

### Appendix 3

## Sampling Establishments, Estimation Method of Results and Sampling Error of the Estimates

### 1 Sampling Establishments

The population of “the Monthly Survey on Service Industries” is based on the 2009 Economic Census for Business Frame.<sup>\*1</sup> The survey covers establishments, enterprises, etc. selected using a statistical method from the country’s establishments, enterprises, etc. mainly engaging in the industries listed in (1) below.

Monthly survey	Establishments; Approximately 26,000 Enterprises, etc.; Approximately 13,000
Annual survey	Establishments; Approximately 67,000 Enterprises, etc.; Approximately 9,500

<sup>\*1</sup> The establishments, enterprises, etc. are extracted based on the 2009 Economic Census for Business Frame. Based on various information collected in the subsequent years, establishments, enterprises, etc. newly established after the implementation of the 2009 Economic Census for Business Frame were also added to the population to implement appropriate sampling. When an establishment closes down, a replacement establishment is selected and added to the subjects of the survey.

#### (1) Coverage of the Survey (Refer to Appendix 6)

The survey covers industries classified in major groups<sup>\*2</sup> designated by the Japan Standard Industrial Classification (Rev.12, November 2007) as shown below.

- G Information and communications<sup>\*3</sup>
- H Transport and postal activities
- K Real estate and goods rental and leasing
- L Scientific research, professional and technical services  
\*Excluding the medium group “71 Scientific and development research institutes”  
and the detailed category “7282 Pure holding companies”
- M Accommodations, eating and drinking services
- H Transport and postal activities
- K Real estate and goods rental and leasing
- L Scientific research, professional and technical services
- M Accommodations, eating and drinking services
- N Living-related and personal services and amusement services  
\*Excluding the minor group “792 Domestic services”
- O Education, learning support  
\*Excluding the medium group “81 School education”
- P Medical, health care and welfare  
\*Excluding the minor group “841 Public health centers,” “851 Social insurance organizations,” and “852 Welfare offices”
- L Services, n.e.c.  
\* Excluding the medium group “93 Political, business and cultural organizations,”  
“94 Religion,” and “96 Foreign governments and international agencies in Japan”

<sup>\*2</sup> The minor group “Establishments engaging in administration, ancillary economic activities” prepared in each medium group are excluded.

<sup>\*3</sup> Since a similar annual survey is implemented for “G Information and communications,” this group is not included in the annual survey (expanded survey). (The monthly survey includes this group.)

## (2) Sampling and Replacing Establishments

### A. Enterprises, etc. (census survey group)

- (a) The survey is conducted on all enterprises, etc. mainly engaging in the following industries.
  - (i) Minor group "371 Fixed telecommunications"
  - (ii) Minor group "372 Mobile telecommunications"
  - (iii) Minor group "382 Private-sector broadcasting except cablecasting"
  - (iv) Medium group "42 Railway transport"
  - (v) Medium group "46 Air transport"
  - (vi) Medium group "49 Postal activities including mail delivery service"
- (b) The survey is conducted on all enterprises mainly engaging in the service industries other than those in (a) above, with capital, investment, or funds worth 100 million yen or more.
- (c) The survey is conducted on a continuing basis without being replaced.

### B. Establishments (census survey group or sample survey group)

Establishments are extracted from those mainly engaging in service industries other than those in A.(a) above, excluding establishments that belong to the enterprises, etc. falling under the A.(a) and (b) above. Sampling establishments are as shown below.

- (a) Census survey group
  - (i) The survey is conducted on all establishments above a certain scale.
  - (ii) The survey is conducted on a continuing basis without being replaced.
- (b) Sample survey group
  - (i) The survey is conducted on sample establishments selected from establishments other than (a) above by being stratified by industry and the number of persons working at the location of establishments.
  - (ii) The sample establishments are in principle surveyed for two consecutive years and are replaced once every two years based on the perspective of stabilizing the survey results and enhancing the precision of the statistical results such as the year-on-year comparison by month.

## 2 Estimation Method of Results

The sales and the number of persons working at the location of establishments (hereinafter called "the number of persons") are calculated based on the results of the 2009 Economic Census for Business Frame, etc. The formula is as follows:

$$\text{Estimate of total sales or estimate of the number of persons: } \hat{T}_x = \sum_{h=1}^L W_h \sum_{i=1}^{n_h} x_{hi}$$

$h$  : Strata by industry, size of the number of persons and type of survey (census or sample)

$W_h$ : Weight,  $\frac{N_h}{n_h}$  ( $N_h = n_h$  and  $W_h = 1$  for census survey)

$L$  : Number of strata

$N_h$ : Number of population establishments in  $h$ -th stratum

$n_h$ : Number of survey establishments in  $h$ -th stratum

$x_{hi}$ : Sales or the number of persons for  $i$ -th establishment in  $h$ -th stratum

\*When there are missing values due to non-response, etc., figures are estimated by using data disclosed by the relevant subject.

The demand situation, a survey item of the monthly survey, is calculated without using the weights: calculations for enterprises, etc. are made for each business activity, and calculations for establishments are made for each establishment.

### 3 Sampling Error of the Estimates

Sampling errors for total sales are estimated by the following formula. The results can be seen in the table.

The standard error rate (%): 
$$\frac{\sqrt{V(\hat{T}_x)}}{\hat{T}_x} \times 100$$

Standard deviation for estimate of total sales:

$$\sqrt{V(\hat{T}_x)} = \sqrt{\sum_{h=1}^L N_h (N_h - n_h) \frac{V(\hat{X}_h)}{n_h}}$$

Sample variance for sales in  $h$ -th stratum: 
$$V(\hat{X}_h) = \frac{1}{n_h - 1} \sum_{i=1}^{n_h} (\hat{X}_{hi} - \bar{\hat{X}}_h)^2$$

Average of sales estimate in  $h$ -th stratum: 
$$\bar{\hat{X}}_h = \frac{1}{n_h} \sum_{i=1}^{n_h} \hat{X}_{hi}$$

Table Sampling Error for Monthly Sales of the Estimates by Industry

(%)

Industry (medium groups)	2015											
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Service industry	0.8	0.7	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
<b>G Information and communications</b>	0.7	0.6	0.6	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7
37 Communications	0.5	0.5	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5
38 Broadcasting	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
39 Information services	1.5	1.1	0.8	1.8	1.2	0.9	1.1	1.0	1.1	1.2	1.4	1.3
40 Internet based services	3.9	3.9	4.8	3.7	6.0	5.9	3.9	4.0	4.8	6.0	3.5	4.1
41 Video picture, sound information, character information production and distribution	2.2	2.3	3.4	2.8	2.1	2.1	2.3	2.6	2.4	2.5	2.6	2.6
<b>H Transport and postal activities</b>	3.5	2.8	2.5	3.5	3.4	3.5	3.5	3.3	3.4	3.5	3.5	3.4
42 Railway transport	-	-	-	-	-	-	-	-	-	-	-	-
43 Road passenger transport	2.5	2.4	2.4	2.7	2.5	2.6	2.6	2.6	2.6	2.5	2.6	2.7
44 Road freight transport	8.7	6.7	6.4	8.5	8.8	8.7	8.7	8.6	8.6	8.8	8.6	8.4
45 Water transport	4.1	4.0	3.7	4.0	3.8	3.8	4.0	3.7	4.1	4.0	4.2	4.4
47 Warehousing	3.0	2.9	3.0	3.6	3.7	2.9	2.9	2.8	3.5	2.7	2.7	3.0
48 Services incidental to transport	3.1	3.2	2.7	3.2	2.3	2.5	2.7	2.5	2.5	3.2	2.6	2.8
4* Air transport, postal activities, including mail delivery	-	-	-	-	-	-	-	-	-	-	-	-
<b>K Real estate and goods rental and leasing</b>	2.2	1.8	1.7	2.0	2.1	1.9	1.9	1.8	1.9	2.0	1.8	1.9
68 Real estate agencies	4.4	3.1	2.3	3.1	4.4	3.1	2.8	2.2	3.6	3.6	2.7	2.5
69 Real estate lessors and managers	3.4	3.1	3.0	3.1	3.3	3.2	3.1	3.1	3.0	3.1	3.0	3.5
70 Goods rental and leasing	3.7	2.8	4.2	4.0	3.5	3.7	3.6	3.4	3.5	3.5	3.3	3.3
<b>L Scientific research, professional and technical services 1)</b>	1.7	1.9	1.4	1.7	1.8	1.6	1.8	2.0	1.5	1.6	1.6	1.5
72 Professional services, n.e.c. 2)	3.2	3.7	2.5	3.0	3.1	3.0	2.9	2.5	2.6	2.7	2.7	2.8
73 Advertising	2.9	3.4	2.4	2.8	2.8	3.0	2.7	2.8	2.5	2.7	2.5	2.6
74 Technical services, n.e.c.	2.9	2.8	2.3	3.1	3.1	2.5	3.3	4.1	2.4	2.8	3.0	2.3
<b>M Accommodations, eating and drinking services</b>	1.5	1.6	1.5	1.5	1.6	1.5	1.6	1.8	1.6	1.6	1.6	1.5
75 Accommodations	4.4	4.5	4.1	4.1	4.3	4.1	4.5	5.1	4.5	4.3	4.5	4.3
76 Eating and drinking places	1.7	1.9	1.7	1.7	1.8	1.8	1.7	1.8	1.8	1.7	1.7	1.8
77 Food take out and delivery services	4.0	3.8	3.0	2.9	3.9	3.5	3.3	2.9	3.2	3.3	3.2	2.9
<b>N Living-related and personal services and amusement services</b>	1.8	1.7	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.6	1.6
78 Laundry, beauty and bath services	3.1	3.2	3.2	3.2	3.1	3.3	3.3	3.2	3.4	3.2	3.2	3.3
79 Miscellaneous living-related and personal services 3)	2.5	2.5	2.2	2.3	2.3	2.4	2.6	2.5	2.3	2.4	2.3	2.5
80 Services for amusement and hobbies	2.3	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.1
<b>O Education, learning support 4)</b>	4.2	4.4	4.0	5.1	5.0	4.8	4.6	4.0	3.9	4.3	4.6	5.0
82 Miscellaneous education, learning support	4.2	4.4	4.0	5.1	5.0	4.8	4.6	4.0	3.9	4.3	4.6	5.0
82a Social education and vocational and educational support facilities	7.3	7.9	6.8	8.9	8.4	8.4	7.4	7.4	7.1	8.9	8.8	8.0
82b Supplementary tutorial schools and instruction service for arts, culture and technicals	5.3	6.1	5.9	5.4	5.4	5.6	5.3	5.4	5.3	5.3	6.3	5.3
<b>P Medical, health care and welfare</b>	1.3	1.3	1.3	1.3	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.3
83 Medical and other health services	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.2	1.2
84 Public health and hygiene 5)	7.5	6.4	7.7	6.8	7.3	6.7	7.1	7.5	6.7	6.9	6.7	7.7
85 Social insurance and social welfare 6)	4.7	4.7	4.7	4.7	4.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7
<b>R Services, n.e.c. 7)</b>	2.4	2.5	2.6	2.7	2.5	2.7	2.1	2.0	2.0	2.0	2.0	2.3
88 Waste disposal business	6.1	5.7	5.7	5.3	5.3	5.3	5.3	6.2	6.0	5.3	5.7	5.8
89 Automobile maintenance services	9.7	8.8	12.5	11.9	9.6	9.2	10.6	10.7	10.5	9.9	9.4	10.8
90 Machine, etc. repair services, except otherwise classified	4.0	4.4	3.9	4.4	4.7	4.4	4.1	4.7	4.2	4.3	4.2	4.4
91 Employment and worker dispatching services	3.3	3.4	3.3	3.3	3.4	3.3	3.2	3.3	3.4	3.2	3.3	3.4
92 Miscellaneous business services	4.1	4.2	4.4	4.5	4.4	4.8	3.2	2.9	2.9	3.1	3.0	3.6
95 Miscellaneous services	7.2	6.2	7.2	9.4	9.4	9.9	10.8	10.9	11.1	10.6	10.4	9.7

1) Excluding "scientific and development research institutes" 2) Excluding "pure holding companies" 3) Excluding "domestic services" 4) Excluding "school education" 5) Excluding "public health centers"  
6) Excluding "social insurance organizations" and "welfare offices" 7) Excluding "political, business and cultural organizations", "religion" and "foreign governments and international agencies in Japan"