

Implementation of 2008 SNA in Japan's Flow of Funds Accounts

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1. Introduction

The Bank of Japan (BOJ) has compiled Japan's Flow of Funds Accounts (JFFA) on a quarterly basis since 1954. The JFFA is adopted as a major source of the Japanese System of National Accounts (JSNA), in particular for compiling the annual sectoral accounts, by the National Accounts Division of the Economic and Social Research Institute (ESRI) of the Japanese government's Cabinet Office¹. The BOJ and the ESRI have therefore collaborated in incorporating the recommendations of the System of National Accounts 2008 (2008 SNA).

There are 61 issues revised from the 1993 SNA in Annex 3 of the 2008 SNA. Among them, this paper discusses issues related to employee stock options (ESOs) and pension entitlements because the 2008 SNA recommendations for the measurement of ESOs and pension entitlements represent significant challenges for both the JFFA and the JSNA. Methods for estimating the value of ESOs and pension entitlements to be recorded in the JFFA are examined and it is explained how holding gains from ESOs and pension entitlements should be distinguished from income in measuring flows for both the JFFA and the JSNA. Implementing such methodologies, however, presents certain practical difficulties.

The 2008 SNA states that the fair value of an ESO should be recorded for the period between the grant date and the exercise date, but [that] if this is not possible, the fair value may be recorded [starting] from the vesting date. If this method is incorporated in the JFFA, it would be possible to capture the outstanding amounts of stock options, but it would be difficult to measure income and revaluation flows until stock options are executed.

Regarding pension entitlements, the rapid ageing of Japanese society has meant that accurate measurement has become increasingly important for both the JFFA and the JSNA. In particular, the accurate measurement of the government's unfunded pension obligations may have a major impact on its behavior. However, estimation of the value of pension fund liabilities requires making several assumptions. Changes in

¹ The BOJ's quarterly JFFA covers financial assets and liabilities and does not include nonfinancial assets. Thus, the ESRI combines JFFA data with sectoral income and nonfinancial assets data in compiling annual sectoral accounts.

liabilities could arise as a result of movements in income or as a result of revaluation, but it would be difficult to identify such a distinction.

2. Employee Stock Options (ESOs)

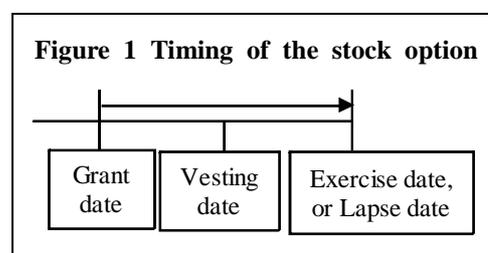
(1) 2008 SNA recommendations on ESOs

The 2008 SNA 11.125 defines an ESO as follows.

“An employee stock option is an agreement made on a given date (the “grant” date) under which an employee may purchase a given number of shares of the employer’s stock at a stated price (the “strike” price) either at a stated time (the “vesting” date) or within a period of time (the “exercise” period) immediately following the vesting date”(2008 SNA, section 11.125).

In addition, the 2008 SNA states that there are three dates relevant to each stock option: the grant, the vesting, and the exercise (lapse) dates (17.385). In the valuation of ESOs, the fair value method is applied (17.386), and *the valuation of the options may be estimated using a stock options pricing model* (17.387) known as “the Black–Scholes model”.

Regarding the timing of recording, *an estimate of the value of the ESO should be made at the grant date. If this is not possible, the value of the option should be recorded at the vesting date* (17.389). Figure 1 describes the time sequence for providing an ESO from grant date to exercise date. If the employee holding the option retires before the vesting date or if he does not exercise the option, then the claim on the employer represented by the ESO is lost. In this sense, stock options may be considered to include a degree of contingency.



(2) Application of the 2008 SNA recommendations on ESOs to the JFFA

Based on the 2008 SNA recommendations on ESOs, any changes in value between the grant date and vesting date should be treated as part of employee compensation. On the other hand, any changes in value between vesting date and exercise date should not, in principle, be treated as employee compensation, but rather as a holding gain or loss. However, due to limitations in the source data, it is only feasible to record the total increase in value between grant and exercise dates as a holding gain or loss.

In Japan, the “Financial Statements Statistics of Corporations by Industry, Quarterly” (FSSCIQ), published by the Ministry of Finance, compiles the accounting data of Japanese corporations as recorded in their financial statements for the quarter or fiscal year. The FSSCIQ identifies the outstanding amounts of stock acquisition rights, including ESOs, at exercise date. These book values are not sufficient for the JFFA because such amounts are neither evaluated at market price nor represented at fair value; moreover, changes in value only provide information on net flows. To conform to the recommendations of the 2008 SNA, new issues and exercises of stock acquisition rights have to be identified so that the former can be recorded as employee compensation. In addition, the market value of these rights has to be captured so as to identify changes in their true value. In light of such needs, it is expected that the FSSCIQ and other corporate

enterprise statistics will seek to provide more complete source data for grants of stock acquisition rights in future².

Table 1 Recording of ESO in conformity with the 2008 SNA

“+” refers to increase in value. “-” refers to decrease in value.

Timings		Grant date(A)	From A to B	Vesting date(B)	From B to C	Exercise date(C)
Items						
Households	Distribution and use of income account, of Households	Compensation of Employee(+)	Compensation of Employees(±)			
	Other changes in assets accounts of Households		Asset(±)		Holding gain and loss(±)	
	Financial Accounts			Employee stock options(+)*		Currency(-) or deposits(-), Employee stock options(-)*, Shares(+)
	Balance sheets, asset	Asset(+)	Asset(±)	Asset(-)	Employee stock options(±)*	Currency(-) or deposits(-), Employee stock options(-)*, Shares(+)
Financial institutions and Nonfinancial corporations	Other changes in assets accounts of Employer		Liability(±)		Holding gain and loss(?)	
	Financial Accounts			Employee stock options(+)*		Currency(+) or deposits(+), Employee stock options(-)*
	Balance sheets, asset					Currency(+) or deposits(+)
	Balance sheets, liability	Liability(+)**	Liability(±)	Liability(-), Employee stock options(+)*	Employee stock options(±)*	Employee stock options(-)*, Shares(+)

*Financial derivatives and employee stock options

**According to 17.392, liability of employer increase, if companies give employees the ESO. The employer’ liability may be classed to others in the financial accounts.

Reference : Table 1 is referred to Yoshino[2011].

3. Treatment of liabilities of the Social Security Pension System

(1) Pension schemes and pension accounting

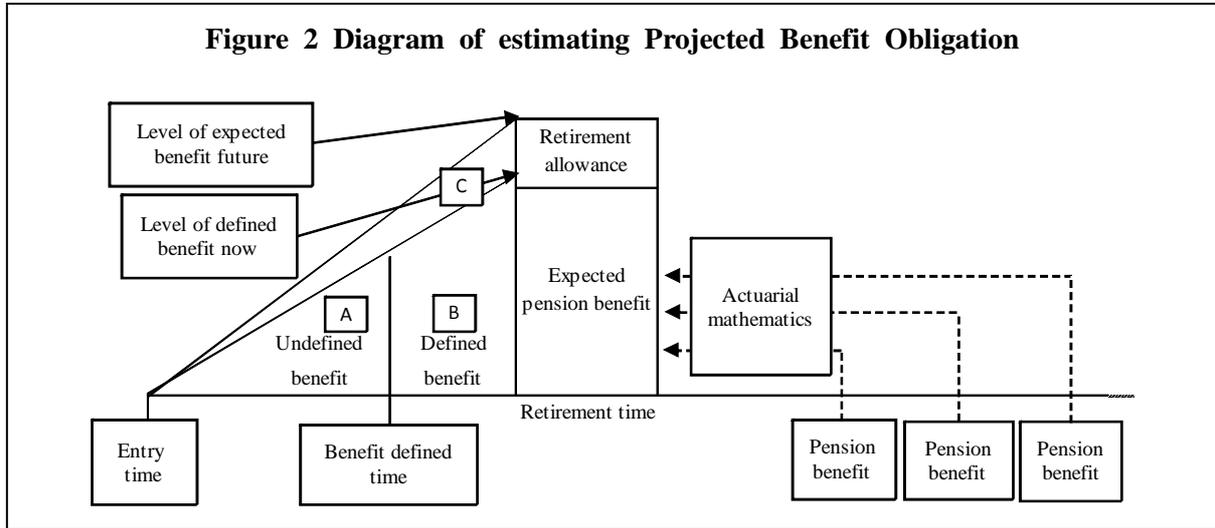
According to the 2008 SNA, there are three major types of pension scheme: social security schemes, employment-related schemes other than social security, and social assistance schemes. The social security pensions are, in principle, operated on a pay-as-you-go basis. In the employment-related schemes, there are two schemes, defined contribution pension schemes and defined benefit pension schemes.

There are two alternative measurements available when actually estimating the liabilities of individual pension schemes, namely the Accumulated Benefit Obligation (ABO) and the Projected Benefit Obligation (PBO). In Figure 2, which shows the pension liabilities of an employer, area B represents the liability as measured by the ABO, while the PBO is captured by areas A, B, and C. Thus the PBO is more comprehensive than and preferable to the ABO, as suggested in the 2008 SNA³.

² See Hagino, Hiroki, Inadachi, Sakuraba, and Sato(2011) about the recording and treatment of ESOs in Japanese FFA.

³ As commercial accounting standards, the Financial Accounting Standards Board (FASB) has adopted ABO, while the International Accounting Standard Board (IASB) and the Accounting Standards Board of Japan (ASBJ) have adopted the PBO.

In general, calculating the volume of the retirement allowance does not require making many assumptions. In contrast, a large number of actuarial assumptions need to be made in order to measure expected pension benefits. Such assumptions include the expected growth rate of employee compensation, the discount rate, the expected investment return on funds, and so on. It is useful to choose the discount rate to represent both the expected investment return⁴ and the risk free rate. The 2008 SNA recommends taking the yields on Treasury bonds as the risk free rate. Source data for average retirement ages and life expectancy are also necessary.



(2) Pension Liabilities in Japan: A Case Study

Table 2 Assumptions of worker “A”

	Age of worker "A"	Probability of starting (to receive) pension benefit	Pension benefit per year(\$)	Life expectancy (years)	Pension Fund (\$)
t	50			25	150000
t+10	60	30%	15000	15	201600
t+15	65	60%	20000	10	233700
t+20	70	10%	30000	5	270900

Assume that worker “A” works for Enterprise “B” and that A contributes to the National Pension and Employee Pension schemes, two of Japan’s social security funds. Both are operated on a pay-as-you-go basis but are partially funded at present. By analyzing A’s pension entitlement within a defined benefit scheme framework, it is

possible to measure the government’s pension liability. Table 2 shows A’s pension entitlement over time, assuming that the discount rate is 2% and the expected investment return on funds is 3%. We can calculate pension entitlements as ABOs. If we ignore the retirement allowance, pension entitlements can be estimated through simple actuarial mathematics. A will be able to receive the pension benefit from any of 3 dates, when (s)he reaches 60, 65, or 70 years of age. A’s pension entitlement at the beginning of selected years⁵ is shown

⁴ The expected investment return depends on the asset allocation in principle. Amir and Benartzi (1998) explained the important correlation between the rate of investment in shares and the investment return. If actuarial assumptions change, analyzing the influence of the changes, that is “Sensitivity Disclosure”, becomes important (e.g. cost, liability and so on).

⁵ Calculation of the pension entitlement is as follows.

$$\text{Pension entitlement(present value)} = \text{Probability of starting [to receive] pension benefit from age 60} \times \text{Pension benefit per year(\$)} \times \text{Life expectancy(years)} \div (1 + \text{discount rate})^{10} + \text{Probability of starting [to receive] pension benefit from age 65} \times \text{Pension benefit per year(\$)} \times \text{Life expectancy(years)} \div (1 + \text{discount rate})^{15} + \text{Probability of starting [to receive] pension benefit from age 70} \times \text{Pension benefit per year(\$)} \times \text{Life expectancy(years)} \div (1 + \text{discount rate})^{20}$$

in Table 2.

Row number	Position / transaction / other flow	Liabilities do not appear in the core national accounts
		General government Social security pension schemes
Column number	H	
Opening balance sheet		
1	Pension entitlements	154629
	Other economic flows	-5371
8	Revaluations	0
9	Other changes in volume	-5371
Closing balance sheet		
10	Pension entitlements	160000
	Related indicators	150100
	Output	0
	Assets held by pension schemes at end-year	150100

If A's pension entitlement changes over time as shown in Table 3, increases in pension assets from 150000 to 150100 and the pension entitlement from 154629 to 160000 can be identified as other changes in volume.

In fact, there are more than 1.5 million enterprises in Japan now. It is not efficient, therefore, simple to sum up the micro data. In this respect, the Freiburg model, the World Bank's PROST model, and the National model are considered useful models for macro data estimation. Mink, Rodríguez, Barredo and Verrinder (2008) introduce the European approach to calculating pension liabilities. ECB (2009) details experiences

that provide valuable lessons for many other countries. Heidler, Müller and Weddige (2009) explains that the Freiburg model needs four types of data: population data, age-sex-specific pension benefits and aggregated pension expenditures.

4. Treatment of Pension Liabilities in the JFFA

(1) Treatment of employment-related pension funds in the JFFA

The treatment of employment-related pension funds involves a classification problem related to employment compensation. The 2008 SNA recommends the following changes to the 1993 SNA in the case of defined-benefit schemes:

- a) the amount of the employer's contribution should be the increase in the net present value of the pension entitlement which the employee has earned in the period, adding any costs charged by the pension fund for operating the scheme and deducting the amount of any contribution the employee makes;
- b) this amount should be determined actuarially, taking into account only the life expectancy of the employee;
- c) an explicit liability of the pension fund to the employee should be shown in the financial account and balance sheet;
- d) the assets of the fund are then to be regarded as belonging to the fund and not as the belonging to the employee.

In the current JFFA, most of the outstanding amount of the entrusted assets held by pension funds comprises pension reserves or pension fund liabilities. Thus, more attention will have to be paid to actuarial

$$\text{year}(\$) \times \text{Life expectancy}(\text{years}) \div (1 + \text{discount rate})^{15} + \text{Probability of starting [to receive] pension benefit from age 70} \times \text{Pension benefit per year}(\$) \times \text{Life expectancy}(\text{years}) \div (1 + \text{discount rate})^{20}$$

$$= 0.3 \times 15000 \times 15 \div 1.02^{10} + 0.6 \times 20000 \times 10 \div 1.02^{15} + 0.1 \times 30000 \times 5 \div 1.02^{20} = 154629$$

Then, the pension liability at year t of enterprise B is as follows.

$$\text{Pension liability} \hat{=} \text{Pension entitlement} - \text{Pension fund assets} = 154629 - 150000 = 4629$$

calculation of household assets in the JFFA.

In the case that pension funds are insufficiently funded, it is necessary to estimate both the accounts receivable for the pension funds sector and the corresponding accounts payable for nonfinancial corporations and financial institutions; these amounts then need to be added to household assets. In Japan, the number of corporations adopting the IFAS regarding retirement benefit obligations has increased. These corporations calculate their retirement plans on an actuarial basis. Thus, the precise amount of such accounts receivable can be directly derived from companies' individual financial statements. In total, accounts payable to pension funds, i.e. the future shortage of pension funding, is estimated to be approximately 30 trillion yen in Japan at present.

In case of changes in accounts payable to pension funds, the 2008 SNA states that the sum of employers' actual and imputed pension contributions should be treated as a part of employee compensation. More precisely, when compiling the amount of employers' contributions it is necessary to clearly separate "revaluations" from "transactions". If employers are offsetting a funding shortage, then contributions should be recorded as revaluations. On the other hand, if employers' contributions increase the net worth of household pension assets, they should be recorded as transactions, i.e. as employee compensation and financial investments in pension funds.

As a rather exceptional case, if the employer changes the pension scheme so that employees' pension assets can increase, stock changes should be recorded as transactions. In the absence of source data for distinguishing transactions from revaluations, however, the JFFA has no alternative but to treat all stock changes in accounts receivable or payable as revaluations.

(2) Treatment of social security pensions in the JFFA

The 2008 SNA recommends that estimates of social security liabilities be included in a supplementary table instead of the main accounts. Such estimates are calculated out of concern, for example, about benefits possibly exceeding contributions or about the likely worsening of the social security balance in an ageing society. The reason why the estimates are not recorded in the main accounts is that there is no savings element involved for pension participants. In addition, estimates tend to demonstrate a substantial degree of fluctuation as a result of changes to the social security pension scheme of the kind that the government has made. As a result, the reliability of estimates remains relatively low.

In the JFFA, the Social Security Funds sector includes institutions that manage social insurance such as pension insurance, the so-called social security pensions, medical care insurance, employment insurance, and workers' accident compensation insurance. The Japanese pension system for employees consists of three tiers: the Basic Pension, Welfare Insurance, and Employees' Pension Funds. Of these, the first two tiers comprise social security pensions.

For many Japanese corporations, however, employee pension funds, which are classified under pension funds in the financial institutions sector, include both a public pension portion of Welfare Insurance Special Accounts and a private pension portion. There is an argument that the Welfare Insurance portion managed by employee pension funds should be classified under public pensions in the social security funds sector. However, the Welfare Insurance portion is not managed in a segregated account within employee pension funds. Thus, there is no alternative to classifying the whole of employee pension funds in the financial institutions sector.

Mutual Pensions, which are a pension system for civil servants, also include both a social security portion and an employment-related pension portion. Since Mutual Pensions manage the employment-related

portion, there is an argument that Mutual Pensions should be also classified under pension funds in the financial institutions sector. At the same time, these pension funds manage the first tier pension portion for participants aged 65 or above who joined prior to the introduction of the Basic Pension Accounts. The JFFA, then, classifies Mutual Pensions under public pensions in the social security funds sector.

(3) Pensions Liabilities in Social Security Pensions

The difficulty of separating employment-related pension funds and social security pensions appears in estimating the liabilities of social security pensions. In Japan, the Ministry of Health, Labour and Welfare publishes “The 2009 Actuarial Valuation of Employees' Pension Insurance and the National Pension” every five years in line with the National Pension Law. The estimates include social security pension liabilities. This framework is only one of the Japanese government’s systems for calculating pension liabilities.

Tables 4 and 5 describe the balance sheets for social security pensions in fiscal 2009. The Japanese national model depends on two discount rates, the pension asset yield (=4.1%) and the rate of increase in the wage (=2.1%). This model is also sensitive to assumptions on social and economic conditions⁶. Similarly,

Table 4 Balance Sheet of Welfare Pension Insurance in the fiscal year of 2009

Case 1 Discount rate=Pension asset yield = 4.1%

Benchmarkyear of 2009FY	Unit:Trillion Yen	
Contribution Total	1660	Pension Benefit Total 1660
Sum of insurance premiums	1190	Pension Benefit until 2009FY 830
Fund Assets and Investment Return	140	Pension Benefit from 2009FY 830
Fiscal Expenditure:Government responsibility in the future	330	

Case 2 Discount rate=Rate of wage increase=2.1%

Benchmarkyear of 2009FY	Unit:Trillion Yen	
Contribution Total	2720	Benefit Pensioners Total 2720
Sum of insurance premiums	1870	Pension Benefit until 2009FY 1020
Fund Assets and Investment Return	320	Pension Benefit from 2009FY 1710
Fiscal Expenditure:Government responsibility in the future	530	

Reference for “The 2009 Actuarial Valuation of the Employees' Pension Insurance and the National Pension”

Table 5 Balance Sheet of National Pension (NP) in the fiscal year of 2009

Case 1 Discount rate=Pension asset yield = 4.1%

Benchmarkyear of 2009FY	Unit:Trillion Yen	
Contribution Total	220	Benefit Pensioners Total 220
Sum of insurance premiums	90	Pension Benefit until 2009FY 120
Fund Assets and Investment Return	10	Pension Benefit from 2009FY 100
Fiscal Expenditure:Government responsibility in the future	120	

Case 2 Discount rate=Rate of wage increase=2.1%

Benchmarkyear of 2009FY	Unit:Trillion Yen	
Contribution Total	360	Benefit Pensioners Total 360
Sum of insurance premiums	140	Pension Benefit until 2009FY 150
Fund Assets and Investment Return	20	Pension Benefit from 2009FY 210
Fiscal Expenditure:Government responsibility in the future	190	

Reference for “The 2009 Actuarial Valuation of the Welfares' Pension Insurance and the National Pension”

⁶ The population projections published by the NIPSSR(The National Institute of Population and Social Security Research) in December 2006 are used. The rapid population ageing is expected; the ratio of population aged 65 and over to the total population is projected to increase to 40.5% in 2055 from 20.2% in 2005. The labor force projections published by the Japan Institute for Labour Policy and Training (JILPT) in March 2008 are also used as the basis for the valuation. The references are used such as “The Medium- to Long-term Fiscal Policy and an Economic and Fiscal Outlook for the Next Ten Years” by the Cabinet Office in January 2009, about assumptions on certain economic factors. Ministry of Health, Labor and Welfare (2011) explains other input data (ex.Long-term economic assumptions, Introduction of Cobb-Douglas production function, Profit rate and nominal rate of investment return, and so on.

Table 6 provides the balance sheet for mutual pensions (National Public Officers Mutual Aid Association and Local Public Officers Mutual Aid Association). In Case 1 in tables 4, 5 and 6, pension benefits up to 2009

Table 6 Balance Sheet of the Mutual Pensions in the fiscal year of 2009

Case 1 Discount rate=Pension asset yield = 4.1%

Benchmark year of 2009FY

Unit: Trillion Yen

Contribution Total	280.1	Benefit Pensioners Total	280.1
Sum of insurance premiums	196.7	Pension Benefit until 2009FY	173.4
Fund Assets and Investment Return	46.7	Pension Benefit from 2009FY	106.7
Fiscal Expenditure: Government responsibility in the future	36.7		

* This case 1 depends on the rate of wage increase = 2.5% and increase rate of price index = 1.0%. Therefore background data of table 6 are different from them of table 4 and 5.

Reference for "The 2009 Actuarial Valuation of the Employees' Pension Insurance and the National Pension"

amounted to 830 trillion yen for the Welfare Pension, 120 trillion yen for the National Pension and 173 trillion yen for Mutual Pensions. 1,123 trillion yen in total (almost US \$13 trillion in liabilities) should be recorded as pension liabilities in the JFFA in order to conform to the 2008 SNA. This amount appears very significant; total household assets in the current JFFA stood at 1,452 trillion yen at the end of fiscal 2009. To obtain estimates of public pension liabilities more frequently will require existing estimation models to be

developed further.

The same actuarially estimated liabilities for the Welfare Pension and the National Pension used to be recorded by the Ministry of Finance (MOF) in the Japanese Government Balance Sheet every year⁷. The MOF has suspended inclusion of pension liabilities in the core balance sheet of the Japanese Government since fiscal 2006. The estimation of pension liabilities became difficult after the Government of Japan (GOJ) introduced the Macro-Slide (MS) method to the public pension scheme, as a mechanism to keep increases in pension benefits consistent with the rate of increase in the price index. Against the background of such institutional changes in Japan, it might be appropriate to apply the rules of 2008 SNA flexibly as far as pension liabilities are concerned.

Though some researchers consider the actuarial assumptions made by the Ministry of Health, Labour and Welfare (2011) to be too optimistic (suggesting, for example, that the pension asset yield, the rate of increase in the wage, the rate of increase in the price index etc. are too high), 5 year calculations such as those made by the Ministry of Health, Labour and Welfare (2009) are essential for applying the 2008 SNA.

4. Conclusion

In introducing the recommendations of the 2008 SNA, this paper has discussed the concepts behind the recording frameworks used in the JFFA and the JSNA, as well as looking at the estimation methods employed for ESOs and pension entitlements in Japan. With regard to ESOs, there are limitations in the

⁷ New versions of Balance Sheet are only in Japanese. But Old versions are translated at web site MOF. <http://www.mof.go.jp/english/budget/others/bs/index.htm> MS method is an important mechanism to restrain the pension benefit in proportion to the rate of price index.

source data contained in the “Financial Statements Statistics of Corporations by Industry, Quarterly.” Since these data are not calculated at fair value, a rigid application of the 2008 SNA recommendations will be difficult in Japan.

Regarding pension entitlements, Japanese corporations are already publishing pension accounts in line with either the Japanese Standard or International Standards. Thus, there are some data sources within the existing Japanese statistical framework that can be made use of. For example, it is recognized that unfunded employment-related pension funds currently amount to approximately 30 trillion yen in Japan. Meanwhile, it is still difficult to measure social security pension liabilities in a timely manner and with the desirable frequency. The estimates of total social security pension liabilities by the Ministry of Health, Labor and Welfare (1,123 trillion yen in 2009) is published every five years. Such estimate is currently the major source for the JFFA and the JSNA, but there remains a degree of opacity about how such official data are estimated.

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