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Accounting from a Cross-Cultural Perspective

Edited by Asma Salman and Muthanna G. Abdul Razzaq

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Notice

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Meet the editors

Dr. Asma Salman is an Associate Professor of Finance at the College of Business Administration, at the American University in the Emirates. She completed her MBA in Finance & Accounting and earned a Ph.D from the School of Management at the Harbin Institute of Technology, Harbin, China. With research credentials from Brunel University, London, she has been actively engaged in scientific research and has published credible articles in international journals and conferences. She also serves as an editor for various international journals and as the Dubai cohort supervisor for students under the Nottingham Business School DBA program. Her research has won her several awards and honors around the globe and she is a recipient of research grants for macro level projects. Her research interests include: Accounting, International Finance and Digital Currencies.

Professor Muthanna G. Abdul Razzaq is a Professor of Accounting. His constant drive to excel inspired him to establish the American University in the Emirates (UAE) in 2006, where he also serves as the President and CEO. Prof. Muthanna received his Bachelor's Degree in Accounting and Postgraduate Diploma in Cost Accounting from Baghdad University, Iraq. He then moved to the UK to pursue his Ph.D in Management Accounting from University of Manchester. During his career spanning 4 decades, he has served in various roles as the Acting Chair of the Department of Accounting, Deputy Dean of Faculty of Business Administration, Chairman of Academic Committee, Vice President for Scientific Research, Member of the Board of the Governors, Vice Chancellor for Administrative and Financial Affairs and Member of the Board of Trustees.

Contents

Preface

Accounting from a cross-cultural perspective shows the differences and the synergy of accounting principles and their implementation from a diverse standpoint. The many years of teaching, learning and consulting have taught us how the accounting concepts are similar but different in approaches in management accounting and decision making. Contemporary perspectives devise diverse regulations yet the financial accounting policies, capital asset treatments and standards remain the same. This presents both opportunities and challenges for the current day organizations and accounting professionals alike. It is also a well-known fact that emerging markets do not always share the same financial management challenges with the developed ones.

This book intends to feature the journey from the double-entry bookkeeping developed in medieval Europe to the changing dynamics of present-day accounting. It is divided into five main sections: The Matching Principle, Ethics in Accounting, Insurance Contracts, Green Accounting, and Financial Instruments. This book shows many different aspects of the same accounting principles but from a cross-cultural perspective. The diversity of the authors who contributed to this book signify the importance of accounting from various dimensions while ensuring that standards are adhered to, and principles are followed and applied.

The first section is titled "**The Matching Principle"** and is authored by Pietro Fera, Nicola Moscariello and Ettore Cinque from Ital. This section examines the renewed interest in the fundamentals of accounting and focuses primarily on the role of the matching principle as a determinant of earnings quality. The authors have performed an extensive and systematic literature review on the determinants and consequences of the matching process, examining a topic of major concern for standard setters.

Section 2 deals with the "**Ethics in Accounting"** and contains two chapters. Nida Türegün from Turkey aimed to reveal the connections among ethical awareness, ethical decision making, and transparency from the perspective of certified public accountants (CPAs) in Istanbul. Data was collected from Turkish CPAs' survey responses and analyzed using explanatory factor analysis. As highlighted during the study, the results show that CPAs are affected mainly by the level of their ethical awareness in decision making about an ethical issue or transparency of financial reports. Maria da Conceição da Costa Tavares and Alcina Portugal Dias from Portugal discuss and devise a literature review on the theoretical considerations and empirical research on sustainability reporting. This chapter analyzes each theory and the relationship between them. The authors conclude that, although the legitimacy theory is the dominant theory used in accounting and sustainability reporting studies, it is related to the other theories. The selection and application will depend on the focus of the study.

Section 3 deals with **"Insurance Contracts"** where Frank Xuyan Wang from Canada analyses the inequality for reinsurance contract, annual loss standard deviation and its application. As direct application of this inequality bounds for other risk measures of reinsurance contract, the TVaR (average of the annual losses that are larger than a given loss), the probability of attaching (greater than a given attachment loss), and the probability of exceeding (the annual loss limit) are obtained, which in turn reveals the capability upper limit of the simulation approach.

Section 4 is a relatively contemporary topic, **"Green Accounting".** M. N. Murty measures the relationship between Genuine Savings and Green GDP. The recent literature on the measurement of sustainable income has developed in two important ways for accounting of contribution of natural resource stocks. This chapter describes the methodology of measuring genuine savings for a country and reviews the estimates available for different countries. It also suggests a way forward for measuring genuine saving for India, where the study is based.

Section 5 deals with "**Financial Instruments**". Sani Kabiru Saidu from Nigeria and Huma Nawaz from Malaysia present a simple and precise narration on the meaning of financial instruments, their forms and characteristics, fundamental principles of Islamic finance as well as the similarities and differences between conventional and Islamic financial instruments. A case study reflecting the core merits and pitfalls of financial instruments is presented to further emphasize the understanding of the topic. This piece is intended to provide readers with a basic understanding of issues raised.

The successful completion of this book has been the result of various "behind-the-scene" members who have supported the book right from its inception until the publication process. We would like to express our sincere gratitude to all the authors for their diverse contributions. Last but certainly not the least, our Author Service Manager Ms. Marijana Francetic for her endless support during the publishing process.

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Section 1

The Matching Principle

Chapter 1

A Renewed Interest on the Fundamentals of Accounting: The Impact of the Matching 'Principle' on Earning Attributes

Pietro Fera, Nicola Moscariello and Ettore Cinque

Additional information is available at the end of the chapter

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Abstract

By adopting a 'revenue/expense' model, the matching principle has traditionally played a fundamental role in determining earnings. However, since the 1970s, standard setters have chosen to move to an 'asset/liability' approach to determine income. Some authors argue that these changes in accounting standards have caused a decline in the matching process, exercising a negative impact on the quality of earnings. A contrasting view, however, is that changes in the economic activity have caused the decline in matching. Moreover, according to Barth, there is no 'matching principle'. Indeed, the matching process often leads to the recognition of assets/liabilities of questionable substance and, therefore, cannot be considered an end in itself. The purpose of this chapter is to perform an extensive and systematic literature review on the determinants and consequences of the matching process, examining a topic of major concern for standard setters.

Keywords: accrual accounting, matching principle, revenue/expense model, asset/liability model, earnings attributes

1. Introduction

Information obtained from the financial reporting activity represent the most relevant data that a firm can disclose to the benefit of a wide group of stakeholders. In fact, the well-known information issue related to the information asymmetry between insiders and capital providers creates a demand for internally generated measures of performance to be reported over finite time intervals [1–5].

Since in the accounting field, sometimes it holds that profit is a point of view, while cash is a reality [6], and the interest of many accounting information users is addressed towards cash. As stated by Lee [7], the cash flow reporting system is based on the periodic recognition of cash inflows and outflows, which are not affected by credit transactions and arbitrary accounting allocations. Therefore, under the cash accounting method, revenues are recognized in the accounting period in which the payment is received, and expenses in the period in which the payment is made. In this case, income is computed as the difference between cash receipts from revenues and cash payments for expenses.

However, over a finite time interval, the mere recognition of realized cash flows could not be necessarily useful because of the net cash flows' fluctuations, with cash inflows and outflows that follow the firm's investment and financing activities as well as the firm's operating activities. For this reason, it can be assumed that realized cash flows undergo timing and matching problems which cause them to be a 'noisy' measure of firm performance [2].

Dechow [2] starts investigating whether cash flows have time-series properties which could be consistent with the idea that cash flows suffer from matching problems. Specifically, her results highlight that changes in net cash flows and in operating cash flows have an average negative autocorrelation (**Figure 1**), with the latter being smaller than the former.

This suggests that a cash-based performance measure suffers from temporary mismatching between cash inflows and outflows. In other terms, given that cash receipts and disbursements—which are strictly related to a specific activity—could be recognized in different measurement periods, a periodic reporting system based on cash flows does not coincide with the net economic benefits of shareholders in a given accounting period [8].

These issues were analysed and modelled by Dechow [2][1]. In particular, she sets up a simplified example based on a firm which has only sales. The starting point of the model is the definition of the cash collected during an accounting period:

$$Cash_t = [(1-\alpha)*Rev_t] + (\alpha*Rev_{t-1}) \tag{1}$$

where $Cash_t$ represents cash collected in the accounting period t, Rev stands for the revenues generated from sales made during accounting periods t and $(t-1)$, and α is the proportion of sales for which cash is not collected until the next accounting period. It must be noted that in this model, α is assumed as a constant for each accounting period, so cash collected in the accounting period t is composed of both the proportion (α) of sales made in the period $(t-1)$ that have not been collected yet, and the proportion $(1-\alpha)$ of sales made and cashed in the period t. Therefore, realized cash flows will differ from the economic net benefits realized in each period to the extent to which credit sales are not included in realized cash flows and the latter embody the inflows of credit sales from the previous period.

[1]Dechow [2] is not the first to investigate the problems related to the cash-basis reporting (e.g., [9, 10], among many others to be added.) However, the author marks an attempt to contrast the empirical properties of earnings to cash flows based on the role of accruals.

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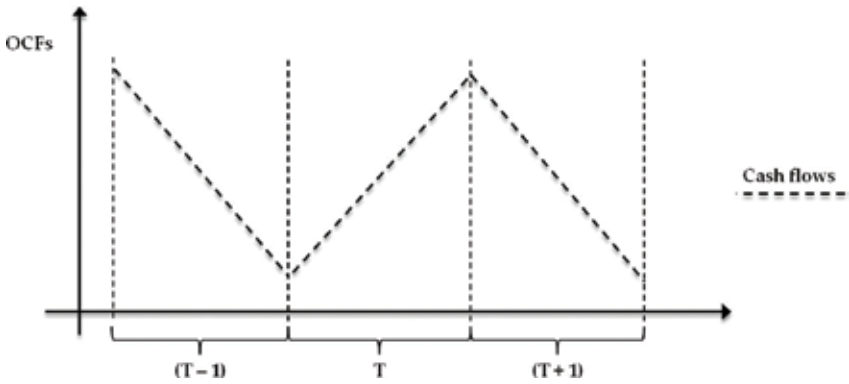

Figure 1. Negative autocorrelation of OCFs and changes in OCFs. Source: authors.

In such settings, if a steady-state firm is defined as one that is neither growing nor declining, it follows that $Rev_t = Rev_{t-1}$. Substituting Rev_t for Rev_{t-1} in Eq. (1) implies that $Cash_t = Rev_t$[2]. This means that in a steady-state firm, there will be no difference between the accounting numbers reported under the cash-basis system and the realized economic benefit. However, the steady-state assumption is an oversimplification because it is quite rare that a firm does not have an increase (or a decrease) in sales over each period. In this case, $Rev_t \neq Rev_{t-1}$ and it follows that:[3]

$$Rev_t - Cash_t = \alpha * \Delta Rev_t \tag{2}$$

where $\Delta Rev_t = Rev_t - Rev_{t-1}$.

As reported in Dechow [2], Eq. (2) highlights that the magnitude of the difference between revenues and cash flows for each period is directly and positively related to the proportion of sales on credit for which cash will be not collected until the next accounting period (α), and the larger is the change in revenues (ΔRev_t).

Even if the model is only focused on revenues from sales, it is readily generalizable to all other accounting features, and suggests that, when firms are not in a steady state, realized cash flows are expected to be a relatively poor measure of firm performance because they suffer from the abovementioned timing and matching problems, and are less able to reflect firm performance. In other terms, cash flows are characterized by a lack of information content about the future as they cannot show inter-period relationships. Given that the interest in a business organization depends on its ability to generate favourable future cash flows, a performance measure exclusively based on realized cash flows (especially during a short period) cannot adequately provide useful information to assess if a firm's performance is successful.

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[2]The process is as follows: $Cash_t = [(1-\alpha)*Rev_t] + (\alpha*Rev_{t-1}) \equiv Cash_t = [(1-\alpha)*Rev_t] + (\alpha*Rev_t) \equiv Cash_t = [(1-\alpha+\alpha)*Rev_t] \equiv Cash_t = 1*Rev_t \equiv Cash_t = Rev_t$.

[3]The process is as follows: $Cash_t = [(1-\alpha)*Rev_t] + (\alpha*Rev_{t-1}) \equiv Cash_t = Rev_t + [\alpha*(Rev_{t-1} - Rev_t)] \equiv Cash_t - Rev_t = [\alpha*(Rev_{t-1} - Rev_t)] \equiv Rev_t - Cash_t = [\alpha*(Rev_t - Rev_{t-1})] \equiv Rev_t - Cash_t = \alpha*\Delta Rev_t$.

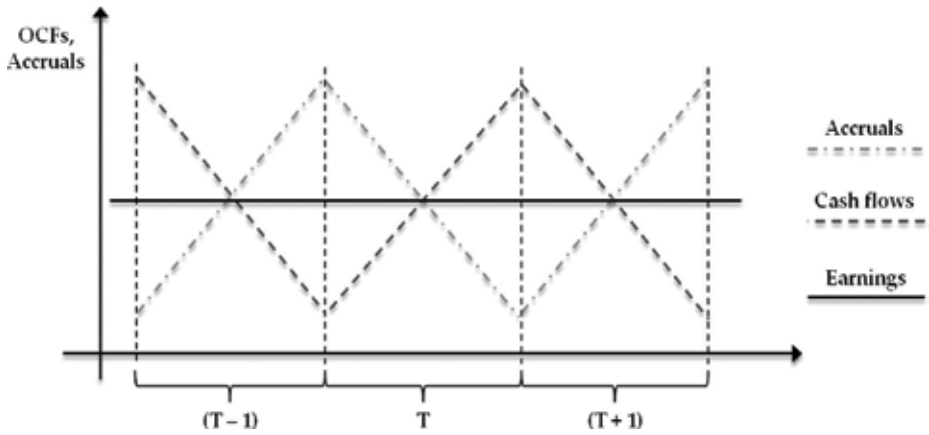

Figure 2. Earnings incorporating the negative autocorrelation of OCFs and accruals. Source: Authors.

An alternative to a reporting system based on realized cash flows is the accrual-basis financial reporting system whose primary product is net income, or earnings, as a measure of performance.

Accruals are adjustments for earned revenues and incurred expenses that are not recognized in the accounts yet. Income is therefore 'adjusted net cash flows' [11]: net cash inflows are still the principal driver of income, but they are temporarily adjusted by the accruals (changes in all non-cash assets and liabilities) because the effective receipts and disbursements of cash may not be the best representation of firms' performance as it does not show the causal relation between advancing cash to earn more cash. Therefore:

$$Earnings = Cash\ flows + Accruals \tag{3}$$

This means that the primary role of accruals is to overcome the abovementioned problems—related to the cash-basis accounting system—in measuring firm's performance when economic entities are in continuous operation [2]. Therefore, if accruals are used to 'adjust' cash flows in order to match positive and negative outcomes associated with the same economic event, changes in accruals will exhibit a negative autocorrelations and accruals will be negatively correlated with changes in cash flows (**Figure 2**).

Dechow et al. [12] formally modelled the accrual accounting process, relying on operating cash flows and the process by which operating cash flows' forecasts are embedded into earnings. In particular, their model not only confirms changes in operating cash flows that have a negative serial correlation, as shown by Dechow [2], but also highlights how earnings incorporate the negative serial correlation of cash flows and accruals to smooth out such correlations and become a better forecast of future operating cash flows than current operating cash flows (**Figure 2**).

2. The process of matching revenues and expenses

Accruals allow business organizations to recognize, in a certain reporting period, revenues and expenses for which they expect to obtain or spend cash, respectively, in a future reporting

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period. By recognizing economic events, regardless of when cash transactions occur, the accrual accounting method offers a fair review of business transactions.

Specifically, this method requires the recognition of revenues when they are earned—for supplied goods and rendered services—and expenses when they are incurred, regardless of the time of their collection (cash inflows and outflows). The underlying assumption is based on the proper recognition of business operations that should occur by matching revenues and expenses (revenue/expense matching process) when the economic event is completed rather than when payments are made or received. This method allows the correlation between current cash flows and future expected cash receipts and disbursements in order to obtain fairer representation of a firm's economic and financial conditions.

However, the usefulness of earnings depends on its quality that, in turn, depends on the quality of its components. Given that the realized cash flows subcomponent of earning is the most reliable element of the financial reporting activity, it goes that the usefulness and the quality of earnings depend on the quality of the accrual subcomponent.

The quality of accruals can be influenced by both firm's economic fundamentals (the so called 'innate factors') and the managerial discretion embedded in their recognition [13]. Nevertheless, besides these exogenous factors, another primary issue concerns the ground rules of the accrual accounting system. Specifically, the endogenous factors that affect the quality of accruals and, in turn, the quality of earnings are represented by the two main processes which guide the production of accounting numbers under the accrual reporting system: the revenue recognition and the matching process.

Since the correlation between expenses and revenues is one of the ground rules underpinning accrual accounting, the matching process has been defined as the central purpose of accounting, becoming the basic concept in the determination of periodic income [14].

Starting from 1940, Paton and Littleton support the determination of a periodic income based on the of stewardship perspective and, therefore, they advocate the historical cost accounting relying on the assumption according to which the historical cost is a more verifiable and objective evidence. As stated by Paton and Littleton [10] '*the primary purpose of accounting, […], is the measurement of periodic income by means of a systematic process of matching costs and revenues*'. According to the authors, the usefulness of matching principle can be viewed as a necessity for periodic profit and loss calculation in order to obtain a benchmark to assess the efficiency of management. In this sense, the difference between business effort (expenses) and accomplishments (revenue) reflects management efficiency, and this information is critical for investors to assess manager's stewardship.

In their matching process, revenues are recognized under the realization principle according to which products and services need to be converted into cash, its surrogates, or other valid assets. On the other hand, the recognition of expenses requires three phases: (i) ascertaining and recoding costs as incurred; (ii) tracing and reclassifying costs in terms of operating activity; (iii) assigning costs to revenues. Therefore, the expired expenses are recorded in accounts in order to match them with the relative 'realized' revenues. However, it has to be pointed out that '*matching costs and revenues requires more than careful procedures*, [… because …] t*he revenues*

of a particular period should be charged with the costs which are reasonably associated with the product represented by such revenues' ([10], 69).

2.1. The evolution of matching process in the standard setting

The revenue/expense (or income statement) approach views the identification of revenues, expenses and earnings as the primary goal of financial reporting. In particular, the main goal is represented by the proper determination of the timing and the amounts of revenues and expenses, while the balance sheet books and values are subordinate and derivative. In such settings, the two major guiding principles are the revenue recognition and the process of matching expenses with revenues. Specifically, the main goal of the traditional matching process is the determination of the proper periodic income, while assets are not determined looking at the existence of future economic benefits, but are considered as suspended revenues that are not properly aligned to the process of matching revenues and expenses. Therefore, the aim of the financial reporting process is to book accruals, which allow to correctly represent the timing of economic benefits (revenues recognition) linking the relative expenses (matching process). Consequently, the balance sheet elements are generally the residual of such a process, with assets and liabilities that are essentially the cumulative effect of periodic accruals. As a result, in order to ensure proper matching and avoid an earnings misrepresentation, the balance sheet not only reports assets and liabilities, but also accrued costs and revenues, and deferred charges and credits [15].

In contrast, the essence of the asset/liability (or balance sheet-based) approach is based on the proper assessment of assets and liabilities as the main goal of financial reporting, with the identification and the evaluation of other accounting numbers that are considered as subsequent and derivative. The main implication of such an approach is that the recognition of income statement values and the determination of earnings are affected by the balance sheet considerations. In fact, the asset/liability approach relies on the assumption according to which the proper determination of assets and liabilities leads the determination of earnings, which are simply viewed as the change in net assets over a certain period (adjusted for distributions and contributions from equity holders)[4].

Although there is an inherent conceptual tension between these two approaches, in practice, financial accounting has always been a pragmatic compromise between them [17]. However, it has to be noted that while the revenue/expense model historically dominated theory, practice, and pedagogy until the mid-1970s, a new era for the accounting process evolution started in 1973, when the FASB became the official standard setter in USA.

In particular, the Board recognized that the revenue/expense model and the asset/liability approach are the two major alternatives for the financial reporting activity. However, in order to ensure conceptual transparency and internal uniformity, the FASB also stated that the two approaches have to be considered as alternative, avoiding a muddled compromise between

[4]This view of earnings has strong underpinnings in economics, where it is known as 'Hicksian income'. See Brief [16] for a review of Hicks' views on accounting.

them. Relaying on such assumptions, in the late 1970s, the FASB stated that the balance sheet approach has to be considered as the only logical and conceptually sound basis of accounting and, therefore, the asset/liability approach should become the cornerstone of standard setting and financial reporting[5].

According to Dichev [17], the FASB's assumptions derive from the idea, according to which earnings should be considered as a 'change in value' and, therefore, it is not possible to determine a 'change in value' without defining the concept of value first. Therefore, the identification of assets and liabilities should represent the logical fundamental concepts that overcome the determination of earnings and, consequently, the balance sheet financial reporting approach represents the only consistent accounting system. Moreover, the revenue/expense model is conceptually doubtful, because it is based on ambiguous processes (like matching) and its application generates deferred and accrued items, which should be considered as unreliable assets and liabilities.

Building on the aforementioned assumptions, the FASB have been developing the asset/liability approach starting from a gradual process of compliance in order to align the older accounting standards to the new Conceptual Framework. Moreover, on the top of that the FASB is even pushing in support of more extreme forms of the balance sheet approach, namely with the idea that should lead to the 'fair value' accounting.

In addition to the FASB's efforts, there has also been a world-wide diffusion of the balance sheet approach that entered the heart of international standard setters too, becoming the dominant financial reporting system. Indeed, when the International Accounting Standards Committee (IASC) was founded (in 1973), it adopted a conceptual framework deeply based on the FASB's one. Then, in 2001, the IASC was replaced by the International Accounting Standards Board (IASB) that joined the FASB in coordinating their ideas and actions, adopting, in 2002, a formal memorandum known as 'The Norwalk Agreement', which details their joint commitment to convergence of US and international accounting standards. Since such process can be implemented only with shared conceptual basis, the two standard setters converge towards the asset/liability approach.

However, it has to be pointed out that the aforementioned choices of the international standard setters are also coming in for severe criticism. In particular, the critique to the standard setters is effectively summarized by Dichev [17] and is built around the four main themes:

- *the balance sheet approach is awkward, since it does not reflect how most firms operate, create value, and are managed.*

In fact, if an economic entity advances expenses to obtain resources and earns revenues, while assets have a subordinate and subsidiary role, a proper accounting system has to reflect this reality, which implies a natural and logical supremacy of the income statement approach. In such settings, the main issue related to the balance sheet approach is that it does not consider the concept of business model that plays fundamental role in determining the value-creation

[5]Storey and Storey [18], Bullen and Crook [19] and other accounts of this decision clearly indicate that the main reason for this conclusion was the perceived conceptual supremacy of the balance sheet approach.

process and the success of a business organization. Indeed, since the firm should be considered as a process and not a pool of 'things', the value of the economic resources originates from their value-in use and not from their value-in-exchange, implying that the revenue/expense model is the natural basis for financial reporting[6].

- *The assumed conceptual supremacy of the balance sheet approach is unclear. If anything, one can argue that the concept of income provides a clearer and stronger foundation for financial reporting*.

The accounting standard setters consider the concept of 'asset' as the most important and fundamental in accounting, and other concepts as derivative and secondary to it[7]. Specifically, the FASB and the IASB maintain that asset-oriented accounting is superior to income-oriented accounting because of the need to define earnings after the definition of assets. However, they then continue to define assets in terms of expected earnings[8]. Therefore, although the standard setters seem to suggest that the two concepts can be divorced and one can be superior to the other, the point is that the concept of asset and income are inextricably connected.

- *The balance sheet approach is probably one of the main sources of the decline in the forward-looking usefulness of earnings*.

The basic idea is that outsiders use earnings as the primary source of information to evaluate existing and future investments. However, the usefulness of earnings for investors is not embedded in the definition of 'changes in assets', but is related to the concept of 'recurring earnings', which represents the best predictor of the future earnings and cash flows. Therefore, while investors perceive good earnings as a highly persistent value able to predict of future earnings, the balance sheet approach considers assets as a store of values and earnings as 'changes in net assets', implying low persistence and predictability of earnings. This means that the balance sheet approach creates earnings which are not aligned to what investors consider 'good earnings'.

- *There are considerable issues related to the implementation of the balance sheet reporting system in practice*.

Such weaknesses derive from the great managerial discretion for the inputs and, consequently, the probability of large estimation errors and/or manipulation of accounting numbers[9]. In addition, the asset/liability model (and most of all the most extreme forms of mark-to-market and fair-value accounting) creates a feedback loop between financial markets and the real economy, and may possibly lead to or exacerbate market turmoil.

In response to the criticisms to the choices of the IASB and the FASB, and therefore to the balance sheet view, some scholars highlights that the significance of the matching process is

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[6] Note that a large minority of business activities and whole businesses do follow a process of value creation which has a balance sheet orientation, and where balance sheet-based accounting is sensible (an example is a firm whose only assets are marketable securities).

[7] Cfr. Storey and Storey [18], and Bullen and Crook [19].

[8] The FASB/IASB define assets as 'probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events'.

[9] See [20].

still recognized under the asset/liability approach as well. In fact, according to Kvifte [21], the asset/liability approach has been, and to some extent still is, misunderstood, because even if there are substantial differences between the balance sheet model and the revenue/expense view, there is a trend in attempting to find differences that do not exist [19, 22]. In fact, it has been said that the purpose of the asset/liability view is to downgrade the importance of income and of the income statement by making the balance sheet more important than the income statement [23]. Others have claimed that the intent of the asset/liability model is to supplant accounting based on completed transactions and matching of expenses and revenues with an accounting based on the valuation of assets and liabilities at current or fair values, labelling it as a 'valuation approach' [18]. However, according to Healy and Wahlen [24], the leading standard-setters do not ignore the emphasis on performance measures of the primary users of financial reports, and the conflict is rather how to achieve the best performance measures. In fact, given that the FASB states that the issue is how income is manifested (FASB, 2004a), Kvifte [21] concludes that the importance of net income is therefore not a matter of disagreement between the two groups.

Moreover, it has to be noted that although the matching process is considered as the basic concept of the income statement approach in the revenues and expenses' recognition method, according to the IASB and the FASB conceptual frameworks, it may also play a role in the asset/liability approach. However, matching is modified by the definition of asset and liability, given that costs has to be expensed in the same period as the revenues that result from the expenditures, but only to the extent that the relative balance-sheet items meet the asset/liability definitions (IASB, 1989).

Overall, whether the spread of the asset/liability approach has sidelined the concept of matching, or it has simply modified its application, the impact of such changes on the quality of accounting numbers is still an empirical matter.

3. Trends in the degree of matching

Although it was a broadly analysed topic until the 1970s, there has been little research effort aimed at matching in the last 20 years [3].

According to Dichev and Tang [3], one of the reasons related to this lack of research is that in earlier years the dominant paradigm of market efficiency implied that the market fully relays on accounting conventions and practices aimed to measure firms' performance. In fact, it is only quite recently that there has been a renewed interest into fundamental analysis, that is a research stream related to the study of whether and how the knowledge on accounting yields superior insights into firm performance and security valuation (e.g. [25–28]; and others)[10].

Another reason for the relative lack of research about the matching process is the aforementioned evolution of accounting standards. Indeed, while early standards recognized the

[10] Dechow and Schrand [29] provide a useful overview of this research stream.

importance of matching on both conceptual and practical level, during the last two to three decades the FASB and the IASB have adopted a perspective where the determination of income is viewed more as resulting from revisions of asset and liability values rather than as the residual from revenues and matched expenses [18].

In the spirit of fundamental analysis, it seems that the study of matching, and its determinants and consequences, can be viewed as a further step into enriching the knowledge about the determination and the properties of earnings. In particular, there are three studies that are close to the spirit of this kind of research. Such strand comprises Su [30] and the related studies of Lane and Willet [31] and Gibbins and Willet [32].

The *fil rouge* of these studies is based on the idea according to which a proper matching of revenues and expenses has a smoothing effect on earnings that is beneficial because it allows for better estimation of long-run economic profitability. Therefore, they conclude that matching, as well as conservatism and other accounting practices, are not merely ad hoc or traditional rules which accountants arbitrarily apply, but have rational bases in the sense that they can allow a better decision-making process [30].

Recently, through an historical retrospective on matching, which includes a review of more contemporary research and thought, Zimmerman and Bloom [33] also confirm that matching, as an approach to income measurement, can be helpful in forecasting earning power. Consequently, they conclude that matching should be retained as a long-standing fundamental accounting principle in standard-setting and in practice.

Moving from the studies that support matching principle as a desirable practice that allows to obtain more useful and informative accounting numbers, and motivated by the aforementioned relative lack of recent research aimed at matching, some authors have tried to deepen the knowledge about this topic analysing trends, and potential determinants and consequences.

The reference study in this 'new' field is the analysis of Dichev and Tang [3], who present a theory of matching and its effects on accounting variables. The principal insight of the theory is that poor matching acts as noise in the economic relation of advancing expenses to earn revenues. Empirically, they concentrate on time-series specifications using a sample composed by the 1000 largest US firms (for 34,785 observations) from 1967 to 2003, and measure matching as the coefficient (γ_2) on current expenses in a regression of revenues on past, current, and future expenses.

$$Rev_{i,t} = \gamma_0 + \gamma_1 Exp_{i,(t-1)} + \gamma_2 Exp_{i,t} + \gamma_3 Exp_{i,(t+1)} + \varepsilon_{i,t} \tag{4}$$

Findings reveal a clear and economically substantial declining trend in the contemporaneous correlation between revenues and expenses, and an increase in the non-contemporaneous correlation between revenues and expenses. Therefore Dichev and Tang [3] highlight a decline in matching, such that an increasing amount of expenses is being recognized before and after the period in which it affects revenues (**Table 1**).

Year	Coefficient on past expenses	Coefficient on current expenses	Coefficient on future expenses
1967	−0.010	1.029	−0.013
1968	−0.014	1.044	−0.015
1969	−0.004	1.030	−0.012
1970	0.002	1.042	−0.033
1971	0.026	1.003	−0.016
1972	0.010	1.089	−0.077
1973	0.063	0.939	0.020
1974	−0.053	1.106	−0.038
1975	0.023	1.061	−0.066
1976	0.028	0.991	0.005
1977	−0.001	1.015	0.007
1978	−0.007	1.053	−0.022
1979	−0.007	1.027	0.006
1980	−0.021	1.070	−0.028
1981	0.063	0.965	−0.010
1982	−0.017	1.054	−0.024
1983	−0.016	1.087	−0.056
1984	0.051	0.972	0.003
1985	0.016	1.013	−0.013
1986	0.039	0.937	0.038
1987	0.145	0.762	0.111
1988	−0.013	1.032	0.007
1989	0.066	1.003	−0.053
1990	0.101	0.932	−0.018
1991	0.176	0.802	0.028
1992	0.117	0.871	0.029
1993	0.168	0.691	0.152
1994	0.033	0.986	0.006
1995	0.029	0.979	0.018
1996	0.020	1.000	0.006
1997	0.093	0.894	0.038
1998	0.032	0.977	0.016
1999	0.081	0.952	−0.005
2000	0.042	1.015	−0.037
2001	0.464	0.533	−0.012

Year	Coefficient on past expenses	Coefficient on current expenses	Coefficient on future expenses
2002	0.092	0.715	0.204
2003	0.132	0.797	0.091
Mean 1967 to 1985	0.007	1.031	−0.020
Mean 1986 to 2003	0.101	0.882	0.034
Difference	0.094	−0.149	0.055
P-Value on Difference	<0.001	<0.001	0.002

Revenues, is net revenues deflated by average assets for the current period.
Expenses, is the difference between *Revenues* and *Earnings* for the current period.
$Expenses_{t-1}$ is the difference between *Revenues* and *Earnings* for the previous period.
$Expenses_{t+1}$ is the difference between *Revenues* and *Earnings* for the next period.
The regression is run on a cross-sectional basis each year.
P-value on the differences is obtained forma two-tailed t-test.
Source: Dichev and Tang [3].

Table 1. Regression of revenues on previous, current, and future expenses.

Period	Exp_{t-1}	Exp_{t}	Exp_{t+1}
1967–1985	0.002	1.032	−0.030
1986–2005	0.089	0.895	0.025
Difference	0.087	−0.137	0.055
P-Value on difference	<0.001	<0.001	<0.001

This table presents properties of earnings-related variables between two time periods, 1967–1985 and 1986–2005. Annual coefficients are obtained estimating the Dichev and Tang [3] model each in both time periods.
Source: Donelson et al. [4].

Table 2. Relation of revenues to lagged, current, and future expenses.

Similar trends in the evolution of matching have been documented by other subsequent studies. Specifically, Donelson et al. [4] selected a sample which consists of 32,645 US firm-year observations between 1967 and 2005, and that is generally consistent with the sample in Dichev and Tang [3]. Next, they estimate a cross-sectional regression which is identical to the regression model reported in Dichev and Tang [3]. As described in such study, Donelson et al. [4] documented a decline in the contemporaneous association of revenue and expense, and an increase in the lag (lead) coefficient (**Table 2**).

Murdoch and Krause [34] also analysed the US market but they began their investigation with 1987 data and, to allow for comparisons with earlier research, extend the analysis period through 2005, including all firms for which pertinent data are available rather than limiting the sample to large firms. In order to assess the degree of matching, Murdoch and Krause [34] observe the correlation between revenues and two expenses measures from the 1987 to 1996 period and compare it to the correlation for the 1997–2005 period, adopting the same methodology of Dichev and Tang [3]. As a result, their findings also highlight a worsening in the degree of matching between revenues and expenses recognized in the same period.

Still focusing on US settings, Bushman et al. [35] built a sample that consists of 228,847 firm-year observations from 1964 to 2012 and, still employing the same technique used in Dichev and Tang [3], confirm the declining trend in matching between revenues and expenses as documented in previous studies.

Further, using a sample composed by 189,608 US firm-year observations with valid data from the years 1970 through 2009, Srivastava [5] replicates the model proposed by Dichev and Tang [3] and obtain similar results in terms of declining matching between current revenues and expenses. Moreover, splitting the sample in two groups of firm he shows that for the new-firm segment, the average matching declines from 1.05 to just 0.59, while the average revenue-expense matching of the seasoned-firm segment declines by much less, from 1.05 to 0.94. As a result, he confirms a declining trend in matching current revenues and expenses, but also highlights that, relative to the seasoned-firm segment, the average matching for the new-firm segment's is 37% lower.

In the same year, Kagaya [36] examine changes in the relation between revenues and expenses over the last 16 years around the world. In particular, the final sample consists of 282,873 firm-year observations for the fiscal years 1991–2008, relative to 30,537 non-financial firms across nine countries (Canada, China, Germany, France, India, Japan, Korea, the UK, and the USA) which, in turn, are clustered in different cultural areas according to the definition of cultural area from Djankov et al. [37]. Referring to the matching measures proposed by Dichev and Tang [3], Kagaya [36] confirms that the correlation between revenue and expense has declined around the world (**Figure 3**), and shows that such a trend is stronger among the English speaking countries (**Figure 4**).

Along the lines of these studies, He and Shan [38] measure matching by the contemporaneous correlation between revenues and expenses. Relying on a sample that includes 42 countries, they estimate the annual matching coefficient from 1991 to 2010, and find that the decline in

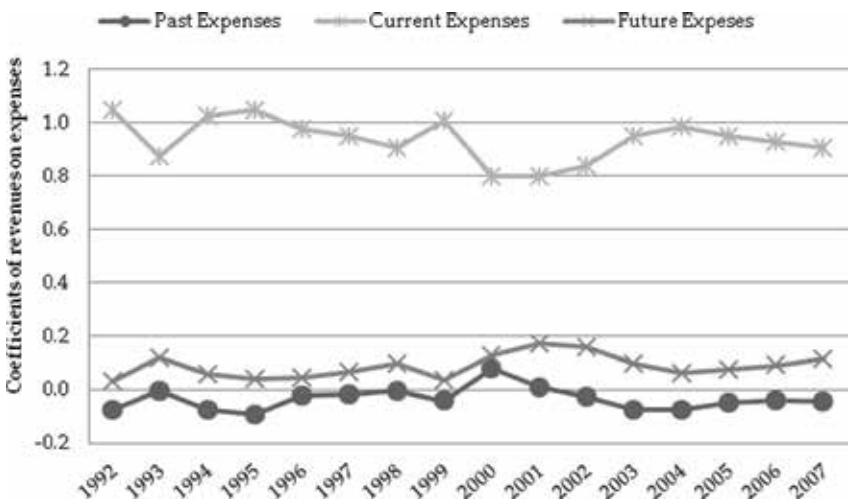

Figure 3. Coefficients in regression of revenues on past, current, and future expenses. Source: Kagaya [36].

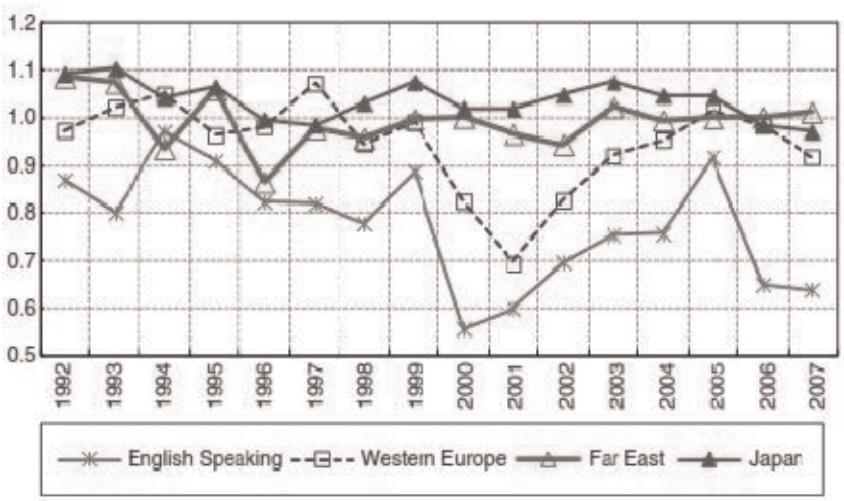

Figure 4. International comparison of the correlation between revenues and current expenses. Source: Kagaya [36].

matching is not unique to the United States, but a worldwide phenomenon during this period (**Figure 5**).

The only dissenting voice in this strand of research belongs to Jin et al. [39], who examine changes in the matching between contemporaneous revenues and expenses in Australian financial reporting. Specifically, relying on Dichev and Tang [3] their results indicate that the revenue-expense relation has declined in Australia during 2001–2005, but improved in more recent years (**Figure 6**).

Overall, looking at these studies focused on the identification of trends in the degree of matching, it seems clear that the major issue is related to a worsening of the relation between

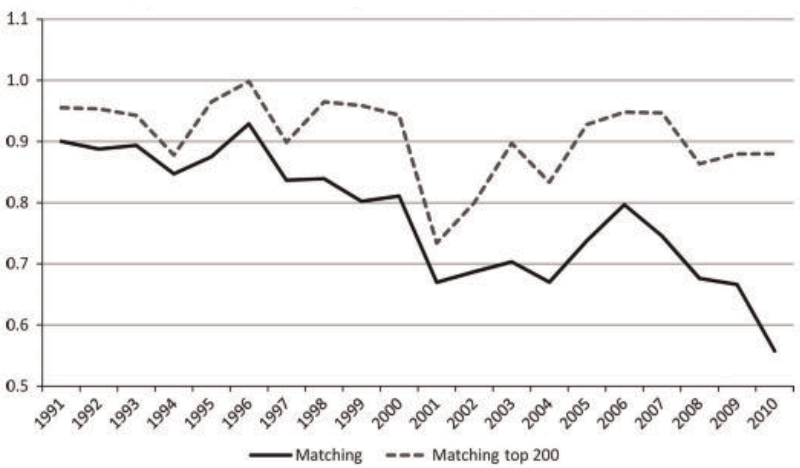

Figure 5. Matching between current revenues and expenses over time. Source: He and Shan [38].

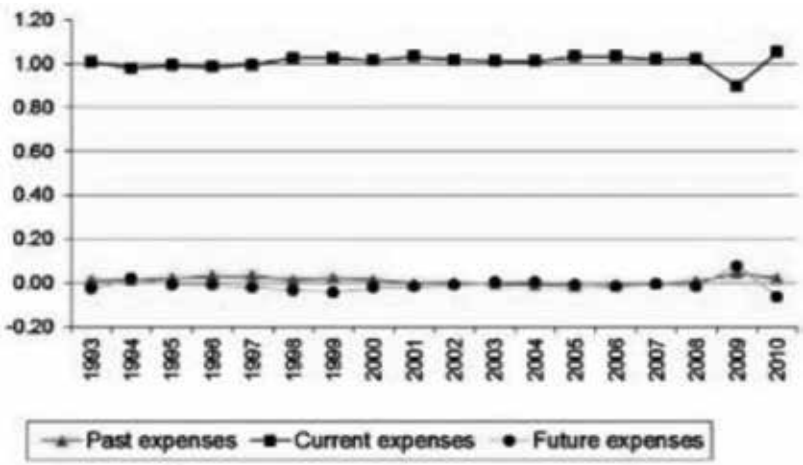

Figure 6. Correlation between current revenues and expenses in Australia. Source: Jin et al. [39].

current revenues and expenses, which has been documented in different settings with the only exception of the Australian one, examined by Jin et al. [39]. However, the mere detection of these changes could be not fully revealing without a careful analysis of both possible determinants and consequences related to such declining trend in one of the milestones of accrual accounting, such as the process of matching revenues and expenses.

3.1. Determinants of changes in the degree matching

According to Dichev and Tang [3], the possible determinants of the combined evidence that suggests a worsening of accounting matching over time can be identified in both the accounting system evolution and innate economic factors.

The reason underpinning this idea is due to the behaviour of accounting standard setters that, since the late 1970s, have taken a deliberate and far-reaching turn away from matching as the fundamental concept in the determination of earnings and towards a more balance sheet-based model of the determination of income[11]. On the other hand, the authors are also aware that changes in the real economy, towards more fixed costs and R&D activities, can also imply a temporal decline in matching success, and that there is little that financial reporting can do about the nature of these changes *per se*. However, Dichev and Tang [3] suggest that changes in the real economy have played a secondary role in the evolution of the properties of earnings. In addition, the authors state that if the point is 'what can be done to counter the effect of these changes on the informativeness of earnings', then the answer and the discretion lie again in the design of the financial reporting system and its relevant bodies.

Anyway, besides such theoretical aspects, the conclusions of Dichev and Tang [3] are not merely conjectures, inasmuch they rely on the empirical evidence of their analysis. However,

[11] See Dichev [17] for a better understanding of this topic.

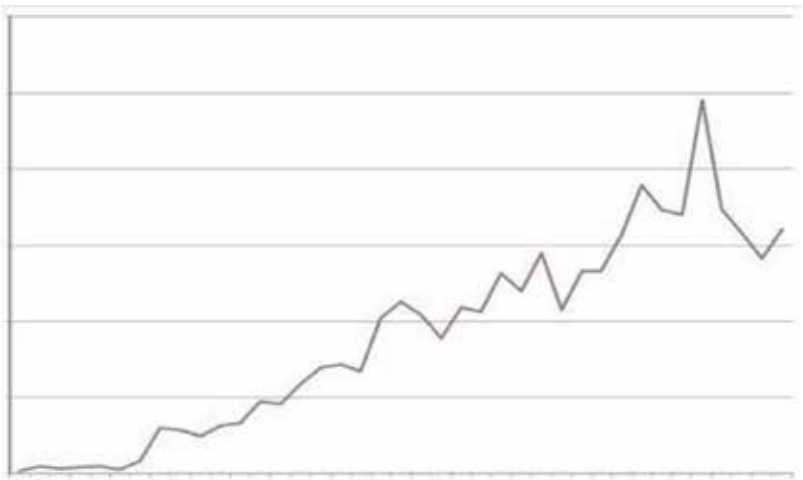

Figure 7. Correlation between current revenues and expenses in Australia. Source: Donelson et al. [4].

to date, Dichev and Tang [3] remain the only ones who ascribe the declining in matching to the accounting system's ground rules.

In fact, Donelson et al. [4], using a simple decomposition framework, show that the decline in the relation between current revenues and expenses is attributable primarily to a single income statement line item, namely special items, and not to systematic issues across multiple line items in the income statement. Moreover, since the 'weight' of special items as a component of total expenses has increased with the incidence of special items over time, decreasing the relation between current revenues and total current expenses, empirical evidence suggests that changes in the frequency of economic events associated with special items have played a more important and sustained role relative to the role played by the adoption of individual accounting standards (**Figure 7**).

Results from Donelson et al. [4] are then indirectly confirmed by Murdoch and Krause [34], who conclude that recurring earnings (that does not include the effect of special items) are preferred to an earnings number that includes the impact of special items.

An alternative explanation, to the declining in the relation between revenues and expenses, is offered by Srivastava [5]. In particular, he highlights that, in his sample, each new cohort of listed firms exhibits a lower degree of matching than its predecessors, mainly because of higher intangible intensity. Therefore, Srivastava [5] concludes that the trend of decline in matching is due more to changes in the sample of firms than to changes in generally accepted accounting principles or in the quality of matching process of previously listed firms (**Table 3**).

A totally different position from Dichev and Tang [3] is also assumed by He and Shan [38], who analyse the impact of IFRS adoption on matching and do not find any significant result, excluding that changes in reporting system have a primary role in determining changes in the degree of matching between current revenues and expenses. In addition, they analyse several economic factors as potential determinants of matching, such as the proportion of firms reporting large special items, the national economic growth, the weight of the service industry

Year	Total firms	Seasoned firms	Seasoned firms (%)	Year	Total firms	Seasoned firms	Seasoned firms (%)
1970	2470	2304	93.28	1990	4684	944	20.15
1971	2786	2263	81.23	1991	4868	935	19.21
1972	2975	2219	74.59	1992	5098	921	18.07
1973	3121	2169	69.50	1993	5319	905	17.01
1974	3206	2108	65.75	1994	5713	873	15.28
1975	3213	2051	63.83	1995	6166	847	13.74
1976	3214	1977	61.51	1996	6593	813	12.33
1977	3105	1886	60.74	1997	6578	757	11.51
1978	3051	1806	59.19	1998	6635	705	10.63
1979	3247	1731	53.31	1999	6500	651	10.02
1980	3510	1657	47.21	2000	6347	605	9.53
1981	3656	1587	43.41	2001	6399	586	9.16
1982	4109	1533	37.31	2002	6183	561	9.07
1983	4273	1428	33.42	2003	6076	546	8.99
1984	4396	1348	30.66	2004	5852	524	8.95
1985	4526	1257	27.77	2005	5755	510	8.86
1986	4544	1186	26.10	2006	5597	472	8.43
1987	4661	1098	23.56	2007	5482	455	8.30
1988	4629	1024	22.12	2008	5344	443	8.29
1989	4636	970	20.92	2009	5091	431	8.47

All of the firms with a listing year before 1970 are classified as 'seasoned firms'.
Source: Srivastava [5].

Table 3. Number of seasoned firms.

in a country's gross domestic product (GDP), and the intensity of R&D activities. Specifically, findings highlight that the degree of matching between contemporaneous revenues and expenses is weaker in countries where many firms report significant special items, GDP growth rates are low, more R&D activities are present, and the service sector accounts for a larger portion of the economy. Therefore, these results support the view that real economic factors are important determinants of matching. Finally, He and Shan [38] also consider whether country-level governance quality affects matching between revenues and expenses, and show that the contemporaneous revenue-expense relation is weaker in countries with common law legal origins and stronger investor protections. However, in these countries, there is a stronger association between past expenses and current revenues, implying that expenses are more likely to be recognized before the associated revenues[12].

[12]This finding is consistent with Ball et al. [40], and Bushman and Piotroski [41], who report that asymmetric loss recognition, a commonly used measure of accounting conservatism, is greater in countries with stronger investor protection.

Period	Earnings volatility	Revenues volatility	Expenses volatility	Correlation rev. – exp.
Mean 1967 to 1985	0.014	0.101	0.094	0.973
Mean 1986 to 2003	0.021	0.093	0.088	0.914
Difference	0.007	−0.008	−0.005	−0.059
P-Value on difference	<0.001	0.057	0.140	<0.001

Period	Earnings persistence	Autocorrelation in earnings changes
Mean 1967 to 1985	0.855	0.019
Mean 1986 to 2003	0.705	0.234
Difference	−0.150	−0.215
P-Value on Difference	<0.001	<0.001

Source: Dichev and Tang [3].

Table 4. Volatility and persistence of earnings, and autocorrelation in earnings changes.

Even more diametrically opposite to Dichev and Tang [3], there is the study of Jin et al. [39]. In fact, as viewed in the previous paragraph, they detect an increasing trend of matching between contemporaneous revenues and expenses for the Australian context, but only after the mandatory adoption of IFRS. Therefore, they suggest that changes in accounting rules have positively affected the matching process effectiveness.

Overall, a wide range of determinants has been proposed in order to justify the detected trend of matching and there seems to be no prevailing ideas among them.

3.2. Consequences of changes in the degree of matching

In addition to the determinants of changes in matching effectiveness, another fundamental issue is the analysis of the consequences of the modified degree of correlation between revenues and expenses.

The essence of the milestone of this research stream [3], is that mismatched expenses act as noise in the economic relation of advancing expenses to earn revenues, and therefore poor matching decreases the contemporaneous correlation between revenues and expenses. However, Dichev and Tang [3] also documented an increased volatility of earnings, a declining persistence of earnings, and an increased negative autocorrelation in earnings changes (**Table 4**)[13].

Therefore, looking at the combined evidence of their study, Dichev and Tang [3] suggest that accounting matching has become worse over time and that this trend had a pronounced effect on the properties of resulting earnings. Therefore, since earnings are the most widely used

[13]Dichev and Tang [3] also highlight that there are none of these temporal patterns in cash-based measures of revenues, expenses, and earnings.

accounting number, these results also suggest that a consideration of degree of matching effectiveness can bring useful insights to financial reporting users.

The same view can be detected in Murdoch and Krause [34], who employ a cash flow prediction criterion to investigate whether the decrease in matching has compromised earnings' usefulness in forecasting future cash flows. In particular, their results indicate that earnings from earlier periods, in which matching was better, can be used to make more accurate predictions of operating cash flows, relative to earnings from later periods with poorer matching. Therefore, Murdoch and Krause [34] conclude that the documented decline of matching damages the ability of earnings to aid in the prediction of future cash flows, thus being at odds with the primary purpose of financial statements.

A different position is assumed by Bushman et al. [35], who examines the timing role of accrual accounting and show that the timing role of accruals has dramatically declined over the past 50 years and has largely disappeared in more recent years. However, in exploring several potential reasons for such observed attenuation, they find that the decline in matching between revenues and expenses is less drastic than the decline in the timing role of accrual accounting. Furthermore, they highlight that the effect of the mismatch on the attenuation of the timing role of accruals is subsumed by the effect of the changes in cash flow volatility[14]. This means that Bushman et al. [35] do not believe that a worsening in the degree of matching affects one of the basic functions of accrual accounting.

Srivastava [5], on his own, analysed some determinants of the deterioration of the quality of earnings, considering matching as one of the of earnings quality components. However, although he confirms that there has been a decline in matching between revenues and expenses, he fails in neglecting the possibility that matching, as a ground rule of accrual accounting, could act as a moderator between the determinant of the documented erosion of earnings quality and the earnings quality measures and attributes. Consequently, the analysis is not able to prove if the downward trend of matching could have had some consequences on the quality of accounting numbers.

Going on, Kagaya [36] investigates the relation between earnings smoothness and matching, and analyses the relation between current accruals, and current and next cash flows from operations. Evidence shows that the degree of matching is positive related to the stability of earnings. Therefore, Kagaya [36] states that matching contributes to the presentation of permanent incomes, controlling for the volatility of earnings. Moreover, his results suggest that the accrual process, supported by matching and accruals, improves earnings smoothing and the signalling ability of future cash flows.

[14]Empirical results are consistent with the idea that the decline in the matching between revenues and expenses over time contributes to the loss of the timing role of accrual accounting. However, the coefficient on the matching trend variable remains negative and statistically significant (revealing that that only about 19% of the timing role decline is related to documented mismatch between revenues and expenses) and it becomes statistically insignificant, whereas the coefficient on cash flow volatility remain highly significant.

Overall, among these studies, that analyse the effects following the declining in matching revenues and expenses, the prevailing idea is that a higher degree of matching is a desirable quality to obtain more informative and useful earnings.

4. Conclusion and remarks

Despite the assumption according to which the accrual reporting system provides better performance measures and useful accounting information through earnings, previous literature on this topic has highlighted very mix findings due to the great heterogeneity of analysed settings. Moreover, it has to be noted that the usefulness of accounting numbers depends primary on their quality that in turn can be influenced by both exogenous factors (firms' economic fundamentals and managerial discretion) and endogenous factors (the reporting system's ground rules), to be considered as determinants of earnings quality.

In connection with the endogenous factors, a niche strand of research has shown a renewed interest into fundamental analysis and highlights that there has been a considerable downward trend in the effectiveness of the basic rules of accrual accounting: revenue recognition, matching and timing. However, even if there are not so many scholars that joined this topic, the heterogeneity in results and ideas is quite deep, especially with regard to the determinants and the consequences of the detected declining trends. In particular, changes in the accounting systems can be considered as the most compelling and controversial topic, when analysed in connection with the quality of accounting numbers and its fundamentals.

In connection with this, it has to be noted that financial accounting figures have always been the result of a pragmatic compromise between two basic approaches: the 'revenue/expense' and the 'asset/liability' ones [17]. However, during the last decades, the emphasis of financial reporting standards has been gradually shifting from the former approach to the latter [42].

In particular, the 'asset/liability' view is described as the only logical and conceptually sound basis of accounting [18, 19, 43]. In fact, since the late 1970s, a movement towards the 'asset/liability' approach has been strongly supported by the Financial Accounting Standards Board and rapidly embraced by many other national standard setters, like Australia, Canada, New Zealand and UK [44]. In this view, the definition of assets and liabilities also represents the fundamental building block in the International Accounting Standards Board's Conceptual Framework [45]. Therefore, the presence of the 'revenue/expense' model has narrowed all over the world, together with the adoption of, or convergence towards, International Financial Reporting Standards [36].

In response to the clear position taken by regulators, national and international standard setters, several scholars have stressed theoretical and empirical drawbacks associated with the 'asset/liability' approach. In fact, it seems that the alleged conceptual superiority of the balance sheet is unclear, while it contrasts with how most businesses operate and create value: advancing expenses to generate revenue and earnings [17, 21]. At the same time, according to Dichev and Tang [3], by worsening the revenue-expense matching process, the constant shift towards an 'asset/liability' model seems to have lowered the earnings quality of US listed

companies over the past 40 years, causing a marked deterioration in the forward-looking informativeness of earnings.

However, few scholars have challenged the conclusions reached by the aforementioned authors, as they ascribe the prolonged decline in the 'matching' between contemporaneous revenues and expenses to changes in the economic environment, rather than to changes in the accounting standards [4, 5].

Therefore, given that this topic is still an empirical matter and far from being undisputed, there are many rooms for future studies in order to deepen the consequences of a change in the financial reporting system on the effectiveness of the process of matching expenses with revenues. Further, other important issues to be considered should aim to assess the effect that the possible different degree of matching could have on the quality of accounting numbers, controlling for a set of variables that might affect both matching process and earnings quality.

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References

[1] Barth ME. Global financial reporting: Implications for US academics. The Accounting Review. 2008;**83**(5):1159-1179

[2] Dechow PM. Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. Journal of Accounting and Economics. 1994;**18**(1):3-42

[3] Dichev ID, Tang VW. Matching and the changing properties of accounting earnings over the last 40 years. The Accounting Review. 2008;**83**(6):1425-1460

[4] Donelson DC, Jennings R, McInnis J. Changes over time in the revenue-expense relation: Accounting or economics? The Accounting Review. 2011;**86**(3):945-974

[5] Srivastava A. Why have measures of earnings quality changed over time? Journal of Accounting and Economics. 2014;**57**(2):196-217

[6] Gîrbină MM, Bunea Ş. Sinteze, studii de caz şi teste grilă privind aplicarea IAS (revizuite) – IFRS. In: Volumul 1. Ediția a III – a revizuita: Editura CECCAR, Bucureşti; 2007

[7] Lee TA. Cash flow accounting and corporate financial reporting. In: Bromwich M, Hopwood A, editors. Essays in British Accounting Research. London: Pitman Publishing; 1981. pp. 63-78

[8] Frankel R, Sun Y. Predicting Accruals Based on Problems with Cash Flows. Working paper. 2014

[9] Paton WA. Accounting Theory. Ronald Press, NY. Re-issued in 1962 by A.S.P. Accounting Studies Press, and re-printed in 1973 by Scholars Book. 1992

[10] Paton WA, Littleton AC. An Introduction to Corporate Accounting Standards. Sarasota, FL: American Accounting Association; 1940

[11] Dichev ID. On the conceptual foundations of financial reporting. Accounting and Business Research. 2017. DOI: 10.1080/00014788.2017.1299620

[12] Dechow PM, Kothari SP, Watts RL. The relation between earnings and cash flows. Journal of Accounting and Economics. 1998;**25**(2):133-168

[13] Francis J, LaFond R, Olsson P, Schipper K. The market pricing of accruals quality. Journal of Accounting & Economics. 2005;**39**:295-327

[14] Littleton AC. Structure of accounting theory (No. 5). American Accounting Association (AAA). 1953

[15] Belkaoui AR. Accounting Theory. Cengage Learning EMEA; 2004

[16] Brief RP. Hicks on accounting. The Accounting Historians Journal. 1982;**9**(1):101-111

[17] Dichev ID. On the balance sheet-based model of financial reporting. Accounting Horizons. 2008;**22**(4):453-470

[18] Storey RK, Storey S. The Framework of Financial Accounting Concepts and Standards. Norwalk (CT): Financial Accounting Standards Board; 1998

[19] Bullen HG, Crook K. Revisiting the Concepts: A New Conceptual Framework Project. FASB report. 2005

[20] Palepu K, Healy P. The fall of Enron. Journal of Economic Perspectives. 2003;**17**(2):3-27

[21] Kvifte SS. Revisiting the concepts: Time to challenge the asset-liability view. Australian Accounting Review. 2008;**18**(1):81-92

[22] Sprouse RT. The importance of earnings in the conceptual framework. Journal of Accountancy (pre-1986). 1978;**145**(000001):64

[23] Kirk RJ. The statement of principles - a panacea or a false dawn? CPA (June). 1998:12-16

[24] Healy PM, Wahlen JM. A review of the earnings management literature and its implications for standard setting. Accounting Horizons. 1999;**13**(4):365-383

[25] Fairfield PM, Sweeney RJ, Yohn TL. Accounting classification and the predictive content of earnings. The Accounting Review. 1996;**71**(3):337-355

[26] Nissim D, Penman SH. Ratio analysis and equity valuation: From research to practice. Review of Accounting Studies. 2001;**6**(1):109-154

[27] Piotroski JD. Value investing: The use of historical financial statement information to separate winners from losers. Journal of Accounting Research. 2000;**38**(supplement):1-41

[28] Sloan RG. Do stock prices fully reflect information in accruals and cash flows about future earnings? The Accounting Review. 1996;**71**(3):289-315

[29] Dechow PM, Schrand C. Earnings Quality. Charlottesville: The Research Foundation of CFA Institute; 2004

[30] Su SY. To match or not to match. The British Accounting Review. 2005;**37**:1-21

[31] Lane J, Willett R. Optimal smoothing of accounting earnings. IMA Journal of Management Mathematics. 1999;**10**:1-14

[32] Gibbins M, Willett R. New light on accrual, aggregation, and allocation, using axiomatic analysis of accounting numbers' fundamental and statistical character. Abacus. 1997; **33**(2):137-167

[33] Zimmerman AB, Bloom R. The matching principle revisited. Accounting Historians Journal. 2016;**43**(1):79-119

[34] Murdoch B, Krause P. The decline in matching and earnings' ability to forecast operating cash flows. Journal of Applied Business Research. 2012;**28**(4):701-708

[35] Bushman RM, Lerman A, Zhang XF. Is the Timing Role of Accrual Accounting Disappearing?. Working paper. 2013

[36] Kagaya T. Matching expenses with revenues around the world. In: International perspectives on accounting and corporate behavior, Springer. 2014. p. 81–106

[37] Djankov S, La Porta R, Lopez-de-Silanes F, Shleifer A. The law and economics of self-dealing. Journal of Financial Economics. 2008;**88**(3):430-465

[38] He W, Shan Y. International evidence on the matching between revenues and expenses. Contemporary Accounting Research. 2016;**33**(3):1267-1297

[39] Jin K, Shan Y, Taylor S. Matching between revenues and expenses and the adoption of international financial reporting standards. Pacific-Basin Finance Journal. 2015;**35**:90-107

[40] Ball R, Kothari SP, Robin A. The effect of international institutional factors on properties of accounting earnings. Journal of Accounting and Economics. 2000;**29**(1):1-51

[41] Bushman MR, Piotroski JD. Financial reporting incentives for conservative accounting: The influence of legal and political institutions. Journal of Accounting and Economics. 2006;**42**(1):107-148

[42] Benston GJ, Bromwich M, Wagenhofer A. Principles versus rules based accounting standards: The FASB's standard setting strategy. Abacus. 2006;**42**(2):165-188

[43] Sprouse RT. Accounting for what-you-may-call-its. Journal of Accountancy. 1966;**122**(4): 45-53

[44] Johnson LT. Understanding the Conceptual Framework. FASB Report. 2014

[45] Camfferman K, Zeff SA. Financial Reporting and Global Capital Markets: A History of the International Accounting Standards Committee, 1973–2000. Oxford University Press on Demand; 2007

Section 2

Ethics in Accounting

Chapter 2

Ethical Awareness, Ethical Decision Making, and Transparency: A Study on Turkish CPAs in Istanbul

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Additional information is available at the end of the chapter

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Abstract

This research aims to reveal the connections among ethical awareness, ethical decision making, and transparency from the perspective of certified public accountants (CPAs) in Istanbul. Data are collected from Turkish CPAs' survey responses, which are based on a seven-point Likert scale, and analyzed using explanatory factor analysis. Hypotheses were tested using ordinary least squares regression, and the results show that, based on the participants' average responses, CPAs are affected mainly by the level of their ethical awareness in decision making about an ethical issue or transparency of financial reports, which indicates that the three concepts are strongly connected to each other.

Keywords: ethical awareness, ethical decision making, transparency

1. Introduction

Accounting is the language of business; it records information to present the overall financial picture of a firm to related parties and help them make decisions. Economic systems rely on accounting; without which they would eventually collapse [1]. However, the structure of economic systems and strong competition have prompted some accountants to pursue unethical behaviors occasionally, with the aim of maximizing their or their companies' interests [2].

The nature of the accounting profession necessitates a high level of ethics and transparency since the financial figures on statements must be accurate, true and relevant for a better decision making process. Accountants may find themselves in a conflict with the interests of firms or personal gains while making decisions. They may desire to manipulate

accounting numbers in order to favor firm with attracting potential investors by presenting higher income or lower income before a potential management acquisition.

Moreover, accountants may have the motivation to manage reported earnings so as to meet earnings targets and, therefore, to get performance-related payment or bonuses, which are related to company's earnings. This situation generates an information asymmetry as managers practice the discretion they hold on accruals, which alternately decreases the reliability together with the relevance of reported earnings and the entire financial statements. External and internal users of financial statements require transparent and reliable information to make appropriate decisions [3]. Only knowledge of ethics can help accountants make ethical decisions to overcome ethical dilemmas, to benefit external users, especially the public, and maintain their trust in the company [4]. Accountants need to be aware of ethical behaviors, make ethical decisions under uncertain situations, and ensure transparent financial reports.

Thus, the aim of this research in this chapter is to reveal the relationships among ethical awareness, ethical decision making, and transparency from the perspective of CPAs. This study contributes to the literature in three ways. First, unlike most existing research, which focuses on ethical awareness and ethical decision making, this study includes transparency. Therefore, it extends the limited research to the relationships among the three concepts.

Second, to the best of my knowledge, this is the first field study to investigate the connections among ethical awareness, ethical decision making, and transparency in Turkey. This study focuses on Turkey since the country represents a setting that is closer to those of many emerging economies. Moreover, Turkey is one of the countries in the new set of emerging economies that is important to the world economy, and it has attracted the attention of investors. Istanbul, in particular, is chosen because of the diversity of CPAs who come to the city from every region of the country, owing to the city's better working conditions. This study also contributes to the literature by revealing the perspective of Turkish CPAs on ethical awareness, ethical decisions, and transparency, and on the relationships among these three concepts.

Third, by highlighting the relationships among these three concepts, this study recommends an area for further study. The rest of the chapter is structured as follows. In the next part of the study, the definitions and importance of ethics and transparency concepts are stated. In the third part, account profession and CPAs in Turkey are explained in details. In the fourth part, the results and analysis are discussed. In the final part, conclusions are presented.

2. Ethics and transparency

In order to understand the study in this chapter, the term ethics and transparency must be explained. Ethics is the essential concept and important value of human behavior. Ethics is a part of an attitude that includes classifying, supporting and advising concepts of right and wrong behavior. The word ethics originates from Greek with a meaning of habit. Ethics tries to determine inquiries of human ethical quality by characterizing ideas, for example, right or wrong, good or bad, virtue and vice, etc. It embraces the study of worldwide morals like

compliance to the law of land, anxiety for health and security, and for the natural habitat. Ethics influence how individuals settle on choices and direct their lives. The perception of ethics differs from country to country since the notions of ethics have been originated from religions, attitudes, and cultures.

On the other hand, for ethical financial reporting transparency plays an important role. Transparency denotes a clear, complete, and understandable reporting. It creates a setting where information is understandable, accessible and visible to all participants. Moreover, it creates a fair presentation of financial statements. Transparent financial reporting allows users of financial information to evaluate the financial position of a business. It assists investors to make better decisions and build confidence in the fairness of the markets. It is important that companies provide clear, complete and reliable financial statements in order users of financial information to be less likely astonished by unknown transactions or events [5]. However, transparency can be violated by showing more detailed information, which may release confidential information, by showing less information or by covering some transactions in the financial statements.

The central aim of unethical behavior and violation of transparency is to mislead investors by announcing financial information, which does not represent the real financial position and performance of the company. Unethical behavior and violation of transparency block decision makers to make rational, logical and realistic decisions. Therefore, uncovering and blocking unethical behavior or violation of transparency is extremely important [6].

According to Küçüksözen and Küçükkocaoğlu, there are 10 aims of unethical behavior and violation of transparency. They take place to influence stock prices and risk of a company; meet the financial conditions in debt contracts; keep good relations with investors, creditors and employees; manipulate management fees; increase the amount of funds provided by public offerings or capital increase; avoid risks that may arise from political and legal arrangements; reduce the perceived risk of investors on the company; signal about the company's future performance; provide tax advantage, and also for insider trading [7].

The following part is going to give a brief explanation about ethical awareness, ethical decision, and transparency concepts.

2.1. Ethical awareness

Ethical awareness is the eagerness and ability to designate moral situations and dilemmas; critically analyze, evaluate, and additionally change one's own moral esteems; and look up the effects of one's own attitude for the lives of others. All sizes of enterprises must be conscious of the ethical implications of their way of acting. Ethical awareness begins with watchful thinking to guarantee an enterprise's activities are morally right.

A person is ethically aware if he/she realizes that a problem he/she experiences incorporates an ethical problem [1]. A person can make right and moral decisions only if that person is aware of an ethical problem. Additionally, that person can identify the potential effects of a problem on the benefits, desires, and welfare of all related parties [8].

Most of the people think acting ethically is its personal reward, however, an enterprise likely consumes monetary motivations too. Unethical behaviors may spoil the position, reputation, and relations of an employee. Moreover, it may damage an enterprise's image, which will end up with losing current and potential customers. Indorsing ethical awareness among employees stops issues from developing in any way.

2.2. Ethical decision

A person's moral choice from among the many possible choices is called an ethical decision [1]. An ethical decision is one that is acknowledged on moral grounds by most of the general public or one that is acknowledged legally. On the other hand, an unethical decision is one that is acknowledged as illegal or immoral. Ethical decision making induces a person to make an ethical decision in uncertain conditions or in ethical dilemmas, relying on his/her assessment at that moment [9].

Making decent ethical decisions needs an educated understanding of ethical concerns, besides a trained manner for discovering the ethical features of a decision and evaluating the thoughts that would affect our decision of a course of action. It is important to have a way ethical decision making.

The more different and problematic the ethical choice we confront, the more we have to depend on talk and exchange with others about the situation. Just through watchful investigation of the issue, supported by the bits of knowledge and alternate points of view of others, we would be able to settle on great moral decisions in such circumstances.

Each profession group is faced with ethical dilemmas while carrying on their activities. Moreover, some professionals may be a threat to society by acting unethically. Some professionals, who are unethical, may advocate various misconceptions such as "everyone is doing it", "moral if it is legal", "possibility of being exposed and punished" in order to justify unethical behavior in the face of ethical dilemma [10, 11]. Ethical values must be taken into account in the practice of professional activities since legal sanctions and written rules designed to prevent unethical behavior are not enough alone. Accountants who hold the foresight of society's interests should be willing to act ethically in the face of ethical dilemmas. In addition, ethical dilemmas should be tried to prevent unethical behavior and contribute to ethical decision making efforts [12].

2.3. Transparency

The word transparency means straight, very clear, honest, and true. Transparency for financial reporting means financial statements that are true and reliable.

The level of access to a firm's financial information by internal and external users, especially investors, is called transparency [13]. Transparency helps decrease price volatility since all users of financial information have the same data for making decisions. It is a very important concept for companies because the more transparent financial reports become, the more investment companies will receive, and the higher their stock prices will be [14].

Nobody can disregard the significance of transparency in financial reporting since individuals make their investments with respect to the financial reporting. Investors believing that

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they are transparent. Investors need more transparent data about the monetary information of the organization. Actually, transparency is the quality of report that supports investors in settling on certain investment choice. It is worthy of recommendation to the investors that those organizations who do not comprehend the significance of transparency in financial reporting ought to be kept away from. Making interests in such organizations is unsafe.

Organizations that comprehend the significance of transparency in their statements are moreover knowledgeable about the investor-state of mind. A nontransparent financial report presents no information regarding the true risks attached to the organization. Here is a basic case of this. An essential marker of future development of an organization is the means by which it has contributed the cash. As an investor, when you search for the invested amount you cannot find a solid data with respect to the speculations made by the organization, at that point evaluating investments turns out to be hard. Nontransparent financial statements also mask the debt level. In this way, an organization may hide whether the organization is on the precarious edge of liquidation.

2.4. Ethical regulations in accounting

It is clearly accepted that preparing financial statement takes in the usage of judgment and assumptions. It means that prepared financial statements might demonstrate different results than if they had been produced for the identical company, identical period but by different equally qualified professional. Nevertheless, both kinds of financial statements meet the prevailing requirement of displaying a true and a fair view. The flexibility of management decision, used to affect the reported results, might generate opportunities so-called "earnings management". A number of individuals argues that numerous companies legally practice earnings management. The common reason behind this is to fulfill the expectancies of analysts, regardless of the inspection from auditors, investors, and authorities [15].

Accounting scandals that were taken place in the beginning of 2000s put forward the significance of reliability in accounting information. Enron misrepresented earnings and reserved massive debts off the balance sheets, WorldCom increased revenues with fake journal entries and capitalized expenses; Tyco International siphoned millions of dollars over unapproved loans and deceitful stock sales and so on. After these scandals, many investors at different levels experienced big losses, and capital markets came under question. Accordingly, new regulations come into charge to assure faithful representation and prevent healthy pricing in the market. As a result of these scandals and other situations regulations on ethics have been made.

The significant international ethical regulations in accounting consist of "The Ethical Standards of the Accounting Profession", published by the American Institute of CPAs in 1966, and revised and republished in 1988 as the "Code of Professional Conduct"; the "Code of Ethics", published by the International Organization of Supreme Audit Institutions in 1998 [16]; the Sarbanes-Oxley Act, which came into force in 2002 [17]; the "Rulebook for Code of Ethics", published by the Institute of Internal Auditors in 2010 [18]; and the "Code of Ethics", published by the International Federation of Accountants (IFAC) in 2005 [19].

Meanwhile, the significant Turkish ethical regulations in accounting include "General Accounting Practice Implementation", published by the Ministry of Finance in 1992, and the ethics-related

regulations that came into force with Law No. 3568 in 1989 [2]. In Turkey, the increased public interest to the ethics concept has arisen with the 2001 economic crisis. The reforms in ethics inevitably took place in the period following the crisis. For the purpose of recovery and improvement of ethics, the "Code of Ethics" has been issued by the Union of Chambers of Certified Public Accountants of Turkey in 2013 [20]. Additionally, the "Ethical Rules for Independent Auditors", published by the Public Oversight, Accounting, and Auditing Standards Authority in a bulletin in 2015 [21]; and the ethics-related regulations published by the Capital Markets Board (CMB) in its bulletins, especially Bulletins No. 1 and 16 [22, 23].

3. Account profession and CPAs in Turkey

An accountant is a person who records, classifies, summarizes, analyzes, interprets, and reports results to related parties, creates accounting policies, and generates financial information for budget and audit purposes to help strategic management and planning [24].

The accounting profession has reached the status of "profession" with the Law on Public Practice Accounting, independent accountant, and financial advisor and Certified Public Accountant numbered 3568 and amended by the Law No. 5786 published in Official Newspaper in 1989, in Turkey. Occupational practitioners keep records that should be held by the enterprises, arrange financial statements and declarations, establish accounting information system, conduct consultancy, and expertise.

Professionals in Turkey are carrying out their activities under the name of two types of professional titles: independent accountant and financial advisor and certified public accountant (CPA). Independent accountant and financial advisors perform bookkeeping, prepare financial statements and declarations, establish accounting information system, conduct consultancy, and expertise in accordance with generally accepted accounting principles and related legislative provisions [12]. On the other hand, CPAs have more credibility and expertise since they have to pass particular tests and meet licensing requirements. They can prepare and sign tax returns and moreover prepare audited financial statements. However, they cannot open an accounting office and cannot be partners in any accounting offices.

Union of Chambers of Certified Public Accountants and Sworn-In Certified Public Accountants of Turkey (TÜRMOB) is a center that gathers the accounting profession under a single roof in Turkey.

3.1. Accounting profession ethics

Accounting profession ethics is a set of rules that should be implemented by professional accountants during the execution of the activities and even in situations and periods in which professional activity is not carried out for any reason, to provide reliable information by paying attention to the value judgments of the society as well as making transactions in accordance with the laws and relations with customers, society, colleagues, and related sectoral organizations [12].

Intended for accounting profession protection of public confidence and increase the credibility of the profession in the community connected with having ethical values in addition to complying with legal regulations related to practice of professional accountants. As in every profession, there are not only specific legal rules in accounting profession, but also ethical principles and rules that made by accounting organizations [25].

The factors, legal regulations, free electoral rights and ethics that affect professional decisions and behaviors of accountants are the points of action in professional decisions for them. According to these points, a profession in the context of the mentioned factors, making professional decisions in the knowledge of ethical and ethical dilemma of professionals is the responsibility to them against the public.

An accountant should act within the framework of ethics and responsibilities as well as professional knowledge and experience, resolve any dilemmas with professional ethics when confronted with any value judgment contradiction. Otherwise, it will be inevitable that new financial crises and scandals will come out again. Therefore, technical information for accountants as well as professional knowledge and experience harmonized with ethical values are so vital in terms of society and the credibility of the profession.

It would be useful to talk about some ethical theories that affect the professional ethics decisions of accountants. Theories of teleological and deontological ethics from these theories mainly emerge in the profession decision making stages of profession members. While teleological ethics is based on the principle that utopia is the right choice based on utility-cost comparison, while deontological ethics developed by Kant is based on the fact that the forms of movement of individuals and groups depend on moral obligations and duties [12].

The moral principles and rule-of-thumb of the community also play an active role in the attitudes and behaviors of accountants in the practice of the profession. Therefore, it is obvious that these troubles will affect every part of the society, which is caused by a number of troubles, especially corruption, in societies not sensitive to moral rules. It should be kept in mind that the accounting profession is performing its services as part of the society in which it is located.

Oriented toward ethics in the accounting profession extensive work has been done and ethical principles and rules have been set not only at Turkey from TÜRMOB according to 3568 code and related regulations, but also from International corporations as The International Federation of Accountants, American Institute of Certified Public Accountants (AICPA), The Federation of European Accountants and Institute of Management Accountants. The study on professional ethics in the United States, where the largest regulations in the accounting profession are found, is the "Professional Ethics Standards in the Accounting Profession" published by AICPA.

Although there are partial differences in principle, it is possible to count rules as "independence, integrity, honesty, confidentiality, public benefit, professional dignity, professional care, professional competence, compliance with accounting principles and standards, confidentiality, social responsibility, impartiality, unfair competition, advertising and incitement prohibition" [12].

Oriented toward accountant profession in Turkey, set of principles and rules have been established in order to enable accountants to have a sense of higher professional knowledge, social

responsibility, understanding of ethical values, and maximizing the public interest by providing quality services.

According to the "General Communique on Accounting System Application" published by the Ministry of Finance, the regulations on accounting profession ethics are composed of 12 basic concepts. Constitution of accounting, social responsibility, neutrality and faithful representation, consistency, full disclosure and substance over form are the concepts related to ethics. From these concepts, the concept of social responsibility requires accountants to engage in ethics in their profession and to take care of the public interest. Other concepts indirectly concern the ethics dimension of the profession [25].

Moreover, CMB has published bulletins based on the Public Disclosure principle in which it was addressed issues related to professional ethics. The Board has undertaken efforts to regulate professional ethics in the bulletins by covering professional competence, independence, care and diligence, under the title of occupational standards.

In accordance with another regulation on accounting ethics in Turkey, Law No. 3568 "Regulations Regarding Working Methods and Principles" published in the direction of work discipline, professional confidence and professional ethics. This law regulates issues related to the ethical and moral values such as the activities that the professions would fulfill or unable to engage in, and the occasions incompatible with profession and professional honor. The "Disciplinary Regulation", which was published for accountants in the Official Newspaper No. 20556 in 1990, states that it is necessary to act within the framework of profession ethics and morality. Otherwise, punishment and sanctions will be subjected. It should also be noted that the Code of Professional Ethics, published in the Official Newspaper No. 24557 in 2001, is a direct regulation of the accounting profession ethics. In addition, TÜRMOB published IFAC publications in the name of "The Code of Ethics Handbook for Professional Accountants", translating the regulations into Turkish, which is related to professional ethics.

"Public Oversight, Accounting and Auditing Standards Authority", which is established by Provision No. 660 and published in the Official Newspaper No. 28103 in 2011, provides the accounting and auditing standards in accordance with the regulations on occupational ethics and regulations in line with the regulations on occupational ethics in the bulletin on "Independent Auditing Regulation" that contributes to the development of the audit profession.

3.2. Ethics literature on accountants

Empirical studies in the "Ethics and Accounting Education in the UK – A Professional Approach?" suggest that even the best accountant is below the average in terms of ethical behavior, despite the expectations from accountants to operate in a state of high ethical standards. The study emphasizes the difference between what is expected and realized, is the result of inadequate education. Universities are not able to adequately fulfill the ethical training that their future professionals need, and as a result of this, accountants are experiencing failures in the face of ethical dilemmas [26].

The work on "Accounting Professional Ethics Rules and Perceptions of Those Rules by Professionals" was carried out to reveal the knowledge, thoughts and perceptions of accountants

operating in Balıkesir province in Turkey. Honesty is one of the main principles of ethics. The study has detected that this principle is perceived by accountants as protecting the taxpayer and public interest equally, being principled, protecting professional reputation and giving confidence. However, in general, it seems that there is little knowledge about the subject of professional ethics [27].

It has been revealed in the "Occupational Ethics, and The Effects of Occupational Ethics on Professional Life" that accountants are aware that they will suffer from their inability to act in line with ethical principles, however, they have not been sufficiently rigorous [28].

The main focus on "The Role of Personal Value in the Emergence of Ethical Dilemma: An Application on Accountants" is to disclose whether accountants in Kars and Erzurum have experienced ethical dilemma or not. The study reveals that accountants have experienced ethical dilemma in relation to factors such as income, age and losing customers. It has been found that the accountants, who are old and have low income, have experienced more ethical dilemmas, while other accountants, who have lower level education in terms of education factor, give more importance to ethical values at the outset of ethical dilemmas [10].

"Accounting Ethics-Responsibility Versus Creativity" suggests that accountants, who face ethical dilemma, must develop their values and virtues in order to overcome an obstacle like creative accounting. Also, suggests that there should be a regulatory accounting system, which will help to strengthen the existing accounting standards. The ethics have a direct impact on the credibility of the accounting profession, and directly affect the perspective of the society to the profession and its members. In addition, the study emphasizes the necessity of ethical education, since the crises and scandals that have been experienced, is a result of inadaqute attitude of accountants in ethical issues [29].

The study in the "Accounting Professional Ethics and An Application in Sivas Province" reveals that social pressure, education level, auditing activities, penal sanctions and conscientious responsibilities have impact on accountants to follow the ethical rules. Responses from accountants indicate three factors, which are desire to earn more money, moral weakness, and lack of professional ethics education in educational institutions [30].

The study conducted on "A Research About Ethical Judgment Levels of Accountants" measures the level of ethical judgment of accountants by using value determination test. Moreover, the study reveals the demographic variables to see whether they are differentiated at the levels of ethical judgment. It was found that the level of ethical judgment is in compliance with Kohlberg Conventional Level and accountants comply with the in house published rules and principles [31].

It has been revealed in the "Occupational Ethics in Accounting Profession and an Application in Kayseri Province" that accountants care about ethics and 97% of the accountants think that there is a need for ethics training. Moreover, accountants think that the occurrence of unethical cases is due to conflicts of interest regarding to monetary relations, and lack of laws and legislations [32].

The survey on "Attitudes of Accounting Professionals and Businesses on Ethics" found that members of the accounting profession believe that honesty, trustworthiness and objectivity should be based on profession and that only self-employed professionals should be

prohibited from taking custody from customers in the case of work done on a Turkey basis for attitudes toward ethics by accounting professionals and businesses. In addition, it has been determined that the members of the profession do not participate in certain provisions of TÜRMOB's ethical code, but they are mostly engaged in professional activities in accordance with the principles and rules [33].

It was mentioned in "The Contribution of Islamic Ethics Towards Ethical Accounting Practices" that individual ethical developments of accountants improve their business ethics [34]. It is stated in "Ethics in Accounting Professionals: Research on Accountants in Ankara Province" that accountants should give importance to in-service training and it would be beneficial to increase the efforts toward the trial to prevent possible unethical behaviors that may be encountered in the profession [24]. According to the study conducted on "Ethical Perceptions of Independent Accountant and Financial Advisor: Erzurum Case" the accountants were aware of ethical principles; however, they were unaware of unethical behaviors. It has been suggested that more education should be given to organizations and accountants about ethics. In addition, it has been determined that the commitment to ethical principles is directly proportional to the level of education and income [35].

It was found in "The Problems and Ethical Attitudes of Accounting Professionals Toward Accounting Errors and Frauds: A Model Practice in City of Erzurum" that apprentices do not have sufficient knowledge about ethics and that there are instabilities in the unethical cases, investigation of ethical aspects of accounting mistakes and mistakes of city of Erzurum accountants and candidate trainees. As a result of the study, it was concluded that vocational training is necessary [36].

It was stated in "The Role of Personal Value in the Emergence of Ethical Dilemma: An Application on Professional Accountants" that the ethical dilemma is the process of indecision that arises when there are truths that can be discussed on opposite sides of an event. In the process of preparing financial statements, accountants often face ethical dilemmas. In addition to legal and regulatory compliance of accountants, it is also important to be committed to ethical principles [37].

It was found in "Perspectives of Professional Accountants on Professional Ethics: A Research in Kırklareli Province" that about 81% of the accountants had an ethical dilemma in their professional activities. Dominant factors revealed as religious beliefs, values about the cultural environment, and anxiety about losing taxpayers. Additionally, it has been observed that accountants are interested in teaching accounting profession ethics [38].

4. Hypothesis development

Studies that investigate the relationships among accountants' levels of ethical awareness and ethical decision making have obtained similar results. According to Shafer et al., accountants' levels of ethical awareness affect their behavior toward aggressive financial reporting [39]. According to Uyar and Ozer, and Liyanapathirana and Samkin,accountants' levels of ethical awareness affect their ethical decision making positively,in Turkey and Sri Lanka, respectively [1, 40]. Based on the findings of these studies, hypothesis 1 is developed as follows:

H1: The level of ethical awareness of CPAs affects their ethical decision making positively.

No study has examined the relationships between ethical decision making and transparency from the perspective of CPAs, although the literature has provided some explanations related to the linkage between these two concepts. Logically, if a person is ethically aware, then he/she can make ethical decisions, and consequently, can create transparent reports and have the desire to increase transparency. In other words, there is a chain effect among these three concepts. Therefore, hypothesis 2 is developed as follows:

H2: The level of ethical decision making of CPAs affects transparency positively.

Finally, hypothesis 3 is developed to determine whether ethical awareness directly affects transparency.

H3: The level of ethical awareness of CPAs affects transparency positively.

5. Study methodology and implementation

The aim of this field study is to reveal the connections among ethical awareness, ethical decision making, and transparency from the perspective of CPAs. Certain measurement tools were utilized to test the hypotheses and achieve the study's aims. A 30-item multi-factorial scale was developed to reflect the ethics and transparency concepts. This scale enables the study to find answers to the research questions, such as what CPAs believe and why they believe them. Each participant was requested to specify his/her response on a 7-point Likert scale, the format of which is coded as strongly agree (−3) to strongly disagree (+3). The survey questionnaires were distributed to 600 CPAs in Istanbul. A total of 162 questionnaires were returned, but only 138 questionnaires were completed and processed for data analysis, since 24 of the returned questionnaires were excluded due to incomplete responses.

SPSS is used for the data analysis. Specifically, explanatory factor analysis and OLS regression were performed to analyze the survey data and test the hypotheses. According to the CPA respondents' demographic data, 85% of the respondents are male, 37% have a high school diploma, and 63% have a college degree.

6. Results and analysis

The suitability of the ethical awareness, ethical decision making, and transparency variables for the factor analysis are tested using Barlett's test of sphericity and the Kaiser-Meyer-Olkin measure of sampling adequacy test (KMO). The KMO yields a value of 0.781, and the Bartlett is smaller than 0.05, which means the observed variables are suitable for factor analysis. The explanatory factor analysis results with the variable factor loads are shown in **Table 1**, and the average responses based on the Likert scale are shown in **Table 2**.

Table 1 shows the factor analysis results for the statements for each of the three factors of ethical behavior awareness, ethical decision making, and transparency. Meanwhile, the results

in **Table 2** are obtained by considering the five highest average responses to the statements for each of the three factors. Based on the responses to first group of statements for the factor of ethical awareness, most of the CPAs disagree that other CPAs in their company engage in unethical practices. They may have answered so to protect the reputations of fellow CPAs, but their response may also simply indicate that they trust other CPAs. Most of the CPAs are aware that if they engage in unethical practices under any conditions, they will be fired. Likewise, most of them are aware that if they participate in unethical practices for their own interests, they will be immediately reprimanded.

Most of them are also aware that if they participate in unethical practices for their company's interests, they will be immediately reprimanded, but the average response to this statement is distinctly lower than that to the former statement. Some of the CPAs may think that if they engage in unethical practices on behalf of their companies, top management may ignore what was done or may even promote them since their actions may have increased profits to a desired level without drawing the attention of anyone inside or outside of the company. The last item in the factor group is that most of the CPAs think that unsuccessful CPAs engage more in unethical practices than successful ones to achieve a short-cut to success. The last three items in the factor group are an indicator that companies have not yet fully complied with the Turkish ethical system for accounting, and still exhibit unethical behaviors.

Based on the responses to the second group of statements for the factor of ethical decision making, most of the CPAs check what is the right thing to do when they are uncertain of what to do, and they do not hesitate to ask what is the right thing to do when something has gone wrong. They do not make decisions by themselves, to avoid making mistakes under certain conditions. According to **Table 2**, most of the CPAs learned how to make ethical decisions from their family, and not from the ethics training or lessons they took. The reason behind this finding is Turkey's family-centered culture. The development of a person's ethical beliefs starts with learning solid family values at home. On the other hand, most of the CPAs think that being a whistle-blower is not always a bad thing. This line of thinking may be explained by signaling theory, which is the idea that one party convincingly signals information to another party. They think whistle-blowing is efficient if managers signal their private information to outsiders to improve their awareness and support dialog among the public, owners, and managers [41, 42]. With regard to the last item in this factor group, most of the CPAs think that it is not appropriate to compromise one's ethics to be successful, not even for a promotion.

Based on the responses to the third group of statements for the factor of transparency, most of the respondents think that transparency is vitally important for companies, and agree that financial reports are trustworthy and reliable if CPAs prepare them. Additionally, they think that it is not easy to violate transparency in their companies. This result indicates that they are aware of the consequences of engaging in unethical practices. On the other hand, they believe their financial reports are not fully transparent. This result indicates that even though they prepare trustworthy financial reports, they do not trust top managers or owners of their companies, who they think may interfere with the numbers for their own or their companies' interests. This result indicates a possible problem with the implementation of penalties under related laws, and compels us to think about whether audit organizations' work should improve and be more detailed.

Ethical behavior awareness	There are numerous opportunities for CPAs inside my company to take part in unethical practices	0.901
	There are numerous opportunities for CPAs outside of my company to take part in unethical practices	0.893
	Most CPAs are aware of the code of ethics	0.845
	CPAs in my company usually participate in practices that I think are unethical	0.813
	CPAs outside of my company usually participate in practices that I think are unethical	0.804
	In my company, unsuccessful CPAs are usually more unethical than successful ones	0.791
	In my company, CPAs are aware that under no conditions will unethical behaviors be tolerated	0.771
	If a CPA inside my company is found to have participated in unethical behaviors that serves	0.745
	His/her own interest (rather than the company's interest), he/she will be immediately reprimanded	0.722
	If a CPA inside my company is found to have participated in unethical behaviors that serve	0.625
	The company's interest (rather than his/her own interest,) he/she will be immediately reprimanded	0.603
	CPAs are aware of sanctions and penalties for unethical behaviors	0.542
Ethical decision making	I check what is the right thing to do when I am uncertain of what to do	0.900
	I ask what is the right thing to do when something has gone wrong	0.859
	If I notice a mistake or manipulation in financial statements, I try to fix it myself	0.856
	If I notice a mistake or manipulation in financial statements, I do not tell anyone	0.837
	I will fulfill top management's request for something that I think to be unethical	0.803
	If I could protect myself from punishments and sanctions, I would engage in unethical practices	0.772
	Being a whistle-blower is not always a bad thing	0.749
	To be successful in my company, sometimes it is appropriate to compromise one's ethics	0.711
	I learned to make ethical decisions from my family	0.638
	I learned to make ethical decisions from my ethics training/lessons	0.541

Transparency	Transparency is vitally important for companies	0.905
	It is easy to violate transparency in financial reports in my company	0.896
	I believe my company's financial reports are fully transparent	0.869
	My company tries to create a culture of transparency	0.860
	My company is more concerned with the bottom line than creating moral responsibility	0.794
	Trust is based on the transparency of financial reporting	0.777
	Financial reports are generated by trustworthy CPAs in my company	0.664
	Financial reports are generated by trustworthy CPAs in other companies	0.620
	I know the consequences of inadequate and deceitful financial reports created through unethical practices	0.504
	It is easy to violate transparency in financial reports in other companies	0.501

Method of factor determination: principal component; rotation method: Varimax, revealed variance: 77.43%.

Table 1. Explanatory factor analysis concerning ethical awareness, ethical decision making, and transparency.

	Questionnaire item	**Average response**	**Standard deviation**
	Ethical behavior awareness		
1.	There are numerous opportunities for CPAs in my company to take part in unethical practices	0.62	2.07
2.	There are numerous opportunities for CPAs outside of my company to take part in unethical practices	−1.34	1.47
3.	Most CPAs are aware of the code of ethics	−1.01	2.01
4.	CPAs in my company usually participate in practices that I think are unethical	2.26	1.01
5.	CPAs outside of my company usually participate in practices that I think are unethical	−0.05	1.67
6.	In my company, unsuccessful CPAs are usually more unethical than successful ones	−1.52	1.69
7.	In my company, CPAs are aware that under no conditions will unethical behaviors be tolerated	−2.10	1.34
8.	If a CPA in my company is found to have participated in unethical behaviors that serve his/her own interests (rather than the company's interest), he/she will be immediately reprimanded	−2.11	1.25
9.	If a CPA in my company is found to have participated in unethical behaviors that serve the company's interests (rather than his/her own interest), he/she will be immediately reprimanded	−1.84	1.21

	Questionnaire item	Average response	Standard deviation
10.	CPAs are aware of sanctions and penalties for unethical behaviors	−0.99	1.03
	Ethical decision making		
1.	I check what is the right thing to do when I am uncertain of what to do	−2.67	1.05
2.	I ask what is the right thing to do when something has gone wrong	−2.20	1.27
3.	If I notice a mistake or manipulation in financial statements, I try to fix it myself	1.04	1.89
4.	If I notice a mistake or manipulation in financial statements, I do not tell anyone	1.25	1.93
5.	I will fulfill top management's request for something that I think to be unethical	−1.02	1.22
6.	If I could protect myself from punishments and sanctions, I would engage in unethical practices	−1.03	1.73
7.	Being a whistle-blower is not always a bad thing	2.29	2.13
8.	To be successful in my company, sometimes it is appropriate to compromise one's ethics	2.38	1.51
9.	I learned to make ethical decisions from my family	−2.12	1.01
10.	I learned to make ethical decisions from my ethics training/lessons	0.15	1.13
	Transparency		
1.	Transparency is vitally important for companies	−2.72	1.01
2.	It is easy to violate transparency in financial reports in my company	2.29	1.29
3.	I believe my company's financial reports are fully transparent	2.17	2.21
4.	My company tries to create a culture of transparency	0.04	1.92
5.	My company is more concerned with the bottom line than creating moral responsibility	1.92	1.78
6.	Trust is based on the transparency of financial reporting	−2.03	1.26
7.	Financial reports are generated by trustworthy CPAs in my company	−2.19	1.09
8.	Financial reports are generated by trustworthy CPAs in other companies	−1.85	1.39
9.	I know the consequences of inadequate and deceitful financial reports created through unethical practices	−1.08	2.04
10.	It is easy to violate transparency in financial reports in other companies	1.22	1.26

Table 2. CPAs' responses to ethical behavior awareness, ethical decision making, and transparency.

OLS regression is performed to test the hypotheses, and the results are presented in **Table 3**. The first column of **Table 3** shows that the ethical awareness variable affects ethical decision making positively ($F = 17.023$, $p = 0.00$). Accordingly, hypothesis 1 is accepted. Therefore, as the level of ethical awareness of CPAs increases, their ability to make ethical decisions also increases. This outcome suggests that CPAs know when situations they face are ethically problematic or include ethical dilemmas, and that they need to make ethical decisions.

Variable	Ethical decisions		Transparency		Transparency	
	β_i	t	β_i	t	β_i	t
Constant	0.702	4.137	0.659	3.264	0.432	1.783
Ethical awareness	0.564	3.287***			0.263	1.189**
Ethical decisions			0.535	4.738***		
R^2	0.307		0.278		0.102	
F	17.023***		15.198***		21.267***	

**Significant at the 0.05 level.
***Significant at the 0.01 level.

Table 3. Regression results.

The second column of **Table 3** shows that the ethical decision variable affects transparency positively (F = 15.198, p-value = 0.00). Accordingly, hypothesis 2 is accepted. Therefore, as the level of ethical decisions of CPAs increases, their desire to create transparency also increases. This outcome suggests that these three concepts are strongly related to each other. Thus, there is a chain effect, where ethical awareness affects ethical decision making, which, in turn, affects the level of transparency.

The third column of **Table 3** shows that the ethical awareness variable affects transparency positively (F = 21.267, p-value 0.00). Accordingly, hypothesis 3 is accepted. Therefore, as the level of ethical awareness of CPAs increases, their desire to create transparency also increases. This outcome suggests that even though we exclude the ethical decisions variable, transparency is directly affected by ethical awareness. Consequently, ethical awareness is a noteworthy factor that affects ethical decision making and transparency.

7. Conclusion

Based on the average of the CPAs' survey responses, in the process of their decision making about an ethical issue or transparency of financial reports, CPAs are affected mainly by their level of ethical awareness. CPAs check what is the right thing to do when they are uncertain of what to do, and they do not hesitate to ask what is the right thing to do when something has gone wrong. This outcome indicates that they are ethically aware, which also allows them to make ethical decisions. The results of this study's analysis show that the three concepts of ethical awareness, ethical decision making, and transparency are strongly connected to each other.

Because of Turkey's family-centered culture, development of the knowledge of ethics begins in the family, and this tendency ensures that an individual is raised with morally sensitive feelings and a higher level of ethical awareness. Therefore, according to the results of the analysis of the survey responses, most of the CPAs believe they generate transparent reports, but they still hesitate to trust their top managers and owners, who have the power

and motivation to act in their own interests. This finding reveals a problem of trust among accountants in Turkey; specifically, it indicates a problem in the implementation of the penalties under related laws, even when such laws are considered inadequate and deterrent.

Thus, ethical awareness affects ethical decision making and transparency and therefore, when the levels of ethical decision making and transparency increase, the level of ethical awareness also increases. Hence, it would be helpful to provide ethics lessons in schools or raise more public awareness about ethics.

The major accounting scandals (e.g. Enron, Lehman Brothers) from around the world have prompted the public to question the accountants' ethics. While accountants embrace their significant roles in generating and auditing financial information for the benefit of society, they face many ethical problems in their daily lives. Their unethical practices can damage all interested parties, and for this reason, they should adapt to rapid changes in accounting standards and legislation to maintain their competitive power, and consequently, their ethics. Therefore, the concepts of ethical awareness, ethical decision making, and transparency should be understood more clearly.

This chapter clearly indicates the importance of ethics to accounting profession. Ethical awareness, ethical decision making, and transparency are important concepts for every profession, individual and society. However, in terms of the accounting profession, it is not exaggerated to attach vital importance to the subject. The accounting profession at the production center of qualified information is important for all segments of the society in the light of the information they provide. Therefore, efforts to raise ethical awareness, ethical decision making and transparency for professionals are needed.

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References

[1] Uyar M, Özer G. The ethical orientation and professional commitment: An EMPIRICAL EXAMINATION ON Turkish accountants. African Journal of Business Management. 2011;**5**(23):10023-10037. DOI: 10.1.1.844.5791

[2] Demir B. Muhasebe ve Denetim Mesleğinde Etik [Ethics in accounting and auditing profession]. Eğitim ve Öğretim Araştırmaları Dergisi [Journal of Research in Education and Teaching]. 2015;**4**(4):341-352

[3] Alexander D, Britton A. Financial Reporting. Cengage Learning EMEA: Hampshire, United Kingdom; 2004

[4] Duska R, Duska BS, Ragatz JA. Accounting Ethics. 2nd ed. Wiley-Blackwell: West Sussex, United Kingdom; 2011

[5] Van Greuning H, Koen M. International Accounting Standards: A Practical Guide. USA: World Bank Publications; 2001

[6] Isa T, Rotariu V. Rational approach for the effects and impacts of financial crisis in the selected developed and developing countries caused by the fraudulent and manipulated financial information. Annals-Economy Series. 2011;**4**:187-191

[7] Küçüksözen C, Küçükkocaoğlu G. Finansal Bilgi Manipülasyonu: IMKB Şirketleri Üzerine Ampirik Bir Çalışma [Financial Information Manipulation: Emprical Study on ISE firms]. Corporate Governance Guide: Aspen Law & Business; 2005. pp. 1-58

[8] Black EL, Burton FG, Stocks K. Does Education and Training in Ethics Affect the Ethical Awareness of Accountants? An International Study [Working Paper]. 2015

[9] Ferrell OC, Fraedrich J, Ferrell L. Business Ethics: Ethical Decision Making & Cases. 11th ed. Boston: Cengage Learning; 2016

[10] Kutlu HA. Muhasebe Meslek Mensupları ve Çalışanlarının Etik Ikilemleri: Kars ve Erzurum İllerinde Bir Araştırma [The role of personal value in the emergence of ethical dilemma: An application on accountants]. Ankara Üniversitesi SBF Dergisi [Ankara University Journal of Social Sciences Institute]. 2008;**63**(02):143-170. DOI: 10.1501/SBFder_0000002067

[11] Güredin E. Denetçinin Meslek Ahlakı, Standartlar ve Uygulamadan Örnekler [Professional ethics, standandards and examples from implementations]. III. Türkiye Muhasebe Denetim Sempozyumu Bildiri Kitabı [III. Turkey Accounting and Auditing Symposium Proceedings]. 1997

[12] Daştan A, Bayraktar Y, Bellikli U. Muhasebe Mesleğinde Etik İkilem ve Etik Karar Alma Konularında Farkındalık Oluşturma: Trabzon İlinde Bir Araştırma [Creating awareness of ethical dilemmas and ethical decision making in accounting jobs: A research in Trabzon Province]. Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi [Ataturk University Journal of Economics and Administrative Sciences]. 2015;**29**(1):63-82

[13] Barth ME, Schipper K. Financial reporting transparency. Journal of Accounting, Auditing & Finance. 2008;**23**(2):173-190. DOI: 10.1177/0148558X0802300203

[14] Abdullah ZI, Almsafir MK, Al-Smadi AA. Transparency and reliability in financial statement: Do they exist? Evidence from Malaysia. Open Journal of Accounting. 2015;**27**(4): 29-43. DOI: 10.4236/ojacct.2015.44004

[15] Senogles G, Glowka M. Aggressive Accounting Vs. Fraudulent Accounting: Charles River Associates Publications, Financial Worldwide Magazine; 2013. Available from https://www.financierworldwide.com/aggressive-accounting-vs-fraudulent-accounting/#.Wjtt8raB0cg Accessed: 2017 September 29

[16] Bilen A, Yılmaz Y. Muhasebe Mesleğinde Etik ve Etikle İlgili Çalışmalar [Ethics in the accounting profession and studies on ethics]. Dicle Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi [Journal of Economics Administrative Sciences Faculty Dicle University]. 2014;**2**(6):57-72

[17] Sarbanes-Oxley Act. Sarbanes-Oxley Act of 2002. 2002. Available from http://fl1.findlaw.com/news.findlaw.com/hdocs/docs/gwbush/sarbanesoxley072302.pdf [Accessed: 2017 September 19]

[18] Institute of Internal Auditors. Rulebook for Code of Ethics of the Internal Auditors. 2010. Available from http://www.finance.gov.mk/files/u10/Rulebook _Code_ Ethics.pdf [Accessed: 2017 September 13]

[19] International Federation of Accountants. 2016 Handbook of the Code of Ethics for Professional Accountants. 2016. Available from https://www.ethicsboard.org/iesba-code [Accessed: 2017 September 10]

[20] Union of Chambers of Certified Public Accountants of Turkey. 2014 Muhasebe Meslek mensupları için Etik Kurallar el kitabı [2014 Handbook of the Code of Ethics for Professional Accountants]. Ankara: TÜRMOB Yayınları; 2014. Available from http://www.turmob.org.tr/turmobweb/ekutuphane/EKIcerikDetay.aspx?enc=lEkNSf+wNjLzJLv72HfFgX//YcLf//FEl24svclzjMHDqfmYO42zYW5h/ocxqt9h17uNFvCljUA= [Accessed: 2017 September 30]

[21] Public Oversight Accounting and Auditing Standards Authority Bağımsız Denetçiler için Etik Kurallar Hakkında Tebliğ [Bulletin on ethical rules for independent auditors]. Official Journal. 2015;29362. Available from http://www.resmigazete.gov.tr/eskiler/2015/05/20150521-10.htm [Accessed: 2017 August 31]

[22] Capital Markets Board of Turkey [CMB] Sermaye Piyasasında Mali Tablo ve Raporlara İlişkin İlke ve Kurallar Hakkındaki Tebliğ [Bulletin on Principles and Rules on Financial Statements and Reports in Capital Markets]. Official Journal. 1989;20064. Available from http://www.resmigazete.gov.tr/eskiler/2008/03/20080308-10.htm [Accessed: 2017 September 30]

[23] Capital Markets Board of Turkey [CMB]. Sermaye Piyasasında Bağımsız Denetim Hakkında Tebliğ [Bulletin on Independent Auditing in the Capital Market]. Official Journal. 1996;22570. Available from http://spk.gov.tr/Sayfa/Dosya/590 [Accessed: 2017 August 31]

[24] Özyürek H. Muhasebe Meslek Mensuplarında Etik: Ankara'da Muhasebeciler Üzerine Araştırma [Ethics in accounting professionals: Research on accountants in Ankara Province]. Hukuk ve İktisat Araştırmaları Dergisi [Journal of Law and Economics Research]. 2012;**4**(1):125-137

[25] Sakarya Ş, Kara S. Türkiye'de Muhasebe Meslek Etiğine Yönelik Düzenlemeler ve Meslek Mensupları Tarafından Algılanması Üzerine Bir Alan Araştırması [A field study on the perceptions of accounting profession members towards regulations on profession ethics]. Karamanoğlu Mehmetbey Üniversitesi Sosyal ve Ekonomik Araştırmalar Dergisi [Karamanoğlu Mehmetbey University Social and Economic Researches]. 2010;**12**(18):57-72

[26] Fleming AI. Ethics and accounting education in the UK—A professional approach? Accounting Education. 1996;**5**(3):207-217. DOI: 10.1080/09639289600000021

[27] Ergün H, Gül K. Muhasebe Meslegi Etik Kurallari ve Bu Kurallarin Meslek Mensuplarinca Algilanisi [Accounting professional ethics rules and perceptions of those rules by professionals]. Muhasebe ve Finansman Dergisi [The Journal of Accounting and Finance]. 2005;**25**:144-154

[28] İşgüden B, Çabuk A. Meslek Etiği ve Meslek Etiğinin Meslek Yaşamı Üzerindeki Etkileri [Occupational ethics, and the effects of occupational ethics on professional life]. Balıkesir Üniversitesi Sosyal Bilimler Enstitüsü Dergisi [Balikesir University Journal of Social Sciences Institute]. 2006;**9**(16):59-86

[29] Uşurelu VI, Loghin D. Accounting ethics-responsibility versus creativity. Annals of the University of Petrosani Economics. 2010;**10**(3):349-356

[30] Kisakürek M, Alpan N. Muhasebe Meslek Etigi ve Sivas Ilinde Bir Uygulama [Accounting professional ethics and an application in Sivas Province]. Muhasebe ve Finansman Dergisi Dergisi [The Journal of Accounting and Finance]. 2010;**47**:213-228

[31] Kutluk FA, Ersoy A. Muhasebe Meslek Üyelerinin Etik Yargi Düzeyleri Üzerine Bir Arastirma [A research about ethical judgment levels of accountants]. Ege Akademik Bakis [Aegean Academic View]. 2011;**11**(3):425-438

[32] Yildiz G. Muhasebe Mesleğinde Meslek Etiği ve Kayseri İl Merkezinde Bir Uygulama [Occupational ethics in accounting profession and an application in Kayseri Province]. Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi [Erciyes University Journal of Social Sciences Institute]. 2010;**36**:155-178

[33] Yalçin S. Muhasebe Meslek Mensuplari ve Isletmelerin Etik Konusunda Tutumlari: Türkiye Arastirmasi [Attitudes of accounting professionals and businesses on ethics]. Muhasebe ve Finansman Dergisi [The Journal of Accounting and Finance]. 2011;**52**:47-66

[34] Yunanda RA. The contribution of Islamic ethics towards ethical accounting practices. Issues in Social and Environmental Accounting. 2011;**5**(2):124-137

[35] Güney S, Çınar O. Serbest Muhasebeci Mali Müşavirlerin Etik Algıları: Erzurum Örneği [Ethical perceptions of independent accountant and financial advisor: Erzurum case]. Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi [Atatürk University Journal of Social Sciences Institute]. 2012;**26**(2):91-106

[36] Güney S, Bozkurt R. The problems and ethical attitudes of accounting professionals toward accounting errors and frauds: A model practice in City of Erzurum. International Journal of Business and Social Science. 2012;**3**(20):255-268

[37] Kutlu HA, Güner M, Demirci NS. Etik İkilemden Çıkışta Kişisel Değerin Rolü: Muhasebe Meslek Mensupları Üzerinde Bir Uygulama [The role of personal value in the emergence of ethical dilemma: An application on professional accountants]. 1 Uluslararası Muhasebe ve Finans Sempozyumu [1st International Accounting and Finance Symposium]. 2012:733-746

[38] Çiçek H, Canbaz S, Keskin A. Muhasebe Meslek Mensuplarının Meslek Etiğine Bakış Açıları: Kırklareli İlinde Bir Araştırma [Perspectives of professional accountants on professional ethics: A research in Kırklareli Province]. Tekirdağ SMMM Odası Sosyal Bilimler Dergisi [Champber of Independent Accountant and Financial Advisors of Tekirdağ Journal of Social Sciences]. 2013;**2**:1-20

[39] Shafer WE, Morris RE, Ketchand AA. Effects of personal values on auditors' ethical decisions. Accounting, Auditing & Accountability Journal. 2001;**14**(3):254-277. DOI: 10.1108/EUM0000000005517

[40] Liyanapathirana NS, Samkin G. Towards an Integrated Ethical Decision Making Model for the Accounting Profession. Sri Lanka: A Developing Country; 2014. Available from https://cdn.auckland.ac.nz/assets/business/about/seminars-events/2014/Towards%20an%20integrated%20ethical%20decision%20making%20model%20for%20the%20accounting%20p….pdf Accessed: 2017 September 1

[41] Jiraporn P, Miller GA, Yoon SS, Kim YS. Is earnings management opportunistic or beneficial? An agency theory perspective. International Review of Financial Analysis. 2008;**17**(3):622-634. DOI: 10.1016/j.irfa.2006.10.005

[42] Siregar SV, Utama S. Type of earnings management and the effect of ownership structure, firm size, and corporate-governance practices: Evidence from Indonesia. The International Journal of Accounting. 2008;**43**(1):1-27. DOI: 10.1016/j.intacc.2008.01.001

Chapter 3

Theoretical Perspectives on Sustainability Reporting: A Literature Review

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Additional information is available at the end of the chapter

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Abstract

This study analyzes the perspectives of the institutional theory, the legitimacy theory, and the stakeholders' theory in the accounting changing process and sustainability reports. The objective is to explore how these theories are used in corporate social responsibility (CSR) disclosure. Through this analysis, it is provided a better theoretical understanding of these theories, which support and promote research on accounting and sustainability reporting. This chapter analyzes each theory and the relationship between them. We conclude that, although the legitimacy theory is the dominant theory used in accounting and sustainability reporting studies, it is related to the other theories. The selection and application will depend on the study focus.

Keywords: institutional theory, legitimacy theory, accounting, stakeholders' theory, sustainability reports

1. Introduction

The present business language takes for granted that no business may be successful without the approval of its stakeholders as a socially and environmentally responsible entity [1]. As there is a greater awareness and concern about the organization's activity and its effects [2], the sustainability reporting offers them quite a lot in terms of transparency regarding environmental and social performance issues. Thus, the voluntary disclosure of these social, environmental, and economic variables, known as triple bottom line (TBL), should be seriously and responsibly perceived. Accordingly, Elkington [3] suggested combining the social and environmental

reports with the traditional financial report to achieve an excellent TBL performance for which new types of economic, social, and environmental partnerships are necessary.

Accounting literature has shown a significant growth of concern for sustainability matters and the accounting practice [4]. Sciulli [2] considers that the phrase *environmental and social accounting research* has been replaced by the term *sustainability reporting research*. Thus, accounting researchers perceive "accounting as a social and institutional practice", rather than as a mere technical practice ([5], p. 5). In this sense, this study looks into (better) understanding that accounting is not a mere daily sustained and due practice, a result of years of habits and self-indulgence [6], but that it also involves and brings about social and institutional pressures that lead entities to take certain measures and decisions in behalf of those institutions' legitimacy [7], which originates constant shifts and changes, not only at the accounts level, but also at the technological and social levels.

Institutional, legitimacy, and stakeholder theories offer different explanatory perspectives of similar sustainability phenomena. In this paper, these theoretical perspectives will be analyzed. They have been applied and taught separately [8] but they together provide a broad theoretical understanding for the research advancement in social and environmental accounting. Therefore, this study aims to explore the IT relation with the accounting shifting processes, as well as the forms of institutional pressure influencing decisions to adopt accounting practices and sustainability reports. The drivers of change and the reasons for those changes will be made known according to the new institutional sociology (NIS) [9]. This paper may be of interest for researchers who need to apply these theories and the relationships among them in accounting research and sustainability reports.

The results enable us to conclude that we may have compatible understandings of theoretical evidence under different perspectives, according to Gray et al. [10] and Chen and Roberts [8].

In this paper we start with a general insight over the IT and responsible accounting practices. Next, we provide an answer to accounting issues related to isomorphism, the legitimacy theory (LT), and the stakeholders' theory (ST). The paper discusses the relationship between these theories and their importance in accounting research and sustainability reports. Final considerations, limitations, and recommendations for future research will also be presented.

2. Institutional theory and accounting practices

According to authors such as DiMaggio and Powell [9], organizations were seen as closed systems, depending on themselves, and had no relationship with their institutional environment. In the 1960s and 1970s, after acknowledging the importance of the institutional environment for organizations, the IT gained a preponderant role in understanding the existing phenomena in the life of organizations [11]. Thus, the IT has been used to study and analyze the establishment of accounting practices in an organization. By studying the reasons for adopting certain accounting practices rather than others, and who the players are in the establishment of such practices and their reasons, it may answer some questions influencing institutional social choices [9, 12].

In fact, the rising number of social and environmental consequences the economic activity is producing [13] has led to an increase of empirical studies in social and environmental accounting, despite most of them approach the private sector [14–16]. However, traditional financial reporting is unable to explain and present complexities associated with several issues of public interest. They do not adequately deal with the measurement of social and environmental impact given that social issues may not always carry monetary values. The social and environmental reporting pays more attention to the social and environmental impact of organizations. Consequently, there is a need for broader sustainability reporting in organizations [13, 15, 16].

Accounting, in its broadest sense, may be considered a record and control system by which the "elements of civil society, the state and the market define, articulate and monitor the behaviors by which they will be judged and held accountable". "Social accounting is concerned with exploring how the social and environmental activities undertaken (or not, as the case may be) by different elements of a society can be-and are-expressed" ([17], p. 240). Thus, the disclosure of the social impact of an organization is important, and the disclosure of accurate and relevant information on corporate behavior can bring stakeholders, organizations, and society some benefits [18]. Hence, disclosure is a way through which organizations can present their CSR [19].

Recently, the focus has been the content and development of stand-alone sustainability reports, such as the Global Reporting Initiative (GRI) (see [16, 20, 21]). The GRI, developed in cooperation with the United Nations Environment Programme (UNEP), is particularly well-known and challenging [18]. It came forward in 1999 as an answer to a unified system of CSR reports' standards missing [21], following the USA's financial system model for disclosure (FASBI) [20, 21]. The GRI offers a set of principles for the CSR report and a structured content with indicators for the social, environmental, and economic domains, with the mission of developing and globally spreading guidelines applicable to sustainability reports, enabling organizations to voluntarily report their activities in those dimensions [18, 22]. It has then become an internationally recognized reporting framework.

2.1. Overall vision on the institutional theory in the organizational practices

The main driver of the IT is that organizations work within a social grid, whose practices are instigated by golden social rules and norms on what is an adequate or acceptable behavior in the environment they operate in [23, 24]. As a result, the social reality becomes the "guidelines for social behavior" ([25], p. 1). Organizations yield to institutional pressures for change since an increasing stability, legitimacy, resources, and survival capacity will reward them for doing so [8, 23, 24].

The IT focuses particularly on the pressures and constraints of the institutional environment and "illustrates how the exercise of strategic choice may be preempted when organizations are unconscious of, blind to, or otherwise take for granted the institutional processes to which they adhere" ([26], p. 148). It limits organizational choices and focuses on how the cultural and social environment influences organizations [27]. The IT is urged by the question of why different organizations, operating in such different environments, are so often similar in their structures [28].

The IT is one of the dominant theoretical perspectives and may facilitate a wider representation of accounting as an object of institutional practices and better coordinate the part of accounting in the institutionalization process. It is more and more applied in the accounting research to study the accounting practice in organizations [29]. The main premise of the IT, which DiMaggio and Powell [27] have related to voluntary corporate disclosures, is that it may help explain why organizations tend to act and communicate in a homogeneous way in the organizational field [30].

The IT, specifically the NIS, is particularly useful to often complete functional explanations of accounting practices [31]. The contemporary IT (NIS) has attracted the attention of a wide range of scholars in the social science areas, and it is followed to analyze the systems which range from the micro to the macro global framework of interpersonal interactions [25].

The two-main precursor works of the NIS are Meyer and Rowan [32] and DiMaggio and Powell [27]. The NIS applied to accounting began around the 1970s, by the investigator Anthony Hopwood, with publications in scientific magazines such as *Accounting*, *Organizations*, and *Society* [6]. The NIS is founded on the premise that organizations answer to their institutional environment pressures and "adopt structures and/or procedures that are socially accepted as being the appropriate organizational choice" ([24], p. 569). According to the NIS, accounting practices are the result of the institutional nature and of the economic pressures from their institutional environment, operating in an open system. IT appears as a response to the main stream in accounting research, which sees accounting practices as an economic, rational, and logical result [11]. DiMaggio and Powell [9] believe that the NIS rejects the rational actors' models, standing up for an interest in institutions as independent variables. For such, they attempt to give cognitive and cultural explanations to those models.

The NIS is being used to obtain proposals about the general governance change. Because of the globalization, organizations can choose different elements of any system that suit their requirements. The timing differences for firms to adopt institutional changes show the potential value of the NIS to predict circumstances that make the acceptance of an institutional innovation likely. Here, the key element is the organization's insertion degree in traditional institutions [33]. According to the NIS, "organizations use formal structures for purposes of legitimization, independently of consequences in terms of efficiency" ([34], p. 852).

The NIS model holds that survival of the organization is motivated by the orientation toward the institutional environment. This alignment enables organizational actors to depict the organization as legitimate [35]. The NIS emphasizes the influences of the institutional environment, molding the social and organizational behavior, thereby reducing ambiguity and uncertainty [36–38].

NIS research analyses how organizations seek practices that are not explained by efficiency maximization. Organizations do not always adopt strategies, structures, and processes to enhance their performance; instead, they react and look for ways to accommodate external and regulative pressures, seeking legitimacy before their stakeholders [27, 28]. The IT supplies a basis for analyzing the nature of the messages of organizational communication, determining how far organizations seek competitive advantage, legitimacy, and responsiveness to

ecological reasons [40]. As Scott states [25], the IT has a long past and a promising future. It is a widely positioned theory to help face questions such as the similarity and differentiation foundations of the organization, the relationship between structure and behavior, the role of symbols in social life, the relationship between ideas and interests, and the tensions between freedom and order.

"Organizational fields rich in myths and ceremonies are constructed when pressure is exerted on organizations by forces in the surrounding environment" ([41], p. 285). The organizational field, as a model within the organization, tends to become infused with a quality taken as certain, where the actors unconsciously accept the model as prevailing, good, and adequate [27]. It is in this sense that the IT is usually used, to account for the resemblance and stability of organizational arrangements within a population or organization field to which compliance standards have followed [42]. Isomorphism is a key element of the IT [43].

Organizational change is not so much due to efficiency and rivalry competitiveness but rather due to bureaucracy reduction and organizations' attempt to become more identical with each other to achieve legitimacy in the market and in their organizational context, and not necessarily to become more efficient [27]. Usually, the IT is not considered an organizational change theory but an explanation to the similarity (isomorphism) and stability, although recently, the NIS has attempted to answer the emerging questions on changing [39], and some argue that organizations are strategic in their answers to imposed institutional pressures [26].

While national institutions are path dependent, according to the traditional IT, and organizations tend to behave the same way (that is, displaying isomorphism), the NIS's intra-organizational dynamic "precipitate and facilitate organizational change, and the adoption of governance elements that the organization finds efficient and/or legitimate" ([33], p. 489).

3. The explanatory theoretical framework for sustainability disclosure: the thesis

Branco and Rodrigues [44, 45] argue that organizations get involved in CSR activities and disclosure for two reasons: because they assume that fruitful relations with stakeholders boost an increase in financial return and because they are adapting to stakeholders' norms and expectations, which constitute a legitimacy instrument, to show their compliance to such norms and expectations (consistent with the IT explanations, in particular with the LT).

There are several authors with important studies combining several theories. For example, Chen and Roberts [8] explore how the IT, LT, ST, and resources dependency theory (RDT) can inform and supply important theoretical frameworks for environmental and social accounting research, as they share a common interest: to explain how organizations survive in a changing society. Golob and Bartlett [18] follow the LT and ST theoretical framework in their comparative study of CSR reports in Australia and Slovenia. Oliver [26] focuses her study on the IT and RDT to analyze the convergent and divergent assumptions relevant to characterize the strategic responses to external pressures and expectations.

Thus, in the analytical framework presented, accounting and sustainability reports will be seen through three different lenses: the IT and isomorphism (see [24, 27, 32, 39, 41, 46–49]), the LT as a source of competitive advantage, differentiating from their competitor and legitimizing their position and compliance with norms (see [2, 8, 10, 14, 44, 45, 50–55]), and the ST, responding to their expectations (see [8, 10, 19, 38, 54, 55]).

These theories, applied as complementary, can enhance our understanding of the practice and choice of GRI sustainability reports, as disclosing instruments of accounting practices and sustainability reports.

3.1. Institutional isomorphism and sustainability pressures

IT literature emphasizes how organizational structures and processes become isomorphic within the norms of specific types of organizations. For those defending the NIS, organizations sharing the same organizational environment are under the same pressures, tending to be isomorphic [9, 27]. Leaptrott [56] states that isomorphism is NIS's focus, which results from the necessity to obtain and maintain legitimacy, to deal with uncertainty and the normative influences of authorized sources. Isomorphism is a synonym for *convergence*, and when an organization becomes similar to the characteristics of another, an isomorphism process happens [43]. This way, DiMaggio and Powell [27] define isomorphism as the process through which organizations adopt similar structures and systems, making their practices identical. The concept of isomorphism does not address the mentality of the intervenient actors in the organizational behaviors but the structure that determines the decision choices those actors will make as rational and cautious.

The IT attempts to explain the existing institutional isomorphic changing process in organizations, arguing that there are forces encouraging the convergence of business practices [57]. The IT claims that organizations' operations comply with social rules, values, and assumptions on what is an acceptable behavior [26, 50]. Some sectors or institutional areas have powerful environmental agents able to impose structural practices in subordinated organizational units [23], which under isomorphic pressures adopt "institutionalized" norms and practices in order to be perceived as "legitimate" [12]. However, to authors such as DiMaggio and Powell [27], these organizational characteristics change to increase compatibility with the characteristics of the institutional environment. In this sense, "isomorphism is a key element of" the IT and assumes that organizations adopt management structures and practices considered legitimate and socially acceptable by other organizations in their field, regardless their real usefulness" ([43], p. 742).

In institutional isomorphism, organizations are not mere production systems; they are also social and cultural systems [12, 36]. Thus, they tend to adopt the same practices over time as an institutional response to common pressures from similar industries or organizations [12, 27, 32, 36, 43]. Institutional isomorphism leads to the organizational success and endurance [32], enabling the identification of three different types of mechanisms making organizations adapt to their institutional environment, leading to isomorphic institutional change: normative, coercive, and mimetic (see [8, 24, 27, 34, 41, 43, 46, 47, 57–61]). DiMaggio and Powell [27]

also mention that uncertainty may lead to isomorphism, and within an organizational field, this tends to be stronger. Thus, these three types of institutional pressures promote homogeneity within organizational fields [61].

In an institutional perspective, the "most important aspect of isomorphism with environmental institutions is the evolution of organizational language" ([32], p. 348). So, the IT explains accounting choice through organizational actors being subject to institutional pressure normative, or coercive, or mimetic [47]. In accounting studies, the IT has been used [24] based on this list of institutional mechanisms, which work differently, "which is important to notice in order to fully understand how decision makers are influenced by institutions" ([47], p. 151).

It would be expected that coercive, normative, and mimetic pressures regarding the adoption of sustainable practices would arise at the state level as this is one of the entities that constitute organizational fields with which firms will be congruent [62]. Hillebrand et al. [49], according to the institutional perspective, which conceptualizes that organizations operate in a social context, sees social pressures as strong predictors of isomorphism. It has shown that mimetic reasons can reduce an organization's capacity to obtain valuable insights from their customers. Frumkin and Galaskiewicz [41] state that, although the PS is seen as an institutionalization conductor, it is also susceptible to these types of pressures, adapting and changing if exposed to institutional forces. Through legitimacy practices it demonstrates social and economic aptitude by conforming to institutional pressures. Touron [34] verifies in his study that the IT partly allows explaining the actions of organizations according to international accounting standards, in which normative isomorphism has a crucial part, and mimicry helps justifying the adoption of accounting norms.

Campbell [63] presents an IT of CSR that consists of a series of propositions, specifying the conditions in which organizations are susceptible to behaving in a socially responsible way. Trevino et al. [48] believe that the cognitive, normative, and regulative pillars represent the processes leading to institutional change and influence the organization's results. Bebbington et al. [46] have used the IT theoretical framework in the narrative analysis to explore how regulative, normative, and cognitive institutions combine with organizational dynamics to influence sustainable development (SD) reports' activity and the institutionalization of this practice. Chen and Roberts [8] state that the focus of the IT study, applicable to social and environmental studies, is the adoption of a certain structure, system, program, or practice of an organization that is normally implemented by similar organizations. Jamali [42] has followed the IT theoretical framework to account for the similarity and stability of organizational practices within a specific organizational area. These practices are affected by the normative, regulative, and cognitive aspects of the institutional environment.

Jackson and Apostolakou [58] investigate the institutional determinants of CSR, in a comparative institutional analysis, to understand how institutional differences between countries may influence how organizations get involved with CSR. They show that national and institutional level factors have an asymmetric effect: they strongly influence the likelihood of an organization to adopt the "minimal norms" of CSR but have little influence on the adoption of "better practices." Also, using a NIS framework, Schultz and Wehmeier [35] have shown that organizations suffer enormous and conflicting pressures in economic, social, and environmental

aspects. In Escobar and Vredenburg's study [59] on multinational oil organizations and the adoption of SD, an interpretative approach based on the RDT and the IT was used. They state that to embrace SD, there must be some kind of power exerted on the organizations.

Institutional theorists claim that organizations face similar institutional pressures, ending up with the adoption of similar strategies. This happens because they integrate a society, and their actions are influenced by stakeholders, "including governments (through regulations), an industry (through standards and norms), competitors (through better business models), and consumers (through loyalty)" ([59], p. 40). Power exerted by regulators leads to coercive isomorphism as it induces organizations to adopt similar SD strategies and practices. Power induced by the industry leads to normative isomorphism as it induces standards to step in to prevent coercive measures from emerging (voluntary norms may be anticipated through written regulations, which may put at risk the competitiveness of a multinational). Power exerted by competitors leads mimetic isomorphism to induce the existence of successful, proven competitive models that should be adopted as they diminish the uncertainty or complexity related to SD pressures.

3.2. Legitimacy theory as explanatory theory in the organizations' image management

The process of legitimacy search is directly related to the IT, as it suggests the institutionalization of the normative values of an integrated social system for concrete behaviors of institutions. Theorists believe that compliance with institutional norms established for a long time leads to institutional legitimacy. This legitimization process also strengthens the legitimacy of the existing social values system [8]. These authors present in their study a group of researchers who have used the LT to explain the motivation behind the voluntary disclosures of organizations. This theory postulates that organizations attempt to continuously assure that they operate within society's norms and limits. In this sense, there is a "social contract" between organizations and people affected by their operations [64]. Thus, conformity with social myths emphasizes the social legitimacy of organizations, convincing the public that they are worthy of support and enhancing their survival perspectives [32, 34].

The IT postulates that it is not enough for organizations to compete for resources and clients; it also has to deal with the pressure to comply with shared notions of adequate norms and behaviors, as violating them may put at risk the organization's legitimacy and affect their capacity to ensure resources and social support [57].

LT is more used in the research literature on environmental and social accounting to support the idea that social disclosure will be kept in the present levels, or increase over time, to avoid legitimacy crisis. However, literature contains some references to reasons, and incidents of social disclosure decrease [65].

In a pluralist world, the LT is concerned with organization-society negotiation [10]. Gray et al. [10] consider Lindblom's [66] exposition of the LT to be the clearest as it argues that, first, we should distinguish legitimacy from legitimation. Lindblom [66] identified four strategies a corporation should adopt when seeking legitimation; first, to educate and inform its "relevant public" about the real changes on performance and activities of the organization; second,

to change the perceptions of its relevant public without changing its real behavior; third, to manipulate perception by deviating attention from a problem to another; and fourth, to change the external expectations of its performance. He shows that social disclosure may be applied in all of these cases.

Gifford and Kestler [38] noticed that multinational companies should be embedded in the civilian society, in local community groups, and in the PS. With these trust partnerships and SD engagement, they keep their authority and credibility in communities and gain local legitimacy in the long term. SD is the ultimate corporate aim by which organizations must genuinely perform their CSR, as big and sanctioned organizations because of environmental infractions get more attention from the government [19].

The CSR disclosure is one of the strategies sought by organizations to be accepted and approved for their actions in society. By disclosing CSR information, they convey a social image of responsibility, legitimizing their behaviors and improving external reputation by showing their conformity to such norms and expectations, leading to the increase of financial profitability [58]. Legitimacy from society is the reward when organizations comply with institutionalized social expectations [8, 44, 45].

The LT suggests that CSR disclosure is an important form of communication that aims to convince stakeholders that the organization is meeting expectations. Organizations disclose CSR information due to external pressures. They seek compliance with what organizations meeting society's expectations do; otherwise they would suffer some harm in their profits and survival [44, 45]. The vision incorporated in this theory, which is publicly embraced by management, is that organizations are sanctioned if they do not comply with the society's expectations [64].

An organization's legitimacy is granted and controlled by people outside the organization. Thus, it attempts to implement certain strategies in order to change stakeholders' perception and divert their attention from certain issues so as to change their expectations regarding the organization's performance. Thus, organizations are encouraged to disclose appropriate environmental information to their stakeholders to ensure that their behavior is perceived as legitimate [19]. The organizational LT predicts that organizations will do what they consider to be necessary to keep their image as valid, with legitimate purposes and methods to attain them [65].

Wilmshurst and Frost [51] state that the LT offers an explanation for the management motivation to disclose environmental information in the annual report. When activities have an adverse impact on the environmental management, the organizations will try to restore its credentials through additional information disclosure to ensure their activities and performances are acceptable to the community. This way, the LT suggests that it would be expected that organizations with poorer environmental performance would provide more environmental disclosures, extensive and positive, in their financial reports, as an effort to diminish the increase of threats to their legitimacy [52].

Chen and Roberts [8] state that the focus of the LT, when applicable to environmental and social studies, is how organizations manage their image when the social expectation is assumed and the public target is not clearly identified, for example, in voluntary environmental and social disclosures. Branco and Rodrigues [67] believe that for some organizations,

being seen as socially responsible will bring them competitive advantage. LT is particularly useful to explain any type of disclosure trying to close a particular existing legitimacy gap. Thus, LT focuses disclosure used to repair or to defend lost or threatened legitimacy, to gain or to extend legitimacy and to maintain levels of current legitimacy.

The consensus among researchers seems to be that corporate disclosure is growing and will increase over time. Organizations may decrease environmental disclosures or alter the disclosure type when they notice a change or threat to their legitimacy, making reports more specific and accurate [65]. Organizations that are seen as innovative are often imitated by others to become legitimate [12].

The LT is often referred to as an explanation to environmental and social reports of the private sector [50]. However, Deegan [14] believes that the LT explains why and how managers benefit an organization by using externally-focused reports. This theory can be further refined to clarify corporate social and environmental reporting practices. Sciulli [2] adopted the LT as the theoretical model in his study on sustainability reports in the PS.

Golob and Bartlett [18] believe that the LT is informed by two other perspectives that contribute to the study and analysis of CSR reports: the RDT, which focuses on the role of legitimacy and the organization's capacity to acquire resources, and the IT [27], which considers the restrictions to organizations in complying with external expectations.

In their work, Tilling and Tilt [53] follow a longitudinal case study using the LT to understand the organizations' motivation to voluntarily disclose environmental and social information. Sciulli [30] argues in his works on sustainability reports in the PS that no theory is predominantly adequate to the investigation on sustainability. Instead, there is a series of theories that, isolated or together, offer suitable information and clarifications for behaviors and management practices, namely, the LT, the IT, and the ST. The LT has been widely used in this context [13, 14, 30, 53]. It suggests that social responsibility disclosure provides an important way of communicating with stakeholders, and of convincing them that the organizations is fulfilling their expectations [67].

Also, Mahadeo et al. [54] follow the LT and the ST in their study on practices of environmental and social disclosure (in annual reports) in emerging economies (Maurice Islands). Based on the LT and the ST, a manager must communicate with several groups to attain the perceived legitimacy [19].

According to Suttipun [55], despite the different theoretical approaches that are used to explain TBL reports, the LT and the ST are the theoretical perspectives more widely put forward in literature on environmental and social accounting.

3.3. Stakeholders' theory as explanatory theory of voluntary sustainability disclosure

The ST is closely aligned with the LT, and both are often used as complements [14]. Both enrich, rather than compete, the understanding of corporate social and environmental disclosure practices, despite their different points of view. Both are concerned with "mediation, modification and transformation" ([10], p. 53).

Inherent to the notion that corporate social disclosures have been driven by the need of organizations to legitimize their activities, management will react to the community's expectations [51]. Organizations are part of a social system, and if they show that their values go against social norms, their legitimacy is, potentially and substantially, threatened. They need to consider all the stakeholders when elaborating their strategies so as not to take the risk of their support to be withdrawn, using environmental and social reports as the means of communication between them [19].

Organizations are seen as having the obligation to consider what society wants and needs in the long term, which implies that they get involved in activities that promote benefits for society and minimize the negative impacts of their actions [67]. However, environmental and social reports may not be as important in some countries as legitimacy is not perceived as being threatened or because stakeholders are not concerned with these issues [65].

By definition, there is some kind of a relationship between an organization and each of its stakeholders [68]. They are the ones offering organizations a set of resources they need to accomplish their businesses [14, 18]. There should be a reciprocal relationship: stakeholders supply vital resources or contribute to the organization, and this fulfills their needs [17]. Thus, it is the vision that the stakeholders have within the community that determines the acceptable activities expected to be undertaken by organizations [51].

The ST suggests an extensive variety of groups in the social environment, which may affect an organization, groups with legitimate claims because of concepts of the agency and property theories [69]. When the ST is used in the management interpretation, the managers' tendency to implement changes regarding the LT gets under focus [65]. As the stakeholders' influence is crucial for corporate image and comparative advantage, organizations manage their relationships with stakeholders by providing them information often as voluntary disclosure in their annual reports or in their websites [55].

Branco and Rodrigues [67] try to show that the CSR term must be based on stakeholders and able to attend to both normative and instrumental aspects. CSR is analyzed as a basis of competitive advantage. Huang and Kung [19] show that the environmental and social disclosure level is influenced by the search of stakeholders' groups—internal, external, and intermediaries—such as shareholders and employees, governments, debtors, suppliers, competitors, consumers, organizations of environmental protection, and accounting organizations, which exert a strong influence on management intentions and organizations.

Manetti [70] shows in his study that he tries to understand the stakeholders' role in sustainability reports. He concludes that it is important to get them involved in the environmental and social accounting for the definition of strategic sustainable aims and coherence in management activities. Chen and Roberts [8] state that focus of the ST, applicable to environmental and social studies, is the unexpected environmental and social activities performed by organizations, such as voluntary participation in activities benefitting society or the natural environment, without explicit self-promotion or publicity.

The ST sees the world through the management perspective of the organization strategically concerned about the continuous success of the organization. From this perspective, the

existence of the organization involves the search of the stakeholders' support and approval, and activities have to be adjusted toward profit [10]. The ST acknowledges that the impact of each stakeholder group on the organization is different, and the expectations of the different stakeholders are different and incompatible. Thus, the ST is adequate for research studies concerned with the connection and interaction of organizations or groups [8]. According to Freeman [69], the original intention of the ST is to allow managers to go beyond business practices, if necessary.

Environmental and social disclosure integrates the dialog between the organization and the stakeholders, and CSR reports are fairly successful in negotiating those relationships. This practice is a intricate activity that may not be completely explained by a single theoretical perspective [10]. To Gray et al. ([68], p. 333), organizations today voluntarily disclose environmental and social information as "part of a legitimacy and/or social construction process".

4. Analysis and discussion

Several scholars have used the institutional, legitimacy, and stakeholder theories to enlighten the existence and content of accounting environmental and social reports [13]; and they acknowledge that these theories share some common characteristics.

The aim of this essay is to provide a wider vision and theoretical support for research on accounting and sustainability reports. We reinforced the idea that accounting is not a mere due and daily sustained technique and practice. Accounting research should consider social and institutional pressures, which lead entities to adopt certain measures and decisions to increase their legitimacy [7]. This allows to understand how and why accounting changes. The IT can help in the development of explanations for accounting change or of the accounting practice [39].

Institutional change can come from "pressures resulting from functional, political, or social sources". This "change involves a decrease in institutional forces or a substitution of one set of behaviors or structures for another" ([56], p. 217). Institutional pressures do not affect organizations in the same way. "Organizations do not always embrace strategies, structures, and processes that enhance their performance but, instead, react to and seek ways to accommodate pressures following external scrutiny and regulation" ([41], p. 285). Organizational change is not so much due to efficiency and rivalry competitiveness but rather to bureaucracy reduction and the attempt of organizations to become more identical to each other to achieve legitimacy without necessarily becoming more efficient [27].

The literature review confirms the close relationship of the IT with accounting environmental and social reports, also designated as TBL or sustainability, and the existence of coercive, normative, and mimetic pressure over organizations, influencing the adoption of certain accounting practices.

The IT postulates that it is not sufficient for organizations to compete for resources and clients; instead, they also have to deal with the pressure to comply with shared notions of adequate behaviors and paths, as their violation may put at risk their legitimacy and influence their capacity

to ensure resources and social support [57]. The IT is not generally considered an organizational change theory but rather as enlightenment for the resemblance and stability of organizational commitments to a community or organizational field. The intra-organizational dynamic of the NIS rushes and facilitates the organization to change as well as to adopt governance elements organizations find efficient and/or legitimate. Thus, organizations tend to behave similarly [33].

The IT argues that there are forces promoting the convergence of business practices, and it attempts to clarify the institutional isomorphic change process in organizations [57]. The IT explains that organizations not only take into account the economic aspects in their structural decisions and management practices but try to legitimize themselves before the stakeholders [27]. Thus, a reason for the isomorphic behavior is to attain legitimacy and social acceptance [24, 43, 60] to improve the organization's reputation as rational, modern, responsible, and legally compatible [60]. The IT has been used in accounting studies [24] because it justifies accounting choice with the organizational actors being under institutional pressure, and it is important to understand these institutional mechanisms, which work differently, and how institutions influence decision makers [47].

From the IT perspective, Brown et al. [20] showed in their study how the institutionalization process is deeply influenced by the initial strategies of the GRI founders. GRI is a brand tool of organizations—private and public—whether it is for management, comparability, sustainability, or reputation. GRI's influence has also been proved by the study of Nikolaeva and Bicho [21].

Organizations are part of the social system, and if they prove that their values are going against social norms, their legitimacy is potentially threatened [19]. The IT holds that organizations imitate others when practices are broadly accepted and shared by the main interveners [2, 46]. Therefore, the IT suggests that the institutionalization of value standards is integrated in concrete behaviors of its institutions. Institutional theorists believe that compliance with institutional norms established for a long time is the way to institutional and social legitimacy [8].

Sustainability reports have been explored as a tool for boosting change, attitudes, and actions necessary to put forward a different kind of organization and decision making compatible to ecological and social sustainability. Oliver [26] presents an example of CSR and organizational ethics maintenance, which may lead organizations to act not because of any kind of direct connection to a positive organizational result but quite simply it would be unthinkable to do differently. So, the organization would not be invariably reducible to strategic behaviors encouraged by the expectation of organizational profit.

Following previous studies, Ball et al. [71] have discussed several approaches to sustainability reports on the role of public services promoting sustainability, and they observe, through a case study in the local government of the United Kingdom, that environmental accounting is pressed—political, social, and functional pressures—toward changing the organization. This is called "deinstitutionalization" (discontinuity of organizational practices or activities).

Cho and Patten [52] believe that some environmental disclosures in reports are used as a legitimacy tool, but others are not. However, organizations with poorer environmental performance provide higher disclosure levels. To Branco and Rodrigues [45], some organizations believe that being seen as socially responsible will bring them "competitive advantage".

Frumkin and Galaskiewicz [41] believe that government agencies have a fundamental part in implanting and triggering institutional change, applying pressure through their funding control, which is sometimes exerted by their regulation power. Government action has the core function of starting the structural transformation of other organizations. However, Chen and Roberts [8] state that the IT [27, 32] is similar to the LT [66] but is focused on the connection between the environment and organizations, mainly in the stability and survival of the organization. It is the institutional legitimacy process that is directly related to the IT [8].

The LT claims that legitimacy is a state achieved when an organizational value system is coherent with society's wider value system, but it does not offer a solution in terms of how it can be achieved or empirically analyzed in practice. However, the organizational or structural legitimacy process is more related to the ST, which recognizes that legitimacy is subjectively assessed according to the value standards of the stakeholders' groups [8]. Freeman [69] highlights that the will to interact and engage is the necessary solution for the approval and support of the stakeholders.

However, as there are no normative or coercive pressures for organizations to adhere to GRI standards yet, mimetic isomorphism would be best for the voluntary adoption of CSR reports since the mimetic behavior may be the right response to the environmental uncertainty, and it may really help managers save resources by copying their competitors' behaviors [21]. These authors consider their own study as the first to explore the voluntary adoption of the world's framework of CSR reports (GRI) by organizations. Results suggest that managers are encouraged to disclose CSR reports, according to the GRI, increasing the organization's legitimacy.

Summing up, each theory gives its contribution, completing each other according to its perspective. Thus, it is possible to incorporate various theories in an attempt to attain a more comprehensible and full understanding of an organization's connection with society, the value of researching a specific social event from various theoretical perspectives should be emphasized.

5. Concluding remarks

We are in a global community, in a new environment and before a new strategic model, where future organizations have to generate value for stakeholders. Socially responsible organizations generate value for others and achieve better results for themselves. CSR is not a mere choice of organizations; it is a matter of strategic vision and survival. The GRI, the internationally acknowledged standard for sustainability disclosure, contributes to the dialog among the diverse stakeholders [22].

Understanding the different theoretical perspectives and the institutional pressures for change, organizations will tend to adopt sustainability practices and the path of social responsibility. This study reveals that those theories are different in their specificity, perspective, and solution levels, but their aims are the same: they have a shared interest of explaining how organizations survive and grow. They stress that financial performance and efficiency are crucial but not enough for organizations to continue surviving. Some organizations may perform some sustainability performance merely to satisfy mutual expectations of doing business.

Here, legitimacy is the only reward. But others may start those practices as a result of their engagement with pertinent stakeholders' groups.

There is an urgent need for investigation on accounting practices and sustainability reports to compare really sustainable organizations in this global world, leading to future benefits. In short, this is a present, pertinent, promising, and interesting theme for everyone: citizens, organizations, community, state, shareholders, among others, inclusively to literature and investigators, as there is little research work in this area.

This study concludes that there are three important theoretical considerations for future research studies on accounting and sustainability reports. Firstly, it must be acknowledged that some organizations start sustainability activities based on pressure to change or on direct interaction with stakeholders, while others can perform analogous activities to achieve their social level of legitimacy; secondly, from the analysis of the perspectives of the institutional, legitimacy and stakeholder theories, it is possible to reach compatible interpretations with economic, social, and environmental business phenomena (of sustainability); thirdly, all these phenomena will be part of executives' motivations to voluntarily get involved and engaged in CSR practices and disclosure. The choice and use of these theories depend on the study theme.

Although these perspectives may complement responses to the present issues on accounting and sustainability reports, it is necessary to understand the concepts and potential applications of each theory; thus, they should be simultaneously studied, mutually complementing each other.

Therefore, the limitations of this study are the gaps in deeper considerations about these and other theories in the explanation and motivation of organizations' sustainability practices. In this sense, the results recommend opportunities for further research studies, namely, using case studies, which may allow more conclusive inferences on these theories, singly or together, to get a more coherent and complete approach to the understanding of accounting practice and sustainability reports.

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References

[1] Gray R. Is accounting for sustainability actually accounting for sustainability. And how would we know? An exploration of narratives of organizations and the planet. Accounting, Organizations and Society. 2010;**35**(1):47-62

[2] Sciulli N. Sustainability reporting by local councils in coastal regions: An Australian study. Asian Journal of Finance & Accounting. 2009;**1**(1):76-86

[3] Elkington J. Partnerships from CmMs mth forks: The triple bottom line of 21st-century business. Environmental Quality Management. 1998;**8**(1):37-51

[4] Bebbington J, Gray R. An account of sustainability: Failure, success and a reconceptualization. Critical Perspectives on Accounting. 2001;**12**(5):557-587

[5] Miller M. Accounting as social and institutional practice: An introduction. In: Hopwood AG, Miller P, editors. Accounting as Social and Institutional Practice. Cambridge: Cambridge University Press; 1994. pp. 1-39

[6] Vieira R. Paradigmas teóricos da investigação em contabilidade. In: Major MJ, Vieira R, editors. Contabilidade e Controlo de Gestão. Teoria, Metodologia e Prática. Lisboa: Escolar Editora; 2009. pp. 10-34

[7] Hopwood A, Miller P. Accounting as Social and Institutional Practice. Cambridge: University Press; 1994

[8] Chen J, Roberts R. Toward a more coherent understanding of the organization-society relationship: A theoretical consideration for social and environmental accounting research. Journal of Business Ethics. 2010;**97**(4):651-665

[9] DiMaggio PJ, Powell WW. The new institutionalism in organizational analysis. Publisher: University of Chicago Press. 1991;**17**:478

[10] Gray R, Kouhy R, Lavers S. Corporate social and environmental reporting: A review of the literature and a longitudinal study of UK disclosure. Accounting, Auditing & Accountability Journal. 1995;**8**(2):47-77

[11] Major MJ, Ribeiro J. A teoria institucional na investigação em contabilidade. In: Major MJ, Vieira R, editors. Contabilidade e Controlo de Gestão. Teoria, Metodologia e Prática. Lisboa: Escolar Editora; 2009. pp. 37-59

[12] Williams Z, Lueg J, Taylor R, Cook R. Why all the changes? An institutional theory approach to exploring the drivers of supply chain security (SCS). International Journal of Physical Distribution & Logistics Management. 2009;**39**(7):595-618

[13] Gray R, Owen D, Adams CA. Accounting and Accountability: Changes and Challenges in Corporate Social and Environmental Reporting. London: Prentice Hall; 1996

[14] Deegan C. Introduction: The legitimising effect of social and environmental disclosures—A theoretical foundation. Accounting. Auditing & Accountability Journal. 2002; **15**(3):282-311

[15] Yongvanich K, Guthrie J. An extended performance reporting framework for social and environmental accounting. Journal of Business Strategy and the Environment. 2006; **15**(5):309-321

[16] Farneti F, Guthrie J. Sustainability reporting by Australian public sector organizations: Why they report. Accounting, Auditing and Accountability. 2009;**33**(2):89-98

[17] Gray R, Laughlin R. It was 20 years ago today Sgt pepper: Green accounting and the blue Meanies. Accounting, Auditing & Accountability Journal. 2012;**25**(2):228-255

[18] Golob U, Bartlett JL. Communicating about corporate social responsibility: A comparative study of CSR reporting in Australia and Slovenia. Public Relations Review. 2007;**33**(1):1-9

[19] Huang C-L, Kung F-H. Drivers of environmental disclosure and stakeholder expectation: Evidence from Taiwan. Journal of Business Ethics. 2010;**96**(3):435-451

[20] Brown HS, Jong M, Levy DL. Building institutions based on information disclosure: Lessons from GRI's sustainability reporting. Journal of Cleaner Production. 2009;**17**(6): 571-580

[21] Nikolaeva R, Bicho M. The role of institutional and reputational factors in the voluntary adoption of corporate social responsibility reporting standards. Academy of Marketing Science. 2010;**39**(1):136-157

[22] Global Reporting Initiative (GRI). Diretrizes para a Elaboração de Relatórios de Sustentabilidade (DERS). Versão 3.0, em português. Amsterdam. 2006. Available from: https://www.globalreporting.org/resourcelibrary/Portuguese-G3-Reporting-Guidelines.pdf [Accessed: February 28, 2012]

[23] Scott WR. The adolescence of institutional theory. Administrative Science Quarterly. 1987;**32**(4):493-511

[24] Carpenter V, Feroz E. Institutional theory and accounting rule choice: An analysis of four US state governments' decisions to adopt generally accepted accounting principles. Accounting Organizations and Society. 2001;**26**(7-8):565-596

[25] Scott W. Institutional theory: Contributing to a theoretical research program In: Smith KG, Hitt MA, editors. Great Minds in Management: The Process of Theory Development. Oxford, UK: Oxford University Press; 2004. Available from: http://icos.groups.si.umich.edu/Institutional%20Theory%20Oxford04.pdf [Accessed: December 22, 2011]

[26] Oliver C. Strategic responses to institutional processes. Academy of Management Review. 1991;**16**(1):145-179

[27] DiMaggio PJ, Powell WW. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. American Journal of Sociology. 1983;**48**:147-160

[28] Tolbert P, Zucker L. Institutional analyzes of organizations: Legitimate but not institutionalized. Biotechnology Studies. 1994;**6**(5):1-46

[29] Dillard J, Rigsby J, Goodman C. The making and remaking of organization context: Duality and the institutionalization process. Accounting, Auditing & Accountability Journal. 2004;**17**(4):506-542

[30] Sciulli N. An accounting research agenda in the context of climate change. Drawing on the Australian local government sector. International Review of Business Research Papers. 2010;**6**(5):125-136

[31] Deegan C, Unerman J. Financial Accounting Theory. European ed. Maidenhead: McGraw-Hill; 2006

[32] Meyer J, Rowan B. Institutionalized organizations: Formal structure as myth and ceremony. The American Journal of Sociology. 1977;**83**(2):340-363

[33] Chizema A, Buck T. Neo-institutional theory and institutional change: Towards empirical tests on the "Americanization" of German executive pay. International Business Review. 2006;**15**(5):488-504

[34] Touron P. The adoption of US GAAP by French firms before the creation of the international accounting standard committee: An institutional explanation. Critical Perspectives on Accounting. 2005;**16**(6):851-873

[35] Schultz F, Wehmeier S. Institutionalization of corporate social responsibility within corporate communications: Combining institutional, sensemaking and communication perspectives. Corporate Communications: An International Journal. 2010;**15**(1):9-29

[36] Scott W. Institutions and Organizations. 2nd ed. Thousand Oaks, CA: Sage; 2001

[37] Scott W. Institutions and Organizations. Thousand Oaks, CA: Sage; 1995

[38] Gifford B, Kestler A. Toward a theory of local legitimacy by MNEs in developing nations: Newmont mining and health sustainable development in Peru. Journal of International Management. 2008;**14**(4):340-352

[39] Ball A, Craig R. Using neo-institutionalism to advance social and environmental accounting. Critical Perspectives on Accounting. 2010;**21**(4):283-293

[40] Milne M, Patten D. Securing organizational legitimacy: An experimental decision case examining the impact of environmental disclosures. Accounting, Auditing & Accountability Journal. 2002;**15**(3):372-405

[41] Frumkin P, Galaskiewicz J. Institutional isomorphism and public sector organizations. Journal of Public Administration Research and Theory. 2004;**14**(3):283-307

[42] Jamali D. MNCs and international accountability standards through an institutional lens: Evidence of symbolic conformity or decoupling. Journal of Business Ethics. 2010; **95**(4):617-640

[43] Rodrigues L, Craig R. Assessing international accounting harmonization using Hegelian dialectic, isomorphism and Foucault. Critical Perspectives on Accounting. 2007; **18**(6):739-757

[44] Branco ML, Rodrigues LL. Factors influencing social responsibility disclosure by Portuguese firms. Journal of Business Ethics. 2008;**83**(4):685-701

[45] Branco M, Rodrigues L. Corporate social responsibility and resource-based perspectives. Journal of Business Ethics. 2006;**69**(2):111-132

[46] Bebbington J, Higgins C, Frame B. Initiating sustainable development reporting: Evidence from New Zealand. Accounting, Auditing and Accountability. 2009;**22**(4):588-625

[47] Collin S-DY, Tagesson T, Andersson A, Cato J, Hansson K. Explaining the choice of accounting standards in municipal corporations: Positive accounting theory and institutional theory as competitive or concurrent theories. Critical Perspectives on Accounting. 2009;**20**(2):141-174

[48] Trevino L, Thomas D, Cullen J. The three pillars of institutional theory and FDI in Latin America: An institutionalization process. International Business Review. 2008; **17**(1):118-133

[49] Hillebrand B, Nijholt JJ, Nijssen EJ. Exploring CRM effectiveness: An institutional theory perspective. Journal of the Academy of Marketing Science. 2011;**39**(4):592-608

[50] Lynch B. An examination of environmental reporting by Australian state government departments. Accounting Forum. 2010;**34**(1):32-45

[51] Wilmshurst TV, Frost GR. Corporate environmental reporting: A test of legitimacy theory. Accounting Auditing & Accountability Journal. 2000;**13**(1):10-26

[52] Cho CH, Patten DM. The role of environmental disclosures as tools of legitimacy: A research note. Accounting Organizations and Society. 2007;**32**(7-8):639-647

[53] Tilling MV, Tilt CA. The edge of legitimacy voluntary social and environmental reporting in Rothmans' 1956-1999 annual reports. Accounting, Auditing & Accountability Journal. 2010;**23**(1):55-81

[54] Mahadeo JD, Oogarah-Hanumana V, Soobaroyen T. Changes in social and environmental reporting practices in an emerging economy (2004-2007): Exploring the relevance of stakeholder and legitimacy theories. Accounting Forum. 2011;**35**(3):158-175

[55] Suttipun M. Triple bottom line reporting in annual reports: A case study of companies listed on the stock exchange of Thailand (SET). Asian Journal of Finance & Accounting. 2012;**4**(1):69-92

[56] Leaptrott J. An institutional theory view of the family business. Family Business Review. 2005;**18**(3):215-228

[57] Braunscheidel M, Hamister J, Suresh N, Star H. An institutional theory perspective on six sigma adoption. International Journal of Operations & Production Management. 2011;**31**(4):423-451

[58] Jackson G, Apostolakou A. Corporate social responsibility in Western Europe: An institutional mirror or substitute? Journal of Business Ethics. 2010;**94**(3):371-394

[59] Escobar LF, Vredenburg H. Multinational oil firms and the adoption of sustainable development: A resource-based and institutional theory interpretation of adoption heterogeneity. Journal of Business Ethics. 2011;**98**(1):39-65

[60] Rodrigues L, Craig R. Chapter 16: Using a dialectic approach to understand stakeholders' conflicts with corporate social responsibility activities. In: A Stakeholder Approach to Corporate Social Responsibility, Pressures: Conflicts, Reconciliation. 2012. pp. 299-3159

[61] Pedersen ERJ, Neergaard P, Pedersen JT, Gwozdz W. Conformance and deviance: Company responses to institutional pressures for corporate social responsibility reporting. Business Strategy and the Environment. 2013;**22**(6):357-373

[62] Gauthier J. Institutional theory and corporate sustainability: Determinant versus interactive. Approaches. Organization Management Journal. 2013;**10**(2):86-96

[63] Campbell JL. Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. Academy of Management Review. 2007;**32**(3):946-967

[64] Brown N, Deegan C. The public disclosure of environmental performance information—A dual test of media agenda setting theory and legitimacy theory. Accounting and Business Research. 1998;**29**(1):21-41

[65] Villiers C, Staden CJ. Can less environmental disclosure have a legitimising effect? Evidence from Africa. Accounting Organizations and Society. 2006;**31**(8):763-781

[66] Lindblom CK. The implications of organizational legitimacy for corporate social performance and disclosure. In: Critical Perspectives on Accounting Conference. New York; 1994

[67] Branco ML, Rodrigues L. Positioning stakeholder theory within the debate on corporate social responsibility. Electronic Journal of Business Ethics and Organization Studies. 2007;**12**(1):1-11

[68] Gray R, Dey C, Owen D, Evans R, Zadek S. Struggling with the praxis of social accounting: Stakeholders, accountability, audits and procedures. Accounting, Auditing & Accountability Journal. 1997;**10**(3):325-364

[69] Freeman R. Strategic Management: A Stakeholders Approach. Boston: Pitman; 1984

[70] Manetti G. The quality of stakeholder engagement in sustainability reporting: Empirical evidence and critical points. Corporate Social Responsibility and Environmental Management. 2011;**18**(2):110-122

[71] Ball A, Broadbent J, Jarvis T. Waste management, the challenges of the PFI and "sustainability reporting". Business Strategy and the Environment. 2006;**15**(4):258-274

Section 3

Insurance Contracts

Chapter 4

An Inequality for Reinsurance Contract Annual Loss Standard Deviation and Its Application

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Additional information is available at the end of the chapter

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Abstract

For reinsurance contract simulated annual losses, an inequality relating their standard deviation and mean is found, $\sigma_f \geq m_f \sqrt{\frac{\mu(A^C)}{\mu(A)}}$, where the coefficient in the inequality is the square root of the ratio of numbers of zero losses years to numbers of non-zero losses years. The largest such coefficient is also proved to be the universal upper bound. As direct application of this inequality, bounds for other risk measures of reinsurance contract, the *TVaR* (average of the annual losses that are larger than a given loss), the probability of attaching (greater than a given attachment loss), and the probability of exceeding (the annual loss limit) are obtained, which in turn reveal the capability upper limit of the simulation approach.

Keywords: reinsurance contract, simulation, standard deviation, coefficient of variation, inequality, ratio distribution, model risk

1. Introduction

In reinsurance industry, simulated losses from catastrophe events combined with reinsurance contract financial terms are used to calculate the contract expected annual loss, the standard deviation of the expected annual loss, and quantiles of the losses (such as the AEP: Aggregate Exceedance Probability, or TVaR: Tail Value at Risk, in Ref. [1]). These numbers are in turn used for pricing or risk management of the contract. There are two kinds of model risks in this approach: independent simulations may give different results without any model change, and simulations vary before or after model change such as from the yearly catastrophe events sets or parameters updates. Empirically, the distribution of the contract expected annual loss may be more like a Beckmann, MaxStable, Gamma, Inverse Gaussian, or even a Lognormal Distribution

than a Normal Distribution, but consider that the mean annual loss is the average of a large number of losses, and especially for simplicity, if we assume they obey a Normal Distribution, to quantify the model risk, we can use Hinkley formula [2] or Marsaglia formula [3] to calculate the probability of two simulations have expected annual loss deviated from each other by more than say 50%. Their formulas, in our model risk quantification context and the simplest scenario, depend on only two factors: the correlation coefficient ρ of the distribution in the two simulations, and the coefficient of variation (CV) of the distribution, that is, the ratio of the standard deviation to the mean. Most reinsurance contracts, due to the carefully selected financial terms, have many or the majority of simulated year's losses zero. Thus call for a study of the CV range or bounds of those scarcely payout contracts.

2. Results

2.1. CV range

Starting from Hölder's inequality (https://en.wikipedia.org/wiki/Hölder's_inequality):

$$\|fg\|_1 \le \|f\|_p \|g\|_{q'} \tag{1}$$

suppose f in the formula is the contract annual loss with mean m_f deducted, that is, is of the form $f - m_f$ and $p = q = 2$, g is some nonnegative weights on the discrete probability space of the simulated years Ω, for example, the set {1,2,…,100,000} for 100,000 years of simulations, each element with a probability of 1e-5 (a typical setting in practice). Then we get:

$$\int |f - m_f| g d\mu \le \left[\int |f - m_f|^2 d\mu\right]^{1/2} \left[\int g^2 d\mu\right]^{1/2} = \sigma_f \left[\int g^2 d\mu\right]^{1/2} \tag{2}$$

Suppose f is nonnegative and zero outside of a subset A of Ω and g is constant a on A and constant b on A^C: $f|_A C = 0$, $f|_A > 0$, $g|_A C = b \ge 0$, $g|_A = a \ge 0$. Then we can deduct that:

$$\sigma_f \ge m_f \frac{a\mu(A^C) + b\mu(A^C)}{\sqrt{a^2\mu(A) + b^2\mu(A^C)}} \tag{3}$$

due to

$$|f - m_f| \ge f - m_f \tag{4}$$

and

$$\int |f - m_f| g d\mu = \int_A |f - m_f| a d\mu + \int_{A^C} m_f b d\mu \tag{5}$$

$$\geqslant \int_A f a d\mu - \int_A m_f a d\mu + m_f b \mu(A^C) \tag{6}$$

$$= m_f a - m_f a\mu(A) + m_f b\mu\left(A^C\right) \tag{7}$$

The maximum of the right-hand side of Eq. (3) is achieved by $\frac{a}{b} = \frac{\mu\left(A^C\right)}{\mu(A)}$, increasing on $[0, \frac{\mu\left(A^C\right)}{\mu(A)}]$ and decreasing on $\left[\frac{\mu\left(A^C\right)}{\mu(A)}, \infty\right)$, and then we get:

$$\sigma_f \geq m_f \sqrt{\frac{\mu\left(A^C\right)}{\mu(A)}} \tag{8}$$

As a corollary, if we use the 2-sigma or 3-sigma rule for the confidence interval of the estimate of the mean, for those contracts that have most years 0 losses, these interval will be very large. For example, if we have only 100 years have nonzero losses out of the 100,000 simulated years, then we will get [math]::sqrt((1e5-100)/100) = 31.6069612585582:

$$\sigma_f \geq 31.6069612585582 m_f \tag{9}$$

And if we have 1000 years nonzero losses, we get the constant [math]::sqrt((1e5-1000)/1000) = 9.9498743710662:

$$\sigma_f \geq 9.9498743710662 m_f \tag{10}$$

Checking against some concrete examples, for a contract we see 2220 nonzero losses records, suppose all of them are in different years, then we get the ratio [math]:: sqrt((1e5-2220)/2220) = 6.63664411016931, and we have its mean loss m_f = 3848 and standard deviation σ_f = 37,149 from the simulation, 37,149/3848 = 9.65410602910603 > 6.63664411016931.

Another contract have unique 41,143 nonzero losses years out of the 100,000 simulated years, with mean loss m_f = 1,874,487 and standard deviation σ_f = 2,357,787, σ_f/m_f = 1.25783054243641 > [math]:: sqrt((1e5-41,143)/41,143) = 1.19605481319037.

From these examples, we see that our lower bound formula for *CV* is relatively close.

Typically, more than half of the contracts may have nonzero losses years count below 10,000, for which we can see their $\sigma_f \geq 3m_f$, since [math]::sqrt((1e5-1e4)/1e4) = 3. More than 80% of the contracts may have nonzero losses years count below 50,000, for which there is the simple inequality $\sigma_f \geq m_f$, since sqrt((1e5-5e4)/5e4) = 1. These bounds are collected in **Table 1**.

This inequality Eq. (8) can explain the observation that when we sort the contracts by the mean annual loss, the lower quarter of contracts may have more than tens of percent deviation from different simulations, since smaller mean loss usually corresponding to fewer years of nonzero losses and higher *CV* (more explanation in the following section).

To get an upper bound for *CV*, suppose the total simulated years is n and each year has the loss $x_i \geq 0$. Then:

$$CV \equiv \frac{\sigma_f}{m_f} = \sqrt{n \frac{\sum_{i=1}^{n} x_i^2}{\left(\sum_{i=1}^{n} x_i\right)^2} - 1} \tag{11}$$

For the expression $\frac{\sum_{i=1}^{n} x_i^2}{\left(\sum_{i=1}^{n} x_i\right)^2}$, by taking the partial derivative with respect to x_1, we can know that it is decreasing in $\left[0, \frac{\sum_{i=2}^{n} x_i^2}{\sum_{i=2}^{n} x_i}\right]$ and increasing in $\left[\frac{\sum_{i=2}^{n} x_i^2}{\sum_{i=2}^{n} x_i}, \infty\right)$. So the maximum must be attained at either 0 or ∞, that is, is the value of $\frac{\sum_{i=2}^{n} x_i^2}{\sum_{i=2}^{n} x_i}$ or 1. Recursively, we know that the final maximum is 1. So we get:

$$CV \leq \sqrt{n-1} \tag{12}$$

For the extreme case when only one year have nonzero losses, we thus verified that the coefficient [math]::sqrt((1e5-1)/1) = 316.226184874055 is exact, that is, we have:

$$\sigma_f = 316.226184874055 m_f \tag{13}$$

Nonzero losses years	***CV* lower bound** $\sqrt{\frac{\mu(A^C)}{\mu(A)}}$
1	316.226184874055
10	99.9949998749938
100	31.6069612585582
1000	9.9498743710662
2000	7
5000	4.35889894354067
10,000	3
20,000	2
30,000	1.52752523165195
40,000	1.22474487139159
50,000	1
80,000	0.5
90,000	0.333333333333333
99,000	0.100503781525921
99,900	0.0316385998584166
99,990	0.0100005000375031
99,999	0.00316229347167527

For given years of nonzero losses out of 100,000 simulated years, the lower bound as given by our formula Eq. (8).

Table 1. *CV* lower bound.

The overall upper bound $\sqrt{n-1}$ for CV is approachable when we let all but one of the x_i arbitrarily close to 0.

From the fact that the minimum of the expression in Eq. (11) is attained at $\frac{\sum_{i=2}^{n} x_i^2}{\sum_{i=2}^{n} x_i}$. we can see that:

$$\frac{\sum_{i=1}^{n} x_i^2}{\left(\sum_{i=1}^{n} x_i\right)^2} \geq \frac{\frac{\sum_{i=2}^{n} x_i^2}{\left(\sum_{i=2}^{n} x_i\right)^2}}{\frac{\sum_{i=2}^{n} x_i^2}{\left(\sum_{i=2}^{n} x_i\right)^2} + 1} \tag{14}$$

More generally, if year *i*s have possibly unequal probability p_i of occurrence (such as when using importance sampling), then:

$$\frac{\sum_{i=1}^{n} x_i^2 p_i}{\left(\sum_{i=1}^{n} x_i p_i\right)^2} \geq \frac{\frac{\sum_{i=2}^{n} x_i^2 p_i}{\left(\sum_{i=2}^{n} x_i p_i\right)^2}}{p_1 \frac{\sum_{i=2}^{n} x_i^2 p_i}{\left(\sum_{i=2}^{n} x_i p_i\right)^2} + 1} \tag{15}$$

The minimum value of the right side is attained when $x_1 = \frac{\sum_{i=2}^{n} x_i^2 p_i}{\sum_{i=2}^{n} x_i p_i}$. This can be used inductively to give an "elementary" proof of our lower bound results, and additionally can show that the lower bound is attained when all the nonzero losses are equally valued which using the Hölder's inequality cannot arrive. Similarly we can show that the upper bound is $\sqrt{\max\left(\frac{1}{p_1}, \frac{1}{p_2}, \ldots, \frac{1}{p_n}\right) - 1}$.

We summarize our deduction and discussion into the following:

Theorem 1. *For reinsurance contract simulated annual losses f, the standard deviation σ_f with respect to the mean m_f is bound below by:*

$$\sigma_f \geq m_f \sqrt{\frac{\mu\left(A^C\right)}{\mu(A)}} \tag{16}$$

where $\mu(A^C)$ and $\mu(A)$ are the measure of the numbers of zero losses years and the numbers of non-zero losses years, respectively. The lower bound $\sqrt{\frac{\mu\left(A^C\right)}{\mu(A)}}$ is attended:

$$\sigma_f = m_f \sqrt{\frac{\mu\left(A^C\right)}{\mu(A)}}, \tag{17}$$

if and only if all the non-zero losses are of the same value. The standard deviation σ_f with respect to the mean m_f is bound above by:

$$\sigma_f \le m_f \sqrt{\max\left\{\frac{1}{p_1}, \frac{1}{p_2}, \ldots, \frac{1}{p_n}\right\} - 1} \tag{18}$$

where the p_i is the probability of occurrence of year i. The upper bound is attained if and only if the smallest occurrence probability year is the only year of non-zero losses. And when only year i have nonzero losses:

$$\sigma_f = m_f \sqrt{\frac{1}{p_i} - 1} \tag{19}$$

For not necessarily nonnegative loss contracts (such as contracts with complex layers structure and hedging design), and for contracts that have significant concentration on the upper bound (due to limit and annual limit), replacing f by $f - m$ or $M - f$, where m and M are the minimum and the maximum annual loss, from the theorem we get the following lower bounds:

Corollary 1. *For arbitrary reinsurance contract simulated annual losses f, the standard deviation σ_f with respect to the mean m_f, minimum annual loss m, and maximum annual loss M, is bound below by:*

$$\sigma_f \ge (m_f - m) \sqrt{\frac{\mu(L^C)}{\mu(L)}} \tag{20}$$

$$\sigma_f \ge (M - m_f) \sqrt{\frac{\mu(U^C)}{\mu(U)}} \tag{21}$$

where $\mu(L^C)$ and $\mu(L)$ are the measure of the numbers of minimum losses years and the numbers of not-minimum losses years, $\mu(U^C)$ and $\mu(U)$ are the measure of the numbers of maximum losses years and the numbers of not-maximum losses years, respectively. The equality hold if and only if f is a bivalued distribution.

From Theorem 1, we can get an upper bound for the average annual loss on an arbitrary subset of the years:

Corollary 2. [1]*For a nonnegative random variable f on a probability space Ω, an arbitrary subset $B \subset \Omega$, the average $\frac{\int_B f d\mu}{\mu(B)}$ is bound above by the standard deviation σ_f and the mean m_f by:*

$$\frac{\int_B f d\mu}{\mu(B)} \le \sigma_f \sqrt{\frac{\mu(B^C)}{\mu(B)}} + m_f. \tag{22}$$

Proof:

Define two functions f_1 and f_2 from f such that they are the restrictions of f on the subset B and B^C: $f_1 |_B C = 0$, $f_1 |_B = f |_B$, $f_2 |_B C = f |_B C$, $f_2 |_B = 0$. Then we have $f = f_1 + f_2$ and $f_1 f_2 = 0$. The standard deviation:

[1]The nonnegative condition can be relax to f is bound below.

$$\sigma_f^2 = E\left[\left(f_1 + f_2\right)^2\right] - \left[E\left(f_1 + f_2\right)\right]^2 \tag{23}$$

$$= \sigma_{f_1}^2 + \sigma_{f_2}^2 - 2m_{f_1}m_{f_2} \tag{24}$$

$$\geq m_{f_1}^2 \frac{\mu\left(B^C\right)}{\mu(B)} + m_{f_2}^2 \frac{\mu(B)}{\mu\left(B^C\right)} - 2m_{f_1}m_{f_2} \tag{25}$$

$$= \left(m_{f_1}\sqrt{\frac{\mu\left(B^C\right)}{\mu(B)}} - m_{f_2}\sqrt{\frac{\mu(B)}{\mu\left(B^C\right)}}\right)^2 \tag{26}$$

from Theorem 1 and the fact that the domain with zero value for f_1 include the set B^C and the domain with zero value for f_2 include the set B. Hence:

$$m_{f_1}\sqrt{\frac{\mu\left(B^C\right)}{\mu(B)}} \leq m_{f_2}\sqrt{\frac{\mu(B)}{\mu\left(B^C\right)}} + \sigma_f \tag{27}$$

The inequality Eq. (22) is arrived by the fact that $m_f = m_{f1} + m_{f2}$ and

$$\sqrt{\mu(B)}\sqrt{\mu\left(B^C\right)}\left(\sqrt{\frac{\mu\left(B^C\right)}{\mu(B)}} + \sqrt{\frac{\mu(B)}{\mu\left(B^C\right)}}\right) = \mu\left(B^C\right) + \mu(B) = 1 \tag{28}$$

□

If we let the subset B be $\{x \mid f(x) > 0\}$, then Eq. (22) become Eq. (16). If we let the subset B be $\{x \mid CDF_f(x) \geq q, 0 \leq q \leq 1\}$, we get the so called AEP TVaR upper bound for the given quantile q or the return period $r \equiv \frac{1}{1-q}$: $TVaR(q) \leq \sqrt{\frac{q}{1-q}}\,\sigma_f + m_f$. For the usually used return period, the *TVaR* upper bound (now simply $\sigma_f\sqrt{r-1} + m_f$) is in **Table 2**.

Numerical example shows that our *TVaR* upper bound is relatively close in the quantile range [0.8,0.9], with the theoretical upper bound deviated from the simulated value by less than 20%, no matter what the distribution of the annual loss is.

Notice that the measure of the numbers of nonzero losses years is also called the probability of attaching in insurance, we can rearrange the terms in the formula Eq. (8) to get a lower bound for the probability of attaching:

Corollary 3. *For a reinsurance contract simulated annual losses f, the probability of attaching, ProbA* $\equiv$ *Prob{f > 0}, with respect to the CV is bound below by:*

$$ProbA \geq \frac{1}{CV^2 + 1} \tag{29}$$

As an application of Corollary 3, we see that if $CV \leq 3$, then $ProbA \geq 0.1$, the 0.9 quantile of f is larger than zero. Equivalently, if the 0.9 quantile of f (the so called *AEP* in insurance) is zero, we

Return period	Quantile	*TVaR* upper bound $\sigma_f \sqrt{\frac{\mu(B^C)}{\mu(B)}} + m_f$
100,000	0.99999	$316.226184874055\sigma_f + m_f$
10,000	0.9999	$99.9949998749938\sigma_f + m_f$
5000	0.9998	$70.7036066972541\sigma_f + m_f$
1000	0.999	$31.6069612585582\sigma_f + m_f$
500	0.998	$22.3383079036887\sigma_f + m_f$
250	0.996	$15.7797338380595\sigma_f + m_f$
200	0.995	$14.1067359796659\sigma_f + m_f$
100	0.99	$9.9498743710662\sigma_f + m_f$
50	0.98	$7\sigma_f + m_f$
30	0.966666666666667	$5.3851648071345\sigma_f + m_f$
25	0.96	$4.89897948556636\sigma_f + m_f$
20	0.95	$4.35889894354067\sigma_f + m_f$
10	0.9	$3\sigma_f + m_f$
5	0.8	$2\sigma_f + m_f$
4	0.75	$1.73205080756888\sigma_f + m_f$
2	0.5	$1\sigma_f + m_f$

For given year of return period, the upper bound as given by our formula Eq. (22).

Table 2. *TVaR* upper bound.

CV upper bound	*ProbA* lower bound $\frac{1}{CV^2+1}$	Beginning quantile with nonzero loss	Return period $(\equiv \frac{1}{ProbA})$
99.9949998749938	0.0001	0.9999	10,000
9.9498743710662	0.01	0.99	100
3	0.1	0.9	10
2	0.2	0.8	5
1.73205080756888	0.25	0.75	4
1	0.5	0.5	2
0.577350269189626	0.75	0.25	1.33333333333333
0.5	0.8	0.2	1.25

For given range of *CV*, the lower bound as given by our formula Eq. (29)

Table 3. *ProbA* lower bound.

know $CV > 3$: then we will less prone to think that those zero quantiles is due to simulation inaccuracy. The *CV* bounds for commonly used *AEP*, related to probability of attaching by the formula $\sqrt{\frac{1}{ProbA} - 1}$, is in **Table 3**.

Similarly, from Corollary 2, we can easily rearrange terms to get an upper bound for the probability of exceeding a given loss, which is called the Cantelli's inequality in the literature (https://en.wikipedia.org/wiki/ Chebyshev's_inequality):

Corollary 4. *For a reinsurance contract simulated annual losses f, the probability of exceeding a given loss x, ProbE ≡ Prob{f ≥ x}, with respect to the mean loss m_f and the standard deviation σ_f, when $x \geq m_f$, is bound above by:*

$$ProbE \leq \frac{1}{\frac{(x-m_f)^2}{\sigma_f^2}+1} \tag{30}$$

Specifically, if $x = \frac{\sigma_f^2}{m_f} + m_f$, then:

$$Prob\left\{f \geq \frac{\sigma_f^2}{m_f} + m_f\right\} \leq \frac{1}{CV^2+1} \tag{31}$$

This bound gives a limitation on simulation with a given number N of simulated years where each year have equal probability of occurrence $\frac{1}{N}$. If $\frac{1}{CV^2+1} < \frac{1}{N}$, that is, $CV > \sqrt{N-1}$, then in theory no simulated loss can reach to $\frac{\sigma_f^2}{m_f} + m_f$, the lowest permissible exposure to allow the given mean m_f and given standard deviation σ_f (to be shown in Lemma 1). In other words, if $CV > \sqrt{N-1}$, no such simulation can match both the given mean and the given standard deviation closely (see also inequality Eq. (12)).

Lemma 1. *For a reinsurance contract simulated annual losses f that are bound up by M and with a given mean loss m_f and a given standard deviation σ_f, we must have:*

$$M \geq \frac{\sigma_f^2}{m_f} + m_f \tag{32}$$

On the other hand, with the given max loss M and mean loss m_f, the standard deviation σ_f must satisfy:

$$\sigma_f \leq \sqrt{(M-m_f)m_f} \tag{33}$$

The maximum standard deviation given m_f and M is attained only by a bivalued distribution of values either 0 or M, with probability $q \equiv 1 - \frac{m_f}{M}$ and $p \equiv \frac{m_f}{M}$, respectively, whose CV is then $\sqrt{\frac{M}{m_f}-1} = \sqrt{\frac{1}{p}-1}$. Similarly, the minimal exposure given m_f and σ_f is attained only by a bivalued distribution of values either 0 or $\frac{\sigma_f^2}{m_f} + m_f$, with probability $q \equiv \frac{\sigma_f^2}{\sigma_f^2+m_f^2}$ and $p \equiv \frac{m_f^2}{\sigma_f^2+m_f^2}$, respectively, whose CV is then $\frac{\sigma_f}{m_f} = \sqrt{\frac{1}{p}-1}$.

Proof: Let $g = \frac{f}{M}$, then g is a random variable with values in interval [0,1]. So:

$$g^2 \leq g \tag{34}$$

and

$$\int_\Omega g^2 d\mu \leq \int_\Omega g d\mu \tag{35}$$

$$\int_\Omega g^2 d\mu - \left(\int_\Omega g d\mu\right)^2 \leq \int_\Omega g d\mu - \left(\int_\Omega g d\mu\right)^2 \tag{36}$$

$$\sigma_g^2 \leq m_g(1 - m_g) \tag{37}$$

$$\frac{\sigma_f^2}{M^2} \leq \frac{m_f}{M}\left(1 - \frac{m_f}{M}\right) \tag{38}$$

This proves both of our inequalities. Without loss of generality, suppose any nonempty subset of Ω have nonzero measure, the equality hold in Eq. (34) and its subsequent inequalities if and only if $g = 0$ or $g = 1$. □

Because of the probability of $\frac{m_f}{M}$ of taking value M, we cannot solve the limitation on *CV* by increasing M. The only solution is then by increasing N or using unequal probabilities (please refer to Eq. (18)), otherwise we may have to choose to only match the mean loss, and reduce the simulated standard deviation.

By examining the proof of Corollary 2 and Theorem 1 Eq. (17), forcing the inequality in Eq. (25) to be an equality, we can prove that:

Corollary 5. *For a nonnegative random variable f on a probability space Ω, an arbitrary subset $B \subset \Omega$, assuming $\sigma_f > 0, \mu(B) > 0, \mu(B^C) > 0, m_f > 0$, the average $\frac{\int_B f d\mu}{\mu(B)}$ attain its upper bound with respect to the standard deviation σ_f and the mean m_f:*

$$\frac{\int_B f d\mu}{\mu(B)} = \sigma_f \sqrt{\frac{\mu(B^C)}{\mu(B)}} + m_f \tag{39}$$

if and only if f is a nonzero constant function on the subset B and a constant function on the subset B^C.

So the maximum *TVaR* distribution is bivalued, this corollary provides a guide for implementing relatively high *CV* distribution simulation: for *CV* close to $\sqrt{N-1}$ which do not simulate well, a conservative and simple selection is using bivalued distribution. Similar conclusion about bivalued distribution can be made for the maximum *AEP* distribution which are bound by *TVaR's* bound and attain the same upper bound given in Eq. (39). Both conclusions give clue for a risk measure of the maximally likely or best compromise quantile by comparing simulated *TVaR* or *AEP* with the theoretical bound for the best match but that is the topic of a different research.

2.2. Simulation deviation

Typical correlation coefficient ρ from yearly model update range from 0.27 to 0.96, the CV range is 0.003–316 as we calculated in **Table 1**. With these parameters we used Mathematica Manipulate function to explore the probability of the ratio of two simulated annual-mean-loss be within the range of 0.5–1.5, assuming the annual-mean-loss obeys the Normal Distribution. We find that the probability is small when ρ is close to 0, and is decreasing when CV is increasing, but is stabilized after $CV \geq 7$. For an example $\rho = 0.822434$, for almost half of the contracts, the simulated annual-mean-loss being within 50% to each other has probability of 0.459, that is, with probability of 0.551 we will see two simulation have simulated annual-mean-loss increased or decreased by more than 50% (**Figures 1** and **2**). These factors should be considered for model risk management or individual contract evaluation.

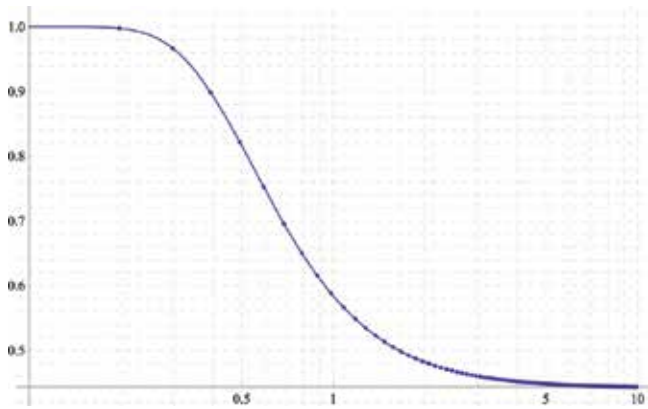

Figure 1. Probability that two simulated mean are within 50% of each other. The horizontal axis is the CV and the vertical axis is the probability. (a) Using Hinkley formula. Formulas used in (a) is complex and very different which may cast doubt for their validity. Our plot is a numerical assurance for their correctness.

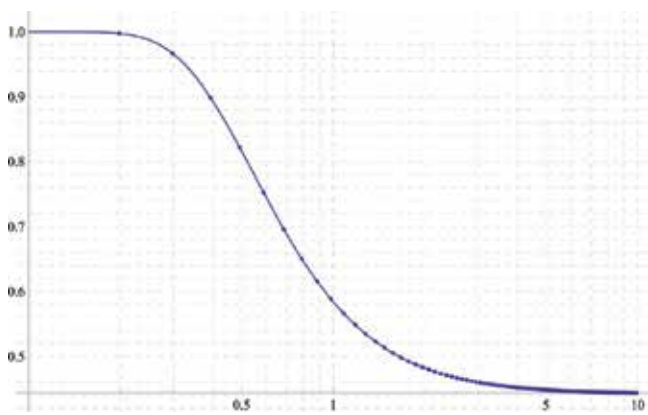

Figure 2. Probability that two simulated mean are within 50% of each other. The horizontal axis is the CV and the vertical axis is the probability. (b) Using Marsaglia formula. Formulas used in (b) is complex and very different which may cast doubt for their validity. Our plot is a numerical assurance for their correctness.

The Mathematica code for the plot in **Figures 1** and **2** is in Appendix A. The two plots are identical even though their formulas are quite different and we do not know whether they can be analytically proved to be equivalent: our plots are numerical validation of both of their formulas.

3. Discussion

The lower bound for *CV* of reinsurance contract annual loss is established. The largest of those bound are also proved to be the upper bound for all *CV*. Applying this range information to ratio distribution, we can get theoretical value of the probability that different simulations will have simulated mean annual loss with deviation from each other less than a given percentage, under the Normal Distribution assumption of the mean annual loss. We think this assumption can be removed by using more suitable distributions, with numerical methods, but may still give the probability not too different. Typical example case numerical study confirmed this, and showed that the "Normal approximation" gives probability only a few percent (2–5%) less than using more suitable distributions that do not have explicit formula for the probability.

As the starting point and the application of the *CV* range, the ratio distribution and the model risk quantification results we get may be only rudimentarily correct due to other factors, such as the distribution modeling, the dependence modeling, and additional parameters dependence than just the *CV* and ρ, but our *CV* inequality itself is mathematically sound.

The less general upper bound $\sqrt{n-1}$ where all probabilities are equal is obtained by Katsnelson and Kotz in the literature [4, 5].

Using the same Hölder's inequality and calculus technique which may not have a simple elementary inequality approach counterpart, we can prove a more complex formula:

Theorem 2. *For reinsurance contract simulated annual losses f, the standard deviation σ_f with respect to the mean m_f is bound below by:*

$$\sigma_f \geq \sqrt{(m_f - m)^2 \mu(m) + (M - m_f)^2 \mu(M) + \frac{\left[(m_f - m)\mu(m) - (M - m_f)\mu(M)\right]^2}{1 - \mu(m) - \mu(M)}} \tag{40}$$

when $\mu(m) + \mu(M) < 1$, where σ_f is the standard deviation, m_f is the mean, m is the minimum annual loss, M is the maximum annual loss, $\mu(m)$ denote the measure of the numbers of minimum losses years, $\mu(M)$ denote the measure of the numbers of maximum losses years.

Proof:

In the inequality Eq. (2), we divide Ω into three subset and let the nonnegative function g be constant in each of the three sets:

$$g|_{\{f=m\}} = a, g|_{\{m<f<M\}} = b, g|_{\{f=M\}} = c \tag{41}$$

Then:

$$\int g^2 d\mu = a^2\mu(m) + b^2\big(1 - \mu(m) - \mu(M)\big) + c^2\mu(M) \tag{42}$$

$$\int |f - m_f| g d\mu = \int_{\{f=m\}} |f - m_f| a d\mu + \int_{\{m<f<M\}} |f - m_f| b d\mu + \int_{\{f=M\}} |f - m_f| c d\mu \tag{43}$$

$$\geq \big(m_f - m\big)a\mu(m) + \int_{\{m<f<M\}} f b d\mu - \int_{\{m<f<M\}} m_f b d\mu + \big(M - m_f\big)c\mu(M) \tag{44}$$

$$= \big(m_f - m\big)a\mu(m) + m_f b - mb\mu(m) - Mb\mu(M) - m_f b\big(1 - \mu(m) - \mu(M)\big) + \big(M - m_f\big)c\mu(M) \tag{45}$$

$$= \big(m_f - m\big)(a + b)\mu(m) + \big(M - m_f\big)(c - b)\mu(M) \tag{46}$$

due to $|f - m_f| \geq f - m_f$.

We get:

$$\sigma_f \geq \frac{\big(m_f - m\big)(a + b)\mu(m) + \big(M - m_f\big)(c - b)\mu(M)}{\sqrt{\big(a^2 - b^2\big)\mu(m) + \big(c^2 - b^2\big)\mu(M) + b^2}} \tag{47}$$

$$= \frac{\big(m_f - m\big)\left(\frac{a}{b}\right)\mu(m) + \big(M - m_f\big)\left(\frac{c}{b}\right)\mu(M) + \big(m_f - m\big)\mu(m) - \big(M - m_f\big)\mu(M)}{\sqrt{\left(\frac{a}{b}\right)^2\mu(m) + \left(\frac{c}{b}\right)^2\mu(M) + 1 - \mu(m) - \mu(M)}} \tag{48}$$

suppose $b > 0$.

Using the negative form of the inequality $|f - m_f| \geq m_f - f$, we also get a dual form inequality:

$$\sigma_f \geq \frac{\big(m_f - m\big)(a - b)\mu(m) + \big(M - m_f\big)(c + b)\mu(M)}{\sqrt{\big(a^2 - b^2\big)\mu(m) + \big(c^2 - b^2\big)\mu(M) + b^2}} \tag{49}$$

$$= \frac{\big(m_f - m\big)\left(\frac{a}{b}\right)\mu(m) + \big(M - m_f\big)\left(\frac{c}{b}\right)\mu(M) - \big(m_f - m\big)\mu(m) + \big(M - m_f\big)\mu(M)}{\sqrt{\left(\frac{a}{b}\right)^2\mu(m) + \left(\frac{c}{b}\right)^2\mu(M) + 1 - \mu(m) - \mu(M)}} \tag{50}$$

suppose $b > 0$.

Define:

$$t = \frac{a}{b}, A = \big(m_f - m\big)\mu(m), B = \big(M - m_f\big)\left(\frac{c}{b}\right)\mu(M) + \big(m_f - m\big)\mu(m) - \big(M - m_f\big)\mu(M) \tag{51}$$

$$C = \mu(m), D = \left(\frac{c}{b}\right)^2\mu(M) + 1 - \mu(m) - \mu(M) \tag{52}$$

$$F(t) = \frac{At + B}{\sqrt{Ct^2 + D}} \tag{53}$$

Then

$$A \geq 0, C \geq 0, D > 0 \tag{54}$$

The derivative

$$F'(t) = \frac{AD - BCt}{\left(D + Ct^2\right)^{\frac{3}{2}}} \tag{55}$$

If $B \leq 0$, then $F'(t) > 0$, $F(t)$ take the maximum $\frac{A}{\sqrt{C}}$ at ∞. If $B > 0$, then $F(t)$ increase on $(0, \frac{AD}{BC})$ and decrease on $(\frac{AD}{BC}, \infty)$, attain the maximum $\sqrt{\frac{A^2}{C} + \frac{B^2}{D}}$ at $\frac{AD}{BC}$.

Apply the same argument to

$$\frac{B}{\sqrt{D}} = \frac{\left(M - m_f\right)\left(\frac{c}{b}\right)\mu(M) + \left(m_f - m\right)\mu(m) - \left(M - m_f\right)\mu(M)}{\sqrt{\left(\frac{c}{b}\right)^2\mu(M) + 1 - \mu(m) - \mu(M)}} \tag{56}$$

with $(M - m_f)\mu(M) > 0$ since $\mu(m) + \mu(M) < 1$, we have if $(m_f - m)\mu(m) - (M - m_f)\mu(M) > 0$, then $\frac{B}{\sqrt{D}}$ attain the maximum $\sqrt{\left(M - m_f\right)^2\mu(M) + \frac{\left[\left(m_f - m\right)\mu(m) - \left(M - m_f\right)\mu(M)\right]^2}{1 - \mu(m) - \mu(M)}}$ at $\frac{\left(M - m_f\right)\left(1 - \mu(m) - \mu(M)\right)}{\left(m_f - m\right)\mu(m) - \left(M - m_f\right)\mu(M)}$.

If $(m_f - m)\mu(m) - (M - m_f)\mu(M) = 0$, then $\frac{B}{\sqrt{D}}$ is monotonically increasing with respect to $\frac{c}{b}$ and attain the maximum $\left(M - m_f\right)\sqrt{\mu(M)}$ at ∞.

If $(m_f - m)\mu(m) - (M - m_f)\mu(M) < 0$, then use the inequality Eq. (50), we can follow the same steps to arrive at the same form of maximum formula. We thus proved the maximal

$$\sqrt{\frac{A^2}{C} + \frac{B^2}{D}} = \sqrt{\left(m_f - m\right)^2\mu(m) + \left(M - m_f\right)^2\mu(M) + \frac{\left[\left(m_f - m\right)\mu(m) - \left(M - m_f\right)\mu(M)\right]^2}{1 - \mu(m) - \mu(M)}} \tag{57}$$

with the specific choice of $\frac{c}{b}$ and $\frac{a}{b}$. □

We can also prove by calculus that:

Theorem 3. *In the terminology of Theorem* 2, *if* $m = 0$,

$$\sqrt{\left(m_f - m\right)^2\mu(m) + \left(M - m_f\right)^2\mu(M) + \frac{\left[\left(m_f - m\right)\mu(m) - \left(M - m_f\right)\mu(M)\right]^2}{1 - \mu(m) - \mu(M)}} \geq m_f\sqrt{\frac{\mu(m)}{1 - \mu(m)}} \tag{58}$$

Proof:

Define

$$F(t) = \left(m_f - m\right)^2 \mu(m) + \left(M - m_f\right)^2 t + \frac{\left[\left(m_f - m\right)\mu(m) - \left(M - m_f\right)t\right]^2}{1 - \mu(m) - t} - m_f^2 \frac{\mu(m)}{1 - \mu(m)} \tag{59}$$

for $t \geq 0$.

Then $F(t)$ is continuous at 0 and

$$F(0) = \left(m_f - m\right)^2 \mu(m) + \frac{\left[\left(m_f - m\right)\mu(m)\right]^2}{1 - \mu(m)} - m_f^2 \frac{\mu(m)}{1 - \mu(m)} \tag{60}$$

$$= \frac{\left(m_f - m\right)^2 - m_f^2}{1 - \mu(m)} \mu(m) = 0 \tag{61}$$

The derivative of $F(t)$ is

$$F'(t) = \frac{\left(m_f - M + (M - m)\mu(m)\right)^2}{\left(-1 + t + \mu(m)\right)^2} \tag{62}$$

which is always nonnegative, so $F(t) \geq 0$ for any $t \geq 0$. □

Theorem 3 can be combined with the following form of the Hölder's inequality:

$$\left(\int\limits_{\{m<f<M\}} |f - m_f| 1 \mathrm{d}\mu \right)^2 \leq \int\limits_{\{m<f<M\}} \left|f - m_f\right|^2 d\mu \int\limits_{\{m<f<M\}} 1^2 d\mu \tag{63}$$

to give an alternative proof of Theorem 2 and then Eq. (16) (or directly for Eq. (20) by using the set $\{f > m\}$).

So there is a complex but better lower bounds Eq. (40), and empirical study shows that when $\mu(m) > 0.86$, both bounds are close to the true σ_f to within 86% with the simple form Eq. (8) 3–4% lower than the complex form Eq. (40). Even though the complex form Eq. (40) is generally valid for any discrete random variable, it may not be as easily applicable as the simple form Eq. (8) when we need a fast first approximation, and hence of less practical interest.

With numerical simulation, we can get σ_f and CV directly, so these formulas seems not to be useful for the numerical results. But since each simulation may arrive at a different value, known a priori their approximate value will be a check for any possible simulation process problem. Our inequalities also reveal that the CV is intrinsically related to important value distribution characteristics of the annual loss random variable. This essentialness of CV is also confirmed by other studies, such as the correlation and cluster analysis of these random variables.

4. Conclusions

Lower bound for reinsurance contract annual loss standard deviation involving zero losses years counts are obtained, which imply a general upper bound for annual loss *TVaR* or *AEP* with no mention of zero losses years. Alternative forms of these bounds give inequalities for probability of attaching and exceeding. These bounds can explain the difficulties or instabilities observed in numerical simulations, show the major reason of the limitation of the simulation is high *CV* and give clue to alternative solutions.

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Conflict of interest

The authors declare no conflict of interest.

Thanks

The author thanks Nancy Wang for checking against a C++ application that validated the practical usefulness of our inequality.

Appendix-A

```
hinkley[x_?NumericQ,c_,p_]:=1/Sqrt[2 Pi]/c (x + 1) (1 − p)/(x^2–2 p x + 1)^1.5 Exp[−1/2/c^2 (x − 1)^2/(x^2–2 p x + 1)](CDF[NormalDistribution[0,1],1/c Sqrt[(1 − p)/(1 + p)] (x + 1)/Sqrt [x^2–2 p x + 1]] − CDF[NormalDistribution[0,1],−1/c Sqrt[(1 − p)/(1 + p)] (x + 1)/Sqrt[x^2–2 p x + 1]]) + 1/Pi Sqrt[1 − p^2]/(x^2–2 p x + 1) Exp[−1/c^2/(1 + p)];

H[x_,c_,p_]:=Integrate[hinkley[y,c,p],{y,−Infinity,x}];

LogLinearPlot[Evaluate[H[1.5,x,0.822434] − H[0.5,x,0.822434]],{x,0.1,10},PlotRange− > All, GridLines− > Full,GridLinesStyle− > Directive[Gray,Dashed],Mesh− > Automatic, ImageSize− > Full,Frame− > on];

Clear[q,marsaglia,M,MA]

Off[NIntegrate::inumr]

q[t_,p_,c_]:=q[t,p,c] = With[{},1.0/c (1.0 + (1.0 − p) t/Sqrt[1.0 − p^2])/Sqrt[1.0 + t^2]]
```

marsaglia[t_,p_,c_]:=marsaglia[t,p,c] = **With**[{},**Exp**[−1.0/(1.0 + p)/cˆ2]/**Pi**/(1.0 + tˆ2)(1.0 + q[t,p,c] **Exp**[q[t,p,c]ˆ2/2.0] **Evaluate**[**Integrate**[**Exp**[−yˆ2/2.0],{y,0.0,q[t,p,c]}]])]

M[v_,p_,c_]:=M[v,p,c] = **With**[{},CDF[NormalDistribution[0,1],1/c (1 − p)/**Sqrt**[1 − pˆ2]] + CDF[

NormalDistribution[0,1],1/c] − 2 CDF[NormalDistribution[0,1],1/c (1 − p)/**Sqrt**[1 − pˆ2]] CDF[.

NormalDistribution[0,1],1/c] + **Evaluate**[**NIntegrate**[marsaglia[u,p,c],{u,0.0,v}]]]

MA[v_,p_,c_]:=MA[v,p,c] = **With**[{},M[(v − p)/**Sqrt**[1.0 − pˆ2],p,c]];

DistributeDefinitions [q,marsaglia,M,MA];

LogLinearPlot[**Evaluate**[MA[1.5,0.822434,x] − MA[0.5,0.822434,x]],{x,0.1,10},**PlotRange**− > **All**, **GridLines**− > **Full**,GridLinesStyle− > Directive[**Gray**,Dashed],**Mesh**− > **Automatic**, **ImageSize**− > **Full**,**Frame**− > on]

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References

[1] Lloyd's Market Association. Catastrophe Modelling Guidance for Non-Catastrophe Modellers [Internet]. 2013. Available from: http://www.lmalloyds.com/lma/finance/Cat_Modelling_Guidance.aspx [Accessed: March 5, 2018]

[2] Hinkley DV. On the ratio of two correlated normal random variables. Biometrika 1969; **56**(3):635-639. DOI: 10.2307/2334671. Available from: http://www.jstor.org/stable/2334671 [Accessed: May 12, 2016]

[3] Marsaglia G. Ratios of normal variables. Journal of Statistical Software. 2006;**16**:1-10. DOI: 10.18637/jss.v016.i04. Available from: https://www.jstatsoft.org/article/view/v016i04/v16i04.pdf [Accessed: May 05, 2016]

[4] Cox NJ. Speaking Stata: The limits of sample skewness and kurtosis. Stata Journal. 2010;**10**:492-495. Available from: http://www.stata-journal.com/sjpdf.html?articlenum=st0204 [Accessed: July 25, 2016]

[5] Katsnelson J, Kotz S. On the upper limits of some measures of variability. Archiv für Meteorologie, Geophysik und Bioklimatologie, Serie B. 1957;**8**(1):103-107. DOI: 10.1007/BF02260299. Available from: http://link.springer.com/article/10.1007%2FBF02260299 [Accessed: July 25, 2016]

Section 4

Green Accounting

Chapter 5

Accounting and Measuring Well-being

M N Murty

Additional information is available at the end of the chapter

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Abstract

The recent literature on the measurement of sustainable income has developed in two important ways for accounting of contribution of natural resource stocks. One set of studies directly addresses the problem of measuring genuine savings or extended wealth formation including changes in human resource capital and natural capital. The second set of studies uses the extended conventional national income accounting methods for accounting of changes in natural resource stocks and environmental extensions of input-output tables. This chapter describes the methodology of measuring genuine savings for a country and reviews the estimates available for different countries. It also suggests a way forward for measuring genuine saving for India.

Keywords: genuine savings, wealth, welfare, sustainable development, natural capital, human skill capital

1. Introduction

Sustainable development of a country depends on its policies related to wealth and capital formation. It requires the measurement of wealth in broader context of including man-made physical capital, human skill capital and natural capital consisting of stocks of exhaustible and renewable resources. The wealth formation during an accounting period has to be measured as the value of changes in man-made and natural resource stocks. Recent research on green accounting was developed in the following four important ways:

i. United Nations (UN) Methodology of System of Environmental and Economic Accounting [20, 21]

ii. European Union (EU) Methodology of Extended Input–Output Tables for Accounting of Environmental Externalities [5]

iii. World Bank Methodology of Measuring Genuine Savings of Countries [8–10]

iv. Methodology of Arrow et al. [1] and the follow-up Dasgupta Committee Report [3] on Green National Accounts in India

One set of studies directly addresses the problem of measuring genuine savings or extended wealth formation including changes in human resource capital and natural capital [8–10]. Genuine savings constitute net accumulation of man-made physical capital and human skill capital and depletion of natural resource stocks. It is an indicator of sustainable income path of a country. Genuine savings of a country could be positive or negative depending if net accumulation of man-made capital is higher or lower than the value of depletion of natural resource stocks. Positive and negative genuine savings indicate, respectively, sustainable and unsustainable income paths. Available estimates of genuine savings for different countries show that some countries have negative genuine savings.

Conventional measure of savings does not consider the most of the expenditures on human skill capital formation, for example, expenditures on education, as savings in the economy. The methodology of measuring genuine savings considers education expenditures during an accounting period as part of savings in the economy. The value of depletion of exhaustible resources stocks has to be deducted from savings. The accounting principle for valuing depletion of these resources is based on the concept of weak sustainability [4, 8, 12–16]. It requires that part of net income earned from the extraction of exhaustible resources has to be reinvested in man-made capital say in creating human skill capital so that present as well as future generations share the benefits of resource extraction. Similarly, the value of degradation of renewable resource stocks has to be deducted from genuine savings. The accounting principle for valuing depletion of these resources is based on the concept of strong sustainability. It requires the measuring of environmental degradation as excess pollution or deforestation over threshold or carrying capacity levels of resource stocks and valuing it at the cost of maintaining the threshold levels or social cost of environmental degradation [20]. There are now a number of theoretical and empirical studies on measuring social cost of environmental degradation.[1]

The plan of the remaining chapter is as follows. Section 2 discusses some methodological issues in measuring genuine savings. Section 3 provides a review of estimates of genuine savings for some countries. Section 4 presents a critical assessment of genuine savings studies and lessons for India. Finally Section 5 provides conclusion.

2. Methodology

2.1. Genuine savings

Green accounting aggregates of genuine savings and sustainable income are defined in the literature on the basis of an inter-temporal optimization problem [7, 13, 14, 16, 22]. The path of

[1] See [6, 11, 17, 18].

sustainable income is derived as the one that maximizes wealth W, defined as the present value of utility or consumption given a rate of discount and the constraints on changes in man-made physical capital, human skill capital, exhaustible resource stocks and environmental resource stocks during an accounting period. The sustainable income is derived as the following current-value Hamiltonian function, which is maximized at each point in time:

$$H = C + \mu_k \frac{dK}{dt} + \mu_s \frac{dS}{dt} + \mu_n \frac{dN}{dt} + \mu_e \frac{dE}{dt} \tag{1}$$

where C is aggregate consumption and K, S, N and E are stocks of man-made physical capital, human skill capital, exhaustible resources and environmental resources and μ_k, μ_s, μ_n and μ_e are their respective shadow prices. The genuine savings G are defined as

$$G = \mu_k \frac{dK}{dt} + \mu_s \frac{dS}{dt} + \mu_n \frac{dN}{dt} + \mu_e \frac{dE}{dt} \tag{2}$$

It could be shown that (Hamilton, 1997)

$$G = rW - C \tag{3}$$

where r is the rate of discount.

Eq. (3) implies that the negative genuine savings at a point in time means that future consumption must be less than current consumption over some period on the optimal path. In other words, negative genuine savings serves as an indicator of unsustainability. The shadow prices of resource stocks in Eq. (1) are the prices required to support sustainable income path. The prices observed in the marketplace will generally differ from these shadow prices [2]. The policy distortions in a typical economy lead to over-extraction of natural resources and excess pollution emissions [10]. Under these conditions it can be shown that real-world resource rents of exhaustible resources and marginal social costs of pollution exceed their shadow prices. Efficient management of natural resources will reduce the differences in observed market prices and shadow prices and also increase genuine savings.

2.2. Measurement

Manmade capital formation ($\mu_k \frac{dK}{dt}$)

Gross national savings are measured as in conventional national income accounts of a country. Net national savings or net physical capital formation representing additions to man-made physical capital are obtained by deducting depreciation of physical capital from gross national savings.

Human skill capital formation ($\mu_s \frac{dS}{dt}$)[2]

Human skill capital is the knowledge, experience and skills embodied in a nation's population. A country augments the stock of human skill capital in large part through its educational

[2] See [16, 19].

systems, into which it spends lot of money every year. Conventional national income accounts consider only educational expenditures incurred in man-made physical capital such as school buildings as investments. These expenditures may constitute only 10% of total education expenditures. The other expenditures consisting of teacher salaries, books, etc., are treated as consumption expenditures which are not correct in the context of measuring genuine savings. Education expenditures lead to the formation of human skill capital and therefore treated as the investment. However, the issues related to valuation of human skill capital are not yet completely understood because one dollar worth of educational expenditure may not necessarily yield one dollar worth of human skill capital. Therefore as an initial adjustment, current educational expenditures could be treated as part of genuine savings in the economy.

Value of depletion of exhaustible resources ($\mu_n \frac{dN}{dt}$)

Extraction of exhaustible natural resources such as crude oil, natural gas, coal, minerals and metals results in the depletion of resource stock extracted. The conventional national income accounts consider all the revenue earned net of cost of extraction of the resource as part of GDP. It is not a correct accounting method given that present and future generations have property rights for exhaustible resources. Therefore, measurement of genuine savings requires that value of depleted resource stocks has to be deducted from nation's savings. In the literature user cost and net price methods are used for valuing resource depletion.

Valuing degradation of environmental resources ($\mu_e \frac{dE}{dt}$)

Various developmental activities in the economy contribute to degradation of environmental resources due to pollution, soil erosion and deforestation. Conventional national income accounts do not account for value of environmental degradation. The methods of maintenance cost (cost of maintaining environmental resource stocks at sustainable levels) or social cost (health cost and income loss) are used for valuing environmental degradation.

2.3. Data

Studies providing estimates of genuine savings for different countries especially those by World Bank economists [9, 23, 24] provide good insights into how macroeconomic data from secondary sources could be used for this purpose. They have attempted a comprehensive accounting of depletion of exhaustive resources in the measurement of genuine savings for different countries. These studies consider most of exhaustible energy resources including crude oil, natural gas, coal and lignite and minerals and metals comprising bauxite, copper, gold, iron, lead, nickel, phosphate, silver, tin and zinc. Resource rents for each resource are estimated as net price which is defined as unit price minus unit cost of extraction.[3] Unit cost of extraction is taken as the average cost instead of marginal cost because of data limitations. Since the unit cost of resource extraction could be different for different countries, a weighted average of unit costs is taken as the cost of extraction. World prices are taken as per unit resource prices, and since these prices may be different across the countries, again a weighted

[3]The basic approach to calculating resource rents for nonrenewable resources is to subtract country- or region-specific average costs of extraction from the world price for the resource in question, all expressed in current US dollars [19].

Region	Natural resource rents as percentage of GDP
East Asia and Pacific	1.2
Europe and Central Asia	1.2
Latin America and Caribbean	3.1
Middle East and North Africa	13.8
North America	0.3
South Asia	1.7
Sub-Sahara Africa	8.0
Low income	12.8
Lower middle income	2.9
Upper middle income	2.7
High income	1.1
India	1.9

Source: World Development Indicators, World Bank, 2016.

Table 1. Rents earned from natural resources (oil, natural gas, coal, minerals and forests) as percentage of GDP in the world regions including India in the year 2015.

average of these prices is considered. **Table 1** provides recent estimates of rents earned from natural resources (oil, natural gas, coal, minerals and forests) as percentage of GDP in different regions of the world including India in the year 2015.

The adjusted [genuine] savings estimates have to take into account the losses of benefits from environmental services of biodiversity, carbon sequestration, soil conservation and recreation from the unsustainable use of forests. They have to also account for losses due to air and water pollution and soil erosion during the accounting period. The disinvestment arising out of greenhouse gas emissions, a global externality of air pollution, has also to be accounted. The most recent estimates of adjusted savings (genuine savings) of the World Bank made for countries and various regions in the world have tried to take into account to the extent possibly these losses in environmental services in an accounting period.

3. Estimates of genuine savings

Estimation of adjusted (genuine) savings of different countries is a pioneering attempt by World Bank economists leading to generalization of national income accounts for estimating green GDP. It is a precursor to now available UN methodology of Environmental and Economic Accounting [UN, 2003]. The World Bank methodology apart from suggesting accounting of depletion of exhaustible resources and degradation of renewable environmental resources suggests also for accounting of human skill formation in measuring genuine savings. Expenditures in human skill formation or educational expenditures will be an addition to conventional net savings, while the value of natural resource depletion is a deletion.

Educational expenditures which are taken as consumption expenditures in conventional national income accounting constitute a significant part of GDP in both developed and developing countries.

The adjusted [genuine] savings [AS] in an accounting period is estimated as:

adjusted savings [AS] = gross savings [GS] – consumption of fixed capital – depletion of exhaustible resources – degradation of environmental resources [particulate matter and CO_2 emissions, water pollution and soil and forest degradation] + additions to human skill capital [educational expenditure].

Tables 2–4 provide estimates of gross savings [GS] and adjusted [genuine] savings [AS] and reduction in gross savings [RGS] due to natural and environmental resource depletion in an accounting period for BRIC countries, developed countries and different regions of the world, respectively. Among BRIC countries, China has to account for the largest reduction in its GS amounting to 44.05% followed by Russia, 19.12; South Africa, 15.21; India, 14.23; and Brazil, 5.38% in the year 2015. Accounting for the particulate matter emissions in the current estimates of AS by the World Bank could be a reason for very steep fall in savings in countries like China and India. For South Africa, estimates of AS have become negative and negligible during

		2010	2011	2012	2013	2014	2015
Brazil	GS	18.50	19.06	18.44	18.56	16.34	14.74
	AS	12.45	12.41	12.33	12.66	10.31	9.36
	RGS	−6.05	−6.65	−6.11	−5.90	−6.03	−5.38
Russia	GS	28.05	30.16	28.73	25.54	25.86	28.08
	AS	12.09	12.83	10.60	7.30	6.43	8.96
	RGS	−15.96	−17.33	−8.13	−18.24	−19.43	−19.12
India	GS	38.65	35.79	34.43	33.70	34.01	32.88
	AS	25.00	22.00	20.54	20.10	20.23	18.65
	RGS	−13.65	−13.79	−13.89	−13.60	−13.78	−14.23
China	GS	51.72	49.93	49.87	49.33	49.49	48.58
	AS	4.66	3.72	3.92	4.85	4.18	4.53
	RGS	−47.06	−46.21	−45.95	−44.48	−45.31	−44.05
South Africa	GS	18.41	17.96	15.25	15.79	15.95	16.72
	AS	2.49	2.60	0.70	−0.02	0.01	1.51
	RGS	−15.92	−15.36	−14.55	−15.81	−15.94	−15.21

Notes: GS: gross savings; AS: adjusted savings due to depletion of man-made capital and natural capital; RGS: reduction in gross savings in the computation of adjusted net national income (ANNI).
Source: World Development Indicators, World Bank, 2016.

Table 2. Estimates of gross savings, adjusted savings and reduced gross savings for four BRIC countries during 2010–2015 (percentage of gross national income).

Country		2010	2011	2012	2014	2014	2015
Australia	GS	23.47	24.98	25.82	25.33	24.84	23.60
	AS	8.38	9.37	10.88	9.99	8.78	8.05
	RGS	−15.09	−15.61	−14.94	−15.34	−16.06	−15.55
Canada	GS	19.79	21.31	21.33	21.92	22.17	20.03
	AS	6.18	7.87	7.57	8.01	8.14	6.02
	AGNI	−13.61	−13.44	−13.76	−13.91	−14.03	−14.01
France	GS	19.78	20.66	19.57	19.44	19.63	20.46
	AS	7.15	7.83	6.40	6.28	6.18	7.36
	RGS	−12.63	−12.83	−13.17	−13.16	−13.45	−13.10
Germany	GS	24.74	26.53	25.72	25.61	26.49	27.17
	AS	11.29	13.26	12.23	12.14	13.10	13.71
	RGS	−13.45	−13.27	−13.49	−13.47	−13.39	−13.46
Japan	GS	24.29	23.50	22.94	23.25	23.78	26.01
	AS	6.14	5.14	5.04	5.18	5.53	6.75
	RGS	−18.15	−18.36	−17.90	−18.07	−18.25	−19.26
UK	GS	12.53	13.46	11.92	11.72	12.00	12.11
	AS	4.28	4.72	3.22	3.33	3.96	4.31
	RGS	−8.25	−8.74	−8.70	−8.39	−8.04	−7.80
USA	GS	15.16	17.50	18.13	19.04	18.96	17.77
	AS	2.73	3.62	5.81	6.26	7.08	7.41
	RGS	−12.43	−13.88	−12.32	−12.78	−11.88	−10.36

Notes: GS: gross savings; AS: adjusted savings due to depletion of man-made capital and natural capital; RGS: reduction in gross savings in the computation of adjusted net national income (ANNI).
Source: World Development Report, 2016.

Table 3. Estimates of gross savings, adjusted savings and reduced gross savings for seven developed countries during 2010–2015 (percentage of gross national income).

recent years implying negative growth or negligible growth rate of well-being measured as green national income [GNP].

Table 3 shows estimates of AS for developed countries during the period 2010–2015. Estimates show that reduction in savings is highest for Japan amounting to 19.16% followed by Australia 15.55; Canada, 14.01; Germany, 13.46; France, 13.10; the USA, 10.36; and the UK, 7.90%. Accounting for air pollution in estimating AGS could be a reason for the sharp fall in savings even in these developed countries.

Table 4 provides estimates of AS [genuine savings] for countries in different income brackets [low income, middle income and high income] in the world. During recent 5-year period, low-income countries have negative genuine savings implying their growth rate of well-being [adjusted national income] is negative. During the same period, the middle-income countries

Country		2010	2011	2012	2013	2014	2015
Low income	GS	14.53	16.70	16.59	15.67	16.72	15.78
	AS	2.21	−1.51	−2.10	−6.06	−4.10	NA
	RGS	−12.32	−18.21	−18.69	−21.73	−20.82	NA
Middle income	GS	34.28	34.13	34.11	33.42	33.95	34.74
	AGS	17.82	16.12	16.04	15.09	15.81	16.91
	RGS	−16.46	−18.01	−18.07	−18.33	−18.14	−17.83
High income	GS	20.64	21.47	21.84	22.02	22.35	22.21
	AGS	7.11	7.87	8.29	10.40	8.88	9.07
	RGS	−13.53	−13.60	−13.55	−11.62	−13.47	−13.14

Notes: GS: gross savings; AS: adjusted savings due to depletion of man-made capital and natural capital; RGS: reduction in gross savings in the computation of adjusted net national income (ANNI).
Source: World Development Report, 2016.

Table 4. Estimates of gross savings, adjusted savings and reduced gross savings for low-income, middle-income and high-income countries during 2010–2015 as percentage of gross national income.

have experienced a sharp fall of savings amounting to 18%, while high-income countries have experienced a fall of 7–10%. This implies that the genuine or adjusted rate of growth of well-being of countries is much lower when accounted for the effects of economic development on environmental and natural resource stocks.

4. Critical assessment of genuine savings estimates and lessons for green GDP measurement in India

Estimation of AS [genuine savings] and the methodology used for it in the literature are pioneering contributions toward measurement of well-being or green national income of countries. Even though the accounting of costs of natural resource depletion and degradation is not yet fully done in the available studies, they clearly provided a way forward for the more comprehensive accounting of all costs. The important contribution of these studies is in:

A. providing methodologies and data sources for measuring the value of depletion of exhaustible resources (energy and mineral resources);

B. attempting for loss of environmental services due to air and water pollution and forest depletion; and

C. presenting a case for considering educational expenditures as contribution to human skill capital formation in a country.

Accounting of educational expenditures as accumulation of human skill capital will significantly increase the genuine savings rates of countries as most of these expenditures are treated as consumption expenditures in conventional national income accounting. However, the assumption that human skill capital is increased by the exact amount of educational expenditures made

in these studies may not be justifiable. There is a need for more studies to find out the relationship between educational expenditures and human skill formation.

The net price or resource rent used in these studies for accounting of depletion of exhaustible resources is not an appropriate method of accounting for depletion. The value of resource stocks valued at net price is already accounted in measuring gross national income [GNI] using conventional methods of national income accounting. Deduction of this amount again from GNI or country's net rate of savings does not give any credit to the country having these resources in comparison to the country not having them. Any method of valuation of resource depletion has to take into account the property rights of both present and future generations to an exhaustible resource stock and the problem of inter-temporal equity in resource use. The user cost could be an appropriate method for valuing the depletion of the resource because it is based on the concept of weak sustainability (man-made capital could be a substitute for natural capital) ensuring the same level of real income to the present as well as future generations from resource extraction. Therefore, in the context of measuring value of depletion of exhaustible resources, studies have to be done to estimate user cost of resource stocks of minerals, metals and fossil fuels.[4] The user cost method of accounting value of depletion takes into account the part of resource rents earned from extraction that is spent in accumulation of man-made physical capital and human skill capital. Therefore, using resource rents for valuing depletion could result in underestimation of cost of depletion of exhaustible resources.

It is difficult to get data for estimating costs of environmental degradation in the form of soil erosion, air pollution and water pollution for a large number of countries for which genuine savings estimates are obtained by these studies. Therefore, these costs are not fully accounted in the estimation. However, an attempt is made in the recent estimates AS for accounting of cost of particulate matter and CO_2 emissions for different countries.

The approach adopted in UN methodology of Environmental and Economic Accounting [UN, 2003] for measuring green GDP is similar to the approach described above for estimating genuine savings. UN methodology prescribes the development of asset and flow accounts of natural resources as satellite accounts of conventional national income accounts. The satellite accounts provide comprehensive information of depletion of exhaustible resources and

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[4]User cost depends on the life of proven reserves and rate of discount used to address to the problem of intertemporal equity. It decreases with the rate of discount and life of the resource stock making it resource specific. The rate of discount depends on the value judgments of the government about the property rights of present versus future generations to the resource stock. This is called user cost method of accounting (El Serafy, 1989). Consider

X: true or permanent income or income to present as well as future generations from resource extraction

O_t: net operating surplus from resource extraction in year t (O_t = turnover-cost of extraction − return on man-made capital used)

r: rate of discount or market rate of interest

T: life of exhaustible resource (proven reserves/rate of extraction)

The true or sustainable income from resource extraction is defined as X such that

$$\sum_{t=1}^{T} O_t/(1+r)^t = \sum_{t=1}^{\infty} X/(1+r)^t$$

for given (O_1 .....O_T), r and T. Assuming O_t = O, t = 1,....T, the user cost (O-X) could be obtained as

$O\text{-}X = O/(1 + r)^T$

degradation of environmental resources in terms of physical quantities and monetary values. The information available in these accounts could be used to obtain estimates of rate of AS or genuine savings for countries. However, these estimates differ from the ones discussed above in two ways. First of all UN methodology does not consider educational expenditures contributing to formation of human skill capital as part of savings. Secondly, it requires comprehensive accounting of monetary values of environmental degradation. These include losses of both marketable and nonmarketable services from soil erosion, forest degradation, air pollution and water pollution.

In an attempt of having green accounting in developing macro-economic statistics in India, the Central Statistical Organization [CSO] and other concerned organizations could try to get independent estimates of AS using the above-described methodology. Macroeconomic aggregates of human skill capital formation and cost of depletion of exhaustible resources could be estimated using data from secondary sources as described above. Estimation of cost of depletion using user costs instead of resource rents as unit costs is possible with data available in India from secondary sources. However, data from secondary sources alone is not sufficient to estimate the cost of degradation of environmental resources. Detailed empirical studies of using data from both primary and secondary sources have to be done in India for estimating the macro-economic aggregate of cost of environmental degradation.

Estimates of adjusted national income or well-being for depletion and degradation of natural resources could be obtained given an estimate of rate of AS or genuine savings. If the difference between GS or conventional gross rate of savings and AS or rate of genuine savings (excluding education expenditure) is positive, the adjusted national income is lower than the conventional national income for a country. As discussed earlier, the World Bank's estimates of AS or genuine savings for India indicate that adjusted national income in India and other countries is lower than the conventional national income. For some low-income countries, AS becomes negative implying negative rate of growth of well-being.

5. Conclusion

Genuine savings or AS consisting of net accumulation of man-made physical capital and human skill capital and depletion of natural resource stocks is an indicator of sustainable income path of a country. They could be positive or negative depending if net accumulation of man-made capital is higher or lower than the value of depletion of natural resource stocks. Negative genuine savings indicate unsustainable income path, and available estimates of genuine savings for different countries show that some low-income countries have negative genuine savings.

The methodology and estimates of genuine savings reviewed in this chapter are pioneering contributions to fast-growing literature on estimation of green national income of a country. The studies of genuine savings apart from suggesting accounting of depletion of exhaustible resources and degradation of renewable environmental resources suggest also for accounting of human skill formation in measuring genuine savings. Expenditures in human skill formation or educational expenditures will be an addition to conventional net savings, while the value of natural resource depletion is a deletion.

We found that genuine savings studies reviewed in this chapter could measure only some important components of genuine savings, especially the cost of depletion of exhaustible resources and degradation of air quality by particulate matter and CO_2 emissions. A comprehensive accounting of cost of environmental degradation could not be attempted in these studies because of data limitations. The important contribution of these studies is in discussing secondary data sources of different countries for measuring the value of depletion of exhaustible resources such as energy and mineral resources.

The satellite accounts of natural resources in UN methodology of Environmental and Economic Accounting provide comprehensive information of depletion of exhaustible resources and degradation of environmental resources in terms of physical quantities and monetary values. The information available in these accounts could be used to obtain very comprehensive estimates of rate of genuine savings for countries. However, these estimates differ from the ones reviewed in this chapter in two ways. First of all UN methodology does not consider educational expenditures contributing to formation of human skill capital as part of savings. Secondly, it requires comprehensive accounting of monetary values of environmental degradation. These include losses of both marketable and nonmarketable services from soil erosion, forest degradation, air pollution and water pollution.

In an attempt of having green accounting in developing macro-economic statistics in India, CSO and other concerned organizations could try to get independent estimates of genuine savings using the above-described methodology and the data from secondary sources. Macro-economic aggregates of human skill capital formation and cost of depletion of exhaustible resources could be estimated using data from secondary sources as described above. Estimation of cost of depletion using user costs instead of resource rents as unit costs is possible with data available in India from secondary sources. However, data from secondary sources alone is not sufficient to estimate the cost of degradation of environmental resources. Detailed empirical studies of using data from both primary and secondary sources have to be done in India for estimating the macroeconomic aggregate of cost of environmental degradation.

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References

[1] Arrow KJ, Dasgupta P, Goulder LH, Mumford K, Oleson K. Sustainability and the measurement of wealth. Environment and Development Economics. 2012;**17**(3):317-353

[2] Asheim G. Net National Product as an Indicator of sustainability. Scandinavian Journal of Economics. 1994;**96**(2):257-265

[3] Dasgupta P. Green National Accounts in India: A Framework A Report of Expert Group Convened by National Statistical Organization, Government of India. 2013

[4] Dasgupta P, Mäler K-G. Net National Product, wealth, and social well-being. Environment and Development Economics. 2000;**5**(1):69-93

[5] European Commission. A New Environmental Accounting Framework Using Externality Data and Input Output Tools for Policy Analysis (EXIOPOL); 2012

[6] Freeman AM III. The Measurement of Environmental and Resource Values: Theory and Methods. 2nd ed. Washington, D.C: Resources for the Future; 2002

[7] Hamilton K. Green adjustments to GDP. Resources Policy. 1994;**20**:155-168

[8] Hamilton K. Defining Income and Assessing Sustainability. World Bank, Environment Department, Washington, D.C. Processed; 1997

[9] Hamilton K, Clemens M. Genuine savings rates in developing countries. The World Bank Economic Review. 1999;**13**(2):333-356

[10] Hamilton K, Atkinson G, Pearce DW. Savings Rules and Sustainability: Selected Extensions. Paper presented to the World Congress of Environment and Resource Economics, Venice, June 25–27, 1998. Processed

[11] Haque AKE, Murty MN, Shyamsundar P, editors. Environmental Valuation in South Asia. UK: Cambridge University Press; 2011

[12] Hartwick JM. Deforestation and National Accounting. Environmental and Resource Economics. 1992;**2**(5):513-521

[13] Hartwick JM. Natural resources, National Accounting and economic depreciation. Journal of Public Economics. 1990;**43**:291-304

[14] Hartwick JM. Intergenerational equity and the investing of rents from exhaustible resources. American Economic Review. 1977;**66**:972-974

[15] Bolt K, Matete M, Clemens M. Manual for Calculating Adjusted Net Savings. World Bank: Environment Department; 2002

[16] Mäler KG. National Accounts and environmental resources. Environmental and Resource Economics. 1991;**1**:1-15

[17] Mitchell RC, Carson RT. Using Surveys to Value Public Goods: The Contingent Valuation Method. Washington, D.C.: Resource for the future; 1989

[18] Murty, M.N and Manoj Panda (2012), Report of CSO, GOI (2012), Generalized National Income Accounts for Measuring Green GDP for India: A Review of Indian and International Experience

[19] Murty MN. Measuring wellbeing and accounting prices. Economic and Political Weekly. August 30, 2014;**XLIX**(35)

[20] United Nations (2003)/SEEA, 2003. Handbook of National Accounting Integrated Environmental and Economic Accounting 2003. European Commission/International Monetary Fund/Organisation for Economic Co-operation and Development/World Bank. Available on; http://unstats.un.org/unsd/envAccounting/seea2003.pdf

[21] UN Handbook of National Accounting. Integrated Environmental and Economic Accounting: An Operational Manual; 2000

[22] Weitzman ML. On the welfare significance of National Product in a dynamic economy. Quarterly Journal of Economics. 1976;**90**(1):156-162

[23] World Bank, World Development Indicators; 2010

[24] World Bank, World Development Indicators; 2016

Section 5

Financial Instruments

Chapter 6

Financial Instruments: Islamic Versus Conventional

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Additional information is available at the end of the chapter

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Abstract

The financial system of any economy is made up of its financial institution, financial instruments and financial regulators. However, the nature of the instruments, institutions and regulations depend on the economic system and philosophy prevailing in that economy. This chapter presents a simple and precise narrations on the meaning of financial instruments, their forms and characteristics, fundamental principles of Islamic finance as well as the similarities and differences between convention and Islamic financial instruments. A case study reflecting the core merits and pitfalls of financial instruments is presented to further press home the understanding of the topic. This piece is intended to provide readers with the basic understanding of issues raised.

Keywords: conventional, Islamic, financial instruments

1. Introduction

All businesses irrespective of their sizes, ownership structure or economic system they operate within require some form of financial intermediation. Cash savings from the surplus components of the economy (both individuals and households) are channeled to the deficit units in the economy to finance various investment projects, business expansions, managing working capital and creation of new lines of products or services. To achieve these extensive business needs, banks, finance houses and capital market operators play a key and pivot role of financial intermediation by allowing corporate and individuals to save and invest profitably.

The financial system of an economy is made up of the various financial regulators, financial instruments and financial institutions responsible for bridging the gap between surplus and deficit businesses. While the institutions are established in corporate forms to provide for

intermediation in an economy, the regulators such as the Central Banks and the Securities and Exchange Commission exist to ensure fair dealings among the institutions as well as protect the interests of investors. Financial instruments (FIs) on the other hands are the vehicles through which the financial institutions deliver values to both the deficit and surplus units in such a manner that is economically beneficial to the parties.

2. Financial instruments

In order to provide a precise and carefully structured meaning, financial instruments (FIs) is defined as 'any contract that gives rise to a financial assets of one entity and a financial liability or equity of another entity' [1]. This definition explains the fact that a financial instrument issued has two forms of effect in Accounting. To an issuer of a financial instrument, it is a liability because an obligation for future cash outflow is created. An investor on financial instruments consider the instrument acquired as assets because it creates future economic benefit in form of cash inflow.

Aside the need for using FIs to generate funds for investments, expansion and day-to-day operational issues, financial instruments are also used in hedging against risks and uncertainties that prevail in business environment. Several uses of FIs has been documented in finance literature.

Financial Instruments can be grouped into bank-based instruments and capital market-based instruments. In order to avoid the risk of capital mismatch, businesses often look at their funding needs and chose a suitable financial instruments that meets their finance objectives based on the timing of funding, expected returns and funds' gestation period. It is therefore sufficing to maintain that financial instruments of short term nature are issued by banks, while the medium and long terms instruments are capital/ stock market-based instruments.

3. Principles of Islamic finance

Before elaborating further on the major similarities and differences between Islamic Financial Instruments (IFIs) and Conventional Financial Instruments (CFIs), it is important to highlight the fundamental principles of Islamic finance. The knowledge of the principles provides a clear basis of understanding the peculiarities of IFIs. The principles are presented below.

3.1. Prohibition of interest (RIBA)

At the very heart of Islamic Finance is the prohibition of collection and issuance of interest/ riba. The ban on interest in all economic activities is so explicitly define and remains non-compromising in Islamic literature as it is divinely forbidden by Allah. Therefore, businesses can be operated and managed on basis consistent with sharing profit or losses, not on a fixed determined outcome or expected returns. Riba/Interest in all forms and types are prohibited

based on Qur'anic Injunctions and prophetic traditions (Hadiths). It is the absence of Interest that provides Islamic finance with its uniqueness and distinct flavor.

3.2. Fair dealings

This principle underscores the need for businesses, professions and people in employments to be conscious of Shariah provisions (Qur'an & Sunnah) in determining what is halal or haram in their dealings. Businesses that include sinful products in their products portfolio should be avoided, profits earned should be moderate and products or services should be harmful or misleading to consumers/ buyers especially where inappropriate products' promotion is used.

3.3. Zakkat

Zakkat is one of the five pillars of Islam. Qur'an enjoined all believers to appropriate 2.5% or 1/40 of qualified zakatable assets based on conditions prescribed by Shariah. Zakat's proceeds are assessed, charged, collected and distributed by an appropriate state authority. Some of the benefits of zakat to its payers include the fact that it reduces poverty, creates new entrepreneurs, wealth re-distribution, reduces envy and promotes social harmony and cohesion among people.

3.4. Others

Other principles of Islamic not captured include prevention of private monopoly as well as the development of suitable platform for the selection of Halal compliant investment. Here, businesses consider what is acceptable (Halal) and unacceptable (Haram) in deciding what to invest on and the extent of returns to be negotiated in a manner that is fair and equitable to all parties.

4. Major differences between CFIs and IFIs

Apart from the fundamental principles governing Islamic discussed, there are some sets of factors that distinctively distinguish conventional financial instruments from Islamic financial instruments. These areas of differences include.

4.1. Nature of assets backing an instrument

Conventional financial instruments (CFIs) are mere paper assets. The value of such assets are based on their intrinsic value usually determined by the availability of information, issuers performance and ratings, targeted returns and the extent of trade-ability of a given instruments.

According to [2], CFIs deal mainly on intangible assets, that is, not backed by tangible assets or commodities and other assets of physical existence and substance. Under this condition, the value of an instrument is normally a function of the future economic benefits it attracts. Islamic

financial instruments (IFIs) on the other hand do not consider money as an instrument of trade or commodity. As such, it does not have intrinsic value, but a mere medium of exchange. Therefore, the use of money as commodity is prohibited by Shariah especially where make gains without effort or any form of risk. IFIs are basically financial instruments essentially supported by assets of different forms especially the tangible ones.

4.2. Relationship between investors and issuers

CFIs considers the relationship subsisting between instruments' investors and issuers as that of borrowers and lenders. For instance, if an institution issues a 10 year bond through the capital market, he becomes the borrower. An investor who subscribed to and acquire the bond issued is seen as the lender.

IFIs on the other hand look at the relationship between investors and issuers as a mutually beneficial relationship in form of either joint venture, partnership or a buyer and seller just to mention few. A case in point here is in Musharakah financing, the financier and his client are technically deemed as partners while in Murabaha, the parties are seen as seller (financier) and the buyer (client) form of arrangement as against the lender and borrower perspectives in conventional finance [3].

4.3. Risk taking

Risk taking is a major underpinning difference between the CFIs and IFIs. Under the CFIs, financiers or investors do not share the associated risk of the investment. This risk aversion is premised on the belief that a borrower must produce returns to cover for the principal and interests without any contemplation of risk to his investment. The conventional arrangement entirely transfers the risk to the client or borrower. IFIs however is built essentially of risk sharing arrangements. The instruments are built with fairness having in mind that whoever is entitle to returns, he/she must equally partake in sharing the risk associated with such returns.

4.4. Existence of divine regulations

IFIs are governed and control by divine laws (Shariah) sourced from the Qur'an, Hadeeths and Ijma (Consensus of Scholars). Coherent policies and regulations are usually drawn from divine laws as mentioned. Unfair business dealings like an exaggerated adverts and promo, cheating in products and prices, abnormal profiting, hoarding, private monopoly and deceits have been outlawed by Shariah. However, these restrictions derived from the divine books are non-existent under the CFIs [4].

4.5. Extent of contractual conditions

Apart from the basic elements of a valid contract as contain in the common English laws such as offer, acceptance and the payment of considerations etc. The CFIs have limited contractual rules and principles. IFIs embody several fundamental principles as enshrined by Shariah. These principles include provisions that IFIs must be from Gharar (i.e., uncertainty). Transactions

conditioned around the occurrence or non-occurrence of uncertain events is prohibited. Such uncertainties also cover transactions beclouded with enormous ambiguity especially those that could potentially lead to disputes and change of terms are considered voidable.

5. Forms of financial instruments

Both the CFIs and IFIs have been classified either based on monetary system instruments or the capital market instruments. Other finance scholars used short, medium and long term basis of classification which pays attention to the duration or life-span of instruments. [5] groups financial instruments into two, i.e. instruments for mobilizing funds and the instruments for utilizing funds.

5.1. Instruments for mobilizing funds

This group is made up of instruments used by banks and other financial intermediators in mobilizing or soliciting deposits from the economic surplus units of an economy. The resources mobilization is achieved through the deposit money banks' instruments like the savings accounts, current accounts, investment accounts and Sukuk (Islamic Bond).

Both the savings and current accounts under the CFIs and IFIs are similar in terms of resources withdrawal and deposit terms and conditions viz. a viz., the payment of deposit on demand. However, for IFIs, there is no interest on any amount save and there is no predetermined returns expected on the deposit. With regards to savings accounts, only profit sharing is permissible under Islamic finance, whereas interest is paid to depositors under conventional finance.

Investment account under the IF is a replica of the fixed deposit account under the CF. Money is such account are meant to generate returns in form of profit or loss which depends on the money is used for. Therefore, the investment outlets and associated risk determine the extent of returns expected. Under the CFIs, a fixed interest is fixed on the deposit irrespective of the returns it intends fetch. The investment account under the IF has a variation of Investment Account with or without authorization. In the latter arrangement, the depositor specifies where his deposit should be invested while in the former, the bank is at liberty to invest in any business deemed profitable by the bank.

Sukuk is another instrument of mobilizing funds. Under this arrangement, the issuer of a sukuk sales it to investors and issued certificates and later rent it for a fee. Issuer also undertakes to buy-back the certificate in the future at the par value of the instrument. The sukuk that confers partial stake in debt is called Sukuk- Murabaha, stake in assets is called sukuk al-Ijarah, in normal business is called sukuk al-musharakah and in investment is called sukuk al-istithmar [6, 10].

5.2. Instruments for utilizing funds

In order to effectively utilize the funds generated by instruments of resource mobilization, four instruments of utilization under IF are clearly identified for discussion, they are: The

Musharakah—Equity participation; Mudaraba—Partnership; Murabaha—Mark-up/Losses and Finally the Ijarah or Leasing [7, 12].

Under Mudaraba (Partnership), the bank and the entrepreneur go into voluntary business association which allows the bank to contribute capital while the client contribute his entrepreneurial skills. If profit is made, the parties share the profit and where the case of loss exist, only the bank suffers it. Arrangement could also be made to gradually reducing the capital as the business progresses to permit for payment of returns based on unpaid capital balance [9].

Musharakah or equity participation is also another utilization instrument where in both the bank and client contribute to the working capital, managerial capabilities, regular assets and technical experience needed to run a business. At the end, profits and losses are shared according to negotiated terms.

Mudaraba is an instrument which allows bank to purchase assets, machinery or domestic appliances. The customer agrees to take up assets and pays back at a mutually agreed mark-up on the costs acquired by bank.

Ijarah is also a form of assets financing, an asset owned by a client could be sold and lease back to seller. Here, the seller gets proceeds on sales and have the right to continue the use of such asset at a rental fee, not interests predetermined.

6. Case study

Alheri Integrated Farm was founded in January, 2000 by Dr. Usman Abubakar. Usman, a retired University researcher had been practicing small scale farming over two decades and then decided to establish a modern farm. His present interest in the business was not more than a pastime. In order to give the business a sound footing in terms of business substance, Usman liquidated his real-estate assets and invested handsomely on the new business which became incorporated as a private limited company under the Company Law. Usman's wife and three children namely—Abubakar, Ibrahim and Aisha, were name as directors.

Professional and unskilled workers were trained and placed on the job. The farms operates a centralized management structure with unit managers handling direct supervision of staff and resources in their care. Overall, the business had been profitable in areas of grains production, animal husbandry and product processing and exportation. Since the business by its ownership make-up is a family business, the company witnessed phenomenal growth due to high retention of earnings, premium working commitment of the owner and the pool of skilled power handling various specialty areas of operations.

Up to January, 2012, the company had been relying on short term loan and sometimes overdraft from it bankers in financing its working capital needs. But the management led by Usman had issues with the growing finance costs of utilizing the facilities in face of poor pricing of unprocessed agricultural output. The finance cost often takes about a third of the normal margin which the owner found as outrageous. During a refresher course in the

summer of 2012, Dr. Usman was introduced to various Islamic banking products and services which in his reckoning are fair, just and Shariah compliant. Upon returning to Nigeria, he quickly open account with Jaiz Bank, the only non-interest banking institution in Nigeria. Since then, the business blossom and became more profitable as the chosen banking products did not only make economic sense, but also morally amenable to his Islamic values and norms.

The current economic crunch in Nigeria which many analysts believe to have emanated from the decline in the global oil prices expectedly led to inflationary situation. Government's intention to diversify the economy provided the basis for increased attention given to the Agricultural sector. The ban on importation of rice and wheat provided a great opportunity for Alheri Farm to invest in Rice and Wheat production premised on good product price and huge products demand.

The farm requires huge capital outlay estimated to $12 million and $3 million in corporate and human resource expenses as per **Table 1**. During the management board meeting, Unit managers who were excluded from previous meetings were brought in to air their views due to the significance of the issue at hand. The subject matter of the meeting was to discuss the various alternatives of raising $13 million in order to tap in and benefit from the emerging window of opportunity in rice and wheat production, milling and sales.

The meeting came up with the following suggestions:

i. The company should go public by Initial Public Offer. The offer could be used to raise the required fund for financing the project

ii. To issue debenture with floating charge at the rate of 12% redeemable after 5 years

iii. Secure a long term bond for the project finance

iv. Raise the required sum through conventional or Jaiz Banking window

v. Considered using long term finance provided by Islamic Finance Instruments

Dr. Usman seem uncomfortable with the options i-iii because of various risks of take over as well as dilution of interest which he found unnerving. Option 'iv' in his reckoning may be too exorbitant to handle considering the high gestation period of the project and the short term nature of the finance option. Since he envisaged mismatch, his interest on long-term finance

Project items	Costs $
Machinery and plants	2,500,000
Freehold land	4,500,000
Buildings and warehousing	3,800,000
Light tools and implements	1200,000
Staffing, training and technology	3,000,000
Total	15,000,000

Table 1. Breakdown of project's costs.

Income statement for the year ended 31 December 2015				
		2015	**2014**	**2013**
		$'000	**$'000**	**$'000**
Revenue	1	10,564	9018	8107
Cost of sales	2	(3413)	(3374)	(2762)
Gross Profit		7151	6644	5345
Overheads/administrative costs	3	(1881)	(1367)	(1046)
Operating profit		5270	5277	4299
Finance expense		(420)	(640)	(560)
Profit before taxation		4850	4637	3739
Taxation		(1213)	(1160)	(935)
Profit for the year after taxation		3637	3477	2807

Table 2. Alheri Integrated farm: 3 year financial summary.

based on Islamic Finance sufficiently attracted his interest. But he has limited knowledge on the instruments as well as their merits and pitfall. The management resolved to seek the services of consultants in Islamic Finance. The firm is interested in briefing on the way out using instruments conforming to Shariah (**Tables 2** and **3**).

Alheri Integrated Farms Limited.

10th July, 2017

The Managing Consultant

Halal Consulting Limited

Abuja-Nigeria

Sir

Appointment as Consultant on Islamic Finance.

Following the resolution of the management board of this company to seek for your service on Long term Islamic Financial Instruments, we write to appoint you as our consultants in the aforementioned capacity for the period of two years in the first instance. The appointment is subject to the content of the engagement agreement already signed today.

The scope of the professional engagement has an urgent requirement for the submission of clear and feasible report on:

i. Assess the viability of the project with focus on discounted pay-back period and the overall business performance outlook given a six year loan offer from Citizen Bank PLC.

ii. Suggest the appropriate instrument considered more suitable to the situation at hand. Discus the various long-term financial options available to the company from Islamic Finance view point

		2013	2012	2011
		$'000	$'000	$'000
Non-current assets				
Property, plant and equipment	4	11,739	10,067	9269
		11,739	10,067	9269
Current assets inventories	5	1492	1328	1249
Accounts receivables	6	1436	963	671
Cash and cash equivalents		428	396	336
		3356	2687	2256
Total assets		15,095	12,754	11,525
Shareholders' equity	Ordinary share capital	1000	1000	1000
Retained earnings		8967	7696	6536
Total shareholders' equity		9967	8696	7536
Non-current liabilities				
Loan	7	1490	1200	1100
		1490	1200	1100
Current liabilities				
Accounts payable	8	1606	1285	1789
Loan	9	1432	1288	1100
Bank overdraft		600	285	–
Total current liabilities		3638	2858	2889
Total shareholders' equity and liabilities		15,095	12,758	11,525

Table 3. Alheri integrated farm: statement of financial position notes as at 31 December.

Attached with this letter are the company's three years income statement, statement of financial position, and the new project's projected returns and capital outlay. Submit your report to our corporate headquarters not letter than two weeks from the undersigned date.

Accept the compliment of our esteemed regards, please.

Signed

Nabila Haruna

Manager, Corporate Services

6.1. Estimates and assumptions concerning the new it project

The operational projections are:

i. When fully operational in about 10 months' time the new rice and wheat fields will allow Alheri Integrated Farm to increase its total output in value by more than ten times its

current capacities. The projected level of output is adjudged to be sufficient new capacity for the foreseeable future of the company's operation.

ii. The new project will also allow the company to integrate its current grains production with the proposed line of activity which may significantly increase the current storage capacity of the farm.

iii. The new line of activities will allow the Farm to improve raw materials and finished goods inventory control and identify in a much easier timeline the farm's inventory needs.

iv. The investment will also identify an improved re-ordering or re-stocking system which is adjudged as efficient by hiring new inventory managers with new computer applications to be deployed for that purpose.

The financial projections are:

1. Initial outlay will be $12 million plus additional incidental costs of $3 million.

2. Market research earlier conducted indicates that the proposed investment will allow Alheri to shore up its annual revenue by between $3 million (minimum) and $4 million (maximum) for the foreseeable future.

3. The Gross Profit while factoring out depreciation on the additional annual revenue is expected to be at least 40%.

4. There will also be an annual rise in overheads estimated at about $500,000 as a result of the proposed investment.

Additional information on the rice and wheat investments cannot be easily quantified or monetized. They include:

i. The new product line will increase the current market position of the farm which has put the company in major production and processing business.

ii. It will also attract government financial intervention especially from the Federal Ministry of Agriculture, the Central Bank of Nigeria and Small and Medium Scale Enterprises Investment Scheme operated by deposit money banks.

6.2. Suggested solution

HALAL CONSULTING LIMITED

24th July 2017.

The Management.

Alheri Integrated Farm Limited.

Sir

Re: Appointment as Consultant on Islamic Finance.

Reference to your appointment letter dated 10th July 2016 requesting an initial report on Funding alternative available for your new projects. We are writing to communicate our findings based on the information you made available to us on the said date.

Having regard to your first requirement wherein the minimum repayment period was made and viability of the project in terms of returns. The analyses made after factoring out finance charges while ignoring depreciation that the project's initial outlay is recoverable in six year period. The computation as per **Table 1** used a simple traditional undiscounted pay back analysis for its simplicity of assumptions. In year six, the cumulative cash-flow stands at $15,960,000.

Regarding the business viability of the projects, the revenue, gross profit, overhead and finance charges' effect of the new project was incorporated into the computation as per Tables II and III in the appendix. While the bank's facility at 24% rate yields the total $5,040,000 to the bank represent one third of the loan value, the benefiting company only gains annual increase of 11% holding other business earnings constant. This implies that the company could only benefit from the gains of $2,160,000 over the period. The figure will increase steadily when the loan is completely paid and the earning capacity of the asset is sustained. Based on present estimation, the bank would gain 233% higher than the company during the normal repayment period.

Given the analyses above, it suffices to maintain that the bank stands to gain more during the most productive period of the project. As the company witnesses rise of sales, finance and overhead costs incidental to the project, their aggregate earnings reduces while the bank enjoys consistent stream of cash inflow of $840,000 annually.

Given the obvious pitfall in conventional finance where the productivity of capital is fixed irrespective of the outcome of investment as well as the incidents where the finance providers take the largest chunk of the returns, Islamic Finance provides the best way out [11]. Islamic finance is a form of business and corporate financing designed on bases consistent with the principles of Islamic law (Shariah). As such, several Islamic finance products have been used locally and internationally (NSE-Rules, 2012).

The component can use a portfolio of Islamic Finance products in addressing its diverse needs as stated in **Table 1**. The first four items on the table are fundamentally assets which could be used for the creation of additional wealth as described in the case. The following financing options can be applied as suggested by Albaity and Ahmad [2]

i. Murabaha—This product will enables Alheri Farms to make a purchase of the identified assets like Machineries and tools without securing an interest-bearing loan as the case discussed. Instead, the bank undertakes buying the items and subsequently sells it to the Alheri Farms on a deferred payment basis on carefully and mutually agreed terms.

ii. Ijarah—Alheri Farm cap opt for lease agreement in which a bank buys any item of assets as par **Table 1** for a company and then leases it out to it over an agreed period of time with the bank earning a profit from the rentals payment instead of the exorbitant finance charges often paid as interests.

These instruments provide short and medium terms financing options. Normally when such instrument are used in financing long term investment, the consequence of financing mismatch would become pronounced in terms of cost and inflexibility.

The long term funding need of the company can be met using any of the following long term instruments:

i. Sukuk is defined as certificates of equal value representing undivided shares in the ownership of tangible or fixed assets and services or in the ownership of a particular assets of a projects or special investments as the case of your company. In its simplest terms, Sukuk can best be called trust certificates. The relevant local financing guide based on the Nigerian Securities and Exchange Commission's rule 2013, Sukuk refers to an undivided in ownership of an assets, investment or project based on Shariah principles and concepts and approved by the SEC. Under a sukuk arrangement, returns to Sukuk holders (certificates), represent rights to receive payments from a trade transaction or ownership of a particular asset or business venture. However, the returns to conventional bondholders represent the right to receive interest for borrowed monies [8, 13–15].

ii. According to [6, 7], Issues of ordinary shares are Initial Public Offer (IPO) are permissible source of long term finance subject to certain screenings associated with the rights and benefits of the shareholders. For instance, benefits like cash dividends, bonus issues, right issues and perquisites given to equity holders are permissible in Shariah.

iii. Preference shares which confers on its owner fixed rate of returns and priority of settlement during winding-up is not legally acceptable in Islamic finance. As such the company may not consider it as viable option, [3, 4].

iv. Convertible loan stock are preference shares or bonds that can be converted into ordinary shares after a predetermined period. Value of the future conversion is not certain, although the future conversion ratio of the number of ordinary shares that will be given upon conversion, is fixed bond or preference share is unknown. There has not been an official consensus or scholarly decree given, however, most Shariah scholars express concerned over the element of gharar therein.

Overall, the short term source of funding has been less optimal on two grounds. One is its sub-optimality based on timing since the repayment period is beyond short term threshold. The second misnomer which the facility provided conferred more benefits to banks with less risk exposure, but more certain and higher returns.

A more plausible option available to the company is to secure plants, machinery and equipment using short-term Sukuk Structure like Ijarah and other forms of Sukuk in bond's form. 20% equity may be raised to finance the operational components of human resource and Information Technology requirements. These options suggested may not dilute ownership structure materially while financial risks exposure remains low.

Signed

Managing Consultant

7. Conclusion

In the context of conceptual discussion on the topic of discourse, the meaning and principle of Islamic and conventional financial instruments were discussed. The latter is more amenable to business and personal financing needs due to relative low risk, profit sharing arrangements and the existence of multiple products financing options ranging from assets acquisition, working capital and non-current assets.

The chapter also reviewed two major classification of Islamic financial instruments (IFIs) which are (i) the instruments of mobilizing funds and (2) the instruments of utilizing funds. The former includes the current accounts, savings account, investment account and the sukuk while the latter is made up of Mudaraba, musharakah and Ijarah. Few differences were identified between the CFIs and IFIs under the instruments of mobilizing funds. However, the absence of riba, risk and partnership instead of lender borrower relationships have found to differentiate the instruments utilizing funds.

Based on the case material presented and analyzed, the company's used short term fund from conventional sources to finance long term project. This approach is referred to financing mismatch. The conventional funding sourced conferred huge portion of the corporate returns to the lender, not the borrower. If the IFIs like Sukuk are utilized, capital assets may be acquired in more favorable terms and raising further equity would provide working and operating capital.

The pitfall of the conventional instruments include the use of interests which is not so sensitive to the productivity of capital as well as lender borrower relationship as against partnership in which the parties are out for mutually benefiting ventures. Drawing from literature and case study, it is safe an inference that IFIs are cheaper, less exploitative and creates limited credit risk exposure. While the CFIs have been used overtime, IFIs are emerging, more dynamic and has strong potential for improvement through research and sponsored studies.

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References

[1] Alam N, Rajjaque M. Shariah-compliant equities: Empirical evaluation of performance in the European market during credit crunch. Journal of Financial Services Marketing. 2010; **15**(3):228-240

[2] Albaity M, Ahmad R. Performance of Shariah and composite indices: Evidence from Bursa Malaysia. Asian Academy of Management Journal of Accounting and Finance. 2008;**4**(1):23-43

[3] Hoepner AG, Rammal HG, Rezec M. Islamic mutual funds' financial performance and international investment style: Evidence from 20 countries. The European Journal of Finance. 2011;**17**(9–10):828-850

[4] Omar MZ. Islamic Equity Market, Shariah Stock Screening and Preference Shares. Malaysia Lecture Series. International Islamic University; 2013

[5] Hassan HM, Razzaque S, Tahir MS. Comparison of financial instruments in Islamic versus conventional banking system and liquidity management. African Journal of Liquidity Management. Vol 7 (18) pp 1695–1700, 14th May 2013. DO1: 10.5897/AJBM11.179

[6] Ahmad A, Rehman K, Saif MI. Islamic banking experience of Pakistan: Comparison of Islamic and conventional banks. International Journal of Business Management. May 2010;**5**(2):137-144

[7] Dusuki WA. Do equity-based Sukuk structures in Islamic capital mark? Manifest Finance. **30**:44-58

[8] Jamalden M. Islamic vs conventional finance. https://www.slideshare.net/jmfsaad/islamic-financial-instruments?qid=81790b5d-695f-489b-821b-56705d24e8f9&v=&b=&from_search=1 [Accessed: 2017–11-10]

[9] Walid M, Khautem BJ, Jihed M. How ethical is Islamic banking in the light of Islamic laws? Journal of Islamic Finance. 2017. DOI: 10.1111/jore.12086

[10] Abu-Umar, Hassan MK. Regulations and performance of Islamic banks in Bangladesh. Thunder land International Business Review

[11] Ariff M, Rosly SA. Islamic banking in Malaysia: Unchartered waters. Asian Economic Policy Review. DOI: 10.1111/J.1748-3131.2011.01208.X

[12] Zaher TS, Hassan MK. A comparative literature survey of Islamic finance and banking. Financial Market Institutions and Instruments

[13] Ibrahim MH. Issues on Islamic banking and finance: Islamic banks, Shariah compliant investments and Sukuk. Pacific Basin Finance Journal

[14] The Nigerian Stock Exchange (NSE) Index; 2015

[15] The Nigerian Small and Medium Scales Enterprise's Data Repository

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Accounting is both an art and science, which governs the communication and processing of the financial information in an organization. Technological advancement is helping the accountants to monitor financial performance in real time. This presents both opportunities and challenges for the current day organizations and accounting professionals alike. This book shows many different aspects to the same accounting principles but from a cross-cultural perspective. The diversity of the authors who contributed to this book signify the importance of accounting from various dimensions while ensuring that standards are adhered to, and principles are followed and applied. This book intends to feature the journey from the double-entry bookkeeping developed in medieval Europe to the changing dynamics of accounting. It is divided into five main sections: The Matching Principle, Ethics in Accounting, Insurance Contracts, Green Accounting, and Financial Instruments.

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