Key theme
Accounting for post employment benefits

Title
Issues with the Preliminary Views on Amendments to IAS 19 Employee Benefits

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Abstract

This paper indicates the following four major issues with the Preliminary Views on Amendments to IAS 19 Employee Benefits in consideration of economic consistency and the consistency between pension related accounting items and non-pension related accounting items. In particular, this paper demonstrates that inconsistent risk evaluation among accounting items drives corporations to inefficient activities.

1. The line between contribution-based promises and defined benefit promises is blurry, and there is no need to distinguish between the two because of the availability of a consistent and comprehensive approach to the evaluation of pension liabilities through the incorporation of risk-neutral valuation methods.

2. Unlike the preliminary views on contribution-based promises, credit risk should not be considered unconditionally in evaluating pension liabilities in order to be consistent with corporate bonds, borrowings, and other balance sheet debt items.

3. This paper recommends the adoption of ABO instead of PBO for the measurement of pension liabilities, as PBO overvalues liabilities through the inclusion of unrealized future pay raise and evoke regulatory arbitrage.

4. The use of other comprehensive income is indispensable in evaluating profit or loss so that such evaluation is consistent with other accounting items that are never measured by changes in market value, such as rent. If some accounting items are measured by accrual income and others by changes in market value, then the risks of the former will be evaluated as smaller than those of the latter. Therefore, the preliminary views on contribution-based promises and approach 1 for defined benefit promises are not appropriate. This paper shows sample results of the difference in measurement using Divined Discount Models in which dividends have serial correlations.

Keywords
risk, utility, mark-to-market, risk-neutral, International Accounting Standards, employees benefit accounting, dividend discount model, PAAinE, serial correlation, regulatory arbitrage

1. Introduction

This paper indicates the four major issues with the Preliminary Views on Amendments to IAS 19 Employee Benefits (hereinafter, the "DP")[1] published by the International Accounting Standard Board (hereinafter, "the Board") in March 2008, in consideration of economic consistency and the consistency between pension related accounting items and non-pension related accounting items. First, the ambiguity and lack of need for the distinction between contribution-based promises and defined benefit promises is discussed in section 2. Next, the consideration of credit risk in the valuation of pension obligations is examined to be consistent with non-pension related accounting items in section 3. The advantages of ABO over PBO are indicated in section 4. In section 5, we recommend the use of other comprehensive income for changes in the market value of plan assets, because the reflection of market value changes to net income overestimates risks compared with the risks of other accounting items as illustrated by examples using Dividend Discount Models in which dividends have serial correlations.

Before proceeding to our propositions, we state briefly the outline of DP as follow;

(a) Entities should recognize all changes in the value of plan assets and in the post-employment benefit obligation in the financial statements in the period in which they occur(PV2).

(b) The Board does not express a preliminary view on the presentation of the components of post-employment benefit cost in comprehensive income. Instead, the Board outlines three approaches to presentation that illustrate ways in which information about post-employment benefit costs could be presented. The approaches are:

Approach 1: An entity presents all changes in the defined benefit obligation and in the value of plan assets in profit or loss in the period in which they occur.

Approach 2: An entity presents the costs of service in profit or loss. Entities present all other costs in other comprehensive income.

Approach 3: An entity presents remeasurements that arise from changes in financial assumptions in other comprehensive income. Remeasurements arising from changes in financial assumptions are prompted by changes in the discount rate and in the value of plan assets. An entity presents changes in the amount of post-employment benefit cost other than those arising from changes in financial assumptions (e.g. the costs of service, interest cost and interest income) in profit or loss (PV5).

(c) Post-retirement benefits are classified into defined benefit promises and contribution-based promises (PV6). A contribution-based promise is a post-employment benefit promise in which, during the accumulation phase, the benefit can be expressed as:

・the accumulation of actual or notional contributions that, for any reporting period, would be known at the end of that period, except for the effect of any vesting or demographic risk; and

・any promised return on the actual or notional contributions is linked to the return from an asset, group of assets or an index. A contribution-based promise need not include a promised return (PV7)

In principle, the Board thinks that the effect of the credit risk of a liability is relevant information that should be included in its measurement (7.27). An entity should present in profit or loss all changes in the value of the liability for a contribution-based promise and all changes in the fair value of any plan assets (PV15).

2. The Distinction between Contribution-based Promises and Defined Benefit Promises

In this paragraph we first assert the ambiguity of the boundary between contribution-based promises and defined benefit promises, while in the next paragraph we state that the distinction between the two is needless. As one example of this ambiguity, according to section 5.39 and 5.40 of the DP, IASB classifies a lump sum benefit at retirement equal to 5 percent of the average of an

[1] This paper is an expansion of our comment letter to International Accounting Standards Board (Sugita & Omori (2008)).

employee's final three years' salary as a defined benefit promise; however, if a person retires from a company with career average plan after three years' employment, his or her lump sum can be also classified into defined-contribution promises according to section 5.10.

There is no need to distinguish between contribution-based promises and defined benefit promises because of the availability of a consistent, comprehensive approach in the evaluation of pension liabilities through the use of risk-neutral valuation in economic theory. One of the reasons for the distinction by the Board lies in the difficulties in evaluating the liabilities of benefits depending on future prices or interests of commodities in capital markets, such as cash balance plans. The capital asset pricing theory of financial economics can calculate the present value of the benefits depending on the variables of the products traded in capital markets as the arbitrage free value. This method of calculation is called "risk-neutral valuation". Traditionally, the price of assets was calculated by discounting future cash flows arising from the assets. The traditional method discounts future cash flows with a discount rate that includes risk premiums for the stochastic cash flows. Risk-neutral valuation is an alternative method that uses a risk free rate for discounting and overestimates the probability that securities with undesirable risks will have those risks actualized in practice. For example, in the case of stock index futures options, cash flows are stochastic and adequate risk premiums should be estimated using traditional methods. However, it may be difficult to estimate risk premiums. On the other hand, with risk-neutral valuation, the discount rate is set to the risk free rate, and future distribution of stock index futures is estimated by equating the present value of stock index futures to the current price of stock index futures. As the result of this estimate, the probability that stock futures will increase in price is underestimated compared to intuitional anticipation. Discounting with the risk free rate solves the mark-to-market value of options, and the pay off of options is calculated with the adjusted probability distribution of stock index futures. In addition to financial products, liabilities can also be measured with risk-neutral valuation as the mark-to-market value of an investment portfolio that generates congruent cash flows.

3. Consideration of Credit Risk

Credit risk should not be considered unconditionally in the evaluation of pension liabilities in order to be consistent with other accounting items such as corporate bonds and borrowing, which are debt items in the balance sheet. In 7.27 of the DP, the Board postulates that the effect of the credit risk of a liability is relevant information that should be included in the measurement of contribution-based promises. However, consideration of credit risk should be consistent among accounting items. If the financial statements are made without fair value debt accounting, pension liabilities are measured without considering credit risks to be consistent with other accounting items such as corporate bonds and borrowings. If the financial statements are made with controversial fair value debt accounting, pension liabilities are measured considering credit risks to be consistent with other accounting items such as corporate bonds and borrowings. In both cases the treatment of pension liabilities is unrelated to plan categories, contribution-based promises, or defined benefit promises.

In general, we are reluctant to include credit risks for the evaluation of debt accounting items according to fair value accounting because it is more difficult for security analysts to measure risks of the company in the case of decreased debt value as well as decreased assets according to the increase of credit risks. It is easier to regard the value of bonds as a sort of strike price of an option of which underlying asset is the corporate value, than as a dependent variable of varying corporate value[2].

[2] We note in passing that the current practice of including AA-rate bond credit risks in the

4. ABO instead of PBO

Although IASB did not indicate in DP any particular changes to the stipulation of PBO for pension liabilities, we assert that ABO should be adopted instead of PBO for the evaluation of pension liabilities for accounting purposes for three reasons. First, PBO evaluation includes the future unrealized salary increase, which does not exist in other accounting items. Therefore, some companies convert PBO to ABO by freezing the defined benefit pension plans. Thus the overestimation in accounting is canceled out. This can be seen as a kind of regulatory arbitrage operation, and we believe that the prevention of such arbitrage is the social responsibility of influential accountants. Second, the salary increase considered by accountants is one of the probable factors considered by conservative accountants, and contains inflation. Many kinds of assets have the probability of inflationary appreciation, but this appreciation is usually not contemplated in other accounting items except in inflationary accounting. Thus, pension plan liabilities are overestimated compared with other accounting items. Third, under the current global capitalism, M&As are frequently performed, and salary increases are more and more unstable, thus increasing the degree of overestimation. In conclusion, our position is the result of our consideration of the prevention of arbitrage, in the consistency with not adopting the inflationary accounting, and in the current unstable pay raise. Due to the above three reasons, we propose the use of ABO instead of PBO[3].

5. Inappropriate Inclusion of Market Value Changes into Profit or Loss

5.1 Theory

We conclude that the DP's inclusion of market value changes into profit and loss is inappropriate because it is inconsistent with other accounting items that are measured by accrual basis only, such as rent. Choosing approach 1 for defined benefit promises from among the three candidates is particularly inappropriate, as an entity presents all changes in the defined benefit obligation and in the value of plan assets in profit or loss in the period in which they occur, while for "contribution-based promises" an entity presents in profit or loss all changes in the value of the liability for a contribution-based promise and all changes in the fair value of any plan assets. We present the following as an example of this inconsistency. A stock price can be expressed as the present value of future dividends. If you immediately recognize changes in a stock portfolio in pension funds that means, logically, you are recognizing all future changes in dividends of stocks at once. On the other hand, items such as rent are recognized only for one year regardless of any changes in the economic environment. To be consistent with approach 1 for defined benefit promises and with the treatment for contribution-based promises, the sum of future increases in rent should be recognized all at once and should be expressed in the profit or loss; however, no accountant or security analyst would ever do this. From the viewpoint of rent, the immediate recognition of the market changes of the stock portfolio is a kind of overestimation.

Theoretically, there are two approaches to calculating periodic income, and in the long run the total amount thereof is the same with both methods. The first is a method in which periodic income is defined as current earnings – the residual of revenues minus expenses during the period.

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discount rate can be justified under special circumstances in which pension benefits are allowed to be given up under the economic conditions that would cause almost all AA-rate companies to become bankrupt. Our position is contrary to PAAinE (2008), which supports a risk free discount rate.

[3] PAAinE (2008) also proposes the use of ABO instead of PBO.

We call this the "standard method". The second is a method in which the periodic income is defined as the sum of (i) current earnings and (ii) the difference between the present value of the future earnings or market value[4] at the previous settlement date and those at the current settlement date. We call this the "present value method." The present value method recognizes periodic income earlier than the standard method, but as the difference is only in the timing of recognition, in the long run the total amount of periodic income is the same with both methods. The risk (variance of periodic income), however, differs, as the variance of sum of the stochastic variables is larger than the sum of variances of each stochastic variable as long as there is a serial correlation[5] among stochastic variables such as the periodic income. Therefore, the utility of periodic income with the present value method is smaller than that with the standard method.

In general, as projects undertaken by corporations are directly related to periodic income, if these two different methods were lined up side-by-side, with business operations recognized in terms of the standard method and the periodic income of pension is recognized in terms of the present value method, the risk of business operations would be evaluated to be relatively large compared to that of pension management, because future profits usually have positive serial correlations. Risk-averse managers want to diminish risks and as a result will invest more in safer assets, and the cost of the pension will increase. Because of this, some sponsoring companies may abolish their corporate pensions or may impute the risk of pension asset management to ordinary employees for whom the investment is sometimes difficult. In summation, this inconsistency in the recognition of the periodic income affects utility and distorts efficient corporate behaviors. Thus, the use of other comprehensive income is inevitable to disclose the changes of market value separately from the accrued income.

5.2. Illustration with stock models

We will now show an example of the difference in utility of these two alternative methods in calculating periodic income. The example deals with a stock model using the dividend discount model.

5.2.1. Assumptions

First, we formulate the utility U for a corporate manager operating a corporation for n years with a pension fund. Year n is greater than or equal to 2, and n is posited to be 100 or 200, but the dividend discount model allows for an infinite number in cases with a suitable discount rate. Investment in a stock is performed at the beginning of period 1, and the profit e_i is reported at the end of period i from i=1 to i=n. The profit e_i is measured according to two alternative methods: the standard method and the present value method. The manager acquires utility U at the beginning of period 1 depending on the profit,

$$U=\Sigma_{i=1 \text{ to } n}\beta^i\{E(e_i)-\lambda V(e_i)\}$$

where β is the subjective discount rate, λ is a parameter expressing the degree of risk aversion, and $E(\cdot)$ and $V(\cdot)$ are the expected value and variance, respectively. We denote $\Sigma_{i=1 \text{ to } n}$ instead of $\sum_{i=1}^{n}$.

[4] We think the market value will converge to the present value of future earnings.

[5] If there is no serial correlation among periodic incomes, the total amount of variance of periodic incomes is the same with both methods as illustrated in the Appendix.

Second, we provide a stock dividend model. Suppose the dividend d_i for the end of period *i* to be the sum of the previous dividend d_{i-1} (constant *d* for *i*=1) and stochastic variable ε_i. The variables ε_i and ε_j are supposed to be independent of each other, and the mean of ε_i is supposed to be 0 and the standard deviation to be σ_i.
Thus we deduct

$$d_1=d+\varepsilon_1,$$
$$d_i=d_{i-1}+\varepsilon_i,$$

in other words,

$$d_1=d+\varepsilon_1$$
$$d_2=d+\varepsilon_1+\varepsilon_2$$
$$d_3=d+\varepsilon_1+\varepsilon_2+\varepsilon_3$$
$$\cdots\cdots\cdots\cdots$$
$$d_n= d+\varepsilon_1+\varepsilon_2+\varepsilon_3+\cdots\cdots+\varepsilon_n$$

As a result of the process of dividends, we observe a positive correlation for arbitrary dividends of different periods. We adopt this model in consideration of the irrelevance of the trend of dividends to the result of this paper. This model implies the possibility of negative dividends, which is interpreted as a capital increase.

Under the above assumptions, the expected value and the variance of stock dividend d_i for time period *i* (*i*=1,...,*n*) are expressed as follows:

$$E(d_i) = E(d+\varepsilon_1+\varepsilon_2+\varepsilon_3+\cdots\cdots+\varepsilon_i) =d, \quad (1)$$

$$\begin{aligned} V(d_i) &=V(d+\varepsilon_1+\varepsilon_2+\varepsilon_3+\cdots\cdots+\varepsilon_i) \\ &= V(d)+V(\varepsilon_1)+V(\varepsilon_2)+V(\varepsilon_3)+\cdots\cdots+V(\varepsilon_i) \\ &= \sigma_1^2+\sigma_2^2+\sigma_3^2+\cdots\cdots+\sigma_i^2. \end{aligned} \quad (2)$$

As already stated, there are two alternative approaches to measure profit e_i for period *i*, and, in the case of stock investment for pension, the profit e_i with the standard method is the dividends subtracted by expenses, and the profit with present value method is dividends for the current period added to the difference between the current stock price and the ex-rights price of the previous period. Taxes are disregarded for purposes of this discussion.

The recognition of expenses should be treated carefully, as the accrual income varies according to the amortization of investment expenses. For the purpose of comparing alternative measurements of profit, the dependence of accrual income on the amortization scheme is undesirable. Therefore, we determined that a specific amortization schedule of investment expenses to calculate profit with the standard method is consistent with the profit with present value method, as described in detail in section 5.2.3. The amortization scheme is not an issue for the present value method because the investment expense is the market value at the time of purchase of the asset.

5.2.2 The case without time discount

We would first like to show the difference in utility between two alternative methods to measure profit in the case without time discount: the standard method and the present value method.

Therefore, we first suppose that the interest rate and risk premium are both 0 , and β is 1. Because we do not suppose a time discount, the time of the recognition of expense does not influence profit calculations, and under the standard method we recognize total investment expenses in the first period for simplicity reasons. Under these assumptions, the stock price *S* after the first ex-right of period 1 is,

$$S=E(d_1+d_2+d_3+\cdots\cdots+d_n)=nd. \quad (3)$$

This shows that we suppose that the current stock price is the expected value of the sum of the dividends.

As for the standard method, e_1, the profit for period 1, is d_1-*S*, then using (1)(2),

$E(e_1)=d-S=(1-n)d$,

$V(e_1)=V(d_1)=\sigma_1^2$

For values of *i* greater than 1, the expected value of profit is the expected value of dividends for period *i* , therefore from (1),

$E(e_i)=E(d_i)=d$,

The variance of profit is the variance of dividends, and from (2),

$$V(e_i)= V(d_i)=\sigma_1^2+\sigma_2^2+\sigma_3^2+\cdots\cdots+\sigma_i^2.$$

The utility U acquired by the corporate manager is expressed in terms of the expected value and variance at time 0 of the profit arising at each period;

$$U =\Sigma_{i=1 \text{ to } n} \{E(d_i) - \lambda V(d_i)\}$$
$$=\Sigma_{i=1 \text{ to } n} \{d - \lambda\Sigma_{t=1 \text{ to } i} \sigma_t^2\}-nd$$
$$= -\lambda\Sigma_{i=1 \text{ to } n} (n+1-i)\sigma_i^2. \quad (4)$$

On the other hand, as for the profit with present value method, the ex-right stock price of the end of the first period being

$$S_1=E(d_2+d_3+\cdots\cdots+d_n)$$
$$=E(d_1+\varepsilon_2+d_1+\varepsilon_2+\varepsilon_3+\cdots\cdots+d_1+\varepsilon_2+\varepsilon_3+\cdots+\varepsilon_n)$$
$$=(n-1)d_1$$
$$=(n-1)(d+\varepsilon_1),$$

and the stock price at the beginning of period 1 being

$S=nd$,

therefore, the profit of period 1 is

$$e_1=d_1+S_1-S=n\varepsilon_1.$$

Similarly, we can calculate profits for period 2 and beyond:

$$e_2=d_2+S_2-S_1=(n-1)\varepsilon_2,$$
$$\cdots\cdots$$
$$e_n=d_n+S_n-S_{n-1}=\varepsilon_n.$$

Each of the expected profit values is 0, and the variances thereof are

$$n^2\sigma_1^2、(n-1)^2\sigma_2^2、\cdots、\sigma_n^2,$$

Now we calculate the utility;

$$
\begin{aligned}
U &= 0-\lambda 0 \\
&\quad +0-\lambda n^2\sigma_1^2 \\
&\quad +0-\lambda (n-1)^2\sigma_2^2 \\
&\quad +\cdots\cdot \\
&\quad +0-\lambda \sigma_n^2 \\
&= -\lambda \Sigma_{i=1 \text{ to } n}\ (n+1-i)^2\sigma_i^2 \ . \qquad (5)
\end{aligned}
$$

Because *n* is greater than or equal to 2, formula (4) is greater than or equal to formula (5), which means that the utility from the profit with present value method is less than or equal to the utility from the profit with the standard method. The decreased utility is the result of increased variance due to the inclusion of all future variance of future profit estimates in the current profit. The increase of variance derives from changes to profit forecasts in the same direction as the current profit changes.

The model without time discount was able to concisely show the smaller utility of the profit by market value changes compared with the profit by accrual income, but ended up deduct the conclusion of denying stock investment due to the negative utilities. The model without time discount means no risk premiums, leading to a situation in which stock investment is an investment with nothing but risks. This conclusion may be a result of the overly simplistic model, so we will further examine a more realistic model with time discount and risk premiums to explore the profit differential in alternative approaches.

5.2.3. The case with time discount

We developed a model that considers differences in valuation according to time, which was disregarded in the previous section. We made a stock price model according to the traditional approach of summing up future cash flows discounted by a rate that is the sum of the interest rate and risk premiums; namely, we used the dividend discount model, which is more easily understood than the model with stochastic discount factor frequently used to evaluate future contingent cash flows that vary according to state and time. Let *v* be 1/(1+interest rate+ risk premium).

Let us start by determining a recognition of expenses that enables the consistent recognition of two alternative measurement of profit. The profit issues in the standard method lie in the change of discounted value of expenses according to the time of recognition. For the purpose of comparison of two alternative approaches for profit measurement, the recognition of expenses should be determined so as not to cause a difference in the level of the expected profits of alternative methods. Therefore, the expected value of profit by the standard method should be equal to the expected value of profit by market value, because the market value of a stock expressed with the dividend discount model grows according to the discount rate if there is no cash flow in the period. Considering the expected value of dividend is *d*, if we denote expenses by C_i for period *i* and ex-right stock price by S_i, the expected value of profit by accrued income is

$$d-Ci$$

and the expected value of profit by market value change is

$$E(S_{i-1})(1/v-1).$$

We obtained Ci by setting the above two profits equal and solving

$$d\text{-}C_i = E(S_{i-1})(1/v\text{-}1)$$

with respect to C_i.

If we denote the expected value measured at period i by $E_i(\cdot)$,
for $i \neq n$, the ex-right stock price S_i for the end of period i is

$$\begin{aligned} S_i &= vE_i(d_{i+1})+v^2E_i(d_{i+2})+\cdots\cdots+v^{n-i}\,E_i(d_n) \\ &= \Sigma_{t=1 \text{ to } n-i} v^t d_i, \end{aligned}$$

and for $i=n$

$$S_n=0.$$

Therefore, we conclude

$$\begin{aligned} C_i &= d\text{-}E(S_{i-1})((1/v)\text{-}1) \\ &= d\text{-}\Sigma_{t=1 \text{ to } n-i+1} v^t d((1/v)\text{-}1) \\ &= d\{\ 1\text{-}\Sigma_{t=1 \text{ to } n-i+1} v^{t-1}+\Sigma_{t=1 \text{ to } n-i+1} v^t\ \} = v^{n-i+1}d. \end{aligned}$$

Summing up the expense C_i with respect to i,

$$\Sigma_{t=1 \text{ to } n}\, v^{n-i+1}d=\Sigma_{t=1 \text{ to } n} v^t d = S,$$

which coincides the investment value at the beginning of period 1.

We can now calculate the utility of investment in the case of standard method. As the profit e_i is

$$e_i=d_i\text{-}C_i = d_i\text{-}\ v^{n-i+1}d,$$

The expected value of the profit is

$$E(e_i) = d(\ 1\ \text{-}\ v^{n-i+1}\ ), \tag{6}$$

and the variance is

$$\begin{aligned} V(e_i) &= V(d+\varepsilon_1+\varepsilon_2+\varepsilon_3+\cdots\cdots+\varepsilon_i\text{-}\ v^{n-i+1}) \\ &= V(\varepsilon_1)+V(\varepsilon_2)+V(\varepsilon_3)+\cdots\cdots+V(\varepsilon_i) \\ &= \sigma_1^2+\sigma_2^2+\sigma_3^2+\cdots\cdots+\sigma_i^2. \end{aligned} \tag{7}$$

Using these expected values and variances for the profit of each period, we can calculate the utility acquired by a corporate manager as

$$\begin{aligned} U &= \Sigma_{i=1 \text{ to } n}\,\beta^i\{E(d_i)-\lambda V(d_i)\} \\ &= \Sigma_{i=1 \text{ to } n}\beta^i\,[d(1\text{-}\ v^{n-i+1})\ \text{-}\ \lambda\Sigma_{t=1 \text{ to } i}\,\sigma_t^2\ ] \end{aligned}$$

$$=\Sigma_{i=1 \text{ to } n} \beta^{i} d(1- v^{n-i+1})- \lambda \Sigma_{i=1 \text{ to } n}\Sigma_{t=i \text{ to } n} \beta^{t}\sigma_i^2$$
$$=\Sigma_{i=1 \text{ to } n} \beta^{i} d(1- v^{n-i+1})- \lambda \Sigma_{i=1 \text{ to } n}\Sigma_{t=1 \text{ to } n-i+1} \beta^{t-1} \beta^{i}\sigma_i^2 \quad (8)$$

For each *i*, the first term of this formula (the utility from the expected value of profit with stock investment) is positive, showing the attractiveness of stock investment for pension funds because U is larger than 0 if discount v is small enough as a result of a sufficiently large risk premium of the market, and/or if risk aversion λ is small.

Next, we calculate the utility of profit the with present value method. In this case, profit e_i is expressed as

$$e_i=d_i+S_i-S_{i-1}$$
$$=d_i+\Sigma_{t=1 \text{ to } n-i}v^{t}d_i -\Sigma_{t=1 \text{ to } n-i+1}v^{t}d_{i-1}$$
$$=d_{i-1}(1+\Sigma_{t=1 \text{ to } n-i}v^{t}-\Sigma_{t=1 \text{ to } n-i+1}v^{t}) +\varepsilon_i (1+\Sigma_{t=1 \text{ to } n-i}v^{t})$$
$$=d_{i-1}(1- v^{n-i+1})+ \varepsilon_i\Sigma_{t=1 \text{ to } n-i+1}v^{t-1}.$$

Thus the expected value and variance of the beginning of period 1 is

$$E(e_i)=d(1- v^{n-i+1}), \quad (9)$$
$$V(e_i)=(\sigma_1^2+\cdots\cdots+\sigma_{i-1}^2) (1- v^{n-i+1})^2+\sigma_i^2 \{\Sigma_{t=1 \text{ to } n-i+1}v^{t-1}\}^2 \quad (10)$$

respectively, deducting the utility

$$U=\Sigma_{i=1 \text{ to } n}\beta^{i}\{E(d_i)-\lambda V(d_i)\}$$
$$=\Sigma_{i=1 \text{ to } n}\beta^{i}[d(1- v^{n-i+1})$$
$$- \lambda((\sigma_1^2+\cdots\cdots+\sigma_{i-1}^2) (1- v^{n-i+1})^2+\sigma_i^2 \{\Sigma_{t=1 \text{ to } n-i+1}v^{t-1}\}^2)]. \quad (11)$$

Then we prove (8) to be larger than (11), which means that the utility with the standard method is larger than the utility with the present value method. Because we determined the expenses in such as way that the expected value of profit with the standard method is equal to the expected value of profit with the present value method, we only have to compare the terms including variances in the utility formula. We now turn our focus to the difference of variances because the approach to determine expenses does not affect the difference in utility as long as the expected values are identical.

Let ΔV_i be the difference in which the variance for e_i in standard method is deducted from the variance for e_i in present value method. This shows

$$\Delta V_i = (\sigma_1^2+\cdots\cdots+\sigma_{i-1}^2) v^{n-i+1} (v^{n-i+1} -2)+\sigma_i^2 \{\Sigma_{t=1 \text{ to } n-i+1}v^{t-1}\}^2.$$

We can then express the difference in utility as follows:

$$\Delta U = - \lambda \Sigma_{i=1 \text{ to } n} \beta^{i} \Delta V_i$$
$$= - \lambda \Sigma_{i=1 \text{ to } n} \beta^{i}\{(\sigma_1^2+\cdots\cdots+\sigma_{i-1}^2) v^{n-i+1} (v^{n-i+1} -2)+\sigma_i^2 \{\Sigma_{t=1 \text{ to } n-i+1}v^{t-1}\}^2\}.$$

The first term in parenthesis indicates the risk reduction effect because of already realized risks, and the second term expresses the risk increase effect due to the summing up of all future

expected risks at once[6]. Whether ΔU is positive or not depends on the amount of two terms. Let D_i be the terms for σ_i^2 divided by $-\lambda \beta^i \sigma_i^2$.

$D_n=1$ is clear, and for $i \leqq n-1$ we have

$$D_i = \{\Sigma_{t=1 \text{ to } n-i+1} v^{t-1}\}^2 + \Sigma_{t=i+1 \text{ to } n} \beta^{t-i} v^{n-t+1} (v^{n-t+1} - 2).$$

Because $\beta^{t-i} < 1$ and $(v^{n-t+1} - 2) < 0$, we have

$$\begin{aligned} D_i &> \{\Sigma_{t=1 \text{ to } n-i+1} v^{t-1}\}^2 + \Sigma_{t=i+1 \text{ to } n} v^{n-t+1} (v^{n-t+1} - 2) \\ &= \{\Sigma_{t=0 \text{ to } n-i} v^t\}^2 + \Sigma_{t=1 \text{ to } n-i} v^t (v^t - 2) \\ &> 1 + \Sigma_{t=1 \text{ to } n-i} 2v^t + \Sigma_{t=1 \text{ to } n-i} v^{2t} - 2\Sigma_{t=1 \text{ to } n-i} v^t \\ &= 1 + \Sigma_{t=1 \text{ to } n-i} v^{2t} \\ &> 0. \end{aligned}$$

Thus, we can derive $\Delta U<0$, which means the utility from profit with present value method is smaller than the utility with standard method.

Because this paper intends to criticize the DP based on the actual practices, we must note the meaning of the adoption of Dividend Discount Models. Although the stock price in the real market is different from the price calculated with the Dividend Discount Models because of the market inefficiency such as the asymmetry of information, the utility of period income with present value method may be smaller than that with standard method because those market inefficiency will not always offset the difference derived with Dividend Discount Models.

5.3. Numerical Examples

In this section, we evaluate the utility difference with a model sequence of dividends below calculated with mean of dividends of several companies:

fiscal year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
annual dividend(yen)	55	55	70	55	55	55	60	60	60	60

The current dividend is ¥60 per share. The stock price is 2,190.Let *n* be 200, which means the company lasts 200 years. Then we can derive *Rs*, the sum of the interest rate and the risk premium, as a discount rate with which the stock price of ¥2,190 is the market value of future ¥60 dividends. The result of the calculation for *Rs* is 2.74%. Note that we disregard the actual practice of interim dividends[7].The mean and standard deviations of yearly differences of dividends are 0 yen and 8 yen respectively.

Now we determine the parameter λ in the utility function

$$U = \Sigma_{i=1 \text{ to } n} \beta^i \{E(d_i) - \lambda V(d_i)\}.$$

As

$$S_1 = \Sigma_{t=1 \text{ to } n-1} v^t d_1,$$

the variance of income after the one-year holding of the stock is

$$V(d_1+S_1) = (1+v+v^2+\cdots v^{n-1})^2 \sigma_1^2 = (1-v^n)^2/(1-v)^2 \sigma_1^2.$$

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[6] We provide simple numerical example in Appendix 2. to observe the changes of ΔV_i with i.

[7] If the discount rate Rs is calculated considering interim dividends, the value of Rs is 2.6% in the above example.

Let W be the amount held by an investor and the marginal utility of stock holding is equal to risk free rate R_f under the market equilibrium,

$$\frac{\partial}{\partial W}(WE(R_s) - \lambda W^2 V(R_s)^2) = R_f \qquad then$$

$$R_s - 2\lambda WV(R_s)^2 = R_f .$$

Now we have

$0.0274 - 2\lambda (8/2190)^2(1-(1/1.0274)^{200})^2/(1-1/1.0274)^2W = R_f$.

If R_f is 0.5%, λ =0.60235/W.

As for holding one stock, W=2190 causes λ =0.000275.

Using these parameter value as well as assumption n=200、d=60、σ_i=8、β =0.9、v= 1/1.0274, we demonstrate utility with standard method is larger than the utility with present value method. The result for (8) is U=714, and (11) is U=494, which shows the remarkable difference between the two approaches.

5.4. Conclusion of section 5

As shown above, the volatility of profit with the present value method is larger than that with the standard method. Therefore the use of other comprehensive income is indispensable in the evaluation of profit or loss if net income is to be consistent with other accounting items that are never measured by present value method, such as rent. If some accounting items are measured by the standard method, and other accounting items are measured by the present value method, the risk of the former accounting items will be evaluated as smaller than the risk of the latter, which should distort the behavior of plan sponsors.

6. Conclusion

The above argument shows several issues with DP in consideration of economic consistency and consistency among accounting items. This paper in particular demonstrates the possibility of inefficient activities by corporations due to the inconsistency of risk evaluation. We will further investigate the Exposure Draft to be published by IASB this November using the framework of this paper.

References

[1] IASB (2008) *DISCUSSION PAPER Preliminary Views on Amendments to IAS 19 Employee Benefits* ,March

[2] Sugita, K. and Omori, K.(2008) ”Comments on the Preliminary Views on Amendments to IAS 19” ,September 24

[3] PAAinE (Pro-active Accounting Activities in Europe)(2008) *The Financial Reporting of Pensions* ,January

Appendix 1.Equivalence of Utilities of Two Alternative Measurements of Profit in the Case of Dividends without Serial Correlations

For reference purposes, in this section we include the equivalence of utility in two alternative profit measurements, if there are no serial correlations in dividends, contrary to the conclusion developed in 5.2. in the case of dividends with serial correlations. In practice, however, stock dividends have strong serial correlations, meaning that the DP is justified only in the unrealistic world of this appendix.

1. Assumptions

The assumptions are the same as in 5.2.1 except the stock dividend d_i paid at the end of period i(i=1,2,・・・,n)

$$d_i=d+\mu_i \qquad \text{(A1)}$$

where μ_i is a stochastic variable, μ_i and μ_j are mutually independent for $i\neq j$, and the mean and standard deviation of μ_i are 0 and σ_i, respectively. Therefore, there are no serial correlations among dividends for different periods.

The expected value and the variance measured at the beginning of period 1 are

$$E(d_i)=d \qquad \text{(A2)}$$

and

$$V(d_i)=V(\mu_i)=\sigma_i^2 \qquad \text{(A3)}$$

respectively for i=1,2,.....,n.

2. Case without time discount

In this section we explore the case without the time discount, by letting the interest rate be 0, the equity risk premium be 0, and β be 1. As such, the stock price before the payment of dividends for the first period is

$$S=E(d_1+d_2+d_3+\cdots\cdots+d_n)=nd. \qquad \text{(A4)}$$

First, we measure profit e_i using the standard method. For the first period, the invested money is recognized as an expense:

$$E(e_1)=E(d_1-S)=d-S=(1-n)d.$$
$$V(e_1)=V(d_1-S)=V(d_1)=\sigma 12.$$

The profit for *i* more than 1is the dividend

$$d_i= d+\mu_i.$$

The expected value of dividend at the beginning of period *i* is

$$E(e_i)=E(d_i)=E(d+\mu_i) =d.$$

and the variance is

$$V(e_i)=V(d_i)=V(d+\mu_i)= V(\mu_i) = \sigma_i^2.$$

The manager's utility expressed as the sum of expected profit and variance is

$$\begin{aligned} U &= \Sigma_{i=1 \text{ to } n} \{E(d_i) - \lambda V(d_i)\} \\ &= \Sigma_{i=1 \text{ to } n} \{d - \lambda\sigma_i^2\} - nd \\ &= -\lambda \Sigma_{i=1 \text{ to } n} \sigma_i^2 \end{aligned} \qquad \text{(A5)}$$

However, with the present value method, using the stock price just after the payment of dividends at the end of the first period

$$\begin{aligned} S_1 &= E(d_2+d_3+\cdots+d_n) \\ &= E(d+\mu_2+d+\mu_3+\cdots+d+\mu_n) \\ &= (n-1)d, \end{aligned}$$

and the stock price of the beginning of the first period

$$S=nd,$$

we calculate the profit e_1 for period 1:

$$e_1=d_1+S_1-S=d+\mu_1+(n-1)d-nd=\mu_1.$$

We proceed to the next period, and we get

$$\begin{aligned} e_2 &= d_2+S_2-S_1=\mu_2, \\ &\cdots \\ e_n &= d_n+S_n-S_{n-1}=\mu_n. \end{aligned}$$

The expected values of these profits measured at time 0 (the beginning of the first period) are 0, and their variances are

$$\sigma_1^2、\sigma_2^2、\cdots、\sigma_n^2.$$

Thus the utility is

$$\begin{aligned} U &= 0-\lambda 0 \\ &\quad +0-\lambda\sigma_1^2 \\ &\quad +0-\lambda\sigma_2^2 \\ &\quad +\cdots \\ &\quad +0-\lambda\sigma_n^2 \\ &= -\lambda \Sigma_{i=1 \text{ to } n} \sigma_i^2 , \end{aligned} \qquad \text{(A6)}$$

which is equal to the utility of profit with standard method shown in (A5).

3. Case with time discount

In the case of the time discount, even if we suppose that dividends are as given in (A1) above, the suitable value of expenses is still

$$C_i = v^{n-i+1}d,$$

the same as the case in 5.2.3,

The profit e_i with standard method is

$$e_i=d_i-C_i=d_i- v^{n-i+1}d.$$

Thus, the expected value and variance are,

$$E(e_i) =E(d_i) = d(1 - v^{n-i+1})$$
$$V(e_i) =V(d_i) = V(d+\mu_i- v^{n-i+1}) = V(\mu_i) = \sigma_i^2.$$

The utility form the profit with standard method is

$$\begin{aligned} U&=\Sigma_{i=1 \text{ to } n} \beta^i \{E(d_i)-\lambda V(d_i)\} \\ &=\Sigma_{i=1 \text{ to } n}\beta^i [d(1- v^{n-i+1}) - \lambda\sigma_i^2] \\ &=\Sigma_{i=1 \text{ to } n}\beta^i d(1- v^{n-i+1})-\lambda\Sigma_{i=1 \text{ to } n}\beta^i\sigma_i^2. \end{aligned} \qquad (A7)$$

As with the present value method,

$$\begin{aligned} e_i&=d_i+S_i-S_{i-1} \\ &=d_i+ dv(1-v^{n-i})/(1-v) - dv(1-v^{n-i+1})/(1-v) \\ &=d_i +dv (-v^{n-i}+v^{n-i+1})/(1-v) \\ &=d_i +dv (-1+v)v^{n-i})/(1-v) \\ &=d_i -dv^{n-i+1} \\ &=d+\mu_i -dv^{n-i+1}. \end{aligned}$$

Therefore, the expected value and variance of these profits measured at the beginning of period1 are

$$E(e_i)= d(1- v^{n-i+1})$$
$$V(e_i)=\sigma^2,$$

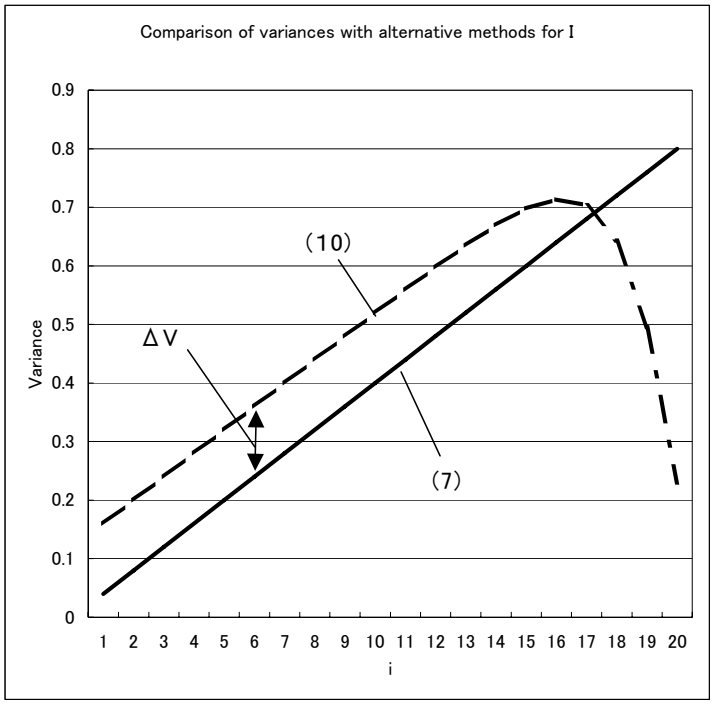
which exactly equal to the expected values and variances of profits with the standard method. Therefore the utility with the present value method is identical to the utility with the standard method (A7).

Appendix 2. Comparison between Variances with the Standard Method and with the Present Value Method

In order to assist in understanding 5.2.3, we provide a simple numerical example to illustrate the difference between variances using the standard method (7) and those using the present value method (10) .

Let n=20、v=0.5、σ_i=0.2 where i=1,2,.....,n, variances with the standard method and present value method for period i calculated as follows:

i	(7) variances with standard method	(10) variacnes with present value method	ΔV ((10)−(7))
1	0.04	0.16	0.12
2	0.08	0.199999	0.119999
3	0.12	0.239998	0.119998
4	0.16	0.279996	0.119996
5	0.2	0.31999	0.11999
6	0.24	0.359978	0.119978
7	0.28	0.399951	0.119951
8	0.32	0.439893	0.119893
9	0.36	0.479766	0.119766
10	0.4	0.519492	0.119492
11	0.44	0.558907	0.118907
12	0.48	0.597659	0.117659
13	0.52	0.63501	0.11501
14	0.56	0.669417	0.109417
15	0.6	0.697676	0.097676
16	0.64	0.713242	0.073242
17	0.68	0.703125	0.023125
18	0.72	0.643125	−0.07688
19	0.76	0.495	−0.265
20	0.8	0.23	−0.57



As stated in 5.2.3., there are two factors in the comparison between variances using the standard method and variances using the present value method. One is the risk reduction factor in the present value method due to already realized risks, and another is the risk increase factor in the present value method due to the summing up of all future expected risks at once. If i is smaller than n, the risk increasing effect is larger than the risk minimizing effect, but if i is large enough such that is approaches n, the risk reduction effect is larger. We have already proved the sum of ΔVi with respect to i to be positive with discount rate β^i, meaning that the present value of variances with the present value method is larger than that with the standard method:

$$\Sigma_{i=1 \text{ to } n} \ \beta^i \ \Delta V_i > 0 .$$

Even though in this example ΔVi is negative when i is large, in practical terms, people will not buy stocks of issuing companies that will cease to exist in the near future, thus $\Delta V_i > 0$ for almost all values of i, meaning that in most cases variance with the present value method is larger than that with the standard method.