

# The Discrepancy Between the Household Saving Rates in Micro and Macro Statistics: An Adjustment Method \*

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## Abstract

The household saving rates in the “System of National Accounts (SNA)” and the “Family Income and Expenditure Survey (FIES)”, which were at the nearly same level in 1980, has deviated significantly after that. In 2015, the difference range was 25.9%. In this paper, we have identified the reasons for the discrepancies between the two statistics. The average difference over the period from 1994 to 2015 is 21.3 percentage point, and 93.2% of them can be explained with the identified factors: (1) differences in coverages of each survey; (2) differences in the concept of income and consumption; and (3) non-sampling errors in the FIES. While it has been known that these factors can explain most of the differences, our results confirm that the discussions are still valid with the 2008 SNA, which was newly introduced in Japan.

Key words: household saving, Family Income and Expenditure Survey, System of National Accounts

JEL Classification D14, E21, P51

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## I. Introduction

Saving is a source of growth and is one of the most important indicators in Japan, which has experienced a long stagnation, while the household sector is the dominant saving depositor. Accordingly, it is indispensable to observe household saving rates. The household saving rates can be observed in the System of National Accounts (SNA), which are macro statistics constructed and published by the Cabinet Office Economic and Social Research Institute. The SNA provide us a consistent system of statistics for every aspect of the whole Japanese economy, a part of which the savings of the household sector is estimated. On the other hand, another measure for household saving rates can also be observed in the Family Income and Expenditure Survey (FIES), which is one of the most important survey statis-

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\* The results and views in this paper are those of the authors and do not reflect the view of the organizations to which they belong. The authors are grateful for helpful comments from the participants of the conference.

tics. The FIES is surveyed and published by the Statistics Bureau of Japan. The saving rate is calculated from household income and expenditure. We call this "micro statistics" because individual households are directly asked their situation.

While household saving rates are available in the both the SNA and the FIES, the two show significantly different trends. The saving rate in the SNA was 17.7% in 1980 and has almost continuously declined to be negative in 2014. On the other hand, the saving rate in the FIES was 22.1% in 1980, slightly above the SNA level, and has rather risen to be around 25% in recent years. That is, there are significant differences between the saving rates in the SNA and the FIES and the difference has been getting larger and larger.

It is indispensable to fill the gap between the two saving rate statistics to understand what is happening to the Japanese economy. With the trend in the SNA, it seems reasonable to ask causes and impacts of declining saving rates on the macro economy. To do so, it is indispensable to understand what is going on for individual households. For example, in the United States, Bosworth and Sabelhaus (1991) analyze the fall of saving rates based on micro statistics. However, in Japan, we cannot do such analysis since the SNA and the FIES exhibit completely different trends in saving rates.

To address this issue, we have tried to identify the reason of the discrepancy between the two statistics and show the consistency between the two after a series of necessary adjustments. While a lot of previous studies have been made, it is still worth doing since several new concepts have been introduced to the SNA by the change in the standard from the 1993 SNA to the 2008 SNA, which is the latest standard of the SNA authorized by the United Nations.

We basically follow the methodologies used in the previous studies, although the structure of the SNA has been changed. Among others, Iwamoto et al. (1995) is the seminal one which pointed out that the discrepancy can be explained by: (1) difference in coverage; (2) difference in concepts for income and consumption; and (3) non-sampling errors. Unayama (2009) updates Iwamoto et al. (1995) using the 1993 SNA (benchmark year = 2000) from 1986 to 2007, and identifies sources of non-sampling errors by exploiting information from multiple surveys, such as the Family Saving Survey and the Survey of Household Economy. Yoneta (2017) further extended to the 1993 SNA (benchmark year = 2005) and evaluates the impacts of the introduction of FISIM<sup>1</sup>. In addition, Yoneta (2017) elaborates on the non-sampling errors that are identified by Unayama (2009) reflecting new studies on the properties of Japanese statistics<sup>2</sup>.

Our analysis is based on the 2008 SNA (benchmark year = 2011). Since changes in concepts associated with income and consumption of the household sector brought by the revision of the SNA standard are not so large, we simply apply the methods used in Yoneta (2017) and extended to the latest period. As a result of consideration, we can explain 93.2% of the average discrepancy, 21.3% for the period from 1994 to 2015; the corrected trend

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<sup>1</sup> FISIM stands for Financial Intermediation Services Indirectly Measured.

<sup>2</sup> "New study results" means the following papers; Unayama (2015), Tada and Miyoshi (2015), Ohno et al. (2015), Kawagoe and Maeda (2013) and Maeda (2015).

shows that the household saving rate has almost constantly fallen as the SNA indicated. In that sense, adjustments are needed when a researcher investigates saving behavior of households using the FIES.

The structure of this paper is as follows. Section 2 explains the characteristics of the SNA and the FIES and confirms the trend of household saving rates in Japan since 1980. In Section 3, we look at the differences in coverage, concept, and non-sampling errors in both statistics. In section 4, the final results are provided. Section 5 concludes.

## II. Characteristics of the SNA and the FIES

### II-1. Household saving rate in the SNA

The SNA is a system of statistics which systematically records the overall picture of the economy. For international comparability, estimation and calculation methods are set by the United Nations called the SNA standard<sup>3</sup>. The standard has been revised in 1968, 1993, and 2008, and the latest standard is called the “2008 SNA”. As the fundamental statistics designated by statistical law, the construction methods are legitimated with advises from the Statistics Commission, an expert committee.

The SNA, which is a primary source of macro economy, is indispensable for multi-faceted analysis of one country’s economy and is widely used for academic research as well as various administrative measures. In the SNA, agents in the economy are categorized into: non-financial corporations; financial corporations; government; non-profit-institute serving households; and households, and all three aspects of each sector: production, expenditure, and distribution, are consistently captured.

As for the household saving rate, we focus mainly on distribution and expenditure of the household sector. The household saving rate is represented as “Saving ratio (%)” listed in “(4) Use of Income Account” of “5. Households (Including Private Unincorporated Enterprises)”, which is a part of “Income and Outlay Accounts classified by Institutional Sectors”.

Figure 1 shows the SNA’s household saving rate from 1980 to 2015. Three series correspond to those that are based on the different standards; the 1993 SNA and the 2008 SNA. This figure shows that the household saving rate, which was slightly below 20% in 1980, has been decreasing to such a level that it is negative due to the decline in the past 30 years. For this trend, the choice of standards and/or the benchmark year is negligible.

### II-2. Household saving rate in the FIES

The FIES is a statistical survey that is a designated survey for Fundamental Statistics by the statistical law<sup>4</sup>. The FIES is a national representative in which about 9,000 households

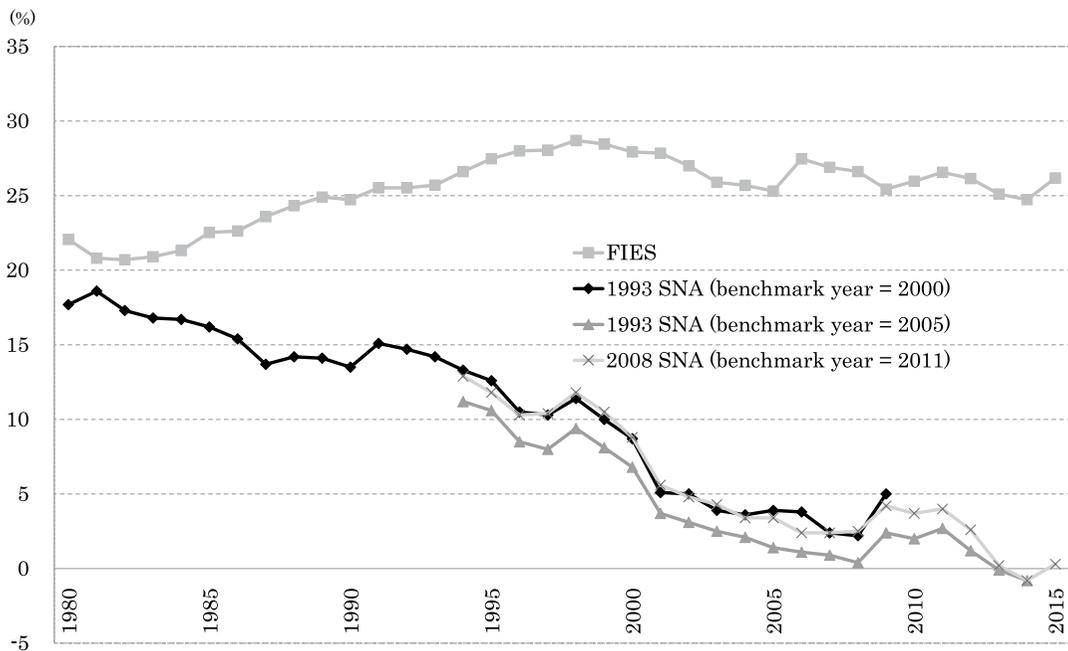
<sup>3</sup> See the Cabinet Office Web site; <http://www.esri.cao.go.jp/en/sna/menu.html>.

<sup>4</sup> See the Statistics Bureau of the Ministry of Internal Affairs and Communications Web site; <http://www.stat.go.jp/english/data/kakei/index.html>.

are sampled from 168 municipalities nationwide. The FIES, which is one of the most important statistical surveys, is widely used not only in academic research but also in policy planning. Their terminology is slightly different from that in economics, so we should be careful to choose a variable. In the FIES, household saving rate is called “Ratio of surplus to disposable income”, or *Kuroji-Ritsu* in Japanese. Due to the reasons discussed below, household saving rate is calculated only for employee households.

The trend in the saving rate from 1980 to 2015 is also shown in Figure 1. The level of saving rate was almost the same as that in the SNA around 1980. However, while that in the SNA has fallen as shown above, that in the FIES is almost leveled off and still remains above 25% in 2015.

Figure 1. Changes in the household savings rates of Micro and Macro statistics in Japan



Note: “FIES” stands for “Family Income and Expenditure Survey”. “SNA” stands for “System of National Accounts”.

Source: “Family Income and Expenditure Survey” and “SNA”.

### III. Necessary Adjustments for the Consistency<sup>5</sup>

#### III-1. Adjustment of differences in coverages

Due to the construction procedure in both statistics, the coverage of calculation differs

<sup>5</sup> For the detailed explanation of the calculation in this section, refer to Unayama (2009) and Yoneta (2017).

greatly between the SNA and the FIES. Specifically, while the SNA covers all households in Japan, the FIES covers only employee households of two or more households since the self-employed do not report their monthly income and, therefore, the saving rate cannot be calculated. Regarding this problem, we adjust to include households in the FIES as in the previous studies.

### *III-2. Adjustment of differences in concepts of income and expenditure*

The concept of income and consumption are partially different between the FIES and the SNA. If the conceptual difference is an important cause of household saving rate discrepancy, we need to make adjustments to ensure comparability. Therefore, referring to Unayama (2009) and Yoneta (2017), we unify the concept of income and consumption by adjusting either the FIES or the SNA. Below, we explain the adjustment method and the amount of the effect.

#### *III-2-1. Treatment of imputed rent*

In the SNA, imputed rents associated with the owner-occupied dwellings are recoded in both income and expenditure sides. Accordingly, the following are recoded: (1) fictitious rents known as “Imputed service of owner-occupied dwellings” in consumption expenditure; (2) repair and maintenance costs that are subtracted from the imputed rent in the income side; (3) rent for land for owner-occupied houses; and (4) resulting operating surplus.

On the other hand, imputed rent is not recorded in the FIES; repair and maintenance costs are recorded as a part of consumption expenditure as well as rent for land.

To fill the gap associated with the imputed rent, we basically remove the variables associated with the imputed rent. While it would be better to estimate and include the imputed rent in the FIES, large measurement errors would inevitably emerge with such adjustments, and so we simply get rid of it from the SNA for consistency.

The step-by-step adjustments affect income and consumption in both statistics as follows: consumption expenditure in the SNA decreases by 45.0 trillion yen on average by excluding “Imputed service of owner-occupied dwellings”; due to the adjustment of repair and maintenance costs, consumption expenditure in FIES decreases by 10,460 yen; due to the adjustment of rent for land, disposable income and consumption expenditure in the SNA increase by 0.3 trillion yen; and by subtracting operating surplus, disposable income in the SNA decreases by 22.3 trillion yen.

#### *III-2-2. Other investment income*

In the SNA, investment income received by an insurance company or employer is regarded as that for beneficiaries to which they are attributable. In fact, “Other investment income” in the SNA is the sum of “Investment income attributable to insurance policyholders”, “Investment income on pension entitlements” and “Investment income attributable to investment funds shareholders”, and counted as a part of income of the household sector. On

the other hand, in the FIES, there is no recognition about the attributable income unless they receive a refund at maturity because the investment company reserves it, in fact.

Again, we remove them from household income in the SNA for consistency with the FIES. As a result, household disposable income in the SNA decreases by 13.3 trillion yen.

### III-2-3. Other current transfers

In the SNA, transfers are subtracted from gross income but not included in consumption. For example, “Other current transfers” in the SNA that includes transfers within the household sector (such as gifts and remittances) to private non-profit organizations (such as donations and religious expenditures) are recorded as a kind of re-distribution and not included in consumption

Since it is recorded as consumption expenditure in the FIES, we recategorize it as “Non-consumption expenditure” to match the concepts in the SNA. As a result, both disposable income and consumption expenditure of the SNA will increase by 17.5 trillion yen.

### III-2-4. Capital tax

In the SNA, inheritance tax and gift tax are included in “Capital tax”, which are regarded as capital transfer from household to general government. Thus, they are a part of disposable income. On the other hand, they are paid from gross income and reduce disposable income in the FIES. That is, they are a part of non-consumption expenditure.

Since the amount of them is hardly identifiable in the FIES, we subtract them from disposable income in the SNA. With this treatment, disposable income in the SNA decreases by 1.8 trillion yen on average.

### III-2-5. Net non-life insurance premium

In the SNA, transactions between households and insurance companies are basically regarded as a part of transfer. Specifically, “Net non-life insurance premium” in the SNA are recorded as current transfers, and therefore categorized as non-consumption expenditure. On the other hand, in FIES, non-life insurance premium is regarded as consumption expenditure.

For consistency, we re-categorize them to consumption in the SNA. As a result, disposable income and household consumption in the SNA increase by 3.2 trillion yen.

### III-2-6. In-kind income<sup>6</sup>

In the SNA, “In-kind income” is recorded as income and consumption. On the other hand, “In-kind income” is not recorded in the FIES. Regarding this point, we adjust the FIES to the SNA.

As a result, the disposable income and expenditure on the FIES increase by 8,891 yen on average.

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<sup>6</sup> “In-kind income” includes “consumption of self-grown vegetables”, “gift from outside” and so forth.

### III-2-7. Valuation adjustment of inventory in private unincorporated enterprises

This is a purely technical adjustment. Since the household sector in the SNA includes unincorporated enterprises, “Valuation adjustment of inventory”, which records gains and losses arising from changes in inventory valuation, affects household income and consumption. This is a concept unique to the SNA and is not taken into account in the FIES. Regarding this point, we adjust the SNA to the FIES. However, disposable income is hardly affected (increases by 0.0 trillion yen).

### III-2-8. Interest, payable

In Japan, mortgages are repaid with interest, and most households are not aware of the distinction between principal and interest. Accordingly, in the FIES, the sum of interest and principal repayment is recorded as savings. In the SNA, however, “Interest, payable” is recorded as non-consumption expenditure. To address this, we recategorize “Interest (payment)” to disposable income in the SNA<sup>7</sup>. As a result, disposable income in the SNA increases by 5.0 trillion yen on average, and the SNA consumption expenditure decreases by 9.1 trillion yen on average.

### III-2-9. Interest, receivable

Based on the 1993 SNA, “Interest, receivable”, which is recorded as a part of disposable income in the SNA, includes FISIM consumption. In the FIES, FISIM, which is a fictitious concept, is of course not recorded. Following Yoneta (2017), we add FISIM consumption to “Interest, receivable” and consumption expenditure in the SNA. As a result of this treatment, disposable income and consumption expenditure of the SNA decrease by 1.3 trillion yen.

## III-3. Adjustment of non-sampling errors

Previous studies pointed out that the differences in saving rates between the SNA and the FIES come not only from differences in their coverage and concept but also from non-sampling errors (Unayama, 2009). Following the literature, here we will try to correct the non-sampling errors basically in the FIES.

### III-3-1. Non-sampling error of consumption expenditure in durable goods

It is known that expenditures on durables and high-priced services, such as weddings and travel abroad, is under-reported in the FIES (Unayama, 2009). To address this, Unayama (2009) and Yoneta (2017) exploit the “Survey of Household Economy (SHE)” to correct consumption expenditure in the FIES. In the SHE, expenditures are surveyed with a pre-coded form that primarily focuses on durable goods and high-priced services, while the FIES uses a free-entry diary form. Thanks to the form, it is believed that the SHE tracks

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<sup>7</sup> Strictly speaking, in SNA FISIM on “interest, payable” has already been recorded as disposable income and consumption expenditure. Therefore, FISIM on “interest, payable” is reduced from consumption expenditure.

consumption of durable goods and high-priced services better than the FIES. To correct this, consumption expenditures on such items are inflated using the results of the SHE.

In addition, Unayama (2015) points out survey fatigue, which is a tendency that consumption falls in later interviews, plays a non-negligible role in the FIES. According to Unayama (2015), the consumption expenditure is 2.5% less in the FIES than the SHE. We use the number to correct the expenditure level in the FIES.

Considering these two, in this paper, the consumption expenditure of each year was divided by 86.0% which is the average of the ratio for all years. As a result, the consumption expenditure of the FIES increase by 45,758 yen on average.

### III-3-2. Non-sampling error of property income

Unlike interest payable discussed above, received interest is usually easily identifiable. However, it is known that the interest income is severely under-reported (Unayama, 2009). According to Unayama (2009), the income in the FIES is only 5-10% of the property income per household in the SNA.

To address this problem, we follow the method of Yoneta (2017) to adjust asset income in the FIES, with which interest income in the FIES is calculated using the amount of asset reported in the FIES, the interest rate published by the Bank of Japan, and the average stock yield published by Japan Exchange Group. As a result, the disposable income of the FIES increases by 9,635 yen.

### III-3-3. Non-sampling error of occasional income

According to Tada and Miyoshi (2015), some occasional income earned by an employee household would be under-reported in the FIES. One of the most important examples is the under-reporting of bonuses. While most employees are supposed to receive bonuses twice a year, only few report their receipt.

Yoneta (2017) addresses this issue by estimating true bonus receipt using information from another survey, such as the Basic Survey for Wage Structure. In addition, for the correction, income tax and social insurance premium associated with the under-reported bonus is also estimated.

Here, following Yoneta (2017), we correct the bonus income in the FIES. As a result, disposable income of employee households increases by 15,367 yen, and that of no job households increased by 10,159 yen.

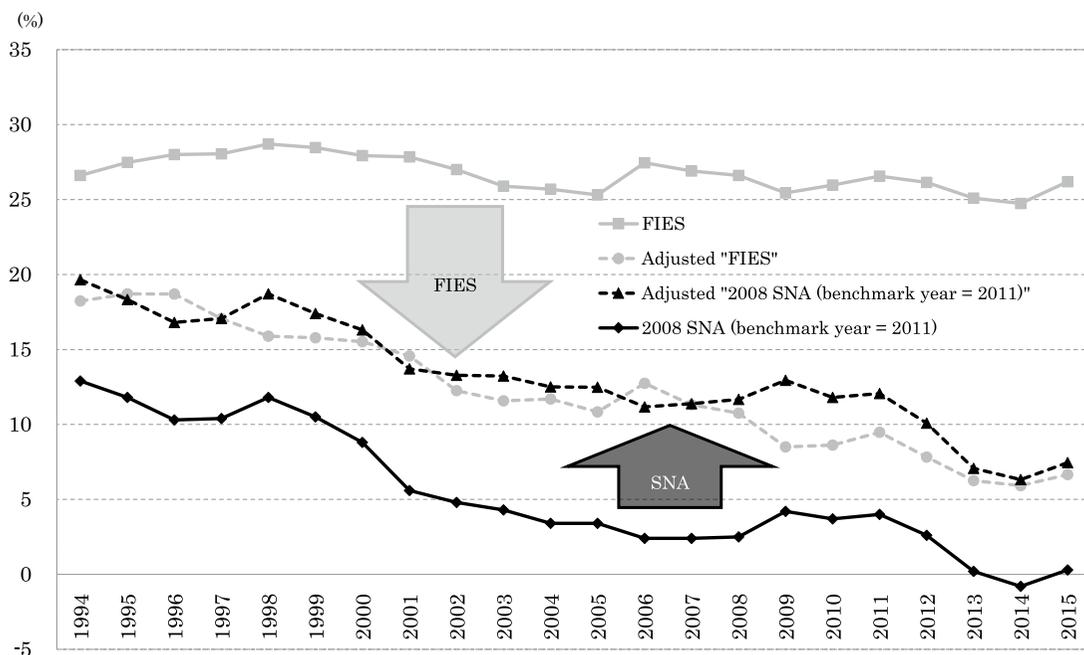
## IV. Result

The table summarizes the impacts of each adjustment discussed in the previous section. In the official data, the average size of discrepancy between the two saving rates for the period between 1994 and 2015 is larger than 20%. After adjusting and correcting both statistics in this paper, more than 90% of the discrepancies can be explained.

Our results show that the discrepancies are almost equally attributable to the three fac-

tors pointed out here: (1) differences in coverages; (2) differences in concepts of income and consumption; and (3) non-sampling errors in the FIES. However, once we address these, we can understand household saving rate consistently between micro and macro data in Japan.

Figure 2. The household savings rates in adjusted Micro and Macro statistics in Japan



Note: "FIES" stands for "Family Income and Expenditure Survey". "SNA" stands for "System of National Accounts".

Source: "Family Income and Expenditure Survey" and "SNA".

Table. Impact by adjustment of FIES and SNA

Adjustment contents		Statistics	Impact on disposable income		Impact on consumption expenditure	
Adjustment of population difference		FIES	The effect on the household savings ratio is -8.8% on average (-14.1% in 2015).			
Adjustment of conceptual difference						
1. Treatment of imputed rent	Excluding "Imputed service of owner-occupied dwellings"	SNA	N/A		-45.0 trillion yen on average (-49.9 trillion yen in 2015)	
	The adjustment of repair and maintenance costs	FIES	N/A		-10,460 yen on average (-9,806 yen in 2015)	
	The adjustment of rent for land	SNA	+0.3 trillion yen on average (+0.2 trillion yen in 2015)		+0.3 trillion yen on average (+0.2 trillion yen in 2015)	
	Subtracting operating surplus	SNA	-22.3 trillion yen (-26.0 trillion yen in 2015)		N/A	
2. Other investment income		SNA	-13.3 trillion yen on average (-11.4 trillion yen in 2015)		N/A	
3. Other current transfers		SNA	+17.5 trillion yen on average (+14.7 trillion yen in 2015)		+17.5 trillion yen on average (+14.7 trillion yen in 2015)	
4. Capital tax		SNA	-1.8 trillion yen (-1.8 trillion yen in 2015).		N/A	
5. Net non-life insurance premium		SNA	+3.2 trillion yen on average (+3.0 trillion yen in 2015)		+3.2 trillion yen on average (+3.0 trillion yen in 2015)	
6. In-kind income		FIES	+8,891 yen on average (+5,339 yen in 2015)		+8,891 yen on average (+5,339 yen in 2015)	
7. Valuation adjustment of inventory in private unincorporated enterprises		SNA	+0.0 trillion yen on average (-0.1 trillion yen in 2015)		N/A	
8. Interest, payable		SNA	+5.0 trillion yen on average (+2.7 trillion yen in 2015)		-9.1 trillion yen (-6.2 trillion yen in 2015)	
9. Interest, receivable		SNA	-1.3 trillion yen (-0.9 trillion yen in 2015).		-1.3 trillion yen (-0.9 trillion yen in 2015)	
Adjustment of statistical errors						
1. Non-sampling error of consumption expenditure in durable goods		FIES	N/A		+45,758 yen on average (+39,328 yen in 2015)	
2. Non-sampling error of property income		FIES	+9,635 yen on average (+6,309 yen in 2015)		N/A	
3. Non-sampling error of occasional income		FIES	+10,159 yen on average (+11,500 yen in 2015)		N/A	
Before adjustment		<FIES> 345,738 yen on average (277,088 yen in 2015)	<SNA> 298.9 trillion yen on average (293.7 trillion yen in 2015)	<FIES> 281,873 yen on average (245,382 yen in 2015)	<SNA> 282.3 trillion yen on average (292.7 trillion yen in 2015)	
After adjustment		<FIES> 374,424 yen on average (300,236 yen in 2015)	<SNA> 286.4 trillion yen on average (274.0 trillion yen in 2015)	<FIES> 326,061 yen on average (280,243 yen in 2015)	<SNA> 248.0 trillion yen on average (253.6 trillion yen in 2015)	

Note: "FIES" stands for "Family Income and Expenditure Survey". "SNA" stands for "System of National Accounts".  
Source: Calculated by authors.

## V. Conclusion

We have checked the consistency between household saving rates in the SNA and the FIES. After several considerations, the discrepancies can be understandable with institutional factors, conceptual differences, and non-sampling errors. It is good to know the consistency between the two, however, the final purpose of our attempt is to understand the trend in saving rates in Japan.

The results here show that the basic trend in saving rate is better captured by the SNA.

That is, the household saving rate has continuously fallen for more than 30 years. For further consideration, it would be necessary to construct modified micro data.

As the study of the household saving rate in Japan, Horioka et al. (1996) show the conclusion that the life cycle hypothesis is supported as a reason for the elderly saving. On the other hand, Hayashi et al. (1988) pointed out that savings may be increased even in old age by the “Dynasty Model” which emphasizes the prosperity of descendants. Also in recent research, Nakazawa et al. (2015) pointed out that Japanese elderly people tend to save. It is a future task to analyze whether it is reasonable for economics by considering adjustment of saving rates of micro and macro statistics concerning for these papers.

## References

<In English>

- Bosworth, P., G. Burtless and J. Sabelhaus (1991), “The Decline in Saving: Evidence from Household Surveys”, *Brookings Papers on Economic Activity*, 1, pp. 183-241.
- Stephens, M. and T. Unayama (2011), “The Consumption Response to Seasonal Income: Evidence from Japanese Public Pension Benefits”, *American Economic Journal: Applied Economics*, vol. 3, pp. 86-118.
- Hayashi, F., T. Ito and J. Slemrod (1988), “Housing Finance Imperfections, Taxation, and Private Saving: A Comparative Simulation Analysis of the United States and Japan”, *Journal of the Japanese and International Economies*, 2, pp. 215-238.

<In Japanese>

- Horioka, Charles Yuji, N. Kasuga, K. Yamazaki and W. Watanabe (1996), “Saving Behavior of the Aged: Is the elderly in Japan withdrawing savings?” Based on analysis by micro data, Noriyuki Takayama, Charles Yuji Horioka, Ota Kiyo, “Savings and heritage inheritance of aging society”, pp. 55-111.
- Iwamoto, Y., S. Ozaki and Y. Maekawa (1995), “On the discrepancy of household savings trends in “Family Income and Expenditure” and “National Accounts Calculation”(1) - Discrepancies in Concepts and Examination of Problems of Biased Specimens”, *Financial Review*, No. 35, pp. 1-32.
- Kawagoe, M. and S. Maeda (2013), “Analysis example using household behavior and the SNA ~ the SNA distribution statistics ~”, ESRI Working Paper, No. 28.
- Nakazawa, M., K. Kikuta and Y. Yoneta (2015), “The Saving Behavior of Elderly People in Japan: Analysis Based on Micro-Data from the National Survey of Family Income and Expenditure”, *KIER Discussion Paper Series*, No. 1509.
- Ohno, T., M. Nakazawa, K. Kikuta and K. Yamamoto (2015), “Comparison of Taxes and Social Insurance Premium Burdens in Household Accounts”, *Financial Review*, No. 122, pp. 40-58.
- Saeko, M. (2015), “The Financial Asset and Liability in Japanese Household Statistics”, *Financial Review*, No. 122, pp. 80-102.

- Tada, T. and K. Miyoshi (2015), "Verifying household incomes in Japanese statistics", *Financial Review*, No. 122, pp. 25-39.
- Unayama, T. (2009), "Separation of savings rate with the SNA in Family Income and Expenditure - Factors of Declining Savings Rate in Japan", RIETI Discussion Paper, Series 10-J-003.
- Unayama, T. (2015), "A Comparison of Consumption-Related Statistics" *Financial Review*, No. 122, pp. 59-79.
- Yoneta, Y. (2017), "What is the Household saving rate in Japan? An Adjustment Method of Household saving rate between the "Family Income and Expenditure Survey" and "System of National Accounts" ", 2017 Hitotsubashi University Graduate School of Economics, Graduate School of Economics Graduate Master thesis.