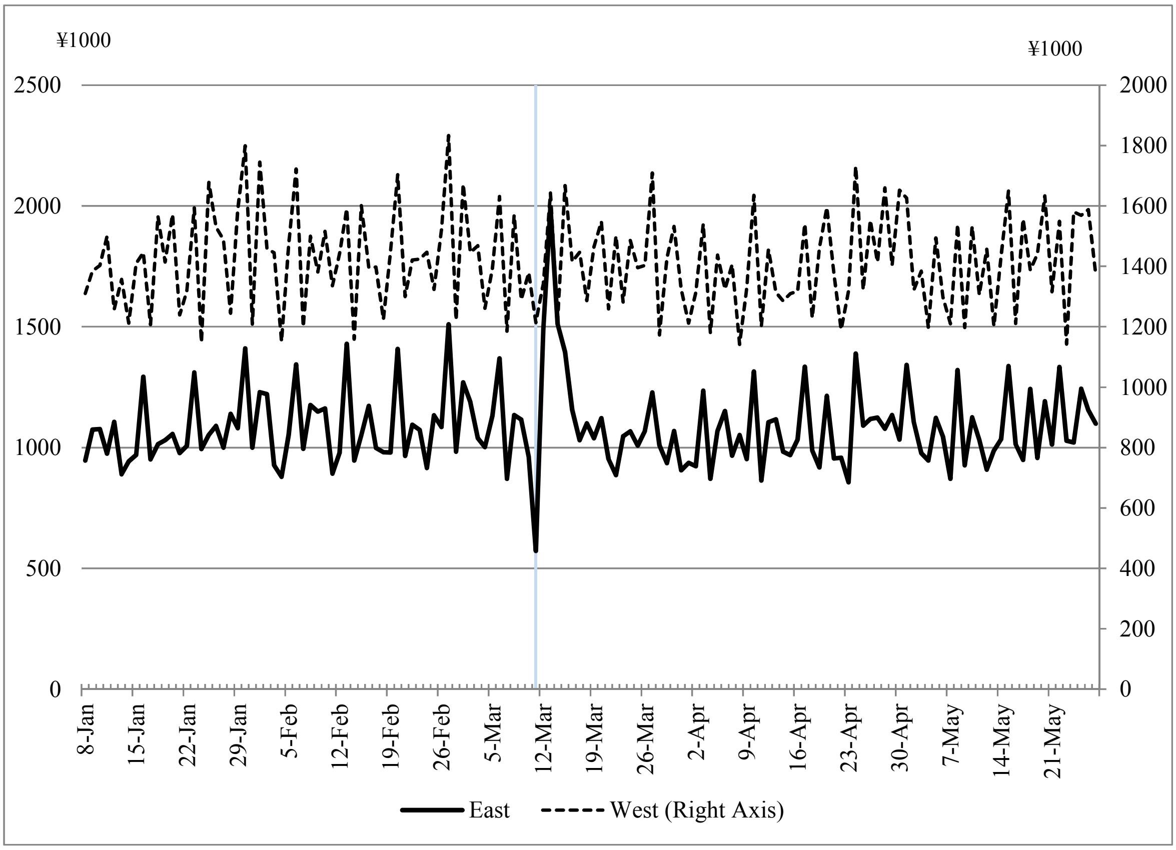


Figure 4: Weekly Expenditures on Foods

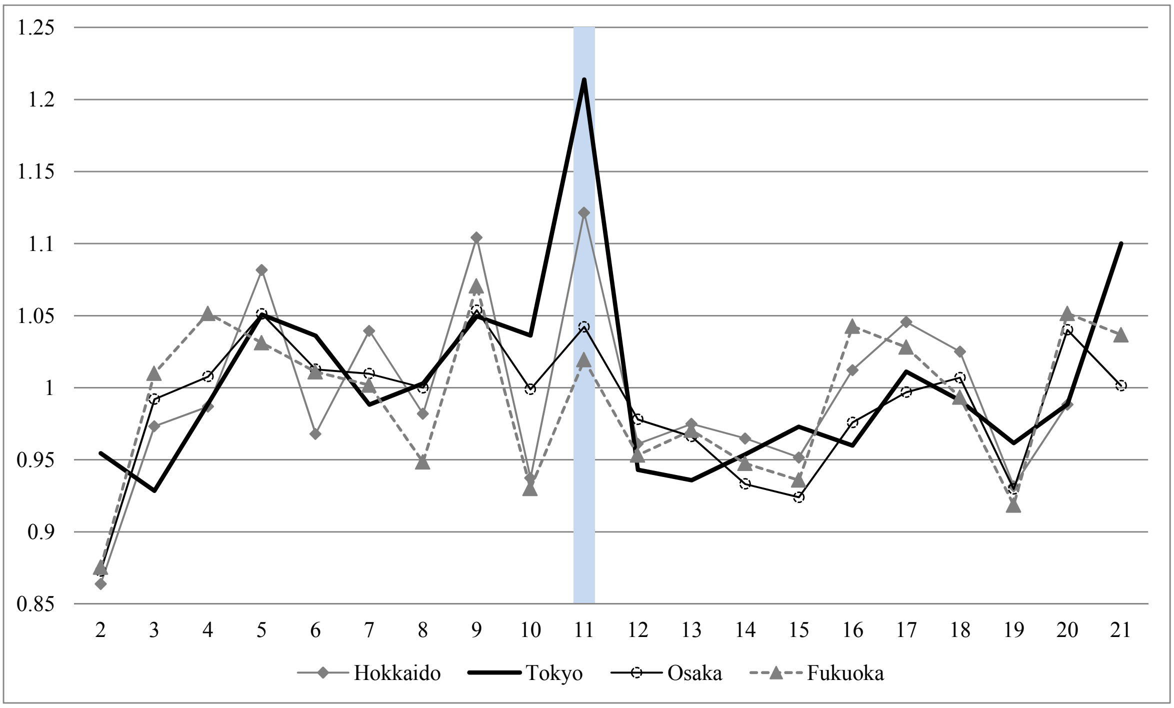


Figure 5: Fisher Price Index for Foods

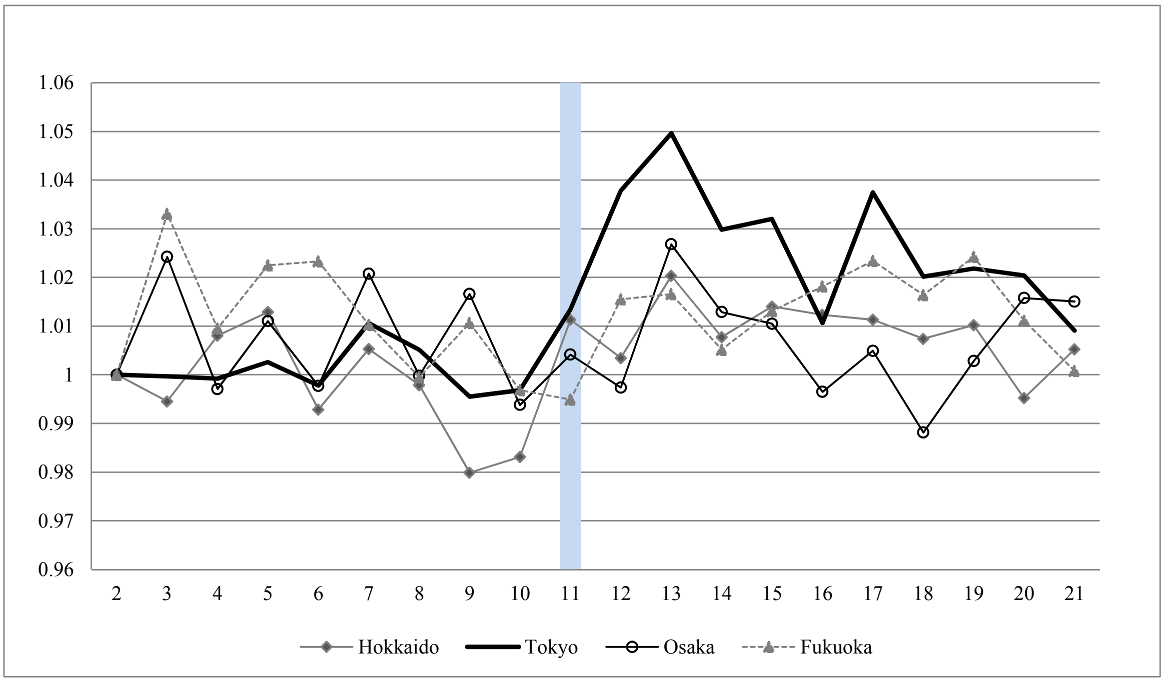
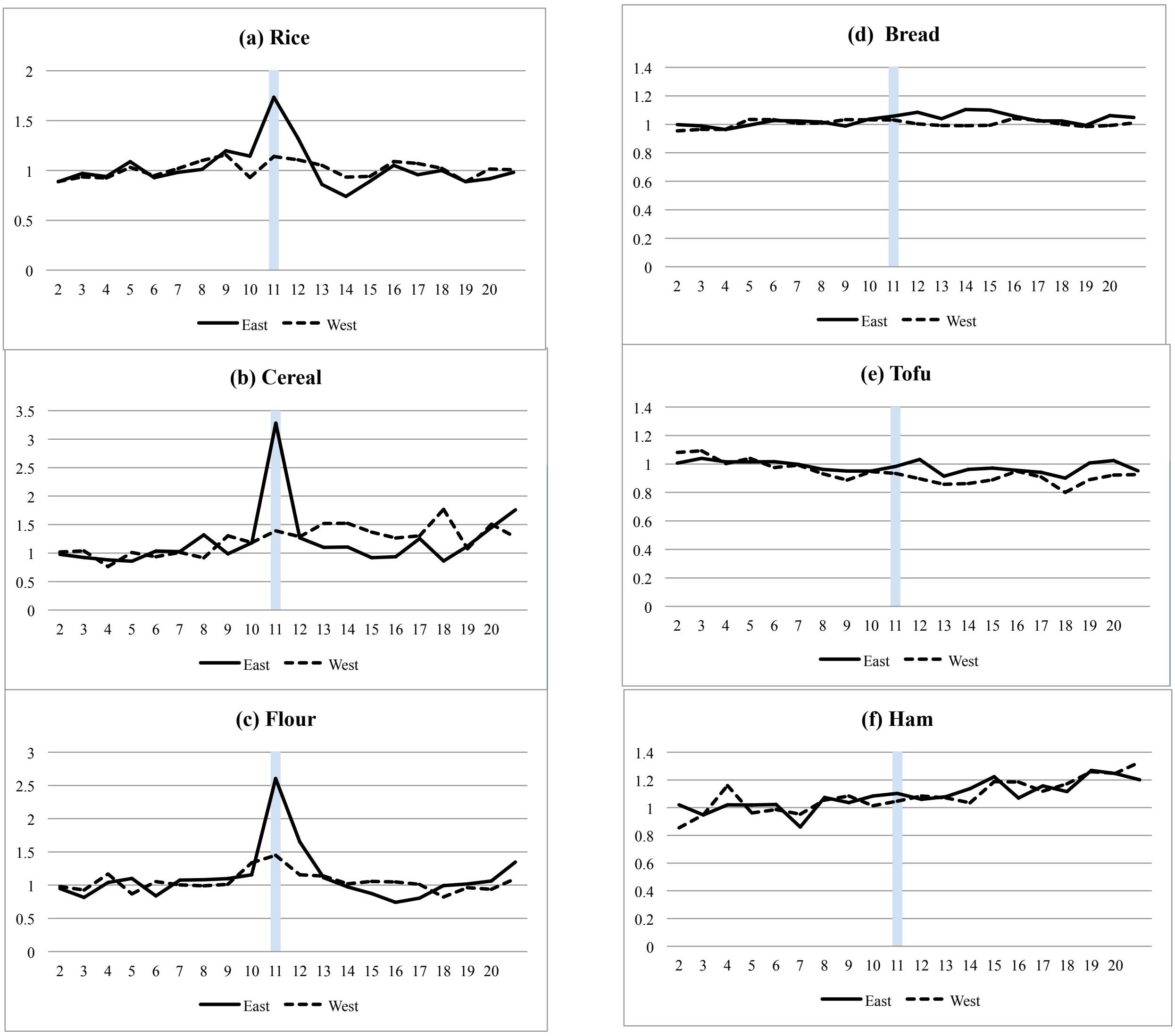


Figure 6: Expenditures on Several Categories

Storable Goods | Perishable Goods



Appendix Table 1: Weekly Frequency of Tremors whose Seismic Scale Is Greater Than 3.

pref_code	Prefecture Name	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
		week																
1	Hokkaido	0	0	0	0	0	0	4	0	0	1	0	0	0	0	0	0	0
2	Aomori	0	0	0	0	0	1	9	0	1	2	0	1	0	0	0	0	0
3	Iwate	0	0	0	0	0	1	27	3	4	4	3	0	0	1	1	0	0
4	Miyagi	0	0	0	0	0	2	30	8	5	5	3	1	3	0	0	0	0
5	Akita	0	0	0	0	0	1	8	1	0	2	1	1	0	0	0	0	0
6	Yamagata	0	0	0	0	0	1	13	0	1	1	2	0	1	0	0	0	0
7	Fukushima	0	1	0	0	0	1	37	8	4	4	19	4	4	4	2	3	2
8	Ibaraki	0	0	0	0	0	0	37	9	2	5	11	3	3	1	1	0	4
9	Tochigi	0	0	0	0	0	0	16	6	0	2	5	2	1	0	0	0	0
10	Gumma	0	0	0	0	0	0	5	1	0	2	3	1	1	0	0	0	0
11	Saitama	0	0	0	0	0	0	10	2	0	2	4	2	0	0	0	0	0
12	Chiba	0	1	0	0	0	0	15	3	0	2	3	2	1	0	0	0	2
13	Tokyo	0	0	0	0	0	0	4	0	0	0	2	1	0	0	0	0	0
14	Kanagawa	0	0	0	0	0	0	4	0	0	0	1	0	0	0	0	0	0
15	Niigata	0	0	0	0	0	0	10	0	0	1	2	1	0	0	0	0	0
16	Toyama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	Ishikawa	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
18	Fukui	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	Yamanashi	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
20	Nagano	0	0	0	0	0	0	23	0	1	0	2	0	0	0	0	0	0
21	Gifu	0	0	0	0	2	0	3	0	0	0	0	0	0	0	0	0	0
22	Shizuoka	1	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
23	Aichi	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
24	Mie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	Saga	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Kyoto	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	Osaka	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	Hyogo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	Nara	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	Wakayama	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
31	Tottori	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	Shimane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	Okayama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	Hiroshima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	Yamaguchi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	Tokushima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	Kagawa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	Ehime	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	Kochi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	Fukuoka	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	Saga	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	Nagasaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	Kumamoto	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	Oita	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	Miyazaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	Kagoshimia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: No major earthquakes occurred during in Week 2, 3, 4, and 7.

Source: Japan Meteorological Agency

Appendix Table 2: Movements of ln(Expenditures) on Staple Foods

	East			West			All		
Week	N	mean	sd	N	mean	sd	N	mean	sd
2	2791	6.41	1.00	3670	6.34	0.99	8174	6.37	1.00
3	2787	6.42	1.02	3748	6.38	0.97	8317	6.39	1.00
4	2771	6.43	1.04	3789	6.39	0.98	8330	6.40	1.01
5	2882	6.49	1.05	3887	6.39	1.02	8546	6.43	1.04
6	2780	6.49	1.00	3710	6.39	0.99	8229	6.41	1.00
7	2796	6.47	1.02	3710	6.39	1.00	8255	6.42	1.01
8	2775	6.49	1.03	3743	6.41	0.99	8251	6.43	1.02
9	2903	6.54	1.06	3931	6.42	1.02	8623	6.46	1.04
10	2786	6.51	1.03	3697	6.41	0.98	8208	6.43	1.00
11	2727	7.01	1.07	3718	6.49	1.01	8167	6.71	1.07
12	2555	6.66	1.05	3670	6.42	1.00	7860	6.50	1.03
13	2695	6.51	1.06	3745	6.41	1.03	8134	6.45	1.05
14	2512	6.43	0.99	3505	6.35	1.01	7642	6.37	1.00
15	2724	6.46	1.00	3710	6.35	0.99	8130	6.39	1.00
16	2708	6.46	1.03	3687	6.41	0.99	8105	6.42	1.01
17	2782	6.49	1.02	3816	6.42	1.00	8310	6.43	1.02
18	2627	6.50	1.03	3509	6.45	1.02	7764	6.46	1.03
19	2667	6.43	1.02	3694	6.37	0.98	8029	6.39	1.00
20	2716	6.49	0.99	3715	6.39	0.99	8155	6.42	1.00
21	2837	6.54	1.02	3846	6.46	0.99	8396	6.47	1.02
	54821	6.51	1.03	74500	6.40	1.00	163625	6.44	1.02

Appendix Table 3: Weekly Shopping Frequencies

	East					West					All				
week	N	mean	sd	min	max	N	mean	sd	min	max	N	mean	sd	min	max
2	3853	2.94	2.54	0	15	5063	2.86	2.44	0	20	11312	2.83	2.44	0	20
3	3853	2.99	2.62	0	19	5063	3.00	2.55	0	22	11312	2.94	2.53	0	22
4	3853	3.04	2.68	0	18	5063	3.04	2.61	0	19	11312	2.98	2.58	0	19
5	3853	3.25	2.71	0	19	5063	3.13	2.59	0	22	11312	3.13	2.60	0	22
6	3853	3.07	2.75	0	20	5063	2.97	2.59	0	23	11312	2.94	2.60	0	23
7	3853	2.93	2.60	0	18	5063	2.93	2.54	0	21	11312	2.90	2.54	0	21
8	3853	3.00	2.63	0	18	5063	3.01	2.58	0	19	11312	2.94	2.56	0	20
9	3853	3.30	2.69	0	18	5063	3.20	2.59	0	19	11312	3.18	2.59	0	19
10	3853	3.00	2.68	0	19	5063	2.93	2.57	0	23	11312	2.91	2.58	0	23
11	3853	3.13	2.92	0	21	5063	2.94	2.56	0	18	11312	2.97	2.67	0	21
12	3853	2.85	2.81	0	22	5063	2.81	2.51	0	17	11312	2.77	2.58	0	22
13	3853	3.07	2.83	0	22	5063	2.98	2.57	0	21	11312	2.95	2.63	0	22
14	3853	2.82	2.80	0	24	5063	2.80	2.60	0	22	11312	2.75	2.62	0	24
15	3853	3.01	2.74	0	21	5063	2.93	2.54	0	19	11312	2.91	2.58	0	21
16	3853	3.04	2.78	0	21	5063	3.01	2.63	0	17	11312	2.97	2.63	0	21
17	3853	3.06	2.72	0	18	5063	3.06	2.61	0	19	11312	2.99	2.62	0	19
18	3853	2.84	2.71	0	17	5063	2.82	2.61	0	21	11312	2.78	2.59	0	21
19	3853	2.92	2.66	0	21	5063	2.92	2.53	0	19	11312	2.87	2.55	0	21
20	3853	3.03	2.75	0	19	5063	2.99	2.59	0	19	11312	2.95	2.61	0	19
21	3853	3.15	2.75	0	20	5063	3.14	2.60	0	18	11312	3.06	2.62	0	20
Total	77060	3.02	2.72	0	24	101260	2.97	2.57	0	23	226240	2.94	2.59	0	24

Appendix Table 4: Shopping Interval (in Weeks)

	East									West								
week	Foods			Staple			Non Staple			Foods			Staple			Non Staple		
	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd	N	mean	sd
2	3158	1	0	2791	1	0	3140	1	0	4099	1	0	3670	1	0	4086	1	0
3	3136	1.10	0.30	2787	1.18	0.38	3127	1.11	0.31	4172	1.11	0.32	3748	1.18	0.39	4159	1.12	0.32
4	3143	1.15	0.44	2771	1.25	0.57	3130	1.15	0.45	4194	1.16	0.47	3789	1.25	0.58	4179	1.16	0.47
5	3283	1.25	0.69	2882	1.36	0.80	3262	1.25	0.70	4294	1.20	0.61	3887	1.30	0.72	4279	1.20	0.61
6	3119	1.14	0.51	2780	1.28	0.74	3104	1.14	0.52	4092	1.14	0.50	3710	1.26	0.73	4077	1.14	0.51
7	3125	1.16	0.54	2796	1.29	0.77	3113	1.17	0.56	4121	1.16	0.55	3710	1.26	0.71	4108	1.17	0.55
8	3148	1.19	0.61	2775	1.31	0.81	3142	1.19	0.62	4176	1.20	0.64	3743	1.30	0.80	4166	1.20	0.65
9	3279	1.28	0.89	2903	1.47	1.20	3265	1.28	0.90	4389	1.28	0.94	3931	1.43	1.14	4377	1.29	0.94
10	3099	1.17	0.72	2786	1.30	0.91	3088	1.17	0.72	4112	1.14	0.68	3697	1.28	0.90	4096	1.15	0.68
11	2960	1.15	0.56	2727	1.30	0.87	2949	1.15	0.58	4101	1.15	0.56	3718	1.27	0.78	4077	1.16	0.57
12	2907	1.20	0.59	2555	1.29	0.77	2889	1.20	0.60	4055	1.17	0.54	3670	1.31	0.87	4039	1.17	0.55
13	3067	1.40	1.12	2695	1.56	1.33	3054	1.40	1.12	4192	1.28	0.87	3745	1.43	1.16	4172	1.28	0.87
14	2893	1.30	1.20	2512	1.41	1.24	2875	1.31	1.20	3922	1.25	1.13	3505	1.37	1.22	3908	1.25	1.13
15	3092	1.24	0.72	2724	1.42	1.06	3079	1.25	0.73	4125	1.20	0.64	3710	1.33	0.88	4107	1.21	0.66
16	3098	1.20	0.71	2708	1.37	0.99	3086	1.21	0.73	4080	1.18	0.72	3687	1.31	0.93	4067	1.19	0.73
17	3124	1.23	0.77	2782	1.42	1.14	3113	1.25	0.81	4248	1.24	0.82	3816	1.37	1.10	4238	1.24	0.83
18	2977	1.32	1.40	2627	1.46	1.54	2962	1.32	1.34	3941	1.29	1.35	3509	1.44	1.57	3917	1.29	1.35
19	3052	1.24	0.81	2667	1.40	1.16	3038	1.25	0.92	4105	1.24	0.95	3694	1.40	1.18	4084	1.25	0.94
20	3096	1.21	0.74	2716	1.38	1.10	3087	1.22	0.74	4163	1.18	0.68	3715	1.31	0.87	4150	1.19	0.71
21	3174	1.22	0.78	2837	1.40	1.18	3168	1.22	0.79	4223	1.19	0.70	3846	1.34	0.97	4208	1.19	0.70
Total	61930	1.21	0.77	54821	1.34	0.99	61671	1.21	0.78	82804	1.19	0.74	74500	1.31	0.94	82494	1.19	0.74

Note: The shopping interval from the last purchase. In each week, only households with positive purchases are included when calculation this table.

Appendix Table 5: The Ratio of HHs with Positive Expenditures

week	East			West			All		
	Foods	Staple	Non Staple	Foods	Staple	Non Staple	Foods	Staple	Non Staple
2	0.82	0.72	0.81	0.81	0.72	0.81	0.82	0.72	0.81
3	0.81	0.72	0.81	0.82	0.74	0.82	0.82	0.74	0.82
4	0.82	0.72	0.81	0.83	0.75	0.83	0.83	0.74	0.82
5	0.85	0.75	0.85	0.85	0.77	0.85	0.85	0.76	0.84
6	0.81	0.72	0.81	0.81	0.73	0.81	0.81	0.73	0.81
7	0.81	0.73	0.81	0.81	0.73	0.81	0.81	0.73	0.81
8	0.82	0.72	0.82	0.82	0.74	0.82	0.82	0.73	0.82
9	0.85	0.75	0.85	0.87	0.78	0.86	0.86	0.76	0.85
10	0.80	0.72	0.80	0.81	0.73	0.81	0.81	0.73	0.81
11	0.77	0.71	0.77	0.81	0.73	0.81	0.79	0.72	0.79
12	0.75	0.66	0.75	0.80	0.72	0.80	0.78	0.69	0.78
13	0.80	0.70	0.79	0.83	0.74	0.82	0.81	0.72	0.81
14	0.75	0.65	0.75	0.77	0.69	0.77	0.77	0.68	0.76
15	0.80	0.71	0.80	0.81	0.73	0.81	0.81	0.72	0.81
16	0.80	0.70	0.80	0.81	0.73	0.80	0.81	0.72	0.80
17	0.81	0.72	0.81	0.84	0.75	0.84	0.82	0.73	0.82
18	0.77	0.68	0.77	0.78	0.69	0.77	0.78	0.69	0.77
19	0.79	0.69	0.79	0.81	0.73	0.81	0.80	0.71	0.80
20	0.80	0.70	0.80	0.82	0.73	0.82	0.81	0.72	0.81
21	0.82	0.74	0.82	0.83	0.76	0.83	0.83	0.74	0.82
Total	0.80	0.71	0.80	0.82	0.74	0.81	0.81	0.72	0.81

Appendix Table 6: Intensive Margin

	East						West						All					
	Foods		Staple		Non Staple		Foods		Staple		Non Staple		Foods		Staple		Non Staple	
Week	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
2	-0.07	0.44	-0.06	0.68	-0.07	0.45	-0.08	0.44	-0.05	0.65	-0.08	0.45	-0.08	0.44	-0.06	0.67	-0.08	0.45
3	-0.05	0.45	-0.05	0.69	-0.04	0.46	-0.03	0.44	-0.03	0.64	-0.03	0.46	-0.04	0.45	-0.04	0.67	-0.03	0.46
4	-0.03	0.46	-0.06	0.68	-0.02	0.48	-0.02	0.45	-0.02	0.66	-0.02	0.47	-0.03	0.46	-0.04	0.68	-0.02	0.47
5	0.02	0.48	0.01	0.73	0.02	0.49	0.01	0.47	-0.01	0.69	0.02	0.49	0.01	0.48	0.00	0.71	0.02	0.49
6	-0.01	0.47	0.00	0.74	-0.01	0.48	-0.02	0.45	-0.01	0.69	-0.02	0.47	-0.02	0.46	-0.01	0.71	-0.02	0.47
7	-0.03	0.46	-0.01	0.71	-0.03	0.47	-0.03	0.46	-0.02	0.67	-0.02	0.47	-0.02	0.46	-0.01	0.70	-0.02	0.48
8	-0.02	0.47	0.01	0.73	-0.03	0.48	-0.02	0.46	0.00	0.69	-0.03	0.47	-0.03	0.46	0.00	0.71	-0.03	0.47
9	0.04	0.47	0.03	0.73	0.04	0.48	0.02	0.48	0.01	0.68	0.02	0.50	0.03	0.48	0.01	0.71	0.03	0.49
10	-0.05	0.48	0.03	0.82	-0.05	0.51	-0.06	0.48	0.02	0.78	-0.06	0.50	-0.06	0.48	0.01	0.80	-0.06	0.50
11	0.10	0.56	0.41	1.02	0.03	0.55	-0.05	0.49	0.08	0.85	-0.06	0.50	0.01	0.52	0.21	0.94	-0.02	0.52
12	-0.09	0.49	0.12	0.88	-0.11	0.50	-0.07	0.49	0.03	0.79	-0.08	0.51	-0.08	0.49	0.05	0.84	-0.09	0.51
13	-0.06	0.51	0.02	0.84	-0.05	0.52	-0.05	0.51	-0.01	0.79	-0.04	0.53	-0.05	0.51	0.00	0.82	-0.05	0.52
14	-0.11	0.46	-0.07	0.76	-0.09	0.49	-0.11	0.46	-0.04	0.76	-0.10	0.49	-0.11	0.47	-0.06	0.76	-0.09	0.49
15	-0.05	0.48	-0.02	0.79	-0.04	0.50	-0.09	0.46	-0.05	0.74	-0.08	0.48	-0.07	0.47	-0.04	0.77	-0.06	0.49
16	-0.07	0.48	-0.03	0.80	-0.05	0.49	-0.04	0.47	0.01	0.79	-0.04	0.49	-0.05	0.47	-0.01	0.79	-0.04	0.49
17	-0.04	0.49	0.01	0.83	-0.03	0.51	-0.04	0.49	0.01	0.77	-0.03	0.52	-0.04	0.49	0.00	0.79	-0.03	0.52
18	-0.04	0.53	0.00	0.82	-0.03	0.55	-0.05	0.51	0.02	0.82	-0.04	0.54	-0.04	0.52	0.01	0.82	-0.03	0.54
19	-0.08	0.48	-0.04	0.79	-0.06	0.51	-0.08	0.49	-0.04	0.76	-0.07	0.52	-0.08	0.48	-0.04	0.77	-0.06	0.51
20	-0.04	0.47	0.01	0.81	-0.03	0.49	-0.07	0.47	-0.01	0.76	-0.07	0.50	-0.06	0.47	0.00	0.79	-0.05	0.50
21	-0.02	0.48	0.05	0.84	-0.01	0.51	0.00	0.49	0.06	0.80	0.00	0.51	-0.02	0.49	0.04	0.82	-0.01	0.51
Total	-0.03	0.48	0.02	0.79	-0.03	0.50	-0.04	0.47	0.00	0.74	-0.04	0.49	-0.04	0.48	0.00	0.77	-0.04	0.50

Appendix Table 7: The Age of the Youngest Child and Weekly Food Expenditures

week	weekly_sales11	weekly_quantity11	weekly_variety11	weekly_sales12	weekly_quantity12	weekly_variety12	weekly_sales21	weekly_quantity21	weekly_variety21	weekly_sales22	weekly_quantity22	weekly_variety22	weekly_sales31	weekly_quantity31	weekly_variety31	weekly_sales32	weekly_quantity32	weekly_variety32	weekly_sales41	weekly_quantity41	weekly_variety41
2	4927	26	20	4370	26	19	4781	30	23	4359	27	22	4412	27	22	4422	29	23	4895	30	24
3	5001	27	20	4700	27	21	4571	29	22	4818	31	24	4394	25	21	4988	33	26	5088	31	25
4	5265	28	20	4910	28	21	4447	27	22	4464	29	23	4524	27	22	4516	30	24	5129	32	26
5	5686	30	22	5030	29	21	5110	28	21	4934	32	25	4886	29	24	5004	32	25	5945	35	27
6	5342	28	21	4744	28	21	4922	29	22	4505	30	23	4391	28	22	5114	33	25	5414	33	26
7	5277	28	21	4801	27	20	4664	30	22	5174	32	24	4524	27	22	4720	30	24	5364	30	24
8	5271	28	21	4919	28	21	4656	28	22	4325	29	23	4509	27	22	4916	31	25	5320	31	25
9	5836	31	21	5154	29	21	5286	31	25	5023	32	25	5154	30	24	5032	32	25	5740	33	26
10	5434	29	21	4749	28	21	4694	30	24	4701	30	24	4032	24	20	4573	29	23	5432	33	26
11	6304	33	24	4840	28	21	5883	37	25	4859	31	23	5965	37	27	4486	30	23	8080	47	35
12	5207	27	20	4897	28	20	4637	28	20	4495	29	23	4248	25	20	4461	29	22	4563	27	21
13	5195	28	20	5038	29	20	4187	26	19	4799	30	23	4766	28	22	4937	31	24	5255	31	24
14	5050	27	20	4637	27	20	4527	27	21	4666	30	23	4082	25	20	4395	30	24	4794	29	23
15	5229	27	21	4435	26	20	4860	30	23	4528	28	22	4314	25	20	4571	31	24	5793	33	26
16	5298	28	21	4792	27	21	4992	32	23	5025	31	25	4206	27	21	4596	30	24	5045	30	25
17	5285	28	21	4982	29	21	4844	28	21	4575	29	23	4406	26	22	4945	31	25	5323	32	26
18	5705	29	21	5105	29	20	4297	27	20	4637	28	22	4170	24	19	4949	32	24	4957	30	24
19	5102	27	20	4614	27	20	4628	30	23	4652	28	23	4262	27	22	4441	29	23	5147	31	25
20	5326	28	21	4801	28	21	4662	29	23	4730	29	23	4596	29	24	4438	30	24	5344	33	26
21	5730	30	22	4995	29	21	5241	35	25	4888	32	24	4128	26	21	5124	33	26	5472	34	26

week	weekly_sales42	weekly_quantity42	weekly_variety42	weekly_sales51	weekly_quantity51	weekly_variety51	weekly_sales52	weekly_quantity52	weekly_variety52	weekly_sales61	weekly_quantity61	weekly_variety61	weekly_sales62	weekly_quantity62	weekly_variety62	weekly_sales71	weekly_quantity71	weekly_variety71	weekly_sales72	weekly_quantity72	weekly_variety72
2	4506	29	23	5482	33	25	5186	34	26	5634	36	27	5315	35	28	6147	33	27	5143	33	26
3	4563	31	24	5608	33	26	5228	34	27	6188	37	28	5641	36	27	6333	34	27	5504	34	27
4	4394	30	23	5868	35	27	5588	36	28	5959	36	28	5604	36	28	6105	33	27	5965	37	28
5	4666	31	23	5932	35	27	5768	36	27	6094	36	28	6150	38	29	6357	35	28	5574	35	26
6	4663	31	24	5809	35	27	5469	36	28	6961	41	31	5627	36	28	6638	37	29	5419	34	26
7	4884	31	23	5954	35	27	5092	32	25	5766	34	26	5532	35	27	6047	34	25	5536	34	26
8	5034	31	24	5448	32	25	5096	33	26	6155	36	27	5362	35	27	6156	33	26	5392	33	25
9	4873	31	23	6244	37	27	5537	35	26	6404	38	28	5619	36	27	6527	36	27	5243	33	25
10	4555	31	24	5639	33	26	4929	33	26	6305	37	29	5473	36	27	6283	32	25	5386	33	25
11	4674	31	24	7391	45	31	5153	33	25	7089	41	30	5485	36	27	6901	37	28	5419	35	26
12	4474	29	22	5701	31	23	4800	32	25	5533	32	24	5184	33	25	5820	30	23	5363	32	24
13	3942	27	20	5328	30	24	5122	32	24	5706	33	25	5041	33	25	5503	31	24	5244	32	23
14	4057	27	21	5267	31	24	4949	30	24	5729	34	26	5008	32	25	6070	32	26	5048	31	24
15	4555	30	23	5401	32	25	4823	33	26	6290	36	28	5516	35	28	6029	34	27	5105	32	25
16	4720	31	24	5425	32	25	5069	32	26	6144	35	28	5536	35	27	6177	33	26	5357	33	25
17	4788	30	23	6174	35	28	5101	34	26	6224	37	27	5826	35	27	6193	34	26	5141	32	25
18	4252	29	21	5424	31	24	5045	34	24	5783	34	26	5430	33	25	6123	33	25	5366	32	24
19	4523	30	23	5487	33	26	4874	32	26	5842	34	26	5063	34	26	5945	35	27	5149	33	25
20	4470	30	23	5771	34	26	5190	33	26	6394	37	28	5560	35	27	6217	36	28	5522	34	26
21	5259	33	25	6389	39	30	5441	35	27	6442	37	28	5643	36	28	6600	36	28	5460	34	26

Appendix Table 8: The Wife's Work Status and Weekly Food Expenditures

week	weekly_sales11	weekly_quantity11	weekly_variety11	weekly_sales12	weekly_quantity12	weekly_variety12	weekly_sales21	weekly_quantity21	weekly_variety21	weekly_sales22	weekly_quantity22	weekly_variety22	weekly_sales31	weekly_quantity31	weekly_variety31
2	5407	29	22	4502	28	21	5229	30	23	4598	30	23	4356	25	18
3	5627	31	23	4874	29	22	5299	30	23	4980	32	24	4318	25	19
4	5393	29	22	4714	29	22	5446	31	24	5040	32	24	5754	31	23
5	6244	34	24	5154	32	23	5701	32	24	5220	32	24	5242	28	19
6	5813	32	23	4718	29	22	5573	32	25	5043	32	24	5602	31	22
7	5480	29	22	5028	30	22	5532	31	24	4924	30	23	5011	28	20
8	5500	30	22	4752	29	22	5431	31	23	4937	30	24	5501	27	19
9	6207	34	23	4729	29	20	5822	33	25	5055	31	23	6779	33	21
10	5790	31	23	4599	29	22	5553	32	24	4898	31	24	5020	26	20
11	6856	37	25	4682	29	21	6593	37	27	4872	31	24	5262	29	21
12	5338	28	20	4212	25	19	5168	29	21	4859	29	23	5293	26	18
13	5499	29	21	4747	29	20	5077	29	22	4906	30	22	5128	28	20
14	5071	29	21	4508	27	20	5222	30	23	4599	29	23	5449	27	20
15	5659	31	23	4226	27	21	5473	31	24	4782	30	23	5304	28	23
16	5476	30	22	4666	28	21	5415	31	24	4904	30	24	4962	25	19
17	5278	28	21	4642	27	21	5559	32	24	4957	31	24	5320	29	22
18	5910	31	22	5092	30	22	5484	30	23	5081	31	23	5448	30	20
19	5503	31	23	4423	28	21	5236	31	24	4667	29	23	4159	22	17
20	5751	31	23	4670	28	21	5499	32	25	4885	31	23	5687	28	21
21	6041	32	24	4913	30	22	5885	34	26	5230	32	25	5991	32	23

week	weekly_sales32	weekly_quantity32	weekly_variety32	weekly_sales51	weekly_quantity51	weekly_variety51	weekly_sales52	weekly_quantity52	weekly_variety52	weekly_sales61	weekly_quantity61	weekly_variety61	weekly_sales62	weekly_quantity62	weekly_variety62
2	5214	29	22	5454	29	23	5111	29	23	4971	27	21	4572	27	21
3	4658	29	22	5212	30	25	4924	29	23	5144	28	22	4871	29	22
4	4746	28	22	5082	28	23	4945	29	23	5264	28	21	5124	30	22
5	5433	32	21	6214	34	28	5105	31	24	5704	31	23	5163	31	23
6	5060	31	22	4771	27	21	4927	28	22	5566	31	23	4888	29	22
7	5069	29	22	6023	32	26	4985	29	22	5205	28	22	5038	29	22
8	4818	29	23	4351	26	23	4857	30	25	5327	28	22	5115	30	22
9	5539	33	23	7040	35	28	5415	33	25	5845	31	23	5451	32	23
10	4620	27	20	5692	34	26	4474	27	21	5373	28	22	4922	29	22
11	5444	29	22	6559	36	28	5051	30	24	6670	36	26	5060	30	22
12	4223	24	19	5065	27	22	4804	29	22	5236	27	20	5125	30	22
13	4365	28	18	5143	30	23	5632	34	26	5292	29	21	5069	30	22
14	4879	29	22	3972	24	20	4302	25	20	5075	28	21	4813	29	21
15	4551	26	19	4845	28	24	4907	27	22	5232	28	22	4619	28	21
16	5023	29	22	5393	31	26	4913	29	24	5335	29	22	5037	29	22
17	4791	28	21	5520	29	24	4971	29	22	5426	29	22	5237	31	23
18	5033	30	20	5982	31	23	4461	28	20	5434	29	21	5001	29	21
19	4736	25	20	4969	28	24	4714	30	23	5205	28	22	4846	29	22
20	4600	27	21	5396	31	25	5066	29	23	5356	29	23	5020	29	22
21	4627	28	21	5158	27	21	5116	31	24	5662	31	23	5169	31	23

Appendix Table 9: Descriptive Statistics by Prefectures

week	Hokkaido_Sales	Hokkaido_Quantity	Hokkaido_Variety	Aomori_Sales	Aomori_Quantity	Aomori_Variety	Iwata_Sales	Iwata_Quantity	Iwata_Variety	Miyagi_Sales	Miyagi_Quantity	Miyagi_Variety	Akita_Sales	Akita_Quantity	Akita_Variety	Yamagata_Sales	Yamagata_Quantity	Yamagata_Variety	Fukushima_Sales	Fukushima_Quantity	Fukushima_Variety	Ibaraki_Sales	Ibaraki_Quantity	Ibaraki_Variety	Tochigi_Sales	Tochigi_Quantity	Tochigi_Variety	Gumma_Sales	Gumma_Quantity	Gumma_Variety	Saitama_Sales	Saitama_Quantity	Saitama_Variety	Chiba_Sales
2	4531	29	20	5343	34	25	5405	32	24	6069	33	27	3933	24	20	4425	27	21	5185	32	23	5477	34	25	4276	25	19	4973	29	21	5256	30	23	5059
3	5105	30	22	4877	30	24	6278	34	25	6354	33	26	4731	26	21	5931	30	23	4126	28	20	5606	34	26	4148	27	21	4471	28	21	5113	28	23	5445
4	5177	29	21	6135	35	27	5442	35	27	6995	38	29	4297	28	22	5102	37	23	4771	29	21	5745	34	25	4290	26	21	4628	29	20	5600	32	25	5308
5	5673	32	22	5088	31	24	5331	31	25	7295	38	29	4081	26	21	5358	32	24	4710	30	23	6157	38	26	5504	35	25	5510	33	23	6132	34	25	5656
6	5077	31	22	6030	38	25	5392	34	26	6784	40	32	5310	30	25	5522	32	25	4112	27	20	5713	36	26	4124	26	21	4874	30	21	5490	31	24	5470
7	5452	31	22	6096	33	25	6393	37	28	6441	37	30	4755	26	21	5816	32	22	5275	31	23	5459	33	24	4212	28	21	5035	30	22	5290	30	23	5424
8	5150	30	21	5210	32	24	4782	28	21	6761	35	27	4605	26	22	5548	29	23	4231	28	21	6113	38	25	5024	29	22	5363	32	22	5205	29	22	5355
9	5792	33	23	5998	34	26	6989	39	28	8003	40	30	5086	33	25	6113	33	25	6440	41	30	6215	38	26	4738	29	22	5469	33	23	6282	35	24	5966
10	4916	31	22	5435	32	23	5714	33	25	6810	37	30	5331	28	22	4497	27	19	4426	31	22	5311	32	23	4398	27	20	5213	30	22	5365	30	23	5359
11	5882	32	22	8170	44	30	4852	26	19	3646	13	10	6431	36	26	7066	41	27	5319	27	19	4815	27	19	4744	28	22	5929	34	23	6855	38	28	6761
12	5041	28	20	4138	27	19	4202	26	19	5392	28	21	4691	27	22	4100	24	17	3513	22	15	5527	32	24	4512	26	21	4570	27	19	5096	28	21	5334
13	5114	29	20	5671	30	23	6592	38	28	4890	23	18	5813	25	21	5263	24	17	4517	23	17	5799	33	24	4556	26	18	4619	27	19	5286	30	22	5267
14	5061	29	21	4905	27	19	5739	33	26	4801	27	18	4324	27	21	3846	25	18	4497	27	21	6209	34	26	4339	26	21	4469	26	20	5227	29	22	5032
15	4991	28	21	5586	31	25	7264	38	30	5152	27	21	5225	32	25	4942	27	20	3979	26	19	6340	35	27	5096	29	22	4818	29	21	5551	31	24	5563
16	5309	30	22	5137	33	23	5604	33	26	6058	34	28	4961	30	24	4874	28	22	4463	28	22	5977	36	26	4596	26	21	4967	29	22	5383	30	23	5342
17	5484	32	22	5350	33	24	6913	38	28	5272	31	24	4458	25	21	4906	25	19	4378	28	21	5992	34	26	4195	24	19	5072	30	21	5379	30	24	5595
18	5376	30	21	5710	32	24	6963	39	30	4272	23	17	5088	27	22	4594	25	19	5169	30	22	5395	31	23	4631	27	20	5694	29	20	5783	32	23	5495
19	4887	28	21	5602	32	25	5517	32	26	6542	30	23	4640	28	22	4432	25	19	4818	31	22	5424	31	23	4450	27	21	4826	31	23	5306	31	23	5105
20	5184	30	22	4584	28	22	5399	33	26	6592	34	27	4846	28	24	4189	26	20	5978	38	26	5792	33	25	4420	28	21	4970	32	23	5699	32	25	5475
21	5318	31	22	5077	33	24	5941	37	28	7574	41	28	4777	27	22	4922	24	20	5042	30	22	6081	35	26	5408	30	22	5673	34	24	5428	31	24	5888

week	Mie_Sales	Mie_Quantity	Mie_Variety	Shiga_Sales	Shiga_Quantity	Shiga_Variety	Kyoto_Sales	Kyoto_Quantity	Kyoto_Variety	Osaka_Sales	Osaka_Quantity	Osaka_Variety	Hyogo_Sales	Hyogo_Quantity	Hyogo_Variety	Nara_Sales	Nara_Quantity	Nara_Variety	Wakayama_Sales	Wakayama_Quantity	Wakayama_Variety	Tottori_Sales	Tottori_Quantity	Tottori_Variety	Shimane_Sales	Shimane_Quantity	Shimane_Variety	Okayama_Sales	Okayama_Quantity	Okayama_Variety	Hiroshima_Sales	Hiroshima_Quantity	Hiroshima_Variety	Yamaguchi_Sales
2	5515	34	27	5414	33	25	4878	28	22	4674	28	22	4596	29	22	4649	29	21	4817	30	22	4583	29	20	3502	23	20	4548	30	23	4898	31	24	4402
3	5250	32	25	5231	31	22	4826	29	23	5312	32	24	4931	30	23	4902	29	22	4865	28	21	4228	29	22	4867	30	24	5023	33	24	4892	32	25	5033
4	5337	32	24	5952	34	24	4903	31	23	5396	32	24	5535	33	24	5576	32	24	5055	29	21	4751	30	23	4277	28	23	4916	31	24	4483	29	23	5130
5	6432	38	27	6099	40	25	5580	32	24	5629	33	25	5145	30	23	5150	32	23	5096	31	23	4890	32	24	3974	25	20	5333	32	24	5181	32	25	4962
6	5294	33	25	4912	30	23	4838	30	23	5423	32	24	4926	31	24	5201	32	23	4750	29	21	4302	30	22	4306	26	22	5006	32	24	4907	30	24	5093
7	5809	29	23	5478	31	22	4864	30	24	5407	32	24	5108	30	23	5252	31	23	5111	31	22	4421	27	21	3913	24	20	4597	30	23	4878	29	23	5128
8	5749	35	27	5277	31	23	4789	29	22	5355	32	24	5178	30	23	4747	29	22	4634	27	20	5834	30	23	4388	24	20	4829	30	23	4868	30	23	4811
9	5273	33	24	6332	39	24	5414	34	24	5643	33	24	5351	32	23	5786	32	23	5561	31	22	4122	28	21	4132	27	21	4973	32	24	4868	29	23	4734
10	5177	31	24	5584	32	23	4684	29	22	5349	32	24	4895	30	23	4673	29	22	5484	31	23	4573	30	24	3651	24	20	5063	32	24	4487	28	22	4718
11	4804	28	22	5360	34	25	5002	30	23	5581	34	25	5173	31	23	5113	32	23	5226	34	23	4472	29	22	3855	24	20	4792	31	23	4707	31	23	4564
12	5147	32	24	4878	30	21	4694	28	22	5237	31	23	5317	30	22	5231	32	23	4687	25	18	5479	35	23	3680	23	19	4763	31	23	4643	27	22	4947
13	6119	38	26	6678	40	27	5005	30	22	5173	31	22	5172	32	22	5126	28	21	4517	27	18	4031	26	20	3775	25	20	4599	30	22	5062	30	22	4435
14	4801	28	22	5833	32	24	5069	30	23	4997	31	23	4486	27	21	4998	30	22	4576	28	21	3929	29	20	3647	24	20	4553	29	23	4622	29	22	4729
15	4929	30	23	4986	30	22	4542	28	21	4948	30	23	4543	28	21	4638	29	22	4829	27	21	4203	28	21	3921	23	20	4947	31	25	4512	29	23	4988
16	5350	33	26	5611	34	26	5254	31	24	5226	31	24	4974	30	22	4500	29	22	4988	28	21	5173	35	26	3968	24	21	5065	31	25	5297	31	25	4565
17	4564	30	21	6188	31	22	5027	31	22	5338	32	24	5260	31	23	4996	29	22	6192	34	24	4571	28	22	4142	23	20	5004	32	24	4775	30	24	5329
18	5588	34	26	6397	38	24	5158	30	22	5392	31	23	5075	30	22	5409	32	22	5077	28	19	4758	31	22	4599	27	22	5090	31	23	5140	30	23	5050
19	5065	30	24	4934	32	25	4548	28	22	4978	30	23	4675	28	22	5285	30	23	5056	28	21	5060	29	22	3721	23	20	4578	30	23	4631	29	23	5072
20	5043	32	24	5781	31	22	4972	30	23	5570	33	25	4920	29	22	4956	30	22	5070	30	22	3889	26	20	3997	24	21	4873	30	23	4921	31	23	4374
21	5517	32	25	4476	29	22	5101	31	24	5362	33	24	5431	33	24	5319	32	23	5068	29	21	5305	35	24	3988	24	20	5137	33	24	5247	33	25	5116

Chiba_Quantity	Chiba_Variety	Tokyo_Sales	Tokyo_Quantity	Tokyo_Variety	Kanagawa_Sales	Kanagawa_Quantity	Kanagawa_Variety	Niigata_Sales	Niigata_Quantity	Niigata_Variety	Toyama_Sales	Toyama_Quantity	Toyama_Variety	Ishikawa_Sales	Ishikawa_Quantity	Ishikawa_Variety	Fukui_Sales	Fukui_Quantity	Fukui_Variety	Yamanashi_Sales	Yamanashi_Quantity	Yamanashi_Variety	Nagano_Sales	Nagano_Quantity	Nagano_Variety	Gifu_Sales	Gifu_Quantity	Gifu_Variety	Shizuoka_Sales	Shizuoka_Quantity	Shizuoka_Variety	Aichi_Sales	Aichi_Quantity	Aichi_Variety
30	23	5343	29	22	5031	27	22	4962	31	23	4815	32	24	3887	25	19	4419	27	23	3600	22	19	4596	26	21	4694	29	22	4792	30	22	4843	30	23
31	25	5197	29	22	5663	29	23	5108	31	23	4655	31	25	4401	29	22	4884	31	25	4049	23	20	4289	26	20	5076	33	24	5100	30	24	5101	31	24
31	24	5535	30	23	5527	28	22	4738	29	21	4416	30	23	5687	34	25	5002	28	24	4473	26	21	4707	26	21	5353	32	25	4664	29	22	5014	31	23
32	25	5882	32	23	5783	31	24	5344	33	22	5031	35	26	4633	31	23	5389	34	25	4116	25	21	4887	30	21	5292	33	23	5128	31	22	5502	32	24
32	25	5799	32	24	5903	31	24	4817	29	22	4504	31	25	5013	30	22	4898	28	23	5178	28	23	4079	24	19	5053	32	25	4887	30	23	5126	30	23
31	24	5532	29	22	5457	29	23	5139	31	23	5575	33	26	5598	32	24	4761	29	23	3816	22	19	4980	27	21	5881	34	26	5459	31	23	4935	30	23
31	24	5614	30	22	5425	28	22	4907	27	21	4367	31	25	4876	29	22	4763	30	24	4014	25	20	4626	27	22	5817	32	26	5040	30	23	5082	31	23
34	25	5875	32	23	6139	31	24	5755	37	24	4554	32	23	4883	29	21	5442	32	25	4455	27	20	4685	28	21	5689	31	24	5345	32	23	5188	32	24
31	24	5800	31	23	5550	29	23	5353	32	24	4984	33	26	5465	33	25	4613	26	21	4259	24	21	4239	26	21	4678	30	23	5138	31	23	4982	29	22
39	27	6793	37	26	6499	34	26	6635	41	28	4498	30	23	4914	29	22	4735	28	23	5006	31	25	6203	34	25	5395	34	26	6143	34	26	5363	32	24
30	22	5278	27	20	5456	27	21	4769	26	18	4377	30	23	5345	34	25	4707	27	22	4148	24	18	3864	22	18	4718	29	22	5049	30	23	5023	30	23
31	23	5238	28	21	5293	28	21	4901	28	20	4997	30	23	4713	27	20	5155	28	21	4163	22	18	4519	27	20	4570	25	20	5313	30	22	5129	31	23
29	23	5338	29	22	5223	28	22	4582	28	21	4954	34	25	4199	29	22	4802	29	24	3553	22	18	4419	25	20	3759	24	19	4976	30	23	4966	30	23
31	25	5446	29	23	5311	29	23	4591	28	21	4096	29	22	5418	32	24	4767	30	25	4957	26	21	4233	23	19	4824	30	23	5038	31	23	4824	30	23
31	24	5373	29	22	5731	31	24	4617	27	21	5001	30	24	4846	31	23	4586	28	23	4448	26	22	4355	25	20	4833	28	22	5101	30	24	5230	31	24
31	24	5660	30	23	5616	30	23	5188	29	21	4517	31	24	5719	33	23	5345	31	24	4076	26	22	4492	26	20	5607	31	24	4733	29	21	4916	30	23
32	24	5547	29	21	5345	27	21	4928	30	21	5082	33	24	4972	28	21	4451	26	21	4735	25	20	4684	28	21	5135	30	23	5383	30	22	5402	31	23
30	23	5382	29	22	5272	29	22	4874	29	22	4543	31	24	5042	33	24	4582	29	24	4615	25	22	4257	24	19	4570	29	24	4877	31	23	4893	30	23
32	24	5532	30	23	5598	30	24	5339	32	23	4509	31	25	4821	28	22	4172	26	21	3980	27	21	4709	29	23	5079	32	25	5178	30	23	4944	30	23
34	26	6157	33	24	5773	31	24	5363	30	23	4828	33	25	5949	34	25	4504	28	22	4425	26	22	4895	27	22	4335	27	20	5380	33	24	5393	32	25

Yamaguchi_Quantity	Yamaguchi_Variety	Tokushima_Sales	Tokushima_Quantity	Tokushima_Variety	Kagawa_Sales	Kagawa_Quantity	Kagawa_Variety	Ehime_Sales	Ehime_Quantity	Ehime_Variety	Kochi_Sales	Kochi_Quantity	Kochi_Variety	Fukuoka_Sales	Fukuoka_Quantity	Fukuoka_Variety	Saga_Sales	Saga_Quantity	Saga_Variety	Nagasaki_Sales	Nagasaki_Quantity	Nagasaki_Variety	Kumamoto_Sales	Kumamoto_Quantity	Kumamoto_Variety	Oita_Sales	Oita_Quantity	Oita_Variety	Miyazaki_Sales	Miyazaki_Quantity	Miyazaki_Variety	Kagoshima_Sales	Kagoshima_Quantity	Kagoshima_Variety
29	23	4023	26	20	4724	30	22	4864	29	22	3771	24	19	4179	27	21	3385	21	16	4230	27	21	4398	26	20	5224	31	25	4832	29	22	3651	23	18
33	26	4202	28	21	4633	29	22	4782	28	21	5047	30	23	4821	28	21	3808	25	20	4678	29	22	5856	31	23	4075	27	22	5415	32	24	3802	26	20
32	25	4185	27	20	4807	30	23	5106	31	23	4197	26	21	5020	29	23	4649	25	19	4466	29	22	4862	27	20	4749	30	24	4411	27	21	3707	22	17
32	24	4232	28	19	5040	31	22	5574	34	25	4482	29	21	4922	29	22	4131	28	22	4631	29	22	5074	31	22	4455	30	24	5371	34	24	3998	26	19
30	24	4920	32	23	5027	32	24	4471	30	21	4837	28	23	4826	28	21	3530	23	18	4543	31	23	4460	26	20	5185	31	24	5499	29	22	3849	24	18
32	26	4600	31	22	5177	30	23	4713	28	22	4171	26	22	4782	28	21	4774	29	22	4782	29	22	4832	29	21	4186	26	20	4669	29	22	4044	26	20
29	24	4638	31	22	5370	32	25	5118	31	23	4459	27	22	4527	26	20	4615	24	19	4498	29	22	5833	32	23	4413	29	23	5419	33	24	4163	24	19
29	21	4312	29	21	4519	30	22	6230	38	26	5127	31	24	5110	29	22	3147	21	17	4492	28	21	5354	29	20	4898	31	24	5032	30	24	3969	23	18
30	24	4417	29	19	4452	29	21	5277	33	25	4326	26	21	4440	26	20	4181	26	22	4418	29	22	4589	24	20	4422	29	23	6137	36	26	4645	30	22
29	23	4390	28	20	4381	27	21	5216	32	24	4714	30	23	4866	28	22	3616	23	18	5094	29	22	4824	29	21	4045	28	22	5377	34	24	3652	23	17
30	24	4572	30	21	4711	30	22	4473	29	21	4331	26	21	4550	26	20	3875	25	18	4382	27	18	5002	31	23	4852	28	21	5627	32	23	3816	22	18
29	22	4816	30	21	4945	30	22	5212	32	21	4155	25	20	4633	28	21	3106	20	16	4354	28	22	5543	31	22	4431	29	22	5116	29	22	3898	24	17
30	24	3998	26	20	4292	27	21	4739	30	22	4412	27	23	4523	26	20	4088	26	19	4452	28	22	4992	29	22	4134	27	22	6288	32	24	3309	22	17
30	25	4591	30	23	4447	29	22	4702	29	21	4086	26	20	4467	26	20	3505	23	19	4406	30	22	5114	31	22	4542	32	24	4520	28	23	4467	22	17
28	24	4004	27	20	4907	29	22	4544	28	22	5087	30	24	4977	28	22	3713	22	18	4131	27	20	4994	29	22	4995	29	23	4840	29	22	3954	23	19
32	25	4484	29	21	4634	28	23	5099	31	22	4026	25	20	4908	29	22	4027	22	18	4611	28	22	4908	29	22	5416	34	26	5261	29	23	3664	23	17
31	23	4197	25	18	4423	28	20	5329	31	22	4225	26	21	4742	27	20	4162	28	20	4120	28	19	5190	31	21	4908	30	22	4873	31	23	4227	25	19
32	25	3864	26	19	4699	28	22	4368	27	20	4565	28	23	4385	27	21	3849	25	21	4529	30	22	5665	28	21	4511	27	21	5585	30	23	3434	21	17
27	22	4338	29	21	4534	28	22	4931	30	21	4780	29	23	5020	29	22	3460	23	19	4776	30	23	5041	28	20	4576	30	24	4506	26	20	3997	25	18
32	26	4504	28	20	4760	31	24	5523	34	23	5214	32	25	4949	31	23	5385	27	23	5540	33	25	5262	30	23	5181	32	25	5371	34	25	4012	25	20

Appendix Table 10: Price Indexes by Prefectures

week	Hokkaido_Paache	Hokkaido_Laspeyres	Hokkaido_Fisher	Aomori_Paache	Aomori_Laspeyres	Aomori_Fisher	Iwata_Paache	Iwata_Laspeyres	Iwata_Fisher	Miyagi_Paache	Miyagi_Laspeyres	Miyagi_Fisher	Akita_Paache	Akita_Laspeyres	Akita_Fisher	Yamagata_Paache	Yamagata_Laspeyres	Yamagata_Fisher	Fukushima_Paache	Fukushima_Laspeyres	Fukushima_Fisher	Ibaraki_Paache	Ibaraki_Laspeyres	Ibaraki_Fisher	Tochigi_Paache	Tochigi_Laspeyres	Tochigi_Fisher	Gumma_Paache	Gumma_Laspeyres	Gumma_Fisher
2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3	0.9855	1.0037	0.9946	1.0139	1.0250	1.0194	0.9772	1.0118	0.9944	1.0173	1.0327	1.0249	1.0398	1.0541	1.0469	1.1103	1.0892	1.0997	0.9715	0.9783	0.9749	1.0044	1.0206	1.0124	1.0013	1.0066	1.0040	0.9827	0.9691	0.9759
4	1.0037	1.0124	1.0080	0.9827	0.9796	0.9811	0.9805	0.9794	0.9800	1.0031	0.9996	1.0014	0.9689	0.9609	0.9649	0.9219	0.9702	0.9457	0.9707	0.9955	0.9830	1.0174	1.0352	1.0262	0.9917	0.9809	0.9863	0.9983	1.0096	1.0039
5	1.0098	1.0160	1.0129	0.9664	1.0020	0.9840	0.9499	0.9665	0.9582	1.0167	1.0135	1.0151	1.0489	1.0448	1.0468	0.9524	0.9741	0.9632	1.0834	1.0563	1.0697	0.9933	1.0097	1.0014	0.9774	0.9854	0.9814	0.9956	1.0258	1.0106
6	0.9900	0.9958	0.9929	1.0011	1.0006	1.0008	0.9611	0.9709	0.9660	1.0118	1.0108	1.0113	1.0063	1.0307	1.0185	0.9538	0.9853	0.9694	0.9819	0.9806	0.9813	0.9858	0.9989	0.9923	1.0114	1.0150	1.0132	0.9734	0.9700	0.9717
7	0.9992	1.0115	1.0053	0.9810	0.9947	0.9878	0.9606	0.9770	0.9688	1.0178	1.0103	1.0140	1.0659	1.1213	1.0932	1.1126	1.1332	1.1228	1.1085	1.0893	1.0988	0.9931	1.0041	0.9986	0.9877	0.9922	0.9899	1.0114	1.0021	1.0067
8	0.9876	1.0082	0.9979	0.9832	1.0016	0.9924	0.9617	0.9586	0.9601	0.9584	0.9864	0.9723	0.9985	0.9913	0.9949	0.9803	1.0388	1.0091	0.9739	0.9955	0.9847	0.9989	1.0245	1.0116	0.9368	0.9774	0.9569	1.0177	1.0205	1.0191
9	0.9743	0.9855	0.9799	0.9852	1.0009	0.9930	1.0067	1.0179	1.0123	0.9728	0.9777	0.9753	1.0090	0.9883	0.9986	0.9955	1.1434	1.0669	0.9808	0.9844	0.9826	1.0340	1.0403	1.0371	1.0047	1.0092	1.0070	1.0229	0.9994	1.0111
10	0.9783	0.9880	0.9831	0.9792	0.9822	0.9807	0.9824	0.9877	0.9850	1.0288	1.0512	1.0399	1.0394	1.0321	1.0357	1.1920	1.1519	1.1718	0.9949	0.9879	0.9914	1.0254	1.0379	1.0316	0.9829	0.9921	0.9875	1.0023	1.0124	1.0073
11	1.0077	1.0150	1.0113	1.0721	1.0428	1.0574	1.0342	1.0366	1.0354	1.1138	1.1159	1.1149	1.0554	1.0663	1.0608	1.0205	0.9998	1.0101	1.0831	1.0554	1.0692	1.0719	1.0968	1.0842	1.0184	1.0340	1.0262	1.0335	1.0207	1.0271
12	0.9974	1.0096	1.0035	1.0311	1.0318	1.0314	1.0503	1.0349	1.0426	1.0469	1.0382	1.0425	1.1427	1.1337	1.1382	1.2289	1.3531	1.2895	1.0261	0.9671	0.9962	1.0433	1.0631	1.0532	1.0342	1.0407	1.0375	1.0838	1.1027	1.0932
13	1.0108	1.0299	1.0203	1.0204	1.0061	1.0132	0.9696	1.0330	1.0008	1.0576	1.0626	1.0601	1.0638	1.1148	1.0890	1.1489	1.2834	1.2143	1.0660	1.0996	1.0827	1.0923	1.1041	1.0982	0.9938	1.0582	1.0255	1.0701	1.0750	1.0726
14	1.0036	1.0119	1.0078	1.0703	1.0679	1.0691	1.0425	1.0278	1.0351	1.0760	1.0432	1.0594	1.1327	1.1412	1.1369	1.0439	1.0953	1.0693	1.1842	1.0571	1.1189	1.0932	1.1070	1.1001	1.0632	1.0679	1.0655	1.0605	1.0605	1.0605
15	1.0075	1.0206	1.0140	1.0432	1.0529	1.0480	0.9840	1.0052	0.9945	1.1558	1.1332	1.1444	1.1170	1.1278	1.1224	1.1422	1.2053	1.1733	1.0930	1.0926	1.0928	1.0748	1.0999	1.0872	1.0309	1.0595	1.0451	1.0589	1.0583	1.0586
16	1.0010	1.0238	1.0123	1.0223	1.0147	1.0185	1.0036	1.0175	1.0105	1.0870	1.1869	1.1359	1.0487	1.0622	1.0554	1.0910	1.2144	1.1510	1.0405	1.0399	1.0402	1.0500	1.0615	1.0558	0.9924	0.9840	0.9882	1.0351	1.0423	1.0387
17	0.9983	1.0245	1.0113	1.0101	0.9970	1.0036	1.0511	1.0727	1.0619	1.0900	1.1587	1.1239	1.1111	1.0819	1.0964	1.0164	1.0235	1.0199	1.1009	1.1022	1.1016	1.0517	1.0534	1.0526	0.9630	1.0545	1.0077	1.0126	1.0199	1.0163
18	0.9986	1.0163	1.0074	0.9890	0.9963	0.9926	0.9826	1.0311	1.0066	1.0609	1.0535	1.0572	1.0760	1.1118	1.0938	1.1114	1.1739	1.1423	1.0808	1.0570	1.0688	1.0611	1.0822	1.0716	0.9989	1.0076	1.0032	1.0816	1.0740	1.0778
19	1.0019	1.0185	1.0102	1.0247	1.0058	1.0152	1.0490	1.0506	1.0498	1.0365	1.0273	1.0319	1.0763	1.0792	1.0778	0.9831	1.0625	1.0221	1.0300	1.0912	1.0601	1.0429	1.0527	1.0478	1.0167	0.9963	1.0065	1.0413	1.0430	1.0422
20	0.9876	1.0029	0.9952	1.0135	0.9955	1.0045	1.0073	1.0283	1.0177	1.0272	1.0432	1.0352	0.9854	1.0241	1.0046	1.0041	1.0206	1.0124	1.0717	1.0898	1.0807	1.0156	1.0272	1.0214	1.0276	1.0056	1.0165	1.0203	1.0266	1.0234
21	0.9971	1.0135	1.0053	0.9704	0.9699	0.9702	0.9775	0.9708	0.9741	1.0707	1.0847	1.0777	0.9941	0.9345	0.9638	1.2409	1.2345	1.2377	0.9449	0.9680	0.9564	1.0795	1.0851	1.0823	1.0268	1.0308	1.0288	1.0297	1.0504	1.0400

week	Ishikawa_Paache	Ishikawa_Laspeyres	Ishikawa_Fisher	Fukui_Paache	Fukui_Laspeyres	Fukui_Fisher	Yamanashi_Paache	Yamanashi_Laspeyres	Yamanashi_Fisher	Nagano_Paache	Nagano_Laspeyres	Nagano_Fisher	Gifu_Paache	Gifu_Laspeyres	Gifu_Fisher	Shizuoka_Paache	Shizuoka_Laspeyres	Shizuoka_Fisher	Aichi_Paache	Aichi_Laspeyres	Aichi_Fisher	Mie_Paache	Mie_Laspeyres	Mie_Fisher	Shiga_Paache	Shiga_Laspeyres	Shiga_Fisher	Kyoto_Paache	Kyoto_Laspeyres	Kyoto_Fisher
2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3	1.0055	1.0135	1.0095	1.0354	1.0466	1.0410	0.9845	0.9920	0.9883	1.0137	1.0222	1.0180	0.9803	0.9776	0.9789	1.0401	1.0446	1.0423	0.9831	0.9932	0.9882	1.0167	1.0121	1.0144	1.0293	1.0600	1.0445	1.0200	1.0165	1.0182
4	0.9622	0.9856	0.9738	1.0018	1.0175	1.0097	0.9443	0.9785	0.9613	1.0548	1.0566	1.0557	1.0434	1.0587	1.0510	0.9869	0.9962	0.9915	0.9856	0.9913	0.9884	1.0056	1.0232	1.0144	0.9693	1.0079	0.9884	1.0056	1.0082	1.0069
5	0.9896	0.9976	0.9936	1.0041	1.0184	1.0112	0.9549	0.9951	0.9748	1.0341	1.0212	1.0276	0.9794	0.9872	0.9833	1.0371	1.0516	1.0443	0.9743	0.9969	0.9856	0.9951	0.9980	0.9966	0.9671	0.9808	0.9739	1.0098	1.0212	1.0155
6	0.9866	0.9896	0.9881	1.0317	1.0137	1.0227	0.9769	1.0016	0.9892	1.0339	1.0216	1.0278	0.9820	0.9634	0.9727	0.9831	0.9977	0.9904	0.9962	1.0042	1.0002	1.0129	1.0021	1.0075	0.9718	1.0076	0.9895	0.9861	0.9634	0.9747
7	1.0044	1.0064	1.0054	0.9657	0.9858	0.9757	0.9427	0.9743	0.9584	1.0686	1.0592	1.0639	0.9585	0.9949	0.9766	1.0300	0.9876	1.0086	0.9836	0.9908	0.9872	1.0431	1.0144	1.0286	1.0069	1.0267	1.0168	0.9713	0.9959	0.9835
8	0.9671	0.9733	0.9702	0.9982	0.9894	0.9938	0.9475	0.9865	0.9668	1.0623	1.0414	1.0518	1.0004	1.0297	1.0150	1.0153	1.0349	1.0251	0.9842	0.9937	0.9889	1.0101	0.9988	1.0044	0.9877	0.9999	0.9938	0.9880	0.9920	0.9900
9	0.9500	0.9407	0.9454	1.0022	1.0115	1.0069	0.9995	0.9978	0.9986	1.0242	1.0285	1.0263	0.9756	0.9202	0.9475	0.9890	1.0056	0.9973	0.9787	0.9836	0.9811	0.9890	1.0121	1.0005	0.9576	0.9854	0.9714	0.9835	0.9863	0.9849
10	0.9861	1.0054	0.9957	0.9986	1.0083	1.0034	1.0399	1.0354	1.0376	0.9827	0.9913	0.9870	0.9734	0.9707	0.9721	0.9810	0.9909	0.9859	0.9788	0.9922	0.9855	1.0449	1.0491	1.0470	0.9384	0.9682	0.9532	0.9944	1.0054	0.9999
11	1.0005	0.9834	0.9919	0.9941	0.9927	0.9934	0.9515	0.9749	0.9631	1.0460	1.0243	1.0351	0.9694	0.9719	0.9706	1.0608	1.0399	1.0503	0.9836	1.0087	0.9961	1.0284	1.0211	1.0247	1.0347	1.0573	1.0459	0.9949	1.0098	1.0023
12	0.9834	0.9644	0.9738	1.0046	1.0088	1.0067	0.9277	0.9642	0.9458	1.0090	1.0311	1.0200	0.9926	1.0123	1.0024	0.9980	1.0064	1.0022	0.9931	0.9992	0.9962	1.0103	1.0091	1.0097	1.0438	1.0629	1.0533	1.0284	1.0253	1.0268
13	0.9918	0.9960	0.9939	1.0180	1.0207	1.0193	0.9752	0.9818	0.9785	1.0372	1.0426	1.0399	1.0047	0.9889	0.9967	1.0655	1.0017	1.0331	1.0011	1.0088	1.0050	1.0174	1.0325	1.0249	0.9404	0.9803	0.9602	0.9891	0.9972	0.9931
14	0.9972	1.0112	1.0042	1.0451	1.0494	1.0473	0.9729	0.9450	0.9588	1.0522	1.0524	1.0523	1.0077	1.0347	1.0211	1.0320	1.0411	1.0365	1.0261	1.0356	1.0309	1.0417	1.0211	1.0314	1.0082	1.0276	1.0179	1.0153	1.0152	1.0152
15	0.9693	0.9828	0.9761	1.0507	1.0444	1.0475	0.9578	0.9797	0.9687	1.0313	1.0217	1.0265	0.9657	0.9724	0.9690	1.0386	1.0355	1.0370	0.9901	1.0012	0.9956	1.0079	1.0069	1.0074	0.9759	1.0054	0.9905	1.0033	0.9896	0.9964
16	0.9581	0.9446	0.9513	1.0175	1.0294	1.0234	1.0238	1.0150	1.0194	1.0846	1.0233	1.0535	1.0038	1.0141	1.0089	1.0648	1.0423	1.0535	0.9922	1.0060	0.9991	1.0542	1.0372	1.0457	1.0163	1.0234	1.0198	0.9921	1.0108	1.0014
17	0.9836	1.0088	0.9961	0.9944	0.9985	0.9964	1.0067	1.0126	1.0097	1.0256	1.0283	1.0269	0.9984	0.9922	0.9953	1.0143	1.0737	1.0436	0.9791	0.9824	0.9808	1.0151	1.0139	1.0145	0.9821	0.9945	0.9883	0.9936	1.0075	1.0005
18	0.9826	0.9908	0.9867	1.0733	1.0234	1.0481	0.9643	0.9816	0.9729	1.0191	1.0290	1.0241	1.0209	1.0181	1.0195	1.0284	1.0390	1.0337	0.9885	0.9931	0.9908	1.0077	1.0218	1.0148	1.0009	1.0306	1.0156	0.9874	1.0022	0.9948
19	0.9819	0.9883	0.9851	1.0447	1.0322	1.0384	0.9826	0.9848	0.9837	1.0867	1.0779	1.0823	0.9644	0.9652	0.9648	1.0494	1.1167	1.0825	1.0042	1.0149	1.0095	1.0606	1.0438	1.0522	0.9899	0.9975	0.9937	1.0110	1.0142	1.0126
20	0.9891	0.9783	0.9837	0.9956	1.0141	1.0048	0.9825	1.0040	0.9932	1.0041	1.0034	1.0038	1.0050	1.0005	1.0027	1.1029	1.1138	1.1083	0.9769	0.9857	0.9813	1.0222	1.0165	1.0193	1.0215	1.0259	1.0237	0.9772	1.0000	0.9885
21	0.9828	0.9734	0.9781	1.0296	1.0013	1.0154	0.9887	1.0175	1.0030	1.0468	1.0341	1.0404	0.9951	1.0063	1.0007	1.0074	1.0085	1.0079	0.9865	1.0005	0.9935	1.0258	1.0350	1.0304	0.9677	1.0054	0.9863	0.9846	0.9828	0.9837

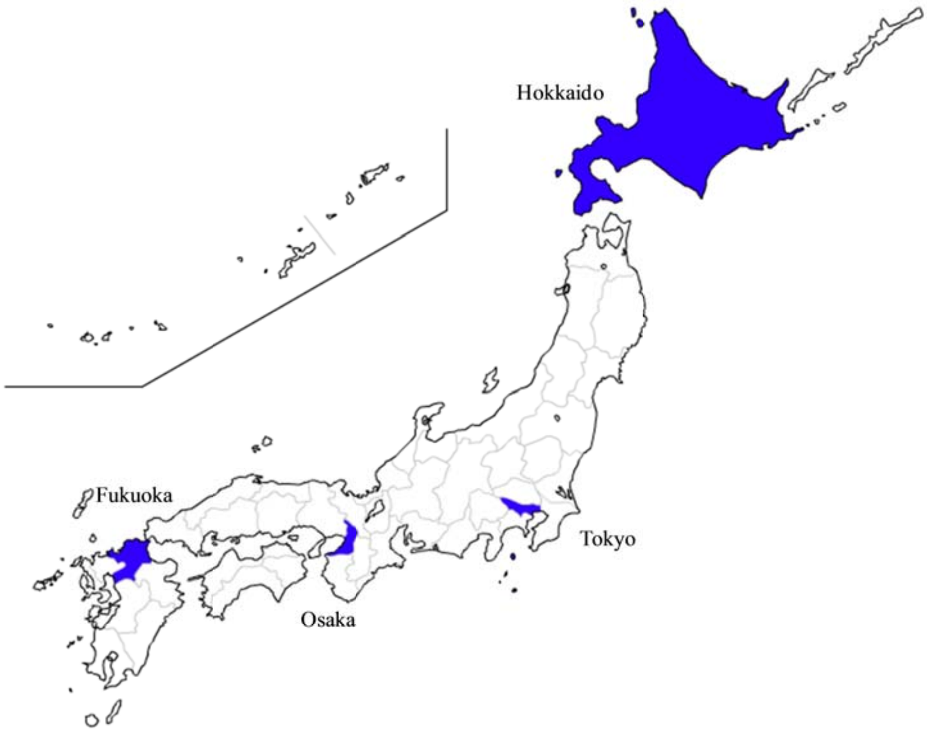
week	Shimane_Paache	Shimane_Laspeyres	Shimane_Fisher	Okayama_Paache	Okayama_Laspeyres	Okayama_Fisher	Hiroshima_Paache	Hiroshima_Laspeyres	Hiroshima_Fisher	Yamaguchi_Paache	Yamaguchi_Laspeyres	Yamaguchi_Fisher	Tokushima_Paache	Tokushima_Laspeyres	Tokushima_Fisher	Kagawa_Paache	Kagawa_Laspeyres	Kagawa_Fisher	Ehime_Paache	Ehime_Laspeyres	Ehime_Fisher	Kochi_Paache	Kochi_Laspeyres	Kochi_Fisher	Fukuoka_Paache	Fukuoka_Laspeyres	Fukuoka_Fisher	Saga_Paache	Saga_Laspeyres	Saga_Fisher
2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3	0.9810	0.9680	0.9745	0.9832	0.9971	0.9901	0.9829	0.9926	0.9877	1.0458	1.0518	1.0488	1.0297	1.0196	1.0246	0.9560	0.9378	0.9468	0.9993	0.9943	0.9968	1.0692	1.0545	1.0618	1.0361	1.0301	1.0331	0.9978	0.9955	0.9966
4	1.0175	1.0123	1.0149	1.0073	1.0179	1.0126	0.9863	0.9957	0.9910	1.0047	1.0315	1.0180	0.9764	0.9834	0.9799	0.9685	0.8915	0.9292	0.9749	0.9863	0.9806	0.9980	0.9940	0.9960	1.0015	1.0176	1.0095	0.9895	0.9995	0.9945
5	0.9937	0.9940	0.9938	1.0016	1.0096	1.0056	1.0017	1.0028	1.0022	1.0084	1.0257	1.0170	0.9814	0.9771	0.9793	0.9281	0.9011	0.9145	0.9947	0.9939	0.9943	0.9953	1.0275	1.0113	1.0229	1.0222	1.0225	0.9931	1.0153	1.0041
6	1.0233	1.0207	1.0220	0.9957	1.0118	1.0037	0.9986	1.0037	1.0012	1.1502	1.1536	1.1519	1.0222	1.0308	1.0265	0.9882	0.9891	0.9886	0.9722	0.9673	0.9698	1.0133	1.0205	1.0169	1.0221	1.0245	1.0233	1.0303	1.0237	1.0270
7	1.0152	1.0154	1.0153	0.9959	1.0044	1.0001	1.0120	0.9963	1.0042	1.0349	1.0428	1.0389	0.9843	0.9947	0.9895	0.9647	0.9622	0.9634	1.0029	0.9979	1.0004	1.0194	1.0279	1.0236	1.0068	1.0138	1.0103	1.0485	1.0555	1.0520
8	0.9869	0.9914	0.9891	1.0157	1.0095	1.0126	0.9987	1.0083	1.0035	1.0242	1.0100	1.0171	0.9908	1.0130	1.0019	1.0017	1.0095	1.0056	1.0134	1.0010	1.0072	1.0041	1.0152	1.0096	1.0071	0.9920	0.9995	1.0056	1.0121	1.0088
9	0.9857	0.9875	0.9866	1.0202	1.0297	1.0249	0.9791	0.9926	0.9859	1.1291	1.1521	1.1405	0.9998	0.9921	0.9959	0.9595	0.8853	0.9216	0.9196	0.9664	0.9427	1.0367	1.0493	1.0430	1.0069	1.0145	1.0107	1.0474	1.0075	1.0273
10	0.9960	1.0162	1.0061	1.0081	1.0038	1.0060	1.0015	1.0004	1.0009	1.0651	1.0462	1.0556	1.0061	1.0188	1.0124	1.0219	0.9947	1.0082	1.0047	0.9945	0.9996	1.0270	1.0503	1.0386	0.9978	0.9959	0.9968	0.9821	0.9735	0.9778
11	1.0217	1.0141	1.0179	0.9858	0.9980	0.9919	0.9484	0.9611	0.9547	1.0004	1.0289	1.0145	0.9723	0.9830	0.9776	0.9694	0.9288	0.9489	0.9900	0.9892	0.9896	1.0076	1.0254	1.0165	0.9883	1.0015	0.9949	1.0063	1.0100	1.0082
12	0.9594	0.9695	0.9645	1.0200	1.0495	1.0347	0.9918	0.9994	0.9956	1.0263	1.0422	1.0342	0.9734	0.9808	0.9771	0.9359	0.9177	0.9268	0.9656	0.9687	0.9672	1.0678	1.0614	1.0646	1.0165	1.0146	1.0155	0.9960	1.0353	1.0155
13	1.0183	1.0087	1.0135	0.9831	0.9912	0.9872	0.9774	0.9951	0.9862	1.0196	1.0145	1.0170	0.9452	0.9452	0.9452	0.9573	1.0058	0.9813	1.0020	1.0108	1.0064	1.0834	1.0522	1.0677	1.0102	1.0231	1.0166	1.0405	1.0496	1.0451
14	0.9973	1.0367	1.0168	1.0189	1.0274	1.0232	0.9770	0.9832	0.9801	1.0566	1.0458	1.0512	1.0618	1.0589	1.0604	0.9870	1.0020	0.9945	0.9595	0.9511	0.9553	1.0451	1.0604	1.0527	1.0108	0.9996	1.0052	0.9809	0.9872	0.9840
15	1.0432	1.0552	1.0492	1.0032	1.0143	1.0087	0.9924	1.0126	1.0024	1.1042	1.0721	1.0880	1.0660	1.0891	1.0775	1.0059	1.0147	1.0103	1.0093	1.0232	1.0162	1.0146	1.0258	1.0202	1.0156	1.0106	1.0131	1.0260	1.1471	1.0848
16	1.0087	1.0094	1.0091	1.0121	1.0158	1.0140	0.9964	1.0008	0.9986	1.0553	1.0620	1.0586	0.9988	1.1384	1.0663	0.9682	0.9797	0.9739	0.9954	1.0034	0.9994	1.0899	1.0571	1.0734	1.0222	1.0142	1.0182	0.9797	0.9501	0.9648
17	1.0155	1.0056	1.0105	1.0104	1.0137	1.0121	0.9922	0.9866	0.9894	1.1368	1.1321	1.1345	1.0237	1.1778	1.0981	0.9924	1.0014	0.9969	0.9712	0.9823	0.9768	1.0982	1.0580	1.0779	1.0183	1.0285	1.0234	1.0323	1.0938	1.0626
18	1.0152	1.0242	1.0197	1.0245	1.0207	1.0226	1.0013	1.0142	1.0077	1.0859	1.0650	1.0754	1.0652	1.1083	1.0865	1.0107	1.0215	1.0161	0.9833	0.9852	0.9843	1.0557	1.0388	1.0472	1.0277	1.0053	1.0164	0.9723	0.9606	0.9664
19	0.9807	0.9947	0.9877	0.9790	0.9953	0.9871	1.0001	1.0031	1.0016	1.0479	1.0742	1.0610	1.0411	1.0584	1.0497	0.9942	1.0085	1.0014	0.9691	0.9727	0.9709	1.0407	1.0472	1.0440	1.0180	1.0305	1.0242	1.0443	1.0893	1.0665
20	1.0110	1.0372	1.0240	1.0288	1.0206	1.0247	0.9755	1.0184	0.9967	1.0840	1.0682	1.0761	0.9879	1.1423	1.0623	0.9836	0.9724	0.9779	0.9743	0.9913	0.9827	1.0539	1.0333	1.0435	1.0085	1.0138	1.0112	1.1119	1.0981	1.1050
21	1.0151	0.9996	1.0073	1.0066	1.0155	1.0111	0.9863	1.0080	0.9971	1.0657	1.1558	1.1098	0.9966	1.0112	1.0039	0.9580	0.8983	0.9276	0.9894	0.9882	0.9888	1.0143	1.0166	1.0154	1.0002	1.0014	1.0008	1.0846	1.0702	1.0774

Saitama_Paache	Saitama_Laspeyres	Saitama_Fisher	Chiba_Paache	Chiba_Laspeyres	Chiba_Fisher	Tokyo_Paache	Tokyo_Laspeyres	Tokyo_Fisher	Kanagawa_Paache	Kanagawa_Laspeyres	Kanagawa_Fisher	Niigata_Paache	Niigata_Laspeyres	Niigata_Fisher	Toyama_Paache	Toyama_Laspeyres	Toyama_Fisher
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0.9857	0.9905	0.9881	0.9889	0.9951	0.9920	0.9990	1.0003	0.9997	0.9918	1.0016	0.9967	1.0066	1.0175	1.0120	0.9796	0.9880	0.9838
0.9830	1.0054	0.9941	0.9863	1.0016	0.9940	0.9950	1.0035	0.9992	0.9959	1.0030	0.9994	0.9863	0.9873	0.9868	0.9799	0.9714	0.9756
0.9876	0.9899	0.9888	1.0039	1.0067	1.0053	0.9989	1.0063	1.0026	0.9996	0.9961	0.9978	0.9393	1.0178	0.9777	0.9846	0.9933	0.9890
0.9813	0.9952	0.9882	0.9769	0.9910	0.9839	0.9961	0.9995	0.9978	0.9886	1.0047	0.9966	0.9876	0.9786	0.9831	0.9921	0.9871	0.9896
0.9824	0.9854	0.9839	0.9833	0.9993	0.9913	1.0107	1.0105	1.0106	1.0122	1.0152	1.0137	0.9806	1.0032	0.9919	0.9664	0.9619	0.9641
1.0025	1.0040	1.0032	0.9803	0.9867	0.9835	0.9972	1.0132	1.0052	0.9907	1.0018	0.9962	0.9971	1.0151	1.0061	0.9760	0.9877	0.9818
0.9954	1.0006	0.9980	0.9874	0.9954	0.9914	0.9923	0.9987	0.9955	0.9967	1.0095	1.0031	0.9018	0.9836	0.9418	0.9665	0.9843	0.9754
0.9590	0.9720	0.9655	0.9783	0.9897	0.9840	0.9890	1.0048	0.9968	1.0072	1.0315	1.0193	1.0197	1.0102	1.0149	0.9562	0.9628	0.9595
1.0383	1.0436	1.0410	1.0197	1.0279	1.0238	1.0063	1.0208	1.0135	1.0326	1.0395	1.0361	1.0021	1.0304	1.0162	0.9874	0.9928	0.9901
1.0449	1.0529	1.0489	1.0267	1.0412	1.0339	1.0305	1.0452	1.0378	1.0376	1.0411	1.0393	0.9859	1.0136	0.9997	0.9771	1.0002	0.9886
1.0185	1.0196	1.0191	1.0233	1.0410	1.0321	1.0456	1.0536	1.0496	1.0567	1.0488	1.0527	1.0348	1.0706	1.0525	0.9632	0.9755	0.9693
1.0034	1.0176	1.0105	1.0257	1.0331	1.0294	1.0254	1.0343	1.0298	1.0579	1.0600	1.0590	1.0435	1.0567	1.0501	0.9887	1.0017	0.9952
1.0264	1.0334	1.0299	1.0307	1.0335	1.0321	1.0315	1.0326	1.0320	1.0211	1.0163	1.0187	1.0103	1.0277	1.0190	0.9735	0.9820	0.9778
1.0081	1.0117	1.0099	1.0199	1.0258	1.0229	1.0043	1.0170	1.0106	1.0314	1.0266	1.0290	0.9776	1.0080	0.9927	1.0005	1.0038	1.0021
0.9901	1.0187	1.0043	1.0114	1.0109	1.0111	1.0310	1.0440	1.0375	1.0113	1.0130	1.0122	0.9987	1.0254	1.0119	0.9603	0.9612	0.9608
1.0067	1.0176	1.0121	1.0142	1.0131	1.0136	1.0159	1.0245	1.0202	0.9940	1.0041	0.9990	0.9222	1.0304	0.9748	0.9891	0.9947	0.9919
0.9928	1.0071	1.0000	0.9949	1.0133	1.0040	1.0130	1.0307	1.0218	1.0189	1.0147	1.0168	1.0303	1.0638	1.0469	1.0081	1.0066	1.0073
0.9941	0.9916	0.9929	1.0138	1.0167	1.0153	1.0102	1.0308	1.0204	1.0215	1.0124	1.0169	0.9876	1.0154	1.0014	0.9902	1.0055	0.9978
1.0025	1.0119	1.0072	1.0004	1.0066	1.0035	1.0023	1.0159	1.0091	0.9900	1.0082	0.9991	1.0178	1.0316	1.0247	0.9925	0.9779	0.9852

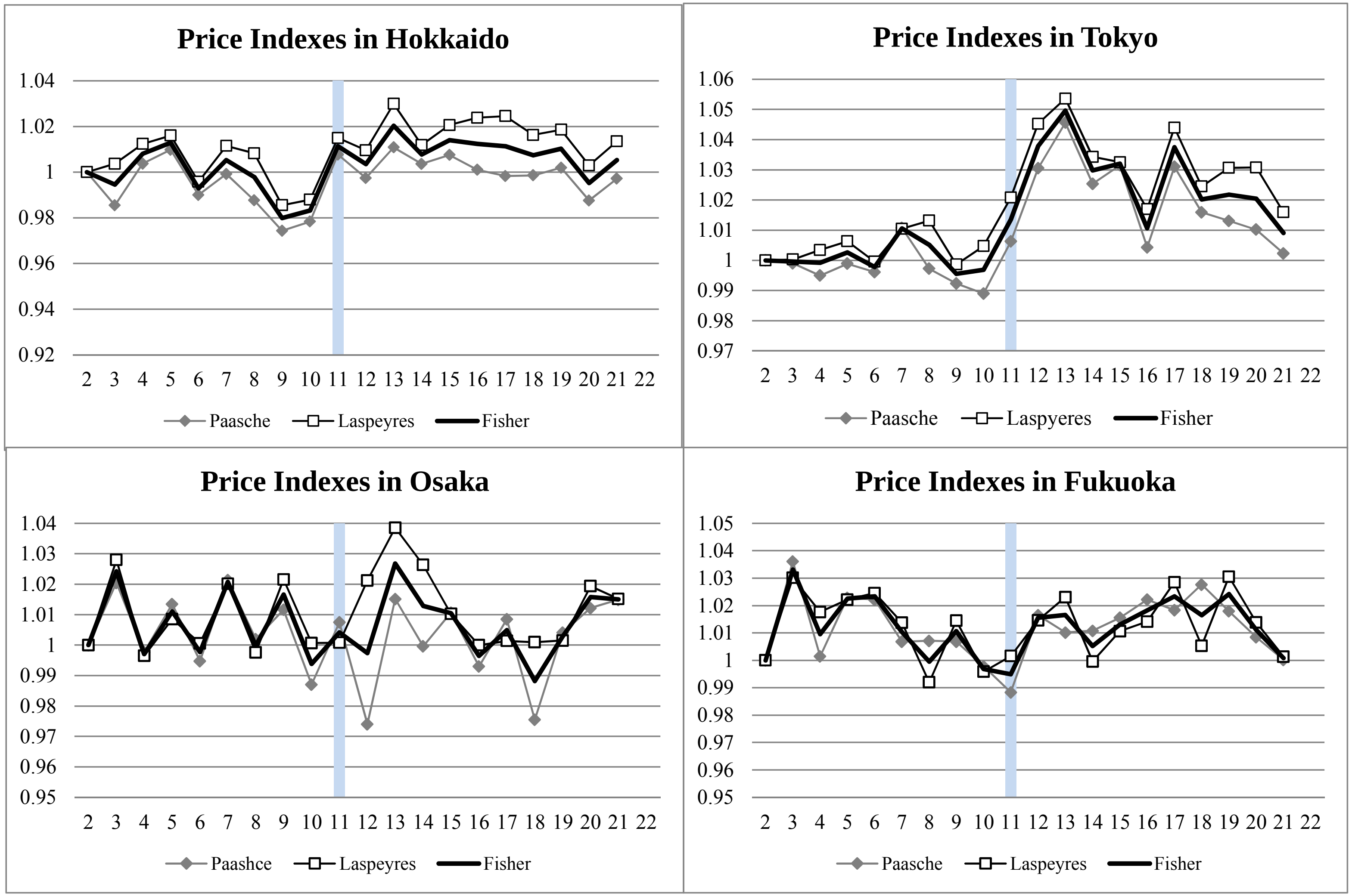
Osaka_Paache	Osaka_Laspeyres	Osaka_Fisher	Hyogo_Paache	Hyogo_Laspeyres	Hyogo_Fisher	Nara_Paache	Nara_Laspeyres	Nara_Fisher	Wakayama_Paache	Wakayama_Laspeyres	Wakayama_Fisher	Tottori_Paache	Tottori_Laspeyres	Tottori_Fisher
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.0205	1.0280	1.0242	0.9938	0.9953	0.9945	1.0132	1.0079	1.0105	1.0236	1.0789	1.0509	0.9942	0.9965	0.9954
0.9977	0.9965	0.9971	0.9939	1.0136	1.0037	1.0024	1.0044	1.0034	1.0138	1.0302	1.0220	0.9840	1.0108	0.9973
1.0135	1.0086	1.0110	0.9857	0.9967	0.9912	0.9362	0.9842	0.9599	0.9861	0.9945	0.9903	1.0041	1.0053	1.0047
0.9948	1.0006	0.9977	0.9918	0.9965	0.9942	1.0325	1.0166	1.0245	1.0219	1.0750	1.0481	0.9713	0.9639	0.9676
1.0214	1.0201	1.0208	1.0087	1.0216	1.0152	0.9831	1.0179	1.0004	0.9952	0.9929	0.9940	1.0313	1.0304	1.0308
1.0020	0.9976	0.9998	1.0001	1.0030	1.0015	1.0275	1.0377	1.0326	1.0209	1.0221	1.0215	0.9931	0.9875	0.9903
1.0116	1.0215	1.0166	0.9777	0.9965	0.9871	1.0160	1.0242	1.0201	1.0058	1.0389	1.0222	0.9878	0.9769	0.9823
0.9870	1.0007	0.9938	0.9914	0.9952	0.9933	1.0080	1.0341	1.0210	0.9808	0.9848	0.9828	1.0235	1.0006	1.0120
1.0075	1.0008	1.0041	0.9870	0.9999	0.9935	1.0045	1.0220	1.0132	0.9965	1.0261	1.0112	0.9560	0.9806	0.9682
0.9741	1.0212	0.9974	0.9974	1.0028	1.0001	1.0117	1.0250	1.0183	0.9866	0.9566	0.9715	1.0087	1.0459	1.0272
1.0152	1.0385	1.0268	0.9960	0.9964	0.9962	0.9807	1.0042	0.9923	1.0353	1.0236	1.0294	0.9931	1.0099	1.0015
0.9996	1.0263	1.0129	1.0296	1.0319	1.0307	0.9968	1.0019	0.9993	1.0337	1.0393	1.0365	0.9290	0.9897	0.9589
1.0107	1.0103	1.0105	1.0037	1.0072	1.0054	1.0157	1.0353	1.0254	1.0209	1.0430	1.0319	0.9713	0.9817	0.9765
0.9930	1.0000	0.9965	1.0250	1.0257	1.0253	0.9895	1.0084	0.9989	1.0035	1.0172	1.0103	1.0020	1.0041	1.0031
1.0085	1.0014	1.0049	1.0108	1.0147	1.0127	1.0234	1.0521	1.0377	0.9902	1.0041	0.9971	0.9326	0.9461	0.9393
0.9755	1.0010	0.9882	1.0156	1.0228	1.0192	1.0155	1.0344	1.0249	0.9896	1.0217	1.0055	0.7666	0.7777	0.7721
1.0041	1.0015	1.0028	1.0017	1.0163	1.0089	1.0516	1.0262	1.0388	0.9920	1.0001	0.9960	0.9772	0.9867	0.9819
1.0122	1.0194	1.0158	1.0187	1.0275	1.0231	1.0269	1.0372	1.0320	0.9702	1.0018	0.9859	0.9655	0.9737	0.9696
1.0149	1.0152	1.0151	0.9909	0.9844	0.9877	0.9900	0.9945	0.9923	1.0214	1.0148	1.0181	1.0344	1.0217	1.0280

Nagasaki_Paache	Nagasaki_Laspeyres	Nagasaki_Fisher	Kumamoto_Paache	Kumamoto_Laspeyres	Kumamoto_Fisher	Oita_Paache	Oita_Laspeyres	Oita_Fisher	Miyazaki_Paache	Miyazaki_Laspeyres	Miyazaki_Fisher	Kagoshima_Paache	Kagoshima_Laspeyres	Kagoshima_Fisher
1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0.9271	0.9785	0.9524	1.0095	1.0081	1.0088	0.9715	0.9718	0.9717	0.9908	0.9993	0.9950	0.9811	0.9987	0.9898
1.0006	1.0280	1.0142	0.9461	0.9697	0.9579	0.9952	0.9941	0.9946	0.9899	1.0058	0.9978	0.9633	0.9710	0.9672
0.9936	1.0118	1.0026	0.9772	1.0209	0.9988	0.9955	0.9976	0.9965	0.9826	1.0029	0.9927	0.9877	0.9883	0.9880
0.9582	0.9589	0.9585	0.9809	1.0035	0.9922	0.9767	0.9849	0.9807	1.0102	1.0201	1.0151	0.9870	1.0110	0.9989
1.0310	1.0800	1.0552	0.9697	0.9783	0.9740	0.9835	1.0017	0.9926	1.0458	1.0814	1.0635	1.0001	1.0117	1.0059
0.9675	0.9881	0.9777	0.9740	0.9651	0.9695	0.9869	0.9915	0.9892	0.9730	0.9730	0.9730	0.9826	1.0004	0.9914
0.9757	0.9858	0.9807	0.9340	0.9874	0.9603	0.9678	0.9748	0.9713	1.0340	1.0858	1.0596	0.9755	0.9689	0.9722
0.9505	0.9819	0.9661	1.0313	1.0348	1.0331	0.9734	0.9737	0.9735	0.9863	0.9982	0.9923	0.9520	0.9834	0.9675
1.0349	0.9988	1.0167	0.9480	0.9711	0.9595	0.9791	0.9873	0.9832	0.9832	0.9895	0.9864	0.9589	0.9734	0.9661
1.0175	1.0858	1.0511	0.9813	0.9966	0.9889	0.9304	0.9344	0.9324	1.0498	1.0491	1.0494	0.9705	0.9910	0.9807
1.0277	1.0492	1.0384	0.9331	0.9670	0.9499	0.9652	0.9851	0.9751	0.9956	1.0017	0.9986	1.0487	1.0350	1.0418
1.0402	1.0909	1.0653	1.0160	1.0241	1.0201	0.9684	0.9830	0.9757	0.9916	1.0177	1.0045	0.9908	0.9944	0.9926
1.0523	1.0198	1.0360	0.9900	1.0147	1.0023	0.9939	1.0077	1.0008	1.0063	0.9916	0.9989	0.9219	0.9509	0.9363
0.9810	1.0331	1.0067	0.9619	0.9824	0.9721	0.9228	0.9445	0.9336	0.9667	1.0019	0.9841	0.9720	0.9867	0.9793
1.0327	1.0762	1.0542	0.9857	0.9994	0.9925	0.9651	0.9767	0.9709	0.9966	1.0140	1.0053	0.9518	0.9180	0.9348
0.9726	0.9690	0.9708	0.9396	0.9849	0.9620	1.0173	1.0357	1.0265	1.0489	1.0421	1.0455	1.0333	1.0814	1.0571
0.9938	0.9825	0.9881	1.0110	1.0110	1.0110	1.0186	1.0039	1.0112	1.0380	1.0728	1.0552	0.9851	0.9741	0.9796
1.0218	1.1240	1.0717	1.0201	1.0096	1.0148	1.0143	1.0237	1.0190	0.9952	1.0144	1.0048	0.9916	1.0169	1.0042
1.1012	1.1551	1.1279	1.0070	1.0430	1.0249	1.0214	1.0123	1.0168	0.9666	0.9791	0.9728	1.0176	1.0336	1.0255

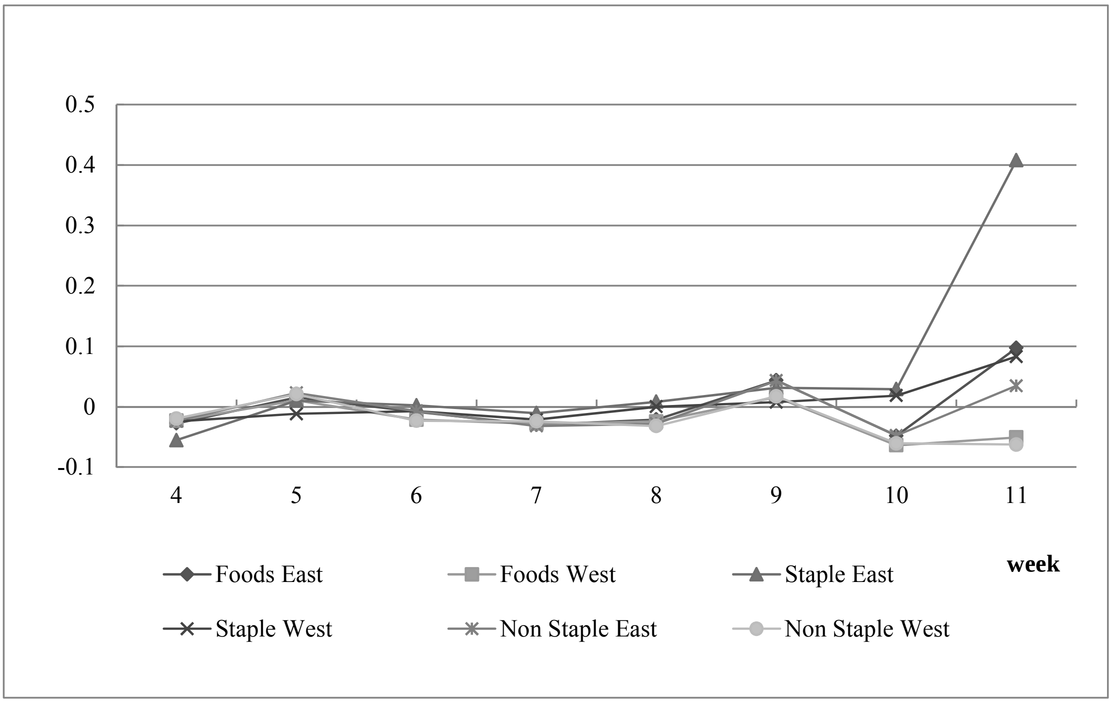
Appendix Figure 1: Four major Prefectures



Appendix Figure 1: Price Index in Four Prefectures



Appendix Figure 3: Average Intensive Margin



Appendix Figure 4: Standard Deviation of Intensive Margin