Fundamental Logic of Periodic Income Determination of Financial Accounting

Nobuyuki Miyazaki *

I. Introduction

Currently, a great number of socially related or socially conscious accounting and reporting, whether they are institutionally legitimate or not, are easily available, including so-called environmental accounting or eco-balancing. Some are related to monetarily measured environmental costs and benefits as well as to physically calculated environmental impacts, or physical environmental accounting. It is already a common phenomenon for a leading Japanese company to adopt a few of these officially recommended methods for its environmental management to provide some kinds of eco-efficiency data in its annually published environmental reports.

This tendency for diversity, or development toward a socially related accounting and reporting is naturally very desirable for many kinds of stakeholder groups around companies to make a rational decision for their interest, however it is still a very important reality that even now the traditional financial accounting which consists of some basic or conventional financial statements including income statement (P/L) and balance sheet (B/S) is of significant, vital importance, and until now different kinds of periodically determined or measured business income have been a most fundamental concept in accounting, where the principle of matching cost with revenue has been the central feature of double-entry book keeping system.

It is, however, quite obvious that now there is little agreement among

* Professor of Business Administration and Accounting, College of Liberal Arts, International Christian University

researchers and CPAs regarding (1) the nature of income, (2) the structure and mechanism of income determination and (3) the essential elements of income determination. According to Leffson, there are three possible ways to tackle with this serious frustration: (1) to abandon periodic income determination, (2) to inquire into and create other measurement tools for periodic income determination, and (3) to decrease defects of present periodic income determination methods in order for them to gain larger power of expression in spite of the present problems around the vast disagreement [Leffson (1966) p. 376].

This study respects fundamentally the third approach, and will focus especially on the importance of "business activities" in an enterprise which generates income as well as on the transformation from original activities to artificial ones so as to theoretically solve these complex problems. As Leonard da Vinci truly pointed out, activities or movements are the source of everything, and to explicitly bring the activities into focus makes these problems more clearly operational.

Further, to make the complex features of periodic income determination of business enterprises easily understandable, the so-called total income determination is taken into consideration as well as the most fundamental structure of its measurement system is utilized.

II. The Role of Income for Business Enterprises

It is without saying that to any business enterprise the pursuit of income is a vital concern for its survival and development; it is more important than other pursuit of a business enterprise. Therefore, the business activities of an enterprise are usually carried out to earn income. Since income stems from business activities and business activities are the "source of income", income is really the "result of business activities" of an enterprise.

The activities of an enterprise are, on the whole, understood in terms of the relationship with the society in which the business enterprise is operating (see Figure 1). They generate two opposite flows as follows: (1) the flows of

services [1]; and (2) those of cash between the enterprise and the society.

The flow of services of an enterprise consists of acquiring services from society and consuming them in its producing process in order to provide services to the society either through rendering services directly goods involving potential services to the customers. The acquisition of services from the society is identified as the "inflow of the services," while the transfer of services to the society is identified as the "outflow of services."

Both flows are normally valued according to the prices of the market, i.e., the expressions of realized exchanges between contracting parties in the market, the value of former being called "expense," while that of the latter" revenue [2]." As expenses are the incurred cost of producing revenues, expenses are related to the revenues involving efforts and accomplishment. Therefore, the computed difference between "revenues" and "expenses" in this sense denotes the "result" of business activities, i.e., income in an original physical sense.

Figure 1

Flow of Services①   Flow of Services②

Business
Enterprise

Flow of Cash③   Flow of Cash④
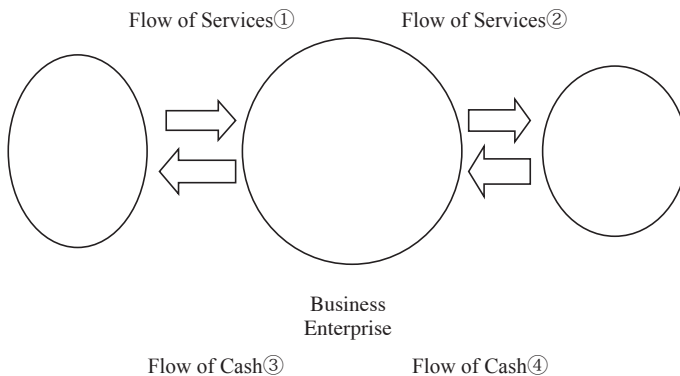
Such a direct method of determining income, however, is not used but rather more importance is attached to a monetary payment process as described below, because the income which should be determined in unambiguous as well as disposable, and also because it is quite possible to picture the flow of services with the help of corresponding opposite monetary payments. Consequently,

cash-payments come to be of decisive importance and make the cardinal contents in determining income with the system of bookkeeping.

The society surrounding the enterprise rewards it by paying for the services provided according to the market price (i.e., the valuation by society). On the contrary, the enterprise must pay for the services which it acquires from the society according to the market price.

On the whole, both flows of services are accompanied by flows of cash-payments which move in parallel but opposite directions, where the "receipt" of cash corresponds and is equal to "revenue" in the original sense [3]. The "disbursement" of cash corresponds and is equal to "expenses" in the original sense.

Since the amount of dollars which is paid willingly depends upon the valuation of the services by the society, the receipt reflects the value which the enterprise provides to the society. Similarly, the disbursement reflects the value which it exhausts. Accordingly, business income determined as the difference between both payments of cash means "added value" which is generated through its business activities.

On the other hand, the difference between a cash- receipt and cash-disbursement indicates the net increase of cash in hand that can be ultimately utilized as the source of disposition. Thus business income determined by matching disbursements corresponding to the inflow of services with receipts corresponding to the outflow of services has in itself dual properties in itself [4]. Such disbursements are called expense-disbursements or simply expenses, while such receipts revenue-receipts or simply revenues. The substituted difference of both is the cardinal contents of determining income and equal to the original difference of expense and revenue in the original sense.

A main concern now is to determine periodic income in a rational fashion. However, periodic determination presents a number of tough problems. As mentioned above, business income is fundamentally generated through business activities (income generating activities). Accordingly the key for the solution of the problems consists in the relationship between accounting periods and

business activities (however complex it may be).

III. The Nature of Periodic Income Determination

A concise definition of periodic income is "the result of business activities in a period." Despite the seeming simplicity, the definition is quite difficult to fully understand because the result must not only be the difference between two flows (i.e., inflows of services and outflows of services valued by market prices or corresponding cash-flow), it must also be the excess of accomplishment over efforts, in which both flows are mutually correlated in the relationship between efforts and accomplishments. In such a condition, they are called expense and revenue respectively, and only if such a condition is fully attained within a period, can they be a periodic expense and periodic revenue. The periodic income which meets the definition above can be determined as the computed difference between both without contradiction.

Accordingly, to meet such a condition a series of business activities must be completed within the period considered. It is normally composed of following: (1) acquisition of services in exchange for cash-disbursement; (2) Utilization of services; (3) Recombination of services into a new product; and (4) Disposition (Delivery) of services to customers in exchange for cash-receipt [5]. In such a condition, there is a complete cycle from cash to cash, where all the efforts can be rewarded with the accomplishments in cash within a period.

As Gilman has noted, such a condition is an ideal one [6], coming into existence usually during the termination of an enterprise (corresponding to "total income determination [7]"), and the essential reason that the consistent operation of periodic income determination is logically impossible consists in such a continuous nature of economic activities, which can be analyzed in two levels as below.

Firstly, the nature of the activities of an enterprise is the infinite, boundless continuity and interdependency. All the disbursements of an enterprise contribute to receipts as long as it survives, therefore corresponding, matching relationship can be recognized between all the disbursements and all the receipts. More

precisely speaking, all the disbursements are related to all the following receipts in some ways, and special or individual effects for acquisition of receipts of each money disbursement cannot be specified in a isolated manner, the disbursements making limitless influence on the following money receipts in complicated, sometimes long term ways. Such a recognition may be identified as the extreme case of a recognition of an infinite character of enterprises by Rieger. What is important here is the discussion now is not about technical possibility of income measurement, but on the theoretically aperiodic, infinite nature of economic activities of an enterprise.

Secondly, even if we can practically drive a wedge into such kind of infinite, eternal nature of enterprise activities, as well as if limit the complex matching relationships of disbursements and receipts, then we will still find plenty of boundless, aperiodic economic activities of enterprises. A number of activities of enterprises, then, will still cover several accounting periods. In such cases, the activities of enterprises can be restricted to only a few accounting periods, however, we are then still not able to carry out a periodic income determination which is free from contradiction.

It is of course true that Rieger did not grasp the consistency of enterprise activities in these two levels, but he comprehended a combined nature of enterprise activities in a so rigorous way that he gave up a periodical isolation of such activities and abandon periodic income determination. Rieger instead grouped about for something that would be related with the "today's economic concept of profit" ("der heutige Wert").

However, it is not appropriate to think that such a rigorous recognition of Rieger would lead directly only to his "today's economic concept of profit". There still be a room for considering that the strong concept of Rieger can be understood not as a concept to deny periodic income determination but a general concept which gives a mutual, common starting point to numbers of types of periodic income determination.

According to Rieger, periodic income determination is an act that divides the precisely detailed series of management occurrences of enterprises as

recklessly as by Guillotine. We can, however, still have a way before us for analyzing series of management occurrences as precisely as possible, divide them in a delicate way, and put them together, summarizing them into each period in a synthetic, overall manner.

It is naturally appropriate to say that this kind of operation which consists of analysis and synthesis requires number of artificial suppositions and that they must be given a rational order, which seem to be a tough work to carry out.

If such assumptions (= measurement rules), however, successfully divide the varied and complex chains of management occurrences, then essentially aperiodic business activities can be regarded as periodic activities so as to get individual capital cycles in each period, and each periodic business activity can be rationally isolated like an independent business project.

Here, each corresponding, isolated disbursement and receipt can be regarded as being "periodically matched", each periodic business activities gaining the same formula and completeness as in case of total income determination, where the principle of total income determination as a prototype is carried out through each periodic income determination.

It is without saying that these processes of periodic isolation of actual business processes are by no means simple and easy, but a creative, and sometimes distractive operation which can be compared to the word "production". Next, the operation of isolation of business activities which consists in the core of periodic income determination will be discussed with very simple examples.

IV. Transformation of the Real Economic Processes

Corporation X has produced product A in Period 1. The total expense incurred to produce it is $30,000 (material cost $20,000, processing cost $10,000). It is sold to a customer for $50,000 in Period 2 and all the transactions involved have taken place in cash. These are the entire activities of Corporation X which have a relationship with generating income.

Naturally, the total income generated by these whole activities is $20,000

(Revenue $50,000 – Expense $30,000). How much, however, is the income of Period 1 and Period 2 respectively? It is impossible fundamentally to answer this question because the total income of $20,000 is the combined result of a series of business activities from the purchase of material in Period 1 to the sales of product a in Period 2. The business activities in Period 1 and 2 are correlated so closely that every activity must have its own unique contribution to the total income of $20,000. Accordingly, it is not the business activities of Period 1 alone nor that in Period 2 alone, and it is impossible to determine the periodic income that meets the definition of it without any artificial transformation of the real activities. If periodic income is to be determined, the only way to transform the real economic process is with the aid of fictitious assumptions. For example, they are concentrated on rather a period or spread into two smaller cycles. On the contrary, if the real business activities are divided into two at the end of Period 1 without any transformation, there are activities such as purchasing and production in Period 1 and holding and sales in Period 2, accordingly, only the expense of $30,000 (i.e., the exhaust of services) is recognized in Period 1 and only the revenue of $50,000 (i.e., transfer of services) us recognized in Period 2. Such a computation is nonsense and the real activities must be transformed in order to adjust them into accounting periods.

In the following example, Corporation Y has purchased Machine B for $50,000, which is constantly used for five years. The disposable value at the end of Period 5 is 0; it is usually replaced every five years.

In this example, Machine B has the cycle from cash to cash (in this case 0) over five years, and as such, determining periodic income is impossible. So, the total cycle over five years must be taken into five smaller cycles in each period, where the purchase and consumption of the services (provided by the machine) for $10,000 in each period is assumed to occur, and $10,000 (depreciation expense) will be matched to the revenue of each period. The value of the services provided by the machine is hypothetical one, although it must be based on the price of services when they are purchased each year. Therefore, considering the cash payment when Corporation Y takes Machine B on lease

every year is very helpful [8]. However, any kind of allocation of the original acquisition cost of it for $50,000 tends to be artificial.

In the following example, Corporation Z has advertised (e.g., on television) its new Product C for a total of $20,000.

Through a favorable influence, the new Product C wins popularity and is sold to a lot of customers for the next five years. Therefore, the outlay of $20,000 exerts a favorable influence on the successive five periods. To allocate it into five periods in a rational fashion, i.e., to compute the reasonable contribution to each period of the advertising cost, however, is next to impossible. For example, if $20,000 is allocated to each period for $40,000 respectively and the revenue in Period 2 is $10,000 (other expenses are neglected here), the difference of $6,000 ($4,000 would be matched with $10,000) is not pure result of Period 2 but the combined result of Periods 1 and 2.

Accordingly, it does not meet the definition of periodic income. Therefore, to meet it, it must be assumed that Corporation Z pays $4,000 for advertising at the beginning of each period. In such a case $6,000 can be stated as periodic income in Period 2.

As illustrated above, in order to determine income periodically in a rational fashion, it becomes necessary to adjust the original business activities to each period by transforming them into fictitious or ideal ones with the help of some artificial assumptions. The nature of periodic income determination consists of a dynamic transformation of an actual economic process. Generally, two different processes can be recognized; the analytical process (1) and the synthetic process (2).

The analytical process (1) consists in the analytic recognition of real economic activities. The actual movements of services and cash are ideally observed as closely as possible (of course as long as such a minute observation is economically beneficial). The causal relationships between receipt (corresponding revenues) and disbursements (corresponding expenses) are inquired as precisely as possible. However, as all the factual relationships

between both cannot be recognized as such, this process cannot help avoiding a number of artificial assumptions to some degree, and has built-in limitations. Yet, there are still various cycles up to the present, a number of which are aperiodic or are spread over some periods and there is no determination of periodic income. For example, the depreciation of Machine B in Example 3-2 has a cycle of over five years as well as the advertising expense in Example 3-3. Therefore, by using this data, it is necessary to proceed to the next process in order to tackle the proper difficulties for periodic delimitation or periodic adjustment.

The synthetic process (2) consists in the adjustment and integration of the business activities analyzed above. As illustrated in the Example of 3-1, -2, and -3, the real economic process is artificially transformed in order to adjust it to each period. Various business activities are concentrated either in one period or separated into a number of smaller series of activities which are carried out within each period. Finally, they must be integrated and there is only one complete cycle of business activities within each period. All the expense-disbursements (or expenses) are matched with all the revenue-receipts (or revenues) completely within a period and there is a complete cycle from cash to cash as is the case with total periods. Each period is idealistically isolated from each other [9]. In the following chapter, the contents which construct the basic structure of the double-entry bookkeeping system are explained.

V. Conclusion

In this treatise the author tries, not to develop a special theory, but to construct a general structure of periodic income determination or profit measurement of an enterprise, which is generally available for all the types or purposes of income determination. So far is explained that the process of periodic income determination needs a producing or creative process in order to bring all the actual business activities into one simple pattern of [G -> W -> W' -> G'] or [Cash Disbursement -> Expense -> Revenue -> Cash Receipt]. The

apparent variety of actual periodical income determination is derived from these creative processes.

In order to complete these processes, the dual transformation procedures are necessary, and they mean the core of periodic income determination. Without them, it is usually impossible to determine the periodic income in a logical fashion. To make such a transformation possible, the analytic process has been contrasted with the synthetic process. This contrast, however, I not always clearly recognized since the two processes may be applied in a combination of many ways.

However, there still remains a difficult problem in regard to the transformation of the real business activities. There are, fundamentally and practically, quite a number of alternative methods of transformation. Therefore, it is necessary to further study the economic and often also social and political interpretation of these alternative methods of transformation as well as the mutual relationship among the methods which are now sometimes called as "true and fair" rules of accounting.

Notes

(1) Since "goods" should be defined as "bundle of services" from the economic point of view, the word "services" is used in order to eliminate redundancy involved in the term "goods and services" as Bedford does (Bedford, 1965, p.77). He argues as follows (Bedford, 1965, p.76): "In fact・・・what is being acquired is not the physical resources itself but the anticipated services in the resource. In this fundamental sense, the essential ingredient in assets・・・is the services which will be extracted from them"

(2) The following definitions are based on flow concepts and almost the same definition as those in this study, The Committee on Accounting Concepts and Standard of the American Accounting Association defined revenue in the 1957 Statement as follows (American Accounting Association, 1957, p. 5): "Revenue・・・is the monetary expression of the aggregate of products or services transferred by an enterprise to its customers during a period of time." On the other hand Hendriksen defined expenses as follows (Hendriksen, 1965, p. 142): "・・・expenses are the using or consuming of goods and services in the process of obtaining revenues. They are the expiration of factor services related either directly or indirectly to the producing and selling of the product of the enterprise."

(3) Such a framework is common to Walb (1926, pp. 42-45) as well as Kosiol (1978, pp. 23-24). They, however, think that periodic income determination should reflect the "real economic process", and they do not consider the concept of "transformation" of the "real business activities" in order to "adjust" them to periods, which will be elaborated in the following chapters.

(4) Adam Smith recognized such dual properties of income almost 200 years ago (Smith, 1937, p. 423). Hirschman summarizes the argument of Smith as follows (Hirschman, 1978, p. 111): "・・・the material welfare of 'the whole society' is advanced when everyone is allowed to follow his own private interest." "Added value" corresponds to "the material welfare of the whole society!" and "net cash in hand" corresponds to "his own private interest." Bedford takes into account the argument of Smith and points out the following three interpretations of income (Bedford, 1965, pp. 179-181): 1) the extent to which an entity has increased its assets through operations; 2) the economic contribution which an entity has made to the economy in which it operates; 3) a measure of efficiency with which a business entity has carried out these responsibilities. 1) corresponds to "net cash in hand" while 2) corresponds to "added value". 3) has relationship with both).

(5) Bedford called those four operations "income generating activities" (Bedford,1965, p. 109), while Bowers itemized a series of events as follows (Bowers, 1941, p. 142):
1) Purchase of material agents or services;
2) Receipt of orders for a good or service;
3) Physical production;
4) Delivery of goods or service to the buyer;
5) Transfer of legal title;
6) Receipt of cash or the equivalent; and
7) Termination of guarantee or similar contingency
Unlike Bedford, this study will not try to recognize series of business activities as an aggregate

of parts (the partial or divisional approach), but as a successive whole (total or overall approach). It probably is not possible to divide series of activities into several parts in order to compute each contribution to income without some artificial assumptions.

(6) Littleton states as follows (Littleton, 1980, p. 70): "・・・the flow of operating transactions is as continuous as the flowing of a river. Transactions themselves are not a mass of unrelated, individual events; most of them are related parts of a continuous patterns of activities wherein some transactions are beginning while others are ending, all without changing the pattern. Cutting up this flow of activities into comparable periods of time catches transactions in many stages of completion."

(7) Schmalenbach (1939, pp. 96-98) as well as Kosiol (1978, pp. 25-27) initiates his theory of income accounting (dynamic accounting) with the income determination in total periods.

(8) Such method of comparing the purchasement of tangible property with taking it on lease is found in Internal Revenue Code Section 1, 482 [7].

(9) According to Schumpeter (1939, p. 13), economic phenomena are "essentially a unique process in historic time", and the object of accounting is no exception. Both processes of periodic income determination mean the conversion of historical and unique phenomena into common models.

Now, periodic income determination is compared to a stream where a number of dams are built at regular intervals. The dams adjust the stream to adequate level and create an artificial stream which is different from the original or natural stream of the river by increasing or decreasing the amount of flow by means of manipulation of the bulbs.

Such an artificial stream is compared to the (transformed 9 direct object of periodic income determination. The original or natural stream should be compared to real business activities whereas the artificial stream to fictitious ones. The fictitious activities, however, must be based on or grounded in the real ones.

Moreover, any one block of the stream has its own beginning and end, therefore it has the same formula as that of the whole stream of the river. As the aggregate of all the blocks of the stream is equal to the whole amount of the original stream, the aggregate of periodic incomes is equal to total income (Schmalenbach's principle of congruity (Schmalenbach, 1939, pp. 96-99)).

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<Summary>

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Until now business income has been a most fundamental concept in accounting, where the principle of matching cost with revenue has been the central feature of double-entry book keeping system. It is, however, quite obvious that now there is little agreement among researchers and CPAs regarding (1) the nature of income, (2) the structure and mechanism of income determination and (3) the essential elements of income determination. This study will focus on the importance of "business activities" in an enterprise which generates income as well as the transformation from original activities to artificial ones so as to theoretically solve these complex problems.