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MATSUURA Toshiyuki
RIETI

MOTOHASHI Kazuyuki
RIETI

RIETI
Research Institute of Economy, Trade & Industry, IAA

The Research Institute of Economy, Trade and Industry
http://www.rieti.go.jp/en/

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Market Dynamics and Productivity in Japanese Retail Industry in the late 1990's †

by

Toshiyuki Matsuura[1] and Kazuyuki Motohashi[2]

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(Abstract)

This study is a first attempt of shedding a light on market dynamics in Japanese retail industry at establishment level using micro dataset from census survey. Entry and exit of establishment and its impact on productivity is investigated by using Retail and Wholesale Census by METI in 1997 and 2002. It is found that a substantial number of gross turn over of establishments, as well as employment reallocation associated with it. This market dynamics of retail industry contributes to aggregated productivity growth.

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[1] Research Institute of Economy, Trade and Industry (RIETI)

[2] Research Center for Advanced Science and Technology (RCAST), University of Tokyo and Research Institute of Economy, Trade and Industry (RIETI): (corresponding address) tel: +81-3-5452-5338, fax: +81-3-5452-5343, e-mail: motohashi-kazuyuki@rieti.go.jp

1. Introduction

According to the report from McKinsey Global Institute, the productivity level of Japanese retail industry was only half of that in the United States in 1997. The main argument is that there are too many small and inefficient retailers in Japan, which can operate in the market relying on various policies to support SMEs. Safety net policy for failing SMEs is important to avoid social costs associated with their bankruptcy, but it may have a negative effect on industrial dynamism and productivity growth. In addition, Large-scale Retailer Store Law, which works as an entry barrier for large retailers into the market, also hindered market competition.

However, this Law had been gradually modified facing the pressure from the United States to lower structural non-trade barriers, and it was abolished finally in 1998. In this process, large international retailers, such as Toysarus, have opened its outlet throughout Japan, which provides competitive pressure to existing surrounding retailers. According to the retail and wholesale census data, consistent decline of the number of retail establishments is found in 1990's. A main factor for this trend is decreasing number of small retailers, such as Pap and Mum type family businesses.

This study is a first attempt of shedding a light on this mixed view on Japanese retail industry by looking at establishment dynamics of retail sector and its relationship with productivity. In this paper, micro data of the Retail and Wholesale Census (RWC) in 1997 and 2002 is used. RWC has been conducted every 3 or 5 years for all establishments whose main business is retail or wholesale business. RWC collected the data on the number of employment, the amount of sales by three digit commodity classification, the size of floor spaces and the age of establishment, which allows us to investigate productivity performance at establishment level.

This introduction is followed by description of data used in this study. Various issues associated with productivity measurement in retail services are addressed in this section. Then, a section on micro level productivity dynamics is provided. The degree of market dynamics is captured by entry and exit of establishments from 1997 to 2002. The magnitude of employment reallocation associated with this dynamics is shown. In addition, aggregated productivity growth is decomposed into within and between effect of continuing establishments, as well as contribution from entry and exit, as is the US case in Haltiwanger et al. (2001). Then, a section on descriptive regression is followed to further investigate the role of market dynamics in productivity growth. Finally, this paper is concluded with future research directions by using micro data from RWC.

2. Data issue on measuring productivity for retail sector

The data for this paper comes from Retail and Wholesale Census (RWC), by the Research and Statistics Department, Minister's Secretariat, Ministry of Economy, Trade and Industry (METI). This census survey covers all establishments in wholesale and retail trade. This survey started in 1952, and has been conducted every 3 or 5 year. The latest data available is the set from 2002.

RWC is conducted through survey staffs who have appointed in each geographical district for on-site surveying and the opening of new establishments of the closing of exiting ones are accurately reflected in the list of establishments in the survey. The problem is that the code number for establishment is revised every time, which makes it difficult for us to construct longitudinal datasets. The matching table of establishment codes exists between 1997 and 2002, which enables us to link the data sets in this period.

In this paper, we define entry and exit as appearance in and disappearance in census survey data of comparing years. Entry and exit under this definition do not necessarily correspond to green field entry and close down of establishments, because samples in RWC are limited to wholesale and retail sector. This fact means those establishments, who switched their main activity from other sector to retail sector or from retail sector to other sector, are categorized into entries or exits. We excluded these switchovers from entry groups by using information on opening year. We are comparing 1997 and 2002 data in this study, and we treated establishments whose opening year is before 1997 but not in the data set of 1997, as switchovers. However, there is no information which enables us to distinguish a "real" closing from a switchover, so that we cannot do the same treatment as entry. Therefore, it should be noted that the definition of entry and exit is not consistent in this study.[3].

For the purpose of this study, we segmented whole retail sector into 16 retail operation form. The retail form is the classification of establishment that is based on service characteristics such as the floor space, operating hours, and the variety of commodity etc. For example, "Specialty superstores (apparel)" is the category of superstores whose floor space is more than 250 square meters and in addition, more than 70 % of commodities handled are categorized into apparel products. The details of the definition

[3] Note also that since the establishments who switched from wholesale to retail or retail to wholesale are deleted in the process of data cleaning, our dataset does not contain switchovers to wholesale sector.

of sales form is listed in Appendix.

The RWC contains data on establishments concerning employment, the amount of sales, the floor spaces, the age of establishment, operating hours etc. For our purposes, the relevant point is that while it is possible to construct measures of labor productivity, it is not possible to multifactor productivity. The labor productivity index is given by:

$$P_{it} = \ln Q_{it} - \ln L_{it} \tag{1}$$

where Q is real gross output and L is labor input. For output measure, the gross margins (total sales less the cost of goods sold.) would be a preferable measure of output, but we are constrained to use sales as our measure of nominal output. The amount of sales is deflated by four-digit industry-level price indices which are developed by aggregating consumer price index.

One of major data issues in labor productivity in retail sector is how to measure labor input, because there are some retailers which uses part time worker extensively. In this sense, simple number of head count cannot be used. Full time equivalent (FTE) labor input is needed, but we are facing data constraints. In 2002 data, both the actual number of part time workers and the full time equivalent number of part time worker[4] are available, while only total number of workers is available in 1997. The Table 1 (C1) is the ratio of labor input based on FTE to that based on head count for 2002.

(Table 1)

In this study, we make an adjustment on 1997 data using aggregated data from other source. "Establishment and Enterprise Census" by Ministry of Internal Affairs and Communications is conducted at the same timing as RWC, which provides the share of part time workers by industry, employment size and establishment type (incorporated or unincorporated). Since as shown in Table 1 (A1) and (A2), the share of part time worker has changed from 1997 to 2002, we have matched this information with RWC at establishment level in 1997 and estimated the share in 1997. As for another component to come up with FTE input, i.e., the total hours worked for part-time workers, there is not information even at aggregated level. Therefore, we assume the average hours

[4] In RWC, the full time equivalent number of part time worker is defined as the total hours worked by part time worker divided by 8. It implicitly assumes a full-time worker's hours worked per day are 8 hours. FTE is calculated as the sum of the number of full time worker and the full time equivalent number of part time worker.

worked by part time worker does not change between these period[5], and use the data in 2002 at establishment data. The ratio of the adjusted number of employment to the original one for 1997 is reported in Table 1 (C2). It is found that significant difference between headcount and FTE exists across retail form as well as across comparing periods.

3. Productivity dynamics at establishment level

In this section, we present basic statistics on market dynamics measured by entry and exit and its impact on productivity dynamics. We begin by characterizing the dynamics of establishment. Table 2 presents the entry and exit of establishments in 1980s and 1990s. The total number of establishments has been decreasing since 1985. The downward trend after 1985 is primarily due to a very large contribution from exit although there is a relatively stable contribution from entry.

(Table 2)

Table 3 presents the entry and exit by retail operation form, as is described in the previous section. There is a large variation in turnover rate by entry and exit among sales formats. The gross turnover by both entry and exit are higher in large stores such as "Specialty Superstores". In contrast, small stores such as "Specialty stores" or "Semi-specialty stores" have negative net growth rate reflecting higher exit rate and lower entry rate.

(Table 3)

The dynamics of establishments accompanies job reallocation. The growth rate of employment and job creation and destruction associated with entry and exit is reported in Table 4. In most of sales formats, job reallocation through entry and exit exceeds the net growth rate. Particularly, there is substantial job reallocation for "Specialty superstores", "Specialty stores", and "Semi-specialty stores". In retail industry, we can see the entry and exit is the source of job creation or job destruction.

(Table 4)

Then, we investigate the dynamics of establishment-level productivity growth.

[5] As explained in footnote 4, the full time equivalent number of part time worker (L^*_P) is defined as $L^*_P = (L_P \times h)/8$, where L_P is the actual number of part-time worker, and h is average hours worked per day by part-time worker. From this equation, h is reduced with using L_P. The estimated h divided by 8 is reported in Table 1 (B). When estimating L^*_P for 1997, we assume h is constant between 1997 and 2002.

Following from Foster et al. (2002), we examine the transition matrix over the 1997-2002 periods. The measure we use is the labor productivity after removing sales form and establishment-size fixed effects. In each of the years under consideration, we classify establishments into quintiles of the labor productivity distribution. We can thus look forwards or backwards in terms of where establishments in 1997 end up or where the establishments in 2002 came from. The transition matrix is reported in Table 5.

(Table 5)

We found a number of similarities with the study by Foster et al. (2002). For example, there is substantial persistence of productivity ranking for continuing establishments. While 32% of establishments in lowest quintile 1997 have been still in lowest quintile 2002, establishments in the top quintile in 1997 have a 45% chance of staying in the top quintile in 2002.

Now, let's move on the issue of the entry and exit and productivity ranking. While the productivity of entries distributed uniformly, exits are concentrated in the lowest category among quintiles in 1997. For instance, in lowest category, 37.4% of establishments do not survive. In contrast, 26.7% establishments in highest rank do not survive. This result indicates market selection mechanism has worked well in our sample periods. We will subsequently discuss this issue through the productivity decomposition.

The productivity decomposition is a method to link the aggregate productivity growth with micro productivity growth.[6] Aggregate productivity growth is weighted average of establishment-level productivity growth, where the weights are related to the importance of the establishment in the industry:

$$\overline{P}_t = \sum s_{it} P_{it} \tag{2}$$

where $\overline{P}_t$ is the index of industry productivity, s_{it} is the share of establishment i in industry and P_{it} is an index of establishment level productivity. Haltiwanger, Foster, and Krizan (2001) review the computations used in empirical studies that decompose aggregate productivity growth into components related to within-establishment productivity growth, reallocation, and the effects of exit and entry. Their decomposition is:

[6] Bertelsmann and Dorms (2000) provide an excellent review of the literature.

$$\Delta P_t = \sum_{i\in C} s_{it-1}\Delta P_{it} + \sum_{i\in C}(P_{it-1} - \overline{P}_{t-1})\Delta s_{it} + \sum_{i\in C}\Delta P_{it}\Delta s_{it} + \sum_{i\in N} s_{it}(P_{it} - \overline{P}_{t-1}) - \sum_{i\in X} s_{it-1}(P_{it-1} - \overline{P}_{t-1}) \quad (3)$$

where C denotes continuing establishments, N denotes entering establishments, and X denotes exiting establishments. In the decomposition, aggregate productivity growth between two periods is composed of five parts. The five components distinguished are (1) a within-establishments effect – within-establishment growth weighted by initial output shares; (2) a between-establishment effect – changing output shares weighted by the deviation of initial establishment level productivity and initial industry level productivity; (3) a covariance term – a sum of establishment level productivity growth times establishment share change; (4) an entry effect – a year-end share – weighted sum of the difference between productivity of entering establishment and initial industry productivity; and (5) an exit effect – an initial – share – weighted sum of the difference between initial productivity of exiting establishment and initial industry productivity.

The between-establishment and the entry and exit terms involve a deviation of establishment-level productivity from the initial industry-level productivity. A continuously operating establishment with an increasing share makes a positive contribution to aggregate productivity only if it initially has higher productivity than the industry average. Entering (exiting) establishment contributes positively only if they have lower (higher) productivity than the initial average.

We apply the decomposition in equation (2) by sales from and region[7]. Following from the previous studies, we use the labor input for share weights. We use the nominal output weights to average across sales forms.

(Table 6)

The decomposition of labor productivity is shown in Table 6. We can find a negative total productivity growth between 1997 and 2002. This is probably due to the severe downturn in the macro economy. The negative within effects might capture this negative trend. On the other hand, in most of sales formats, the contribution of the reallocation effects exceeds that of within establishment effects. Especially, the

[7] We assume each establishment faces the market segmented by region. The regional code we used is the "area" code from regional database "Minryoku" by asahi shimbun, which is labeled according to city groups within prefecture. As for department stores, the market is defined as prefecture level.

between-establishment share effect has positive contribution on the productivity improvement, which means the increases in the share of efficient establishment contribute to productivity improvement. The covariance term captures the dynamic interaction among continuing establishments. When productivity growth and changes in share move in opposite direction, this term is negative. We found the negative covariance effect in all the sales format, which implies that, for continuing establishments, the downsizing has been a source of productivity enhancing over this period.

Let us turn to the contributions of entry and exit. Positive exit share effect indicates exiting establishments have lower productivity. Particularly, small stores, such as "Specialty stores" and "Semi-specialty stores" have relatively higher positive contribution of the exit term. This fact implies more unproductive small establishments have exited during our sample periods.

Concerning the productivity dynamics in Japanese economy, Nishimura, Nakajima, and Kiyota (2003) reports after 1996, that is, during severe recession, the "Natural Selection Mechanism" of economic Darwinism has not worked especially for wholesale and retail industry. They compares TFP index among entries, continues and exits. And they found the TFP index for exits is better than that of entries and continues and conclude "Natural Selection Mechanism" does not work. However, our finding is a counterevidence of the failure of "Natural Selection Mechanism", because our results imply even in severe recession unproductive establishments has been kicked out by the market selection mechanism.

4. Regression analysis

In this section, the relationship between market dynamics and productivity performance is further investigated by regression analysis. Here, we use Cob Douglas production function to analyze productivity of retail establishment.

$$\ln Output_{i,t} = \alpha \ln Emp_{it} + (1-\alpha)\ln Cap_{it} + \sum_j \beta^j \bullet X_{i,t}^j + \varepsilon_{i,t} \quad (4)$$

Equation (4) can be transformed into labor productivity equation as follows, which is used as a regression model in this section.

$$\ln(Output_{i,t} / Emp_{i,t}) = (1-\alpha)\ln(Cap_{it} / Emp_{i,t}) + \sum_j \beta^j \bullet X_{i,t}^j + \varepsilon_{i,t} \quad (5)$$

The amount of sales deflated by consumer price index is used for output, and a labor input is the number of employment at full time equivalent adjustment, both of which are described in detail in previous section. We use an index of floor space times opening hours for the capital input. In a process of providing retailing services, a shop is the most important capital inputs. A floor space times opening hours reflects a volume of capital service inputs from a shop to production function of retail industry. However, it is obvious that this indicator is not a perfect one, and capital stock other than structure may also play an important role. For example, it is found that IT plays an important role in retail productivity (Motohashi, 2003; Jarmin et. al, 20002). In equation (5), all of these unobserved factors are included in an error term.

Xj's are various controlling factors for productivity. In this paper, the following variables, which are available from Retail Census of both 1997 and 2002.

- The ratio of non retail revenues to total revenues (income_rate)
- Age of establishment (log of years)
- Dummy variable for parking (1: Yes or 0: No)
- Dummy variable for single_unit (1: Yes or 0: No (one of multiple units))
- Dummy variable for incorporated (1: Yes or 0: unincorporated)
- Three digit industry dummies, employment size category dummies as well as location dummies by 47 prefectures

First, equation (5) can be used for evaluating productivity level of entry and exit establishment. Cross section regression of (5) including a dummy variable of "exit" for 1997 data or "entry" for 2002 data gives us productivity level difference between exiting (entering) establishments and continuing ones in each year. Table 7 and 8 show the results of regressions for all samples, as well as samples by type of form. 16 types of establishment form are aggregated into 7 categories as is shown in these tables.

(Table 7) and (Table 8)

It is found that productivity of exit and entry establishments is relatively lower than that continues ones even after controlling for various other factors. This supports the findings in previous section of positive contribution of exit establishments and negative contribution of entry ones to aggregated productivity growth. Establishment level market competition contributes to aggregated productivity by exit of lower productivity growth, while entry ones are not efficient as compared to continuing players.

Regression results for all samples are driven by large number of small establishments,

so that results by establishment form make it clear the relationship between market dynamics and productivity for retail outlets other than pap and mum type shops. According to Table 6, negative coefficients with "exit" can be found in all types of form. The role of market competition for aggregated productivity growth is important across any type of retail establishment.

On the other hand, entry establishments are not always lower in productivity level. In "large supermarket", "large specialty store" and "convenience store", positive and statistical significant coefficients are found to "entry". For these types of retailers, relatively efficient establishments enter the market, and this dynamics contributes to aggregated productivity growth. There may be an advantage for new shops, such as new facilities to attract customers. These types of shops are operated by large enterprises which have an experience in retail operations as well as good marketing research staffs, so that these establishments can start at relatively higher productivity level.

Positive coefficients with establishment age are consisted with lower productivity of entry ones. [8] The same pattern can be observed in US studies (Haltiwanger et. al, 2001), and one of reason behind this finding is the existence of learning effect. When new establishment is opened, it may not have a good knowledge of customers nearby. In a process of operation, there should be learning effects for better retail services. However, it should be noted that in the cross sectional regression analysis, the coefficients of age might capture not only learning effect but also cohort effect. To distinguish both effects, we merge all the samples in 1997 and 2002 and productivity performance with cohort dummies and age is investigated by estimating fixed effect model. Table 9 presents the result of productivity growth regression by using equation (2) again.[9]

(Table 9)

It is found that the establishment age has positive and significant effect on the productivity performance even when the cohort effect is controlled. According to these results, although the productivity performance for entering establishments is relatively low, the potential growth of their productivity might be high.

5. Conclusion

[8] Note that the coefficients for entry dummy become negative or insignificant if we remove age from independent variables. The results of estimation are provided only on readers' request.

[9] In this equation, age is multiplied by time (t=1 and t=2). Within transformation of this term gives age itself.

In this paper, a role of market dynamism in aggregated productivity growth is investigated, based on micro data from Retail and Wholesale Census in Japan. From 1997 to 2002, the number of retail establishment decreases from 1,393,275 to 1,122,563. However, gross establishment turnover by entry and exit is much larger than this net figure of net change. In this process, substantial number of employment reallocation is found.

Aggregated labor productivity growth from 1997 to 2002 has been decomposed into the contribution of continuing, entry and exit establishments. Continuing ones' productivity can be further decomposed into within, between and cross terms. Although aggregated labor productivity dropped sharply from 1997 to 2002, positive contributions from between and exit components are found. Market dynamics of employment reallocation within continuing establishments as well as exit of lower productivity retailers has positive impact on aggregated productivity. On the other hand, entry establishments are lower in productivity, which leads to negative contribution in entry term.

The results from regression analysis support these findings from productivity decomposition. Inefficient establishments exited from the market even after controlling for floor spaces, operating hours, age as well as other characteristics of establishments. This finding is consistent from small pap and mum type family retailers to large scale department store and super market. In contrast to productivity decomposition results, entry establishment is higher in productivity for "large superstore", "large specialty store" and "convenience store". In these categories, both of entry and exit have positive impact on aggregated productivity growth. In addition, to access the potentiality of entering establishments, the productivity growth analysis is also conducted. It is found that even after controlling the coefficients with establishment age is positive and significant, which implies there is a significant learning effect on the productivity of each establishment. Therefore, entering establishments are inefficient in terms of productivity level at their starting point, but they have a higher potential for productivity growth.

When we come back to an initial question on whether Japanese retail sector is in a process of dynamic transformation, the answer is yes. We have found a significant market dynamics in this industry, which contributed to aggregated productivity growth as well. The magnitude of this dynamics can be a comparable level to that in the US, shown in Haltiwanger et al. (2002).

As an initial attempt of micro data analysis of Japanese retail industry, this study has

made a significant contribution to understanding market dynamics and productivity in an important industry which has not studied very much. At the same time, this study opens up various further research questions. One of important policy questions is whether regulatory reform in this industry, such as abolishment of Large-scale Retail Shop Law affects market dynamics of this industry. Existing studies addressing this question (Nishimura and Tachibana, 1996; Matsuura and Nakajima, 2002) suffer from data limitations. Using micro-data covering whole population of retailers, these studies can be improved substantially.

In order to address this question, we need to conduct analysis by using the data dating back to pre-reform period, i.e., 1980's. Another idea is to break down all establishments into reasonable size of region where competition takes place, and to conduct cross region analysis. An impact of entry of large scale retailers in existing establishments can be done with such data. In addition, it is important to conduct cross country comparative analysis. Due to confidentiality rule on access to micro datasets by government survey, it needs cross boarder coordination of researchers. However, the added value must exceed the cost.

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Table 1; The revision of labor input

	A1	A2	B	C1	C2
Department stores	40.0%	23.7%	0.73	0.89	0.92
Supermarket stores	80.5%	57.1%	0.62	0.69	0.75
specialty supermarket stores(Foodl)	78.2%	53.9%	0.58	0.67	0.71
specialty supermarket stores(Apparel)	76.5%	41.4%	0.64	0.72	0.82
specialty supermarket stores(Housing)	72.8%	44.0%	0.59	0.71	0.77
Convenience stores	83.2%	52.6%	0.51	0.60	0.65
Other supermarkets	57.4%	26.9%	0.63	0.79	0.86
specialty stores(Apparel)	31.6%	12.0%	0.85	0.95	0.96
specialty stores(Food)	46.3%	25.0%	0.63	0.83	0.87
specialty stores(Housing)	38.3%	21.3%	0.52	0.82	0.84
Semi-specialty stores(Apparel)	31.7%	14.3%	0.81	0.94	0.96
Semi-specialty stores(Food)	33.9%	19.3%	0.65	0.88	0.89
Semi-specialty stores(Housing)	28.0%	14.0%	0.72	0.92	0.94
Motor Vehicle stores	7.3%	3.0%	0.88	0.99	1.00
Fuel stores	35.1%	18.8%	0.69	0.89	0.93
Other retail stores	37.0%	18.4%	0.74	0.90	0.92
Total	48.5%	25.7%	0.61	0.81	0.86

Note:

A1: The share of part-time worker in 2002.

A2: The share of part-time worker in 1997.

B: The ratio of hours worked pre day by part-time worker to that by full-time worker.

C1: The ratio of FTE to the number of head counts in 2002.

C2: The ratio of FTE to the number of head counts in 1997.

Source: Authors' calculation based on RWC panel data.

Table 2; The trend of the entry and exit of establishments in 1980s and 1990s.

	number of establishments	entry(%)	exit (%)	net growth (%)
1979	1,673,667	13.5	-9.81	3.69
1982	1,721,465	12.52	-9.66	2.86
1985	1,628,644	9.02	-14.41	-5.39
1988	1,619,752	9.62	-10.17	-0.55
1991	1,591,223	10.63	-12.39	-1.76
1994	1,499,948	8.52	-14.25	-5.74
1997	1,416,396	9.42	-14.77	-5.35
2002	1,300,057	11.14	-18.74	-7.59

Note: "entry" and "exit" is the ratio of entries and exits to total number of establishments in previous survey. Both are estimated from the table of the number of establishments by open year in "Retail and Wholesale Census, Report by Industry". "entry" for 2002 in this table include a switchover entry as well as a "green field" entry.

Source: Takahashi (2003), Table 10.

Table 3; The dynamics of establishments by sales form.

		Establishment				
		1997	2002	growth rate	entry rate	exit rate
1	Department stores	474	413	-29.1%	8.2%	-21.1%
2	Supermarket stores	1,888	1,766	-17.5%	15.5%	-22.0%
3	specialty supermarket stores(Foodl)	17,420	15,764	-8.2%	19.8%	-29.3%
4	specialty supermarket stores(Apparel)	4,528	5,006	25.5%	44.6%	-34.1%
5	specialty supermarket stores(Housing)	9,859	10,888	10.7%	41.6%	-31.2%
6	Convenience stores	36,579	37,161	-0.1%	30.7%	-29.2%
7	Other supermarkets	119,959	95,144	-40.9%	12.6%	-33.3%
8	specialty stores(Apparel)	124,561	91,777	-29.0%	15.9%	-42.2%
9	specialty stores(Food)	198,959	154,139	-15.6%	12.5%	-35.0%
10	specialty stores(Housing)	371,240	299,935	-15.9%	13.3%	-32.5%
11	Semispecialty stores(Apparel)	62,352	55,197	-0.6%	20.0%	-31.5%
12	Semispecialty stores(Food)	176,417	136,724	-25.8%	4.6%	-27.1%
13	Semispecialty stores(Housing)	137,575	108,515	-21.4%	8.3%	-29.4%
14	Motor Vehicle stores	57,338	49,364	-13.9%	16.3%	-30.2%
15	Fuel stores	70,705	57,974	-16.8%	5.3%	-23.3%
16	Other retail stores	3,421	2,797	-22.3%	13.1%	-31.4%
	Total	1,393,275	1,122,564	-19.4%	12.6%	-32.0%

Note: “entry” and “exit” is the ratio of entries and exits to total number of establishments in previous survey.

Source: Authors’ calculation based on RWC panel data.

Table 4; The job reallocation by sales form.

		Employment				
		1997	2002	net growth rate	Job creation with entry	Job destruction with entry
1	Department stores	171963	117403	-38.2%	12.0%	-4.6%
2	Supermarket stores	226168	245143	8.1%	14.6%	-7.7%
3	specialty supermarket stores(Foodl)	401990	479131	17.6%	7.3%	-14.5%
4	specialty supermarket stores(Apparel)	36364	49938	31.7%	14.4%	-28.3%
5	specialty supermarket stores(Housing)	115786	163208	34.3%	21.2%	-31.4%
6	Convenience stores	262356	308097	16.1%	9.5%	-16.1%
7	Other supermarkets	463528	371677	-22.1%	38.5%	-28.7%
8	specialty stores(Apparel)	364438	263384	-32.5%	14.4%	-10.1%
9	specialty stores(Food)	711633	611906	-15.1%	12.8%	-16.4%
10	specialty stores(Housing)	1323464	1158519	-13.3%	8.3%	-9.3%
11	Semispecialty stores(Apparel)	220725	216723	-1.8%	21.4%	-29.3%
12	Semispecialty stores(Food)	540268	403933	-29.1%	33.3%	-28.2%
13	Semispecialty stores(Housing)	476731	353695	-29.9%	32.4%	-26.1%
14	Motor Vehicle stores	478329	397942	-18.4%	0.7%	-0.6%
15	Fuel stores	375406	333745	-11.8%	1.6%	-2.6%
16	Other retail stores	17729	11076	-47.0%	52.3%	-39.6%
	Total	6186877	5485520	-12.0%	15.7%	-15.3%

Note: “Job creation with entry” and “Job destruction with exit” is a gross job increase or decrease divided by employment in 1997.

Source: Authors’ calculation based on RWC panel data.

Table 5; Transition matrix of relative productivity ranking from 1997 to 2002.

	Quintile 1 (2002)	Quintile 2 (2002)	Quintile 3 (2002)	Quintile 4 (2002)	Quintile 5 (2002)	Exit
Quintile 1	32.48	14.54	6.56	4.36	4.67	37.39
(1997)	40.35	18.06	8.15	5.42	5.8	23.32
Quintile 2	16.84	28.2	13.13	5.02	2.17	34.64
(1997)	20.92	35.04	16.31	6.24	2.7	21.61
Quintile 3	7.09	18.54	27.83	11.07	3.02	32.46
(1997)	8.81	23.03	34.57	13.75	3.75	20.25
Quintile 4	3.97	6.95	18.6	32.29	9	29.18
(1997)	4.93	8.64	23.11	40.11	11.17	18.2
Quintile 5	3.58	2.52	4.37	16.62	46.26	26.66
(1997)	4.44	3.13	5.42	20.64	57.42	16.62
Entry	26.31	15.5	15.93	17.72	24.53	
	20.55	12.11	12.44	13.84	19.16	

Note: Quintile 1 is the lowest in the productivity ranking, while quintile 5 is top. In each cell, the top number is the row percentage, and the bottom number is the column percentage.

Source: Authors' calculation based on RWC panel data.

Table 6; The decomposition of productivity growth by sales form

form for entry exit	labor productivity	labor productivity	diff in labor productivity	within share	between share	cross share	entry share	exit share	net entry
Department stores	8.679	8.746	6.7%	7.9%	5.2%	-7.3%	-1.3%	2.2%	0.9%
Supermarket stores	8.254	8.008	-24.6%	-11.9%	3.5%	-4.4%	-11.9%	0.1%	-11.8%
specialty supermarket stores(Food)	8.030	7.844	-18.6%	-5.8%	7.5%	-8.3%	-14.1%	2.0%	-12.0%
specialty supermarket stores(Apparel)	7.874	7.683	-19.0%	1.4%	2.8%	-3.7%	-19.7%	0.3%	-19.4%
specialty supermarket stores(Housing)	7.962	7.702	-26.0%	2.7%	9.3%	-11.2%	-28.9%	2.1%	-26.8%
Convenience stores	7.324	7.280	-4.4%	11.5%	12.2%	-16.8%	-12.3%	1.0%	-11.3%
Other supermarkets	7.284	7.132	-15.2%	-8.2%	10.9%	-14.4%	-8.1%	4.6%	-3.5%
specialty stores(Apparel)	6.946	6.654	-29.2%	-9.4%	6.8%	-14.7%	-16.0%	4.1%	-11.9%
specialty stores(Food)	6.479	6.349	-13.0%	-4.4%	10.4%	-15.0%	-9.8%	5.7%	-4.1%
specialty stores(Housing)	6.794	6.745	-4.9%	1.7%	11.8%	-18.5%	-2.8%	2.9%	0.1%
Semi-specialty stores(Apparel)	7.209	6.949	-26.0%	-12.1%	6.3%	-11.2%	-15.1%	6.0%	-9.1%
Semi-specialty stores(Food)	6.920	6.760	-16.0%	-12.9%	11.2%	-17.0%	-3.2%	6.0%	2.8%
Semi-specialty stores(Housing)	7.113	6.932	-18.1%	-8.9%	8.0%	-15.7%	-4.2%	2.7%	-1.5%
Motor Vehicle stores	7.977	7.813	-16.3%	-11.9%	3.5%	-7.0%	-6.0%	5.1%	-1.0%
Fuel stores	7.765	7.704	-6.1%	-2.6%	12.0%	-15.6%	-1.9%	2.0%	0.1%
Other retail stores	7.436	7.183	-25.3%	-12.6%	7.4%	-13.8%	-8.5%	2.8%	-5.8%
Total	7.529	7.394	-13.5%	-4.6%	8.3%	-12.4%	-8.1%	3.2%	-4.9%

Source: Authors' calculation based on RWC panel data.

Note: Net entry is the sum of entry share and exit share.

Table 7: Labor productivity level in 1997: Continue vs Exit

	LP all	LP (1)	LP (2)	LP (3)	LP (4)	LP (5)	LP (6)	LP (7)
floor_h_l	0.304	0.382	0.483	0.533	0.817	0.293	0.276	0.185
	(270.69)**	(9.93)**	(10.07)**	(70.89)**	(104.22)**	(242.64)**	(83.71)**	(17.65)**
income_rate	-1.586	-3.152	-1.221	-0.236	-0.461	-1.668	-1.375	-2.325
	(127.41)**	(3.75)**	(0.80)	(1.70)	(2.69)**	(116.59)**	(48.59)**	(39.26)**
age	0.058	0.206	0.395	0.247	0.182	0.041	0.105	0.068
	(54.07)**	(9.40)**	(16.52)**	(43.33)**	(37.61)**	(34.13)**	(31.79)**	(6.36)**
park	0.140	-0.041	0.139	0.027	-0.018	0.152	0.059	0.159
	(70.35)**	(0.68)	(1.62)	(1.43)	(1.59)	(69.02)**	(10.08)**	(5.22)**
single_unit	-0.208	0.029	-0.216	-0.176	-0.018	-0.205	-0.234	-0.018
	(73.74)**	(0.52)	(1.33)	(10.70)**	(1.21)	(64.85)**	(27.02)**	(0.75)
incorp	0.485			0.385	0.208	0.494	0.450	0.503
	(197.39)**			(14.40)**	(18.21)**	(179.94)**	(61.08)**	(22.53)**
ee==exit	-0.247	-0.242	-0.107	-0.105	-0.097	-0.259	-0.303	-0.162
	(119.82)**	(4.87)**	(2.00)*	(8.99)**	(8.39)**	(112.97)**	(47.31)**	(8.05)**
Observations	1204973	447	1888	31807	36579	974718	131150	9428
R-squared	0.17	0.32	0.16	0.16	0.26	0.16	0.14	0.25

Absolute value of t statistics in parentheses
* significant at 5%; ** significant at 1%

Table 8: Labor productivity level in 2002: Continue vs Entry

	LP all	LP (1)	LP (2)	LP (3)	LP (4)	LP (5)	LP (6)	LP (7)
floor_h_l	0.280	0.361	0.394	0.436	0.693	0.278	0.274	0.155
	(213.12)**	(5.42)**	(6.47)**	(51.30)**	(74.93)**	(195.84)**	(71.97)**	(14.00)**
income_rate	-1.636	0.751	0.107	-0.608	-0.247	-1.675	-1.484	-2.285
	(117.52)**	(0.55)	(0.17)	(4.58)**	(1.75)	(102.95)**	(49.51)**	(34.83)**
age	0.071	0.289	0.492	0.400	0.399	0.058	0.005	0.058
	(38.26)**	(4.82)**	(10.78)**	(39.99)**	(54.52)**	(27.62)**	(0.94)	(3.35)**
park	0.132	-0.108	0.292	-0.057	0.061	0.143	0.058	0.213
	(54.80)**	(1.17)	(3.66)**	(3.20)**	(5.43)**	(52.71)**	(8.63)**	(6.53)**
single_unit	-0.171	-0.010	0.184	-0.188	-0.031	-0.177	-0.093	-0.046
	(48.37)**	(0.09)	(0.83)	(9.34)**	(2.26)*	(43.75)**	(8.56)**	(1.67)
incorp	0.432			0.201	0.016	0.465	0.360	0.417
	(142.80)**			(5.43)**	(1.39)	(134.66)**	(41.77)**	(16.39)**
ee==entry	-0.233	0.147	0.317	0.136	0.122	-0.257	-0.418	-0.039
	(49.15)**	(0.86)	(3.40)**	(6.91)**	(7.97)**	(46.53)**	(26.32)**	(1.06)
Observations	1004210	328	1588	33883	38803	798355	105607	8839
R-squared	0.13	0.16	0.12	0.12	0.21	0.12	0.1	0.2

Absolute value of t statistics in parentheses
* significant at 5%; ** significant at 1%

(1) Department Store
(2) Large supermarket
(3) Large speciality store
(4) Convenience store
(5) Small store
(6) Motor vehicles store
(7) Fuel store

Table 9: Labor productivity growth from 1997 to 2002

Dependant Variable	lp all	lp (1)	lp (2)	lp (3)	lp (4)	lp (5)	lp (6)	lp (7)
floor_h_l	0.354	0.719	0.359	0.760	0.946	0.343	0.330	0.170
	(273.80)**	(9.82)**	(4.77)**	(56.52)**	(83.92)**	(232.18)**	(74.31)**	(14.26)**
income_rate	-1.118	-0.262	-0.200	-0.413	-0.447	-1.105	-1.217	-1.421
	(96.04)**	-0.320	-0.300	(2.03)**	(2.34)**	(80.40)**	(40.80)**	(17.54)**
age	0.057	0.042	0.086	0.060	0.068	0.056	0.042	0.057
	(139.55)**	(3.31)**	(11.04)**	(34.55)**	(40.59)**	(112.81)**	(20.56)**	(16.69)**
est_before 1944	-3.633	-2.593	-5.217	-3.900	-4.006	-3.577	-2.635	-3.642
	(140.32)**	(3.27)**	(8.40)**	(32.44)**	(36.79)**	(113.89)**	(20.62)**	(15.68)**
est_1945-1954	-3.076	-2.178	-4.813	-3.335	-3.367	-3.028	-2.212	-3.099
	(140.74)**	(3.25)**	(8.85)**	(32.77)**	(35.16)**	(114.26)**	(20.54)**	(16.57)**
est_1955-1964	-2.523	-1.760	-3.851	-2.727	-2.735	-2.489	-1.824	-2.490
	(141.66)**	(3.22)**	(10.23)**	(32.74)**	(34.09)**	(115.35)**	(20.84)**	(16.44)**
est_1965-1974	-1.942	-1.248	-2.904	-2.136	-2.043	-1.916	-1.412	-1.943
	(141.35)**	(2.98)**	(11.02)**	(34.56)**	(32.07)**	(115.20)**	(20.97)**	(16.79)**
est_1975-1984	-1.371	-0.941	-2.188	-1.540	-1.551	-1.344	-0.993	-1.383
	(141.00)**	(3.20)**	(11.84)**	(36.11)**	(34.98)**	(114.42)**	(20.96)**	(16.89)**
est_1985-1994	-0.786	-0.492	-1.259	-0.949	-0.944	-0.760	-0.567	-0.787
	(135.62)**	(2.87)**	(11.20)**	(37.55)**	(38.95)**	(108.59)**	(20.19)**	(15.99)**
park	0.016	-0.018	0.023	-0.042	-0.051	0.019	0.001	0.012
	(5.87)**	-0.340	-0.260	-1.620	(1.68)*	(6.44)**	-0.160	-0.320
single_unit	0.008	-0.178	0.144	-0.005	0.054	0.002	0.008	-0.106
	(1.80)*	(2.44)**	-0.410	-0.140	(2.35)**	-0.380	-0.470	(2.57)**
incorp	0.143			0.021	0.161	0.138	0.133	0.008
	(20.16)**			-0.260	(6.56)**	(16.15)**	(4.51)**	-0.100
Number of obs	1630208	645	2724	44691	50926	1301561	185652	12914
Adj R-sq:	0.0771	0.0735	0.0101	0.0474	0.1126	0.0764	0.0651	0.1133

Absolute value of t statistics in parentheses

* significant at 5%; ** significant at 1%.

"est_19XX-19XX" are the cohort dummy variables.

Appendix; The definition of sales form

	Classification		Self service system	Commodity handled	Sales floor space	Business hours
1	Department stores		No		3000 square meter or more over	
2	Supermarket		Yes		3000 square meter or more over	
3	Speciality stores	Apparel	No	Apparel; 90% or over		
4		Foods	No	Foods; 90% or over		
5		Housing	No	Housing; 90% or over		
6	Convenience stores		Yes	deals with food or bevarage	30 or over-under 250 square meter or more over	14 hours or over
7	Other supermarket		Yes			
9	Speciality sperstores	Apparel	Yes	Apparel; 70% or over	250 square meter or more over	
10		Foods	Yes	Foods; 70% or over	250 square meter or more over	
11		Housing	Yes	Housing; 70% or over	250 square meter or more over	
12	Semi-speciality stores	Apparel	No	Apparel; 50% or over		
13		Foods	No	Foods; 50% or over		
14		Housing	No	Housing; 50% or over		
15	Motor Vehicle stores			Industry "motor vehicle stores"		
16	Fuel stores			Industry "Fuel stores"		
17	Other retail store		No			

Note: The definition of sales form originally comes from “Retail and Wholesale Census, Report by sales form”.