'DEPRIVAL VALUE' VS 'FAIR VALUE' MEASUREMENT FOR CONTRACT LIABILITIES IN RESOLVING THE 'REVENUE RECOGNITION' CONUNDRUM: TOWARDS A GENERAL SOLUTION

Joanne Horton,[1] Richard Macve[2] and George Serafeim[3]

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Contact address:

Prof. R. H. Macve, FCA, Hon FIA

Department of Accounting

LSE, London WC2A 2AE, UK

Tel: *+44 (0)20 7955 6138*

Fax: *+44 (0)20 7955 7420*
e-mail: R.Macve@lse.ac.uk

[1] Professor of Accounting, University of Exeter
[2] Professor of Accounting, London School of Economics
[3] Assistant Professor, Unit of Accounting & Management, Harvard Business School

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ABSTRACT

Revenue recognition and measurement principles can conflict with liability recognition and measurement principles. We explore here under different market conditions when the two measurement approaches coincide and when they conflict. We show that where entities expect to earn ‘super-profits’ (residual income) the conceptual conflict is exacerbated by the adoption of ‘fair value’ (FV) as the measurement basis for assets and liabilities rather than the more theoretically grounded approach of ‘deprival value/relief value’ (DV/RV) which better reflects the impact of, and rational management response to, varying market conditions. However, while the balance-sheet liability and the revenue recognition problems, and the related problems of income statement presentation, can be resolved by the application of DV/RV reasoning, this is not sufficient fully to resolve issues of the appropriate timing of profit recognition. Performance measurement issues still need to be addressed directly. The standard setters’ current ‘revenue recognition’, ‘insurance contracts’, and ‘measurement’ projects therefore need broadening to consider the pervasive issue of accounting for internally-generated intangibles.

[162 words]

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I. INTRODUCTION

In June 2010 FASB and IASB issued a joint Exposure Draft (ED) on revenue recognition (FASB/IASB, 2010). The Boards had previously stated (FASB/IASB, 2005, p.9) that they 'have found their definitions of liability insufficiently helpful in distinguishing revenues from liabilities (for example, when payment for products or services is received in advance)'. After many conceptual twists and turns—with the Boards sometimes adopting different approaches from each other—the joint Discussion Paper (FASB/IASB, 2008) debated whether performance obligations under contracts should be measured at fair value (FV). The Boards stated (at para. 5.20) that they were 'uncomfortable' with the potential implication of fair-valuing contract assets and liabilities at inception in that it could lead to recognition of 'Day 1' revenue and profit 'before the entity transfers to the customer any of the goods and services that are promised in the contract'.

While the measurement of FV has been extensively discussed in several voluminous publications (most recently in IASB 2011), 'discomfort' is not a concept that has been discussed in either of the Boards' Conceptual Frameworks (CF), or in their current joint CF revision project (e.g. Bromwich *et al*. 2010; Macve, 2010b). Under the 2010 ED it is proposed that the initial measurement of the performance obligation should normally be at the transaction price, with revenue (and thereby related profit) recognized when the promised goods or services are transferred to the customer. FV has been abandoned here.[4]

A major industry where the issues have been very fully explored by IASB and FASB is insurance. In another series of voluminous papers (see Horton *et al.*, 2007;

[4] A comparison of FASB/IASB proposals on Revenue Recognition, Insurance Contracts and Fair Value Measurement is available from the authors on request. See also Barker and McGeachin, 2010.

Macve, 2011) the two Boards have veered first one way and then the other between applying the FV approach to insurance liabilities[5] (where a profit on inception could often result) and proposing that they should normally be initially stated, as in much current practice, by reference to the amount charged for new contracts (with the profit emerging thereafter over the life of the contract). The Boards both favour the latter approach, as proposed in the IASB's July 2010 Exposure Draft (IASB, 2010a), but still differ over the 'building blocks' that make up the total liability amount and how they should subsequently be accounted for. However, the traditional income statement presentation of 'premiums less claims and other costs' is generally to be replaced by an analysis of the margins being earned and of variations in assumptions (FASB, 2010).

The Boards' discussions of FV (e.g. Foster & Upton, 2001; FASB, 2006; IASB 2011) have only added to the confusion. While FV is defined by both Boards as an 'exit price' they also recognize a 'cost approach' as a 'valuation technique' to arrive at FV for assets that are used in the business. Here, exit price becomes 'replacement cost' (RC) because '[i]n effect, the market participant buyer steps into the shoes of the entity that holds those specialised assets' (IASB, 2009: BC61). 'Given the "economic principle of substitution", fair value cannot exceed current replacement cost for the asset's services' (BC 63). So replacement cost will continue to be used for in-use tangible assets, except presumably where an 'income approach' (i.e. using discounted cash flows) provides a lower value for the recoverable amount (BC62).

Here the Boards seem to be groping towards an element of the 'deprival value' (DV) reasoning that we shall argue for here, but without wishing to abandon the claimed 'objectivity' of FV by conceding that in certain situations the value is indeed

[5] Labelled 'Current Exit Value' in the IASB's 2007 Discussion Paper (see Horton *et al.*, 2007).

the owner's own 'entity-specific' estimation of its value.[6] Here they are beginning (albeit without identification of their sources) to pick up elements of the standard microeconomic analysis of price formation in competitive, fully-informed markets (e.g. Katz and Rosen, 1998), and so have to make heroic assumptions about how information asymmetries or gaps between the entity and the hypothetical prospective 'market participant' buyers of its assets are to be overcome in practice (cf. Akerlof 1970). All this conceptual twisting and turning could have been avoided if the Boards had openly adopted the principle underlying DV—which provides a much clearer conceptual foundation for measurement but which they continue to dismiss (Macve, 2010a).

The Boards' more recent approach to FV of assets also raises the question of how far it may in turn be consistent with the 'relief value' (RV) approach to liability measurement that we shall analyse here. While the Boards acknowledge (e.g. IASB 2011: 41(b)) that in certain circumstances the FV of a performance liability might reflect the consideration received for entering into a contract, they have not so far generalized this approach sufficiently to have been able to adopt FV for either their Revenue Recognition or their Insurance Contracts projects, leaving inconsistency in the timing of revenue and profit recognition.

While no one measurement basis can be shown to dominate for all users and all decision uses (e.g. Dean *et al.* 2010),[7] our paper seeks to provide a conceptual rationale for preferring the DV/RV approach over FV for financial accounting, which is also more consistent with current conventions for revenue and profit measurement and for income statement presentation. Section II first sets out our main argument in

[6] The 'economic principle of substitution' was of course the original insight underlying the DV approach to valuation in imperfect markets (e.g. Baxter, 1971).
[7] All valuation measures are subject to the 'aggregation' problem (e.g. Edey, 1974), requiring a choice of what standard setters refer to as 'the unit of account' (e.g. FASB/IASB, 2005).

favour of RV for liabilities, which adopts the DV logic for assets, *mutatis mutandis*, and therefore corresponds to finding the amount by which an entity would be better off if it were relieved of the liability. We maintain that this argument is of *general application* to all kinds of business contracts. To illustrate this we take a simple one-year magazine subscription. In Appendix A we discuss how these same principles can be applied to insurance contracts.

In the subsequent section (Section III) we illustrate this argument under two key market situations.[8] We then briefly introduce the issue of changes in prices and other assumptions in section IV. Section V explores briefly how DV/RV reasoning may relate better to desirable income properties. Section VI concludes.

We aim to show the generality of the theoretical proposition that, given the familiar Hicksian (1946) 'No. I' conceptualisation that 'economic wealth' at the beginning of an accounting period equals the present value of expected future net cash flows (PV), and 'income' equals change in wealth during that period,[9] DV/RV reasoning *always measures* (under common market assumptions and consistent with a business objective to maximise wealth) *the difference in that PV between having and not having an asset/liability*. While DV is relevant to managerial and regulatory decisions (e.g. Byatt in Weetman, 2007; Macve, 2010a), FV by contrast generally fails the tests of relevance and reliability for a measure of business performance (e.g. Penman, 2007; 2011). Its focus solely on exit price at the measurement date may be

[8] Extension to insurance contracts is introduced in Appendix A; and extension to interest effects in Appendix B. Further supporting analysis is available from the authors on request.
[9] We consider alternative definitions of economic income in section V below.

purely hypothetical, as immediate disposal is often not the best option, and it ignores transaction costs, which must be relevant to value and to decision making.[10]

Supplementary disclosure of FV may be argued to have value in providing information on a business's financial flexibility. Nevertheless even here 'net realisable value' (NRV), which allows for transaction costs to be incurred on disposal, would reflect this aspect better (e.g. Edwards and Bell, 1961; Chambers, 1974) and could provide more useful supplementary disclosure for investors (cf. Horton *et al*., 2007)

We shall show that the revenue recognition problems for identified contracts (and the problems of income statement presentation) can be resolved by the application of DV/RV reasoning. However, major conceptual difficulties still require resolution, in particular over deciding how to treat situations where entities expect to earn 'super-profits', i.e. profits that cannot be regarded as factor costs in the way that 'interest' and 'reward for risk bearing' may. Moreover, in cases where companies may have invested in building up the necessary internal intangibles that enable them to achieve apparent super-profits thereafter, current GAAP accounting for those intangibles is unable properly to match investment and return. Performance measurement issues therefore still need to be addressed directly. The standard setters' current 'revenue recognition' and 'insurance contracts' projects need broadening to consider the pervasive issue of accounting for intangibles, and more generally the inadequacy of their current model that identifies 'comprehensive income' solely in terms of changes in recognized assets and liabilities (IASB 2010b, paras. 4.25; 4.47; 4.49).

[10] Van Zijl and Whittington (2006), in attempting to provide a reconciliation between FV and DV, rightly argue that in order to be consistent with rational decision-taking current value must include the impact of related transactions costs.

II. THE ARGUMENT

We contrast here liability measurement under the concepts of RV and FV. While FV is defined by FASB/IASB as an exit price, RV is an economic way of thinking which only under restricted conditions is equal to FV. Specifically RV corresponds to the benefit an entity would enjoy if the liability disappeared. Unlike FV, which is one of a number of possible *measurement bases*, DV/RV provides a *decision rule* for choosing the relevant measurement basis for a given economic situation.

Defining PV as 'the present value of future cash inflows/outflows from continuing with the asset/liability' (often called 'value in use'), it is well known that, at an elementary level, DV for assets can be calculated as follows (e.g. Baxter, 1975, chapter 12).

$$DV = \text{Min}\,[RC;\ \text{Max}\,(PV;\ NRV)] \qquad (1a)$$

or DV is equal to the lower of RC and 'recoverable amount' (i.e. the higher of NRV and PV).

Substituting 'replacement loan/advance' (RL) for RC, and 'net transfer value' (NTV)—i.e. the payment needed to transfer the obligation to a third party—for NRV, then correspondingly,

$$RV = \text{Max}\,[RL;\ \text{Min}\,(PV;\ NTV)] \qquad (1b)$$

or RV is equal to the higher of 'replacement liability' and what might be labelled 'obligation satisfaction' (i.e. the lower of PV of amounts to settle the liability directly in due course and NTV).

Clearly, unless prices are extremely volatile, or a serious commercial mistake has been made, DV/RV at initial recognition will normally be equal to its 'historical cost/amount' (HC).

It is also obvious from the algorithm above that, provided markets exist, DV is always constrained between current (gross) replacement price and current (net) exit price, and only utilises 'value in use' (PV) where neither replacement nor disposal would currently be contemplated as economically rational. In frictionless markets, the difference between entry and exit price will be small so that effectively DV here converges to just 'market price', and therefore also equals FV.[11]

The same result holds for RV. However, Baxter (2003, pp.19-20) withdrew his earlier (1975) support for RV as representing the 'mirror' image of DV, on two main grounds. The first was that for financial liabilities (such as a company's debentures) it was difficult clearly to envisage what the concept of 'replacement loan' implied without imposing a lot more structure on the model (including available investment opportunities, possible capital rationing, etc.). We do not pursue that issue here (Baxter's argument here is supported by Kulkarni, 1980; cf. Horton and Macve, 2000);[12] but we shall here set out how RV for performance liabilities corresponds well to DV for assets.

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[11] Baxter, 2003, p.3, argued for caution against the intuitive sense that the advantage conferred by an asset is usually the higher of NRV or PV from future use (i.e. 'recoverable amount'). 'Our more familiar approach to value conjures up visions of benefits that would follow the acquisition of an extra asset. The deprival principle tells us to look instead at the disbenefits following the loss of an existing asset'. Hence where RC is lower than recoverable amount, DV is RC. It may be objected that, if PV > RC (or NRV > RC), the rational firm will surely have acquired every available asset and so there may not be a replacement asset ready to be acquired (or more generally, having equated marginal cost and marginal revenue, the last asset to be acquired must have PV = RC so on deprival either PV or RC gives the DV). However the widespread existence of long-lived assets for which PV > RC indicates the prevalence of market imperfections such that firms generally have not been able to exhaust all opportunities for investment in assets earning more than RC (i.e. with positive NPVs or yielding 'abnormal earnings'), with the consequence that valuing them at FV will show an immediate gain of the kind that Nobes (2003) argues for. (Where replacement is indeed impossible, RC is effectively ∞ and then DV is correspondingly recoverable amount.) We shall argue that similar market situations prevail *mutatis mutandis* for performance obligations such that RV is RL and not 'obligation satisfaction'.

[12] We also note that for corresponding financial assets, such as receivables, the DV is generally simply the (risk-discounted present value of) the amount due. The applicability of DV reasoning for traded financial instruments is analysed further in Macve and Jackson (1991).

Baxter's second objection to RV was that liability values do not in fact mirror the pattern of assets' values over their life. He says (2003, p.16) that an 'asset's value pattern starts with replacement cost, then can have a tail of falling use-values, and ends with net realisable value. This duly includes the three values of the [DV] diagram.' But (after considering different possible situations faced by a firm) he concludes that 'a liability's relief pattern can hardly ever contain figures comparable to an asset's three possible values….Its value remains firmly at repayment cost, and is not a mirror image of an asset's value.'

But his argument here is incorrect: a long-lived asset's DV does ***not*** during its life progress from RC through PV to NRV. As long as PV remains high enough it stays at RC (albeit 'depreciated' RC as it ages) until it is time to dispose of it, when any remaining NRV (which may be zero if there is no final scrap value) will now be at least as large as both PV and (depreciated) RC. [13] So Baxter's description here of how asset values behave is incorrect, and therefore his resulting objection to RV here is incorrectly based. As we shall argue, in the absence of price changes, the RV of a profitable performance obligation falls during its life from the initial consideration (= RL at that time) through 'amortized' RL until the last payment is made (normally the final instalment of PV but sometimes NTV if that can be arranged more cheaply). It therefore completely mirrors a profitable use-asset's DV pattern. In both cases, deprival/relief brings the need/opportunity to replace earlier than the originally planned date of expiry.

[13] This correct pattern is consistent with the graphical illustration on p.35 of Baxter (1971) and is fully illustrated in Fig. 13.7 on p. 165 of Baxter (1975). The Appendix to Baxter (2003) on 'Depreciating Assets' does set out the value pattern correctly, albeit in a more simplified way targeted at practitioner readers.

As neither of his objections applies to performance obligations (which Baxter (2003) does not explore) we shall now set out to do that here.[14] But first a warning: although it is effective in getting the message across that normally RC gives an upper bound on asset value (even though the asset is expected to yield a higher PV or NRV) because of the normal market opportunity to replace (what IASB, 2009 labels 'the economic principle of substitution'), there can be serious dangers in over-reliance on this simple pedagogical formulation and on the 'decision trees' and 'ranking tables' frequently derived from it (e.g. Van Zijl & Whittington, 2006; Weetman, 2007; cf. Macve, 2007). For example, for depreciating assets over the subsequent course of their useful life, Baxter's *Depreciation* (1971, pp. 34-6) showed that RC generally needs interpreting, not as the current second-hand market purchase price, but as 'the adverse consequence of deprival on the present value of all future cash flows, given that the asset now has to be replaced earlier than planned'.

As we shall show, similar complexities arise with performance liabilities when the contract period extends beyond the end of the accounting period, so that there has been part-performance to date. These situations do require management estimates of optimal actions so, like PV, the resulting DV/RV might be criticised as 'too subjective' for financial reporting. However, as markets get deeper, RC and NRV for assets become ever more readily observable and then, as Baxter demonstrated, *DV must always be bounded by these market prices* so the only subjectivity lies in fixing where on the spectrum in between them (and including them) DV lies. RV for liabilities represents the same case. So DV (and equivalently RV) tends towards FV in

[14] Kulkarni (1980) does not consider 'performance obligations'. Baxter (2003, p. 14), with reference to a very early version of our current paper, says: 'If the balance sheet includes deferred revenue (as where a magazine publisher gets subscriptions in advance), measurement must probably be a crude compromise as the issues are complex'. He does not give any further analysis and this has motivated our paper to analyse these 'complex issues' and to argue that for these kinds of liability the RV 'mirror' does apply.

'perfect markets' but copes much more adequately and simply than FV does with typical real-world market imperfections, where buying and selling prices differ and there are transaction costs or other frictions. Here FV fails appropriately to measure the impact of the asset/liability on the net present value of all future cash flows in the way that DV/RV correctly does (subject to the aggregation problem common to all valuation approaches below the level of the whole firm).

The particular focus of this paper is on the relationship between liability measurement and revenue recognition. We therefore next explore the accounting for the liability on an uncompleted contract's 'revenue in advance of costs'. This focus is readily illustrated by a simple example like accounting for prepaid magazine subscriptions but is obviously generally applicable to a spectrum of common business activities (including insurance, see Appendix A). We rely on a general model, making the minimum number of assumptions necessary, to highlight that the problem of accounting for incomplete performance is generic rather than industry-specific, and to show how there is no essential conflict between the 'release of liability' and the traditional 'revenue earned / performance based' approaches to revenue recognition and related profit recognition. Specifically, the only necessary assumptions beyond reasonably functioning markets are the nature of competition in the industry, and a contract where (at least some of) the consideration is receivable in advance of performance.[15] The analysis will hold whether markets are in long-run equilibrium or only in short-run equilibrium, or indeed in disequilibrium (the consequences of any resulting volatility in prices or in other economic assumptions are considered in section IV).

[15]This situation has the attraction of being the mirror-image of the more commonly discussed accounting problems (e.g. for inventories or plant and equipment) where cost outlays occur first and revenues flow in later.

The paper builds on many of the ideas in Lennard (2002) and counters the views of Nobes (2003). While Nobes argues for exit valuation of liabilities (and corresponding recognition of profit on inception of contracts), Lennard's essay seeks to justify a RV measurement basis as against IASB's/FASB's dominant focus on FV or proxies for it. The difference in emphasis is that our paper aims to provide a more strictly 'value measurement' argument, derived from analysing alternative market conditions, about why the 'deferred revenue' is the relevant RV of a liability (i.e. the answer to the general question: 'What difference would it make—to the PV of future cash flows—if the contract liability were "removed"?'). In contrast, Lennard's paper (e.g. para.25(ii); para.34) appears to rely more, as the FASB/IASB projects do, on arguments as to 'when does the performance occur?'. In a nutshell, we argue that, just as Baxter showed that the value (DV) of a profitably employed asset is that it saves the business having to make the outlay to replace it before the best time, so correspondingly the burden (RV) of a liability to perform on a profitable contract is that it prevents the business getting the inflow from signing up a replacement contract until the current customer is satisfied.[16]

We advance three main arguments. The first conclusion of our paper (consistent with Lennard's) is that the asset/liability and deferral/matching approaches can be reconciled via DV/RV and thereby avoid forcing unconventional revenue and profit recognition patterns. In this respect it is consistent with the Boards' latest proposals for both the revenue recognition and the insurance projects.

However, a more significant, second, conclusion is that adopting DV/RV is not sufficient to resolve all the conceptual issues relating to profit recognition patterns:

[16] See again fn. 9 above. It may seem to make intuitive sense to say that the burden imposed by a liability is usually the lower of transfer value or settlement in due course (i.e. 'obligation satisfaction') but (mirroring assets *mutatis mutandis*) we need instead to focus on what opportunity relief from the current obligation will provide.

those issues still need addressing directly and are primarily related to the recognition and measurement of intangibles, both purchased and internally-generated.

Thirdly, the model in this paper also illustrates that it appears unnecessary, when adopting a 'value-based' approach to liabilities, wholly to abandon traditional styles of income statement presentation. Retaining the traditional forms should better assist users in trying to understand how far the results of the current period 'true up' against previous assumptions (e.g. Penman, 2007).

In illustration of our general theoretical argument we explore in the next section a simple example of how some possible situations would be accounted for and presented in the financial statements under our approach. These will be summarised in Table I, which gives a simple numerical illustration. Appendix B extends the argument to the case of positive interest rates, for greater generalisability, with Table BI giving the algebraic illustrations.[17]

III. THE SETTING

Our aim is to demonstrate how far the application of RV rather than FV reasoning in the measurement of contract liabilities can help to resolve the apparent conflict between 'asset/liability' approaches and 'deferral/matching' approaches. In order to bring out the basic issue we focus initially on the special case where the interest rate is zero per cent (i.e. we *exclude* interest effects as in Forfar & Masters, 1999). This will enable us to illustrate our three main arguments and show the relationship to ordinary accounting conventions more clearly. Interest effects are considered in Appendix B and Table BI, where they are shown not to alter the main conclusions.

[17] Further, more complex, examples showing how the basic approach is readily adapted to a wider range of possible situations are available from the authors on request.

Our setting has the following simple assumptions. The Revrec Corporation receives payment in advance of performance on 1 July. In the simplest case one could think of Revrec as a magazine publisher collecting an annual subscription for 12 monthly issues of a magazine. Its year end is 31 December.[18] Costs over the contract are expected to be £y, for simplicity assumed to be incurred evenly with production and distribution (i.e. £$\frac{y}{12}$ per month) and such that marginal costs equal average costs. Ignoring risk, under perfectly competitive equilibrium conditions, Revrec will only be able to charge £y and profit will be zero, consistent with the predictions of micro-economics that in long-run equilibrium only factor costs are covered in fully competitive markets (e.g. Katz and Rosen, 1998). So if the total costs and revenues for the year are both £114 (= £9.50 per month), traditional revenue recognition conventions, given £114 due up-front, would allocate £57 to the half-year to 31 December, leaving unearned revenue at that date at £57, just sufficient to cover the second-half year costs. £57 is also the RV as in perfect markets it represents both the amount by which the PV of future cash flows would improve if Revrec were now able to abandon this contract and issue a replacement contract six-months earlier than previously planned (i.e. overall gaining six months additional revenue but facing the same costs) and the amount that competition would ensure had to be offered either to refund the customer on cancellation, or to pay another publisher to take over the reminder of the contract. In such perfect markets, with no transaction costs, it will

[18] In our simple illustration we have assumed that the contract lasts a year and is initiated 6 months before the end of the accounting period. Our results clearly generalise regardless of whatever point of time during the accounting period the contract is initiated at. Moreover, if there are seasonal factors affecting the business, the allocations of revenue and costs to sub-periods can easily be adjusted from simple time allocation to reflect these as appropriate, as suggested in the Insurance Contracts exposure draft (IASB, 2010a). Contracts of more than one year's duration would be handled by extension in essentially the same way (see further Appendix A).

also represent FV. The corresponding illustrative numbers are presented as conventional accounts in Solution 1 in Table I.[19]

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Insert Table I about here
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However, Revrec also needs to cover risk, assumed to require an additional risk premium of £RP per contract-year.[20] Therefore, the certainty equivalent will be the sum of performance costs and risk bearing.

$$CE = y + RP \tag{2}$$

and the certainty equivalent of expected performance costs is £$\frac{CE}{12}$ per month).[21]

We examine what is Revrec's revenue and profit if all expectations are realised and if it charges either:

(i) £CE for a year's subscription (i.e. £$\frac{CE}{12}$ per monthly issue) or

(ii) £CF (i.e. £$(\frac{CE}{12}+\frac{\xi}{12})$ per monthly issue), where ξ is the 'abnormal profit' or super-profit earned due, for example, to imperfectly competitive conditions, so that:

$$CF = CE + \xi = y + RP + \xi \tag{3}$$

With our illustrative numbers, and assuming that the risk premium is £0.50 per month, so that factor costs now total £120 p.a., and that super-profit for the whole contract is

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[19] In order to be able to handle positive interest rates consistently (see further Appendix B), whatever the accounting conventions adopted, we assume that in all cases Revrec distributes half the total profit on the contract by the end of the first accounting period, i.e. 31 December, and the remainder during the following period by the end of the contract on the subsequent 30 June.

[20] For simplicity we assume here that there is no risk of Revrec's insolvency (cf. Horton & Macve, 2000; and Horton *et al*., 2007). We also do not discuss here whether the 'risk premium' should reflect the whole of the company's risk or only its 'systematic' risk (cf. IASB's DSOP (2001) chapter 5): IASB 2010a proposes to limit recognition of diversification effects to similar classes of insurance contracts.

[21] Without loss of generality we assume for illustration that the risk pattern is even throughout the period: alternative patterns could be accommodated where appropriate, as suggested in IASB, 2010a.

£12, the corresponding accounts are given as Solution 2 and Solution 3 in Table I. Under (i) the total contract revenue is £120 and under (ii) £132.

For example, one could think of our market setting in (ii) in terms of the outcomes analysed in cooperative game theory (e.g. Green *et al*. 1995), where the firm's bargaining power is going to determine the division of value. If the firm is able to raise the willingness-to-pay of customers or lower the opportunity costs of its suppliers and as a result appropriate more value compared to competitors, it will obtain super-profits, at least in the short term.[22] As we next analyze, it is the presence of firms which exhibit asymmetry to their competitors and are able to capture higher value, that cause conflicts between the 'asset/liability' and the 'revenue recognition' accounting approaches when exit values such as FV are adopted.

(i) *Solution when Revrec charges £CE*

Solution 2, in Table I, first illustrates the key economic situation of 'perfectly competitive markets': as Revrec is charging no more than what is needed to cover all costs including required 'normal economic profit' (i.e. interest and risk), so accounting profit is £RP= (CE – y) in total if expectations are realised (i.e. interest [£0] and reward for risk bearing [£RP]). *Pro rata* 'revenue earned' and 'profit earned' to 31 December are $£\frac{CE}{2}$ and $£\frac{RP}{2}$ respectively. In this case the balance sheet liability at 31 December is unambiguously $£\frac{CE}{2}$, representing, in competitive markets, both the consideration that would be charged for the six-months' remaining magazines and the amount it will cost to perform the remaining half of the contract

[22] Cooperative game theory is ideal for our purposes since it allows the business situation to remain unstructured, imposing no formal structure on the interactions between companies, thereby reinforcing the generalisability of our results.

(including the cost of risk-bearing). It is also the amount a customer would expect to be reimbursed if the contract is cancelled at that point ('cost of release'). Again, in competitive markets, with no transaction costs, RV = RL = PV = NTV (and = FV). With our illustrative numbers, revenue and profit for the first six months are £60 and £3 respectively (where the accounting profit represents the earning of the risk premium), and the liability at 31 December is £60 on all measurement approaches.

The presence of transaction costs would alter the picture and potentially drive a wedge between RL and NTV, normally making the former lower and the latter higher (just as they can between RC and NRV for assets, normally making the former higher and the latter lower). This does not alter our result: clearly PV for liabilities must now also be sufficiently lower (higher for assets) or firms will not take on the obligation (investment) and, provided PV is still sufficiently low (high for assets), RV would still be RL (just as DV is still RC) but now FV (which ignores transaction costs) is too low (and too high for assets, as argued by Van Zijl and Whittington, 2006).

(ii) *Solution when Revrec charges £CF*

In Solution 3 in Table I, Revrec is charging £$\frac{\xi}{12}$ per issue/month more than what is needed to cover all costs including 'normal economic profit' (i.e. interest and risk). So accounting profit is £(TP) in total if expectations are realised (i.e. interest [£0] plus reward for risk bearing [£RP] plus super-profit [£ξ]); *pro rata* 'revenue earned' and 'profit earned' to 31 December would conventionally be £($\frac{CF}{2}$) and £($\frac{TP}{2}$) respectively.

$$TP = RP + \xi \tag{4}$$

With our illustrative numbers, revenue and profit on this basis for the first six months are £66 and £9 respectively (where the accounting profit represents the

earning of the sum of the risk premium and the super-profit). The corresponding liability on the contract at 31 December would be shown as £66 (equal to the unearned revenue). But should it be only £60 (with additional profit of £6 recognized in the first six-months) as argued by Nobes (2003)?

In this case ('less than perfectly competitive markets') the balance sheet liability at 31 December is potentially one of the following:

(a) £($\frac{CF}{2}$), representing the consideration that could be charged for the remaining six-months magazines/insurance—in our illustration, £66.

(b) £{$\frac{CE}{2}$ = ($\frac{y}{2}$ + $\frac{RP}{2}$)}, being the amount it will cost to perform the remaining half of the contract (including the cost of risk-bearing)—in our illustration, £60.

(c) £($\frac{CF}{2}$) would also appear to be the amount a customer would expect to be reimbursed if the contract is cancelled at that point ('cost of release')—in our illustration, £66.

Clearly Revrec would plan to perform rather than cancel the contract, as this is the more profitable alternative. Consistent with Lennard's (2002) RV approach, (c) does not therefore seem to be a relevant amount on a 'going concern' basis.[23] If (a) is adopted (equivalent to the 'deferred revenue' on a conventional 'matching' approach), revenue and profit for the first 6 months are the conventional £{$\frac{CF}{2}$ = ($\frac{CE}{2}$ + $\frac{\xi}{2}$)} and

[23] If (c) is greater than (a) or (b) and is payable even where cancellation is at the customer's option there is a positive probability that the option will be exercised against the company, and here it may indeed be the most relevant value. However, the business is not sustainable as a going concern on this basis (i.e. if customers all act 'rationally'). Alternatively if contracts allow the company, at its option, to exit by paying less than CE/2 it would be rational to take this opportunity and this would represent RV—but again this is not a sustainable business model as customers collectively would be irrational to enter such contracts. (Further analysis of 'unusual' situations is available from the authors—e.g. Macve, 2007). Related issues about policyholder options have been discussed within FASB/IASB's insurance project in the context of a 'deposit floor' (FASB, 2010).

£($\frac{RP}{2}+\frac{\xi}{2}$) respectively—with the same to come in the second six months. The corresponding accounting is set out in Table I, Solution 3(a).

However, (b) would appear to be the FV of the liability as defined by FASB/IASB, and is the relevant value according to Nobes (2003).[24] Under FV accounting, profit for the first 6 months would therefore rise to £($\frac{RP}{2}+\xi$) {i.e. interest [£0] plus reward for risk bearing [£$\frac{RP}{2}$] plus all of the 'NPV' of the super-profit [£ξ]}—with just £$\frac{RP}{2}$ normal profit to come in the second six months. In Solution 3(b) in our illustration, this gives £15 as the profit in the first six-months with just £3 normal profit to come in the second six months

Contract revenue could still be stated at £{$\frac{CF}{2}=(\frac{CE}{2}+\frac{\xi}{2})$} for each six months (in our illustration £66): but only if the value of the anticipated further excess revenue (i.e. £ $\frac{\xi}{2}$) (in our illustration £6) is also recognized in the first six months and is then 'recycled'/'reclassified' out again in the second six months in a manner similar to revaluations of 'available for sale' securities which may be recycled/reclassified to profit and loss on realisation (IASB 2007a).

Lennard's (2002) RV is £($\frac{CF}{2}$) = £66, i.e. the higher of consideration [£($\frac{CF}{2}$) = 66] and the lower of {remaining performance cost [£($\frac{y}{2}+\frac{RP}{2}$) = 60] and cost of release [£$\frac{CF}{2}=(\frac{y}{2}+\frac{RP}{2}+\frac{\xi}{2})$ = 66]}. Under what circumstances is it realistic to

[24] As FV excludes transaction costs (b) should be sufficient to compensate another entity for taking over the contract and fulfilling it.

regard this rather than £($\frac{CE}{2}$) = £60 as the liability at 31 December? The key argument here is that one has to ask 'what are the market circumstances that can give rise to this situation?'. If one presumes that Revrec is behaving rationally and optimally, it will have already taken on as many such contracts as can be handled while adding to profits—but no more (i.e. it will have as far as possible equated marginal cost and marginal revenue). Reasons not to take on an additional contract might include adverse consequences of having to lower the price and/or rising costs (whether operating, financing or organisational) of further expansion, perhaps due to indivisibilities such as the need to incur major investment which would require finding outlets for substantial, rather than simply marginal, production volume increases; or it may face regulatory constraints, e.g. on size of market share.[25]

So the crucial insight here (which mirrors Baxter's (2003) argument for DV of assets), is that, *if Revrec is now at its optimal capacity but it still has 'super-profitable' contracts, then if 'relieved' of one of those current contracts immediately after inception Revrec would seek to use the production capacity now freed up to obtain and fulfil another 'replacement' subscription, for which it could again charge £(CF)*. In other words it would end up in the same position as before, still facing production outlays and risk with an expected cost of £(y + RP), but would now have received a further £CF = £(y + RP + ξ) from the 'replacement' subscriber. Again the equivalent amounts at 31 December would be £(y + RP)/2 and £($\frac{CF}{2}$) respectively (here £60 and £66).

[25] E.g. in the case of insurance companies there may be prudential regulatory constraints inhibiting volume expansion through further price cutting. While the precise conditions would need fuller analysis in each case, it is sufficient here to recognize that this will be a common situation.

The entry value ('consideration') rather than FV may therefore be taken as the relevant liability measure for a profitable contract, however profitable that contract may be. In our illustration, this approach gives revenue and profit in each six months as £66 and £9 respectively, with the 31 December balance sheet liability as £66. (Table I, Solution 3 dv(a) shows the accounts for these income statement and balance sheet amounts.) So if Revrec uses RV as the measure of its liability (as 'relief' would enable the signing of a substitute profitable contract), this valuation will be equivalent to conventional deferred revenue throughout and so would lead to balance sheet and income statement figures generally identical to those under the conventional 'revenue recognition/matching' approach, even though we are here adopting primarily an 'asset/liability' framework. RV offers a resolution of the revenue recognition conundrum and is consistent with the Boards' being uncomfortable with adoption of FV's 'exit price' and its forcing of recognition of 'Day 1' profit.

Recognition of inherent goodwill?

Even with this higher liability value given by RV [i.e. £($\frac{CF}{2}$)], Revrec could however still *choose* to report all the profit on inception of the contract if it were allowed to value the relevant 'inherent goodwill', as in Solution 3dv(b) in Table I. Corresponding to Solution 3(b), here the accounting, if it is to follow conventional practice as to the amount of contract revenue recognized and *in addition* take a 'Day 1' profit equal to the NPV of the super-profit, would then also have to require 'amortization' of this initial profit measure as revenues are earned and costs incurred (to avoid double-counting), but clearly this would still not necessitate a wholesale recasting of the income statement from a 'traditional' basis onto a 'changes in valuation' basis of the kind proposed by IASB (2010a) for the generality of insurance contracts.

In our illustration in Table 1, Solution 3dv (b), this approach gives revenue in the first six months as £66, with an additional recognition of net internal goodwill of £6 (effectively adding to profit the present value of the second six months' goodwill) to give a bottom-line profit of £15 then; and revenue in the second six-months again of £66, with additional recognition of the amortization of the remaining goodwill (£6) to leave net profit for that period equal only to the 'normal' profit of £3, representing release from risk. The 31 December balance sheet liability is stated at RV of £66, but there is also the unamortized balance of goodwill among the assets (£6).

Situations where recognition of this internal goodwill might be more readily accepted in practice would be where there is strong market evidence that the profit estimate on the contract is realistic: e.g. where other companies would be prepared to pay an acquisition cost of up to £ξ to take over Revrec's contract (or pay for 'goodwill' of £ξ to take over the company instead) and thereby still earn a 'normal' profit on the business after charging for that acquisition cost/goodwill. Revrec could thereby realise the £ξ immediately on inception of the contract. If it does not wish to actually transfer its business in this way, it could nevertheless 'mark to market' and report the value gain accordingly, which would then have to be recycled as a charge against the subsequent conventional reporting of revenues and profits earned.

In the absence of a market for Revrec's contract, or an actual takeover, it will remain that much harder to estimate the goodwill value in the existing contract as a guide to how much up-front profit on inception it is legitimate to recognize. A result from adopting an 'asset/liability' approach that produces an apparently large profit on inception would therefore need to be carefully tested by asking what market conditions make it reasonable to believe that an enterprise such as Revrec is able to successfully charge premium prices that significantly exceed factor cost, and yield a

return over and above that required by equity shareholders to compensate simply for time and risk-bearing. An extremely safe, conservative view for accounting and auditing purposes might be simply to assume that such situations cannot arise (or at least cannot be sustained for long in a competitive economy) and therefore to argue that costs and/or the risk premium must have been underestimated, and the provisions for one or more of these should be increased until all initial profit is eliminated, so that all profit has to 'emerge' over the life of the contract.

The FASB/IASB's (2010) joint approach to revenue recognition from contracts with customers—like the FASB's (2010) and IASB's (2010a) approach to what IASB label the 'residual margin' in insurance contracts—reflects this caution, and refuses to allow recognition of 'Day 1' profits. But the problem of determining what is a suitable pattern *within* the contract period will still remain. If the initial, more 'aggressive' estimates do turn out to be correct, higher profits will eventually emerge by the end of the contract period than those assumed in fixing the accounting provisions. But when should they be recognized i.e. how much profit can be recognized by 31 December?

What is happening during the contract period is that the value of the super-profit, which is conventionally an unrecognized intangible, is being realized. Should it be recognized that imperfectly competitive conditions are present when the contract is initiated or only 'gradually' as it is proved that actual costs are indeed less than revenues?[26] Can that be adequately proved before the contract is wholly completed?[27]

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[26] Note that an equivalent economic situation arises if Revrec believes its competitive advantage lies, not in being able to charge premium prices for its 'masthead/brand', but in being able to undercut competitors on cost efficiencies.

[27] While the completion date of Revrec's contract may be clear, where there are ongoing obligations (e.g. product warranties or, as in the case of insurance contracts, delays between occurrence and settlement of claims) the enterprise may remain 'on risk' well beyond the initial contract period and the

Furthermore, can the 'risk premium' itself be adequately measured: or is the uncertainty in the estimates so great that 'certainty equivalents' are themselves little more than guesses and all resulting profits (or losses) may better be seen as 'a reward for bearing uncertainty' due to the dynamic nature of a modern economy in which technological change, shifting demand, and management action produce markets that are at best in temporary and unstable equilibria (e.g. Knight, 1921)? This is where FASB (2010) differs from IASB (2010a), as it does not separately recognize the risk premium in an insurance contract but lumps it within an overall 'composite margin'—see Appendix A.

Without some form of reliable external market benchmark any choice of profit recognition pattern is an 'incorrigible allocation' (i.e. logically as good as any other, e.g. Thomas, 1977; Macve, 1997) and wholly conceptual arguments about the nature of assets and liabilities, and about recognition and measurement criteria, seem unlikely to take the debate any further forward. A revision to the standard setters' conceptual framework may acknowledge the problem, but seems unlikely to be able to solve it. It would appear that evidence of how relevant markets are behaving is what is needed to guide accounting in different individual reporting situations—the deeper and more mature the market, the stronger the available evidence and the less need to rely on management estimates or on judgements as to whether or not accounting policies adopted are reasonable given the uncertainties involved.[28]

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risk-bearing element of profit (if that can be separately identified) may only emerge during that run-off period**.**

[28] This approach is consistent with the Boards' approach (e.g. IASB, 2011) in categorizing FV measurements at different 'levels' related to the availability of market evidence on prices. The paradox here for accounting standard setters is that it is only when values are not already readily obtainable from other reliable market sources that the accounting process may be seen to add incremental information content (e.g. Beaver 1998; Beaver & Demski 1979; Macve, 2010b).

Our initial conclusion therefore stands—that the conventional amount for 'deferred revenue' can represent the RV of a contract's performance liability and that DV/RV reasoning offers a resolution of the conflict between the 'revenue recognition' and 'asset/liability' approaches to stating balance sheet measures and income statement elements. However, unfortunately it is also clear that this resolution of the balance sheet measurement problem is not sufficient in itself to resolve the issues over 'bottom line' profit recognition. Such recognition is a separate issue and essentially requires deciding whether or not to recognize internal goodwill (whether or not identified with particular intangibles such as brands) and thereby the profitability of contracts ahead of their actual full or partial fulfilment (or indeed before their inception).[29] Standard setters clearly need not only to devote attention to clarifying and refining their valuation concepts but also to move beyond regarding asset/liability valuation alone as an adequate tool for resolving accounting conflicts (e.g. FASB 2006: cf. Barth and Landsman 1995; Horton and Macve 2000; Dean *et al*. 2010).

[29] Under certainty all future NPVs on the entity's anticipated business will logically be assigned to the opening accounts for the first period of its activities (Shwayder, 1967). Under uncertainty choice is needed of some 'critical event' that signals sufficient certainty of profit realization (e.g. Johnson, 1970; IASB 2010b, para. 4.48). In current UK life insurance company valuation practice, where the critical event is regarded by the industry as the sale of the policy, the corresponding distinction is between the 'embedded value' (of the existing book of contracts in force, which is accounted for) and the 'appraisal value' (which allows for the expected profitability of future contracts, which is not accounted for but is typically extrapolated from the reported figure for 'profit on new business' (e.g. Horton *et al*., 2007)).

The internal rate of return

For both revenue recognition generally and insurance contracts in particular, FASB and IASB propose to eliminate the recognition of any profit at inception (see Appendix A). One way to do this would be to adjust the estimate of the required rate of return to the 'internal rate of return' ('IRR') or 'effective interest rate' [= r] and thereby eliminate the NPV of the contract. Profit will then emerge as the earning of the IRR on the initial consideration value.

In our simple example with a super-profit of ξ (= £12), and where the market rate of interest is assumed to be zero, the rate of return required on the customer's initial deposit that equates it to the future costs/risk releases to be incurred by Revrec is clearly *negative* [r < 0] (as it only requires Revrec to pay a total of £y (= £114) to supply the customer with magazines, against an initial purchase price received of £CF (= £132), i.e. the sum of the future cash outflows is less than the initial price received).[30] This is much cheaper than borrowing £CF at the market rate of interest (even when that rate is 0%), which would require repayment here (with interest at i = 0% per month) by 12 instalments of £($\frac{CF}{12}$) (= £11) totalling £(CE + ξ) (= £120 + 12 =132). As Revrec thereby gains £(CF - y), which yields the total profit of £(RP + ξ) (= £6 + 12 =18) over the contract's life, it effectively here *earns* interest on borrowing from its customers (it is borrowing at a *negative* interest rate of r % per month) as well as earning interest from investing the customer's advance at i% per month (here =

[30] Where there are no super-profits, i.e. the NPV is zero, the IRR (r) equals the interest rate (i). With super-profits, when i >0 (using variables as defined in Tables I and BI), the rate at which Revrec is borrowing remains negative as it still only requires Revrec to pay a total of £y to supply the customer with magazines, against an initial purchase price received of £$PV_{CF12,i}$ = {$\frac{CF}{12}$ x $\alpha_{12,i}$}. The super-profit that emerges when i > 0 will then be the sum of interest earned (at i) on the assets acquired from the consideration received together with the 'unwind of the discount' on the liability (at r) as shown in Appendix B, Table BI Solution 4.

£0), and thereby earns an overall positive IRR. The profit split by this method as the liability decreases (i.e. when we are assuming that i = 0%) would be £[- $IntEV_{CE,1\text{-}6,r}$ + $\frac{RP}{2}$] to the first 6 months to 31 December and £[- $IntEV_{CE,7\text{-}12,r}$ + $\frac{RP}{2}$] to the second 6 months.[31] This is more conservative than the FV 'asset/liability' method as no 'profit on inception' is recognized. But it is less conservative than the conventional 'deferred revenue' method as here more overall return is earned in the first six months, while the balance of the outstanding customer liability at 31 December is smaller.[32] In our numerical example with super-profit of £12, when the interest rate = 0%, the resulting IRR (r) on the liability is -1.458% per month (approximately -16% per annum). At this rate, revenue for the first six months is £66 (as before) and profit is £11.86, with the remaining liability at 31 December at £63.14. The remaining profit of £6.14 correspondingly emerges in the second six months, as shown in solution 4 in Table I.

However, the objection to using the IRR is that it is no more than a 'fix' to avoid any recognition of profit on inception. In addition it produces balance sheet amounts at 31 December that are hard to understand. The 'liability' balance at this date (calculated using the IRR) will be $£EV_{CE6,r}$, being neither the 'deferred revenue' of $£PV_{CF6,i}$ (which we have argued to be the RV), nor the risk-adjusted liability for future costs of $£PV_{CE6,i}$.[33] It therefore produces figures that cannot be interpreted

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[31] As r is negative, to find r with the pattern in our example here (i.e. that starts with the initial inflow) requires equating the 'end' (or terminal) values (EV in the Tables). [- $IntEV_{CE,1\text{-}6,r}$] is then a positive amount of income. Where i > 0, the income also includes interest on the initial consideration received, i.e. [$IntPV_{CF,1\text{-}6,i}$].

[32] The amounts of asset and liability in the beginning are both equal to $£PV_{CF12,i}$. The liability initially also equals $£EV_{CE12,r}$: thereafter asset and liability amounts diverge, with the liability only equal to $£EV_{CEn,r}$ (where *n* is the number of remaining months in the contract). See Tables I and BI for definition of the other variables.

[33] Indeed, given that Revrec starts with no net assets, it may be hard to explain how it earns 'a rate of return'. Moreover, in the general case, where companies also hold productive assets and inventories, or have incurred costs in advance of the contract, use of the IRR produces values for these (at accounting

either in the way that current GAAP figures can, or in any way that 'conceptual framework' measurement of liabilities might be understood (see also Draper *et al*. 1993). Its main advantage is that the showing of an earned rate of return consistently higher than the cost of capital is a widely understood way of indicating that super-profits are being made. But it is just one of many possible ways of spreading the total expected contract income between the two accounting periods and is not demonstrably superior on any conceptual grounds.[34]

IV. CHANGING PRICES AND OTHER ASSUMPTION CHANGES

Like IASB (2005), which only deals with measurement at initial recognition, we do not analyse fully here the effect of changing prices. However, we note that the ASB's discussion paper on *Revenue Recognition* suggested that often an appropriate technique when 'dealing with incomplete contractual performance is to assess the value of benefit that has not yet accrued to a customer' (ASB 2001, para. 3.22), which is consistent with the FASB/IASB (2010) proposals. However, inconsistently with RV reasoning, it argues that: 'Once again, when making this assessment, it is important that it is based on prices and circumstances that would have prevailed at the time the contract was originally formed; otherwise, *changed prices may distort the allocation of overall revenue from the contract*' (para. 3.23—emphasis added).

If at the year-end conditions have changed, such that Revrec can now charge more for its services, while costs have not changed, then the conventional 'historical cost'

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dates after initial recognition) which simply represent present values of future cash flows discounted at r and so do not represent DVs and are inconsistent with any available market values (Baxter 1975). Insurance companies have argued for continuing the current convention to account for their contract acquisition costs as an asset—'deferred acquisition costs' (DAC). Our analysis supports this insofar as the DAC may represent DV at initial recognition (as 'deprival' would require spending the same amount again). But spreading on the basis of IRR over the contract life would destroy this relationship of balance sheet amounts to DV at subsequent accounting dates.

[34] A similar objection applies to other proposed 'economic' allocation methods such as 'Earned Economic Income' (Peasnell, 1995a; 1995b: cf. Grinyer, 2000).

revenue recognition approach will still show the originally expected amounts. But RV will rise because avoidance of the current obligation would allow entry into a new, replacement contract at the new price. Should revenue also be raised—or should some other income statement item capture the price revision?

There is clearly an 'opportunity loss' from being saddled with the current contract (and equivalently an 'opportunity gain' if prices have fallen). But whether the accounts should record any loss or gain as part of 'current earnings' opens up the same arguments as those debated frequently in the past (e.g. Edwards and Bell, 1961; Baxter, 1975; Whittington, 2008) over whether 'holding' gains and losses from changes in replacement costs of assets should be recognized, and if so whether this should be in current earnings or presented separately (e.g. as reported currently under IFRS in 'Other Comprehensive Income (OCI)') and, if the latter, whether they should then be 'recycled' into current earnings in subsequent periods to offset the higher or lower cost (here revenue) amounts then flowing through.[35] It may be noted however that not recognizing such revaluation gains and losses, as recommended by ASB (2001), has the same overall net effect on earnings as initial recognition outside earnings coupled with subsequent recycling into earnings.

Where the higher price now being charged to new customers also reflects the opportunity for Revrec to earn a higher margin of profit in the future, it would seem paradoxical to show a loss now due to restating the current liability at the new higher RV amount. Clearly a satisfactory overall solution also requires recognition of the related intangible for the NPV (as discussed above), which should also be restated

[35] Clearly if Revrec charges a higher initial annual magazine subscription/insurance premium for providing this guarantee against any price rise, the embedded option premium would need to be matched against the recognition of any such loss or gain from price changes. (On options in DV/RV see Stark, 1997.)

upwards to reflect the additional profit the company could earn at the new price. Once again, not repricing the liability is tantamount to the implicit recognition of this gain.

The repricing issue therefore emphasises our previous argument that profit recognition (and thereby performance measurement) needs to be considered independently of simply resolving asset and liability measurement issues, and this may also change revenue recognition.

More generally we have assumed in the discussion so far that events turn out as planned. In practice, however actual outcomes will diverge in various ways from expected outcomes and estimates of remaining outcomes will be revised. If the revisions to outcomes/estimates only arise in the second half of our contract year, then the profits reported for the first half year will remain identical. Clearly if the revisions are adverse (e.g. costs are now expected to be higher) then the accounts will now show smaller profits, or indeed losses, in the second half-year and overall (after charging for interest and risk-bearing). Equally clearly, the more profit that has been recognized in the first half of the year, the greater the loss (or at least profit fall) that will have to be reported in the second half-year. But provided a proper provision for risk is made initially, this possibility would not appear of itself to justify changing the pattern that is chosen *ex ante*.

Revisions to experience and future estimates may also arise before the accounts at 31 December are finalised. If the revisions are favourable, this will create (or further increase) NPVs; if unfavourable this will reduce or even eliminate NPVs; and if they become sufficiently unfavourable provision will be needed for what is now an onerous contract (as conventional accounting recognizes, at least when undiscounted future cash flows are expected to be negative or insufficient to recover existing stated asset amounts). The same difficulties as previously discussed over deciding when to

recognize any changes in positive NPV will arise, but our analysis has suggested that *all* changes in asset and liability values, *including* internal goodwill, are needed to give a full picture (as e.g. Edey, 1963).

The Boards are taking a different approach but without any clear conceptual justification. With regard to revenue recognition generally, the joint 2010 ED does not propose any departure from spreading the original contract transaction price (except where the contract becomes onerous); and in respect of insurance contracts, while other elements constituting the liability amount are to be re-estimated, the Boards propose that the residual margin (IASB) /composite margin (FASB) in their initial liability estimates continue to be released into earnings on the original pattern (see Appendix A).

V. PROFIT PATTERNS

Ohlson (2006), now supported by AAA (2009), argues that investors like to have a natural starting point in the income statement as they try to forecast subsequent periods' sustainable earnings.[36] The concept of sustainable earnings is consistent with Hicks's (1946) 'No. II Income' which can be described, in the case of a firm, as the maximum amount of periodic dividend it can pay to the owners of the equity, into infinity. Ohlson argues that reporting such maintainable earnings would require that assets and liabilities be derived from income and not *vice versa* (as in his formulation there of an 'accounting principle' for deriving a period's closing net operating assets).

Only when interest rates are expected to, and do, remain constant does Hicks's 'No. II Income' coincide with Hicks's (1946) 'No. I Income' i.e. the maximum dividend an entity can distribute each period while leaving its capital value intact (as

[36] We use here the terms sustainable, maintainable and persistent interchangeably.

in Ohlson's 'steady state' formulation). The 'asset/liability' approach adopted by FASB and IASB measures assets and liabilities and thereby defines income as changes in these and so adopts a *structurally similar* approach to Hicks's 'No. I' concept (cf. Bromwich *et al*., 2010). Under the assumption of no expected change in the interest rate, the approach to income measurement adopted by standard setters could therefore still produce persistent earnings. However, as illustrated in our argument above, in conditions of imperfect competition an exit value measurement basis such as FV cannot produce a maintainable earnings figure, as it normally forces recognition of the total super-profit on 'Day 1' (as in Solution 3(b) in Table I).[37]

So in periods where contracts are initiated FV profits will be much higher compared to periods where profits are only made from the carrying out of existing contracts. FV measurements, as currently defined, cannot therefore of themselves provide bottom-line income numbers of the kind that Ohlson argues are directly useful to analysts, as the resulting profit pattern will exhibit greater volatility[38] compared to the profit pattern that would be created by DV/RV measurements under the reporting approach illustrated in Table I Solution 3dv(a). Analysts may also thereby be hindered from understanding the ongoing processes by which profitable firms add value during their performance activities through turning inputs (at entry prices) into outputs (at exit prices), i.e. their 'business model' (see e.g. Penman, 2007, 2011; Singleton-Green, 2010, for further discussion).

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[37] To overcome this problem would require the recognition and capitalization of all future super-profits, on which a sustainable income would then be reported equal to 'interest on capital' plus reward for risk bearing.

[38] Except when the company is able to write an equal number of similarly profitable contracts in each accounting period. As illustrated under Table I Solution 3dv(b), if internal goodwill is capitalised, a similar problem would arise even if DV/RV is adopted as the basis of measurement. The danger lies in any failure by analysts (or other users) to understand the true nature of these 'Day 1' super-profits and their relationship to future earnings. This implies that full disclosure of the significance of this profit element is needed, in the way that UK life insurers assist analysts in their supplementary MCEV reporting by highlighting the 'profit on new business', which is conceptually equivalent to the NPV in new contracts written (see Horton *et al*. 2007 for further discussion).

Whatever pattern of profit reporting is adopted, under whatever system for reporting asset and liability values, it is clear that disclosure of the assumptions being made about future growth and profitability is also needed if a picture that can be fully interpreted is to be given (e.g. Bromwich *et al*. 2010; Bromwich 2010).

VI. CONCLUSION

Will the 'asset/liability' approach produce reported earnings patterns of better 'quality' than the 'revenue recognition' approach? A conflict most generally will appear wherever enterprises expect to earn super-profits, i.e. profits that cannot be identified as factor costs in the way that items such as 'interest' and 'reward for risk bearing' may. Moreover, in many circumstances, even these elements may not be separately estimable with any reliability from market benchmarks. In other cases, while companies may have invested in building up the necessary intangibles that enable them to achieve apparent super-profits, current GAAP accounting for these intangibles fails to properly match investment and return.

DV reasoning (in the form of RV) does offer a reconciliation of the 'asset/liability' approach and the 'revenue recognition' approach to the measurement of liabilities. We have argued that the exit price liability measurement approach of FV (which also ignores transaction costs) generally fails the tests of both decision-relevance and economic logic. Moreover, RV does not force the recognition of 'Day 1' profit on inception of a contract, which has proved to be a major stumbling block in the Boards' discussions of revenue recognition and insurance contracts. Our analysis provides conceptual clarification that supports the Boards' being 'uncomfortable' about the implications of adopting FV here, and their focussing instead on the consideration associated with the transaction. Moreover, our accounting illustrations

in Table I show that adopting RV allows reflection of current values while obviating the need for a wholesale recasting of the presentation of the income statement (of the kind proposed in IASB 2010a).

However, we have also argued that this balance sheet/income statement reconciliation is still insufficient in itself to determine the issue of when profits should be recognized: that requires specific consideration of how performance should be measured, and not just of how it should be presented. It is therefore unfortunate that it is only the latter issue which became the focus of the Boards' joint project on 'performance reporting' (downgraded to 'financial statement presentation', cf. Barker, 2004).

Given that the conflict with current GAAP pervades all kinds of business it would appear that the Boards will need to consider the whole issue of accounting for intangibles, and indeed the overall adequacy of a model that identifies 'comprehensive income' solely in terms of changes in recognized assets and liabilities (e.g. Macve 1997; Bromwich *et al*. 2010), before they are likely to make any progress in going beyond 'revenue recognition' issues to the appropriate measurement and presentation of the corresponding reported performance.

Table I Recrev Corporation: An Example

Numerical illustration (assuming interest rate = 0%)

Dynamics of solution 1: *CE = y = £114; TP = y - y = £0*

Dynamics of solution 2: *CE = y + RP = £114 + 6 = 120; TP = RP = CE - y =£6*

Dynamics of solution 3, 4: *CF = CE + ξ = y + RP + ξ = £114 + 6 +12 = 132*; *TP = RP + ξ = CF - y =£18*

Dynamics of solution 4: IRR (see Table BI) is here calculated to be -1.458% per month (-15.941% per annum)

Income Statement year 1 (six months)

[Total profit on contract] Solution #:		Magazine revenue £	Income other (NPV/recycling) £	Income Other (Unwind of r) £	Total Income £	Costs magazine £	Costs amortiz'n of NPV/G'will £	Total cost £	Profit (Jul-Dec) Year 1 £	Profit (Jan-Jun) Year 2 £
[£0] 1		57.00	-	-	57.00	57.00	-	57.00	0	0
[£RP] 2		60.00	-	-	60.00	57.00	-	57.00	3.00	3.00
[£(RP+ξ)] 3	either a)	66.00	-	-	66.00	57.00	-	57.00	9.00	9.00
	or b)	66.00	6.00	-	72.00	57.00	-	57.00	15.00	3.00
	or dv a)	66.00	-	-	66.00	57.00	-	57.00	9.00	9.00
	or dv b)	66.00	12.00	-	78.00	57.00	6.00	63.00	15.00	3.00
[£(RP+ξ)] 4		66.00	-6.00	8.86	68.86	57.00	-	57.00	11.86	6.14

Balance Sheet 31 December Year 1

Solution #:		Assets Cash etc. £	Other NPV/G'will £	**Total Assets** £	Liabilities contract £	Equity (undistrib'd profit) £	[Assumes half total profit distributed to date =] £
1		57.00	-	57.00	57.00	-	0
2		60.00	-	60.00	60.00	-	3.00
3	either a)	66.00	-	66.00	66.00	-	9.00
	or b)	66.00	-	66.00	60.00	6.00	9.00
	or dv a)	66.00	-	66.00	66.00	-	9.00
	or dv b)	66.00	6.00	72.00	66.00	6.00	9.00
4		66.00	-	66.00	63.14	2.86	9.00

Variables are defined in the text (and extended in Table BI). Solution 1 assumes no risk. Solution 2 assumes risk premium RP. Solution 3 assumes also super-profit ξ. Solution 4 is based on IRR. The solutions are equivalent, *mutatis mutandis*, for the case of the insurer (Insrec Corporation), where 'magazine revenue' is 'premium income' (see Appendix A).

APPENDIX A: Insurance Contracts

The IASB's project on insurance began with the IASC in 1997 and has remained extremely controversial. FASB later joined the project and, although IASB has issued an ED (2010a), the two Boards have not yet reached full agreement. However, as we have argued here, insurance contracts, far from requiring some special treatment, also fit the general case of RV recognition, which will be equivalent to the conventional 'deferred revenue'/'unearned premium' (at least until prices change). Assume Insrec Corp. issues one-year insurance policies on similar terms to Revrec Corp., so that for a typical policy Insrec receives the year's premium in advance on 1 July, and expects to pay claims and other related costs of £$\frac{y}{12}$ at the end of each month,[39] while requiring a risk premium for the uncertainty inherent in its estimates of £$\frac{RP}{12}$ per month. Clearly a one-year policy where the policyholder pays in advance is structurally similar to the general case that we have been considering.

Acquisition costs are normally paid by insurance companies and, under conventional GAAP, have traditionally been deferred and amortized against premium income.[40] 'Unearned premiums' will conventionally be carried as a liability in Insrec's balance sheet at the 31 December accounting year-end (in the simplest case through simple time-apportionment between accounting periods, or more sophisticatedly by taking account of any variation in the pattern of insurance risk across the policy year) but clearly, in a situation where Insrec's product is fully competitively priced, they will only represent no more than Insrec's liability to pay the remaining expected claims and other related costs, together with provision for risk-bearing. However, as we have already seen in Revrec's case, if Insrec is able to charge a premium which more than covers all costs that have been or are expected to be incurred, its provision for 'unearned premiums' will exceed its estimates for claims and related costs still to be recognized plus the risk premium. Insrec will have an NPV that could be recognized as 'profit on inception of the contract' under the asset/liability approach.

So we may legitimately equate Insrec's insurance policy with other commercial arrangements with customers, such as Revrec's magazine contract.

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[39] Strictly one cannot discuss the liability on an individual policy as insurance relies on the pooling of risks across substantial populations of policyholders: but we can still scale down the resulting statistical expectations in considering our simple 'typical' policy example, as argued by IASB (2010a).

[40] Examples and solutions extended to include acquisition costs, and showing that the traditional accounting approaches can similarly be reconciled with a RV valuation of the policy liabilities, are available on request from the authors.

The 'current exit value' approach favoured by IASB in its Discussion Paper (2007b)—which IASB at the time could not distinguish from FV—would generally only produce the same result as practice under traditional UK/US/international GAAP if insurers face perfectly competitive markets—or are able to treat as policy acquisition costs all investment in brands, reputation etc. that has given them any competitive advantage. In the real world, substituting FV represents an implicit decision to accelerate the pattern to be adopted for reported realization of the insurer's 'brand value' and other intangibles. FASB (1999, paras. 166-7) smuggled in the same implicit decision on revenue and profit recognition.

In their exposure of the IASB's (2010a) insurance ED the Boards decided to go back to the more traditional view and propose 'plugging' the measure of the liability with a 'residual margin' (IASB), or 'composite margin' (FASB), in order to eliminate any 'Day 1' profit recognition and spread the profit on a systematic basis over the life of the contract.[41] In doing so they have not been able to explain conceptually how the resulting balance sheet liability at subsequent dates represents a current value. We have argued here that our RV approach fulfils this requirement while being consistent with the profit measurement approach espoused by the Boards.

However, for long-term insurance contracts both Boards want the presentation of the income statement to depart from the traditional 'premiums less claims and expenses' approach and to report instead the margins being earned and variations in these due to experience gains and losses and revisions of assumptions (with the premiums, claims etc. relegated to note disclosures). But our analysis here can readily be extended to long-term ('life') insurance contracts. In the case of 'single premium' contracts we merely have to extend the period over which the contract is in force with corresponding liability measurements being required at each accounting date. Where premiums are paid annually under 'level term' contracts, policyholders initially pay more than the amount required to cover each year's risk, and in the later stages of the policy pay less than this, which provides them with an economic incentive (in addition to maintaining guaranteed insurability) to continue the contract, and gives rise to a similar accounting problem of how to recognize 'deferred revenue'. So the timing of payment is not crucial to the argument. Our argument therefore supports maintaining the traditional form of income statement presentation, albeit with some additional elements as in our examples in

[41] The Boards differ over how far interest on these margins should be recognised (FASB, 2010).

Tables I and BI, together with elements for changes in prices and assumptions as discussed in Section IV.

APPENDIX B: Accounting for interest effects.

Conventional microeconomics recognizes that capital must earn its required rate of return and this is as much a cost of production as materials, labour, use of equipment, etc. Capital is rewarded both for time between investment and return ('interest') and for risk bearing. Our simple numerical examples in Table I assume an interest rate of zero. Here we show how this will change if the interest rate is greater than 0, based on Solution 1 (i.e. not allowing for risk), for consistency labelled Solution 1 in Table BI.[42]

Solution 1 (now with interest rate > 0)

Assume interest is i% per month. As production etc. costs are £$\frac{y}{12}$ per issue, and a year's subscription covers 12 issues, therefore the competitive price for a year's subscription paid in advance is now the amount equivalent in present value to 12 future monthly receipts of £$\frac{y}{12}$ each, namely £{$PV_{y12,i} = \frac{y}{12}$ x $[\frac{1}{i} - \frac{1}{i \times (1+i)^{12}}] = \frac{y}{12}$ x $\alpha_{12,i}$}, giving a 'discount' of £$D_{y,12}$ = (y - $PV_{y12,i}$) to the customer for paying annually instead of individually for each instalment as it is delivered. Assuming the customer has therefore initially paid £$PV_{y12,i}$ on July 1st, then at 31 December the conventional accounting allocation of the revenue under present-day GAAP would normally be half to each 6-month period, i.e. £$\frac{PV_{y12,i}}{2}$, while both the cost to date and the 'liability to produce and deliver 6 more issues' appear *prima facie* to be £$\frac{y}{2}$, indicating a loss of £$D_{y,12}$ (i.e. making provision now for the loss to come in the second six months). So we need to recognize the interest effect in the accounting and then there will be no conflict between the 'revenue recognition' and the 'asset/liability' approach. Earned revenue to 31 December in total is the price of the first six instalments, plus interest on the

[42] That Table also shows how the accounting in the other solutions in Table I would correspondingly be adjusted. The full workings for Table B1, and also for a number of additional scenarios, are available from the authors on request. (For simplicity of illustration we assume immediate distribution of any monthly profits to avoid further interest effects**.)**

assets held to date—which is £(IntPV$_{y,1\text{-}6,i} = \sum_{1}^{6} i \times PVy$)—i.e. earned revenue totals £$\frac{y}{2}$ + £IntPV$_{y,1\text{-}6,i}$. Expenditure is the cost of the first six instalments plus interest (i.e. 'unwind of the discount' on the liability) to date, i.e. £($\frac{y}{2}$ + £IntPV$_{y,1\text{-}6,i}$), which again gives the standard 'competitive' result of an overall net income of zero. As all the finance has been provided by the customer, and there is no risk, the equity owners have contributed nothing and have correspondingly earned nothing. The year-end liability is the remaining obligation to incur the second six months costs of £$\frac{y}{12}$ per month, which is now not simply £$\frac{y}{2}$ but the present value £PV$_{y6,i}$ = $\frac{y}{12}$ x $\alpha_{6,,i}$

With our illustrative numbers, where production etc. costs are £9.50 per month, and assuming an interest rate of 1% per month,[43] the customer's discounted up-front payment is £9.50 x $\alpha_{12,0.01}$ = £106.92, which is the initial RV. Interest accrues monthly on this gradually reducing initial liability, giving a total 'unwind of discount' as an extra cost of £5.14 in the first six months. In the first six months revenue from the magazine is £57 (the same as in Table I Solution 1) and by 31 December the liability is down to £55.06 (as compared to £57 in Table I Solution 1), comprising a provision for the present value of the expected remaining production costs to be incurred, or equivalently the present value of the second six months' deferred revenue. Revrec will have had to call off from the customer's initial deposit an amount equal to the production cost of £9.50 as each of the first six monthly issues was produced; but they will have earned interest on the gradually decreasing balance of that deposit, also amounting to £5.14.[44] So the first six months' net profit is zero. If everything goes to plan in the second six months, the pattern will be repeated (but with the amounts of offsetting interest both lower) and Revrec will earn a net profit of zero overall for the financial year**.**

[43] We assume competitive capital markets such that borrowing and lending are available on the same terms to all participants. 1% per month, with monthly rests, is equivalent to $((1.01)^{12} - 1)*100$ % per annum, i.e. 12.6825% per annum. An annuity of 12 instalments of £9.50 per month at 12.6825% p.a. has a present value of £9.50 * 11.25508 = £106.92326, say £107.

[44] The bookkeeping is [opening liability £106.92 + unwind of discount £5.14 = £112.06, less reduction equal to revenues for 6 monthly magazine issues £57 = remaining liability £55.06]. Equivalently for the asset (the customer's deposit) as the costs are spent. Full workings for the bookkeeping for arithmetical illustrations of all the situations covered in Table BI, and also for a number of additional scenarios, are available from the authors on request.

So including interest brings no conflict between the 'asset/liability' and 'revenue recognition' approaches and, as Table B1 illustrates, this also holds for all the other scenarios considered in the main paper.

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Insert Table BI about here

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This analysis is consistent with the IASB's (2010a) approach of proposing that interest be accrued on all elements of the provision for insurance contracts, including the residual margin in insurance contracts, as against FASB's (2010) rejection of this—see Appendix A.

Table BI: Recrev Corporation: example as in Table I but with interest rate >0%

Income Statement year 1 (six months)

[Total profit on contract] Solution #:		Magazine revenue	Income other (NPV/ recycling)	Income other (Unwind of discount)	Costs	Costs amortiz'n of NPV/G'will/ DAC	Costs other ('interest'/ unwind of discount')	Profit (Jul-Dec) Year 1	Profit (Jan-Jun) Year 2
		£	£	£	£	£	£	£	£
[£0] 1		y/2	-	$IntPVy_{,1-6,i}$	y/2	-	$IntPV_{y,1-6,i}$	0	0
[£RP] 2		CE/2	-	$IntPV_{CE,1-6,i}$	y/2	-	$IntPV_{CE,1-6,i}$	RP/2	RP/2
[£(RP+ξ)] 3	Either a)	CF/2	-	$IntPV_{CF,1-6,i}$	y/2	-	$IntPV_{CF,1-6,i}$	(RP+ξ)/2	(RP+ξ)/2
	or b)	CF/2	$PV_{\xi 12,i}$ -(ξ/2)	$IntPV_{CF,1-6,i}$	y/2	-	$IntPV_{CE,1-6,i}$	$PV_{\xi 12,i}$ +(RP/2)+$IntPV_{\xi,1-6,i}$	(RP/2)+$IntPV_{\xi,7-12,i}$
	or dv a)	CF/2	-	$IntPV_{CF,1-6,i}$	y/2	-	$IntPV_{CF,1-6,i}$	(RP+ξ)/2	(RP+ξ)/2
	or dv b)	CF/2	$PV_{\xi 12,i}$	$IntPV_{CF,1-6,i}$ + $IntPV_{\xi,1-6,i}$	y/2	ξ/2	$IntPV_{CF,1-6,i}$	$PV_{\xi 12}$ +$IntPV_{\xi,1-6,i}$+(RP/2)	(RP/2)+$IntPV_{\xi,7-12,i}$
[£(RP+ξ)] 4		CF/2	-ξ/2	$IntPV_{CF,1-6,i}$ - $IntEV_{CE,1-6,r}$	y/2	-	-	(RP/2)+$IntPV_{CF,1-6,i}$ - $IntEV_{CE,1-6,r}$	(RP/2)+$IntPV_{CF,7-12,i}$ - $IntEV_{CE,7-12,r}$

Balance Sheet 31 December Year 1

Solution #:		Assets Cash	Other DAC/G'will	Total Assets	Liabilities contract	Equity (undistrib'd profit)	[Assumes half total profit distributed to date =]
		£	£	£	£	£	£
1		$PV_{y6,i}$	-	$PV_{y6,i}$	$PV_{y6,i}$	-	0
2		$PV_{CE6,i}$	-	$PV_{CE6,i}$	$PV_{CE6,i}$	-	RP/2
3	either a)	$PV_{CF6,i}$	-	$PV_{CF6,i}$	$PV_{CF6,i}$	-	(RP+ξ)/2
	or b)	$PV_{CF6,i}$	-	$PV_{CF6,i}$	$PV_{CE6,i}$	$PV_{\xi 6,i}$	(RP+ξ)/2
	or dv a)	$PV_{CF6,i}$	-	$PV_{CF6,i}$	$PV_{CF6,i}$	-	(RP+ξ)/2
	or dv b)	$PV_{CF6,i}$	$PV_{\xi 6,i}$	$PV_{CF6,i}$ + $PV_{\xi 6,i}$	$PV_{CF6,i}$	$PV_{\xi 6,i}$	(RP+ξ)/2
4		$PV_{CF6,i}$	-	$PV_{CF6,i}$	$EV_{CE6,r}$	$PV_{CF6,i}$ - $EV_{CE6,r}$	(RP+ξ)/2

Solution 1 assumes interest rate i > 0, but no risk. Solution 2 assumes both risk and interest rate. > 0. Solution 3 assumes also super-profit ξ. Solution 4 reflects IRR = r, where ξ > 0, such that $PV_{CF12,i} = EV_{CE,12,r}$. As r here is negative so at 31 December $EV_{CE6,r} > PV_{CE6,i}$ and over the contract total super-profit ξ = $IntPV_{CF,1-12,i}$ - $IntEV_{CE,1-12,r}$. The solutions are equivalent, *mutatis mutandis*, for the case of the insurer ('Insrec Corporation'), where 'magazine revenue' is 'premium income'. Variables (in addition to those defined in Table I)—$\alpha_{n,i}$: annuity factor for *n* periods at interest rate *i*; $PV_{x,n,i}$: Present value of annuity with *n* cash flows *x*, discounted at interest rate *i*; $IntPV_{x,\gamma-\beta,i}$: Sum of interest charged on the present value of *x* from time point *β* until *γ* at interest rate *i*.

REFERENCES

American Accounting Association (AAA), Financial Accounting Standards Committee (2009). A Framework for Financial Reporting Standards: Issues and a Suggested Model, available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1441338 (accessed 5 Feb 2011).

Akerlof, G.A. (1970). The market for "lemons": quality uncertainty and the market mechanism. *Quarterly Journal of Economics*. Vol. 84, No. 3 (August): 488-500.

ASB (2001). Discussion paper: *Revenue Recognition*. July.

Barker, R. (2004). Reporting Financial Performance. *Accounting Horizons* 18 (2): 157-172.

Barker, R. and McGeachin, A. (2010). The Recognition and Measurement of Liabilities in IFRS, University of Aberdeen working paper.

Barth, M.E. and Landsman, W.R. (1995). Fundamental Issues Related to Using Fair Value Accounting for Financial Reporting. *Accounting Horizons* 9 (4): 97-107.

Baxter, W.T. (1971). *Depreciation*. London: Sweet & Maxwell.

Baxter, W.T. (1975). *Accounting Values and Inflation*. London: McGraw-Hill.

Baxter, W.T. (2003). *The Case for Deprival Value*. Edinburgh: ICAS

Beaver, W. (1998). *Financial Reporting: An Accounting Revolution.* 3rd edition, Prentice-Hall.

Beaver, W. H. and Demski. J. S. (1979). The nature of income measurement. *The Accounting Review* 54 (1): 44-53.

Bromwich, M. (2010). Fair Value accounting: a comparative example of different accounting systems. LSE working paper.

Bromwich, M., Macve, R. and Sunder, S. (2010). 'Hicksian income in the conceptual framework'. *Abacus*, Vol. 46, No. 3: 348-376.

Chambers, R.J. (1974). *Accounting, Evaluation and Economic Behavior* (revised edition). Scholars Book Co., New York, 1974.

Dean, G., Lennard, A., Whittington, G., Macve, R. and Barth, M. (2010). Contributions to 'Wanted: foundations of accounting measurement', EAA Symposium, Tampere 2009. *Abacus*, 46(1): 84-127.

Draper, P.R., Pope P. and McInnes, W. **(**1993). An Assessment of the Effective Annual Rate Method as a Basis for Making Accounting Allocations. *Journal of Business Finance and Accounting*: 143-151.

Edey, H.C. (1963). Accounting Principles and Business Reality. *Accountancy* (reprinted in Carsberg, B.V. & Edey, H.C. (eds.) *Modern Financial Management*, Penguin, 1969; and in Edey, 1982).

Edey, H.C. (1974). Deprival Value and Financial Accounting (in Edey H.C & Yamey, B.S. (eds.) *Debits, Credits, Finance and Profits*, London: Sweet & Maxwell, 1974; reprinted Edey, 1982).

Edey, H.C. (1982) *Accounting Queries*. New York & London: Garland,

Edwards, E.O. and Bell, P. (1961). *The Theory and Measurement of Business Income*, Berkeley and Los Angeles, University of California Press.

FASB (1999). Preliminary Views: *Reporting Financial Instruments and Certain Related Assets and Liabilities at Fair Value*. December 14th, Norwalk, CT: FASB.

FASB (2006). SFAS 157: *Fair Value Measurements*. Norwalk, CT: FASB.

FASB (2010). Discussion Paper: *Preliminary Views on Insurance Contracts.* September.

FASB/IASB (2005). *Revisiting the concepts: a new conceptual framework project*. May.

FASB/IASB (2008). Discussion Paper: *Preliminary Views on Revenue Recognition in Contracts with Customers*. December.

FASB/IASB (2010). Exposure Draft: *Revenue from Contracts with Customers*. June.

Forfar, D.O. and Masters, N.B. (1999). Developing an International Accounting Standard for Life Insurance Business. *British Actuarial Journal* 5: 621-698.

Foster, J.M., and Upton, W.S. (2001). 'The Case for Initially Measuring Liabilities at Fair Value', in *Understanding the Issues* 2 (1), Norwalk, CT: FASB, May.

Green, J.R., Mas-Colell, A., and Whinston, M. D. (1995). *Microeconomic theory*, Oxford University Press.

Grinyer, J.R. (2000). The Logic of Earned Economic Income—A Reply. *British Accounting Review* 32 (1): 115-124.

Hicks, J.R. (1946). *Value and Capital*. Oxford: Clarendon Press.

Horton, J., and Macve, R.H. (2000). 'Fair value' for financial instruments: how erasing theory is leading to unworkable global accounting standards for performance reporting. *The Australian Accounting Review* 11 (2): 26-39.

Horton, J., Macve, R.H. and Serafeim, G. (2007). *An Experiment in 'Fair Value' Accounting? The State of the Art in Research and Thought Leadership on Accounting for Life Assurance in the UK and Continental Europe* (London: Centre for Business Performance, ICAEW).

IASB (2001). *Draft Statement of Principles (Insurance)* (incomplete and not endorsed by the Board) [no longer available on IASB website].
IASB (2005). *Measurement Bases for Financial Accounting—Measurement on Initial Recognition*.
Canadian Accounting Standards Board Discussion Paper. November.
IASB (2007a). IAS 1 *Presentation of Financial Statements* (revised).
IASB (2007b). Discussion Paper. *Preliminary Views on Insurance Contracts.* 3 May.
IASB (2009). Exposure Draft: *Fair Value Measurement*. 28 May.
IASB (2010a). Exposure Draft: *Insurance Contracts*. July.
IASB (2010b). *Conceptual Framework for Financial Reporting*. September.
IASB (2011). IFRS13 *Fair Value Measurement*. May.
Johnson, O. (1970). Toward an "Events" Theory of Accounting *The Accounting Review*. Vol. 45, No. 4 (Oct), pp. 641-653.
Katz, M.L. and. Rosen. H.S. (1998). *Microeconomics.* 3rd edition, Boston MA, Irwin/McGraw-Hill.
Knight, F.H. (1921), *Risk, Uncertainty and Profit*, University of Chicago Press.
Kulkarni, D. (1980). The Valuation of Liabilities. *Accounting and Business Research*, Summer: 291-7.
Lennard, A. (2002). *Liabilities and how to account for them: an exploratory essay.* London, ASB.
Macve, R.H. (1997). *A Conceptual Framework for Financial Accounting and Reporting: Vision Tool or Threat?* New York, Garland.
Macve, R.H. (2007). 'A Comment on: *"Deprival value and fair value: a reinterpretation and a reconciliation"* ' (LSE working paper).
Macve, R. H. (2010a). The Case for Deprival Value, in Dean *et al*., 2010: 111-119.
Macve, R. H. (2010b). 'Conceptual frameworks of accounting: some brief reflections on theory and practice'. *Accounting and Business Research*, Vol.40. No.3: 303-308.
Macve, R.H. (2011), Discussion of Foroughi, K. (chairman*) et al.* (IFRS working party): 'Insurance Accounting: A New Era?', *British Actuarial Journal* (forthcoming).
Macve, R. H. and Jackson, J. (1991)*, Marking to Market: Accounting for Marketable Securities in the Financial Services Industry* (ICAEW: ISBN 1-85355-169-4).
Nobes, C. (2003). *Liabilities and their Measurement in UK and International Accounting Standards*. London, ACCA.
Ohlson, J.A. (2006). A practical model of earnings measurement. *The Accounting Review* 81 (1): 271-279.
Peasnell, K.V. (1995a). Analytical Properties of Earned Economic Income. *British Accounting Review* 27: 5-33.
Peasnell, K.V. (1995b). Second Thoughts on the Analytical Properties of Earned Economic Income. *British Accounting Review* 27: 229-239.
Penman, S. (2007). Financial reporting quality: is fair value a plus or a minus? *Accounting and Business Research*: *International Accounting Policy Forum*, 33-43.
Penman, S (2011). *Accounting for Value*. Columbia University Press.
Shwayder, K. (1967). A Critique of Economic Income as an Accounting Concept. *Abacus* 3 (1): 23-35.
Singleton-Green, B. (2010). *Business Models and Accounting.* London: ICAEW.
Stark, A.W. (1997). The impact of irreversibility, uncertainty and timing options on deprival valuations. *Accounting and Business Research,* Winter: 40-52.
Thomas, A.L. (1977). Allocation: the Fallacy and the Theorists. In Baxter, W.T. and Davidson, S. (eds.), *Studies in Accounting*, 3rd edition , London, ICAEW.
Van Zijl, T. and Whittington, G. (2006). Deprival value and fair value: a reinterpretation and a reconciliation. *Accounting & Business Research* 36 (1): 121-130.
Weetman, P. (ed). (2007). Comments on deprival value and standard setting in measurement: from a symposium to celebrate the work of Professor William T. Baxter. *Accounting and Business Research* 37 (3): 233-242.
Whittington, G. (2008). What the 'Old Guys' can tell us: Edwards and Bell's 'The Theory and Measurement of Business Income'. *The Irish Accounting Review,* 15(1): 73-84.