論　文

Welfare Assessment of Entry of New Retail Formats and Deregulation for Restriction on Large Retail Scale Stores in Japan[†]

Keiichiro HONDA[a], Toshiyuki MATSUURA[b,][*], Takeshi MIZUTA[c]

Abstract

This study attempts to measure the welfare gain caused by new retailer entries and the deregulation of entry restriction. In 1990s and 2000s, the retail sector in Japan experienced significant reallocation dynamics. Two retail formats have expanded their market share: one is specialty supermarket stores that expanded their market shares partially due to the deregulation of large-scale stores, and the other is convenience stores that take advantage of their distinctive service quality and efficient operation system. We estimate the consumer benefit by incorporating the differences in service quality as well as differences in price among retail formats and demonstrate that welfare improvements are primarily explained by changes in price and service quality.

JEL Classification Code：L13, L81, L51

Keywords：Competition, Welfare Analysis, Retail Industry, Entry Regulation

[a] Prefectural University of Kumamoto

[b] Keio University

[c] Hitotsubashi University

[*] Corresponding author; Keio Economic Observatory, Keio University, 2-15-45 Mita, Minato-ku, Tokyo, 108-8345, Japan, TEL：+81-3-5427-1479, FAX：+81-3-5427-1640.

小売業における新業態参入と大型店舗の規制緩和の厚生評価

本田圭市郎・松浦寿幸・水田岳志

〈要 旨〉

　本研究は、我が国のサービス業で大きなシェアを占める小売業において、新業態の参入や参入規制の緩和が、消費者の経済厚生に与えた影響の測定を試みるものである。1990 年代から 2000 年代にかけて、日本の小売業は二つの業態のシェア拡大という劇的な変化に直面した。一つは、大型店への規制緩和により拡大したスーパーマーケットであり、もう一つは独自のサービス品質と効率的なオペレーションを行うコンビニエンスストアである。本研究では、これらを含めた小売業内の業態間で価格やサービス品質が異なることを考慮した需要関数を推定し、消費者余剰の変化を測定した。その結果、1990 年代と 2000 年代の消費者余剰の変化は、主に価格とサービス品質の変化によって説明され、特に価格の寄与が大きいことが明らかになった。規制緩和は、小売店の価格水準の低下を通し、消費者余剰へ影響していると考えられる。

JEL 分類コード: L13, L81, L51
キーワード：競争、厚生分析、小売業、参入規制

1．Introduction

The entry and exit dynamics of firms are considered a major source of economic growth. Entering firms often have new innovative business models and relatively high productivity. Competition caused by a surge of entering firms not only stimulates incumbents' incentive for innovation but also force inefficient firms to exit markets. In the service sector, it is known that the reallocation effects of entry and exit play an important role in productivity growth. For example, in the case study of the U.S. retail industry, Foster *et al*.（2006）investigated the impact of entry and exit on the aggregate-level productivity growth during the 1990s and showed that the relatively more productive entering retail outlets have displaced the less productive exiting retail outlets throughout the 1990s, accounting for the labor productivity growth during the decade.

In this study, we measure the welfare gain caused by the entry of new retailers in Japan. During the 1990s and 2000s, the Japanese retail sector experienced a significant reallocation due to entry and exit dynamics. Two types of retail formats expanded their market shares throughout the 1990s. One was the mid-sized specialty supermarket store featuring discount pricing strategy that expanded its market share partially due to the deregulation of entry restriction for large-scale stores in the late 1990s. The other retail format that expanded its share was the so-called convenience store that offered innovative services by making active use of information technology. In this study, we estimate the welfare impact of the entry of these new retail formats.

However, measuring the performance of service industries, such as the retail industry, is fraught with many difficulties. Within the retail industry, for example, each firm differentiates its service by offering a distinct range of products with additional service. Since entering firms often bring new innovative services, it is necessary to measure accurately the quality of service provided by each firm in order to assess the impact of the entry of new service providers. Moreover, as a result of product differentiation, each firm is likely to have some market power. In such cases, the hedonic method, which is the most commonly used approach to measure quality under the perfect competition assumption, cannot be applied to this sector since the hedonic approach is applicable only for perfect competition setting.

In the case of Japanese retail industry, the two entering retail formats mentioned

above adopt different policies: while specialty supermarket stores use discount pricing strategy, convenience stores feature service quality. Thus, to measure the welfare gain caused by new retailer entries, we need to employ a model that accommodates the differences in price and quality of output. In fact, there are many empirical frameworks that enable us to estimate the demand structure in differentiated product settings by utilizing the market-level or aggregated data. The most well-known framework is the logit family model. Berry（1994）introduced a useful empirical framework using extreme-value distribution of consumer preferences, and Berry *et al.*（1995）applied the random coefficient model to the U.S. automobile market. In this study, we employ the nested logit demand function for retailing services and quantify welfare improvement. In previous studies, Sunada（2010）estimated the changes in service quality and consumer welfare for shopping using the CES demand function. However, his specification does not take into account regional factors and market dynamics such as changes in number of outlets. We extend Sunada's specification to incorporate the regional differences in price and service quality, while estimating consumer benefits from increased market dynamics.

Welfare assessment of the entry of new retail formats will provide us with policy implications. In Japan, although the entry of large-scale stores had been restricted by the Large Scale Retail Store Law（LSRS Law, hereinafter）until the early 1990s, it was gradually relaxed and finally repealed in 2000. However, the impact of deregulation seems to have been limited. While specialty supermarket stores—relatively large discounting food retailing stores—have increased their market shares, Generalized Merchandise Store（GMS）, which have much larger floor space and deal with a wider range of products, failed to increase its market share. In fact, Carrefour and Wal-Mart, the French and the U.S. multinational retail chains, struggled in the Japanese retail market because of low profitability. Carrefour exited Japan in 2005, and Wal-Mart has not yet succeeded in expanding its market share. Based on these facts, some economists argue that the abolition of the LSRS Law has not created enough impact on the Japanese retail industry. In this study, by measuring consumer preferences with regard to price and service quality, we also assess the impact of deregulation and explore why gigantic GMSs, such as Carrefour and Wal-Mart, failed to dominate the Japanese retail market despite the abolition of the LSRS Law.

The structure of this paper is as follows. We introduce the historical and institutional background of the Japanese retail industry in the next section. We present our model

in section 3. In section 4, we explain our data set. Section 5 provides estimation results and section 6 discusses the implications from estimation results. A summary and conclusion are presented in the final section.

2．Background

There is a conventional notion that the Japanese retail industry is quite peculiar. This is because Japan has more retailers per capita than other countries. Most stores are small and family-owned firms, the so-called Mom and Pop stores. For example, according to Ito (1992), while retail store per 1000 residents (retail density) for the U. S. and Germany was 8.3 and 6.7 respectively, it was 14.5 for Japan in 1982. Workers per retail store for Japan, Germany, and the U.S. were 3.7, 5.9, and 8.1, respectively. Throughout the 1980s and 1990s, retail density in Japan has been gradually decreasing and reached 11.3 in 1997, which was still quite high since the U.S. retail density in 1997 was around 6.0.

The discussion on these facts has attracted attention from researchers and policy makers since the 1980s. There are two opposing views on the reason for the large number of retailers in Japan. The first view is that since transportation and inventory costs for consumers are high in Japan, they prefer shopping at nearby small retail stores almost every day. For example, Flath (1990) and Flath and Nariu (1996) empirically investigated the effect on retail density using passenger car per capita and the average housing size as proxies for consumers' transportation and inventory costs. Their research demonstrated that Japan's retail density is not exceptionally high.

The second view is that entry restrictions on large-scale stores have affected consumer behavior, and therefore consumption tendencies and preferences have been distorted. For example, McCraw and O'Brien (1986) argued that since public transportation has been well developed, there is no reason for consumers to choose nearby small retailers. They attributed high retail density to entry restrictions imposed by the LSRS Law on large-scale stores. In fact, Nishimura and Tachibana (1996) analyzed the effects of the LSRS Law on retail store productivity and showed that LSRS Law has brought some distortions in the Japanese retail market.

In the 1990s, the trend changed from protectionism to deregulation as a result of the "Japan-U.S. Structural Impediments Initiative," which was aimed at opening up the Japanese retail market and promoting competition. In 1994, the LSRS Law was eased

Figure 1 : The number of Large Stores from 1985 to 2007
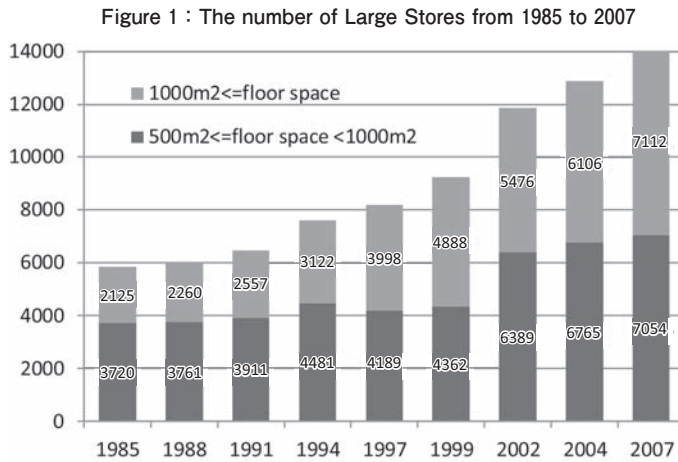
Source: Census of Commerce (Ministry of Economy, Trade and Industry)

to give more freedom for new retail stores with less than 1000 m^2 of floor space to entry the retail market. Finally, in 2000, the LSRS law was completely repealed[1].

Along with the process of deregulation, the number of large stores has increased in the late 1990s. Figure 1 presents the transition of the number of food and beverage retail outlet with more than 500 m^2 of floor space from 1985 to 2007. Especially, we see the surge of entry of large outlets with more than 1,000 m^2 of floor space just after the relaxation of LSRS law, namely 1994.

Figure 2 indicates the changes in sales shares among food retail formats. Two retail formats expanded their market share during regulatory transition periods: specialty supermarket stores and convenience stores[2]. Specialty supermarket stores are mid-sized stores that occupy more than 250 m^2 floor space and primarily deal with food products. Since they are relatively large stores, their expansion might be attributed to by the deregulation. Convenience stores are relatively small stores that operate for more than 14 hours a day and deal with not only food products but also a broad range of items. The shares of specialty supermarket stores and convenience stores have substantially increased from 33.0% to 44.0% and from 10.2% to 14.4%, respectively. On the other hand, the share of Generalized Merchandized Stores (GMS) that have a floor space of more than 3000 m^2 and deal with a broad range of items, has remained unchanged through the late 1990s and 2000s[3].

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[1] For details of LSRS Law, see Appendix A.

[2] The definition of retail formats are summarized in Appendix B.

Figure 2：The sales share of food and beverage by retail formats
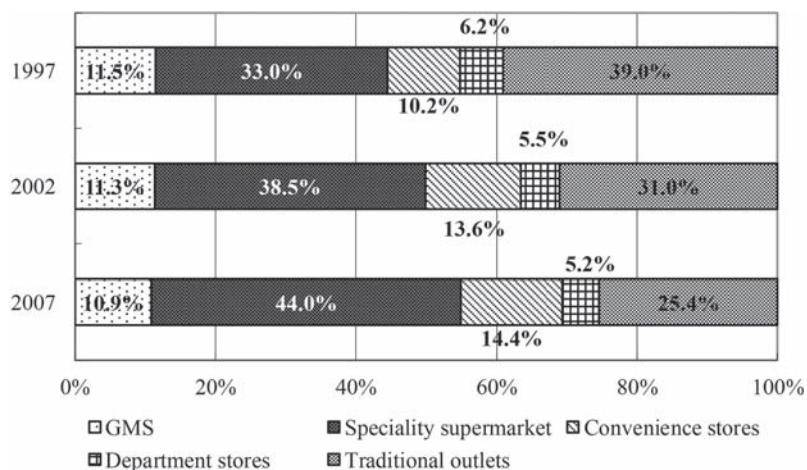
Note: See Appendix B for the definition of retail formats.

Table 1：Price gap by products and retail formats

	Rice (Brand A, 5 kg, Yen)	Hen eggs (M size, 10 pieces, Yen)	Chocolate (National brand A, Yen)	Instant noodle(National brand A, Yen)	Plain yogurt, (National brand A, Yen)
GMS	2675.0	191.0	97.81	82.06	216.3
Specialty supermarket stores	2573.0	188.7	97.85	81.14	208.4
Department stores	2918.0	206.9	101.09	83.59	230.1
Traditional Stores	2752.0	206.1	100.63	82.30	226.0
Convenience stores	2939.0	208.2	101.33	83.74	242.8

Source: National Survey of 1997, Ministry of Internal Affair and Communication.
Note: For the details of the definition of retail formats, see Appendix B.

The emergence of specialty supermarket stores may be attributed to their price policy as well as the deregulation. Table 1 shows a substantial price gap between retail formats. While specialty supermarket stores attract consumers by offering products with the lowest prices, convenience stores offer relatively high prices.

Convenience stores in Japan are quite different from what would be expected in Europe and the U.S. For example, while the majority of small stores cannot adopt advanced information technology in Japan, major convenience store operators actively make use of these technological advances such as the POS System, which enables them to organize an efficient distribution system. Currently, major chains organize deliveries to each retail outlet 3 to 5 times a day and provide consumers with fresh and sometimes highly perishable food products. Some convenience store operators collect records of each customer's gender and age for each purchase, and make active use of

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3 Although GMS and Department stores deal with not only food and beverage but also clothing, furniture, and other household goods, sales data in Figure 2 are restricted to sales of food and beverage products.

this information for their original brand product development and merchandising. According to Larke and Causton（2005）, Seven-Eleven Japan, the largest convenience store operator, sells its own branded merchandise, which amounts to 50% in total sales. Moreover, long business hours and additional services are also fundamental to convenience stores' operation. In Japan, most convenience stores generally operate 24 hours a day, and offer additional services such as making photocopies, photo developing, postal package handling, and payment of utility charges.

These dynamic market transitions affect consumer welfare. However, previous studies have not empirically examined their impact during periods of regulatory transition. Since previous studies such as Flath（1990）, Nariu and Flath（1996）, and Nishimura and Tachibana（1996）are all cross sectional studies, it does not distinguish the cause from the effect. Our welfare assessment based on the structural estimation of demand function for shopping will reveal how the dynamics of entry and exit has impacted the retail market and to what extent entry restrictions have been influential.

3 ． Model

Consumer Choice

We suppose that consumers have a choice between two levels of differentiated retailing services. The structure of consumer choice is presented in Figure 3. First, an individual consumer decides whether to purchase a product from each of $g=1,\cdots$, G groups（for example, GMS, specialty supermarket store, or convenience store）. Second, the consumer decides from which outlet $j=1,\cdots, N$ in that group to purchase. Suppose that the outlets available in each group g are denoted by $J_g \subset \{1, \dots, N\}$. Utility for consumer h is given by the following equation:

$$u_j = \beta z_j - \alpha p_j + \xi_j + \varepsilon_{jh}^h \quad \alpha > 0. \tag{1}$$

where p_j is the price of retail outlet j. And While z_j is a vector of the observable characteristics of service quality for retail outlet j, ξ_j is unobservable service quality for outlet j.

Following from Berry（1994）, the random error term ε_j^h is defined as follows:

$$\varepsilon_j^h = \zeta_g^h + (1-\rho)e_j^h, \text{ for } j \in J_g, \tag{2}$$

where the errors e_j^h are iid extreme values. ζ_g^h is common random variable to all the products h in group g. And ρ is the parameter which induces a correlation between the products in group g.

Following Berry (1994), we obtain the share of retail outlet j as

$$s_j = \frac{e^{u_j/(1-\rho)}}{D_g} \times \frac{D_g^{(1-\rho)}}{\sum_{g=0}^{G} D_g^{(1-\rho)}}, \quad \text{for} \quad j \in J_g \tag{3}$$

where the term $D_g = \sum_{j \in J} e^{u_j/(1-\rho)}$ is the "inclusive value." The first term on the right hand side of equation (3) is the share that an individual will chose the outlet $j \in J_g$ in retail group g. The second term is the share of choosing any outlet from group g.

Here, we assume the equality of price p_j, and service quality z_j and ξ_j within group g; in other words, we assume $p_j = p_k = p_g$, $z_j = z_k = z_g$ and $\xi_j = \xi_k = \xi_g$ for $j, k \in J_g$.[4] Then, we obtain

$$D_g = \sum_{j \in J} e^{u_j/(1-\rho)} = e^{u_g/(1-\rho)} N_g$$

where Ng is the number of outlet in retail group g. The aggregated market share for type g retail group is derived as follows:

$$s_g = s_j N_g = \frac{e^{u_g} N_g^{(1-\rho)}}{\sum_{g=0}^{G} e^{u_g} N_g^{(1-\rho)}}. \tag{4}$$

We introduce outside goods that have $u_0 = 0$ and inclusive value $D_0 = 1$. From equation (3), it's share can be written as $s_0 = [\sum_{g=0}^{G} D_g^{(1-\rho)}]^{-1}$. Taking log of the ratio of s_g to s_0, we obtain

$$\ln s_g - \ln s_0 = \beta z_g - \alpha p_g + (1-\rho) \ln N_g + \xi_g. \tag{5}$$

where ξ_g represents the unobservable service characteristics of type g retail format, which is a random variable with the mean value of zero. In our regression analysis, we treat this term as an error term. The dependent variable is the difference of logged share of retail format g and logged share of outside goods. Independent variables include the price, quality of the service and the number of outlet for retail format g. Note that if $\rho = 1$, the model is degenerated into logit model and increase in N_g does not affect the share of group g.[5] On the other hand, when $0 < \rho < 1$, the sales share of group g increases as entry of new outlets in group g.

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[4] This specification was proposed and used by Berry and Waldfogel (1999), which quantifies the social inefficiency of free entry in radio broadcasting.

[5] When $\rho = 1$, increases in N_g affects only the sales share of outlet j in each group of retail format g.

Figure 3：Structure of consumers' choice
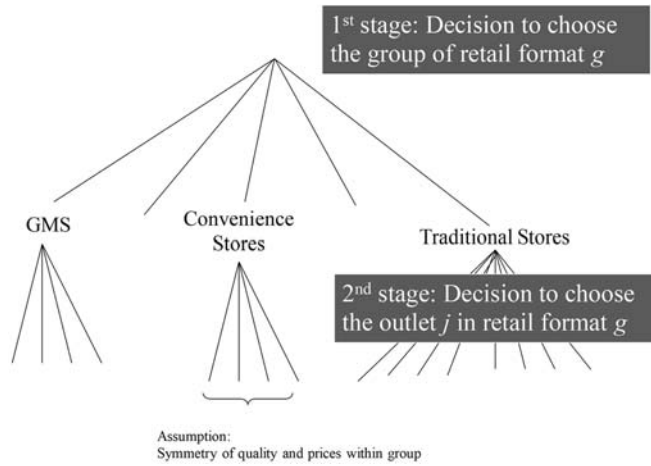
Extension: Welfare

We now demonstrate how we can estimate the changes in consumer welfare that arise from the expansion of various services. The change in consumer surplus that results from a change in the vector of price and quality, namely from u_g to $u_g{'}$ is given by

$$\Delta CS = \frac{1}{\alpha}[\ln(1+\sum_{g=1}^{G}e^{u'_g}N_g^{(1-\rho)})-\ln(1+\sum_{g=1}^{G}e^{u_g}N_g^{(1-\rho)})]., \tag{6}$$

where $u_g=\beta z_g-\alpha p_g+\xi_g$.[6] Using estimated coefficients, $\hat{\beta}, \hat{\alpha}$ and residual $\hat{\bar{\xi}}_g$, this framework enables us to decompose the source of the changes in consumer surplus into three factors; changes in price, quality and the number of outlet. As we mentioned, the deregulation promotes the entry of large retail stores. We can access the impact of the deregulation by comparing the consumer surplus with and without increases in the number of GMS and Specialty supermarket stores.

4．Data and Estimation Methodology

Our dataset is the regional data set for food retailing outlets covering 1997, 2002, and 2007. The primary data source is the *Census of Commerce*, which is compiled by the

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[6] The residual of equation (5), ξ_g is considered as one of components of quality. This treatment is often used in previous studies such as Khandelwal (2010).

Ministry of Economy, Trade and Industry. The *Census of Commerce* covers all the establishments belonging to the wholesale and retail industry. From the Census, we obtained the data for the sales at six-digit product level and establishment characteristics. One limitation of the Census is the lack of price information. Therefore, we referred to the *National Survey of Prices* (Ministry of Internal Affairs and Communications), which provides the commodity-level price information. Both data sets are available at establishment level. However, Since *National Survey of Price* is sampling survey, it is difficult to match these two statistics at establishment-level. Thus, we aggregate both data sets at regional level. Besides, the *Census of Commerce* and the *National Survey of Prices* use the different definition of retail formats. When aggregating establishment-level data, we adjust the retail format type for *National Survey of Prices* to match the one in the *Census of Commerce*.[7] As for price data, we first calculate commodity-level average price by region, retail format and year. Then, Price indices by region and retail formats are constructed by aggregating the commodity-level price with the weight of the Consumer Price index (as compiled by the Ministry of Internal Affairs and Communications). Our regional unit is Metropolitan Area which is defined in *National Survey of Price* by dividing each prefecture into three or four areas and includes 189 areas.

For market share, we use sales for food products by each retail format because we focus on the choice behavior of food retailing stores. Value of sales is deflated by price index constructed by *National Survey of Price*. As for the share of outside goods, we use the ratio of the expenditure for eating-out in total food related expenditure by prefecture and year, which is obtained from *Family Income and Expenditure Survey* (Ministry of Internal Affairs and Communications).

For service quality indicators, we referred to previous studies that address the definition of retail output, e.g., Oi (1992) and Betancourt and Gautschi (1988). In these previous studies, retail outputs are considered as a mix of distribution services, such as assortment and assurance. Betancourt and Gautschi (1988) discussed the economic function of retail organization and proposed the concepts of distribution service from an empirically-based perspective. According to their definition, distribution service is classified into the following four categories: (1) *accessibility of location*, (2) *assortment,* (3) *assurance of product delivery in the desired form and at the desired time*, (4)

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[7] For details on our definition of retail formats, see Appendix B.

information and *ambience*. We refer to these concepts and construct the following service quality indicators based on different retail format characteristics: operating hours, goods in stock per sales, broad assortment index, single store ratio, floor space per employee, and ratio of cash payment to total sales.

As proxy for *time accessibility* or *assurance of product delivery*, we use "operating hours" which is normalized by dividing 24 hours. We expect "operating hours" to have a positive effect on market share. "Goods in stock per sales" is the inverse of the merchandise turnover ratio, and is defined as the ratio of value of stocks to sales of products. Low "goods in stock-sales" ratio implies adoption of just-in-time delivery system, which enables retailers to provide fresh food products to customers. For *assortment*, we prepare a herfindahl index for products sales which is defined as the following;

$$HI_j = \sum_{k=1}^{K} \omega_{jk}^2,$$

where ω_{ik} indicates the sale share of products k for retail outlet j[8]. The more retail outlets deal with the product lines, the index HI will approach 0. On the other hand, those retail outlets dealing with only 1 product line have $HI=1$. Product information is available at six-digit level. This index is calculated by each establishment, and aggregated by region and retail formats with the sales share weight. This index covers not only food and beverage products but also all the commodity line, such as apparel products, drags and toiletries and other miscellaneous products.

"Single store ratio" is defined as the share of single store to total number of outlets by retail format, region and year. It is expected to have negative effects on market share, because single stores are inferior to multiple stores in terms of providing price information, availability, and other characteristics. "Log of floor space per employee" is proxy for *broad assortment* services or *information* supply to customers. Retail outlets with larger floor space offer a broader variety of products. On the other hand, in order to provide consumers with sufficient price and product information, managers have to increase the number of employees. The expected sign of the coefficient will be positive or negative depending on consumer preferences. "Ratio of cash payment to total sales" is defined as the ratio of cash settlement to total sales, which suggests an index for a variety of payment. While the majority of non-traditional or chain stores usually offer a

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[8] Product line is defined according to the 2-digit commodity code.

Table 2 : Average service characteristics for food retailing outlets in 1997

	Traditional Store	GMS	Specialty Supermarket	Convenience store	Department store
Price Index	1.0100	0.9700	0.9400	1.0100	1.0800
Operating hours	0.4840	0.4230	0.4540	0.8650	0.3840
Floor space per employee	11.8	47.2	22.7	9.5	46.3
Goods in stock per sales	0.0002	0.0230	0.0011	0.0011	0.0556
Method of Payments	0.7890	0.9090	0.9780	0.9490	0.6940
Single stores ratio	0.7060	0.0318	0.1170	0.7800	0.1750
Herfindahl index	0.8670	0.2870	0.8340	0.6820	0.2060

Source: Authors' calculation based on Census of Commerce.
Note: For normalization, operating hours are divided by 24.

variety of payment methods, such as debit card, credit card, or prepaid electric money card, traditional stores do not. Thus, a negative sign is expected for the coefficient. Finally, to capture unobservable format-specific service quality, retail format dummy variables are included in the equation. Finally, to capture the service characteristics common across sales formats that adopt self-service system, such as GMS, Specialty supermarket stores, and convenience stores, we include the dummy variable, "Self-service format."

Table 2 provides a summary of the variables we use as service characteristics by retail formats. Three items are noteworthy. First, while Convenience stores have the second highest price level, their distinctive services are reflected by longer operating hours and low goods in stock per sales. Second, looking at floor space per employee, there are clear differences between large and small retail formats. While floor space per employee for GMS and Department store exceeds 40, those for Traditional stores and Convenience stores are 11.8 and 9.5, respectively. Third, Traditional stores offers higher price and they are inferior to other retails formats in terms of service quality, such as operating hours.

Since an error term, which is the unobserved service characteristics, may correlates with price and the number of outlets, the price and number of outlets are considered as endogenous variables and OLS estimates are not consistent. Therefore, instrumental variables are needed. As discussed in Berry, *et al*. (1995), Hausman (1997), and Nevo (2001), we use standard instrumental variables, such as (1) the mean of service characteristics of other types of retail formats and (2) degree of competition in their local market; the number of outlets in other sales format locating in same area. As for the first instruments, since we assume that retailing firms determine their service characteristics before their location decisions and subsequent price competition, we

consider their competitors' service characteristics are exogenous. The latter variable is an instrumental variable for the logged number of outlet, lnN. This measure will be correlated with the logged number of outlet, but uncorrelated with the unobservable service characteristics, ξ_g.

5. Estimation Results

The estimation results are presented in Table 3. We estimate the model using both OLS (Column 1) and GMM (Column 2) methods including retail format dummies, and area-year dummies. Three things are noteworthy. First, OLS estimates for the

Table 3 : Estimation result of market share equation

VARIABLES	(1) OLS	(2) IV
Price	-0.355***	-2.368**
	(0.124)	(0.954)
$lnNg$	0.836***	0.869***
	(0.0183)	(0.0520)
Operating hours	0.842***	0.641***
	(0.132)	(0.182)
Goods in stock per sales	-5.644***	-5.876***
	(0.350)	(0.478)
Floor space per employee	-0.187***	-0.222***
	(0.0238)	(0.0304)
Single store ratio	-0.321***	-0.354***
	(0.0492)	(0.0547)
Ratio of cash payment	-0.927***	-1.263***
	(0.104)	(0.195)
Self-service store ratio	1.058***	1.075***
	(0.191)	(0.205)
Herfindahl index	0.0878	-0.316
	(0.148)	(0.246)
Observations	2,480	2,477
R-squared	0.935	0.926
Number of year-market	566	563
Area-Year FE	Yes	Yes
First stage F test		
Price		9.93
$lnNg$		83.36
Hansen J test p-value		0.195

Note: 1) Figures in brackets are standard errors.
2) "***," "**," and "*" represent level of significance at 1%, 5%, and 10%, respectively.

Table 4 : Decomposition of Annual Average Changes in Consumer Surplus

	1997-2002	2002-2007
ΔCS	2.36%	1.92%
Changes in Price	1.50%	1.54%
Changes in Quality	0.82%	0.45%
Changes in Ng	0.04%	-0.07%

coefficients of price are smaller than those by GMM in absolute value, suggesting that OLS estimates may suffer from endogenous bias. Second, the coefficients for log of number of outlets, which correspond to $1-\rho$, are all estimated between 0 and 1, which is consistent with our theoretical framework. Third, first stage F test statistics are sufficiently high and the test of over identification is not rejected for column 2.

Focusing on other variables in column 2, we can observe that the operating hours has significantly positive impact on market share. Coefficients for Goods in stock per sales, Floor space per employee, Single store ratio and Ratio of cash payment are all negative and significant. A negative coefficient for goods in stock per sales suggest that since low goods in stock per sales implies the adoption of just-in-time delivery systems, consumers highly value retailing outlets that provide fresh food products. The coefficient for floor space per employee, which is also negative and significant, may implies that Japanese consumers prefer to smaller stores.

Table 4 presents the changes in consumer surplus and its decomposition. The changes in the consumer surplus from 1997 to 2002 and from 2002 to 2007 are 2.36% and 1.92%. We decompose the changes in consumer surplus into changes in price, quality and the number of outlets by holding two out of three attributes constant. For the period between 1997 and 2002, more than half of which are explained by changes in price, which amounts to 1.50 percent point. As we mentioned in Figure1, we have seen the surge of increase in the number of retail store whose floor space is more than 500 m^2 and less than 1000 m^2 between 1997 and 2002. Price may decrease due to increases in competitive pressure.

We also found significant contribution of changes in quality（0.82 percent point）from 1997 to 2002. This result may indicate increases in new retail format such as convenient stores contribute to consumer welfare. On the other hand, changes in the number of outlets was 0.04% between 1997 and 2002 and -0.07% between 2002 and 2007.

6．Discussion

Combined with the estimation results and service characteristics by retail format in Table 2, the reason why GMS failed to expand market share despite deregulation can be explained by insufficient price competitiveness and failure to differentiate its service characteristics from those of specialty supermarket stores. For example, in Table 2, while the price index for GMS is 0.97, for specialty supermarket stores it is 0.94. The indices for operating hours and goods in stock per sales for GMS are also the same with those for specialty supermarket stores. Negative coefficient on floor space per employment reflects the fact that Japanese consumers do not place particular importance to huge floor space for daily food shopping. According to Aoyama (2007), retailing MNEs such as Wal-Mart and Carrefour, have succeeded in expanding their markets overseas by collaborating with manufacturers and adopting factory direct models, which enable them to undercut competitors' prices. However, in case of Japan, their offers were refused by Japanese manufacturers, and they failed to adopt the model. Thus, both Carrefour and Wal-Mart had no cost advantages in Japan. Moreover, taking advantages of huge floor space, Carrefour and Wal-Mart stuck to their low-cost operations, such as the stack-them-up-and-sell-them-cheap strategy, whereby products are displayed without being taken out of corrugated boxes. However, that strategy failed because Japanese consumers were not familiar with bulk purchase.

7．Concluding Remarks

In this study, we measured the welfare gain caused by the entry of new retailers. During the 1990s, the retail sector in Japan experienced significant reallocation dynamics. Two retail formats expanded their market share. The first, specialty supermarket stores, partially expanded their market shares due to the deregulation of large-scale stores. The second, convenience stores, took advantage of their distinctive service quality and efficient operation system. In our analysis, since retail service providers usually differentiate their service quality, we incorporated the differences in their service characteristics as well as in their price; consumer benefit was measured by estimating the nested logit demand function.

Our results revealed that changes in consumer surplus during the 1990s and 2000s are predominantly explained by changes in the price and quality of service. In particular, we observed the significant contribution of changes in the price during the regulatory transition period from 1997 to 2002. We found that the deregulation of entry restrictions forced retail stores to lower their price level. Moreover, the result suggested that deregulation influences consumer surplus.

Furthermore, estimated parameters for the demand function imply that Japanese consumers place more importance on long hours of operation rather than larger floor space for daily food shopping. This might be one of the reason why retailing MNEs, such as Wal-Mart and Carrefour, faced difficulties in expanding market share in Japan.

Although this paper provides thoughtful insights, various avenues exist for future researches. First, following Berry *et al.* (1995), with some additional assumptions on the competition among firms, marginal cost or markup can be recovered from the estimated demand function. Accessing the impact of deregulation on markup might be an interesting exercise. Second, using the quality indicator calculated by our demand estimates, we will be able to construct the quality adjusted price index and real output of retail service. Furthermore, we will be able to estimate a quality adjusted productivity indicator for the retail industry. Third, exploring the regional differences in the regulation of large-scale stores might provide policy implications. While large-scale store law was a nationwide regulation, additional entry restrictions were imposed by the local government in some cities and prefectures when the law of large-scale store was effective. Using the information on additional entry restrictions, one may be able to access the impact of deregulation at a regional level.

References

Aoyama, Y (2007). Oligopoly and the structural paradox of retail TNCs: An assessment of Carrefour and Wal-Mart in Japan, *Journal of Economic Geography*, 7 (4), 471-490.

Berry, S. T. (1994). Estimating discrete-choice model of product differentiation, *RAND Journal of Economics*, 25 (2), 242-262.

Berry, S. T., J. Levinsohn, and A. Pakes (1995). Automobile prices in market equilibrium, *Econometrica*, 63 (4), 841-890.

Berry, S. T., and J. Waldfogel (1999). Free entry and social inefficiency in radio broadcasting, *RAND Journal of Economics*, 30 (3), 397-420.

Betancourt, R. and D A. Gautschi, (1988). The economics of retail firms, *Managerial and Decision Economics*, 9 (2), 133-144.

Flath, D. (1990). Why are there so many retail stores in Japan? *Japan and the World*

Economy, 2（4）, 365-386.

Flath, D. and T. Nariu,（1996）. Is Japan's retail sector truly distinctive? *Journal of Comparative Economics*, 23（2）, 181-191.

Foster, L., J. Haltiwanger, and C. J. Krizan,（2006）. Market selection, reallocation and restructuring in the US retail trade sector in the 1990s, *Review of Economics and Statistics*, 88（4）, 748-758.

Hausman, J.（1997）. Valuation of new goods under perfect and imperfect competition, In T. F. Bresnahan and R. J. Gordon（Eds.）, *The Economics of New Goods*. National Bureau of Economic Research Studies in Income and Wealth, 58,（pp. 207-248）. Chicago: University of Chicago Press.

Ito, Takatoshi（1992）. *The Japanese Economy*. Cambridge, Massachusetts: The MIT Press.

Khandelwal, A.（2010）. The long and short（of）quality ladders, *Review of Economic Studies*, 77（4）, 1450-1476.

Larke, R. and M. Causton（2005）. *Japan: A Modern Retail Superpower*. New York: Palgrave Macmillan.

Matsuura, T., and M. Sunada（2011）. Welfare assessment of new retail formats: Evidence from Japan's retail industry, Keio-Kyoto GCOE Discussion Paper, DP2010-018.

McCraw, T. K., and P. A. O'Brien（1986）. Production and distribution: competition policy and industry structure, In T. K. McCraw（Ed.）, *America versus Japan: A Comparative Study*（pp. 77-116）. Harvard Business School Press.

Nevo, A.（2001）. Measuring market power in the ready-to-eat cereal industry, *Econometrica*, 69（2）, 307-342.

Nishimura, K. G., and T. Tachibana.（1996）. Entry regulations, tax distortions and the bipolarized market: the Japanese retail sector, In R. Sato, R. V. Ramachandran and H. Hori（Eds.）*Organization, Performance, and Equity: Perspectives on the Japanese Economy*（pp. 1-57）, Boston: Kluwer Academic Publication.

Oi, W.（1992）. Productivity in the distributive trades: The shopper and the economies of massed reserves, In Z. Grilliches（Ed.）, *Output Measurement in the Service Sector*（pp. 161-193）, Chicago: University of Chicago Press.

Sunada, M.（2010）. Measuring the cost of living index, output growth, and productivity growth of the retail industry: An application to Japan, *Review of Income and Wealth*, 56（4）, 667-692.

Appendix A：Historical overview of Large Scale Retail Law

In Japan, the business of large-scale retailers has been highly restricted by law to protect the businesses of small-scale retailers. The protection of small retail businesses originated from the "Department Store Law" established in 1937. Although the law was once repealed after WWII by GHQ, it came to life again in 1956 in almost the same manner as before. In 1974, the law was enforced as the "Large Scale Retail Store Law（LSRS law）" targeting not only department stores but also large super-stores. At the same time, the new law had the added purpose of restraining new entrants with large capital from abroad. The law had not only protected smaller businesses but also restricted competition among large retailers through controlling the entry of new businesses.

In 1978, the law was reinforced. When a large-scale retailer started a new business in a certain area, it first had to notify the Minister of International Trade and Industry. The minister would then investigate the potential effects of the new entry on small-scale retailers in that area. If the investigation detected potentially negative effects, the minister would urge the entrant to modify its business plan based on factors such as floor space, business days, closing times, or the number of holidays.

The role of the minister was just to provide guidelines. Representatives in regional business districts carried out substantial adjustments. Furthermore, local governments were allowed to impose additional entry regulations on large stores.

In the 1990s, the trend shifted from protectionism to deregulation as a result of "The Japan-US Structural Impediments Initiative," which aimed at opening up the Japanese market and promoting competition. In 1994, the LSRS Law was eased to give more freedom to new entrants into the retail industry with less than 1000 m^2 of floor space. inally in 2000, the law was completely repealed.

Appendix B：Definition and Concordance of Retail Formats

（1）The definition of retail formats

id		Self-service system	Sales floor space	Operating hours	Note
1	GMS	Yes	3000m^2 or over		2
2	Specialty supermarket	Yes	250m^2 or over		3
3	Department stores	No			2
4	Traditional stores	No			
5	Convenience stores	Yes	between 30m^2 and 250m^2	14 hour or more	

Note

1）Self-service stores are defined as establishments that adopt the self-service system in 50% or more of the sales floor. The "Self-service system" means that the establishment meets the following conditions;

　　i）Merchandise is put on the shelf unwrapped or prepackaged with price labeled on them.

　　ii）Shopping baskets or shopping carts are provided to customers.

　　iii）Customers pay for all of the purchases at the check-out counters.

2）Department and General Supermarkets are stores that retail clothing, food, and housing products, in which retail sales for each of these categories is over 10% but under 70%.

3）Specialty supermarkets are those stores which retail clothing, food, or housing products whose retail sales is 70% or over.

（2）Concordance table of retail formats between National Survey of Prices and Census of Commerce

		National Survey of Price	Census of Commerce
1	GMS	Supermarket	GMS
2	Specialty supermarket	Specialty supermarket	Specialty supermarket
3	Department stores	Department stores	Department stores
4	Traditional stores	General retail outlets	Other Supermarket
			Specialty stores
			Semi-specialty stores
5	Convenience stores	Convenience stores	Convenience stores