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Options in National Accounting**

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Abstract

In national accounting, there is a framework consisting of three accounts, flow, stock, and reconciliation between stock and flow. In this framework, income gains in the flow transactions are distinguished from holding gains. However, it is hard to make a clear distinction in some aspects. This paper focuses on retirement benefits and stock options whose treatments have been frequently discussed in business accounting and examines how they should be treated in national accounting.

Recently, in business accounting, liabilities related to compensation, such as actuarial liabilities of retirement benefits and stock options, has been principally evaluated at fair value and some of gains/losses arising from revaluation of these liabilities has been already included in compensation cost. As for retirement benefits, the change in value of actuarial liabilities of defined-benefit pension plans are recorded as compensation cost in Japan's Accounting Standards and Financial Accounting Standards (FAS).¹ As for stock options, the Joint Working Group of Standard Setters in International Accounting Standard Committee (IASC) drafted a paper suggesting that the change in value of stock options during vesting period should be included in compensation cost, though this idea is not yet a majority opinion even in business accounting.

In Japan, the liability amount of defined-benefit pension plans cannot be ignored against the background of rapid aging. It is strongly required that such liabilities should be recorded at fair value in national accounting. However, the way of recording these liabilities is not precisely defined in 93SNA. If national accounting records gains/losses arising from revaluation as compensation of employees as business accounting does, this treatment will be inconsistent with that of gains/losses arising from changes in the benefits structure. In addition, from the practical point of view, this will probably make compensation extremely volatile. Once interest rates increase, actuarial liabilities may decrease rapidly and corporations may get windfall earnings. Considering these factors, it seems better to treat gains/losses arising from revaluation as holding gains.

As for stock options, it is inferred from the statement of 93SNA that the option premium at the grant date should be regarded as compensation of employees. However, 93SNA does not refer to the treatment of gains/losses arising from revaluation either. In the US national accounts, gains arising from revaluation of stock options are widely recognized as compensation of employees.

From the viewpoint of consistency, it is obvious that national accounting should not include gains/losses in compensation costs. This is because the gains/losses of stock options reflect changes in stock prices directly. Our analysis suggests that the total amount of compensation of employees in US will change substantially if stock options granted after the mid-nineties are exercised one after another.

¹ The business accounting standards in the United States.

In summary, it is conceptually desirable, for the sake of consistency under the current SNA, to treat gains/losses arising from revaluation of retirement benefits and stock options as holding gains. Nevertheless, this conclusion is based on consistency and may not focus on the real essence of these liabilities. In a sense, they spotlight the recent actual economy where the distinction between income gains/losses and holding gains/losses are ambiguous. Thus, statisticians and compilers of national accounting should reexamine the concept of national accounting, and at the same time, should disclose detailed data. This will enable users to recompose the data and understand the impact of an alternative approach on the economy even under the present system of national accounts.

Introduction

In 1993, the System of National Accounts (SNA) was revised for the first time in 25 years and the Statistical Commission of the United Nations has recommended the implementation of the new system (93SNA) as an international standard.² On the other hand, in business accounting, accounting standards still vary among countries but the International Accounting Standard Committee (IASC) has been promoting standardization in recent years.

Under these circumstances, when it comes to the valuation of financial instruments, mark-to-market valuation has become popular in many countries. It can be said that the accounting concept of business accounting is getting closer to that of national accounting in which stocks are evaluated based on market price.

Mark-to-market valuation has even influenced the method of measuring compensation cost in business accounting. Actuarial liabilities for retirement benefits are recorded at fair value and losses arising from the change in value are treated as compensation costs in the income statement. As for stock options, a Joint Working Group of Standard-Setters in IASC drafted a paper suggesting that the change in value of stock options during a vesting period should be included in compensation cost, though this is not yet a majority idea. Furthermore, the IASC discussed the idea “employee benefits” such as retirement benefits and stock options should be looked at comprehensively. This is a challenge for national accounting, because fundamental assumption of national accounting is that income gains – including compensation of employees, which are treated as flow transactions, are conceptually distinguished from holding gains, which are treated as reconciliation.

This paper focuses on retirement benefits and stock options, and discusses the treatment of these newly developed “labor liabilities.” The key point is whether national accounting should regard gains/losses arising from the change in value of retirement benefits or stock options as income gains (flow transactions) or holding gains (reconciliation).

We develop our argument as follows. In section 1, the concepts of flow transactions and reconciliation in national accounting are summarized. In section 2, we explain how retirement benefits are recorded under 93SNA and point out the problem in the method of recording internal reserves. In sections 3 and 4, we illustrate two approaches of recording underfunding of pension funds and stock options and, show how a change in recording method has a quantitative effect on macroeconomic statistics, and finally summarize our discussion.

1. Distinction between Transactions and Reconciliation in National Accounting

1.1 Framework of 93SNA

SNA provides an overall view of economic activities by tracing the following accounts (Chart 1): 1. *Production Account* records the production (output) and the use of goods and services when producing this output (intermediate consumption); the balancing

² A comprehensive system of national accounts was first established in 1968 (68SNA).

item is value added. 2. *Distribution of Income Accounts* record the distribution and redistribution of incomes and shows, for sectors that have some final consumption, how disposable income is allocated between final consumption and savings; the balancing item is savings. 3. *Capital Account and Financial Account*³ record transactions linked to acquisitions of non-financial assets and transactions in financial instruments; the balancing item is either net lending or net borrowing. 4. *Reconciliation Account* records changes in assets and liabilities which are due to factors other than the accumulation transactions. 5. *Balance Sheets* display assets and liabilities valued at the end of an accounting period.

In the following context, it is important that “reconciliation” be conceptually distinguished from “flow transactions” in the SNA. Furthermore, a key characteristic of 93SNA is that the reconciliation account is divided into two accounts. *Revaluation Account* records “changes in the value of assets, liabilities, and net worth due to changes in the level and structure of prices, which are reflected in holding gains and losses” (12.2)⁴ and *Other Changes in the Volume of Assets Account*⁵ records other changes in reconciliation account. In addition, holding gains in revaluation account are partitioned into neutral holding gains and real holding gains for analytical purposes. “Real holding gains” are defined as “the value of the additional command over real resources accruing to the holding of an asset as a result of a change in its price relatively to the price of goods and services in general in the economy.” In short, it is “real holding gains” that illustrates the effect of real appreciation in market value on assets and liabilities in 93SNA.

1.2 Distinction between Real Holding Gains and Income Gains

Though real holding gains are clearly distinguished from income gains in 93SNA, there are still questions whether real holding gains should be regarded as equivalent to income gains. This is because, in fact, real holding gains have an influence on the economy and, in concept, can be regarded as implicit transfers of real purchasing power.

In this respect 93SNA describes that “Real holding gains are important economic variables in their own right that need to be taken into account as well as income for purpose of analysing consumption or capital formation. It can be argued that real holding gains ought to be assimilated with income as defined in the System to obtain a more comprehensive measure of income” (12.81). However, 93SNA continues that “there is no consensus on this [opinion]” and “their [real holding gains] impact on economic behavior is not the same as that of income received in cash or in kind” (12.81). The conceptual distinction between real holding gains and income gains is considered to be very important in 93SNA.

³ In Japan’s SNA, capital account and financial account are combined and called as *Capital Finance Account*.

⁴ From “*System of National Accounts 1993*”, the same hereafter.

⁵ Other changes in the volume of accounts are defined as “changes that are due to factors such as discoveries or depletion of subsoil resources, destruction by war or destruction by natural catastrophes” (12.2).

Still, the line between income gains and holding gains is not clear. Income gains are recorded on an accrual basis, and are sometimes imputed even though transactions on a cash basis are not observed. For example, we assume that the interest of zero-coupon bond is credited over the life of the bond and the interest accruing is reinvested in the bond. In this case, the change in value of zero-coupon bond by reinvested is not a holding gain but acquisition of the bond by income gains measured on an accrual basis⁶.

If so, what cases should be imputed as income gains? Recent movements in business accounting raise this problem to the level of national accounting.

1.3 Concept of Employee Benefits and Compensation of Employees

Compensation of employees is recorded at the time “an employee becomes entitled to receive from an employer in respect of work done during the relevant period, whether paid in advance, simultaneously, or in arrears of the work itself”(7.21) in 93SNA. In practice, corporate compensation plans are diverse. Under these circumstances, IASC proposes a comprehensive concept of “Employee Benefits” in IAS19. Employee benefits include not only wages in cash but also wages in kind, receipts from retirement benefit plans, share-based payments, vacations, and so on.

Measuring and recording these benefits is one of the most important issues in national accounting as well as in business accounting. As shown in Chart 2, the SNA of Japan has not recorded compensation of employees on an accrual basis. 93 SNA does not provide clear guidance on these issues either.

We focus on the treatments of retirement benefits and stock options in national accounting in the followings.

2. Treatment of Retirement Benefit in National Accounting

2.1 New Accounting Standards for Retirement Benefits

In June 1998, the Business Accounting Deliberation Council introduced new accounting standards for retirement benefits in Japan, which came into effect from fiscal periods beginning on or after April 1, 2000. The new standards basically follow Financial Accounting Standards 87 (FAS87) and International Accounting Standards 19 (IAS19), and propose that actuarial liabilities of retirement benefit plans must be recorded on an accrual basis and evaluated on a fair value basis.

The new business accounting standards for retirement benefits can be briefly summarized as follows:

1. Actuarial liabilities of retirement benefits are calculated comprehensively. The distinction between internal reserves and external reserves is not connected with the calculation of actuarial liabilities.
2. Actuarial liabilities of retirement benefits are calculated by discounting the benefit obligations to the present value.

⁶ In detail, see the appendix.

3. The difference between actuarial liabilities and pension assets is recorded as “reserves for retirement allowances” in the balance sheet. The amount recognized as “retirement benefit expenses” is the sum of expenses minus the amount of expected return on pension assets.
4. Differences arising from changes in plan amendments or those in assumptions –such as the expected long-term rate of return- could be amortized over a fixed number of years.

These standards are basically consistent with the principle of national accounting in the sense that retirement benefits are measured on an accrual basis and the actuarial liabilities of retirement benefits are evaluated on a fair value basis. Nevertheless, they highlight problems in recording retirement benefits in national accounting.

First, in national accounting, internal reserves must be clearly distinguished from external reserves. Second, in distribution of income account, retirement benefits must be recorded on a cash base. Third, 93SNA does not provide a clear guideline for underfunding of corporate pension plans.

In the next sub-sections, the former two points are discussed (the third point is examined in section 3).

2.2 Internal Reserves and External Reserves

National accounts are expected to provide an overview of the relationship among sectors of the macro economy. When looking at external reserves, the pension funds sector plays an important role as financial intermediary. On the other hand, internal reserves are grasped as a direct relationship between corporations sector and households sector. Thus, 93SNA requires contributions to pension funds to be treated as “employer’s *actual* social contributions” and imputed contributions to internal reserves be treated as “employer’s *imputed* social contributions”.

In practice, however, it is difficult to value an employer’s imputed social contributions. 93SNA notes that “the only practical alternative may be to use the unfunded social benefit payable by enterprises during the same accounting period as an estimate of the imputed remuneration that would be needed to cover imputed contributions”(8.73). This is the case with the SNA of Japan.

It should be noted that this method is appropriate only when plan amendments such as age structure of labor force are almost fixed. As a matter of fact, as it rapid ages, the Japanese economy does not meet the requirements for this approximation. Now that business accounting is introducing new accounting standards, other methods that use residuals between total contributions and contributions to pension funds⁷ should be reconsidered on compiling employer’s imputed social contributions.

2.3 Accrual Recording

While 93SNA regards pension reserves as financial assets held by households, it stipulates that receipts from pension funds on a cash basis are included in *disposable*

⁷ Total contributions are obtainable from financial statements and contributions to pension funds from the data on pension funds.

income of households. This is because “pensioner’s households tend to regard the pensions they receive as income in the form of current transfers”(9.14). To do so, pension contributions recorded as compensation for employees are transferred by households sector to pension funds sector in distribution of income accounts. As a result, the amount of pension contribution has no effect on disposable income. However, this causes an inconsistency with financial accounts in which pension reserves, originating from pension contributions, are held by households sector. To reconcile this, 93SNA introduces an adjustment item.⁸

Receipts from internal reserves are also included in disposable income like those from pension funds. However, 93SNA does not regard internal reserves as liabilities of corporations because there is no clear pool of accumulated assets from which to pay benefits. This treatment needs a further complex recording rule which defines imputed contributions to internal reserves as households’ income that is transferred from households to corporations immediately.

In theory, it is clearer to assume that households acquire financial assets by imputed contributions to internal reserves. In practice, however, the distinction between external reserves and internal reserves is becoming unclear in Japan⁹. Thus, the method of recording internal reserves in national accounting must be reexamined.

3. Treatment of Underfunding of Pension Funds

3.1 Actual Condition of Underfunding in Japan

As new accounting standards for retirement benefits were introduced, the underfunding of corporate retirement benefit plans has drawn the attention of economists and analysts. Regarding the underfunding of pension funds, 93SNA takes a very optimistic view; “if the plan is under-funded, there is some expectation that the situation is temporary, typically by adjusting contributions” (13.78).

The situation, however, is very serious in Japan, partly because the underfunding of internally reserved benefit plans, for which there were no reserves in accordance with actuarial calculations, is added to that of pension funds. Some studies show that the amount of underfunding is more than 40 billion yen (Chart 3). New accounting standards will have a serious impact on the activities of corporations from now on. Thus, the treatment of underfunding in national accounts is very important when analyzing the Japanese economy.

⁸ In order to achieve this, it is also necessary to add pension contributions, and subtract pension receipts from disposable income to get a figure for savings that is the same as what it would have been if pension contributions and pension receipts had not been recorded as current transfers.

⁹ In Japan, some companies transferred securities that are accumulated as internal reserves to “retirement benefit trusts” in order to protect the rights of employees to receive their pensions even when the company falls into bankruptcy. In this case, fund management is conducted by companies. Thus, while securities are accumulated externally, this system does not indicate the establishment of new pension funds.

3.2 Recording of Underfunding

The idea of recording under-funding can be classified into two approaches. One records changes in the value of the underfunding as compensation of employees (we call this the “compensation approach”). The other records those as holding gains (we call this the “swap contract approach”). For simplification, we assume that retirement benefit plans are limited to pension plans in the following. Although internal reserves and external reserves must be treated differently, the essence of our discussion remains unchanged.

a. Compensation Approach

The compensation approach is based on the view that underfunding occurs because the amount of contributions to pension funds on a cash basis was insufficient and the recognition for underfunding is considered to be an additional contribution. In this view, underfunding is recorded as follows (Chart 4(2)): 1) underfunding accompanied by changes in the value of pension funds is recognized as compensation of employees; 2) households sector acquires pension reserves from this compensation; 3) pension funds sector holds the rights to collect assets from corporations sector, accounts receivable; 4) corporation sector owes liabilities to pension funds sector, accounts payable.

The compensation approach regards changes in the value of the pension funds as current transfers in distribution of income accounts and as financial transactions in financial accounts.

b. Swap Contract Approach

The swap contract approach is based on the view that when underfunding occurs, actuarial liabilities of pension funds are reevaluated. For example, if the discount rate is lowered, actuarial liabilities increase and the underfunding is recorded. It seems reasonable that corporations are supposed to make an implicit swap contract with pension funds – i.e., corporations guarantee the fixed return to pension funds.

In this view, the under/overfunding corresponds to the market value of the swap contract. The case of underfunding is recorded as follows (Chart 4(3)): 1) pension reserves increase, corresponding to the change in the discount rate; 2) the market value of the swap contract between a corporation and pension fund increases.

The swap contract approach regards changes in the value of pension funds as revaluations of a swap-like contract in revaluation account. They are recorded neither as current transfers in distribution of income accounts nor as financial transactions in financial accounts.

Both approaches have advantages and disadvantages. We must examine closely their consistency within national accounts, their influence on macroeconomic figures, and consistency with business accounting.

From the perspective of consistency in 93SNA, the swap contract approach is desirable. 93SNA suggests that the change in the value of actuarial liabilities that results from changes in benefit structure should be accounted for the other changes in the volume of asset account.¹⁰ It is natural to account the change in actuarial liabilities that result from changes in the discount rate for revaluation account because both the other changes in the volume of asset account and revaluation accounts are parts of reconciliation account as pointed out in section 1.1.

If we look at macroeconomic figures, our concern is that the compensation approach will make compensation of employees too volatile. For example, a study shows that when the discount rate rises from 3.1% to 5.5%, actuarial liabilities decrease by 14 billion-yen, which equals 5% of the compensation of employees (FY1999). Since the discount rate corresponds to market interest rates, these changes in the discount rate are to be expected. Business accounting eases the change in the value of actuarial liabilities by adopting a method where by differences arising from changes in plan amendments or in assumptions are amortized over a fixed number of years. However, this kind of amortization cannot be adopted for national accounts because stocks are evaluated on a fair value basis and the difference in the stock at the end of the last accounting period must be recorded as transactions or in reconciliation account. In addition, the compensation approach regards the decrease of underfunding –or the increase of overfunding- as the decrease in the compensation of employees. It is strange that a change in market interest rates directly affects the compensation of employees.

Nevertheless, the compensation approach is worth considering because it is consistent with business accounting. The new business accounting standards for retirement benefits indicate that retirement benefit expenses are calculated as the sum of expense -including amortization cost of underfunding- minus the amount of expected return on pension assets and are accounted for compensation costs¹¹.

4. Treatment of Stock Options

4.1 Treatment of Stock Options in Business Accounting

An increasing number of companies use stock options as part of their compensation packages. In the U.S., many companies, particularly startup IT companies, are said to have granted stock options in exchange for wages and salaries in the 90s. In Japan, the granting of stock options was permitted in 1997, and the number of companies that grant stock options has been increasing (Chart 5). In fiscal 1999 (FY1999), this number surpassed 400, which is twice as many as that in FY1998. It is undeniable that stock options have influence on macro economic conditions.

However, the treatment of sock options is still unclear even in business accounting. In Japan, business accounting standards for stock options has not yet been

¹⁰ However, this treatment seems to be inconsistent with the treatment of contributions to pension funds recorded as compensations of employees on a cash basis in distribution of income accounts.

¹¹ In U.K. business accounting, service costs are regarded as compensation costs, but interest costs and the amortization cost of underfunding are regarded as financial costs. For details, see FRS17 (Retirement Benefits). This is similar to the swap contract approach.

stipulated. In U.S. business accounting standards, FAS123 recommends that stock options should be recognized as compensation costs on a fair value basis at grant date, but also it allows companies to adopt APB Opinion 25, in which stock options are valued at the difference between the share price at the grant date and the exercise price of the stock option. In fact, few companies have chosen to adopt FAS123 for transactions with employees.

Under these circumstances, a Joint Working Group of Standard-Setters in IASC drafted a paper in October 2000, which suggested that compensation costs should be valued at the fair value of stock options at vesting date (we call this the “G4+1 statement”¹²). This statement pays attention to the fact that a stock option loses its effect if employee quits his or her job during the vesting period. According to this view, compensation for working during the vesting period should be reflected in the compensation for employees.

4.2 Treatment of Stock Options in National Accounting

There is no guideline for stock options in 93SNA. The transferable economic value of stock options is unclear. Some argue that stock options should be regarded as contingent assets. Stock options are not recorded in Japan’s SNA. In the U.S. national accounts (NIPA), only the nonqualified stock option’s value calculated by the difference between the exercise price and the share price at exercise date is included in wages at the time stock options are exercised. In this case, stock options are recorded on a cash basis.¹³

In concept, a stock option is considered to be a kind of financial derivative. The value of a stock option should be recorded as compensation of employees on an accrual basis using an option-pricing formula when a stock option is granted. The idea of recording at grant date is as follows (Chart 6(1)): 1.the fair value of the stock option is recorded as compensation of employees at grant date (distribution of income account); 2.companies issue “warrants” and households acquire these warrants via compensation (financial account).

The critical point is how changes in the value of stock options should be treated. Two approaches can be considered like the treatment of the underfunding of pension funds.

a. Compensation Approach

The compensation approach regards changes in the value of stock options as compensation of employees (Chart 6(2)). The G4+1 statement is considered to be an a

¹² This treatment is proposed by the working group of standard setters that consists of the accounting standard boards of Australia, Canada, New Zealand, the United Kingdom and the United States (G4+1).

¹³ Stock options in the United States are classified into two major types: incentive stock options (ISO’s), which are tax free compensation packages, and nonqualified stock options (NSO’s). The NIPA only record NSO’s as compensation of employees because compensation of employees is estimated based on the statistics regarding income tax in the NIPA.

type of the compensation approach. If we apply the G4+1 statement to national accounting, changes in the value of stock options are treated as compensation of employees for the vesting period and as holding gains after the vesting date.

b. Option approach

The option approach regards changes in the value of stock options as reevaluations (Chart 6(3)). In this approach, compensation of employees is evaluated on the value of the stock options at the grant date suggested in FAS123. In other words, stock options are treated in the same way as ordinary financial derivatives after the grant date.

The difference between the compensation approach and the option approach is important not only for the recording of stock options but also for the whole system of national accounts. The compensation approach has the advantage that “the employee’s services are valued at a price that reflects the performance in the share price achieved at the end of the contract” (G4+1, 5.34). In other words, the compensation approach considers that the value of work after the grant date is reasonably evaluated by the change in the value of stock options after the grant date. Hence, compensation of employees is affected by changes in share prices after the grant date. This view is conceptually inconsistent with the assumption in national accounting that income gains are distinguished from changes in share prices. In this sense, it is impossible to adopt the compensation approach to the current system of national accounts.

The compensation approach seems to focus on a side of real essence of stock options. Stock options are “a means of giving them [employees] a benefit directly related to the performance of the share price that results from –or at least coincides with- their effort”(G4+1, 5.34). The option approach cannot highlight this characteristic of stock options. This problem shows how the distinction between income gains and holding gains becomes ambiguous. It may be time to reexamine the “dichotomy” between income gains and holding gains.

4.3 Estimation

In this subsection, for the purpose of grasping the impact of stock options on compensation of employees, we roughly estimate both values of stock options at the grant date and at the end of the accounting period. The calculation is based on the Black-Scholes model, using data compiled from the notes in financial statements.¹⁴

The value of stock options in Japan is shown in Chart 7. The fair value of stock options at grant date is 110 billion yen in FY1999 and at the end of March 2000 it is 330 billion yen. These figures are less than 0.1 % of the compensation of employees throughout FY1999. Therefore, the treatment of stock options in national accounting is of little importance at the moment.

¹⁴ As for the assumptions of the estimations, see footnotes in Chart 7.

In contrast, Chart 8 shows that the fair value of stock options issued in the United States by the Dow Jones Industrial Average 30 members is estimated at grant date to be \$12 billion in 1998. This amount, which reflect only 30 companies and exclude new-born IT companies, corresponds to 0.2 % of compensation of employees in the United States. This estimation indicates that stock options are regarded as an important compensation method in the United States. Furthermore, the fair value of stock options at the end of 1998 is estimated to be \$40 billion. Since share prices in the United States rose during the 1990s, stock options will have a crucial influence on compensation of employees if the compensation approach is adopted. The current treatment of NIPA is similar to the compensation approach although the treatment of the current NIPA is based on cash basis accounting. Hence, it should be noted that the total amount of compensation of employees in the US will change substantially if stock options granted after the mid-1990s are exercised one after another.

Conclusions

This paper focuses on the treatment of retirement benefits and stock options, with reference to the impact of the underfunding of pension funds and stock options on the compensation of employees. We present two approaches: the compensation approach which regards changes in the value of pension funds or stock options as compensation of employees and the swap contract approach or option approach which regards them as holding gains. Though business accounting has evolved in line with the compensation approach, this approach is inconsistent with the current SNA. It is conceptually desirable to adopt a swap contract approach or option approach in national accounting.

Still, however, the compensation approach is a way to highlight a side face of real essence of the underfunding and stock options that the swap contract approach or option approach cannot focus upon. In a sense, they focus on the actual economy where the distinction between income gains/losses and holding gains/losses has blurred. It seems that the “dichotomy” between income gains and holding gains itself should now be reexamined.

The System of National Accounts is a multi-purpose system and when compiling national accounts, we should respect the consistency of the system. In this sense, we cannot adopt the compensation approach unless the system is comprehensively revised. Even so, when investigating developments in the real economy, statisticians and compilers of national accounts should continue to consider the concept of national accounting. At the same time, they must endeavor to disclose detailed data for users and indicate the impacts on the economy that would be caused by alternative approaches. This will enable them to recompose the data and understand the impact of an alternative approaches on the economy even under the present system of national accounts.

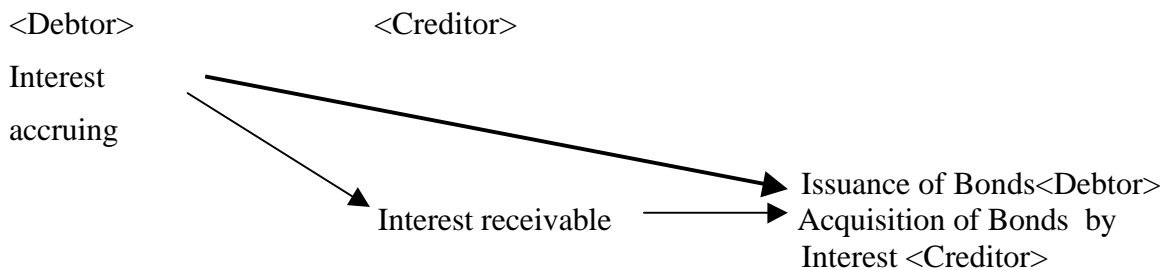
Appendix: Recording the Accrual of Interest on Zero-Coupon Bonds

1. Treatment of Zero-Coupon Bonds

Zero-coupon bonds are sold at prices substantially lower than prices that are redeemed on maturity. Although zero-coupon bonds do not entitle holders to fixed or variable money income, the balance between the issue price and the redemption price is regarded as the value of interest over the life of the bond in 93SNA.

2. Accrual of Interest and Reinvestment

To understand the treatment of a zero-coupon bond in 93SNA, consider the case when a five-year bond with a face value of 100 yen is issued at the price of 80 yen. The balance between the issue price and the redemption price is distributed over time until its maturity as interests accruing every year. This interest is supposed to be effectively reinvested in the bond by its holders because the interest is not paid to the holder on a cash basis. In this case, the effective interest rate endogenously calculated is about 4.5 percent and interests is increased year after year.



Interest Accruing¹⁵

Year		1	2	3	4	5
Cash Flow	-80	0	0	0	0	100
Interests		3.65	3.82	3.99	4.17	4.36
Price of the Bond	80	83.65	87.47	91.46	95.64	100.00

3. Debtor Approach and Creditor Approach

Under 93SNA, how do we calculate interest when market interest rates are changed? There is no consensus in this point and two approaches are proposed: the “Debtor Approach” and the “Creditor Approach.”

¹⁵ In this paper, we calculate an effective interest rate as a continuous composition interest.

The debtor approach calculates the interest by the effective interest rate that is decided at the time the bond is issued. In this view, despite revaluation of the bond price, the value of interest is fixed.

The creditor approach calculates the interest by the current effective interest rate that changes along with market interest rates. In this view, when market interest rates are changed, both the value of stocks and interest are reevaluated.

Consider a case when the market interest rate drops from 4.5% to 3.5% and the price of a zero-coupon bond rises to 90 yen two years after the issuance of the bond.

Debtor Approach

Year		1	2	3	4	5
Cash Flow	-80	0	0	0	0	100
Interests		3.65	3.82	3.99	4.17	4.36
Holding gains			2.53	-0.77	-0.84	-0.92
Price of the Bond	80.00	83.65	90.00	93.22	96.55	100.00

Creditor Approach

Year		1	2	3	4	5
Cash Flow	-80	0	0	0	0	100
Interests		3.65	3.82	3.22	3.33	3.45
Holding gains			2.53			
Price of the Bond	80.00	83.65	90.00	93.22	96.55	100.00

If we adopt the debtor approach, holding gains/losses are recorded every year after the market interest rate drops even though the market interest rate changes *only once*. In the debtor approach, the sum of holding gains over the life of the bond necessarily results in zero in the end.

On the contrary, if we adopt the creditor approach, holding gains are recorded only when market interest rates drop. This is because the effective interest rates in the creditor approach are lowered to 3.5%. The creditor approach decreases interest accruing instead of recording holding losses as in the debtor approach.

Japan Government Bonds issued on July 20, 1994 are a typical example that illustrates the difference between the debtor approach and creditor approach.

Income Gains and Holding Gains

(Annual rates)

	Yield to Maturity	Debtor Approach		Creditor Approach	
		Income Gains	Holding Gains	Income Gains	Holding Gains
94/4Q	2.78%	3.73%	-0.94%	3.55%	-0.76%
95/1Q	5.95%	3.75%	2.20%	3.40%	2.55%
/2Q	30.94%	3.74%	27.20%	1.72%	29.22%
/3Q	5.36%	3.52%	1.84%	1.48%	3.88%
/4Q	9.48%	3.47%	6.01%	0.92%	8.56%
96/1Q	-4.75%	3.47%	-8.22%	1.36%	-6.11%
/2Q	0.42%	3.51%	-3.09%	1.43%	-1.02%
/3Q	5.18%	3.55%	1.63%	1.10%	4.08%
/4Q	2.93%	3.51%	-0.58%	0.92%	2.01%
97/1Q	2.66%	3.52%	-0.86%	0.73%	1.94%
/2Q	-0.08%	3.54%	-3.62%	0.82%	-0.91%
/3Q	3.38%	3.62%	-0.24%	0.47%	2.91%
/4Q	0.52%	3.59%	-3.07%	0.46%	0.06%
98/1Q	0.77%	3.59%	-2.82%	0.40%	0.36%
/2Q	0.44%	3.62%	-3.18%	0.39%	0.05%
/3Q	0.40%	3.70%	-3.29%	0.39%	0.01%
/4Q	0.36%	3.69%	-3.33%	0.40%	-0.04%
99/1Q	0.68%	3.73%	-3.05%	0.17%	0.51%
/2Q	0.16%	3.76%	-3.60%	0.20%	-0.04%

4. Conclusions

As shown in the case of this JGB, the debtor approach overestimates interest income and capital losses when market interest rates are lowered. According to the debtor approach, while creditors purchasing this JGB in the second quarter of 1999 received interest at an annual rate of 3.76%, while they suffer holding losses at an annual rate of 3.60%. Japan's SNA actually includes these biases by using the debtor approach.

According to the creditor approach, a creditor receives interest at an annual rate of 0.20% in the second quarter of 1999. The creditor approach is said to record interest reflecting changes in the economic situation and seems to be a reasonable way of recording interests.

In fact, a Joint Working Group of Standard-Setters in IASC drafted a paper¹⁶ in December 2000 suggesting that interest payable/receivable should be calculated using market interest rates. This paper contends that financial instruments should be evaluated on a fair value basis and, for consistency with the fair value evaluation of financial instruments, interest should be also evaluated on a fair value basis. This idea, in concept, is the same as that of the creditor approach.

Still, however, it must be noted that the concept of "interest" in the creditor approach is drastically different from that of the debtor approach. If we adopt the creditor approach, the amount of interest that will be recorded in the future is influenced by changes in market interest rates. In other words, interest is contingent income in the

¹⁶ Joint Working Group of Standard-Setters(2000) "Financial Instruments and Similar Items"

creditor approach.¹⁷ Hence, the change in market interest rates –the change in the price of bonds- brings about not only a change in holding gains but also creates a change in income gains. If we consider the creditor approach to be desirable to measure the economy, we may have to reexamine the “dichotomy” between income gains and holding gains.

¹⁷ If we adopt the creditor approach, the balance between the issue price and the redemption price does not equal the sum of interest over the life of a zero-coupon bond.

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- G4+1 “Accounting for Share-based Payment”, discussion paper, IASC, 2000
- Hagino, Satoru “Distinction between Capital Gain and Income Gain”, IFC Bulletin No.5, 1999
- International Accounting Standards Committee IAS19 “Employee Benefits” IASC, 1998
- International Accounting Standards Committee IAS 39 “Recognition and Measurement of Financial Instruments”, IASC 1998
- Joint Working Group of Standard-Setters “Financial Instruments and Similar Items”, draft, JWSS 2000
- Joice, John and Chris Wright “Calculating the Accrual of Interest on Tradable Debt Securities”, research paper, OECD Working Party on Financial Statistics 2000
- Moylan, Carol “Treatment of Employee Stock Options in the U.S. National Economic Accounts”, presentation paper, OECD Meeting of National Accounts Experts, 2000
- Research and Statistics Department, Bank of Japan “Guide to Japan’s Flow of Funds Accounts” 1999
- United Nations et al. “System of National Accounts 1993”, United Nations, 1993

(Chart 1)

System of National Accounts 1993

(Current Accounts)	Production Account	Production Account	Input-Output Tables
	Distribution of Income Accounts	Allocation of Primary Income Account	
		Secondary Distribution of Income Account	
		Use of Income Account	
(Accumulation Accounts)	Capital Finance Account	Capital Account	
		Financial Account	Financial Transactions (Flow of Funds Accounts)
	Reconciliation Accounts	Revaluation Account	Reconciliation between Flows and Stocks (Flow of Funds Accounts)
		Other Changes in the Volume of Assets Account	
		Others	
(Balance Sheet)	Balance Sheet	Balance Sheet	Financial Assets and Liabilities (Flow of Funds Accounts)

Notes: The names of accounts are those of Japan's SNA.

(Chart 2)

Employee Benefits

	Employee Benefits in Business Accounting	Treatment in Japan's National Account	Notes
Present Benefits in Cash	Wages	Compensation of Employees Wages and Salaries	
Present Benefits in Kinds	Housing Allowance etc Contributions to Health Insurance Society Paid Vacations	Compensation of Employees Wages and Salaries Compensation of Employees Employers' Actual Social Contributions Not Recorded	Vacations are recorded in financial statements only in a few countries.
Future Benefits in Cash	Unfunded Employee Social Benefits Plans Corporate Pension Plans	Compensation of Employees Employers' imputed Social Contributions Compensation of Employees Employers' Actual Social Contributions	Underfundings of retirement benefit plans are not recorded in national accounting.
Future Benefits in Shares	Stock Options	Not Recorded	Standard treatment is not stipulated in business accounting.

(Chart 3)

Underfunding of Pension Funds

Research Institution	LTCBR	NLI Research Institute	Goldman Sachs, Japan
Amount of underfunding	45 trillion yen	43 trillion yen	80 trillion yen
Number of employees	11.7 million	4.89 million	4 million
Discount rate	3.0%	3.1%	2.0%
Surveyed companies	Companies with owner's equity of one trillion yen or more	Companies Listed on All Stock Exchanges	Companies Listed on Tokyo SE

Sources:

LTCBR "SOKEN CYOUSA" November 1998

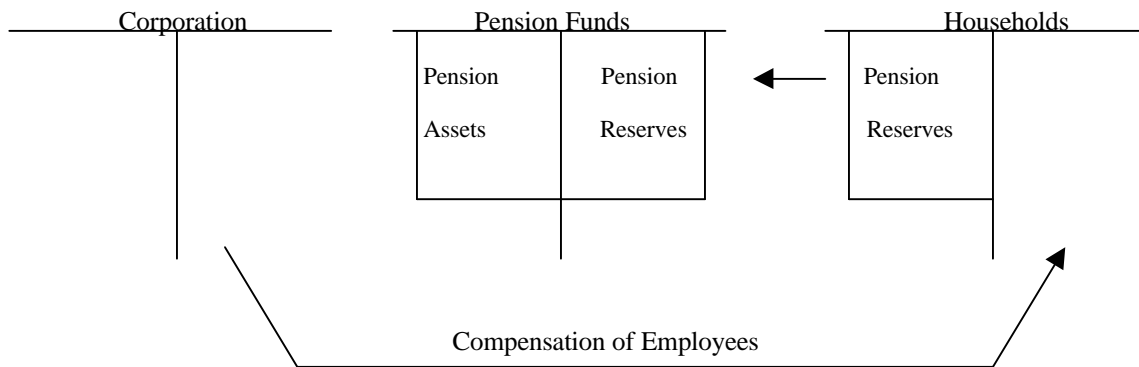
NLI Research Institute "NENKIN Strategy" February 1999

Goldman Sachs, Japan "Portfolio Strategy" October 1998

Notes: Research papers are available in Japanese only.

Treatment of Underfunding

(1) Contribution to Pension Funds (Balance Sheet)

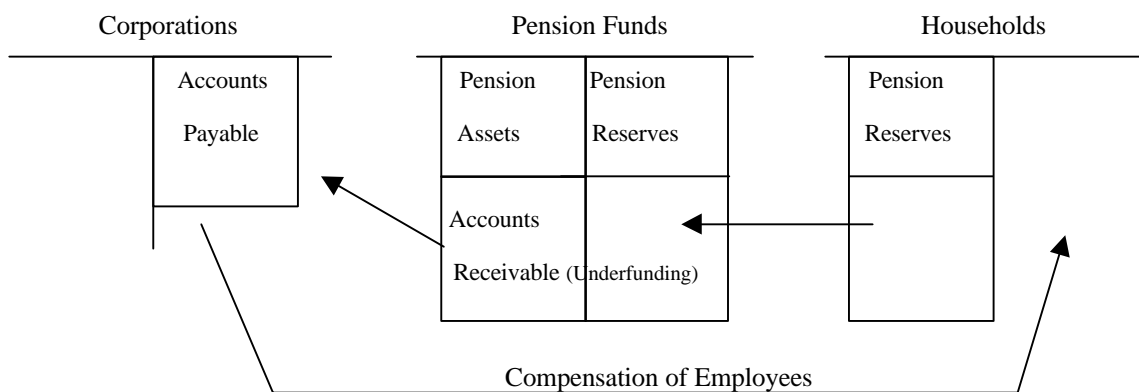


(Financial Account)

Pension reserves are recorded as the increases of household assets and pension funds liabilities. The amount of the increase equals the increase of pension assets.

(2) Treatment of Underfunding <Compensation Approach>

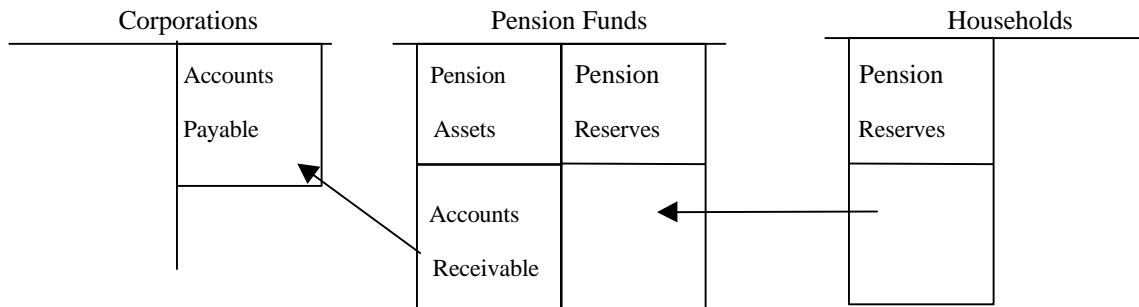
(Balance Sheet)



(Financial Account)

Pension reserves are recorded as the increases of household assets and pension funds liabilities. The underfunding is recorded as accounts payable/receivable.

(3) Treatment of Underfunding <Swap Contract Approach>
 (Balance Sheet)



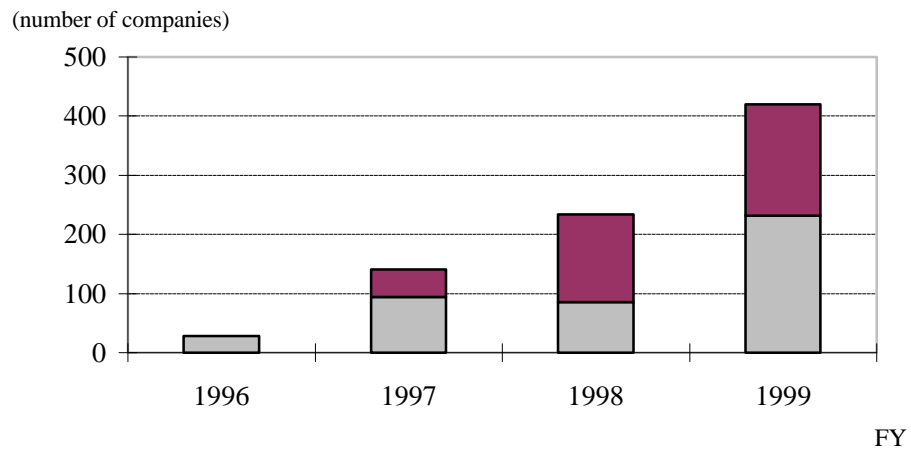
(Financial Accounts)
 Not Recorded

(Reconciliation Account)

Pension reserves are recorded as the increases household assets and pension funds liabilities. The underfunding is recorded as accounts payable/receivable.

(Chart 5)

Developments of the Grant of Stock Options in Japan



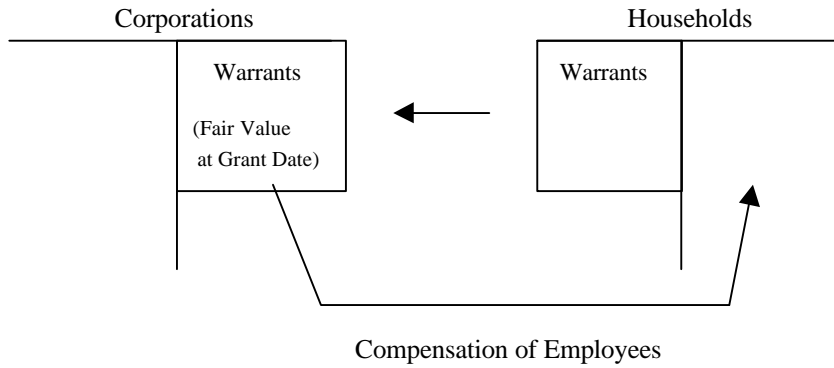
Sources:

DAIWA SMBC “sutokku opusyon dounyu happyou gaisya (announcement of companies introducing stock option)” 20 November 2000 (Japanese only)

Notes: Multiple votes of companies are included.

Recording Method of Stock Options

(1) Grant Date (Balance Sheet)

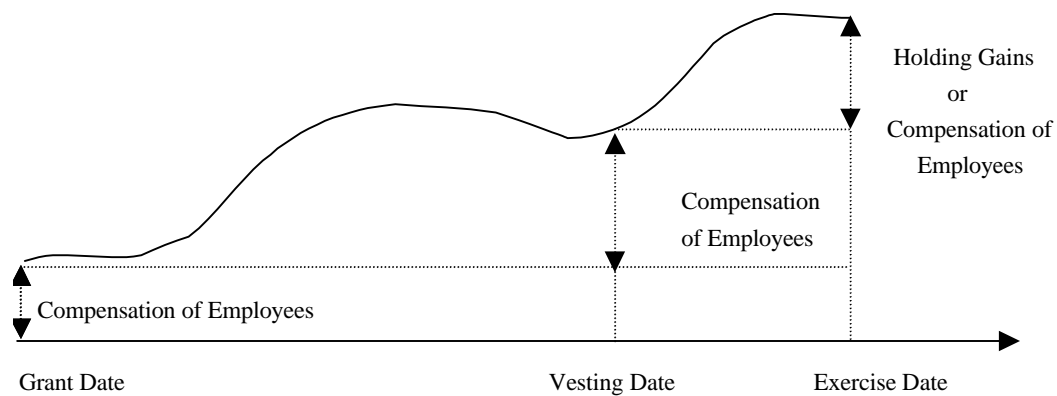


(Financial Account)

Warrants are recorded as the increases of households assets and corporations liabilities.

(2) Compensation Approach

Fair Value of Stock Options



(Financial Account)

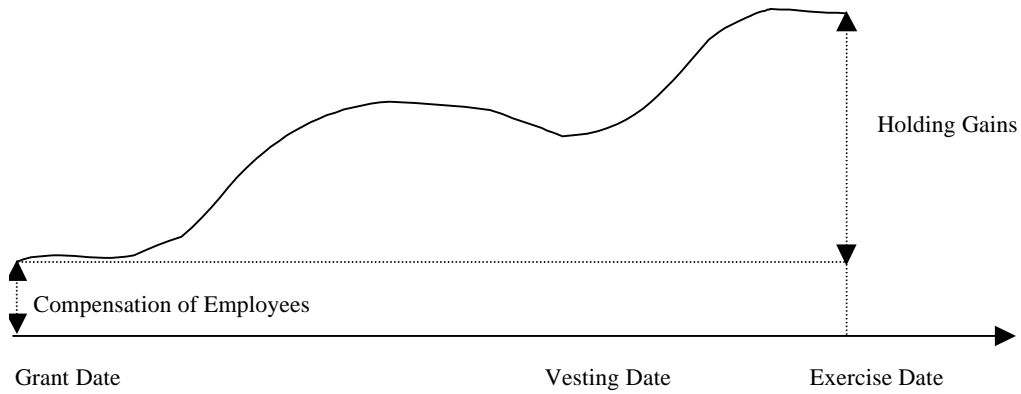
Changes in the value of stock options are treated as the issuance of warrants by corporations and as the acquisition of warrants by households during vesting period.

(Reconciliation Account)

Change in value of stock options are treated as revaluation after the vesting date.

(3) Option Approach

Fair Value of Stock Options



(Financial Account)

Fair value of stock options is recorded as the assets of households and as the liabilities of corporations at the grant date.

(Reconciliation Account)

Change in value of stock options are treated as revaluation after the grant date.

(Chart 7)

Fair Value of Stock Options in Japan

(trillion yen)

	Fair Value at Grant Date	Fair Value at the end of March 2000	Number of companies
FY1997	254.1	224.3	95
FY1998	327.7	1,087.2	145
FY1999	1,094.4	3,331.2	222
FY2000(First half)	1,811.3	-	425

Notes 1. Calculated based on the following assumptions:

Option Pricing Formula	Black-Scholes Model
Amount of option granting	Number recorded in Financial Statements
Risk free interest rates	2%
Volatility	Calculated from share prices during the first half of 2000.
Grant date	The day the grant is announced
Dividend	Not considered

2. Stock options include warrants that are paid to employees as compensations.

Sources:

DAIWA SMBC “sutokku opusyon dounyu happyou gaisya (announcement of companies introducing stock option)” 20 November 2000 (Japanese only)

Commercial Law Center “Commercial Law Review-Data Book” (Japanese only)

IBJ Nikko Information System, Ltd. “Funding Eye”

Financial statement of corporations

(Chart 8)

Fair Value of Stock Options in the United States
-DJIA 30 companies-

(million dollars, %)

	Fair Value at Grant Date	Fair Value at the end of the Year
1996	6,360	77,996
1997	9,988	104,391
1998	11,977	145,049

Notes: Exclude stock options issued by Eastman-Kodak and AT&T.