

# Outlet Sampling Method on the 1997 National Survey of Prices

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**Summary:** The Statistics Bureau of Japan conducted The 1997 National Survey of Prices in November 1997 in order to obtain cross-sectional pictures of retail prices. The outlet sampling method on the 1997 Survey was a probability sampling method, while its predecessors adopted a purposive selection (quota sampling). The paper introduces the procedures of the outlet sampling on the 1997 Survey.

**Keywords:** Census of Commerce; outlet list; selling floor space; price distribution; regional price difference; retail price; outlet sampling

## 1. Introduction

There are two major price surveys conducted by the Statistics Bureau in Japan. One is the monthly Retail Price Survey, and the other is the quinquennial National Survey of Prices (NSP). The former mainly aims at measuring monthly changes in prices of goods and services and providing price data for the CPI. The latter is designed to obtain cross-sectional pictures of retail prices, particularly with respect to price variation among outlets, stages of distribution and regional differences. The NSP was begun in 1967 when price inflation was observed with the accelerated economic growth. After that, it was conducted in 1971, 1974 and 1977. After 1977, the survey interval was widened to five years, and the 1997 Survey was the eighth.

The sample outlets of the preceding NSPs were selected by enumerators based on a purposive selection (quota sampling method). The enumerators were told to select three outlets for each item where the item had the largest sales in their survey areas.

The 1997 Survey adopted a new method, in which a probability sampling was used utilizing the results of the 1994 Census of Commerce.

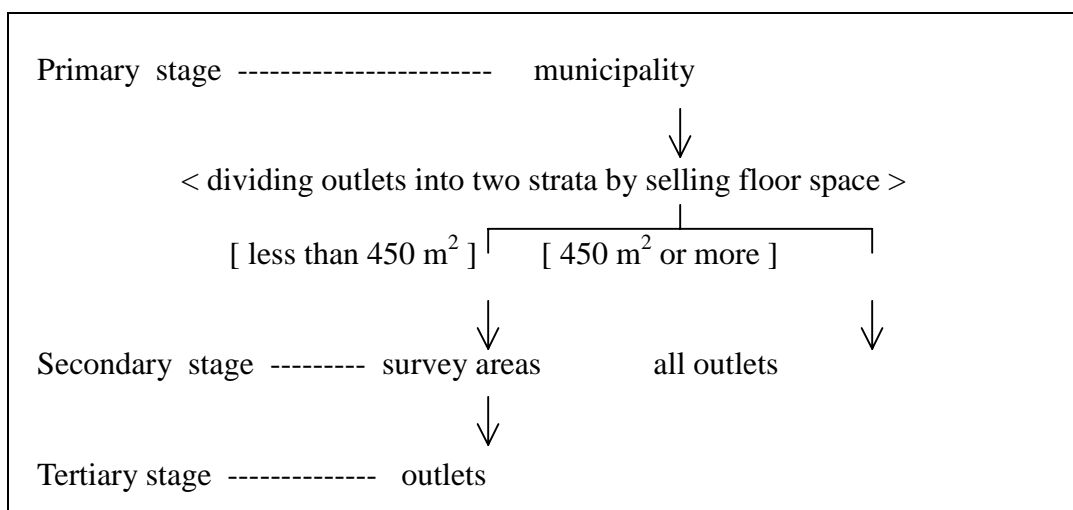
The preliminary results of the 1997 Survey will be released around May 1998, and the detailed results by the end of March 1999.

## 2. Sampling Frames

The outlet list was compiled from the results of the 1994 triennial Census of Commerce conducted by the Ministry of International Trade and Industry. About 142 thousand sample outlets were selected from about 1.5 million outlets on the list by the Statistics Bureau.

### 3. Sampling Units

The sample outlets were selected based on the two- or three-stage stratified sampling method. The primary sampling unit was the municipality. After the primary stage sampling, outlets in each sample municipality were stratified into two strata by the selling floor space. The first stratum was composed of outlets with selling floor space of 450 m<sup>2</sup> or more, while the second of those with selling floor space of less than 450 m<sup>2</sup>. From the first stratum, all outlets (about 24 thousand) were selected. Moreover, the outlets that were opened newly between the date (June 1) of the 1994 Census of Commerce and June 1, 1997 were added to the first stratum and all selected as samples. As for the second stratum, the secondary sampling unit was the survey area, and the tertiary the outlet.



The limit on the selling floor space of 450 m<sup>2</sup> was set for stratifying outlets for the following reason. In Japan, if a proprietor has a plan of constructing a new outlet with selling floor space of 500 m<sup>2</sup> or more, the Large-Scale Retail Stores Law imposes him / her to undergo the coordination process in which the effects of the plan have to be assessed on the nearby outlets. This coordination has been deregulated to a considerable extent these days, but needed lengthy time until recently. For this reason, many new type outlets (for example, discount stores etc.) with selling floor space of 450 m<sup>2</sup>- less than 500 m<sup>2</sup> emerged (see Table1).

Table 1 Number of Outlets by Selling Floor Space in Niigata Prefecture

	Total	Area		
		Shopping	Residential	Other
Total	12,174	5,440	3,974	2,760
550m <sup>2</sup> or more	90	37	38	15
500 - 550	11	7	3	1
450 - 500	73	19	38	16
400 - 450	27	12	10	5
350 - 400	41	18	15	8
300 - 350	70	23	28	19
Less than 300	5,931	2,662	1,921	1,348

Source : the 1994 Census of Commerce

#### 4. Primary Stage Sampling

All the 3,233 municipalities were classified in consideration of their population size and geographical location within every prefecture. All the 221 cities with a population of 100 thousand or more were selected. 450 municipalities were selected randomly from cities with a population of less than 100 thousand, towns and villages. The sampling ratios for municipalities are shown in Table 2.

**Table 2 Sampling Ratios for Municipalities by Population Size**

Population size	Sampling ratio	Number of sample municipalities
<i>Cities</i> 100,000 or more	1 / 1	221
50,000 -- less than 100,000	2 / 3	179
30,000 -- less than 50,000	1 / 3	60
Less than 30,000	1 / 3	19
<i>Towns and Villages</i> 40,000 or more	1 / 5	5
Less than 40,000	1 / 15	187

#### 5. Survey Areas

The enumeration districts of the Census of Commerce were grouped according to their characteristics, i.e. shopping area, residential area and the rest. These groups were further divided to contain about 100 outlets. Then, the survey areas, i.e. the sampling units at the secondary stage, were randomly selected from these areas. The total number of survey areas was 2,954.

**Table 3 Allocation of Sample Survey Areas and Sample Outlets**

Municipality class					Number of sample survey areas	Number of sample outlets
<i>Cities</i>						
				Tokyo	90	3,600
				Osaka	50	2,000
				Yokohama	40	1,600
				Nagoya	35	1,400
				Sapporo	28	1,120
				Kyoto,	25	1,000
				Kobe	25	1,000
				Fukuoka, Hiroshima, Kitakyushu	20	800
				Kawasaki, Sendai, Chiba	18	720
				< Population size >		
				700,000 -- less than 800,000	13	520
				600,000 -- less than 700,000	12	480
				500,000 -- less than 600,000	11	440
				400,000 -- less than 500,000	10	400
				300,000 -- less than 400,000	9	360
				200,000 -- less than 300,000	8	320
				150,000 -- less than 200,000	7	280
				100,000 -- less than 150,000	6	240
				50,000 -- less than 100,000	3	120
				30,000 -- less than 50,000	2	80
				Less than 30,000	1	40
				<i>Towns and Villages</i> 40,000 or more	2	80
				Less than 40,000	1	40

## 6. Selecting Outlets in Survey Areas

Forty sample outlets were selected from each survey area in the following way.

At first, the outlets in each survey area were classified into 31 divisions according to the combination of sales items. Divisions having one outlet or more were allocated at least one sample outlet, and the remaining samples were distributed to divisions in proportion to the number of outlets. The outlets in each division were sequenced according to annual gross amount of sales. The allocated number of sample outlets were selected systematically from each division. The allocation of the number of survey areas and sample outlets is shown in Table 3. The total number of sample outlets thus selected was 118,160 (40 x 2,954), which are shown in detail in Table 4 for each of the 31 division.

In addition, substitution outlets were determined for fear that sample outlets might be closed or might have moved.

Table 4 Number of Sample Outlets by Divisions According to the Combination of Sales Items

Divisions according to the combination of sales items	Number of sample outlets	Divisions according to the combination of sales items	Number of sample outlets
1 Convenience store (selling liquor)	1,605	17 Household goods store	3,190
2 Convenience store (other)	2,050	18 Men's suits store	3,214
3 Grocery Store	7,789	19 Women's dresses and children's clothing store	14,064
4 Liquor Store	8,672	20 Shoes store	2,614
5 Rice Store	3,976	21 Bag store	1,321
6 Bakery Store	3,004	22 Drug store	4,552
7 Fish Store	3,696	23 Cosmetic store	3,304
8 Meat store	3,163	24 Watch and glasses store	3,038
9 Fruit and Vegetable shop	3,563	25 Bicycle store	2,848
10 Tofu store	1,730	26 Gas station	4,844
11 Candy store	4,572	27 Stationery store	2,594
12 Packed box lunch store	5,394	28 Sporting goods store	2,204
13 Tea leaves and coffee bean store	1,976	29 Camera store	1,993
14 LPG store	2,177	30 Toy store	2,438
15 Electrical appliances store	6,631	31 Flower store	3,427
16 Bedclothes store	2,517	TOTAL	118,160

## 7. Collected Prices

Items which had been expected to be sold at each sample outlet based on the results of the 1994 Census of Commerce were priced. Collected prices for the 307 specifications<sup>1)</sup> in the 1997 NSP amounted to about 2.5 million. The average number of prices per specification was 8,200, which was almost double that of the 1992 NSP. Thus, the use of information from the 1994 Census of Commerce doubled the sampling efficiency.

- 1) The number of survey items was 171. They were selected according to the relative importance of each item to the total consumption expenditures. Two or more specifications were designated in principle for each survey item. The specifications were selected in consideration of their representative characteristics regarding price differences among outlets and regions.

## 8. Average Prices by Municipalities

The average price for each specification in each of sample municipalities was calculated in the following way.

At first, the average price by type of outlet<sup>2)</sup> was calculated as a weighted arithmetic mean of prices using the reciprocals of the sampling ratios of the outlets.

2) Supermarkets, convenient stores, department stores, volume sales specialty stores, cooperative stores, ordinary retail outlets

$$P_x = \frac{\sum r_i P_i}{\sum r_i} \quad \text{where } P_x : \text{Average price by type of outlets (1)}$$

$$P_i : \text{Price of each sample}$$

$$r_i : \text{Reciprocal of sampling ratio}$$

Next, the average price for the municipality was obtained as a weighted harmonic means of the average price by type of outlets.

$$P = \frac{\sum w_x}{\sum \frac{1}{P_x} w_x} \quad (2) \quad \text{where } P : \text{Average price by municipalities}$$

$$w_x : \text{Expenditure by type of outlets}$$

The weights( $w_x$ ) were calculated on the basis of expenditure by type of outlet derived from the results of the 1994 National Survey of Family Income and Expenditure (55,000 households; quinquennial survey) conducted by the Statistics Bureau (see Table 5).

Table 5 Percentage of Expenditure by Type of Outlet

Type of Outlet	Liquor		Electric appliances	
	Tokyo	Sapporo	Tokyo	Sapporo
Total	100.0	100.0	100.0	100.0
Ordinary retail outlet	62.1	30.6	54.7	36.5
Supermarket	14.9	28.8	6.8	24.6
Volume sales specialty store	12.9	24.6	31.3	34.8
Convenient store	3.5	13.2	0.0	0.0
Department store	3.1	0.9	5.4	0.4
Cooperative store	3.6	1.9	1.9	3.7

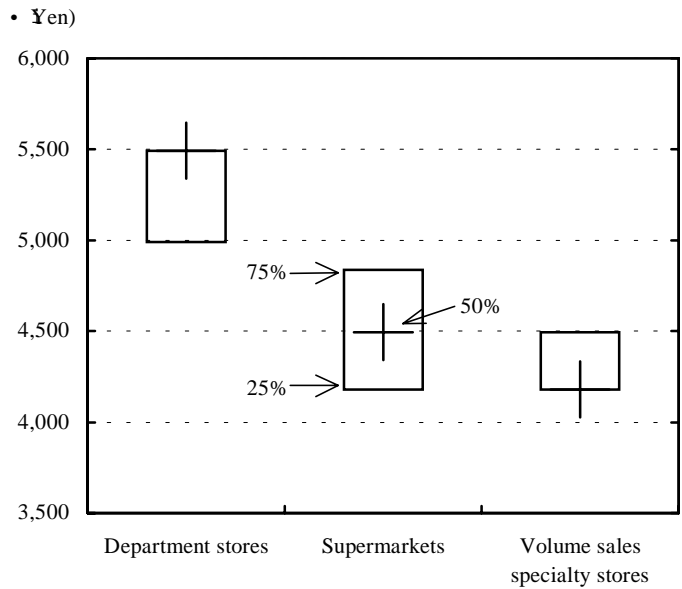
Source: the 1994 National Survey of Family Income and Expenditure

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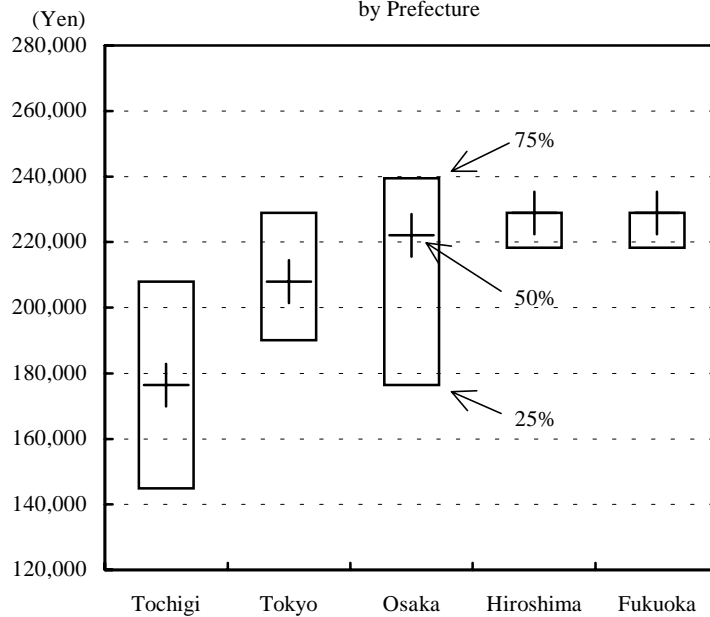
## Appendix Example of Price Distribution Statistics in the Result of the 1997 NSP

Figure 1 Price Distribution Statistics of Beer by Type of Outlet



Note: a case of 24 cans of 350ml of beer

Figure 2 Price Distribution Statistics of Refrigerator by Prefecture



Note : 4-door refrigerator with the volume of 400 liters