Statistics Bureau, Ministry of Internal Affairs and Communications

Outline of integrated tabulation of National Income and Expenditure Survey for one-person households into National Survey of Family Income and Expenditure 2009.

1. Purpose

Against a background where it was difficult to collect data on one-person households in the National Survey of Family Income and Expenditure 2009, the National Income and Expenditure Survey for one-person households was targeted at one-person households aged under 60 who were chosen among monitors registered at private research agencies with the purpose of complementing the results of the National Survey of Family Income and Expenditure 2009. As part of these efforts, an integrated tabulation was implemented.

Because of the method of implementation of the National Income and Expenditure Survey for one-person households, the effects of the monitor survey on the accuracy of survey results, the tabulation method and the validity of survey results were verified (at the 2nd Study Group on Improvement of Family Income and Expenditure Survey, etc. held in February 2011), and the result was published as reference information.

2. Tabulation method

Statistical tables were used for Questionnaire Information of the National Survey of Family Income and Expenditure 2009 (limited one-person households), and those of the National Income and Expenditure Survey for one-person households.

The estimation method is basically the same as that used in the National Survey of Family Income and Expenditure 2009 (limited one-person households) and National Income and Expenditure Survey for one-person households. However, multiplication rates, weights of estimation formulas, were newly calculated based on the multiplication rates used in tabulation of each surveys.

National Survey of Family Income and Expenditure 2009 (limited one-person households)	National Income and Expenditure Survey for one-person households
<aged under 60> Multiply the multiplication rate by 0.5. <aged 60 or over> Use the multiplication rate used in tabulation.	(1) Calculate a correction coefficient based on households distribution in the Labour Force Survey 2009 by using the multiplication rate used in tabulation. (2) Multiply the multiplication rate used in tabulation by the correction coefficient obtained in (1), and again by 0.5.

* See Appendix 1 for the estimation formula.

* See Appendix 2 for an outline of the sampling method and calculation of multiplication rates in the Family Income and Expenditure Survey 2009 (one-person households), and National Survey of One-person Household Income and Expenditures.

3. Statistical tables

The following survey results were tabulated into statistical tables. The form of the statistical tables is basically the same as that of the National Survey of Family Income and Expenditure 2009 (limited one-person households), and National Income and Expenditure Survey for one-person households:

I. Income and Expenditures
II. Expenditures on Commodities
III. Major Durable Goods
IV. Savings and liabilities
V. Distribution of Households

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Visit the website of the Statistics Bureau (http://www.stat.go.jp/english/index.htm) for details of the Family Income and Expenditure Survey.

Appendix 1 Estimation formula

The estimation formula used in tabulation is as follows:

$$\bar{x} = \frac{\sum_i \sum_j \beta'_{ij} x'_{ij} + \sum_i \sum_j \beta''_{ij} x''_{ij}}{\sum_i \sum_j \beta'_{ij} + \sum_i \sum_j \beta''_{ij}}$$

where;

x'_{ij}: Value of each item for the *j*-th tabulated household in the *i*-municipality of the National Survey of Family Income and Expenditure 2009 (limited one-person households). However, income or expenditures obtained by “family account book” are weighted averages with monthly adjusted adjustment coefficients.

x''_{ij}: Value of each item for the *j*-th tabulated household in the *i*-municipality of the National Income and Expenditure Survey for one-person households. However, income or expenditures obtained by “family account book” are weighted averages with monthly adjusted adjustment coefficients.

β'_{ij}: Multiplication rate used in tabulation for the *j*-th tabulated household in the *i*-municipality of the National Survey of Family Income and Expenditure 2009 (limited one-person households) for integrated tabulation

$$\beta'_{ij} = D'_{q'h} \times \sum_{m \in B'} \left(\tilde{\alpha}'_{im} \times M_{ijm} \right)$$

where;

$D_{q'h}$ ：Correction coefficient by *q’*-area, *h*-sex and age group

q' ：6 districts by area (Hokkaido and Tohoku, Kanto, Hokuriku and Tokai, Kinki, Chugoku, Shikoku, Kyushu, Okinawa)

h : 6 group by sex and age (under 35 years, 35～59, 60 years and over)

$\tilde{\alpha}'_{im}$ ：Adjusted adjustment coefficient for the i-municipality in m-month

M_{ijm} ：Existence of the questionnaires eligible for tabulation for the *j*-th tabulated household in the *i*-municipality in m-month (1 or 0)

B' ：The set of m-month ({1, 2,}, {1} or {2})

As questionnaires used to tabulate and main tabulated items depend on the statistical tables, weights vary from the number of survey month, existence of the questionnaires or the number of tabulated households.

β''_{ij}: Multiplication rate used in tabulation for household j in municipality i in the National Income and Expenditure Survey for one-person households for integrated tabulation

$$\beta''_{ij} = D''_{q'h} \times \sum_{m \in B''} \left(\tilde{\alpha}''_{im} \times M''_{ijm} \right)$$

where;

$D_{q'h}$: Correction coefficient by q'-area, h-sex and age group

q' : 6 districts by area (Hokkaido and Tohoku, Kanto, Hokuriku and Tokai, Kinki, Chugoku, Shikoku, Kyushu, Okinawa)

h : 6 group by sex and age (under 35 years, 35～59, 60 years and over)

$\tilde{\alpha}'_{im}$: Adjusted adjustment coefficient for the i-municipality in m-month

M_{ijm} : Existence of the questionnaires eligible for tabulation for the j-th tabulated household in the i-municipality in m-month (1 or 0)

B' : The set of m-month ({1, 2,}, {1} or {2})

As questionnaires used to tabulate and main tabulated items depend on the statistical tables, weights vary from the number of survey month, existence of the questionnaires or the number of tabulated households.

[Calculation of $\tilde{\alpha}'_{im}$, an adjusted correction coefficient, used in the National Survey of Family Income and Expenditure 2009 (limited one-person households)]

Each prefecture is divided into major cities and other areas, and adjustment coefficients are given to sample municipalities in each area.

Major cities・・・Designated cities under article 252-19 of the Local Autonomy Law (Sapporo-shi, Sendai-shi, Saitama-shi, Chiba-shi, Yokohama-shi, Kawasaki-shi, Niigata-shi, Shizuoka-shi, Hamamatsu-shi, Nagoya-shi, Kyoto-shi, Osaka-shi, Sakai-shi, Kobe-shi, Hiroshima-shi, Kitakyushu-shi, Fukuoka-shi) and Ku-area of Tokyo

$$\alpha'_i = \frac{N_D}{\sum_{d' \in D'} N_{d'}} \times \frac{N_i}{n_i}$$

D: Major cities or other areas in each prefecture (However, each major cities are treated separately if prefectures have several major cities.)

$$\tilde{\alpha}'_{im} = \begin{cases} \alpha'_i \dfrac{n_i}{\tilde{n}_{im}} & \left(\dfrac{n_i}{\tilde{n}_{im}} \leqq 2 \right) \\ 2\alpha'_i & \left(\dfrac{n_i}{\tilde{n}_{im}} > 2 \right) \end{cases}$$

D' : Sample municipalities in *D*-area

i : Sample municipalities

α'_i : Adjustment coefficient in the *i*-municipality

N_D : The number of eligible households in the *D*-area(the 2005 Population Census)

$N_{d'}$: The number of eligible households in the *d*'-municipality (the 2005 Population Census)

N_i : The number of eligible households in the *i*-municipality (the 2005 Population Census)

n_i : The number of planned sample households in the *i*-municipality

$\tilde{n}_{im}$: The number of households for tabulation in the *i*-municipality in m-month

[Calculation of $D'_{q'h}$, a correction coefficient of household distribution, used in the National Survey of Family Income and Expenditure 2009 (limited one-person households) for integrated tabulation]

$D_{q'h}$ is calculated using the number of one-person households by area, sex and age groups based on the results of the 2009 Labour Force Survey. The calculation method is different between one-person householders aged below 60 and those aged 60 or over because the National Income and Expenditure Survey for one-person households covers one-person householders aged below 60 only.

One-person householders aged under 60

$$D'_{q'h} = D_{q'h} \times 0.5$$

One-person householders aged 60 or over

$$D'_{q'h} = D_{q'h}$$

$D'_{q'h}$: Correction coefficient of household distribution used in the National Survey of Family Income and Expenditure 2009 (limited one-person households)

[Calculation of $D_{q'h}$, a correction coefficient of household distribution, used in the National Survey of Family Income and Expenditure 2009 (limited one-person households)]

Correction coefficient of one-person household distribution is calculated from the average number of one-person households by district, sex and age groups in the Labour Force Survey 2009.

$$D_{q'h} = \frac{W'_{q'h}}{\sum_{(i,j)\in H_{q'h}} \sum_{m\in B'} (\tilde{\alpha}'_{im} \times M_{ijm}) \times \frac{1}{|B'|}}$$

$W'_{q'h}$: The number of one-person households by *q*'-area, *h*'-sex/age group based on the results of the 2009 Labour Force Survey

$H_{q'h}$: The set of households which belong to *q*'-area and *h*-sex/age group

$|B'|$: The number of survey months (Number of elements in *B'*)

[Calculation of $\tilde{\alpha}''_{im}$, a correction coefficient of household distribution, used in the National Income and Expenditure Survey for one-person households]

$$\tilde{\alpha}''_{im} = \frac{V_{ql}}{\sum_{(i,j)\in L_{ql}} \tilde{n}''_{im}}$$

V_{ql}: The number of one-person households by *q*'-area, *l*'-sex/age group based on the results of the 2005 Population Census

q, District group: Hokkaido, Tohoku, Kanto, Hokuriku, Tokai, Kinki, Chugoku, Shikoku, Kyushu and Okinawa (10 groups)

l, sex/age group:

Men: Aged below 30, 30 to 39, 40 to 49, and 50 to 59

Women: Aged below 30, 30 to 39, 40 to 49, and 50 to 59 (eight groups)

L_{ql}: The set of households which belong to *q*'-area and *l*'-sex/age group

$\tilde{n}''_{im}$: The number of households for tabulation in the *i*-municipality in m-month

[Calculation of $D''_{q'h}$, a correction coefficient of household distribution, used in the National Survey of One-person Household Income and Expenditures for integrated tabulation]

$$D''_{q'h} = \frac{W'_{q'h}}{\sum_{(i,j)\in H''_{q'h}} \sum_{m\in B'''} \left(\tilde{\alpha}''_{im} \times M''_{ijm}\right) \times \frac{1}{|B''|}} \times 0.5$$

$W'_{q'h}$: The number of one-person households by *q*'-area, *h*'-sex/age group based on the results of the 2009 Labour Force Survey

$H_{q'h}$: The set of households which belong to *q*'-area and *h*-sex/age group

B'' : The number of survey months (Number of elements in *B''*)

Appendix 2 Outline of sampling method and calculation of multiplication rates in the National Survey of Family Income and Expenditure 2009 (limited one-person households), and National Survey of One-person Household Income and Expenditures.

	National Survey of Family Income and Expenditure 2009 (limited one-person households)	National Income and Expenditure Survey for one-person households
Sampling method	4,402 one-person households were sampled from Unit areas were sampled from among those selected for two-or-more-person households.	1,600 one-person householders aged under 60 among those identified by the Population Census 2005 were allocated in a proportional manner according to "prefecture and city/county" and "10 district groups and sex and 4 age groups" to be invited to participate in the survey.
Calculation of multiplication rate	1) A prefecture was divided into large cities and other cities, towns and villages, and a linear estimate of multiplication rate was calculated. 2) A correction coefficient of household distribution was calculated from the number of one-person households by district, sex and age group used in the Labour Force Survey. 3) The figures of survey results were estimated using the coefficients calculated from 1) and 2) as a multiplication rate.	Based on the results of the Population Census 2005, "the number of one-person householders aged below 60" was divided by the number of households tabulated by 10 district groups and sex and 4 age groups. Then, the value obtained was used as a multiplication rate for tabulation to estimate the figures of survey results.