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THE RATE LEVEL OF PUBLIC UTILITIES AND INFLATION ACCOUNTING

by

Yukiharu Kurokawa

1. The Focal Point of the Issue:

Presently, the rate level¹⁾ of an electric power company, one of the typical privately-owned public utilities business organizations in Japan, is determined "on the basis of the comprehensive cost that is calculated on the ground of an appropriate cost required for sincere and effective management plus reasonable gains."²⁾ The comprehensive cost here means the total amount of the depreciation of fixed assets for power supply, business expenses, taxes and profit return. The profit return is defined as "the amount to which the rate of return multiplied against the value of truly and effectively fixed assets."²⁾

However, the value of the business assets is calculated on the amount of the book value (under the present system of accounting; that is, historical cost accounting) of fixed assets for power-supply, assets required for construction, and deferred assets, and plus the amount equivalent to the working assets of some 1.5-month business expenses. Furthermore, the rate of business return is fixed at 8% that is assumed to have been set in consideration of standard interest rate in 1950.

Along with recent inflational trends, it has been feared that public utilities corporations will have a very difficult time to keep up with the amount of money necessary for business operations with the rate standards that cover the comprehensive cost calculated on the basis of the above-mentioned historical cost accounting as the public utilities firms are obliged to provide services for a long period of time on a stable level. It is safe to say that the problem concerning the method of calculation for reasonable rates at

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- 1) The problem concerning public utilities rates can be largely divided into two parts; the problem concerning the rate level and the issue in connection with the rate structure. In this paper, attention was focused upon the problem concerning the rate level only in the framework of accounting.
- 2) Manual for the rules of rate calculation. (Issued on March 31, 1950 by the Public Utilities Bureau of the Ministry of International Trade and Industry in its public bulletin 318.)

the time of inflation arised when public utilities rates began to be ruled under the control of certain law-enforcing organizations.³⁾ Furthermore, it is possible to understand this argument concerning the calculation of the rates as a problem coming out of yet-to-be solved issue inherent to accounting fields such as the concept of asset evaluation and capital that should be reserved. In this paper, the system of rate level setting for privately-owned public utilities business is not examined separately from financial accounting. It is rather intended to examine the rate level in connection with financial accounting, because the rate level results revenues and the valuation of property and the concept of capital that should be maintained determine the calculation method of the amount of cost in relation to the system of accounting.⁴⁾

For further developing the subject of discussion, it is necessary to clarify what kinds of approaches are used. In this paper, we will take the approach of "ultra-decision maker model"⁵⁾ in connection with the issue on the alternative choice of accounting as the issue on the selection of rate level is inclined to be determined on political basis between competing groups. Accordingly, the boundary of the interest groups which are taken into consideration and its selection criteria will be clarified in the first place. Secondly, the attributes that should be considered as the comprehensive accounting system will be clarified and thirdly, an alternative idea that should be adopted in dealing with the selection goal of each attribute will be selected. And then, the outline of the method of calculation for the rate level stemming from the accounting system adopted will be shown.

2. *The Boundary of Interest Groups and their Preferred Goals*

In selecting the rate level system and accounting system connecting with it, it is required to clarify the goals that should be achieved. If there are more than two goals, they should be clarified and if there is a goal that is higher in position than other goals and that rules over the other goals, the process of the selection of alternatives becomes

3) It is the discussion over the argument as to whether the rate base should be set on the basis of the cost of reproduction or of the amount of prudent investment. The cost of reproduction means "the cost required for reproducing the property of public utilities firms under the conditions of depreciated present value." To do so, "business assets must be evaluated in terms of their materialistic value in the first place... and then an adjustment should be made in connection with 'intangible aspects of the value.'" (Kita [6], p.171.) In the prudent investment, on the other hand, "the things that those who invested in public services are not specified assets in tangible or intangible forms but they are regarded as capital ...assuring public utilities firms an opportunity to gain reasonable profit and it almost means the same as such words as 'historical cost, original cost and actual cost.'" (Kita [6], p. 176.)

4) Anthony in his hypothetic study, examined the accounting system that expresses the conditions most closely of a model business organization which is under steady state (the condition under which the organization neither grows nor declines). As a result of the examination, it was concluded that if the rate level is set on the basis of historical cost, the historical cost accounting is most suitable and if the rate level is set on the basis of the current cost, the replacement cost accounting is most suitable. (Anthony [1].)

5) Kurokawa [7], p. 34.

easier like the single goal planning. If there are more than two goals,⁶⁾ it is requested to determine their priority order. That is, it is necessary to determine the coefficient of measurement structure in dealing with utility function.⁷⁾

Now, in considering the boundary of the interest groups that are related to the rate level and the goals of preference, we should first take a look at the meaning and concept of public utilities business organizations. According to Prof. Kita, "the concept of modern public utilities business organizations is rooted in the Mann vs. Illinois case that was brought to the court in 1877 in the United States. And he wrote, "The Supreme Court of the United States in this famous ruling defined that a public utilities firm is an organization that is obliged to pay attention to public interest." The Prof. added that this definition shows the right-duty relation of the public utilities organization, and when its economic activities are subject to this right-duty relation, the organization is defined as a public utilities company.⁸⁾ Gracer once talked about the meaning of a public utilities firm as follows: (1) The organization is obligated to supply, in principle, its services to all of those who request for the services; (2) the organization is obligated to deal with all the clients on equal basis; (3) the organization is obligated to prepare for facilities necessary for providing reasonable and satisfactory services regularly; (4) the provision of public interest strongly depends on the execution of these duties by the public utilities firm; (5) the rates of all these services must be set on equal basis at relatively low price.⁹⁾ In the past, scores of arguments and discussions were being made in connection with the meaning and concept of the public utilities firm, but no definite set of definition has been given.¹⁰⁾ As this paper deals with the privately-owned public utilities firms among the public utilities organizations, we must pay attention to the characteristics of privately-owned sector of business in addition to the characteristics mentioned above.

Keeping the above-mentioned characteristics and the roles theory¹¹⁾ in mind, the main interest groups in this field are classified into the following four categories.

- (1) Consumers – the consumers who are different time to time
- (2) Management

6) According to Prof. Ijiri, "multiple goal" not merely means that there are more than two goals in theory but it means that although each goal can be measured operationally, but there is no single method established to integrate each goal to the measurable upper goal. (Ijiri [5], p. 255.)

7) As typical examples of public utility function, there are multiplicative utility function and additive utility function. (Kurokawa [7], pp. 40–44.)

8) Kita [6], p. 42.

9) Kita [6], p. 43.

10) Prof. Nishikawa wrote; "there have been many kinds of arguments and discussions on the subject of the characteristics of the public utilities firms." And he continued; "ignoring abstractive concept theories, if we look into the concrete characteristics of the public utilities firm, it can be defined as follows: 1) Necessary services that are essentially requested for modern life, 2) in the form of monopolization in each location, 3) through specific network, 4) will be provided constantly or regularly, 5) by making use of public facilities. (Nishikawa [10], p. 41.)

11) According to Nadel, "the two standards for extracting the network of the role system are 1) the difference in the power of domination in connection with bilateral conducts, 2) the difference in the power of dominance over the existing resources and rights. (Kurokawa [7], pp. 45–46.)

(3) Investors – creditors and investors

(4) Employees

Let us consider their preferred goals. First of all, consumers are looking for low rate level in general. We should pay attention to the fact that the time the services are consumed is different from generation to generation like past, present and future. Accordingly, the conflict of interest among each generation in connection with the rate level is observed. Since the conflict between the consumers in the production field and those in the consumption field occurs in relation to rate structure, it will be set aside in this paper. Secondly, the management side is expected to request for setting the rate level at higher point as it is obligated to provide services for a long period of time on stable basis effectively. Another reason why the management side wants to set the level at higher point is that it has to deal with unassured future inflow of income in obtaining the fund for replacement. Thirdly, the investors naturally are expected to request for the profit return that is worth covering the risks of their investment although their recognition about the firm would differ in dimension as their distribution rights of assets are different. Fourthly, the employees look for “appropriate valuation to the quality level of their labor.”¹²⁾

In summary, there is a set of goals to keep providing efficient services for a long period of time on stable basis and the request of share for the necessary capital investment as means of assuring the achievement of the goal. And the business organization is expected to adjust these requests. There is no conflict of interest about the former, but there is the conflict about the latter, which results in the problem of multiple goals.¹³⁾

3. *Attributes that Must be Considered in the Comprehensive Accounting System:*

Because of the difference in view points, there are a variety of methods when one tries to describe about the accounting system. In this paper, I intend to focus on the relation between profit and the capital assets that must be maintained and describe the accounting system on the basis of the following three points; (1) the measure of capital, (2) the valuation of non-monetary assets; and (3) the range of capital to be maintained.^{14), 15)}

3-1. **The measure of capital**

In general, measurement means to determine the relations about attributes between

12) National Electric Power Labor Union Federation “Proposal for the improvement of power rate level system in medium/long range view” Feb., 1977, p. 63.

13) Various concepts in connection with the so-called public utilities rate level issue such as equality in the imposition of public utilities rate, equality in the share of capital, the fair distribution, and the distribution of services among different generations can be understood as the description of the direction set for the purpose of adjusting each conflicting goal of the second step to achieve the first goal.

14) The relation between income and capital is interpreted as follows for a time being:
Income = (The capital at the end of period) – (the capital to be maintained)

15) Capital is defined as the money invested in accounting entity.

different objects or events.¹⁶⁾ In doing so, the tool of measurement is essential. In short, it is required to understand what the tool is to measure something. In the field of accounting which uses a variety of goods and services, the nominal money measure has been widely used as a common tool of measurement as it is measured by the rules of addition. In the nominal money measure, attention was focused upon the exchangeability of money. "It is the amount of goods and services which can be purchased with a given amount of money."¹⁷⁾ However, since no consideration is given to the change of purchasing power of the money in connection with the passing of the time in the nominal money measure, when the purchasing power changes, it does not satisfy the function as the standard for determining the relation which is the basic element as a tool of measurement. The nominal money measure throws the exchangeability that the money has and the standard function as a tool of measurement into confusion. To solve this problem, the purchasing power measure was proposed.

The unit of purchasing power is defined as the amount of goods and services which can be purchased with a given amount of money at one point of period. The purchasing power measure can be classified into the general purchasing power measure and specific purchasing power measure depending on the range of goods and services which are to be purchased with the money in subject. The unit of the general purchasing power is the opposit figures of consumers' price index or GNP deflator. On the contrary, the unit of specific purchasing power is the purchasing power for the business organizations concerned. The unit can be the opposit figure of total investment index or price index by industry. When it is assumed that capital is continuously invested in the assets to which the organization had invested,¹⁸⁾ it is defined as the operating capacity measure.¹⁹⁾ That is to say, the operating capacity measure is the very last form of the specific purchasing power measure. In summary, the measure of capital can be classified into the following groups. (1) Nominal money measure; (2) General purchasing power measure; (3) Specific purchasing power measure (operating capacity measure included).²⁰⁾

16) Stevens' definition of measurement has often been quoted in the field of social science. By Stevens, measurement is defined as the assignment of numerals to objects or events according to rule – any rule". (Yu [14] *p. 170.)

17) Health [4] p. 161.

18) There are three alternative definitions of productive assets; a) the same physical assets possessed by the company, b) the assets to produce the same volume of goods and services in the following year, c) the assets to produce the same value of goods and services in the following year. (Minor changes are added to Sandilands' proposal. [12], Par. 117.) In this paper, it is not limited to the non-monetary assets as above. In order to allow the room for applying the operating capacity measure to the total assets as the very last form of the specific purchasing power; d) the assets to operate the same scale of business conduct in the following year, is added.

19) In usual case, instead of classifying the measure to the nominal money measure and the purchasing power measure (operating capacity measure included) as well did, the concept of the capital to be maintained is grouped into; the capital as nominal money, capital as purchasing power and the capital as operating capacity.

20) For example, if we take a look at the amount of capital investment into such non-monetary assets as land, (1) in the nominal money measure, it is shown by the amount of the original investment, (2) in the general purchasing power measure, it is shown by the amount of money requested for the adjustment of purchasing power and (3) in the operating capacity measure, it is shown in terms of the amount of money equal to the replacement cost. From the change of measure, there naturally are no profit and loss involved.

3-2. Evaluation of non-monetary assets

Several definitions that distinguish between the monetary assets and non-monetary assets have been proposed.²¹⁾ In this paper, we refer to Sandilands' definition of the non-monetary assets as follows. "All assets whose 'value', measured in monetary units, may change may be described as 'non-monetary'."²²⁾ According to Sandilands, there are at least following nine alternative standards besides the historical cost being proposed as the evaluation methods of non-monetary assets.

- (i) The price that would have to be paid at today's date to purchase an asset of the same type as the existing asset (the 'current replacement cost').
 - (ii) The price that would have to be paid at today's date to purchase an asset of the same type as the existing asset *less* depreciation to the extent that the existing asset has been depreciated (the 'written down replacement cost').
 - (iii) The current open market sales value of the asset.
 - (iv) The 'forced sale' value of the asset, ie the amount likely to be obtained for the asset if the asset were put on the market in circumstances unfavourable to the seller.
 - (v) The 'net realisable value' of the asset, ie the amount likely to be realised for the asset *less* the costs likely to be incurred in bringing the asset to the point of sale.
 - (vi) The present value of all expected future earnings from the asset in discounted terms (sometimes called the 'economic value' or 'discounted present value' of the asset).
 - (vii) The 'existing use' value, ie the value of the asset to its owner for its existing purpose.
 - (viii) The 'alternative use' value, ie the value of the asset for a prospective purpose other than the purpose for which it is at present used.
 - (ix) The 'going concern' value, ie the value of the asset to a company on the assumption that the company will continue to trade as a going concern.
- (i) and (ii) above are the current purchase price (iii), (iv) and (v) are the net realisable value and (vi) is the discounted present value. (vii), (viii) and (ix), on the other hand, are descriptions of principles upon which the choice of a basis of valuation may be made. ^{24),25)}

21) As a result of examining and correcting Perry Mason, Jones, ARS No. 6, Sweeney, APB Statement No. 3 and others, Heath defined the meaning of monetary assets as follows; "monetary assets are those assets whose holders gain or lose general purchasing power during inflation or deflation simply as a result of general price-level changes." (Heath [4], p. 172.)

22) Sandilands [12], Par. 87.

23) *Ibid.*, Par. 88.

24) *Ibid.*, Par. 89.

25) The classification of measure of the assets are different from one author to another. According to Edwards Bell's classification, for example, the current purchase price is the current cost in the present entry market or the present cost and the net realisable value are the current value in the present exist market or opportunity cost and the discounted present value is the expected value. (Edward = Bell, Fushimi = Fujimori translated [2], p. 63.)

From the discussion above, the evaluation method of non-monetary assets can be classified into four divisions; namely, (1) the historical cost, (2) the current purchase price, (3) the net realisable value and (4) the discounted present value.

3-3. Domain of capital

The domain of capital means to what extent the assets is included in the capital to be maintained. The maintenance of total capital and the maintenance of stockholders equity are typical examples of it, for example. Besides, we can think of such alternatives as the idea to further classify the contents of stockholders equity and the idea to divide debts into long-term debt and short-term debt and deal with the two types of debts in different treatments. As this issue seems to be directly connected with the entity theory, let us describe the nine classifications of the entity theory by Earnest.²⁶⁾

1. The Proprietary Orientation

- (i) The Traditional Proprietary Theory
- (ii) The Residual Equity Theory
- (iii) The Equity Theory

2. The Pure Entity Orientation

- (iv) The Self-Equity Theory
- (v) The Social Theory

3. The Functional Orientation

- (vi) The Activity Theory
- (vii) The Enterprise Theory
- (viii) The Fund Theory
- (ix) The Commander Theory

The Traditional Proprietary Theory (i) regards a business and the owner are one and the same. The theory regards the business organization as just a means of adding wealth for the owner.

The business assets are seen as being owned by the owners and the business liabilities are therefore liabilities of the owners. The firm's managers are representatives of the stockholders and are presumed to act in their best interests. The objective of the accounting process is to present to stockholders a report which describes the growth in their wealth over a period of time and the amount of their wealth as of a particular point in time. Net income is the measure of the growth in net assets before distribution of assets to the owners in the form of dividends.²⁷⁾ Accordingly, the capital to be maintained is the assets that belongs to the stockholders (group of stockholder unit).

In the Residual Equity Theory (ii), the owners are divided into several groups and it pays attention to the owners of common stocks. "Residual equity" refers to that interest in corporate assets which will absorb the effect upon those assets of any economic event that no interested party has specifically agreed to absorb. The business firm itself does not enjoy income. This "income" to owners is the amount attrib-

26) Earnest [3], Chapter II, pp. 13-14.

27) *Ibid.*, pp. 18-20.

utable to their equity interest after recognition of payments due to all of the senior claimants.²⁸⁾ Accordingly, the domain of the capital to be maintained is the assets of those lower ranking owners, which are common stocks.

The equity theory (iii) recognizes that there are various types of investors having equity in the corporate assets. Since each group contributes assets and has claims against the firm, the balance sheet equation becomes assets equal owners' equity. Income is the measure of growth in assets attributable to investors such that interest, income taxes and cash dividends constitute withdrawals of owners' income, i.e., owners' assets, from the business.²⁹⁾ Accordingly, the range of the capital to be maintained in this theory is the whole assets of the business firm.

The self-equity theory (iv) has as its fundamental premise the notion that the business firm is distinct from investors, both in form and in substance. It assumes that the primary objectives of the firm are survival and growth.

The company is seen as an institution in its own right, holding itself out as a competent party to contract with capital-supplying parties, in the process of securing capital.

This view is maintained because capital will not be returned to stockholders as there is no maturity date. Consequently, the reason a company's shares of stock still have market value is because its transfer is not a transfer of the corpus but merely the right to receive future dividends. The reason outside parties contribute funds to an entity is to earn a return on their investment and not to enjoy a claim against the firm's assets. Unless considerable amount of capital cost is paid (share is also the cost), it becomes impossible to maintain the supplied capital and further supply the capital. Income to the entity is a measure of the growth in assets retained by the business after recognition of payments due to all external parties. Since all such parties have provided some benefit to the entity, payments therefore are costs to the entity.³⁰⁾ According to this theory, the domain of capital to be maintained is the entity – the total assets of the firm.

The social theory (v) views the entity as a social institution. It focuses attention on the business enterprise's role of satisfying the many demands of society including those of investors, employees, creditors, lessors, stockholders, customers, suppliers and the community.

Because enterprise objectives do not coincide with those of its many participants, management decisions are mediative in nature. The accounting process is seen as measuring the contribution of the business entity to society. This is achieved by assessing its operations in terms of its contribution to the flow of output to the community. The format entails measurement by use of a "value added" concept of business income featuring disclosure of its division among the various participants in the organization.³¹⁾ By this theory, the range of the capital to be maintained is the contributed portion of each member of the society to the assets – the total assets of the firm.

28) *Ibid.*, pp. 20–21.

29) *Ibid.*, pp. 22–24.

30) *Ibid.*, pp. 24–27.

31) *Ibid.*, pp. 27–29.

The activity theory (vi) views the business as constituting an activity, namely, an organizational unit created for the purpose of performing certain, specified functions. The activity theory recognizes that there are two mutually exclusive parties involved in the activities of the business enterprise — managers and owners. The owner group is composed of all long-term investors, i.e., both stockholders and long-term creditors. The accounting process has two purposes. For managers, it is necessary to compute the extent of its accomplishments by measuring the success of the enterprise as a productive economic entity. For owners' purposes, income determination involves measurement of the activity's success as a method of doing business.³²⁾ Accordingly, the domain of the capital to be maintained under this theory is the total assets that belong to the company and the assets less short-term liabilities.

In the Enterprise Theory (vii), the creditors to the business firm are regarded that they hold interests or equities as the stock holders have. The interests or equities of creditors (liabilities) are claims against the entity arising from past activities or events which, in the usual case, require for their satisfaction the expenditure of corporate resources. The interests or equities of stockholders represent residual claims to corporate assets. When standing on this basis, it recognizes that the business enterprise enjoys net income and that a portion of that income is enjoyed also by certain "external" groups — stockholders, holders of interest bearing debt and tax collecting agencies of government.³³⁾ Accounting process are determining the enterprise net income and then the net income to stockholders. The domain of capital to be maintained under this theory is the total assets of the business company.

In the Fund Theory (viii), a fund is a collection of assets that has been brought together for some functional purpose. The invariable presence of restrictions applicable to any given fund of assets is recognized as necessarily conditioning management's operation of a fund. It is considered a primary function of accounting to classify such restrictions on assets in a logical and meaningful manner. Accordingly, Income (if there is such concept) is identified the results of operations of a given period of time, the difference between asset inflows not specifically restricted and asset outflows not specifically restricted — a mathematical residual reflecting an enlargement of resources due to operations —.³⁴⁾ In this theory, the domain of the capital to be maintained is the asset itself. In short, it is the total amount of asset that is restricted.

The commander theory (ix) focuses on persons having power to deploy resources over which they have economic control even though such individuals do not happen to own such resources. A "commander" is defined as such a person who merely has control over such resources. Using the concept of a "commander," one can visualize managers, trustees, receivers, liquidators and ministers of government as also filling the role of commanders in their respective professional duties. Accounting thus becomes a matter chiefly of recording, reporting, analyzing and interpreting events relating to resources by commanders at one level to commanders at another level. By the way,

32) *Ibid.*, pp. 30–32.

33) *Ibid.*, pp. 32–34.

34) *Ibid.*, pp. 34–36.

the balance sheet is a statement of accountability reflecting management's handling of economic resources which are provided by various creditors and investors. The right side of the balance sheet becomes a statement dealing with those resources over which certain other (external) commanders have control, i.e., creditors and stockholders. Accordingly, profit is a measure of the growth in economic resources over which management has jurisdiction and for which it is, therefore, a commander,³⁵⁾ and the domain of capital to be maintained is the assets dominated by the management.

So far, the domains of the capital to be maintained were shown in accordance with the classification of entity theory by Earnest. In the above-mentioned classification, the proprietary orientation focuses its attention to the relation between entity and the defined owner groups. And the Pure Entity Orientation distinguishes entity from the interests of any outside interest groups. That is why we could show the domains of the capital to be maintained under these theories relatively with ease. The Functional Orientation, however, pays attention to the function of financial reports that provide information to a wide variety of people who use it. That is one of the reasons why the domain of capital to be maintained is not as clearly defined. Because, the four theories in the Functional Orientation regard that "An entity is not viewed as being owned by any one party, nor is it considered to be divorced from the interests of all parties."³⁶⁾

3-4. Economic income and the three attributes of accounting system:

Economic income is calculated by multiplying a set of discounted rate to the subjective value of the asset that was the discounted present value of the futurely expected realized cash flow. According to Edwards Bell,³⁷⁾ the subjective value V_0 can be described as follows.

$$V_0 = \sum_t^n \frac{D_t}{(1+i)^t} + \frac{M_n}{(1+i)^n} \quad (3-1)$$

Where, D_t : Expected realized operating cash flow at the end of period t

M_n : Expected realized cash flow from sale of assets at the last period of the n period

i : Discount rate that is supposed to be set constant every period

n : The period during which cash flow is expected

If the subjective profit is defined as the amount that can be paid as share allotment without reducing the subjective value during a certain period of time, the expected subjective profit (S_1^a) can be described as follows:

$$\begin{aligned} S_1^a &= V_1 - V_0 = \left(\sum_t^n \frac{D_t}{(1+i)^{t-1}} + \frac{M_n}{(1+i)^{n-1}} \right) - \left(\sum_t^n \frac{D_t}{(1+i)^t} + \frac{M_n}{(1+i)^n} \right) \\ &= V_0 (1+i) - V_0 = iV_0 \end{aligned} \quad (3-2)$$

Eventually, this is the difference between the subjective value at the end of the period and the one at the beginning of the period which both are based on the planning at the beginning

35) *Ibid.*, pp. 36–40.

36) *Ibid.*, p. 30.

37) Edwards Bell, Fushimi, Fujimori translation [2], Chapter 2.

of the period. However, at the end of the period, the expected realized cash flow and discount rate may exchange as a result of adjustment of the planning or improvement of the accuracy of prediction. And so, if the subjective profit expost is defined as the difference between the adjusted subjective value of the end of the period and nonadjusted subjective value of the beginning of the period, the subjective profit expost (S_1^P) can be described as follows:

$$S_1^P = V_1^P - V_0 = \sum_t^m \frac{Dt'}{(1+j)^{t-1}} + \frac{M_m}{(1+j)^{m-1}} - V_0 \quad (3-3)$$

Where, V_1^P : Adjusted subjective value at the end of the period

j : Adjusted discount rate at the end of the period

D_t' : Adjusted expected realized operating cash flow at the end of the period t

M_m : Adjusted expected realized cash flow from sale of assets of the m period

m : The adjusted period during which cash flow is expected

The subjective value V_0 at the beginning of the period in the formula (3-3) is equivalent to the "capital to be maintained." However, since the flow of the expected cash flow is changed, it is debatable if this "capital to be maintained" also has to be changed to the adjusted subjective value V_0' at the beginning of the period.

However, the adjusted subjective value V_0' at the beginning of the period is shown as follows.

$$V_0' = \sum_t^m \frac{Dt'}{(1+j)^t} + \frac{M_m}{(1+j)^m} \quad (3-4)$$

Behind the theory that the subjective value V_0 at the beginning of the period must be regarded as the "capital to be maintained," there is a set of thoughts, that decision makers make a decision at the beginning of the period on the basis that the assets concerned would bring profit in future, the subjective value V_0 at the beginning of the period is the "capital to be maintained."

On the contrary, since V_0 and V_0' are both based on the future plans and expectation and V_0' has an advantage over V_0 in connection with the recentness of information on which the value of assets are determined, the adjusted subjective value V_0' at the beginning of the period can be regarded as the "capital to be maintained." Accordingly, if the windfall gains (or losses) equivalent to the difference between this V_0' and V_0 should be treated as profit (loss) or as the adjustment of the capital depends on the will of the owners of the assets concerned as to whether they feel it necessary to maintain the capital by reinvesting or not. And I agree with this theory.³⁸⁾ The problem concerning the windfall gains as to whether they should be treated as profit or the adjustment of the capital is generated not only in the case like the above that the original investment cost for the assets concerned is not determined, but it occurs even if the

38) Lee [8], pp. 36-39.

original investment cost is determined.³⁹⁾ These are regarded as the inherent problems of the economic income system. Let us now summarize the discussion by connecting the three attributes of the accounting system that have been discussed with this concept of the measurement method of economic income.

(1) About the measure of capital

It is understood that all of (3-1), (3-2), (3-3) and (3-4) use the nominal money measure as a premise. If then they are measured by using the purchasing power measure (including the operating capacity measure), how does it go? If the expected change rate for the purchasing power measure (including operating capacity measure) between the beginning of the period and the t period is supposed to be h_t , and the actual discount rate is set as k , the (3-1) formula may be rewritten as follows:

$$V_0^* = \sum_t^n \frac{Dt}{(1+k)^t(1+h_t)} + \frac{M_n}{(1+k)^n(1+h_n)} \quad (3-5)$$

If we suppose that the purchasing power measure (including the operating capacity measure) alters every period at the constant rate of h ,⁴⁰⁾ the relation between the actual discount rate k and nominal discount rate i is described as follows:

$$1+k = \frac{1+i}{1+h} \quad (3-6)$$

And if the (3-5) formula's h_t is replaced to $(1+h)^t$, and the (3-6) formula is replaced, the (3-5) formula will become as follows:

$$V_0^* = \sum_t^n \frac{Dt}{\left(\frac{1+i}{1+h}\right)^t(1+h)^t} + \frac{M_n}{\left(\frac{1+i}{1+h}\right)^n(1+h)^n} = \sum_t^n \frac{Dt}{(1+i)^t} + \frac{M_n}{(1+i)^n} = V_0 \quad (3-7)$$

From these formulas, we can gain the very natural result that the subjective value at the beginning of one period is equal whether the tool of the measurement is the nominal money measure or purchasing power measure (including the operating capacity measure).

(2) About the evaluation of non-monetary assets

The evaluated amount of non monetary assets at the t period is calculated upon the discounted present value of the expected cash flow after the t period. However, under certainly when there is no subjective goodwill it is equal to the original cost at the beginning of the period.

39) One typical example under this condition is the case when the subjective goodwill at the beginning of the period is 0.

If we assume that M_0 : Total market value of the assets at the beginning of the period, then, subjective goodwill G_0 is: $G_0 = V_0 - M_0$
From the assumption, $G_0 = 0$,
therefore, $V_0 = M_0$.

In short, this is the case when the subjective value at the beginning of the period is the same as the total market value of the assets at the beginning of the period. (Of course, there is a tacit premise that the total of market value at the beginning of the period is equivalent to the original investment cost.)

40) Senjyu, Fushimi [13], pp. 148-149.

(3) About the domain of capital

The following hypothesis can be proposed for the measurement method of economic income. A business firm is distinguished from a wide variety of investors' groups. And the goals of the business organizations are set at the existence and growth of the company itself. The investors' groups are regarded as those who provide fund required for achieving the goals. (For example, the decision whether to obtain necessary capital through the issuance of stocks or bonds or through loan is determined in comparison with the cost of capital or risk that is judged by the firm itself.) For this view, the Self-Equity Theory suits the best when the entity theory that has been described in this section is taken into consideration. Further, the domain of the capital to be maintained is the business firm itself – the total assets of the firm.⁴¹⁾

4. Selection of Accounting System

In Section II, the following two points were described in connection with the main interest groups of privately-owned public utilities firms including consumers, management people, investors, creditors and employees whose interest differ from time to time. Their goals are; (1) the firms concerned keep providing services effectively and stably for a long period of time, and (2) each interest group wishes to reduce its obligation and duty to the minimum possible level. As the first goal, there is no conflict of interest, but as the second goal the conflict of interest exists and adjustment is required. In this section, what kind of accounting system matches to the privately-owned public utilities firms in accordance with each attribute shown in Section III is described.

(1) Measure of capital

Under the present accounting system, it is not possible to maintain the capital which can possibly reproduced according to one theory. One of the reasons why this theory is insisted is attributed to the unstableness of measure along with the change in the purchasing power of money from time to time. For the business organization to be able to keep providing services on stable basis for a long period of time, it is necessary to have a measure that can clarify if the company maintains the capital that can be reproduced or not. Also, it is necessary to have as precise as possible in measuring if the provision of services is being made effectively or not. Accordingly, the measure that reflects the purchasing power of money is better than the nominal money measure.

As mentioned earlier, a wide variety of purchasing power of money can be set between the general purchasing power that is set on the premise of the opposit figure of the GNP deflator that is very close to the purchasing pattern of the whole economy world and the specific purchasing power (ultimately, it is to become the operating capacity measure) that takes the purchasing pattern for the business firm concerned into

41) Whether the structure of capital raising can be included in the measurement method of economic income or not is a very interest problem. For example, from the view point of the entity theory that supports either one of the owner orientations, the domain of the capital to be maintained can be restricted to the shares of the owners for proposing a profit calculation method.

consideration. In the past, there had been discussions on as to what kind of purchasing power is selected. The points of the discussions were: (1) possibility of measurement, and (2) meaningfulness of measurement. If we stand on the possibility of measurement, the general purchasing power measure, which is the opposit figure of the GNP deflator and others, has such advantageous points as that it has been publicly announced for a long period of time and widely accepted by the society, plus it can be used for each business firm in total manner of fashion. On the other hand, the specific purchasing power measure, especially the operating capacity measure, is able to measure only when the products are identical or they can be compared in quantity.⁴²⁾ In addition, even if the hypothesis above is satisfied, if the purchasing patterns of the producing assets change due to the technical advancement, improvement of productivity, etc., the definition of concerned measure will become difficult. If we stand on the meaningfulness of the measurement, the general purchasing power measure that is based on the purchasing pattern of the whole economy becomes meaningless as the purchasing power of the money differs essentially from one entity that uses the money to another. For the request that the capital that can be reproduced is to be maintained, the specific purchasing power measure which reflects the purchasing pattern of the entity itself is superior. By the way, products of the privately-onwed public utilities firms as electric companies or gas companies are identical for a long period of time. And so, the possibility of measurement of the specific purchasing power measure to the privately-onwed public utilities firms is more than that to the common privately-onwed companies.

Furthermore, in considering the second goal of the interest groups that surround the privately-owned utilities industry, there will be no direct conflict of interest concerning the selection of the measure.

Accordingly, the specific purchasing measure is concluded to be the best suited measure of capital⁴³⁾

(2) Evaluation of non-monetary assets

Four evaluation methods of assets were cited in Section III. They were (1) the historical cost, (2) the current purchase price, (3) the net realisable value and (4) the

42) Morita [9], p. 133.

43) If the operating capacity measure is to be used, how to understand the "same production ability" concerning the range of the replacement assets to maintain productive capacity will become a problem. In the footnote 18) in this paper, four descriptions were given in connection with this problem. The definition (b) and (c) take into consideration the fact that in the technology of the assets used and productivity are constantly improved when compared with (a). Plus, the definition (c) takes into consideration the fact that product value of the firm may be increased due to changes of product prices, physical quantity of the product may become stable or be reduced. When the first goal of the utilities company is taken into consideration, quantity of services are requested. Therefore, the definition (b) is most suitable as production capacity. However, the (b) definition is feared to be limited to non-monetary assets only. So, the definition (d) that can be applied to all the assets should be used. Plus, it is assumed most appropriate to assume that the concrete contents for the business capability of the (d) definition should be the same amount of sales capacity for services. (As it is applied to all the assets, it can be measured by using the specific purchasing index that is limited very much in the purchasing patterns.)

discounted present value. When the value of assets that is indicated by these evaluation methods are classified while attention is focused upon the decision making of the entity, the historical cost is the past value for the entity, the current purchase price and the net realizable value show the present value for the entity and the discounted present value shows the future value for the entity. In considering the first goal of privately-owned public utilities business firms, the future value that the company concerned would have to be equal or larger when compared with the present value. Unless the above-mentioned conditions are satisfied, the decisions to keep the assets concerned and to keep providing services are absolutely absurd since it is a privately-owned business organization. Accordingly, in making such decisions, the historical cost that shows the value at one point of the past is considered to be the sunk cost. Therefore, the historical cost must be eliminated from our consideration.

There are two conditions under which the decision to satisfy the goal to keep the assets concerned continuously is made.

- (a) Discounted present value \geq Current purchase price \geq Net realisable value
- (b) Discounted present value \geq Net realisable value \geq Current purchase price

The discounted present value is determined by the cash flow of the future. This cash flow is totally dependent on the rate level to be set. In addition, there are conflicts of interests among each interest group in connection with this rate level. Therefore, it is not suitable to calculate it as the value of asset. On the contrary, the current purchase price and the net realisable value are not directly connected with the interest of each interest group. In order to satisfy the decision making mentioned above, it is necessary to evaluate by the large figure of either the current purchase price or the net realisable value since the larger figure between the two show the value of the assets at the present moment.⁴⁴⁾ (As apparent from the context of this examination process, the conclusion does not generate the conflict of interest among the interest groups surrounding the public utilities business directly. It is considered possible that this conclusion will be accepted by all the interest groups concerned.)

(3) Domain of capital

In Section III, it was concluded that what determines the domain of the capital to be maintained is the problem of what kind of entity theory one stand on. And Earnest's nine accounting entities were shown. The first goal that a privately-owned public utilities firm must satisfy which has been described in Section II can be interpreted as the description of the roles that satisfy the needs of those who compose of a society (consumers, investors, employees, etc.). As the second goal is to recognize the conflict of interest among each member who composes the society and to adjust the conflict, the Social Theory (v) is best suited. According to the Social Theory, the domain of capital that

44) There are two kinds of the current purchase price as mentioned in Section III. If we suppose that the subject of comparison in making a decision is the discounted value of expected cash flow in the remaining useful life, the written down replacement cost (ii) is appropriate. There are three kinds of the net realisable value. Since it is the question that "if the asset is sold at the present moment on the ground that the firm continuously exists as a premise, what would happen?", the current open market sales value of the asset (iii) is most appropriate.

should be maintained is the contributed portion of all the people who construct the society against the assets. According to this theory, the accounting process is the measurement of amount of value added and the distributed amount of value allocated among each member of the society. Through the added value, the efficiency of a business firm is judged and through the amount distributed, adjustment among the interest group is made

Judging from the above-mentioned discussion, the total picture of accounting system can be described as follows:

The specific purchasing power measure is used as measure of capital and the larger amount of either the current purchase price or net realisable value is used as the evaluation of non-monetary asset. The capital to be maintained is the total asset of the firm. As for accounting process, it is composed of the measurement of added value amount and the calculation of its distribution.⁴⁵⁾

5. *Calculation System of Rate Level*

In the previous section, we tried to find out the accounting system that satisfies the goals sought by privately-owned public utilities firms. By using this accounting system, we now propose concrete alternative ideas that determine how to set the rate level.

(Alternative idea I)

To set the rate level so that the value added in each period mentioned in the previous section become equal to the total figure of distributed amount to each member of the group on the basis of following standards.⁴⁶⁾

Personal expenditure: It is to be determined, taking personal expenditures of other

45) The calculation of added value in a strict sense is based on the amount of production, but in this paper, it is based on the amount of sales. Followings are concrete characteristics of the accounting system we've been talking about; (1) Value added is that the revenues calculated on the basis of the specific purchasing measure less material cost and depreciation cost calculated on the basis of the specific purchasing measure. (2) The difference between the amount of the non-monetary assets and the amount of those calculated on the basis of the specific purchasing measure is regarded as the account of variance from valuation. (The current purchase price and the amount calculated on the basis of specific purchasing measure are very close and in the case of the asset investment on facilities, it rarely happens that the net realisable value is larger in amount than the current purchase price. Therefore, the difference concerned will not become very large.) When the depreciation cost and material cost for the period are calculated, the portion concerned of the amount of credit balance in account of variance from valuation is eliminated. (3) The so-called purchasing power losses against the monetary assets calculated on the basis of the specific purchasing power measure, that is to be reflected to the amount of value added. (4) The purchasing power gains in connection with debts are not recognized until the debts are cleared (as long as the total amount of the capital is not reduced). (5) Interest, dividend and taxes as well as public dues are calculated on the basis of the specific purchasing power measure.

46) The total sum of the amount distributed to each member of the interest groups calculated in terms of the specific purchasing power measure is to be made equal to the amount of value added. However, the base of the amount distributed to each member of the interest group is measured by the nominal money used in the actual economic society.

privately-owned business organizations into consideration.

Dividend and interest: It should be set at the level so that investors feel it attractive to make additional investment.

Taxes and public dues: There is a problem as to whether it should pay taxes and public dues as much as other business organizations pay since it is a privately-owned company, or the taxes and duties are pardoned as it is a public utilities firm. This is beyond the boundary of our examination in this paper.

Inner reserve: As the specific purchasing power of the invested capital is considered to be maintained, inner reserve is not required.

(Alternative idea 2 – supplement)

The alternative idea 1 is the model that seeks to achieve the balance of the value added for every period. In addition, as the specific purchasing measure is involved in the model to make it more complex. So, let us take a look at the model that is based on the balance of useful life of the assets for a long period of time and the nominal money measure which is the actual unit of dealing in the economic society.

First of all, the subjective value V_0 of the asset concerned that is determined by discounting the future cash flow set by the rate level should be equal to the market value of the asset. This reason is attributed to the same factors described in Section IV. As long as the discount rate reflects the purchasing power, it gains the same results as measured by the purchasing power when calculated by the (3-6) and (3-7) formulas. So, the specific purchasing power is used for the purchasing power as the reasons mentioned in Section IV and we suppose that its change rate is constant h every period. Also, if the actual discount rate is supposed to be constant k every period, the discount rate i by the nominal money measure is (by rewriting the (3-6) formula);

$$\begin{aligned} 1+i &= (1+k)(1+h) \\ \therefore i &= (1+k)(1+h) - 1 \end{aligned} \quad (5-1)$$

Now, the actual discount rate k is the amount of pure rate of interest plus risk factors. The pure rate of interest “assures the time value of money. In other words, it assures the fact that an individual (in this paper, a business firm) must compensate to the deed to put off consumption from the present moment to future.”⁴⁷⁾ The main factors of risk factors include the money value risk, the financial risk, the business and industry risk, and the management risk, it has been said.⁴⁸⁾ However, in the case of public utilities business, the financial risk, the business and industry risk and the management

47) Scott; Yoshida and others translation [11], p. 131.

48) The money value risk is determined on the basis of the probability of change in the future rate of interest. For example, if the expiration date is put off, the probability of future change in interest rate will become higher and the risk becomes stronger accordingly.

The financial risk is the possibility that either short-term or long-term cash flow of the company become short of the payment to the investors or creditors.

The business and industry risk means the possibility that the limitation to the activities of the business and industry endangers the cash flow of the firm.

The management risk means uncertainty in connection with the ability of the management (Ibid., pp. 133–136.)

risk are very close to 0. Accordingly, in the case of public utilities industry, the risk factors as a whole are very small.

Judging from the discussion above, the alternative idea 2 determines the rate level that assures the income D_t which formulated the following formula of (5-2) on the ground that the discount rate i including both the pure interest rate and the change rate of the specific purchasing power measure as a premise.

$$M_0 = \sum_t^n \frac{D_t}{(1+i)^t} + \frac{M_n}{(1+i)^n} \quad (5-2)$$

Where, D_t : Expected realised operating cash flow at the end of period

M_0 : Total sum of market value of the assets at the beginning of the period

M_n : Expected realised cash flow from sale of assets at the last period of the n period

Now, let us discuss the alternative idea mentioned above. The alternative idea 2 is based on the concept of economic income. Behind the concept of economic income, it is mentioned earlier that there seems to be the Self-Equity Theory. However, the alternative idea 1 and the accounting system are derived from the Social Theory that best suits the privately-owned public utilities industry. It seems to be contradictory, but as the Self-Equity Theory and the Social Theory both are included in the pure entity orientation, when the privately-owned public utilities industry is viewed from the board standpoint of the pure entity orientation, it does not contradict.

Both the alternative idea 1 and 2 use the specific purchasing power measure. The ultimate form of the specific purchasing power measure is the operating capacity measure and with it, the replacement cost of assets are assured. A question may be raised that although the services expected from the assets after the replacement are to be provided to the future consumers, why the present consumers are forced to pay for the replacement capital. However, our intention in this paper is to maintain the specific purchasing power (including the operating capacity measure) of the capital that has been invested to the firm. If the consumers at the time cover the reduced amount of the specific purchasing power for the company capital that is accrued along with the passing of time, the purchasing power of the capital at the time of replacement is naturally maintained and replacement will become possible. In other words, the present consumers are not paying for the increased amount of the future replacement capital, but they are making up the reduced amount of purchasing power for the company capital at the present moment.

Accordingly, both the alternative idea 1 and 2 generate no inequality among different generations in connection with the distribution of services and obligations.

Finally, the difference between the cash income of each period which is a result of the rate level set by the above-mentioned alternative idea 1 and the actual performance forms the portion consumer equity. It is naturally reflected to the change of rate level from the following period, when judging from the Social Theory.

6. Conclusion

The purpose of this paper is to propose the reasonable method of rate level calculation for privately-owned public utilities firms at the time of inflation. To start with, what are reasonable factors for the accounting system of the privately-owned public utilities firms, on the ground that the calculation method of rate level and accounting system are jointly considered, was examined. In selecting the alternative ideas of accounting, the approach taking the "ultra decision maker model" into consideration, was used. And the range of the interest groups surrounding the privately-owned public utilities firms and their preferential goals were clarified first of all. As a result, the goals of the privately-owned public utilities firms were narrowed down to the following two points: (1) To keep providing services effectively and stably for a long period of time, (2) to adjust the conflict of interest in connection with the obligated imposition of necessary capital and distribution among each interest group.

Secondly, the three attributes that should be considered to describe the comprehensive accounting system were cited. They are (1) the measure of the capital, (2) evaluation of non-monetary assets and (3) the domain of the capital to be maintained. And the alternative idea for each attribute were examined. Thirdly, each attribute that shows the comprehensive accounting system in the light of the goals of privately-owned public utilities business above-mentioned was examined. As a result, the followings were selected: (1) the specific purchasing power measure as the measure of the capital, (2) for the evaluation of non-monetary assets, the larger amount of either the current purchase price or net realisable value, (3) as the Social Theory in the entity theory does fit to the domain of the capital to be maintained, the contribution portion of all the member of the society against the assets – the total asset of the company. The characteristics of this accounting system are the measurement of the amount of value added and the measurement of the distribution amount to each member of the society in connection with the value added. On the basis of the accounting system selected through the above-mentioned process, two methods of calculation for the rate level were proposed.

In concluding this paper, let the author clarify the aims of this work. First of all, in proposing the reasonable calculation methods of rate level, it was felt necessary to link the discussion with the accounting system. Secondly, in choosing the comprehensive accounting system, it was felt necessary to try if the ultra decision maker approach in the selection process of alternative accounting ideas was effective or not. Thirdly, what types of attributes should be cited to describe the comprehensive accounting system was a very big issue. The author showed frames of the three attributes namely, (1) measure of the capital, (2) evaluation of non-monetary assets and (3) the domain of the capital to be maintained (entity theory). Fourthly, it was intended that measurement methods of economic income by the above-mentioned frames were interpreted and that the connection with the Accounting measurement were examined.

One of the key issues in this paper was how to understand the measurement by

the specific purchasing power measure that includes the operating capacity measure. It may not be necessary to add the following description, but let us view the interpretation of backlog depreciation from the stand point of the measurement by the operating capacity measure.

7. Supplement: Backlog depreciation and measurement by operating capacity measure:

Let us suppose that the depreciable fixed asset at 100 million in terms of the nominal measure money \$100 million is purchased all at the equity capital at the beginning of one period. No other conditions are set in this proposition. The useful life of this fixed asset is two years and at the beginning of the third year period, it is expected to be replaced.

It is supposed that the purchasing price of the fixed asset concerned goes up 10% annually. Now, this firm in concern gains income by renting this fixed asset. Plus, it is supposed that no other expenditures are imposed except the depreciation cost calculated on the basis of the straight line method at the scrap value of 0. In the case of above, how much income does the company need to continue its operation?

The depreciation cost on the basis of the replacement cost accounting is calculated as follows:

$$\text{End of the first year period: } 100 \times (1 + 0.1) \times \frac{1}{2} = 55$$

$$\text{End of the second year period: } 100 \times (1 + 0.1)^2 \times \frac{1}{2} = 60.5$$

$$60.5 - 55 = 5.5 \text{ (Backlog depreciation)}$$

$$\underline{\underline{121}} \text{ (million dollar)}$$

If the total amount of income at the end of the first year period is \$55 million and at the end of the second year period is \$66 million, the company possesses \$121 million (cash equivalents) at the end of the second year period and it becomes possible to replace the asset. (It can be supposed that the income source is rent only. It also can be supposed that the company can receive interest earned and the interest can be added). In other words, if the backlog depreciation is set at \$5.5 million, the replacement of the asset will become possible.

There is one theory that if the amount of money equivalent to the depreciation value on the basis of the current replacement cost is invested to the fixed asset every year, the maintenance of the capital is possible without applying the backlog depreciation. That is to say, if 1/2 of the fixed asset is purchased with the cash equivalent to depreciation cost of \$55 million at the end of the first year period and the remaining half with the cash equivalent to the depreciation cost of \$60.5 million at the end of the second year period, the same asset are being maintained at the end of the second year period. (It is possible to assume that the fixed asset that was purchased at the end of the first year period is not to start operation and that the fixed asset that was purchased at the beginning of the first year period only is depreciated. Also it is possible

to assume that the 1/2 of the total fixed asset of the fixed assets purchased both at the beginning and at the end of the first year period is depreciated.) Under these assumptions, the backlog depreciation becomes unnecessary.

Now, if we are asked to select the accounting system that enables to maintain the capacity of asset, is it acceptable to choose, whether we use backlog depreciation or not, depending upon the defference in the facility investment plans? If is it acceptable, it becomes impossible to structurize a coherent accounting system.

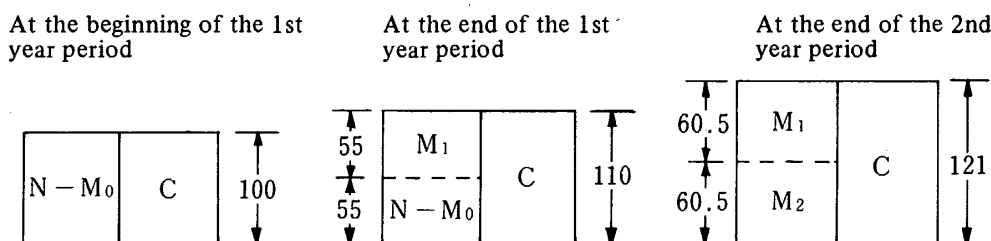
Let us now reinterpret the above-mentioned conditions from the standpoint of the measurement by the operating capacity measure. Capital is regarded as the money invested in entity. And the capital to be maintained is regarded as the purchasing power of the money. As the purchasing power measure, the specific purchasing power measure, especially the operating capacity measure as its ultimate form, is used. Since the decline of the operating capacity unit is 0.1 per year, the capital to be maintained that was measured by the measurement at the end of the first year period is \$110 million and at the end of the second year period is \$121 million. Let us apply this to the two patterns of facility investment mentioned previously.

Where; M_t : Monetary asset gained at the end of the t year period.

$N-M_t$: Non-monetary asset purchased at the end of the t year period.

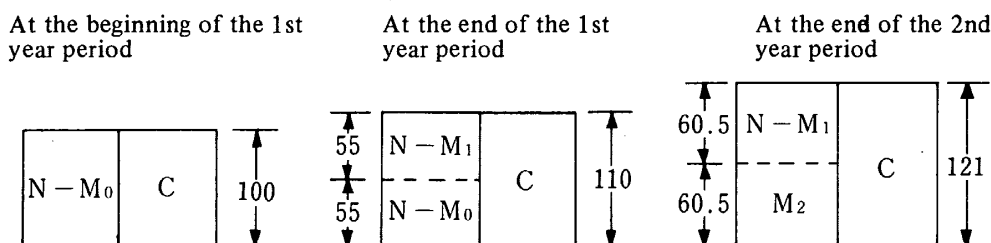
C: Capital to be maintained.

(1) To replace at a time at the end of the second year period.



(Illustration 1)

(2) To replace half of it at the end of the first year period.



(Illustration 2)

In the illustrations 1 and 2, there is a difference in the contents of the capital to be maintain \$121 million that is measured by the operating capacity measure at the end of the second year period. When the case that the half of the asset is replaced at the end of the first year period is adopted, the capital that was invested to non-monetary asset $N-M_1$ purchased at the end of the first year period is remeasured from \$55 million to \$60.5 million. On the other hand, if the case that the asset is replaced at one time

at the end of the second year period is adopted, the purchasing power of the M_1 that was obtained in the end of the first year period is remeasured from \$55 million to \$60.5 million. However, the monetary asset M_1 , even if it is measured by the operating capacity measure at the end of the second year period, remains to be only \$55 million, in short, by keeping the monetary asset M_1 obtained in the end of the first year period, there is a loss of purchasing power \$5.5 million. (Accordingly, it is necessary to obtain the monetary asset (cash equivalent) to the loss of purchasing power at the end of the second year period in order to maintain the purchasing power capital).

As the results of the discussions above, the following points were clarified:

- (1) If the essence of capital is regarded as the purchasing power of money and the replacement cost accounting as the measurement by the operating capacity measure, the backlog depreciation actually means the loss of purchasing power caused by holding the monetary asset.
- (2) As for the depreciation of the non-monetary asset, only the depreciation in the concerned period is calculated on the basis of the current replacement cost. If the loss of purchasing power calculated on the basis of the measurement of the operating capacity measure about the monetary asset, replacement capital can be obtained as a result.
- (3) As an accounting system, the backlog depreciation is not applied. Instead, the loss of purchasing power of the monetary asset is calculated.

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