ASEAN Journal on Science and Technology for Development

Volume 41
Number 2 *Business Innovation for the Sustainable Development Goals (SDGs) Part 2*

Article 5

2024

The Perspective of Cash Flow Risks on Earnings Measurement

Daisuke Suzuki
Reitaku University, 2-1-1, Hikarigaoka, Kashiwa City, Chiba Prefecture, 277-8686, Japan, dsuzuki@reitaku-u.ac.jp

Junpei Yamada
Meiji Gakuin University, 1-2-37 Shirokanedai Minato-ku Tokyo, 108-8636, Japan, junyama@eco.meijigakuin.ac.jp

Shoji Kamimura
Kanagawa University, 4-5-3 Minatomirai, Nishi-ku, Yokohama-shi, Kanagawa 220-8739, Japan, kamimura@kanagawa-u.ac.jp

SPECIAL ISSUE ARTICLE

The Perspective of Cash Flow Risks on Earnings Measurement

Daisuke Suzuki [a,*], Junpei Yamada [b], Shoji Kamimura [c]

[a] Reitaku University, 2-1-1, Hikarigaoka, Kashiwa, Chiba, 277-8686, Japan
[b] Meiji Gakuin University, 1-2-37 Shirokanedai, Minato-ku, Tokyo, 108-8636, Japan
[c] Kanagawa University, 4-5-3 Minatomirai, Nishi-ku, Yokohama-shi, Kanagawa 220-8739, Japan

Abstract

The essence of earnings in financial statements is significantly influenced by changes in the economic environment. The main objective of this paper is to elucidate a universal principle capable of explaining any types of earnings measurements. To achieve this, we examine the factors influencing earnings by modeling them from a cash flow perspective. Consequently, this paper directs the attention away from stocks and flows, placing emphasis on the risks inherent in income and expenditure in the context of earnings measurements. It highlights the crucial role of these risks in earnings. Additionally, we illustrate that adjusting these risk tolerances enables the representation of any types of earnings measurements. Furthermore, it also mentions that traditional accounting basic concepts, including the principle of matching expenses with revenues, can be interpreted in the context of such risks. If these concepts that have been described in language can be organized through the concept of risks, it is expected to contribute to subsequent research.

Keywords: Earnings measurement, Stock and flow, Risk tolerance, Basic concepts

1. Introduction

In financial accounting, it is widely acknowledged that earnings play a fundamental role in assessing the performances of companies. How are earnings measured in financial statements in the first place? Our objective is to unveil a universal principle that facilitates the understanding of earnings measurements across any various types. To achieve this, we examine the factors influencing earnings measurements by modeling them from a cash flow perspective. Shifting our focus from traditional stock and flow perspectives, we direct attention to the risks associated with incomes and expenditures in this context.

As is well known, the earnings measurements are sometimes discussed from the perspectives of the *asset-liability approach* and the *revenue-expense approach*. Within these contexts, it has been observed at times that the asset-liability approach emphasizes the balance sheet, while the revenue-expense approach places greater focus on the income statement (Financial Accounting Standards Board (FASB), 1976, par. 34, par. 39). However, some previous research indicates that both approaches are not mutually exclusive (Nissim and Penman, 2008; Barker and Penman, 2020). In the field of economics, stock refers to a specific quantity at a given point in time, while flow represents the quantity observed over a defined period (Mankiw, 2016, p.20). We can

Received 23 October 2023; revised 2 January 2024; accepted 28 February 2024.
Available online 30 May 2024

* Corresponding author.
E-mail addresses: dsuzuki@reitaku-u.ac.jp (D. Suzuki), junyama@eco.meijigakuin.ac.jp (J. Yamada), kamimura@kanagawa-u.ac.jp (S. Kamimura).

https://doi.org/10.29037/2224-9028.1578

view flow as the rate of change of stock, and conversely, stock as the accumulated sum of flow. Fundamentally, whether observing flow from the perspective of stock or observing stock from the perspective of flow, they are basically equivalent.

Therefore, there seems to be no sign of the discussion converging, and as a result, it does not appear to have yielded clear and solid insights. If that's the case, even though there has been strong support for valuing assets and liabilities at fair value in recent years, it does not necessarily imply a prioritization of the asset-liability approach. And then, recent changes in thinking about earnings measurement, frequently noted (Zimmerman and Bloom, 2016), might not be part of the debate within these two approaches but could belong to an entirely different dimension.

Here, we focus on the fact that any earnings measurements result from the allocation of incomes and expenditures, paying particular attention to the risks associated with them. Furthermore, by considering the extent to which the earnings measurement incorporates these risks of cash flows, we demonstrate that the tolerance for the risks can explain any methods of earnings measurements. We also show that this perspective can also shed light on some traditional basic concepts of accounting, including the principle of matching expenses with revenues.

This paper is developed using a descriptive methodology and is structured as follows. In Section 2, we review prior research, and in Section 3, we define two risks related to incomes and expenditures. We examine the relationship between these risk concepts and traditional foundational concepts, demonstrating that all earnings measurements can be explained based on the degree of risk tolerance. Section 4 provides a summary of these findings. In conclusion, this paper establishes that the risk tolerance is a pivotal factor influencing the formulation of earnings measurements.

2. Literature review

According to FASB (1976, par. 34, par. 39), the asset-liability approach constitutes the fundamental process of measuring the attributes of assets and liabilities, including their fluctuations, and recognizes the net increase in an entity's resources over a period as earnings. In contrast, the revenue-expense approach involves the fundamental process of recognizing and measuring revenues and expenses, deeming the difference between revenues and expenses for a period as earnings. The former is said to be supported by many current accounting standards and researchers, including Sprouse and Moonitz (1962) (Dichev, 2008; Demerjian, 2011), while the latter has also been examined by numerous studies (Paton and Littleton, 1940; Anthony, 1984).

In recent years, it has been suggested that the former approach has gained more emphasis, with less discussion regarding the revenue and expense-related concepts such as *realization* and *matching principles* (Zimmerman and Bloom, 2016, p.4). At this point, Nissim and Penman (2008) examines both approaches from the perspective of fair value and historical cost valuation, while Barker and Penman (2020, p.323) suggests that the asset-liability approach could be expanded to enhance the utility of the income statement. These papers indicate that these approaches are not mutually exclusive, implicitly suggesting that the discussion of earnings measurements is not as straightforward as it can be accommodated within these two approaches.

Whether to approach earnings measurements from the stock or the flow viewpoint, it appears unlikely that the discussions will converge. Schmalenbach (1955) has already pointed out that both aspects, when conditioned on clean surplus, influence earnings measurements. In this context, Barker and Penman (2020, p.343) note that the discussions within these two approaches can be confusing and suggest a combined approach.

What is an essential principle for understanding earnings measurement? It is intriguing that Barker and Penman (2020, p.343) are shifting the focus of the discussion toward uncertainty. Barker and Penman (2020, p.329) refer to the International Accounting Standards Board (IASB) (2018, par.4.13, par.6.61) in the context of discussions on uncertainty. Specifically, they mention the following terms as outlined by the IASB: uncertainty about the amount or timing of economic benefits flowing from or to an asset or liability, referred to as *uncertainty of outcome*, and uncertainty about whether an asset or liability exists, referred to as *uncertainty of existence*. While these terms express uncertainties related to flow and stock respectively, IASB also indicates the term of *fundamental uncertainty* as aggregating these two uncertainties. As mentioned before, because stock and flow are closely interrelated, it is not possible to discuss these risks separately. Therefore, the concept that encompasses them might be necessary.

Regarding this, the Accounting Standards Board of Japan (ASBJ) (2006, paras. 13,15) refers to revenues and expenses as the portions of the changes in assets and liabilities that have been *released from the*

risks. It is also suggested that funds invested are released from the risks once they have contributed to cash acquisition. If we assume the existence of a probability space, future cash flows have variability in their outcomes and can be considered as probability variables. Defining their standard deviation as risk, when multiple possibilities converge into one, the risk converges to zero. ASBJ says that, at that point, the result is recognized as revenue, and the portions of assets and liabilities contributing to the result are considered as released from the risks and recognized as expenses. This discussion encompasses both revenue and expenses, as well as assets and liabilities. Therefore, it can be argued that it aligns highly with the fundamental uncertainty that is mentioned before.

The notion of release from risks was sometimes introduced as an alternative to realization. The principle of matching is also connected to this notion in its recognition of expenses concurrently with the determination of results. Realization and historical cost are sometimes considered two sides of the same coin, with implications for asset valuation. Therefore, the concept of the risk in this context is a highly influential idea that intersects with multiple foundational principles. If so, we must examine the relationship between the concept of the risk and the existing foundational principles of financial accounting.

However, considering that multiple foundational concepts such as realization, matching and others have been recognized as significant in the past, it may be worthwhile to verify whether a single concept of the risk alone is sufficient to express the essence of earnings measurement. In finance, cash flow is highly emphasized (Desai, 2019, p. 66). As is well known, given that all cash flows up to settlement are equal to total earnings, then regardless of the method of earnings measurement, they ultimately result from the allocation of cash flows (Schmalenbach, 1955). Based on these considerations, we need to explore the concept of risk not from the perspective of stocks and flows, as in previous research, but from the perspective of incomes and expenditures, while taking *Der Grundsatz der Kongruenz* into consideration.

3. Equity and earnings from two risks perspective

3.1. Risks related to income and expense

While providing a precise definition of earnings may be beyond the scope of this paper, we define two risks related to income and expense as follows. First, we define *the risk related to income* as the standard deviation associated with income on potential earnings. The risk related to income decreases as the time of income generation approaches. It is important to note that the presence of income does not necessarily imply the absence of risk. Unless the obligation to perform as consideration has been fulfilled, there remains a possibility of refund, and the income still cannot be released from the risk. Revenue is recognized not based on any expectations but when the income is released from the risk.

On the other hand, *the risk related to expenditure* is defined as the standard deviation associated with expenditure on potential earnings. In earnings measurements, items that are certain to exist are treated as stock, while those with uncertain existence are not considered as such. Expenditures stemming from the stocks are classified into two categories: the amounts that definitively flow out externally and the amounts held as the stocks once again. Concerning the latter, subsequently, parts of the stocks become associated with the risks related to expenditures, ultimately transitioning to expenses.

It is important to note that the risk related to expenditure may not necessarily accrue over time. Even with the passage of time, it is also possible that we may not clearly know to what extent an asset has depreciated. However, at this point, by omitting the portion of the stock associated with the risk related to expenditure and recognizing it as an expense, we can consider the certain portion as stock. In finance, there is often an emphasis on future cash flows, while past expenditures are regarded as sunk costs. In contrast, financial accounting includes some of these expenditures on the balance sheet. In this sense, the concept of the risk related to expenditure can be characteristic of accounting.

When focusing on earnings measurements, it primarily involves revenues that have been released from the risks related to incomes and expenses that have incurred the risks related to expenditures. It is crucial to recognize that the impact of the risk related to income is not limited solely to the flow of revenues but rather extends to the stock of assets and liabilities. Furthermore, it's noteworthy that the impact of the risk related to expenditure is not confined solely to the flow of expenses but also encompasses the stock associated with allocations. It is no longer a simple distinction between stock and flow. However, a fundamental question arises: what specific relationship exists between the two risks of incomes and expenditures in earnings measurements? Unlike ASBJ (2006), this introduces an

additional dimension by considering not just one, but two concepts of risks. Therefore, while paying attention to the existing foundational concepts in accounting, as well as the events underlying these two risks, we consider them more concretely using the following simplified model.

3.2. Risks and foundational concepts

Consider a situation, as illustrated in the following figure, in which a company invests cash K into an equipment at time t = 0 and earns the incomes $R_t\mathbf{1}_{At}(\omega)$ from the equipment for each period over the useful life of n years. The indicator function $\mathbf{1}_{At}(\omega)$ represents that, due to event At, the incomes for each period are either R_t or 0. On the other hand, we denote the depreciation of the equipment for each period as $E_t\mathbf{1}_{Bt}(\omega)$, where event Bt determines whether the depreciation is E_t or 0. In this setup, the risk related to income is expressed through $\mathbf{1}_{At}(\omega)$. It reflects the variability in future incomes, and the distribution depends on events related to incomes. If revenue is deferred until the event at occurs, the risk related to income becomes an element representing realization. Furthermore, if we express the ability to generate future incomes using assets, the risk related to income can also become an element representing the concept of *control*, that is one of the traditional foundational concepts of accounting.

On the other hand, the risk related to expenditure is encapsulated by $\mathbf{1}_{Bt}(\omega)$. At time t = 0, essentially, there is no risk inherent in the evaluation of the equipment as stock. The focal point of expenditures lies in the essence of historical cost accounting that is also one of the foundational concepts. However, subsequently, over time, the risk related to expenditure will emerge in the equipment. Recognizing expense in each period where $\mathbf{1}_{Bt}(\omega)$ occurs, the risk related to expenditure becomes an element representing cost allocation. When capital cost is assumed to be zero, the economic value is $\Sigma R_t\mathbf{1}_{At}(\omega)$, and the expenditure K and the subsequent depreciations of the equipment are not directly considered there. In that sense, the risk related to expense represented by $\mathbf{1}_{Bt}(\omega)$ is a concept of risk unique to accounting (Fig. 1).

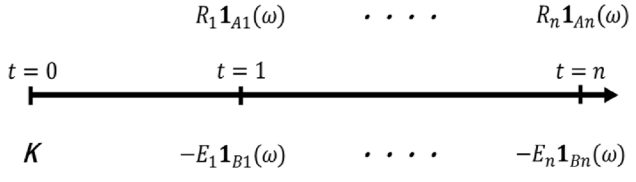

Fig. 1. The time series of cash flows.

When the risk related to expenditure arises and the expense is recognized, there is a potential for a discrepancy between the actual depreciation and the recognized expense. If a depreciation, denoted as E_t, occurs, the difference between the previously recognized expense and the actual depreciation might be recognized as additional expense, commonly referred to as losses. In practice, separate accounting rules for impairment exists alongside depreciation and amortization. On the other hand, when $\mathbf{1}_{Bt}(\omega)$ is zero, it implies that expenses had been recognized prematurely. This represents a pre-recognition of expenses due to the introduction of the risk into asset valuation, serving as an element expressing *conservatism* that is also one of the foundational concepts.

Naturally, there is no guarantee that the relationship between events At and Bt remains stable. In general, there is an assumption of a certain degree of correlation between investments and their outcomes, and this correlation impacts the forecast of future performance. Therefore, here as well, we can assume that there is a certain correlation between the two events at any given time. Here, expressing the relationship between these two events in terms of conditional probability reveals elements for representing the matching principle of revenues and expenses. For instance, in commodity trading, the receipt of consideration and the delivery of goods generally occur simultaneously, making the occurrence of events At and Bt simultaneous. This is generally referred to as *individual matching* and can be expressed by Eq. (1) below. On the other hand, in fixed assets investments, the occurrence of events At and Bt is assumed to have a more gradual relationship. The relationship between income acquisition and depreciation cannot be directly confirmed, and it is only assumed that there is a probability of depreciation occurring when income is generated. This is generally referred to as *periodical matching* and can be expressed by Eq. (2).

$$P(B_t|A_t) \cong 1 \tag{1}$$

$$P(B_t) \neq P(B_t|A_t) < 1 \tag{2}$$

3.3. Risk tolerance

In the above discussion, the risks associated with $\mathbf{1}_{At}(\omega)$ and $\mathbf{1}_{Bt}(\omega)$ were excluded from the earnings measurement and the asset valuation, respectively. To maintain assets as risk-free stock, revenues indicating the increase in assets are confined to those released from the risk related to income.

Simultaneously, stocks bearing the risk related to expenditure are treated as expenses and consequently excluded from the stock. Indeed, under uncertainty, indicating what is certain holds value as information.

However, in practice, not all stocks involving risks are excluded. For instance, sales with accounts receivables, which carry the risk of non-payment, are recognized as revenue, assuming temporary release from risks. Similarly, gains and losses in the valuation of trading securities are recognized in the earnings measurement. This is based on the assumption that they are saleable at fair value; however, their values are subject to market conditions and associated risks. The extent to which risks are accepted in the earnings measurement depends on factors such as the economic environment and the preferences of information users. Therefore, we propose defining the extent to which the risks related to income and expenditure are accepted in the earnings measurement as *risk tolerances*.

We can model all conceivable earnings measurements by adjusting these two risk tolerances. First, when we minimize the risk tolerance for income, all risks related to incomes are avoided, and incomes with such risks are excluded from the earnings measurement. In such a case, incomes are not considered for the earnings measurement until they are certain, and any increases in stock are limited to cash. On the other hand, when we maximize the tolerance, all expected future incomes at that moment are recognized as stock, and their increments become part of the earnings measurement as revenues.

When the risk tolerance for expenditures is maximized, all risks related to expenditures are considered in the earnings measurement. In principle, the value of investments decreases over time. Considering them as a family of random variables, even if there is no risk to the current value, it is assumed that there are risks associated with future random variables. If all these risks are considered, all expenditures become the expense at the time of expenditure, and the stock is limited to cash. On the other hand, when the risk tolerance for expenditures is minimized, all risks related to expenditures are excluded from the earnings measurement. Therefore, investments made through expenditures remain as stock until the risks of their decrease are eliminated and the decreases are confirmed, at which point only the portion with confirmed decrease is recognized as expense.

By adjusting these two levels of risk tolerance, we can scrutinize all types of earnings measurements, ranging from cash flow measurement to variations in enterprise value. It is reasonable to consider that actual accounting practices operate within this framework. We can then assess the extent to which actual individual accounting rules accommodate and should accommodate the two risks. Organizing the foundational concepts in accounting, which were previously explained only through words, based on the concrete measures of risk tolerance may also facilitate the observation of changes in perspectives on earnings measurements over time.

4. Discussion and conclusion

Given the potential for changes in the economic environment to influence the way we think about earnings measurements, the main objective of this paper is to unveil a universal principle capable of explaining all possible earnings measurements. To achieve this, we examine the factors influencing earnings measurements by modeling them from a cash flow perspective. As a result, this paper focuses on the risks of income and expenditure rather than stock and flow, demonstrating that it is possible to represent all forms of earnings measurements by adjusting for these risk tolerances. Furthermore, it also mentions that traditional accounting basic concepts, including the principle of matching expenses with revenues, can be interpreted in the context of such the notion of the risks.

In fact, there has been an ongoing debate regarding whether stock or flow is more important in the earnings measurement. It appears that the underlying assumptions of the discussion change each time. If so, there are potential hindrance to the organic development of fundamental accounting concepts. Therefore, what we proposed is not a choice of which approach to emphasize but rather a perspective that centers on the "degree" of analysis in terms of how much risks related to income and expenditure is tolerated in earnings measurements.

However, this paper still faces several challenges. The effort to express the matching principle in terms of conditional probabilities is an application of insights from the adjacent field of finance. Nevertheless, within this paper, we have only addressed defered revenues and prepaid expenses, neglecting accrued revenues and accrued expenses, rendering the earnings measurement model incomplete. Furthermore, by applying the clean surplus assumption, we have not explored other comprehensive income. As we further refine the depiction of earnings measurements, the subsequent task is to analyze under what economic conditions and to what extent accounting rules that tolerate risks can maximize societal welfare.

Acknowledgements

This work was supported by JSPS KAKENHI Grant Number 20K02046. The authors would like to thank Dr. Kamariah Ismail at the 2nd International Conference on Business, Management, and Information Systems in 2023 and Kenichi Akiba and Yutaro Murakami at the Accounting Conference in 2022. The author(s) also gratefully acknowledge the helpful comments and suggestions of the reviewers, which have improved the quality of this paper.

References

Accounting Standards Board of Japan. (2006). The discussion paper, "Conceptual Framework of Financial Accounting.". Retrieved from: https://www.asb.or.jp/en/wp-content/upoads/ConceptualFramework200612.pdf. (Accessed 1 October 2018) (Tentative translation: March 16, 2007).

Anthony, R. N. (1984). *Future directions for financial accounting*. Dow Jones-Irwin.

Barker, R., & Penman, S. (2020). Moving the conceptual framework forward: Accounting for uncertainty. *Contemporary Accounting Research, 37*, 322−357.

Demerjian, P. R. (2011). Accounting standards and debt covenants: Has the "Balance Sheet Approach" led to a Decline in the Use of Balance Sheet Covenants? *Journal of Accounting and Economics, 52*(2−3), 178−202.

Desai, M. A. (2019). *How finance works*. Harvard Business Review Press.

Dichev, I. (2008). On the balance sheet-based model for financial reporting. *Accounting Horizons, 22*(4), 453−470.

Financial Accounting Standards Board (FASB). (1976). *An analysis of issues related to conceptual framework for financial accounting and reporting: Elements of financial statements and their measurement, Discussion Memorandum*. Norwalk, CT: FASB.

International Accounting Standard Board (IASB). (1989). *Framework for the preparation and presentation of financial statements*. IASB.

Mankiw, N. G. (2016). *Macroeconomics 9 edition*. Worth Publishers.

Nissim, D., & Penman, S. (2008). Principles for the Application of Fair Value Accounting. In *White Paper 2*. Center for Excellence in Accounting and Security Analysis, Columbia BusinessSchool.

Paton, W. A., & Littleton, A. C. (1940). *An introduction to corporate accounting standards, Monograph 3*. American Accounting Association.

Schmalenbach, E. (1955). *Dynamische Bilanz.12Aufl.* Westdeutcher Verlag.

Sprouse, R. T., & Moonitz, M. (1962). A tentative set of broad accounting principles for business enterprises. In *AICPA Accounting Research Study 3*.

Zimmerman, A. B., & Bloom, R. (2016). The matching principle revisited. *The Accounting Historians Journal, 43*(1), 79−120. https://doi.org/10.2308/0148418443179