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CONSISTENCY BETWEEN MACRO- AND MICRO-DATA SETS IN THE JAPANESE HOUSEHOLD SECTOR

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This paper makes a comparative analysis of the micro-data, the *Family Income and Expenditure Survey* (FIES) and the *National Survey of Family Income and Expenditure* (NSFIE) data, with the macro-data, the *System of National Accounts* (SNA), figures for the Japanese household sector. The overall FIES/SNA ratio is about 80 percent. In comparing the results to those of other countries, the figure seems to be not bad. However, the treatment of categories such as Gross Rent, Fuel and Power, and Medical Care and Health Expenses, require further consideration. In this regard we consider imputed rent for owner-occupied dwellings for the SNA and a sampling scheme for the FIES.

1. INTRODUCTION

Ruggles and Ruggles (1975) discussed the need and means of bridging the two distinct disciplines of micro and macro economic analysis.[1] Their attempts to set up a methodology for linking macro- and micro-data and developing effective procedures for handling micro-data sets are the cornerstone for numerous studies. In particular, to cope with the current needs in designing economic policies by utilizing detailed information from the SNA, several approaches have been proposed and put into practice. Disaggregation of macro figures into sectoral

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[1]They argue that microanalytic simulation can provide a means of bridging the macro/micro gap. It can model the behavior of individual units, aggregate the units to determine their effect on the economic system, and in turn transmit the feedback from other units or aggregate constraints back to the individuai units. Before microanalytic simulation can become a generally applicable tool, however, there are severe data problems that must be solved. Moreover, it is important to check micro survey data against aggregate macro-data in order to assess the validity and value of the survey data. Taking the *System of National Accounts* (SNA) aggregates as a criteria, we can compare the *Family Income and Expenditure Survey* (FIES) and the *National Survey of Family Income and Expenditure* (NSFIE) micro-data with the macro control totals and make a closer investigation into several topics such as: (1) statistical deviation in the FIES and the NSFIE from the SNA totals; (2) recording biases in the FIES statistics which might be caused by under-reporting and other miscellaneous errors by respondents; (3) tabulation and classification criteria causing such statistical divergences of the FIES/NSFIE data; and (4) relative measurement discrepancies among categories of income and consumption between the FIES/NSFIE and the SNA.

figures can give us more detailed information. The proposal by Ruggles and Ruggles emphasizes the importance of detailed individual information provided by micro-data sets generated by sampling surveys.[2]

Macro data, e.g. the SNA, are estimated according to the SNA rules [see UN (1968, 1977)], and, on the other hand, micro data, e.g. the FIES and the NSFIE, are estimated according to the FIES rules or the NSFIE rules. In recent years, results in comparisons of the macro- and micro-data sets have been reported in some countries, i.e. Canada, the U.K. and the U.S.

Atkinson and Micklewright (1983) conducted a numerical analysis of the *Family Expenditure Survey* (FES) in Britain. They presented a detailed discussion about the numerical characteristics of the British FES data concerning principal types of income and aggregated the FES data to compare it with the corresponding figures in the British *Blue Book*. Although they did not directly analyze distribution statistics, their article has drawn attention to data problems in sampling surveys, highlighting the need for caution in handling various sorts of micro-data and using them in statistical analysis.

Ruggles and Ruggles (1986) has treated the integration of macro- and micro-data sets in the household sector. They at first proposed to separate the private sector in the *National Income and Product Accounts* (NIPA) into the private non-profiit institutions and the household sector, and compared the figures of micro- and macro-data for the U.S. household sector using the NIPA and the BLS database. In comparing the macro and micro figures they considered two kinds of adjustments; (A) imputations and attributions, and (B) other changes in the recording of transactions for households. For the category (A), they introduced the treatments for (1) owner-occupied housing, (2) employer-financed pensions and insurance, (3) financial services, (4) health-care services, and (5) other imputations and attributions. For the category (B), they considered (1) the treatment of withheld income, and (2) the distribution between capital and current outlays.

Adler and Wolfson (1988) conducted the analysis in comparing the *Social Policy Simulation Database* (SPSD) in 1984 and the *National Accounts* for the Canadian households. In the Workshop on Methodological Problems in Household Expenditure Surveys and Other Types of Diary Surveys held in Stockholm in 1991, statisticians analyzed the consistency of micro- and macro-data sets in some countries. Although the final reports have not yet been published, comparisons of micro- and macro-data in Australia, Finland, Sweden and the U.K. are reported.

This approach to data analysis is rather rare in Japan.[3] The main objective of the present paper is to make a comparative analysis of micro-data, i.e. the FIES and the NSFIE, after aggregating them by using appropriate estimating

[2]Micro-data provide insights on the interdependence of variables and other information relevant to a specific micro unit as a separate and distinguishable set. Micro-level data cannot be obtained from macro figures which are estimated by using a variety of statistical sources. One of the motivations for our present analysis is based on the proposal by Ruggles and Ruggles to draw on both sets of data.

[3]Experimental approaches have been employed in the Department of National Accounts at the Economic Planning Agency in compilation of statistics such as distribution of income, consumption and accumulation of households, mainly using micro-data of both the 1979 and 1984 NSFIE and applying appropriate methods to realize a numerical consistency between macro and micro statistics.

methods explained in later sections, with macro figures, i.e. the SNA. Results of aggregating the micro data are reported by objectives of consumption expenditures and by types of commodities for successive continuous five-year periods from 1984 through 1988.

The standard of comparison for micro- and macro-data sets is similar to Adler and Wolfson (1988). That is, we will compare the macro- and micro-data sets at the level after the imputations and attributions are excluded in the SNA figures. The main reason is that at this level we can preserve sampling characteristics of the original micro-data sets.

In section 2, the estimating method for aggregation of the FIES/NSFIE is described. In section 3, results obtained from this estimation are presented. And finally, in section 4, some concluding remarks are presented.

2. Estimating Method for the Aggregation of the FIES/NSFIE

Aggregating the FIES data, we have to consider several restrictions due to sampling characteristics of the FIES.[4] The FIES does not cover single households nor households engaged in agriculture, forestry and fisheries, rendering it difficult to compare the FIES figures with the control totals of the SNA. We also should expect various sorts of errors in the data because the FIES survey is conducted by distributing a self-reported questionnaire for a sample of about 8,000 households. Under such circumstances, where the validity of the data is not entirely certain, questions will be raised about how to measure the reliability of the statistics and about the aggregate means of estimating errors in reporting.

Comparing the micro- with the macro-data sets requires several steps. The first is to estimate the number of households broken down by three occupational categories of household heads: (1) employees' and self-employed households, (2) single households, and (3) farmers' households. Aggregating income and expenditure data must be done for each occupational category after estimating expenditure data for single and farmer households which we cannot get from the FIES.

To obtain an aggregate of single households, the NSFIE is the only statistical information available to supplement the FIES data. For farmers' households, we can make use of the *Survey on Income and Expenditure of Farmers' Households*

[4]The FIES is conducted every year covering 8,000 respondents, while the NSFIE is conducted every five years covering 54,000 respondents. The sampling scheme in the NSFIE is fundamentally the same as the FIES. The FIES surveys households defined as a group of two or more persons sharing a dwelling and living expenses. Households are classified as follows: (a) Workers' households, (b) Individual Proprietors' households, and (c) Other households. Workers' households refer to households whose heads are employed as workers in enterprises or establishments, private or government, such as government officers, private companies, factories, schools, hospitals, shops, etc. Individual Proprietors' households refer to households whose heads are merchants, artisans or administrators of unincorporated enterprises. According to the definition of coverage for the FIES, the following households are excluded: (a) Households engaged in agriculture, which in the FIES refers to those either cultivating ten ares (a quarter acre) of land or more, (b) Households engaged in forestry, (c) Households engaged in fisheries, (d) One-person households, (e) Foreigner households, (f) Households which manage restaurants, hotels, boarding houses or dormitories, or are otherwise sharing even though not managing boarding houses as an occupation, (h) Households with four or more living-in employees, (i) Households whose heads are absent over a long period of time. In addition to the FIES coverage, the NSFIE covers the data for farmers' and single households.

(SIEFH) as supplementary information for estimating income and consumption for farmers.

Following this estimation of the three types of household figures, we can add up consumption spending by all three sub-groups of households and obtain a monthly series of consumption data comparable with the SNA control totals (after calculating calendar year totals).

The second step is to estimate the effects of household size on amounts of consumption spending to get basic information for estimating a monthly series of expenditure data for single and farmers' households using figures for ordinary households compatible with the FIES. We estimate 84 regression equations by groups of commodities, where we assume that the number of family members has a systematic effect on the amount of consumption.

The specification is set up as a polynomial of third orders:

$$(1) \qquad C_i = a_i + b_i * N + c_i * N^2 + d_i * N^3, \qquad (i = 1, \ldots, 84),$$

where N is the number of household members and which can follow a uni- and bi-modal pattern of interaction between both variables.

Observations are from the 1984 NSFIE. They provide us with valuable information on consumption spending classified into 84 commodity groups by family members from one to more than seven members.[5] Using these data, we first conduct a preliminary test to determine the optimal degree of polynomial equation (1) with a critical significance level of 0.15, and then to calculate estimates using the weighted least-squares method with household members of the 1985 *Population Census* as weights for 84 commodity categories.

Results of the regression are used in the later stages where we have to estimate a monthly series of consumption expenditures by 84 commodity groups for single as well as farmer households.

The third step is to estimate a monthly series of consumption expenditure for single households by individual commodities. Total consumption is divided into 84 commodity groups. The most basic information is obtained in the second stage, which gives us the amounts of consumption expenditure by family members. We can estimate, using the monthly data of the FIES for ordinary households, amounts of spending for 84 groups of commodities for single households.

After we construct a series of consumption spending data for 84 commodity groups, we further disaggregate them into about 500 individual commodities which are defined in the FIES. In breaking down figures from 84 sub-groups to 500 individual commodities, the same allocation ratios are used as those for ordinary households.

One note of caution is in order. We can adjust the level of spending shown in the FIES's monthly series in order to compare with its master survey, the NSFIE. However, there are some discrepancies between the FIES and the NSFIE data.[6]

[5]From the 1984 NSFIE we cannot get spending classified into 84 commodity groups directly for single households, but figures for 84 use categories are available. We have to derive figures from commodity based classifications (not use based classifications) by allocating Social Expenses for single households.

[6]In detail, see Table 3 in Maki and Nishiyama (1991).

Comparing both sets of statistics for the same period, we find systematic under-reporting in the FIES survey. When we incorporate the NSFIE information into our estimation of monthly spending, we have several alternatives in incorporating the data. In the present paper we incorporate the NSFIE information at the level of consumption expenditures.

The fourth step is to estimate the spending for farmers' households. To estimate monthly consumption data for farmers, we have to first take into account the gaps in family size which can be found between the FIES and the SIEFH, and second, to adjust for consumption in kind which is usually considerable in farmers' households. We make an adjustment for the total amount of consumption by using the average ratio of consumption as shown in the SIEFH to that in the FIES in each fiscal year, and then extrapolate it to the family size in the SIEFH, where the basic information is calculated in stage two. The same method is employed for single households in disaggregating the figures for 84 commodity sub-groups into individual commodities.[7]

The fifth step is to break down and distribute spending on such items as Pocket Money (of which detailed uses are unknown) and Social Expenses. This procedure might seem superfluous, but without it, we could not compare the aggregated FIES data with the SNA control totals because in the SNA, figures are determined on the basis of commodity flows. Thus, we must handle the data on the basis of similar classifications. We determined the spending ratios to break down Social Expenses by using the 1985 *Consumer Price Index.*

The sixth and last step in our procedure involves converting the estimated expenditure classified in the FIES's commodity code into the international standard classifications of the SNA document.

In this procedure we tabulate consumption data in four types of commodities, i.e. durable, semi-durable, non-durable and services, and in terms of eight kinds of objectives.[8] Although *Annual Reports on the FIES* as well as the *Reports on the NSFIE* give us the information about consumption expenditures broken down into the four categories listed above, their figures are derived by reclassifying those in commodity classifications excluding such items as Social Expenses which do not specify the purchased commodities, and therefore, are not included in the total consumption figures. Since we have already obtained the figures after allocating Social Expenses into commodity categories as a result of the previous step, we now make the final reclassification which enables us to compare our estimated aggregates with the SNA control totals on the basis of a common classification concept.

To complete this step of the calculation, we estimate a converter with which we reclassify consumption figures from the FIES to the SNA commodity classifications. For this purpose, we make use of the information from *Annual Reports on the FIES, Comprehensive Time Series Reports on the FIES, 1947-1986*

[7]The major defect in this approach is that we lose information about the composition of consumption supplied from the SIEFH, because we make use only of its summed-up amounts.

[8]Classification by objectives as proposed in the SNA (1968) is comprised of Foods, Beverages and Tobacco, Clothing and Footwear, Gross Rent, Fuel and Power, Furniture and Others, Medical Care and Health Expenses, Transport and Communications, Recreation, Entertainment, Education and Cultural Services, and Miscellaneous Goods and Services such as expenditures in restaurants and cafes, and package tours.

and some information provided by the Department of National Accounts, Economic Planning Agency. We also make a final improvement on the converter with reference to the SNA manual that was published in 1968 from the UN (p. 108).

We estimated a converter based on the 1979 figures. Checking out whether or not alternating converter files have a considerable impact on the final results merits further research.

3. Results

Our analysis features the effect of family size on consumption expenditure and compares the characteristics of the FIES with the SNA in terms of objectives and types of consumption expenditures. Let us examine the effect of family size on consumption expenditure.

Estimated coefficients for variables of N (family size), N^2 (square of family size), N^3 (cube of family size) and a constant term in the regression equations indicated in section 2 are obtained corresponding to 84 commodity groups of the NSFIE [detailed estimating results are shown in Maki and Nishiyama (1991)].

Our findings can be summarized as follows. First, for categories relating to foods and beverages, all variables, including quadratic and cubic forms in family size, are highly significant, and determination coefficients are also very high.

Second, we can pick up some categories of commodities, for which all three variables of family size are insignificant on consumption expenditures. Such categories include Tea (24), Eating Out (28), Service Charges for Repairs and Maintenance (31), Cloth and Threads (54), Services related to Clothing (57), Medicines (58) Hotel Charges (72), Package Tours (73), Other Recreational Services (75), Personal Effects (78), Tobacco (79), Money Gifts (82) and Remittances (84). In estimating consumption expenditures on these groups of categories for single and farmers' households, we calculated them by a simple interpolation method.[9]

Next, we examine characteristics of the FIES in comparison with the SNA in terms of consumption expenditure objectives for which commodities are acquired. From Table 1, we can get a summarized view of the numerical characteristics of the FIES and its master survey, the NSFIE, compared with the SNA in terms of the international classifications employed in the SNA documents [see UN (1968)].

Our major findings are as follows. First, over the period, the FIES/SNA ratio for total of final consumption remains around 80 percent. However, the figures gradually decrease annually from 83.5 percent in 1984 to 77.9 percent in 1988. This tendency is very similar to results of other countries.

[9]First, we calculate consumption spending by family of the same size shown in the FIES of the current month, using information in the 1984 NSFIE. Second, we get the ratio between spending by family of the current size and that by single households. Third, we multiply the consumption spending in the FIES by the calculated ratio, which can be considered to be current consumption by single households. This procedure, of course, has a problem of not utilizing the full information about the relation of family size to consumption.

TABLE 1

COMPARISON OF THE FIES AND THE SNA BY OBJECTIVES OF CONSUMPTION

(1) 1984 Calendar Year (Billions of Yen)

Objectives	FIES	SNA	FIES/SNA
Food, beverages and tobacco	32,094.8	40,192.8	
less: Food for Self-Defence Forces		39.1	
		40,153.7	79.9%
Clothing and footwear	10,057.7	11,925.2	
less: Clothing for Self-Defence Forces		6.6	
		11,918.6	84.4%
Gross rent, fuel and power	13,245.0	32,993.9	
less: Rent for owner-occupied dwellings		21,168.2	
		11,825.7	112.0%
Furniture and others	7,073.6	10,674.6	66.3%
Medical care and health expenses	2,894.1	18,438.2	
less: Compensation from health care insurance		13,249.6	
		5,188.6	55.8%
Transportation and communication	15,347.1	17,582.0	87.3%
Recreation and others	14,981.6	17,030.6	88.0%
Miscellaneous	18,109.7	26,546.1	
less: Casual insurance		513.3	
less: Life insurance		4,176.0	
		21,856.8	82.9%
Final consumption	113,803.6	175,383.4	
less: Imputation and attribution		39,152.8	
		136,230.6	83.5%

(2) 1985 Calendar Year (Billions of Yen)

Objectives	FIES	SNA	FIES/SNA
Food, beverages and tobacco	32,484.1	41,537.2	
less: Food for Self-Defence Forces		39.9	
		41,497.3	78.3%
Clothing and footwear	10,590.9	12,490.5	
less: Clothing for Self-Defence Forces		6.7	
		12,483.8	84.8%
Gross rent, fuel and power	13,388.3	35,082.3	
less: Rent for owner-occupied dwellings		22,727.0	
		12,355.3	108.4%
Furniture and others	7,468.9	11,478.2	65.1%
Medical care and health expenses	2,962.4	19,548.7	
less: Compensation from health care insurance		13,909.0	
		5,639.7	52.5%
Transportation and communication	15,874.5	18,119.6	87.6%
Recreation and others	15,371.4	18,259.3	84.2%
Miscellaneous	18,844.1	28,819.1	
less: Casual insurance		632.6	
less: Life insurance		4,554.9	
		23,631.6	79.7%
Final consumption	116,984.6	185,335.1	
less: Imputation and attribution		41,870.1	
		143,465.0	81.5%

TABLE 1—continued

(3) 1986 Calendar Year (Billions of Yen)

Objectives	FIES	SNA	FIES/SNA
Food, beverages and tobacco	32,249.7	42,043.4	
less: Food for Self-Defence Forces		41.1	
		42,002.3	76.8%
Clothing and footwear	10,668.6	12,872.6	
less: Clothing for Self-Defence Forces		6.8	
		12,865.8	82.9%
Gross rent, fuel and power	13,504.5	36,113.0	
less: Rent for owner-occupied dwellings		24,211.3	
		11,901.7	113.5%
Furniture and others	7,359.6	11,818.9	62.3%
Medical care and health expenses	2,930.9	20,737.3	
less: Compensation from health care insurance		14,780.3	
		5,957.0	49.2%
Transportation and communication	15,977.0	18,620.3	85.8%
Recreation and others	15,744.5	19,303.2	81.6%
Miscellaneous	19,321.7	30,817.8	
less: Casual insurance		943.6	
less: Life insurance		5,033.3	
		24,840.9	77.8%
Final consumption	117,756.5	192,326.5	
less: Imputation and attribution		45,016.4	
		147,310.1	79.7%

(4) 1987 Calendar Year (Billions of Yen)

Objectives	FIES	SNA	FIES/SNA
Food, beverages and tobacco	31,693.0	42,824.9	
less: Food for Self-Defence Forces		42.1	
		42,782.6	74.1%
Clothing and footwear	10,829.0	13,373.6	
less: Clothing for self-Defence Forces		7.0	
		13,366.6	81.0%
Gross rent, fuel and power	13,595.1	37,919.4	
less: Rent for owner-occupied dwellings		25,934.6	
		11,984.8	113.4%
Furniture and others	7,589.2	12,329.0	61.6%
Medical care and health expenses	3,127.6	22,052.9	
less: Compensation from health care insurance		15,621.0	
		6,431.9	48.6%
Transportation and communication	16,630.3	19,350.9	85.9%
Recreation and others	16,302.2	20,068.8	81.4%
Miscellaneous	19,856.6	32,784.4	
less: Casual insurance		892.4	
less: Life insurance		5,615.8	
		26,276.2	75.6%
Final consumption	119,623.0	200,703.8	
less: Imputation and attribution		48,200.3	
		152,503.5	78.4%

TABLE 1—continued

(5) 1988 Calendar Year (Billions of Yen)

Objectives	FIES	SNA	FIES/SNA
Food, beverages and tobacco	31,833.3	43,888.3	
less: Food for Self-Defence Forces		42.8	
		43,845.5	72.6%
Clothing and footwear	11,372.3	13,549.1	
less: Clothing for Self-Defence Forces		7.4	
		13,541.7	84.0%
Gross rent, fuel and power	13,742.2	40,036.2	
less: Rent for owner occupied dwellings		27,580.9	
		12,455.3	110.3%
Furniture and others	7,667.4	12,939.5	59.3%
Medical care and health expenses	3,371.1	23,125.9	
less: Compensation from health care insurance		16,285.0	
		6,840.9	49.3%
Transportation and communication	17,478.1	20,904.0	83.6%
Recreation and others	17,209.8	21,114.6	81.5%
Miscellaneous	21,001.2	34,627.7	
less: Casual insurance		1,083.9	
less: Life insurance		6,410.7	
		27,133.1	77.4%
Final consumption	123,675.4	210,185.2	
less Imputation and attribution		51,410.7	
		158,774.5	77.9%

The accuracy of the estimation for Foods and Beverage expenditures is less than 80 percent and is lower than expected. It is anomalous that the ratio is so low when such items represent everyday expenses and should be easily recorded in the FIES. For example, the SPSD/NA ratio for Food, Beverages and Tobacco in the Canadian households was 91.4 percent in 1984 [see Table 1B in Adler and Wolfson (1988)]. The probable reason is that our estimated results are affected by inaccurate reporting of Social Expenses and Pocket Money in the FIES questionnaire.

Our estimation for Clothing and Footwear is accurate, for which the FIES/SNA ratio is over 80 percent.

The Gross Rent in the SNA covers imputed rent for owner-occupied dwellings which is not recorded in the FIES, nor the NSFIE. The figures of imputed rent for owner-occupied dwellings are picked up from the published data of the SNA. The FIES/SNA ratio exceeds 100 percent which means there is a problem in the estimating method for imputations of rent for owner-occupied dwellings.

A lower ratio for the FIES/SNA is evident in the category of Furniture and Others, which includes various durables. One of the reasons for underestimation is due to ambiguity of distinguishing the furniture for family use or for business use, especially using the commodity flow method in the estimation of the SNA figures.

An extreme is Medical Care and Health Expenses for which the FIES/SNA ratio is at most 50 percent. One of the reasons is due to the sampling method for the FIES. When there is a sickly patient in a household, it can be difficult to conduct an interview and record the daily household purchasing data regularly.

For Transport and Communication, the FIES/SNA ratios are reasonably good at around 85 percent. This is a surprising result, because such commodities as automobiles, gasoline, tires, etc., are all missed or under-reported in the FIES.

The FIES/SNA ratio for Recreation and Others is high. This is also a little surprising, because it is commonly believed that estimation of service expenditures is weak.

As for annual movements, the FIES/SNA ratio steadily declines. It is obvious that this decline is not due to discrepancies in data for Clothing and Footwear

TABLE 2

COMPARISON OF THE FIES AND THE SNA BY TYPES OF COMMODITIES

(1) 1984 Calendar Year (Billions of Yen)

Type	FIES	SNA	FIES/SNA
Durables	7,781.9	10,846.4	71.8%
Semi-durables	16,903.7	21,396.3	
less: Clothing for Self-Defence Forces		6.6	
		21,389.7	79.0%
Non-durables	46,964.1	56,466.0	
less: Food for Self-Defence Forces		39.1	
		56,426.9	83.2%
Services	42,153.9	86,674.7	
less: Rent for owner-occupied dwellings		21,168.2	
less: Compensation from health care insurance		13,249.6	
less: Casual insurance		513.3	
less: Life insurance		4,176.0	
		47,567.6	88.6%
Final consumption	113,803.6	175,383.4	
less: Imputation and attribution		39,152.8	
		136,230.6	83.5%

(2) 1985 Calendar Year (Billions of Yen)

Type	FIES	SNA	FIES/SNA
Durables	8,172.7	11,442.9	71.4%
Semi-durables	17,734.4	22,561.5	
less: Clothing for Self-Defence Forces		6.7	
		22,554.8	78.6%
Non-durables	47,480.0	58,361.3	
less: Food for Self-Defence Forces		39.9	
		58,321.4	81.4%
Services	43,597.2	92,969.4	
less: Rent for owner occupied dwellings		22,727.0	
less: Compensation from health care insurance		13,909.0	
less: Casual insurance		632.6	
less: Life insurance		4,554.9	
		51,145.9	85.2%
Final consumption	116,984.3	185,335.1	
less: Imputation and attribution		41,870.1	
		143,465.0	81.5%

or Transport and Communications. The most probable causes are Food, Beverages and Tobacco, Furniture and Others, and Recreation and Others.

We also examine characteristics of the FIES in comparison with the SNA by types of commodities. Table 2 shows discrepancies between our estimation of the FIES base and the SNA control totals by types of commodities. Figures are calculated by reclassifying those by objectives in Table 1.

Consumption expenditure on durable goods in the FIES is about 60 to 70 percent of figures in the SNA, while spending on semi-durables such as clothing and cooking appliances and those on non-durables are 76 to 79 percent, and 77 to 83 percent of the SNA figures, respectively.

The FIES/SNA ratio for services is unexpectedly high ranging from 82 to 88 percent. When we look at the figures by types of commodities, coverage is

TABLE 2—continued

(3) 1986 Calendar Year (Billions of Yen)

Type	FIES	SNA	FIES/SNA
Durables	8,164.1	12,568.2	65.0%
Semi-durables	17,743.7	23,156.8	
less: Clothing for Self-Defence Forces		6.8	
		23,150.0	76.6%
Non-durables	47,020.2	58,006.3	
less: Food for Self-Defence Forces		41.1	
		57,965.2	81.1%
Services	44,828.4	98,595.2	
less: Rent for owner-occupied dwellings		24,211.3	
less: Compensation from health care insurance		14,780.3	
less: Casual insurance		943.6	
less: Life insurance		5,033.3	
		53,626.7	83.6%
Final consumption	117,756.4	192,326.5	
less: Imputation and attribution		45,016.4	
		147,310.1	79.9%

(4) 1987 Calendar Year (Billions of Yen)

Type	FIES	SNA	FIES/SNA
Durables	8,970.1	13,551.4	66.2%
Semi-durables	18,120.1	23,804.5	
less: Clothing for Self-Defence Forces		7.0	
		23,797.5	76.1%
Non-durables	45,967.0	58,594.6	
less: Food for Self-Defence Forces		42.1	
		58,552.5	78.5%
Services	46,566.0	104,753.3	
less: Rent for owner-occupied dwellings		25,934.6	
less: Compensation from health care insurance		15,621.0	
less: Casual insurance		892.4	
less: Life insurance		5,615.8	
		56,689.5	82.1
Final consumption	119,623.2	200,703.8	
less: Imputation and attribution		48,112.9	
		152,590.9	78.4%

TABLE 2—continued

(5) 1988 Calendar Year (Billions of Yen)

Type	FIES	SNA	FIES/SNA
Durables	9,317.5	15,176.2	61.4%
Semi-durables	19,129.3	24,469.7	
less: Clothing for Self-Defence Forces		7.4	
		24,462.3	78.2%
Non-durables	46,286.4	59,848.8	
less: Food for Self-Defence Forces		42.8	
		59,806.0	77.4%
Services	48,942.2	110,690.6	
less: Rent for owner-occupied dwellings		27,580.9	
less: Compensation from health care insurance		16,285.0	
less: Casual insurance		1,083.9	
less: Life insurance		6,410.7	
		59,330.1	82.5%
Final consumption	123,675.4	210,185.2	
less: Imputation and attribution		51,410.7	
		158,774.5	77.9%

high in Services and is low in Durables. From Table 2 we can confirm our common impression that family survey statistics are comparatively weak in capturing expenditures on consumer durable goods and that we may have to reconsider the allotment rate for family use and business use in durables and semi-durables based on the commodity flow method of the SNA.

We can compare the Canadian experience by Adler and Wolfson (1988). Though they do not summarize their estimates in terms of commodity types as in our study, their results are not similar to the tendency of durable goods in Japan. On the other hand, Japan and Canada are similar in terms of Medical Care and Health Expenses; in both countries there is a similar quality of sample information.

4. Concluding Remarks

According to the proposal by Ruggles and Ruggles, we analyzed the consistency between macro- and micro-data sets in the Japanese household sector. We found that:

(1) The overall FIES/SNA ratio is about 80 percent in Japan compared to about 75 percent in the U.S., 87 percent in Canada, 80 percent in Australia, 87 percent in Finland, 85 percent in Sweden, and 92 percent in the U.K. Thus the Japanese FIES/SNA ratio is not so bad.

(2) Comparing the FIES with the SNA statistics in terms of objective for which commodities are acquired, the FIES/SNA ratio is highest for Gross Rent, Fuel and Power, and lowest for Medical Care and Health Expenses due to sampling problems. Regarding Gross Rent, Fuel and Power, we have to consider how to estimate the imputed rent for owner-occupied dwellings.

(3) The figures for the other six categories by objectives seem reasonable, except Furniture and Others. For Furniture and Others, we may have to reconsider

the allotment rate of durables and semi-durables between family use and business use based on the commodity flow method of the SNA.

(4) In terms of types of Commodities, the FIES/SNA ratio is highest in the services categories. The ratio for durables is about 10 percent points lower than that for semi-durables and non-durables.

(5) Due to the preliminary nature of this study, we can not derive any final conclusions, but our findings suggest that we should develop procedures for making use of the FIES data as external information in integrating micro-data with the macro-data of the SNA.

Finally for further research, we need mutual exchange for information on how to improve the present statistical system of the country.

REFERENCES

Annual Report of the Economic Research Institute (in Japanese), Economic Planning Agency, 1990.

Adler, H. J. and Wolfson, M., A Prototype Micro-Macro Link for the Canadian Household Sector, *Review of Income and Wealth*, 34, 371-392, 1988.

Atkinson, A. B. and Micklewright, J., On the Reliability of Income Data in the Family Expenditure Survey 1970-1977, *Journal of the Royal Statistical Society* (A), 146 (I), 33-53, 1983.

Maki, A. and Nishiyama, S., Consistency between Macro- and Micro-Data Sets in Japan: System of National Accounts vs. Family Income and Expenditure Survey, Discussion Paper No. 247, Institute of Social and Economic Research, Osaka University, June 1991.

Ruggles, R. and Ruggles, N., The role of Microdata in the National Economic and Social Accounts, *Review of Income and Wealth*, Series 21, (2), 203-216, 1975.

Ruggles, R. and Ruggles, N., The Integration of Macro and Micro Data for the Household Sector, *Review of Income and Wealth*, Series 32, (3), 245-276, 1986.

Statistics Bureau, *Handbook on the 1985 Base Consumer Price Index*, (in Japanese).

United Nations, *A System of National Accounts, Studies in Methods*, Series F, No. 2 Rev. 3 (ST/STAT/SER.F/2/Rev. 3), 1968.

United Nations, *Provisional Guidelines on the Statistics of Distribution of Income, Consumption and Accumulation of Households, Studies in Methods*, Series M, No. 61 (ST/ESA/STAT/SER.M/61), 1977.