

**Moving the Conceptual Framework Forward:
Accounting for Uncertainty**

Richard Barker^a

Saïd Business School, Oxford University

and

Stephen Penman^b

Columbia Business School, Columbia University

The comments of Sudipta Basu, Colin Clubb, Ilia Dichev, Trevor Harris, Anne McGeachin, Katherine Schipper, Shiva Rajgopal, Geoff Whittington, and the anonymous referees are appreciated.

^a richard.barker@sbs.ox.ac.uk

^b shp38@columbia.edu

Moving the Conceptual Framework Forward: Accounting for Uncertainty

Abstract

To meet the objectives of financial reporting in the IASB's Conceptual Framework, the 'balance-sheet approach' embraced by the Framework is necessary but not sufficient. Critical, but largely overlooked, is the role of uncertainty, which we argue defines the role of accrual accounting as a distinctive source of information for investors when investment outcomes are uncertain. This role is in some sense paradoxical: on the one hand, uncertainty undermines both the balance sheet (because uncertain assets are unrecognized) and the income statement (because mismatching is unavoidable). However, these inevitable accounting effects can be exploited to provide information about uncertainty, though not by a balance-sheet approach alone. Rather, criteria for balance sheet recognition and measurement, and for income statement presentation, are established by consideration of the impact of uncertainty on matching and mismatching in the income statement. This combination of balance-sheet and income-statement approaches enhances the communication of information to investors under conditions of uncertainty, thereby giving greater clarity and purpose in satisfying the objective of the Framework to provide information about "the amount, timing, and *uncertainty* of future cash flows".

Moving the Conceptual Framework Forward: Accounting for Uncertainty

1. Introduction

This paper argues that the concept of uncertainty is insufficiently developed in the (Exposure Draft of the) Conceptual Framework of the International Accounting Standards Board (IASB, 2015). Addressing this issue resolves the key issues in the Framework—recognition and measurement of assets and liabilities—and leads to greater clarity in defining earnings in the income statement.

The Framework assigns conceptual primacy to the definition of assets (liabilities), expressed in terms of rights (obligations) with respect to economic benefits. This ‘balance sheet approach’ seemingly rejects an ‘income statement approach’ involving the matching of expenses to revenues; (net) income is viewed as a by-product of the measurement of assets and liabilities in the balance sheet.¹ We argue that the incorporation of uncertainty would maintain the balance sheet approach, albeit refined to accommodate uncertainty in the recognition of assets and liabilities, but would also define accounting for revenues and expenses that is guided by the matching concept. Accordingly, our approach can be characterized as a mixed balance sheet and income statement approach, but one that has the important feature of conveying information about uncertainty, an issue of central concern to investors.

Uncertainty is discussed in the Framework, mostly in the context of the challenges it creates for the measurement of assets and liabilities (e.g. paras. 5.15-5.21). Yet that discussion does not get to the heart of why the concept of uncertainty is so important for accounting. This is perhaps unsurprising, given that uncertainty is pervasive in practice, and thereby accepted rather than explored. Yet, in the hypothetical case where investors have no uncertainty with respect to an entity’s claim to economic benefits, there would be limited use for the ‘technology’ of accrual accounting, and thereby for the balance sheet or the income statement. It is uncertainty that gives accounting the potential to be useful.

¹ The income statement approach is advocated and contrasted with the balance sheet approach in Dichev (2007). Zimmerman and Bloom (2016) provide a history of the two approaches and of the matching concept that underlies the income statement approach.

Because the Framework does not adequately capture this central role of uncertainty, the ‘valuation-relevance’ and ‘stewardship’ objectives in the Framework are not explicitly linked to the technology of accrual accounting; after stating these objectives, the Framework simply presumes that accrual accounting is useful. We show that uncertainty explains that usefulness, and is therefore the key concept that links accrual accounting to the Framework’s objectives and shapes the solutions for recognition, measurement, presentation and disclosure. In brief, the central role of accounting is to shed light on uncertainty in investing and in the evaluation of stewardship, and explicit acknowledgement of this role is therefore needed in the Framework to guide conceptual thinking.

To develop this argument, we take as a benchmark the setting of a certain world, in which all assets and liabilities can be recognised at their economic value, and where ‘perfect’ matching is possible in the income statement, yet where it is also the case that the income statement is redundant as a source of useful information. The introduction of uncertainty changes these conditions: it raises the prospect of the non-recognition of assets and liabilities and means that perfect matching is impossible. Yet it also raises the prospect of accounting conveying information about uncertainty, if uncertainty is handled appropriately. We show that this involves a balance-sheet approach for recognition and measurement, but one that considers the consequences for imperfect matching in the income statement. A balance sheet approach is insufficient without an explicit consideration of the effects of recognition and measurement on the articulating income statement.²

To that end, we identify four different types of (mis)matching under uncertainty. This typology defines the income statement but at the same time strengthens the conceptual foundations of recognition and measurement in the balance sheet. In effect, we propose an income-statement approach to financial reporting that extends the balance-sheet approach that is embedded already in the Framework.

² While the conceptual primacy of the balance sheet is evident in the Framework, the IASB stresses that the income statement is not overlooked (BC4.3). It is likely that, in practice, the IASB does think through income and expenses issues in making recognition and measurement decisions with respect to assets and liabilities. Yet such thinking is not formalised conceptually in the Framework with the same logical clarity that is applied to the deductive approach that starts with the formal definitions of assets and liabilities.

First we consider the objectives of financial reporting, and the critical role of uncertainty in both understanding the nature of those objectives and in laying a foundation for how best they can be met.

2. Framework Objectives and the Demand for Accrual Accounting

We take as given the IASB's stated objective in the Framework to 'provide useful financial information about the reporting entity that is useful to existing and potential investors, lenders and other creditors in making decisions about providing resources to the entity' (para. 1.2). We also agree with the implication that follows from this objective, which is that investors and others (hereafter 'investors') seek information with respect to 'the amount, timing and uncertainty of (the prospects for) future net cash inflows to the entity and their assessment of management's stewardship of the entity's resources' (para 1.3). Note the reference to uncertainty.

This objective is essentially little more than an expression of the discounted cash flow model that underpins basic no-arbitrage valuation theory: investors are concerned with valuation and that involves forecasting the amount and periodic timing of future cash flows and a discount to present value for the uncertainty surrounding them. The stewardship feature recognizes that that the generation of those cash flows is in the hand of agents who have to be monitored. However, while the stated objective brings focus to the type of information required, it does not say anything directly about how accounting might convey that information. Likewise, the Framework's Qualitative Characteristics are not so much a description of the properties of accounting information but, rather, of useful information in general. It is difficult to argue against a definition of relevant information that is 'capable of making a difference in the decisions made by users.' (para. 28) Nor is it unreasonable that information should 'faithfully represent the phenomena that it purports to represent' (para. 2.14), nor that it should be 'complete, neutral and free from error' (para. 2.15). Yet such characteristics are in themselves rather anodyne, because they do not lead to discriminating decisions about how the accounting is actually to be done: they might be characterised as virtuous but not concrete.

Although the Framework does not explicitly link accounting variables to the discounted cash flow model, some insight can be introduced from the residual income model, which has long existed in the research literature (Edwards and Bell, 1961; Peasnell, 1982; Ohlson, 1995). At one level, the residual income model can be viewed as little more than a formal restatement of the discounted cash flow model; it just substitutes the accounting variables, book value and earnings, for cash flows, and it does not matter how book values and earnings are recognized and measured. Thus, the residual income model does not in itself demonstrate that the mechanism of accrual accounting provides information to investors. At another level, however, and as will be explored later in the paper, the residual income model offers useful insights, because it makes transparent a formal relationship between accounting and valuation. In turn, this suggests (even though it does not in itself demonstrate) that accrual accounting—the balance sheet and the income statement—can potentially serve as a ‘technology’ that captures and structures data in order to provide useful information.

Something of this insight is implied (but not explored) in the Framework’s description of accrual accounting. The Framework asserts that ‘accrual accounting ... is important because information about a reporting entity’s economic resources and claims and changes in its economic resources and claims during a period provides a better basis for assessing the entity’s past and future performance than information solely about cash receipts and payments during that period’ (para. 1.17). There is an explicit role here for both the balance sheet and the income statement, a role that is ‘important’ because accrual accounting is asserted to have informational superiority over the cash flow statement.

In the next paragraph, the Framework goes on to claim that information in the income statement ‘... indicates the extent to which the reporting entity has increased its available economic resources, and thus its capacity for generating net cash inflows through its operations ... (and) may also indicate the extent to which events such as changes in market prices or interest rates have ... (affected) the entity’s ability to generate net cash inflows’ (para. 1.18). This statement hints more strongly at why accounting information might be considered to be useful, and also at how it might be used, yet the picture remains incomplete. The question that remains unanswered is the following: why, in principle, are users helped to understand ‘the amount, timing and uncertainty of (the prospects for) future net cash inflows’ by means of the structuring of economic resources and claims into a

balance sheet, alongside the presentation of changes in those resources and claims in the income statement?³

What is missing here is a characterisation of the problem that accounting is trying to solve. Without defining that problem, the Framework proceeds directly (from its Objective and Qualitative Characteristics) to a proposed solution, which takes the form of a conceptual analysis of criteria for recognition and measurement.

In this paper, we identify uncertainty as the central problem that links the objectives of financial reporting with the technology of accrual accounting. The context is that investors face uncertainty (risk) in making investments, and so they seek information about that uncertainty; while expected economic benefits are important, so is the uncertainty that those expected economic benefits may not actually be achieved.⁴ It is the practical implication of uncertainty that justifies the need for accrual accounting and that shapes the appropriate criteria for recognition, measurement, presentation and disclosure. In brief, the central role of accounting is to shed light with respect to the problem of uncertainty, and explicit acknowledgement of this role is therefore needed in the Framework to guide conceptual thinking.⁵

We develop these ideas by first defining what we mean by two concepts that are of central importance for the paper - 'uncertainty' and 'matching'. We then proceed by considering accounting under certainty and then by asking how that accounting might change with uncertainty.

3. Key Concepts

³ We note here a firmly held assumption that recognition in the financial statements matters, over and above disclosure. Inclusion in the balance sheet somehow changes the meaning of information with respect to uncertainty.

⁴ Note uncertainty exists now, with respect to amounts and timings of cash flows that do not yet exist. The challenge for accounting is to capture and structure currently-available data (an input) in order to help mitigate the problem of uncertainty with respect to forecasting (an output).

⁵ Shizuki Saito has called our attention to the Conceptual Framework of the Accounting Standards Board of Japan that introduces uncertainty and its resolution with a concept of *release from risk of investments*. The concept is proposed to distinguish net income (realized) from comprehensive income (that includes unrealized gains and losses). However, the concept does not take on the central role (that we propose) as the organizing principle to resolve the key issues of recognition and measurement and as the governing principle for the application of accrual accounting. See Saito and Fukui (2016) on the point.

The Meaning of 'Uncertainty'

For financial reporting, it is helpful to distinguish different types of uncertainty:

Existence uncertainty. This refers to uncertainty about the existence of an element to be recognised in the financial statements. For example, it might be unclear whether or not an entity has an asset, either because it is uncertain whether the entity has control or whether economic benefits (cash flows) are expected.⁶ The Framework defines this uncertainty simply as 'uncertainty about whether an asset or a liability exists.'

Outcome uncertainty. While it might be clear that an accounting element exists, there might nevertheless be uncertainty about the amount or timing of associated cash flows. The Framework defines outcome uncertainty as 'uncertainty about the amount or timing of any inflow or outflow of economic benefits that will ultimately result from an asset or liability.'

Realization uncertainty. Notwithstanding the degree of outcome uncertainty, there is an additional dimension concerned with the availability of deep and liquid markets for the asset or liability in question. For example, there might be a deep and liquid market for an asset (such as a derivative financial instrument) which has a high outcome uncertainty. In this case, the entity has a certain payoff if the value of the asset is realized immediately, notwithstanding an uncertain payoff if the asset is instead held.⁷ This realization uncertainty is similar to, though not quite the same as, the IASB's notion of 'measurement uncertainty', which it defines as 'uncertainty that arises when the result of applying a measurement basis is imprecise and can be determined only with a range.' The difference is that we are explicitly concerned with the existence of markets as mechanisms for certain realization, as opposed to being concerned with the (closely related) concept of precision in applying a measurement basis. To illustrate the difference, an amortization schedule for a financial asset could be applied precisely, even if there is no active market in which the asset

⁶ In our discussion, we express expected economic benefits as (the more familiar) expected cash flows, with the understanding that benefits can be received (or resources disbursed) in cash-equivalent kind. We acknowledge that, for example, the service potential of PPE is better represented in terms of economic benefits rather than cash flows, that 'realization' for PPE involves the consumption of these benefits rather than the exchange of cash, and that this has implications for our discussion of accruals/matching. Our use of 'cash flows' is just for simplicity of exposition; we believe this does not take away from the Framework definitions of assets and liabilities.

⁷ Degrees of realization uncertainty can be related to the fair value measurement hierarchy.

could be sold for a certain amount; this would be low measurement uncertainty but high realization uncertainty.

Asymmetric uncertainty. An additional issue is whose uncertainty we are concerned with. A distinction needs to be made in the financial reporting context between preparers of accounts ('management') and users ('investors'). The issue is one of information asymmetry, arising because management has access to more information than investors, such that, for any given level of existence, outcome, or realization uncertainty, there might be incomplete information revealed to investors, creating for them an additional level of uncertainty. In addition, there might also be cognitive constraints among investors, resulting for example from the way in which information is presented to them, interacting with the limited time that they can devote to processing that information (as in Hirshleifer and Teoh, 2009). The importance of this asymmetric uncertainty is heightened by the presence of an agency relationship, whereby there is not only an asymmetry of information between management (the 'agent') and investors (the 'principal'), but also a difference in economic incentives relating to that information. This agency setting places additional demands on the informational role of the accounting system under conditions of uncertainty, not least by adding a stewardship function in addition to being concerned solely with decision-relevance.⁸

For the purposes of this paper, existence and outcome uncertainty are very closely related and can, for convenience, be combined. We refer to them (combined) as *fundamental uncertainty*. Both are concerned with uncertainty around the amount and timing of economic benefits expected to flow to or from the entity. Thus, this paper is concerned with three types of uncertainty, namely: fundamental, realization, and asymmetric. These are all, of course, resolved over time, with the implication for accounting being one of periodicity,

⁸ A further consideration is that investors can be expected to differ amongst themselves with respect information about uncertainty. Sunder (2015) draws attention to two distinct concepts of uncertainty, which are often conflated in spite of having different implications for decision-relevant information. The first is the 'hazard concept', which is an asymmetric concern for the risk of loss. The second is the 'dispersion concept', whereby higher risk is associated greater variation in outcomes. To illustrate the difference, the case for historical cost accounting and for prudence is stronger if the concept of hazard is brought to the fore, while a concern for dispersion is more naturally associated with the use of fair value. We do not explore uncertainty along these lines. (Sunder actually uses the term risk rather than uncertainty, though it is clear that his argument makes no conceptual distinction between these two terms.)

of reporting on unresolved uncertainties at (or over) a given point (or period) of time.⁹

We next consider the concept of matching, which appears (at first sight) not to be directly related to uncertainty but which, as we will argue, is actually of central importance for understanding the effectiveness of financial accounting under conditions of uncertainty.

The Meaning and Application of ‘Matching’

The application of matching has a long history in accounting practice, and yet in recent years it has fallen out of favour with both the IASB and the FASB (Zimmerman and Bloom, 2016).

Historically, the perceived conceptual significance of matching can be illustrated by the following quote from Paton and Littleton (1940, p16), perhaps the most authoritative source of its day, “accounting exists primarily as a means of computing ... the difference between costs (as efforts) and revenues (as accomplishments).” Likewise, Edwards, Bell and Johnson (1979, p11) simply took as given the centrality of the matching concept: “In order to measure the success or failure of business activities, utilizing the criterion of profit, accountants have adopted the concept of matching efforts with accomplishments.”

The matching concept has an intuitive appeal, with natural linkages to other longstanding, ‘traditional’ concepts in accounting. Matching is an exercise in accrual accounting, indeed arguably it is the purpose of accruals: accruing receivables ensures that revenue is matched to a specific period of time, while capitalizing and expensing outflows has the same periodic performance measurement effect for expenses.¹⁰ For similar reasons, matching lends itself to historical cost measurement, because it can be seen as a mechanism for allocating

⁹ We do not make the Knightian distinction between “risk” and “uncertainty”, with the former concerned with an expected distribution of payoffs (with knowledge of the underlying ‘system’) and the latter with a future that is fundamentally unknown (Knight, 1921); we are concerned with the distinction between outcomes that are certain and those that are not, as opposed to variation within the latter. We use the term ‘fundamental uncertainty’ to capture the notion that we are concerned with our inherent understanding of expected economic benefits.

¹⁰ Matching might be described as a specific type of accrual accounting. All accruals can be described as being motivated by what happens in the reporting period. The Framework does not develop this periodicity, but instead it is implied by recognition and measurement decisions made at any specific balance sheet date, and by changes between those amounts from one period to the next. Different perspectives on uncertainty will lead to a different application of accruals, and thereby to different information content in the accounts. An example is Level 3 fair value, in comparison with historical cost. Each is a different application of accruals. Different interpretations of matching would call for one rather than the other. Similarly, if there is an investment that proves to be unsuccessful, there would be expiration of the asset with time, or else via impairment, both of which would be applications of accruals, yet neither of which would match expense with revenue.

incurred costs to recognized revenues. Matching is also clearly aligned with the concept of earnings, and of valuation by means of 'earnings power', because matching can be interpreted to mean the periodic measurement of value-added from trading in input (supplier) and output (customer) markets. In addition, there is a more subtle, yet also more powerful, intuitive appeal for the matching concept. Ijiri (1975) identifies the 'exchanges' concept as a fundamental strength of the double-entry accounting system, whereby the simultaneous recognition of both benefit and sacrifice reveals differences in economic value in the operation of the market economy. Double-entry is more than just an identity; it is a mechanism for the role of markets in conveying information, a role it fills by associating ('matching') what counterparties give up in exchange with one another (Hayek, 1945; Basu and Waymire, 2010).

On this view, the concept of matching lies at the heart of the information-usefulness of the double-entry accounting system, with decision-relevance not just for investors but also for management whose business decisions reflect related costs and benefits (should I start a new division or a new product?) even in the face of much uncertainty. If this continual matching guides managerial decisions, then it should arguably also guide the accounting.

Against these perceived benefits, however, it must be noted that matching has never been particularly tightly defined. It tends instead to be used in a way that presupposes that it is understood, and to be illustrated with examples that are straightforward. For example, Hylton's (1965) definition—'assigning revenue earned and expense incurred to the accounting period in which these events occur'—leaves open both the concept and the practicality of the notion of 'assigning'. AICPA (1961) states that 'a major objective of accounting for inventories is the proper determination of income through the process of matching appropriate costs against revenues.' Here again there is vagueness in the terms 'proper' and 'appropriate'. There is the noteworthy use of the straightforward, *specific* example of inventories, but this is insufficient to justify matching as a *general* concept. Similarly, while matching was acknowledged historically in the FASB's conceptual framework (SFAC 6, 1985), its meaning was left somewhat open. Para. 145 of SFAC 6 describes the goal of accrual accounting being 'to relate revenues, expenses, gains, and losses to periods' which involves 'matching of costs and revenues, allocation, and amortization.' Quite why 'allocation' and 'amortization' are different from matching is unclear, although para. 146

notes that many expenses ‘are not related directly to particular revenues,’ while para. 148 states further that the period to which certain types of expense relate are ‘indeterminable or not worth the effort to determine.’ In short, SFAC 6 appears to struggle somewhat with matching, endorsing its importance while at the same time identifying (somewhat unclearly) that matching falls short of being generally applicable.

This problem of definition is but one of a number of reasons for the matching concept falling out of favor with standard-setters. A second reason is that application of the matching concept has not always been benign, and might instead be viewed as opportunistic. Sprouse (1966) influentially argued that the practice of matching corrupts the balance sheet, by allowing the creation of meaningless asset and liability balances.¹¹ In general, matching can be portrayed as a licence to engage in earnings management. In addition, and to the extent that investors are subject to cognitive bias, matching can be viewed as (unhelpfully) a mechanism for meeting irrationally-determined information needs, for example smoothing as a response to loss aversion, historical cost as a response to omission bias, or a focus on realized gains and losses in response to investors’ ‘mental accounting’ (Thaler, 1985; Hirshleifer and Teoh, 2009). A further reason for matching being out of favour is that it can be viewed as conceptually redundant. Barth (2008) notes that ‘matched economic positions will naturally result in matched accounting outcomes.’ The argument, consistent with a balance-sheet perspective, is that if accountants get ‘right’ the recognition and measurement of assets and liabilities, then matching will take care of itself and does need to be defined or applied as a distinct concept. In its only reference to matching, the IASB’s Framework ED makes this point as follows (para. 5.8): ‘The simultaneous recognition of income and related expenses is sometimes referred to as the matching of costs with income. The concepts in this [draft] Conceptual Framework lead to such matching when it arises from the recognition of changes in assets and liabilities.’

Therefore, in contrast with the centrality of the concept in a ‘traditional’ perspective on financial accounting, matching plays no explicit role in the Framework (and neither in IASB standards-level decision-making) because it is perceived to be poorly defined, open to

¹¹ BC4.3(d) of the IASB’s ED draws directly from Sprouse in dismissing matching as generating ‘a mere summary of amounts that have arisen as by-products of a matching process. Those amounts do not depict economic phenomena.’

abuse, and redundant conceptually; it is no more than a traditionally accepted convention, unsupported by underlying conceptual rigour.

We will argue that a greater understanding of the role of uncertainty in accounting resolves this impasse between ‘traditional’ and ‘standard-setter’ views of matching. It enables a more concrete definition of matching, one that can be introduced into the conceptual framework, along with uncertainty, to resolve recognition and measurement issues. Accordingly, the rest of the paper explores the implications of uncertainty and matching for the IASB’s conceptual framework.

4. Recognition under Uncertainty

We start by setting out the benchmark case of accounting under conditions of certainty, a ‘straw man’ that helps bring into relief the central role of uncertainty in accounting and, with it, both the insights and the limitations associated with the concept of matching.

Recognition in a Certain World

In the hypothetical setting of fundamental certainty, net assets are known to be owned and controlled by the reporting entity, the timing and amount of the payoffs from those net assets is also known, and so too is the risk-free cost of capital and (therefore) the economic value of the entity. There are three features of accounting information in this setting that can be used as a benchmark for evaluating the real-world setting of uncertainty.

First, economic value (known with certainty) can be booked on the balance sheet.

Alternatively stated, there can be no (unrecorded) goodwill because goodwill arises when there is a residual that equates (uncertain) economic value to the sum of the carrying amounts of individual assets.

Second, fundamental certainty also implies ‘perfect matching’, in the sense that there is no ambiguity in the timing of income and expense recognition in the income statement.

Alternatively stated, there are no unexpected (‘windfall’) gains or losses, because expected (*ex ante*) earnings are always equal to achieved (*ex post*) earnings. Hicks’ distinction between alternative earnings definitions collapses (Hicks, 1946; Bromwich et al., 2010).

Expected profits and net assets are two sides of the same coin, with the latter being equal to the former capitalised at the risk-free rate, meaning that there is no obvious prior claim of either a balance sheet approach or an income statement approach to financial reporting.

Third, all information about economic benefits is given by the balance sheet and the risk-free rate, such that accrual accounting serves no useful purpose, for the simple reason that cash flows are both known and sufficient for valuation. There is no need to recognise revenues as they are ‘earned’, nor to allocate or amortise in order to recognise expenses as they are ‘incurred’, nor therefore to establish the articulated relationship between balance sheet and income statement that enables the accrual technology to be applied. The role of accounting in this world is therefore at best trivial, and there is neither a demand for an income statement, nor anything which leads to the expanded discussion of recognition and management approaches in the Framework.

The setting of fundamental certainty also makes redundant the notions of realization uncertainty and asymmetric uncertainty. The contribution of Beaver and Demski (1979) was to note that, in effect, a setting of perfect and complete markets is equivalent, in terms of implications for accounting, to a setting of fundamental certainty. Economic opportunities can be fully realized by a reporting entity in this setting, notwithstanding the existence of outcome uncertainty.¹² It is only when the assumption of fundamental certainty is dropped, and with it the certainty around expected outcomes, that the ability to realize outcomes through the existence of markets becomes relevant to the method of accounting. Likewise, there is no reason to assume an agency conflict, or a ‘stewardship’ demand for financial accounting, because expected returns are risk-free and management performance is entirely determined.

In summary, the setting of fundamental certainty provides a benchmark with three characteristics: first, all assets and liabilities are recognised at their economic value; second, perfect matching is possible in the income statement; third, notwithstanding perfect matching, the income statement is redundant as a source of useful information. Moreover,

¹² Strictly, the Beaver and Demski assumption of perfect and complete markets includes markets for human capital, which are in practice ruled out of accounting recognition. This is not, however a demanding assumption in a hypothetical, certainty setting.

the concepts of realization uncertainty and asymmetric uncertainty provide no incremental insight into accounting.

It is thus the uncertainty setting where accrual accounting and the income statement potentially come into play, where the existence of markets and of agency relationships becomes relevant and, as we will argue, where a balance-sheet approach alone is no longer sufficient.

Accounting under Uncertainty

The world of certainty is, of course, highly stylized. It is valuable conceptually as a benchmark, but it fails almost entirely as a description of the world in which business actually operates.¹³ The certainty case is, however, a useful device to understand accounting under uncertainty, for uncertainty requires a consideration of the appropriate accounting where the three characteristics above do not hold: first, there is the prospect of the non-recognition of assets and liabilities (because either existence is in doubt or else expected outcomes cannot be anticipated with confidence); second, perfect matching is impossible (because expenditure incurred cannot *ex ante* be associated with uncertain future revenue); and, third, there is the possibility of earnings conveying information for forecasting and valuation purposes, thereby bringing the income statement to life to supplement the (now imperfect) balance sheet.

The introduction of uncertainty thus changes the picture, and forces us to think differently about how the technology of accounting can be useful. If, because of either fundamental or realization uncertainty, the balance sheet cannot capture the economic value of the entity, then what should it capture, and in what way does it remain useful, in spite of its reduced scope? If matching is impossible, then what is the meaning in earnings? How, if at all, can the income statement convey information under uncertainty, given the inevitable mismatching that results? And how are these questions affected further by the introduction of asymmetry between management and investors? These are the essential problems with

¹³ Perhaps the closest case is the accounting for a held-to-maturity (risk-free) government bond under the effective interest method. Yet even here the certainty case does not strictly apply, not least because it requires that the bond be held to maturity.

which financial accounting must grapple, and they arise entirely upon the introduction of uncertainty.

It is insightful at this point to return briefly to the residual income model, and to consider the implied informational roles of the balance sheet and the income statement. In doing so, conclusions for the 'real world' follow that relate to each of the three benchmark features of the certainty setting.

First, the residual income model shows that, if book value does not capture the economic value of the entity, then earnings become value-relevant: if the price-book value ratio (PBV) is different from one, the 'missing' value is explained by the sequence of expected residual income (or 'abnormal earnings') in the future. This possibility is acknowledged – indeed, assumed – in the Framework (para 1.7): 'general purpose financial reports are not designed to show the value of an entity.' Yet the Framework neither identifies uncertainty as the underlying reason for this position, nor does it identify the consequential valuation role for the income statement in providing flow-based value-relevant information, to supplement the stock-based information that is (incompletely) provided in the balance sheet. To illustrate, consider the distinctive case of assets that are independent of one another and have observable market prices (low realization uncertainty). For these assets, market-based valuations are known, PBV equals one, and earnings are informationally redundant. For other assets, in contrast, PBV is less than one, and the income statement plays a role in valuation. In the extreme case, valuation relies entirely upon the extrapolation of income statement data whenever fundamental or realization uncertainty is high enough for assets not to be recognized at all.

This in-principle usefulness of the income statement is, however, problematic in practice. This is because the income statement can only be perfectly matched in a certainty setting, and any uncertainty of future revenues implies the uncertainty of amortisation schedules by which currently-incurred resource outflows can be attributed (via the accrual mechanism) to corresponding future resource inflows. While perfect matching in this setting is desirable, because of the valuation role identified above for the income statement, it is also impossible. This impossibility of matching (and the inevitability of mismatching) is the underlying weakness in calls for an 'income-statement approach', as an alternative to the

balance sheet approach adopted by the IASB (Storey and Storey, 1998). It is, of course, desirable, that, the past can serve as a guide to the future, for which a 'matched' income statement would be ideally suited, and where a Price-Earnings (PE) ratio would have its surest practical foundation (Black, 1980). Yet such an approach would be to will a solution by denying the problem. While desirable as the basis for valuation under uncertainty, perfectly 'matched' earnings is unachievable for precisely the reasons why it is desirable, namely that (both *ex ante* and *ex post*) it exists only in the absence of uncertainty (Solomons, 1961).

This discussion suggests a conundrum, a Catch 22, which is most evident if we now turn to the third characteristic of the certainty setting, namely that the income statement in a certainty setting is informationally redundant. The conundrum is this: perfectly matched earnings can only be known in a setting where they do not need to be known, while earnings become in principle useful only in a setting where they cannot be known (Beaver and Demski, 1979). Moreover, we are not directly helped by the Framework in addressing this problem. While the Framework does refer to the notion of 'predictive value' (para. 27), and thereby to some relationship between a 'known' past and an uncertain future, the reference is too vague to be helpful. The residual income model, meanwhile, is silent.

The above Catch 22 is, however, stated in stark terms, with reference to the impossibility of *perfect* matching. We will argue that addressing the conundrum requires acknowledging that imperfection is unavoidable, yet that its consequences can be minimised. Our approach is to consider how accounting can be *informative* with respect to uncertainty, whereby the unavoidable existence of uncertainty is acknowledged and the role of accounting is conceptualised as a mechanism for enabling investors better to understand the consequences of uncertainty and thereby to make better informed resource allocation decisions.

We start with a consideration of accounting for the inflow of economic resources, in the form of revenue, and then proceed to consider the more problematic and more complex case of accounting for the outflow of economic resources, and the associated issue of matching.

Accounting for Revenues under Uncertainty

With respect to revenue, both the Framework and IFRS 15 can be viewed as *implicitly* acknowledging uncertainty in recognition and measurement, and as providing useful information in doing so, notwithstanding the above Catch 22.

With uncertainty, expected cash flows have variance around them.¹⁴ In itself, this need not constrain their recognition on the balance sheet—they could simply be estimated. Yet the Framework does constrain recognition, because the definition of an asset makes the requirement of expected cash inflows a necessary, yet not sufficient, condition for recognition. An asset is defined as follows (where an ‘economic resource’ is in turn defined as ‘a right that is capable of producing economic benefits’): an asset is ‘*a present economic resource controlled by the entity as a result of past events.*’ (para 4.5)¹⁵

This definition requires the establishment of control based upon past events, thus excluding recognition based on future events.¹⁶ This differentiates what is ‘known’ to be an asset from what could be an asset based on expected future transactions and events that are as yet uncertain. It is only in that context that it makes sense to ask the questions demanded by the Framework’s definitions, because only then are we unsure what the answers might be: ‘does the entity have control?’ and ‘was there a past event?’ and ‘are there likely to be economic benefits?’ So, *implicit* in these definitions of assets and liabilities is an acknowledgement of uncertainty.

It is therefore a practical accommodation of uncertainty that potential assets and liabilities that arise from (uncertain) future transactions with customers are excluded from recognition until the asset definition can be satisfied. It follows that, under IFRS 15, accounts receivable are mostly, in effect, not recognized until the uncertainty has been resolved. Revenue recognition thereby typically books an asset only when there is low variance around the expected cash flows (with the recognition of a receivable, discounted to cash-equivalent for non-collection and with any liability booked for unfulfilled firm

¹⁴ We use variance to refer to all moments of the distribution, not just the second moment (the “variance”).

¹⁵ A liability is defined similarly as ‘a present obligation of the entity to transfer an economic resource as a result of past events.’ (para 4.24)

¹⁶ In practice, this even includes future events committed to under executory contracts. Future events are, however, relevant to the measurement of assets and liabilities that have been recognized (consider, for example, derivatives); hence the issue here is one of recognition rather than measurement.

performance).¹⁷ While IFRS 15 invokes the criterion of “satisfying a performance obligation”, it also requires the consideration to be received as “highly probable”.

While this language, along with notions of completing an earnings process, differs from ours, we essentially see it as capturing the same economic idea; the resolution about the risk of receiving cash is paramount, with the various criteria being the instruments to operationalize the idea. For example, IFRS 15 requires that a near certain cash flow is not recognised if there is no control, yet if ‘control’ is seen as a proxy for uncertainty resolution, for being ‘sure’ that the claim belongs to the entity, then this apparent difference is really just a manifestation of finding a rule that works in practice to implement the underlying idea.¹⁸ The accounting says: prospective customers may well suggest expected cash flows (economic benefits), but that expectation is not booked as an asset because of uncertainty around the expectation. Accordingly, while investors may anticipate future revenues and price the firm accordingly, the accounting informs that those anticipated revenues are risky—the anticipated customers may not show up. Or, in the words of the Framework, the rights and control of an asset as a result of a past event have not been established.^{19 20}

An implication of this accounting is that it gives partial definition to the income statement, albeit as the by-product of a balance-sheet approach. Revenues are recognized when “earned” in satisfaction of the asset and liability definitions, in other words with the completion of the earnings process acting as a proxy for the resolution of uncertainty. For

¹⁷ See AAA (2011) for an alternative revenue recognition scheme explicitly built around the resolution of uncertainty.

¹⁸ Likewise, a performance obligation might be satisfied, and so revenue recognised, yet there might be variable consideration, and so a high dispersion of possible outcomes. Such cases are unavoidable in practice, as accounting standards have to ‘draw a line somewhere’.

¹⁹ Barker (2015) points out that the delay in recognizing expected revenues that is implicit in the Framework definition of an asset amounts to a prescription for (conservative) accounting whereby book value is typically less than price. Barker and McGeachin (2015) document a number of illustrations in the Framework and actual IFRS standards where uncertainty impinges on asset recognition and measurement.

²⁰ The accounting says that the expected benefit (and the associated asset) cannot be recognized until the firm has a low-beta asset, cash or a cash equivalent (discounted) receivable. Indeed, revenue recognition imbeds the fundamental principle underlying asset pricing theory: the no-arbitrage principle. A stock is a claim on the expected cash flows of a firm, so when the firm realizes those expected earnings into cash or a near-cash asset on shareholders’ behalf, the investors’ risk and expected return are correspondingly reduced. On a consolidated basis, the firm’s accounts are part of the shareholders’ accounts, so it makes no difference if the shareholder “realizes” or the firm “realizes” on the shareholder’s behalf. Penman (2016) connects accounting under uncertainty to the required return for investing, and reports on empirical research where features of accounting that involve delayed recognition of earnings are associated with risk to investment outcomes and with average stock returns that are a reward for that risk.

revenues, the accounting therefore approximates the case of perfect matching *ex post*, albeit with exceptions such as telcom and insurance revenues.

For the forward-looking investor, facing uncertainty, the reporting of revenue enables extrapolation of a future flow based upon the evidence of a past flow. In this regard, stock prices anticipate future sales (and earnings) but (all else equal) a high price-to-sales ratio conveys that the higher future sales indicated by the price are risky, for those expected sales have not yet been realized. Accordingly, the evolution of the income statement (and the corresponding balance-sheet) revolves around uncertainty and its resolution over time. Price-to-sales ratios converge to the mean over time as the expected sales are realized (in the denominator) or as prices (in the numerator) fall because prospective sales (and the earning from those sales) are not realized. The price-to-sales ratio described here corresponds to the notion in Edwards and Bell (1961) of 'subjective goodwill', whereby expected economic gains are realised over time in the accounting.²¹

Accounting for Expenditures under Uncertainty

The case of revenue is relatively straightforward. In other respects, however, the delineation of the accounting under uncertainty is incomplete under the Framework (and in accounting standards). Specifically, while the asset and liability definitions in the Framework implicitly handle uncertainty surrounding revenues, the same is not true for net assets from expenditures incurred to generate future (uncertain and unrealized) revenues. These expenditures have variance around them: future economic benefits from holding the asset are uncertain in timing and amount.²² Such assets include inventory, fixed assets, research and development investments, brand building investment through promotion and advertising, supply chain development, investment in product distribution systems, start-up

²¹ In contrast with the certainty setting, the balance sheet and income statement each relate to different aspects of the revenue process, and therefore each contains different information. Accounts receivable is a current claim with respect to whatever component of consideration remains unpaid from the satisfied performance of past revenue contracts. It has a PBV of one (given unbiased estimates of bad debts). In contrast, accrued income in the (historical) income statement is a basis for forecasting, and so for valuation, yet of course the valuation is not of accounts receivable but of overall inflows. The balance sheet and the income statement are serving a different informational purpose, and while the former is a stock and the latter a flow, they do not correspond directly to one another.

²² This problem increases to the extent that expenditures are associated with longer time periods, for example with the life of plant and equipment being longer than the revenue cycle.

costs, software costs, to name a few.²³ While inventory, fixed assets, some development, and some software costs appear on the balance sheet in satisfaction of the asset definition, many of the other investments satisfy the requirement of expected economic benefits yet are expensed immediately.

It is largely left to individual standards to draw the line, without the benefit of explicit guidance from the Framework. In IAS 38, the IASB applied the criterion of “probable future economic benefits” to distinguish between “research” (which is expensed) and “development” (which is capitalized and amortized). In justifying the immediate expensing of R&D in FASB Statement No. 2, which predates the conceptual framework, the FASB focused on the “uncertainty of future benefits.” IAS 12 recognizes deferred tax assets only if it is probable that taxable profits will be realized in the future against which the deferred taxes can be applied. However, a line for recognizing assets under uncertainty is not drawn in the draft Conceptual Framework.²⁴

There are three possible approaches for dealing with uncertainty under the balance-sheet approach in the Framework. The first is not to recognise any assets, in effect treating all outflows as sunk costs and rendering the income statement no different from the cash flow statement. The alternative extreme would be full recognition of all assets with non-zero expected economic benefits, even those with low probability of any benefit. The propensity for “water in the balance sheet” would be high, while the income statement would be swamped by repeated impairments as investments with low-probability outcomes *ex ante* proved so *ex post*; ascertaining profitability from the income statement would thus be frustrated. This alternative does have the feature that the outcome to uncertainty is revealed in due course: an asset that fails to yield the expected economic benefit is written

²³ A question here is whether each of these examples qualifies as resources controlled by the entity (see, for example, the basis for conclusions in FAS2, SFAS141 and 141R). As noted earlier on the paper, however, the need for the ‘resources controlled’ constraint arises under conditions of uncertainty, and so the ‘key question’ is one that implicitly reveals the depth of instinctive thinking that presupposes, but does not explicitly acknowledge, the central role of uncertainty. There is also ambiguity in the meaning of a ‘right’ in this context, and therefore in what the entity is deemed to ‘control’, not least because an outflow on research expenditures (say) does in itself give an entity enforceable control over the assets of any other entity. One route is to view a right in this context as an intellectual property right that enables the future economic benefit of cost savings with respect to (as yet unearned) revenue; the right to benefit is thereby indirect (Barker, 2015).

²⁴ With respect to ‘measurement uncertainty’, the Framework does attempt to draw a line (though somewhat vaguely), applying a test of ‘relevance’ for whether ‘measurement uncertainty is high’ (para. 2.13).

off. But that matching would report on the uncertainty *ex post*, taking investors by surprise. In practice, investors seek instead an *ex ante* indication of the uncertainty they face, because investment decisions are not made *ex post*. A list of assets on the balance sheet that fails to discriminate with respect to uncertainty does not satisfy this *ex ante* demand.

The in-between option is the recognition of assets under a defined threshold for uncertainty.²⁵ Non-recognition when outcome uncertainty is above a threshold conveys information about the uncertainty to investors *ex ante*, such that a higher PBV ratio conveys that economic value is not expected to be achieved through the relatively certain recovery of amounts previously invested. Such an approach works most effectively by taking an income statement dimension into consideration. We develop such an approach in the remainder of this paper, with the aim of making it possible to convey additional information that helps investors to understand the consequences of uncertainty.

5. Matching under Uncertainty

The proposed approach requires consideration of the effects on the income statement of the accounting in the balance sheet, in particular the implications for matching. Uncertainty inevitably involves mismatching, yet this does not imply that we should give up on matching altogether, since the above alternatives of cash accounting or full recognition are not attractive. Our approach, explored below, determines the threshold for admitting uncertainty to the balance sheet by explicit reference to associated matching effects on the income statement. This is an “income-statement approach” to complement the “balance-sheet approach” of the Framework. It is based on an underlying point that a balance-sheet approach is necessary but not sufficient in the presence of uncertainty.

A Scheme for Expense Recognition under Uncertainty

As argued above, revenues are recognized under a principle that connects (albeit implicitly) the income statement to uncertainty resolution, which in turn provides useful income statement information for the purposes of flow-based valuation. A corresponding

²⁵ Cade, Ikuta-Mendoza, and Koonce (2016) report on two experiments where individuals use a probability threshold to determine whether an asset or liability exists.

argument for expense recognition is, however, more difficult to make, because of the inevitable mismatching that arises under uncertainty and the associated corruption of earnings information due to this mismatching.

Taking this mismatching into account, we propose the following approach, which extends the Framework's existing definition of an asset to more explicitly consider uncertainty:²⁶

Assets (as defined in the Framework) should not be recognised unless either an evidence-based amortization scheme can be established *ex ante*, or else realization uncertainty is low, such that the consequent mismatching is unlikely to affect the income statement significantly.²⁷

Thus we propose that assets and liabilities should be recognized with a view to the mismatching consequences in the income statement. That is, recognition revolves around the uncertainty about either the appropriate amortization schedule or the scope for realization through existing markets. Only if the accountant can establish an evidence-based amortization rate that is likely to result in approximate *ex post* matching, or if the value of the asset can be realized, should an asset then be recognized.

One can think of the issue as determining the likelihood of *ex post* asset write-downs, that result from *ex post* amortization differing from the *ex ante* scheme. That likelihood might be ascertained from the risk of not realizing revenues (or, in the case of realization uncertainty, the risk that the carrying amount of the asset is not recovered directly). So, for example, and as implemented in IAS 38, that likelihood might be considered to be too high for Research but acceptable for Development, or for software that has passed the "technical feasibility" point. Amortization uncertainty might alternatively be established from the likelihood of a sizable gain or loss on de-recognition; that gain or loss should be small (*ex ante*) relative to revenues over the life of the asset. Write-downs and de-recognition gains and losses (both of which are 'remeasurements') reveal risk *ex post* rather than *ex ante*, and so a desirable property of financial accounting is that the likelihood of write-downs is minimized, reducing the *ex post* reporting of risk. In the case of assets measured at fair

²⁶ We focus our discussion on assets, for which the challenges of matching are most obvious.

²⁷ Note that we require the solution to be evidence-based, consistent with the 'enhancing' qualitative characteristic of 'verifiability'.

value, where carrying amounts can continue to move around, the issue is whether risk is appropriately captured at the balance sheet date, with Level 1 corresponding to a low risk of mis-measurement and Level 3 a high risk.

In effect, for items meeting the definition of an asset but failing to meet the criterion above, the write-down is taken *ex ante*, with immediate expensing arising from non-recognition. That means mismatching in the current period, but a mismatching that conveys risk *ex ante*, with lower earnings and particularly risky assets omitted from the balance sheet. Just as uncertain prospective revenues are omitted from the balance sheet, so too are expenditures for which revenue outcomes are deemed to be particularly uncertain. Accordingly, while mismatching is inevitable—it must occur, either *ex ante* or *ex post*—the mismatching is employed in an informative way.

It should be acknowledged that adopting this approach might not actually lead to many changes in practice in the recognition and measurement of (net) assets in the balance sheet. This is because the recognition and measurement criteria in the Framework and in individual standards already lean heavily towards excluding uncertain values for reasons of uncertainty. What the above approach would do, however, is two things. First, it would clarify the Framework’s conceptualisation of balance sheet recognition, making more explicit the determining role of uncertainty and offering more guidance and specificity. Second, it would have conceptual and practical consequences for the income statement: it would introduce a conceptualisation of the income statement to the Framework, filling a gap that is currently created by the application of a balance-sheet approach (O’Brien, 2009). It would change the way that income statement information is presented in practice, which would have practical consequences for the application of accrual accounting in helping investors to understand valuation in the presence of uncertainty.

These are fairly strong claims, and they require further substantiation. In particular, the execution of the approach requires judgement, and it remains to be demonstrated that the application of such judgement is feasible. In the next section of the paper, we therefore seek to identify different categories of recognition, ordered in line with the discussion above. This, we argue, is a process that first requires giving further thought to the notion of matching, and to the inevitable mismatching that occurs under uncertainty.

Operationalizing Matching under Uncertainty

The impossibility of perfect matching does not render the concept of matching redundant. The extent to which matching can, or cannot, be achieved, is fundamentally important in evaluating the usefulness of the income statement under conditions of uncertainty and, so too therefore, for consideration of recognition and measurement in the balance sheet. In short, a critical limitation of the Framework lies in its exclusion of any analysis of matching.

We propose an exhaustive classification that distinguishes four different levels of matching – Types 1 through 4 – each of which has different implications for the appropriate method of accounting under uncertainty. We describe Types 1, 2, 3 and 4 as, respectively, revenue matching, *ex ante* matching, *ex post* matching and mismatching. The identification of types must be evidence-based, upholding the Framework’s qualitative characteristic of ‘verifiability’ (para. 2.29), meaning that the type of matching has been demonstrated to work in the past with little *ex post* mismatching as a result.²⁸

Type 1 – revenue matching – refers to expenses that can be described as ‘directly recoverable’. The archetype here is cost of goods sold or, more broadly, any cost which can be described as direct, as opposed to indirect. The defining feature of Type 1 is a direct relationship between revenue that is earned and expense that is incurred. For example, the initial cost to a retailer of acquiring a product is unambiguously and uniquely associated with the revenue generated from the sale of that product; indeed, under IFRS 15 it is transfer over control of the asset that satisfies the performance obligation and triggers revenue recognition.²⁹ To the extent that the revenue is matched to the appropriate reporting period, then so too can the corresponding expense be said to be matched. Similarly, Type 1 matching includes the acquisition cost associated with the realized profit from securities held in a trading book. Amortization that allocates on a production basis (as with mine acquisition and development costs allocated to periods on the basis of percentage of known reserves extracted) also fits this level, though with more uncertainty

²⁸ There is no suggestion of inappropriate matching, in the spirit of Sprouse (1966). On the contrary, there is consistency with a balance sheet approach. The point is that the Framework *does* imply matching, but it is not pursued to consider what happens when there is mismatching. Identifying the concept does not mean ‘more matching’, it means ‘look out for mismatching!’

²⁹ The example is less obvious for a manufacturer, where the cost of goods sold includes an allocation of overheads; this component is ‘assumed’ in practice to be Type 1, though actually fits the Type 2 definition (Hornigren and Sorter, 1961).

(about known reserves). In general, a reasonable and workable approximation is that matching is achievable in the case of Type 1.

This application of matching is prevalent in IFRS, for example, with the (implicit) notion of cost recovery that justifies the (cost-based) recognition of inventory on the balance sheet (Barker, 2015). Moreover, while IAS 1 does not define either cost of goods sold or gross profit, and neither does it require the presentation of either amount by reporting entities, these metrics are of course widely reported in practice and highly consequential. The conceptual omission in IAS 1, which follows from the corresponding omission in the Framework, is that Type 1 represents an evidence-based matching process, involving balance sheet recognition of recoverable amount and corresponding expensing as and when revenue is recognised.³⁰ In line with revenue recognition, this mechanism is valuable to investors because it informs flow-based valuation, based upon the reporting of ‘resolved uncertainty’ through the entity’s recognition of earnings at the level of gross profit.

Type 2 – *ex ante* matching – refers to expenses that can be matched, *ex ante*, to periods of time. They cannot be matched directly to units of revenue, even though there remains an implicit presumption that they are nevertheless recoverable. The archetype here is a fixed overhead, such as rent, although the category generalises to all indirect overheads, such as selling and general administration costs, and also depreciation of tangible non-current assets and amortisation of certain intangible assets (an example would be the acquisition cost of a patent right with a known patent term). The defining feature of Type 2 is that the period over which expenses are incurred is known with a reasonable degree of certainty, such that expenses can be allocated to the periods of time in which they can be said to be incurred. While there is no direct matching with revenue, there is nevertheless a matching with reporting period.³¹ In some cases, such as depreciation, there remains an inevitable degree of arbitrariness about the specific time periods into which the overall costs of the underlying asset are allocated (see Thomas, 1975), yet there is nevertheless an estimable useful life, which makes possible an *ex ante* expense schedule, that is unlikely to be subject

³⁰ We note the logic of double-entry book-keeping does not imply balance sheet primacy (Basu and Waymire, 2010). Nor does the adoption of a balance sheet approach make the matching concept redundant.

³¹ The matching does not necessarily imply straight-line amortization, though an alternative that matches to varying revenues over periods would be appropriate only if that variation could be assessed *ex ante* with little uncertainty.

to significant *ex post* adjustment. The requirement to be evidence-based requires that the amortization scheme has largely worked (without significant *ex post* mismatching adjustments) in the past. From an investors' perspective, there is an allocation of cost that facilitates flow-based valuation, while there is also sufficient confidence that the amounts charged in any one period are not exposed to significant uncertainty. Broadly, this category corresponds to recurring items that are reported within operating profit, but outside gross profit.

Type 3 – *ex post* matching – refers to expenses (and also income) that can be matched to any given reporting period, yet where the matching can only be evidence-based *ex post*. The archetype here is gains or losses on mark-to-market financial instruments, where the defining feature is that year-end market prices (and hence reported gains or losses) can be known at the end of the reporting period but not at the beginning. These are items that exhibit outcome uncertainty but not realization uncertainty.³² In this context, it is instructive to note the absence in the Framework of a distinction between 'gains and losses' and other forms of 'income or expense', even though such a distinction in terminology is widely used in practice, including in IFRS itself. Such a distinction does not arise in a pure balance-sheet approach, because in that context it matters only whether there is a change in the carrying amount of (net) assets, and not whether the change was, in the language used here, either Type 2 or Type 3. Yet that distinction is of great importance to investors, because the former corresponds to a recurring expense, which is appropriately valued via a multiple in a flow-based valuation, while the latter corresponds to a valuation 'shock', to a one-off gain or loss that attracts a valuation multiple of one, and which corresponds to a direct adjustment to economic value (Barker, 2004). It is in this sense that Hicks (1946, p.179) argues that 'theoretical confusion between income *ex post* and *ex ante* corresponds to practical confusion between income and capital.' The balance sheet carrying amounts are in effect of different types, because an evidence-based *ex ante* amortisation schedule is possible for Type 2 but not for Type 3.

Types 2 and 3 are 'connected' through the possibility of asset impairments, whereby there are unexpected losses on assets for which an evidence-based amortization scheme had hitherto been confidently asserted. We propose that such impairment losses should be

³² The borderline case is Level 3 fair value.

classified as Type 3, because their informational properties are similar to items matched *ex post*.

Type 4 – mismatching – refers to expenses that cannot be matched, either *ex ante* or *ex post*. The archetype here is research expenditure (including purchased in-process R&D) where recoverability cannot be assumed to take place over a reliably estimable period of time, if at all. Similar examples include expenditure on brands, organisational know-how, and other such intangibles. The point here is that, because of underlying uncertainty – both fundamental and realization - concerning the recoverability of the outflow of economic resources, there is no basis on which an evidence-based amortization scheme could be established, either *ex ante* or *ex post*.³³ There is therefore little guarantee of avoiding subsequent mismatching that would significantly affect the income statement. Given the inevitability of mismatching, assets should not be recognised, because to do so would be to give ‘false’ reassurance with respect to uncertainty. There is instead information conveyed by the absence of recognition. All of the mismatching under this approach takes place in the reporting period in which the outflow of economic resources takes place. In other words, expenditure is immediately amortized, because of uncertainty about establishing conditions that satisfy Types 1, 2 or 3. It should be noted that, while matching fails here, the concept of matching remains useful, because it matters to investors to understand when matching has *not* been applied.³⁴

In applying these classifications, there is a unit of account issue to consider. One might make the determination of Types 2 and 3 on a pooled (portfolio) basis for a class of assets such that the average *ex post* matching error is small (as seems to be the case with plant and equipment historically). The ability to identify an asset component in an expenditure

³³ Note that the issue here is not one of the difficulty of measuring the expenditure on R&D but instead the uncertainty of outcome/recoverability. Our conclusion is in line with current accounting practice, but we note that neither IASB for FASB has substantially reviewed the accounting treatment of R&D since the introduction of their conceptual frameworks. Open questions in this context include: the analogue for R&D of full cost vs successful efforts; the nature of the ‘resource’ created by R&D spend; the extent to which the resource is ‘controlled’; and the whether the issue of measurement (including boundaries of what to measure) are insurmountable.

³⁴ Colin Clubb has suggested to us that these Type 4 expensed investments (on research, for example) might be capitalized back to the balance sheet if and when they generate revenues *ex post* (the research on a drug is successful), and then amortized against those revenues with a Type 2 matching. This matching would then report the amount of (net) earnings from the investment (in research). Effectively, the expensed investment expenditures are then in a conditional suspense account, to be reversed on a successful outcome. Issues of successful efforts versus full costing (of pooled successful and unsuccessful investments) arise.

(disentangled from an expense component where there is no future benefit expected) would also enter the recognition assessment. For example, assets can result from expenditures on salaries, bonuses, and retention allowance for employees, but these are difficult to identify. To restrain judgment, the “evidence-based” requirement means that an accepted amortization scheme must be consistent with evidence from the time-series and cross-sectional history that such a scheme does not typically result in substantial remeasurement. In this regard, the embraced amortization scheme that passes the threshold governs the gradual derecognition over time, subject to *ex post* write-downs (now minimized) if, based on new evidence, the threshold is no longer satisfied. The size of any derecognition gain or loss reports on the *ex post* validity of the *ex ante* recognition under uncertainty, and the history of such gains and losses then provides an input to evidence-based recognition under uncertainty.³⁵

In the remainder of this paper, we illustrate the application of the above typology, including evaluating its consequences for investor decision-making under uncertainty. We first consider implications for measurement.

6. Measurement

Types 1-4 are a discriminating, exhaustive categorisation for the purposes of recognition. However, the analysis is so far incomplete because consideration needs to be given not just to recognition but also to measurement.

³⁵ We see the approach applying to liabilities as well as assets, though we see it being applied more conservatively in the case of liabilities. The issue arises with excessive liabilities for restructuring charges which result in subsequent mismatching when those excessive charges are “bled back” to the income statement. This includes both credits that do not meet the definition of a liability and also changes in estimates, which happen all the time (warranties, asset retirement obligations). FASB Statement No. 146 applies criteria to restrict restructuring charges and the consequent mismatching. Uncertainty is the issue with which IAS 37 grapples; a “more likely than not” criterion is applied. In FASB Statement No. 5, the “probable” criterion for the recognition of the liability reduces the (probable) subsequent mismatching if there were non-recognition, as does the “remote” criterion where a likely subsequent gain is booked to the income statement if the liability is recognized. For pension accounting, a liability from a vested accumulated pension obligation (ABO) has different uncertainty around it than that the projected benefit obligation (PBO).

The Framework broadly proposes two measurement bases, historical cost and current value, with the latter being either current exit price (“fair value”) or value-in-use.³⁶ The Framework is rather vague, however, on which measurement attribute should be applied in which circumstance. We argue here that the conceptual basis for the selection of measurement attributes can be strengthened by applying the Types 1-4 categorisation outlined above.

Measurement under Certainty

As with recognition, we start with consideration of the benchmark certainty case. Here, assets and liabilities can be measured at their value-in-use with no uncertainty around that value: value is equal to the present value of the certain future cash flows, discounted at the certain risk-free rate. Price (fair value) and cost are always equal to this value if the item is traded in an efficient asset market with zero transaction costs; any other valuation would violate no-arbitrage (in this case, riskless no-arbitrage). There is no measurement issue: cost, fair value, and value-in-use coincide.³⁷ Further, the value of a portfolio of assets is equal to the sum of the (certain) values of each asset in the portfolio. As with recognition, therefore, so also with measurement: the accounting is simple in the case of certainty, with there being nothing to choose among measurement attributes.

Measurement under Uncertainty

In considering how uncertainty changes the position, we start with Type 1, which is characterised by an evidence-based matching process, involving balance sheet recognition of directly recoverable amounts and corresponding expensing as and when revenue is recognised. It follows that the appropriate measurement attribute is cost, because this enables the value-added to be reported on a matched basis, and to thereby be a foundation for flow-based valuation. In contrast, measurement at fair value would represent a mismatching, and hence a loss of value-relevant information, because of the disconnection in timing between marking to market and recognising revenue. In this regard, the rationale for historical cost is not just as a default, as a measurement attribute to be applied when fair

³⁶ While current input price is mentioned in paragraph 6.18, it does not get much traction in the Framework.

³⁷ Strictly, in the absence of complete markets, there may be goodwill (consumer surplus), making value-in-use higher than fair value.

value is difficult to determine.³⁸ Instead, the underlying insight is that historical cost differs from fair value because of the ability of firms to add value (Penman, 2007 and Nissim and Penman, 2008). But that added value is uncertain. As was discussed above, IFRS 15 rules out booking the added value for uncertain expected revenue, which in turn has two implications: first, value cannot be added to the cost of inventory because of uncertainty; second, when the uncertainty is resolved sufficiently for the revenue to be recognised, so too the accounting recognises the direct costs and, thereby, the margin that captures the economic distinction between the initial, uncertain cost of the investment in the inventory and the later, certain outcome when that investment in inventory is realised at fair value. In short, the accounting reveals the gains from uncertainties resolved during the reporting period.

Much the same argument can be made for Type 2. It was argued above that, because the period over which Type 2 expenses are incurred is known with a reasonable degree of certainty, flow-based valuation is enhanced by means of an approximate matching. Here again, the matching of revenue to *cost* is important, because it is the value added in the reporting period that underpins estimates of the same in future periods.

While Types 1 and 2 are similar, there are also important differences. With Type 1, there is uncertainty over whether the asset might be exchanged for an alternative asset (receivables or cash) with (most likely) a higher value, while Type 2 costs might more insightfully be viewed as sunk, rather than recoverable, and it is the evidence-based (hence, relatively certain) allocation of expenses that makes them 'belong' to the reporting period, whether or not revenue is also recognised in the same period.³⁹ While the Framework does not make a distinction between 'variable' and 'fixed' costs, this (consistent with Horngren and Sorter, 1961) is in substance the difference that separates Type 1 from Type 2.

A common feature of Types 1 and 2 is the sharp contrast with the certainty case, and the resulting emphasis on the income statement over the balance sheet in terms of the provision of value-relevant information. The balance sheet amounts of working capital are

³⁸ Note however that the argument extends to current value in the form of a replacement cost (i.e. an input value, rather than a fair (exit) value); replacement cost could be used in principle in place of historical cost, ideally (as in Edwards and Bell, 1961) with holding gains identified separately in order that value added might be more effectively measured.

³⁹ Although there remains, of course, unresolved uncertainty at the level of the cash-generating unit.

in themselves likely to comprise a relatively modest component of enterprise value, while in sharp contrast the corresponding income statement variables – revenue and cost of goods sold – are of central importance for the valuation of the entity. It is this income statement emphasis which makes cost the appropriate balance sheet measurement attribute.

The relative roles of the financial statements is reversed, however, in the case of Type 3, where the defining feature is low realization uncertainty, such that market prices (and hence reported gains or losses) can be known at any given point in time. Here, valuation can be grounded in the balance sheet and, in common with the general case under conditions of certainty, the income statement can be viewed as redundant. The case of stand-alone securities, such as shares and bonds, is particularly pertinent. In this case, asset pricing theory shows that the contribution of each asset to the uncertainty for the portfolio is defined. Indeed, an asset's value is defined in terms of its contribution to the risk of the portfolio, its beta. The value of a portfolio is always equal to the sum of the values of the component securities, and security betas are determinable and aggregate to the portfolio beta.⁴⁰

The final category, Type 4, is of course straightforward in that measurement issues are pre-empted by the absence of recognition and thereby do not arise. Importantly, however, while Type 4 is in itself straightforward, its accounting treatment is not inconsequential, because it indirectly affects consideration of measurement attributes for Types 1, 2 and 3. This point is fairly subtle, but in practice it is very important. It can be seen by taking value-in-use as the point-of departure between the cases of certainty (where measurement attributes are equivalent) and uncertainty (where measurement attributes diverge, and where in any practical application one must be chosen in preference to the others).

The challenge for value-in-use arises from the basic notion of business being to combine assets and liabilities (with other factors of production) under an entrepreneurial plan to create value for investors. Business value is thus determined by expected cash flows and the uncertainty around those expectations for the whole portfolio of (recognized and unrecognized) assets and liabilities. The portfolio property for the certainty case and Type 3 no longer holds: portfolio value cannot be determined by summing the values of individual

⁴⁰ Debt can be conceptualized similarly if separable from the operating net assets of the business.

assets and liabilities. In short, the notion of (entity-specific) value-in-use is misconceived for joint-use assets, as paragraph 6.45 in the Framework recognizes, and there is no accounting solution to the allocation problem when assets contribute jointly to portfolio value (Thomas, 1969). For example, if inventory is a recognized asset but the promotion asset (brand) is not, one cannot ascribe a value to the inventory if it is dependent on the uncertainty about the promotion campaign.

The alternative current value metric, fair (exit) value presents a potential solution if traded fair values represent the contribution of the recognized assets or liabilities to the joint value of assets and liabilities in the entity. Yet that is a very unlikely situation: different firms use assets for different purposes, combining them (often uniquely) in carrying out businesses under various degrees of uncertainty. For example, the current exit price for a warranty liability—the amount paid to transfer the liability under paragraph 6.21—is the amount charged by the acquirer to service the liability, but that may be different from the in-house cost to the entity with their expertise with their own products; the entity “adds value” (with less uncertainty) with a comparative advantage to service warranties on its own products that no outsider can replicate.⁴¹

The non-recognition of Type 4 assets therefore reinforces the case for the recognition of Types 1 and 2 at cost rather than value, because the presence of uncertainty renders the concept of an individual asset value problematic, while also making cost a useful informational input in understanding the resolution of uncertainty. This reasoning also suggests that the application of Type 3 should be restricted to separable assets with stand-alone value where those values sum to portfolio value, which are likely to be ‘non-operating’ for most businesses.

Moreover, Type 3 can be problematic in practice even when there are separable assets with stand-alone values. In finance theory, financial assets and liabilities are separable from operating business assets and liabilities under specific assumptions (Modigliani and Miller, 1958), and usually separable from each other. However, just as historical cost accounting

⁴¹ Again, traded securities with stand-alone value come to mind as an exception, but even there, value is different for the passive investor versus the active investor who holds the securities because the value is judged to be less than the current price. The latter is, of course, a business that attempts to add value to market prices.

requires income statement matching to be effective, fair values require balance sheet matching: fair valuing debt liabilities that yield a gain on deterioration of the debt price, for example, must be matched with a fair valuing of the assets whose value deterioration gives rise to the additional credit risk that re-values the debt. In short, the accounting for debt and operating assets is not separable. However, fair valuing assets that typically do not have stand-alone value in operations is not feasible.

This discussion of measurement, along with the earlier, associated, discussion of recognition, has immediate implications for the way in which income and expenses can be presented in an informationally useful way, with the underlying aim of helping investors to make decisions under conditions of uncertainty. The next section of the paper therefore outlines an illustrative format for the income statement.

7. Presentation of the Financial Statements

Our discussion on measurement concludes that, while a balance sheet approach is appropriate for recognition, the accountant typically cannot communicate value via the balance sheet. However, there is also an income statement, and the significant feature of the income statement is that the earnings from both recognized and unrecognized assets are reported, as are the earnings from employing them jointly (Penman, 2009). Accordingly, the income statement should be designed to highlight this number, but with attention to the inevitable mismatching under uncertainty that corrupts it. The Framework is conceptually predisposed to ignore these issues, because it does not explicitly take uncertainty into consideration.⁴²

We suggest the following divisions in the income statement. We do not address directly the issue of other comprehensive income (which raises unrelated issues of reclassification adjustments/recycling).⁴³

⁴² The absence of progress on the Financial Statement Presentation project is evidence of this conceptual blind spot, as is the Framework's neglect of definitions of income and expenses (Barker, 2010). See Penman (2016) for a financial statement design that imbeds some of the ideas in this paper.

⁴³ Note, however, that cash flow hedging utilises OCI in order to achieve matching. Our typology reduces the demand for an 'earnings' measure, because it categorises by information-usefulness.

Income Statement

Revenue	100	These are Type 1: revenues are reported as earned, and expenses are matched to revenues
Cost of Goods Sold	25	
Gross Profit	75	
Overheads	40	These are Type 2: expenses are matched to time periods
Underlying Profit	35	
Mismatched Expenses	10	These are Type 4: resource outflows expensed in the absence of either evidence-based amortisation or reasonable certainty of realization
Profit before Gains and Losses	25	
Gains and Losses	5	These are Type 3: gains and losses that are matched <i>ex post</i> to time periods, including impairment losses ⁴⁴
Profit before Interest and Tax	20	
Financing Expenses (Income)	8	(Amounts here represent the separation of financing from operating activities)
Profit before Tax	12	
Tax	3	
Profit/Loss	9	

With this presentation, there is a separation of profit and loss from recognized revenue and corresponding matching (Type 1), amounts that are matched to the reporting period either *ex ante* (Type 2) or *ex post* (Type 3), and amounts resulting from mismatching (Type 4). Broadly, Types 1 and 2 together form the basis for flow-based valuation, because they allocate with a reasonable degree of confidence income earned and expense incurred during the reporting period; they have the potential to forecast the net income from future, potentially realizable revenues. Type 3 is also (mostly) measured with confidence, but it carries a valuation multiple of one, as opposed to attracting an earnings multiple. These are the fair value gains and losses, and also impairment losses, which pertain only to the current period and (except for an expected return component) are zero in expectation.⁴⁵ The impairment losses inform about the success of the accountant's initial typing of

⁴⁴ Note that all Type 3 are remeasurements, mostly at fair value (or fair value less costs to sell), though they might also include write-downs to value-in-use.

⁴⁵ To the extent the fair value gains and losses concern financing net assets, they are reported with financing expenses (income) so that Profit before Interest and Tax is a number that refers to operations.

expenditures to minimize *ex post* mismatching, thereby informing *ex post* about the entity's capacity to report evidence-based Underlying Profit.

Type 4 includes uncertain investments expensed *ex ante*. These require more subjective judgement on the part of the investor, since they indicate greater uncertainty in investing, with valuation implications being relatively difficult to determine.⁴⁶ The separate categorisation of Type 4 signals that they are a different type of 'expense', while simultaneously avoiding contamination of amounts reported further up the income statement. Compared to current reporting, the division brings some clarity to the broad category of Selling, General and Administrative Expenses (SG&A) where many uncertain investment expenditures are expensed. SG&A is often a significant percentage of sales but includes mismatched elements that corrupt operating profit margins.⁴⁷

There is a particular situation where the total in Profit before Gains and Losses is not affected by the separate presentation of mismatched expenses. The cancelling error property of accounting says that, in steady state, earnings are unaffected by asset recognition or the amortization scheme applied to the recognized assets: for given revenues, R&D expense and earnings are the same under a policy of expensing R&D or capitalizing and amortising it, provided that there is no growth in R&D expenditures.⁴⁸ Accordingly, the accounting reduces earnings only in the case of growth in unrecognized investment (all else held constant). In this case, the separate categorisation of Type 4 communicates that, while the firm is reporting earnings from current revenues due to past investment, the firm is adding more risky investment that bears on the uncertainty about revenues in the future.

Beyond the income statement, the discussion in this paper also has implications for the presentation of the cash flow statement. In current practice, cash flows relating to recognized, non-current assets appear in the investing section of the statement, while cash

⁴⁶ Changes in estimates would also be included in this section. These are more likely for long-lived assets and liabilities where initial estimates are more uncertain. Changes in estimates for long lived items (for example, changes in actuarial assumptions for pension liabilities) could be recognized in this section but then amortized into matched expenses over a long period.

⁴⁷ There is, of course, subjectivity in the distinction made 'through the eyes of management' between Types 2 and 4, and the implicit assumption here is that suppressing that distinction is less informative than revealing it.

⁴⁸ The cancelling error property is formally stated as earnings are unaffected if the error from omission of net assets in the balance sheet is the same at the end of the earnings period as at the beginning.

flows relating to unrecognized assets appear in the cash flow from operations section. Thus, the investing section is not cash incurred on investments, but rather cash incurred on investments that the accountant has chosen to recognize. Cash flow from operations (CFO) is therefore a misnomer—it includes investments in unrecognized assets such as brand building and research. CFO is in fact an accrual measure, reflecting the accountant’s recognition decision for assets.

These considerations suggest the following presentation: report CFO as the cash flow from the Underlying Profit section of the income statement above—the net cash from trading with customers—with the investment section involving the cash flow from all investments, both those recognized in the balance sheet and those recognized in the mismatching section of the income statement.⁴⁹ A weaker prescription would dispense with the distinction between CFO and investing cash flows altogether. The cash flow statement would then have just two sections, cash from all operating activities (including investment) and cash from financing activities. The former is free cash flow, a familiar measure to investors.

Properties of the Financial Statements

In summary, we lay out the features of the financial statements under the design proposed here. We judge these features by how they meet the two-part objective of the Framework, concerning, first, decision-relevance and, second, stewardship.

The decision-relevance objective is to provide useful information to investors about “the amount, timing, and uncertainty of future net cash flows.” To the extent that current revenues are an indication of future revenues, the matching section of the income statement provides a basis for estimating the amount of future earnings and resultant cash flows from customers. To the extent that revenues are expected to be different in the future, the expense matching produces a profit margin which, applied to those revenues, again communicates an estimate of future earnings and cash flows. The investor can, of course, then add any information (outside the financial statements) that indicates that sales and/or profit margins will be different in the future. Importantly, however, this section of the income statement has no accounting feature for which the investor has to adjust in

⁴⁹ Components of the gains and losses section could in turn be either operating, investing or financing, depending upon the function of the underlying activity.

forecasting future earnings and cash flows.⁵⁰ In short, the Gross Profit and Underlying Profit sections of the income statement provide a sound anchor for forecasting, adding meaning to the Framework's concept of 'predictive value'.

To complement this information, the non-recognition of particularly risky investments and their identification in the mismatching section of the income statement reports on the *uncertainty* of future revenue, earnings, and cash flow forecasts. That provides information for evaluating the risk of investing in the firm.⁵¹ The income in the matching section is from realized sales, so the ratio of the income in that section to the expenses arising from unrecognized assets reported in the mismatching section conveys the extent of the uncertainty: a low ratio indicates that not much income is being realized relative to the risky investment being made. Of the total expenses reported within Profit before Gains and Losses, a relatively large amount of Mismatched Expenses indicates a relatively significant (risky) investment in the prospect of future earnings and, all else equal, a relatively high reinvestment of the earned amounts that have been reliably matched.

The reporting of fair-value gains and losses in a separate section of the income statement not only ensures that the net income flows in the other sections are not corrupted by value changes, but also informs that, to the extent the income is unrealized, the corresponding value of assets in the balance sheet is at risk of not being realized. Hence, the role of the recognized amounts is to help investors verify (or challenge) a valuation that is already given, as opposed to estimating (via extrapolation of Underlying Profit) an uncertain valuation that is by design excluded from the financial statements. As Gains and Losses also includes *ex post* write-downs, it informs on how reliably Underlying Profit is being measured; for example, an impairment of PPE informs that the evidence-based *ex ante* matching was in the event more uncertain than had previously been assumed by

⁵⁰ There is no pretense that matched and mismatched expenses can be identified perfectly. There will be grey areas (as in most accounting)—for example, elements of employee wages and bonuses that are paid to encourage (uncertain) retention. But it must be that an analyst cannot readily identify a misclassification to make an explicit adjustment.

⁵¹ Penman and Zhang (2016a) connect conservative accounting (similar to that proposed here) to the required return for investing (the cost of capital) in an asset pricing framework. Penman and Zhang (2016b) shows empirically that this accounting provides information about uncertainty (risk) of outcomes, and that risk is priced with higher average stock returns.

management and communicated to investors.⁵² This adds meaning to the Framework's concept of 'confirmatory value'.

As for the balance sheet, it contains only operating assets and liabilities that have significant probability of yielding cash flows.⁵³ The investor sees inventory and non-current assets, for example and concludes: this is a firm that can produce revenues. That contrasts with a start-up with no inventory or non-current assets but large research expenditures in the income statement. The balance sheet contains no element that has a significant probability of reversing and therefore of surprising the investor later because the asset did not exist *ex ante*; there is no "water in the balance sheet" that is likely to evaporate later. Consequently, in forecasting future revenues, earnings, and cash flows from the income statement, that investor does not have to anticipate that those earnings will be shocked by value in the balance sheet that fails to be realized.⁵⁴ The balance sheet is also one that creditors can lend against.

As to measurement, the limited use of current value accounting also means that the balance sheet is less risky. In fair valuing, the accounting recognizes unrealized value, so erosion of balance sheet value can hit the investor later as the value added to historical cost is not realized. That is *ex post* risk revelation.

The proposed accounting implies that equity price will typically be greater than book value. Net assets will be missing from the balance sheet. But these so-called intangible assets are those around which there is considerable uncertainty which the accountant is communicating.

As for the revised cash flow statement, it now provides a cash flow measure that reports the cash flow from trading with customers, uncorrupted by investment in uncertain assets and liabilities. That is relevant to both the debt investor and the equity investor.

⁵² See also Prakash and Sinha (2013).

⁵³ This may seem unduly narrow, as it is possible that an item (such as a derivative financial instrument) might have a low probability of a large payoff, and therefore an economic value that 'ought' to be captured on the balance sheet. In this case, however, the probability of payoff is likely to be low in the sense that the outcome is unlikely, yet high in the sense that the derivative will trade (or can be priced) at a value which can be realized and so, via the market, has a high probability of yielding cash flows.

⁵⁴ Note that the balance sheet enters valuation in two ways: indirectly via the matching process that seeks to measure earnings power (Types 1 and 2), and directly to the extent that Type 3 matching corresponds to balance sheet amounts with a valuation multiple of one.

The accounting and its presentation resonates with the residual income valuation model that values equity based on accrual accounting rather than cash flows. That valuation starts with the balance sheet and adds the present value of forecasted (residual) earnings to the balance sheet. As above, the income statement facilitates the forecasting of the earnings to add to book value. While the forecasted earnings are discounted for risk in the valuation—they are risky—the balance sheet is not. That must then be a relatively low-risk balance sheet that does not have to be discounted for the probability that it can come back and hit the investor later.

Investors are concerned not only with fundamental uncertainty, however, but also with asymmetric uncertainty. In this regard, we have not yet made a distinction between the informational needs of managers and of investors, as the decision-relevant information discussed so far applies to them both. This distinction is implied, however, by the second part of the Framework's objective, which is to provide useful information to investors about "management's stewardship of the entity's resources." In practice, this is not only an issue of the asymmetry of information between management (agents) and investors (principals), but also of a difference in economic incentives relating to that information. In turn, and as will now be argued, this also concerns the 'hazard concept' of risk, being an asymmetric concern for the risk of loss (Sunder, 2015), with implications for historical cost accounting and for the application of prudence (conservatism) in IFRS.⁵⁵

If earnings is used as a performance measure, revenue recognition under IFRS 15 requires the management to consummate sales in order to be rewarded. Plans, prospects, and promises are not enough; the manager must see the plan through to realization to be rewarded; uncertainty must be resolved and, after matching expenses, profitably so. As sales are realized on the resolution of uncertainty, that locates the issue of managing under uncertainty with the manager. Similarly, with the non-recognition of assets above threshold uncertainty, the management is not likely be rewarded on earnings that later will be erased with a write-down of assets of uncertain value (after the manager leaves). The scenario of a

⁵⁵ Barker and McGeachin (2015) document a number of illustrations in the Framework and actual IFRS standards where uncertainty impinges on asset recognition and measurement.

manager being rewarded on earnings, then leaving, to be followed by “big-bath” write-downs by a new manager is mitigated.⁵⁶

Indeed, earnings are penalized by non-recognized assets, informing investors that the manager’s reward might be delayed because he or she has now imposed an added risky gamble on investors.⁵⁷ One might argue that this might provide a disincentive for managers to make risky investments. But the risky investment is transparent in the mismatching section of the income statement. And it does not corrupt the earnings in the matching section. A successful manager will deliver strong earnings in this section because there is no amortization from risky investments already expensed. When income from realized sales in the matching section is low relative to the unrecognized and uncertain investments in the mismatching section, the manager has yet to perform in realizing income from uncertain investing; a Board can reward him or her accordingly.

The proposed income statement format enables investors to better make these distinctions, in comparison with the existing (IAS 1) format, in which the categories identified in this paper are mostly conflated. For example, application of our proposed classification leads to gains or losses arising from conditional conservatism being reported as Type 3, symmetric gains or losses from fair value also as Type 3, and early loss recognition from unconditional conservatism as Type 4. There is no explicit conservatism in either Type 1 or Type 2.⁵⁸

It is arguable that the Framework’s blind spot with respect to agency, and the implications of agency under conditions of uncertainty, leads it to a particular form of ‘framing’ that either sidelines or rejects not just matching but also the related concepts of stewardship and prudence, and to a degree also historical cost accounting. Basu and Waymire (2006 and 2010) argue that there is a common element in these concepts, which is that (as argued by them) they are firmly-established in accounting practice, the products of a long evolution. Yet they are also not conceptually supported in the Framework. Two explanations are possible for

⁵⁶ Note that this example presumes a corporate governance/stewardship role for accounting, rather than simply being concerned only with representing the ‘economics’ of the entity in its financial statements.

⁵⁷ Much of the principal-agent literature in accounting and economics deals with incentives for agents (managers) for making investment decisions under uncertainty and with how agents share that risk with the principal.

⁵⁸ Although historical cost measurement can be viewed as implicitly conservative (Barker and McGeachin, 2015), while the delay in recognizing expected revenues that is implicit in the Framework definition of an asset amounts to a prescription for (conservative) accounting whereby book value is typically less than price (Barker, 2015).

this incongruence between practice and ‘theory’. The first is that practice lacks conceptual foundation, and that its rejection in the Framework results from a normative approach that is more rigorous and conceptually superior. The second is that the conceptual position asserted in the Framework arises from an insufficiently positive approach, one that fails to understand the conceptual foundations that are implicit in practice, and that the Framework has a role to extract and to formalise this practice (Hirshleifer and Teoh, 2009; Basu, 2015). The argument in the paper is that the second of these two explanations is the stronger, and that not only does the Framework fail to adequately capture the role of stewardship, matching, prudence and historical cost, given its blind spot with respect to uncertainty and agency, but that, in so doing, it creates an avoidable and insubstantive conflict between a ‘brave new world’ of a (conceptually grounded) balance-sheet approach and an anachronistic, conventional (conceptually flawed) traditional focus on the income statement.

8. Summary Statement

While there are several issues raised in this paper, the essence of them can be summarised briefly. The balance-sheet approach in the Framework is a good starting point for evaluating issues of recognition and measurement. However, taking into consideration the implications of uncertainty, the balance-sheet approach cannot be executed satisfactorily if the income statement is implicitly treated simply as a by-product. As the Framework recognizes, the income statement and the balance sheet are structurally linked, so consideration of the income statement is important in implementing the balance sheet approach.

The rejection of an income statement approach defined by matching (and the downplaying of matching in paragraph 5.8 of the Framework) is understandable, for perfect matching is only feasible under certainty. Under uncertainty, mismatching is inevitable, yet an informative income statement should convey a measure of value added (profit) from sales—“earnings power” it once was called—and that requires some form of matching. A balance sheet approach for recognizing assets and liabilities under uncertainty resolves this tension

for it provides a way to minimize the mismatching and convey information about the uncertainty.

The balance sheet approach is thus implemented with respect to the consequences in the income statement. The labels, “balance-sheet approach” and “income statement approach” are in some sense distracting, but one might call our approach a mixed balance sheet and income statement approach. Or an approach that focuses on the income statement, but with the implementation of matching (under uncertainty) done from the balance sheet. From this perspective the sharp division between a balance sheet approach and income statement approach, which has become such a controversial issue, now becomes a more comprehensive conceptual approach in which there are complementary roles for both of these primary financial statements.

While this paper endorses the balance sheet approach in the Framework as a starting point for Recognition and Measurement, it is implicitly critical of the suppression of “prudence” in the Framework. The proposed approach for recognition under uncertainty resonates with these characteristics: the resultant balance sheet is a prudent, conservative one. The income statement activates on the resolution of uncertainty. Effectively, the approach says the uncertainty requires prudence in the execution of the accounting.

Appendix: Case Studies on Recognition under Historical Cost Measurement

Amazon.com, Inc. reported a loss for the third quarter of 2013, as it had done for the full year, 2012. The losses continued into 2014 on rising sales. The losses were attributed to “spending on technology and content, such as video streaming and grocery delivery to mobile devices” and the firm’s “willingness to win customers by losing money.” Stated differently, the losses were not due to profits from current sales, but to the expensing of these investments with uncertain outcomes. While high expectations were built into the share price, the accounting conveyed uncertainty: The added revenues from these investments have yet to be realized.⁵⁹ In the totality of things, the accounting informs that, yes, there is income from current sales, but the amount of new risky investment is high relative to that income, and the current price is subject to erosion if the risky investments do not pay off. (Unfortunately, analysts have trouble under the current reporting to disentangle these risky investment expenses from expenses supporting current sales.)

Twitter, Inc. went to IPO in November 2013, closing on its first trading day priced at 26 times estimated 2014 sales, a price imbedding significant earnings expectations. The firm was reporting losses due largely to the expensing of R&D, advertising and promotion that amounted to 80 percent of revenue. These expenditures were investments to generate revenue growth, but there was uncertainty about whether the expected revenues and earnings would be realized. While the market built high sales expectations into the IPO price, the accounting that expensed the investments informed about the uncertainty around these expectations. The ratio of income recognized from current sales to these risky investments is low.

Mature, pharmaceutical companies typically report high margins on sales and a fairly constant R&D to sales over time. They are firms where the R&D investment in the past continues to pay off, successful firms in (roughly) steady state with respect to their R&D investments. The ratio of income in the proposed matching section to that in the mismatching section is high. In contrast, start-up biotech firms report losses, largely due to

⁵⁹ See press reports in *The Wall Street Journal*, October 25, 2013, p. B3 and *Financial Times* of the same date, p. 13. *The Wall Street Journal* also reported (p. C1) a study by Morgan Stanley that 89 percent of a present value calculation on Amazon related to cash flow forecasted for years after 2020, that is, on growth expectations in the long term.

the expensing of R&D but with few revenues yet to be realized. The expensing of R&D on low revenues reports that the firm's investments are risky; the R&D investment is yet to payoff.

The Coca-Cola Company is a successful company where the investment in brand building has paid off. It has high sales and operating income from sales (before promotion expenses) relative to the promotion expenses that generate future sales. According it is low risk: It has a beta of 0.4.

References

- American Accounting Association Financial Accounting Standards Committee. 2011. Accounting for revenues: A framework for standard setting. *Accounting Horizons* 25 (3): 577-592.
- Barker, R. 2004. Reporting financial performance. *Accounting Horizons* 18 (2): 157-172.
- Barker, R. 2015. Conservatism, prudence and the IASB's conceptual framework. *Accounting and Business Research*
- Barker, R., and A. McGeachin. 2015. An analysis of concepts and evidence on the question of whether IFRS should be conservative. *Abacus* 51 (2): 169-207.
- Basu, S., and G. Waymire. 2006. Recordkeeping and human evolution. *Accounting Horizons* 20 (3): 201-229.
- Basu, S., and G. Waymire. 2010. Sprouse's what-you-may-call-its: Fundamental insight or monumental mistake? *Accounting Historians Journal* 37 (1): 121-148.
- Beaver, W., and J. Demski. 1979. The nature of income measurement. *The Accounting Review* 54 (1): 38 -46.
- Bierman, H. 2009. The missing concept. *The CPA Journal* 74 (4): 22–27.
- Black F. 1980. The magic in earnings: Economic earnings versus accounting earnings. *Financial Analysts Journal* 36 (6): 19-24.
- Bromwich, M., R. Macve, and S. Sunder. 2010. Hicksian income in the conceptual framework. *Abacus* 46 (3): 348–376.
- Cade, N., K. Ikuta-Mendoza, and L. Koonce. 2016. Assets and liabilities: When do they exist? Unpublished paper, University of Washington and University of Texas at Austin.
- Dichev, I. 2007. *On the balance sheet-based model for financial reporting*. Occasional Paper, Center for Excellence in Accounting and Security Analysis, Columbia Business School.
- Edwards, P. and E. Bell. 1961. *The theory and measurement of business income*. Berkeley, CA: University of California Press.
- Edwards, P., E. Bell, and T. Johnson. 1979. Accounting for economic events. Scholars Book Co.
- FASB. 1985. *Statement of financial accounting concepts 6*. Norwalk, CT: FASB.
- Hicks, J. 1946. *Value and capital: An inquiry into some fundamental principles of economic theory*. Oxford: Clarendon Press.
- Hirshleifer, D., and S.H. Teoh. 2009. The psychological attraction approach to accounting and disclosure policy. *Contemporary Accounting Research* 26 (4): 1067-90.

- Hornngren, C., and G. Sorter. 1961. Direct costing for external reporting. *The Accounting Review* 36 (1): 84–93.
- Hylton, D. 1965. On matching revenue with expense. *The Accounting Review* 40 (4): 824-828.
- IASB. 2010. *Framework for the preparation and presentation of financial statements*. London: IASB.
- IASB. 2015. *Conceptual framework for financial reporting*. London: IASB.
- Ijiri, Y. 1975. *Theory of accounting measurement*. Sarasota, FL: American Accounting Association.
- Knight, F. 1921. *Risk, uncertainty and profit*. Boston: Houghton Mifflin.
- Miller, M., and F. Modigliani. 1958. The Cost of Capital, Corporation Finance and the Theory of Investment. *American Economic Review* 48: 261-297.
- Nissim, D., and S. Penman. 2008. *Principles for the application of fair Value accounting*. White Paper No. 2, Center for Excellence in Accounting and Security Analysis, Columbia Business School.
- Paton, W., and A. Littleton. 1940. *An introduction to corporate accounting standards*. Evanston, IL: American Accounting Association.
- O'Brien, P. 2009. Changing the concepts to justify the standards. *Accounting Perspectives* 8 (4): 263-275.
- Ohlson, J. 1995. Earnings, book values and dividends in security valuation. *Contemporary Accounting Research* 11 (2): 661-687.
- Peasnell, K. 1982. Some formal connections between economic values and yields and accounting numbers. *Journal of Business Finance & Accounting* 9 (3): 361–381.
- Penman, S. 2007. *Financial statement analysis and security valuation*. New York: McGraw-Hill.
- Penman, S. 2009. Accounting for intangible assets: There is also an income statement. *Abacus* 45 (3): 359-371.
- Penman, S. 2016. Valuation: Accounting for risk and the expected return. *Abacus* 52 (1): 106-130.
- Penman, S. 2016. *The Design of Financial Statements*. Occasional Paper, Center for Excellence in Accounting and Security Analysis, Columbia Business School.
- Penman, S., and X. Zhang. 2016a. Conservative accounting, earnings, and expected stock returns. Unpublished paper, Columbia University and University of California, Berkeley.
- Penman, S., and X. Zhang. 2016b. Connecting book rate of return to risk: The information conveyed by conservative accounting. Unpublished paper, Columbia University and

University of California, Berkeley.

Prakash, R. and N. Sinha. 2013. Deferred revenues and the matching of revenues and expenses. *Contemporary Accounting Research* 30 (2): 517-548.

Saito, S., and Y. Fukui. 2016. Convergent evolution in accounting conceptual framework: Barker and Penman (2016) and ASBJ (2006). Unpublished paper University of Tokyo and Aoyama Gakuin University.

Solomons, D. 1961. Economic and accounting concepts of income. *Accounting Review* 36 (3): 374–383.

Sprouse, R. 1966. Accounting for what-you-may-call-its. *Journal of Accountancy* 122 (4): 45-53.

Storey, R. and S. Storey. 1998. *FASB special report, the framework of financial accounting concepts and standards*. Norwalk, CT: FASB.

Sunder, S. 2015. Risk in accounting. *Abacus* 51 (4): 536-548.

Thaler, R. 1985. Mental accounting and consumer choice. *Marketing Science* 4 (3): 199-214.

Thomas, A. 1969. *The allocation problem in financial accounting theory*. Sarasota, FL: American Accounting Association.

Thomas, A. 1975. *Accounting for depreciable assets*. Accounting Research Monograph, No. 1, AICPA, New York.

Zimmerman, A., and R. Bloom. 2016. The matching principle revisited. *Accounting Historians Journal* 43 (1): 79-119.