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(Comment Letter on IASB Discussion Paper, *Preliminary Views on Amendments to IAS 19 Employee Benefits*)

The effect of credit risk in the measurement of liabilities

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Dear Sir/Madam,

The attached paper deals with the effect of credit risk in the measurement of liabilities and replies to the Discussion Paper's unasked question: "how any practical issues might be resolved": §7.29. It is not possible to do this without reviewing the premises in the principal standards and other discussion papers explaining why accountants believe credit risk affects any liability, whether financial or not.

A fundamental premise is given in SFAS 157 *Fair Value Measurements*: §A31. This holds that an investor relying on a contractual promise to pay $500 in five years time could invest either $374 ($500/1.06^5) in a borrowing at an annual risk-inclusive interest rate of 6% or $284 ($500/1.12^5) in a riskier borrowing with the interest at 12%. This is completely untrue in any efficient market: if investors could rely on obtaining interest at 12%, then no investor would invest at a lower rate of return and a debt instrument offering 6% could never be issued. The premise ignores the fact that the rates of return compensate for the credit risks and the promised return of $500 is discounted as if it were a deterministic value and not a capital at risk.

Further, the effect of credit risk in measuring liabilities cannot be determined without using a measure for the credit risk assumed: the probabilities of credit default occurring. Of this salient fact, accountants show a consistent unawareness. Not appreciating that expected ("probability-weighted") credit defaults determine efficient market-consistent values makes it impossible to measure either.

To date, the most salient consequence of the misapprehension is that the liability on a host debt instrument could be measured at the quoted (fair) values of the corresponding assets on the creditors' market. The fair-value option in IAS 39 *Financial Instruments: Recognition and Measurement* provides that the debtor may designate a liability of long-term duration, although the liability itself will never be traded, and measure it at these spot asset values. Increases in short-term asset values, for example, enable traders to realise capital gains and generally trade in cash flows that are not available to the debtor. The debtor is only liable for the contractually stipulated cash flows. Further, the implementation guidance to IAS 39 prohibits measuring a financial instrument on the basis of cash flows which do not exist. In measuring the effects of credit risk on liabilities, the attached paper demonstrates that only an explicit embedded derivative in the host debt instrument, a debt buy-back option enabling the debtor to intervene on the creditors' market and buy back the debt prematurely at any time at its quoted asset value, could justify valuing the whole instrument at this fair (asset) value.

Replying to questions on credit risk requires understanding the relationship between the discount factor and default probabilities to derive market-consistent current valuations of future cash flows. For actuaries this is obvious[1]. For others, the attached paper discusses credit risk as simply as possible but in detail to clarify what this understanding means when looking at accountants' premises, examples and propositions.

Whereas accountants distance their standards and discussion papers from an "actuarial textbook" (Discussion Paper: §7.9 and on *Insurance*: §34), their concepts must not stray from the realm of science. To put fair value accounting in an Alice-in-Wonderland world runs the risks of misleading financial reporting in such a mark-to-market accounting environment and further Enron-like experiences.

Yours faithfully,
Nicki L. Tillinghast

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[1] The question: What is the market-consistent transfer value to another debtor of an obligation to pay CU500 in 5 years, for example? Take the risk-free interest rate on the markets to be 5%, say, and the debtor's credit standing such that it must promise a contractual return of 6% on any debt instrument it issues. As opposed to a probability of not defaulting of 100% for an investment in a risk-free security at 5% assume, for simplicity, that the spread of 1% relates to credit risk giving rise to a probability of not defaulting on maturity of about 95.4%, i.e. $(1.05/1.06)^5$. What is the market-consistent current transfer value to another debtor of the obligation to pay CU500 in five years, i.e. the price the original debtor would have to pay a transferee to assume the obligation in its stead?

(a) $CU500/1.05^5 = CU392$
(b) $CU500/1.06^5 = CU374$
(c) $CU500 \times 95.4\%/1.05^5 = CU374$
(d) $CU500/95.4\%/1.06^5 = CU392$

The formulae of the unconscious actuary (cf. http://jp.milliman.com/en/publications/pdfs/deflators-demystified-RR04-01-07.pdf) would suggest the answer is (b)—cf. SFAS 157: A31 discussed below. But this is incorrect because in an efficient, arbitrage-free market, the only price that can prevail in the market is (a). If market participants could simply borrow at 5% and invest at 6% then arbitrage opportunities would occur: these are inexistent in efficient markets because any such opportunities are necessarily already arbitrated out. The calculation in (c) shows that the expected value of the promise of remunerating CU374 at 6% to get CU500 is only worth 95.4% of CU500, i.e. CU477: obviously inadequate to meet the obligation to pay CU500. The calculation in (d) shows that if the required liability amounts to CU500, the nominal return promised must amount to CU524 (CU500/95.4%), to take account of the expected default implicit in the rate of 6%. This means the initial investment at the nominal rate of 6% must amount to CU392 ($CU524/1.06^5$), i.e. the market-consistent value in (a) which is, of course, independent of the "credit characteristics of the liability", e.g. the expected credit defaults of any debtor.

The effect of credit risk in the measurement of liabilities: Abstract

Background

1 Credit risk in liabilities is discussed by accountants in a number of key papers setting out "received opinion":

- The FASB's standard SFAS 157 and the accompanying IASB Discussion Paper, *Fair Value Measurement*.
- The discussion papers on:
  - Insurance contracts by the IASB.
  - The financial reporting of pensions by EFRAG. (Although both EFRAG and the ASB believe measuring non-financial liabilities should not include credit risk, they give very good explanations of received opinion on why it should.)
  - The IASB's standard IFRS 7, *Financial Instruments: Disclosures*.
  - *Preliminary Views on Amendments to IAS 19 Employee Benefits* by the IASB.

Scope

2 Received opinion to justify the belief that contractual liabilities at market-consistent values must be reduced to reflect their creditworthiness is examined starting from the same assumptions:

- that credit spreads in interest rates measure differences in creditworthiness.
- that the market is an efficient market.

Technical analysis

3 Using a simple methodology:

- Creditworthiness is shown to be measurable only by using an underlying probability distribution to calculate the expected values of credit defaults on cash flows and therefore market values. For the general reader, the simplest possible probability distribution compatible with the premises is used.
- The absence of arbitrage opportunities to secure risk-free profits on an efficient market is shown to determine that the only possible discount rate is the risk-free rate.
- The use of traditional equations to discount non-deterministic cash flows at other rates, such as risk-inclusive rates, is demonstrated to be generally unfit to provide market-consistent valuations.

Conclusions

4 None of the reasoning or examples in received opinion is found compatible with a technical approach nor shows awareness of flaws in using traditional equations to value cash flows (an unawareness that has been attributed to "unconscious actuaries"[2]).

<u>Received opinion with reference to a simple example (the examples actually given are discussed *et cetera* in the paper)</u>

Received opinion shows no constructive awareness of the existence of the probabilities of credit default such as that of only being able to pay 3/4 of a contractual liability of CU1,400 due in a year's time giving it an expected value of 3/4 x CU1,400 = CU1,050 and therefore yielding only 5% *per annum*, the risk-free interest rate, on an investment of CU1,000 issued at a contractual (risk-inclusive) interest rate of 40%. Therefore, deterministic equations are used to calculate the present value of debt, such as: CU1,400/1.40 = CU1,000.

This ignores that the capital is at risk, that its future expected value is 3/4 of CU1,400 and that its present value must be discounted at 5% *per annum*, the only possible market-consistent rate of return on efficient markets and therefore the discount factor required to give the present-day value of money: [¾ x CU1,400]/1.05 = CU1,000. As a consequence, the same contractual liability of CU1,400 with a debtor of "creditworthiness" so low that it can only borrow at the nominal ("junk-bond" yield) interest rate of 75% is taken to have a present value of CU1,400/1.75 = CU800. On an efficient market, a debt issue offering CU1,400 on investing CU1,000 could never exist if CU800 could be invested and earn the same amount. This fact is ignored because it is not understood that the capital is at risk on the junk bond. Whilst increased credit risk is assumed to account for the higher nominal rate of 75%, the credit risk on the promised return is not evaluated.

Equally, received opinion appreciates that a contractual liability to pay a year's interest at 40% on a cash borrowing of CU1,000 underlies the fair value of the assets issued on the creditors' market and that if the issuer's nominal borrowing rate on that market increased to 75% immediately after inception, the fair value of the assets would fall to CU1,040/1.75 = CU800.

Therefore it assumes that a transferee debtor with the same nominal borrowing rate of 75% would accept CU800 as the price for accepting the contractual liability to pay the creditors CU1,400 in a year. However, no transferee debtor could accept such a liability for

[2] *ibid.*

CU800 as, even if it invested in junk bonds, it could then only expect to obtain CU840 in one year on an efficient market and would therefore be unable to honour the transferred liability.

Further, received opinion understands, in the event future credit defaults leave them with CU0, that debtors would not honour an unfunded enforceable obligation to pay CU1,400 (such as for legal fees or for contractual contributions for employees' retirement) but shows no constructive awareness of the probability of that un-incurred default arising, such as that of only being able to pay 2/5 of that enforceable liability of CU1,400 in a year's time, giving it an expected value of CU1,400 - 2/5 x CU1,400 = CU840. Using the same deterministic equation as before, it therefore assumes that a transferee debtor with a nominal borrowing rate of 75% would accept CU800 as the price for accepting the enforceable liability to pay CU1,400 in a year. However, no transferee debtor could accept such a liability for CU800 as, even if it invested in junk bonds, it could then only expect to obtain CU840 in one year on an efficient market and would therefore be unable to honour the transferred liability.

Demonstrations

This paper demonstrates that the required transfer price of a host debt instrument issued with a contractual rate of interest of 40% repayable in a year for CU1,400 is always CU1,000, i.e. the contractual reimbursement discounted at the contractual rate of interest. This implies that the "credit characteristics" of the contractual liability based on the probabilities of default are unchanged, which this paper demonstrates to be market-consistent. This paper also discusses the different cash flows that creditors expect to receive as a result of taking immediate capital gains or losses on the fair (exchange) values of the corresponding assets and demonstrates the consistency with the expected probabilities of credit default on the asset values.

This paper further demonstrates the effects of an explicit call option (a debt buy-back option) embedded in the host debt instrument enabling the debtor to extinguish the liability by buying back the debt at its quoted value of exchange between creditors–-the fair value of the assets—prior to maturity. The expected probabilities of default are shown to account for the modified cash flows on the contractual debt instrument and to value the debt buy-back option. The value of the option is shown to be zero on inception: an American call option with time value only and a strike price equal to the underlying variable on initial recognition: the fair (asset) value of the amount lent by creditors. The transfer price of the resulting contractual liability is then shown to equal the fair value of the corresponding assets and the embedded derivative to justify accounting for this liability at the fair value of the assets.

Consequently, this paper calls into question the use of the fair value option for liabilities in financial instruments which are not trading liabilities or otherwise do not incorporate a debt buy-back option. Accounting for such liabilities at the fair (exchange) value of the corresponding assets on the creditors' market implicitly creates and values a cash flow that does not exist in the issued instruments.

Furthermore, this paper demonstrates that the required transfer price of an unfunded enforceable liability to pay CU1,040 in a year (such as the amount of a legal claim, unfunded employer's contribution for its employee's retirement…) must always be discounted at the risk-free market rate to give the present value of money. This is shown to be the only market-consistent price in an efficient market that would be acceptable to a transferee debtor—whatever the un-incurred probability of credit default of the transferor debtor, the transferee and in its subsequent investment—to provide the return it requires to meet the enforceable liability transferred.

Other key issues examined

credit enhancements – risk margins (cash advance premiums) in fair value measurements – creditors' put options (including put options in participating contracts) – notional credit defaults on insurance premiums and, by implication, funded employer contributions – expected finance costs of debt instruments – unrecognised experience adjustments for changes in the probabilities of expected defaults and unrealised credit defaults on debt instruments at current exit value and at the corresponding assets' fair values.

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Background

Differences of opinion

5 The objections to recognising a future event such as credit default in order to reduce the current value of a future (contractual or constructive) obligation have been well-aired.

- The EFRAG Discussion Paper, *The Financial Reporting of Pensions*, rejects it, as does EFRAG in its comment letters on the IASB Discussion Papers on *Fair Value Measurement* & *Insurance Contracts*.

- Indeed, most respondents to the Discussion Paper on *Insurance Contracts* "vigorously" oppose any measurement that reflects the "credit characteristics" of the liability: IASB February 2008 Agenda paper 2A: *Insurance Contracts: Overview of comments*: §7(f).

- And, in the replies to the Discussion Paper on *Fair Value Measurement*: "Some respondents think it is appropriate to reflect the risk of non-performance (including credit risk) in a fair value measurement" of liabilities : "However, many are concerned that reflecting non-performance risk in the fair value leads to counterintuitive results when there is a change in credit standing and the liability is remeasured at fair value": IASB October 2007 Agenda paper 2C: *Fair Value Measurement: Staff Analysis of Comment Letters*: §34.

6 However, in the Discussion Paper, *Fair Value Measurement*:

- §41: "IFRSs do not provide guidance on whether non-performance risk should be considered when measuring the fair value of a non-financial liability. However, the IASB observes that a requirement to consider non-performance risk when measuring the fair value of a liability extends to fair value measurements of all liabilities the principle already established for financial liabilities in IAS 39. Also, the IASB agrees with the position in SFAS 157 that the risk that an obligation will not be satisfied affects the value at which that obligation would be transferred. Therefore, the IASB reached a preliminary view that the fair value of a liability should reflect non-performance risk."

- §23: "Although IFRSs use the term 'settlement' in the definition of fair value, the IASB's preliminary view is that the term 'transfer' more accurately describes the fair value measurement objective in IFRSs…….. the price that market participants would require in order to assume the liability reflects their views on the expected outflow of resources embodying economic benefits associated with the ultimate settlement with the counterparty."

7 SFAS 157 *Fair Value Measurements: Application to Liabilities*: §15: "A fair value measurement assumes that the liability is transferred to a market participant at the measurement date (the liability to the counterparty continues; it is not settled) and that the non-performance risk relating to that liability is the same before and after its transfer."

- However, fair value measurements of liabilities for insurance contracts, pensions or post-retirement benefits are not applicable in US GAAP.

8 In the Discussion Paper, *Preliminary Views on Insurance Contracts*: §IN21: "An informative and concise name for a measurement that uses the three building blocks is 'current exit value'. This paper defines current exit value as the amount the insurer would expect to pay at the reporting date to transfer its remaining contractual rights and obligations immediately to another entity."

- However, whilst based on the "three building blocks" the Discussion Paper *Preliminary Views on Amendments to IAS 19 Employee Benefits* uses SFAS 157's style of reference: ITC11: "The Board's preliminary view is that entities should measure the liability for a contribution-based promise at fair value assuming the terms of the benefit promise do not change."

Persistency of conflicting attitudes

9 It is important to appreciate the prevalence and persistency of these differing attitudes. For example, at the same time as issuing the Discussion Paper, *Preliminary Views on Amendments to IAS 19 Employee Benefits*, the IASB:

- Took it to be "unsurprising" that most respondents to the Discussion Paper on *Insurance Contracts* reject the notion that "the current exit value of a liability reflects its credit characteristics": meeting with the Insurance Working Group in April 2008–Agenda paper 3: *Settlement value*: §6(c).

- Considers that, while most respondents would say no in response to whether a "settlement value" would be affected by "the credit characteristics of the liability", it is not obvious how its tentative description (described as being "neither rigorous nor distinct": §21) answers that question "without an additional, arbitrary stipulation": §21(d)—the same Agenda paper.

10 In contrast, most commentators find that the inclusion of own credit risk is an arbitrary stipulation, is confusing, does not result in relevant information, and conflicts with the going concern assumption.

11 For example, the EFRAG Discussion Paper, *The Financial Reporting of Pensions*, issued in the name of the major European standard setters with its development led by the ASB, holds that the appropriate measurement attribute for the related liabilities is a "settlement value" and that liabilities should not be reduced to reflect their credit risk. Presumably the IASB has the same attitude as to the "settlement value" proposed for insurance contracts.

12 Given the conflict over the IAS 39 fair value option in Europe, there is presumably little doubt that the European Parliament, or the Commission, will vigorously and unsurprisingly reach the same conclusion as most constituents.

Informed debate

13 In its replies to the Discussion Paper on *Insurance Contracts* the ASB wrote:

> "We are aware that there remains considerable disquiet about the requirements in IAS 39 regarding the inclusion of credit characteristics in the fair value measurement of a liability, and consider that this is a key aspect of that standard requiring further consideration. In our view, the IASB has not yet made a convincing case for this approach.
>
> In principle, we cannot see any reason for taking a different line for insurance contracts on this issue than for financial instruments, where the credit rating of the instrument is taken into account in the fair value measurement. However, we do not consider this to be a major issue for insurance accounting, since insurers generally need a high credit rating to continue in business (and a significant deterioration in their credit rating would often lead to a cessation of the business)."

14 This is a reasonable proposition. Presumably, and perhaps necessarily, the open minds of the FASB and the IASB are not opposed to informed debate on a measurement attribute of their own choosing.

15 The definition of the current exit value of a liability, although what is supposed to be traded is a continuing liability to an unchanged counterparty, is in fact based on the market value of the corresponding assets held and traded by the creditors and not the debtors. This is a generalisation of the concept of valuing "financial liabilities held for trading" under IAS 39 "as if":

- all liabilities were instruments bearing a nominal rate of interest provided as a remuneration to the creditors, which is notably not true of most non-financial liabilities.
- the issuing entity could redeem any liability by paying back its creditors at the value at which they trade on the creditors' market at any reporting date, which firstly is neither the raison d'être nor the purpose served by most liabilities and secondly, if this redemption option existed, would obviously modify the actual trading values on the creditors' market.
- **In this paper:** for the reasons given in the Discussion Paper on *Insurance Contracts*, we shall refer to the immediate transfer price of a liability as its current exit value although we shall demonstrate that:
  - On inception the current exit value of a liability equals the fair value of funded assets, including the proceeds from borrowings, the premium paid for insurance benefits and, by implication, from funded contributions for employee retirement benefits.
  - Whilst the corresponding asset fair values would vary subsequently for changes in future credit risk affecting the cash flows on their traded values in the creditors' market, the current exit value of the liability does not.
  - A host debt instrument, with a debt buy-back option as an embedded derivative, exercisable at any time before its maturity, would enable debtors to profit from capital losses in the fair values of the corresponding assets by extinguishing the liability of the host debt instrument prior to its term on buying back its contractual debt at the fair values of the assets. By valuing the separable derivative, this paper shows that the current exit value of the combined instrument would then equal the fair (asset) values.
  - Unfunded contributions for employee retirement benefits are no different to unfunded general liabilities such as the obligation to pay a claim based on the outcome of a legal case.
  - The current exit value of such unfunded liabilities is not reduced by future credit risk.

Fair value measurement

SFAS 157's justifications & the irrelevance of nominal interest rates

16 Promoted by the IASB Discussion Paper, SFAS 157 *Fair Value Measurements* relies on the example of two promises to pay cash of $500 in 5 years time given by Entity X and Entity Y to justify including credit default risk in "current exit values": §A31. It says Entity X with AA credit rating can borrow at 6% and will receive about $374 ($500/1.06^{5}) in exchange for its promise and Entity Y with BBB credit rating can borrow at 12% and will receive about $284 ($500 /1.12^{5}) in exchange for its promise. The fact that the two fair values of $374 and $284 are not equal is supposed to show that Entity X and Entity Y should consider the effect of their credit risk (credit standing): "on the fair value of the liability in all periods in which the liability is measured at fair value because those who might hold the entity's obligations as assets would consider the effect of the entity's credit standing in determining the prices they would be willing to pay". In fact it shows exactly the opposite.

- The first point is that if it were true that you could invest $284 at 12%, why would anyone invest as much as $374 at as little as 6%? And why wouldn't you invest $374 at 12%? The reasoning given in the example is false because efficient markets compensate for any such arbitrage opportunities: they do not exist.

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- The second point is that we must suppose that the debtors actually wish to receive $500 in five years because, for example, this is the amount of the arising employee benefit, insurance claim, or just the cash required at that time to discharge a given liability. If the risk-free rate, over the five years, is 5%, then the expected present value of money for $500 in five years time is just $500/1.05^{5}: about $392.

- Both Entity X and Entity Y will account for a liability at fair value of exactly $392 on receiving this amount in cash, even if we suppose, as intended, that the rates of 6% and 12% just reflect the credit characteristics of the promise made by entities X and Y respectively on an efficient market to pay interest at 6% and 12% respectively.

- Now, providing for a liability of $500 due in five years is not the same thing as promising to pay an interest rate of 6% on an investment of $374 in a borrowing by Entity X or of 12% on an investment of $284 in a borrowing by Entity Y as SFAS 157 erroneously suggests. On an efficient market no arbitrage opportunities can arise and the expected return on any investment can only equal 5% *pa*: the risk-free rate, i.e. $500 for an investment of $392. It follows, assuming that all defaults are total defaults to derive a simple probability distribution, that 374/392 –95%- and 284/392 –72%- are just the probabilities of not defaulting on the nominal return of $500 promised by Entity X and Y respectively, i.e. the expected return in five years from Entity X is only 95% of $500 and from Entity Y is only 72% of $500.

- If the obligation *in fine* actually amounts to $500, then both Entity X and Y must borrow $392. Entity X has to promise an interest rate of 6%, which will give a nominal return of $524 ($392 x 1.06^{5}) and an expected return of $500 ($524 at 95%). Entity Y has to promise an interest rate of 12%, which will give a nominal return of $690 ($392 x 1.12^{5}) and an expected return of $500 ($690 at 72%).

17 SFAS 157 §A31 concludes "that the fair value of the liability to each entity (the proceeds) incorporates that entity's credit standing." This is obviously incorrect, as any entity must receive the same proceeds as that of a risk-free entity for the investor's expected return to be sufficient to meet the given amount required at term. Alternatively put, it is clearly erroneous to expect to be able to invest increasingly reduced amounts in entities with increasing risks of credit default and believe the expected return would not also be increasingly reduced. Such entities promise higher nominal rates on borrowings precisely because of an increasing risk of credit default on the nominal return so that, for the same initial investment, an efficient market requires the **expected return** (**not the nominal return** which is at risk) to be identical. It follows that the transfer (current exit) value of any liability (assuming the obligation to the counterparty continues) is also invariant, whatever the relative credit standings of the transferor and the transferee.

"Credit enhancement" in SFAS 157

18 SFAS 157 is unclear on how to treat credit enhancements of the transferee, but so is the only comment letter by the New Zealand Institute of Chartered Accountants on the *Fair Value Measurement* Discussion Paper that points this out (CL129): only mentioned in paragraph 15 of SFAS 157 and presumably "relating to contractual terms that reduce the credit risk of the liability".

19 If, for example, Entity Y promising to pay 12% on proceeds of $284 over 5 years also issued creditors with a put option exercisable on maturity with a strike price of $500, would this add anything to the promise to pay the same amount in the host debt instrument?

20 Creditors could of course choose to take out credit guarantee insurance or add the required premium to the proceeds of $284 in exchange for the put option (perhaps with the *proviso* that the issuer would itself take out the insurance for the benefit of creditors). The insurance premium or price of the option would of course equal the expected present value of the cash flow in default on $500 and we have already established that the probability of that event not occurring is 72%. The "probability-weighted" cash flow is then 38% of $500 and the price of the put option or insurance premium is its present value $108 (38% x $500/1.05).

21 Once again creditors always have to invest, and debtors—whatever their credit rating—always have to provide $392 (here $284 + $108) at present value to meet the given liability of $500.

22 Should Entity Y take out an insurance policy for the benefit of "risk-adverse" creditors, it will use $108 out of the proceeds of $392 received to perform this service. Risk-adverse creditors could equally have invested the $392 with a risk-free issuer, i.e. investing at the risk-free rate of 5% ($392 x 1.05^{5} = $500).

- But, in all events, Entity Y's service to insure the creditors a risk-free investment costs the creditors no more.

- And, Entity Y's liability, net of the asset value of the insurance contract or the proceeds retro-ceded on inception to benefit the creditors, amounts to $392 - $108 = $284, just the liability it would account for in the first place if creditors had only invested cash of $284.

- In view of the market's expectation that the probability of default by lenders in the BBB credit rating class amounts to 28% over a 5-year horizon, Entity Y has to promise a higher rate of interest than the risk-free interest rate of 5% *pa*, say p%, to give a nominal return of (1+p%)^{5} on borrowing $1. Therefore, the compensation required by market participants is that 72% of the promised return on $1, i.e. its future value net of expected defaults, equals the risk-free return on $1 at the end of 5 years, i.e. $1 x 1.05^{5} = $1.28. Market participants therefore require that $1.28 = 72% x (1+p%)^{5}. From this it follows that p% = 12%.

  - We have already seen that compensation required amounts to $108 at present-day values on an investment of $284, i.e. that an investment of $284 will only yield a return of $284 x 1.05^{5} = $362 on a market-consistent basis and that an investment of $392 ($284 + $108) is required to yield a return of $392 x 1.05^{5} = $500. The nominal return is then of course $690 ($392 x 1.12^{5}) but its expected value on a market-consistent basis amounts to 72% thereof, i.e. 72% x $690 = $500.

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23 Hitherto, we have considered the $108 ($392 - $284) as if it were a "credit enhancement" (on a borrowing). In fact, just investing $392 in Entity Y promising a nominal rate of interest of 12% does not change the fact that the probability of credit default not occurring is still only 72%. We must therefore examine "risk premiums".

"Credit enhancement" and risk margins in SFAS 157

24 SFAS 157 §B5 states: "A fair value measurement should include a risk premium reflecting the amount market participants would demand because of the risk (uncertainty) in the cash flows." Clearly, for an investment of $392 in Entity Y at a nominal rate of 12%, market participants are demanding a cash risk premium of $190 ($392 x 1.12^5 - $392 x 1.05^5). We could also have calculated this using the "formulae" given for assets in SFAS 157:

- SFAS 157 §B18 gives as an example that of an asset with a cash inflow of $780 in 1 year, a risk-free rate of 5% and a risk premium of 3%. The cash risk premium is given to be:

  - [$780 × (1.05/1.08)] = $22.

- Obviously, for the investment of $392 in Entity Y, the cash inflow expected at a nominal rate of 12% is $690 ($392 x 1.12^5), and reasoning over 5 years we must use 1.05^5 instead of 1.05 and 1.12^5 instead of 1.12. Substituting in the SFAS 157 formula, we obtain the cash risk premium of:

  - [$690 × ($1.05^5$/$1.12^5$)] = $190, i.e. just the amount to be explained at present value on inception: $190/$1.05^5$ = $108 (see 23).

25 SFAS 157 promotes the idea that the "current exit value" of Entity Y's liability (not necessarily attributable to a borrowing) to pay $500 in 5 years amounts to $284 ($500/1.12^5) and not $392 ($500/1.05^5). Again, this obviously ignores certainty equivalents: see 27. If we were to calculate the cash risk premium as before, we would obtain:

- [$500 × ($1.05^5$/$1.12^5$)] = $138.

- As we know, risk margins on liabilities are not deducted but added to cash outflows unadjusted for risk (*Insurance* Discussion Paper: §IN18 & §206). *A priori*, this would give the risk-certain cash flow for the promise to pay $500 as a market-consistent liability of $638 ($500 + $138), i.e. a market-consistent value for the liability of:

  - [$500 + $138] / 1.05^5 = $500/$1.05^5$ + $138/$1.05^5$ = $284 + $108 = $392.

  - Readers will recognise that the $108 here is just the amount previously referred to as a "credit enhancement" and not as a "risk margin".

26 In discussing credit risk, expected value calculations have been preferred to avoid calculating explicit risk margins. As all of the Board's reasoning, as well as their examples, are based on rate spreads assumed to entirely reflect differences in credit risk, and no other uncertainty, we are of course also entitled to make the same assumption, e.g. that because the probability of credit default by lenders in the BBB credit rating class is expected to be 28% over a 5-year horizon, they must offer a rate of 12% and not the risk-free rate of 5%. It follows, using expected values, that the market-consistent present value of the cash risk premium (risk margin) of $190 previously calculated on an investment of $392 is 72% x $190 / 1.05^5 = $108.

- This again gives us the "risk margin" of $108 we would expect (25 above) to be included in the market-consistent value of any liability to pay $500 in 5 years by Entity Y.

27 So $108 is not taken here to be a "credit enhancement" but as the cash risk premium required by creditors to obtain a certainty-equivalent cash flow to be discounted at the risk-free rate:

- SFAS 157 §B14: "A *certainty-equivalent cash flow* refers to an expected cash flow (as defined), adjusted for risk such that one is indifferent to trading a certain cash flow for an expected cash flow."

- SFAS 157 §B12: "The expected present value technique uses as a starting point a set of cash flows that, in theory, represents the probability-weighted average of all possible cash flows (expected cash flows)."

28 It is unfortunate that CL 129 did not develop the lack of clarity in SFAS 157 with respect to differentiating between a "credit enhancement" and a "risk margin". Now, as many commentators of the Discussion Paper on *Fair Value Measurement* noted, SFAS 157 bases most of its reasoning on the value of financial assets and extends this, in a general and incomplete way, to liabilities. SFAS 157 provides no example or formulae to calculate the effect of risk margins on liabilities and the Discussion Paper on *Insurance*, unlike IFRS 7, provides no reasoning with respect to risk-inclusive rates.

- It is important to realise that both of the methods used in SFAS 157 to provide "the present value (fair value) of the asset's cash flows"—SFAS 157 §B14—rely equally on identifying the risk (credit) spread. This is stated to be 3% in the example given in SFAS 157 (see 24 above or SFAS 157 §B14), but any spread rate will always show that the results of "method 1" (discounting at the risk-free rate) equal "method 2" (discounting at any rate considered risk-inclusive). Using either method is therefore only as reliable as the "market-consistent" risk spreads identified.

- There is no reason to suppose that the risk spreads on the debtors' transfer market for an issued debt instrument are identical to the risk spreads on the corresponding creditors' assets. Using probabilities incorporating the risk spreads (see 26) to calculate

the expected values of cash flows, we shall show these market-consistent probabilities may in fact differ (cf. 153 & 154) and therefore that the risk spreads do differ.

- The risk spread on creditors' assets reflects the fact that these may be bought and sold on the creditors' market so that their cash flows incorporate short-term capital gains or losses.

- The risk spread on the debtors' liability does not incorporate these short-term cash flows unless the liability incorporates a contractual debt buy-back option enabling the debtor, or any transferee debtor, to intervene on the creditors' market and extinguish the liability by buying it back at the quoted (fair) values of the corresponding creditors' assets.

29 Let us now take a liability (specifically not attributable to a borrowing) of $500 due in 5 years by Entity Y.

30 It is again unfortunate that the authors of CL129 did not examine the notion of a "credit upgrade" with reference to the example of such a liability discussed in Statement of Financial Accounting Concepts 7, *Using Cash Flow Information and Present Value in Accounting Measurements*: §78 *et seq.* Only the first part of this example is (re)used in SFAS 157: §A31 (discussed above, 16). The liability to be accounted for is again $500, though this time arising in 3 years, by two entities with borrowing rates of 6% and 12%. This liability is said to have a present (fair) value of $420 ($500/1.06^{3}) for Entity X and $356 ($500/1.12^{3}) for Entity Y.

- Concepts 7 §80a excludes the possibility that Entity X could transfer the liability to Entity Y because it says the creditor "would never consent to replace …[Entity X] with an entity of lower credit standing", i.e. Entity Y.

- It then explains why the inverse transfer could not take place either. It says Entity X would price the transfer at $420 and that the price of $420, §81: "includes the fair value of …[Entity Y's]… liability ($356) plus the price of an upgrade in the credit quality of the liability." The additional amount that "might" be paid for the "upgrade" is then discredited as a possible transfer price because it is pronounced to be a "separate transaction" because such an "upgrade" is "analogous to the purchase of a credit guarantee"—although presumably no actual guarantee may in fact be purchased.

31 Now maintaining the same logic, *mutatis mutandis* over 5 years, with respect to an entity able to borrow at the risk-free rate of 5%--when it is not contentious that the present value of a liability, whether or not a borrowing, to pay $500 in 5 years is $392 ($500/1.05^{5})—and taking Entity Y as the second entity only able to borrow at 12% over 5 years, the second part of the example just reiterates that the present (fair) value of Entity Y's liability, which is not a borrowing in the second part of the example, is $284 ($500/1.12^{5}). As we have already established that $392-$284 = $108 (23, 25 & 26), the obvious first questions for liabilities that aren't borrowings are:

- Why would creditors of the first risk-free entity "never consent" to a transfer of the liability to Entity Y at the price of $392? This transfer would include both $284 and the $108 which is just the compensation required to overcome any creditors' objections for the "credit downgrade" (see 23, 25 & 26)) or, equivalently, just the amount required to provide the creditors the cash risk premium of $190 ($108 x 1.12^{5}) they would require from Entity Y (see 23 & 24). Are compensations not only for a "credit upgrade" but also for a "credit downgrade", or the equivalent "risk premium", also both supposed to be "separate transactions" as well? Why? Why wouldn't creditors be "indifferent as to the asset held" on trading two cash flows adjusted to be certainty equivalents (see 24-27)? And why wouldn't the risk-free entity pay Entity Y the full amount of $392 at which it accounts for the liability in order to derecognise and transfer it in a single transaction?

- Why would Entity Y exclude the risk margin of $108 in any event in evaluating its liability at $284 ($500/1.12^{5}) if this is supposed to be the "current exit value" of an obligation to pay $500 in five years?

  - Readers understanding that this "credit enhancement" is in fact simply the amount required to provide the certainty-equivalent values of the obligation to pay $500 five years hence will just calculate its market-consistent present value using the risk-free interest rate to provide the present-day value of the money, i.e. $392 ($500/1.05^{5}). They will understand, as will the creditors and all other market participants, that $284 **understates that liability** to pay them $500 by $392-$284=$108.

  - Readers interested in gambling odds will calculate these with reference to the rate of return on an efficient market, i.e. the risk-free rate of 5% *pa*. They will understand that a liability accounted for at a present value of $284 can only be expected to yield a return of $362 ($284 x 1.05^{5}) and not $500. In other words, the odds against the provision for this liability of $284 being fit for purpose are ($500-$362)/$500 = 28%. It follows that the expected (probability-weighted) value of the **understatement in the liability** accounted for, i.e. the market inconsistency in the provision of $284, is $138 (28% x $500) on maturity, i.e. at present value just $138/$1.05^{5}$ =$108.

32 To reject the possibility of the inverse transfer to Entity X, Concepts 7 states in §80c, *mutatis mutandis* over 5 years with Entity X able to borrow at the risk-free rate, that if Entity Y were to borrow money to pay the $392 ($500/1.05^{5}) required by Entity X, it would have to promise $690 ($392 x 1.12^{5}) on such a borrowing, i.e. more than the liability of $500 to its original creditors. Now we have already noted (16 above) the contradictory statement in the first part of the example reproduced in SFAS 157 §A31 that in exchange for a promise to pay $500 in five years Entity Y would issue debt for $284 ($500/1.12^{5}) **and therefore not $392**. **$284**, it also states in the first part of the example, would again be the fair value of this promise to any creditor of Entity Y, i.e. its asset value. It follows that:

- **In exchange** for assuming Entity Y's obligation to its original creditors (to pay them $500 in 5 years), Entity X would accept this asset and account for it at its fair value of $284, on subscribing to a debt issue by Entity Y to pay $500 in 5 years.

- In doing this Entity X would be accounting for the asset of $284 like any other creditor on such a debt issued by Entity Y. The only difference is that in lieu of accepting a transfer price in cash for assuming Entity Y's original liability, Entity X accepts the debt issued by Entity Y at its market-consistent fair value equivalent of $284.

- Further, Entity X would always be able to meet its obligations as a transferee debtor by relying on the asset value of Entity Y's issued debt. Indeed, if the fair value of this asset is $284 ($500/1.12^{5}) on maturity in 5 years, … $356 ($500/1.12^{3}) on maturity in 3 years, ... then its fair value is $500 ($500/1.12^{0}) on maturity.

- Consequently Entity Y would have issued debt to Entity X at its fair value of $284 to pay $500 on maturity and Entity Y would therefore not need to borrow (any more) money to pay $690 on maturity. In other words, the statements made in the second part of the example are incompatible with those made in the first part of the example: *reductio ad absurdum est*.

33 In fact we have already established—when the risk-free rate is, say, 5%—that the "current exit value" of an obligation to pay $500 in five years, or the creditor assets' fair value, is always $392 ($500/1.05^{5}), whatever the creditworthiness of the issuer. A much more interesting question arises when the default probabilities expected by creditors on issued debt increase subsequent to inception. As we know, the fair value of issued debt on the creditors' market then decreases, but what about the "current exit value" of the liability? We shall subsequently deal with more general examples of this.

Current exit values

The Insurance paper's justifications & the exclusion of a liability's "credit characteristics" on initial recognition

34 The Discussion Paper on *Insurance* holds that because a borrower measures its debt initially at the amount of cash received (under IAS 39), the initial amount of the debt must include the credit characteristics of the debt. For example, it says, suppose Issuer A issues debt of CU 1,000, repayable in one year with interest of 6% paid at maturity. Issuer A would typically measure the debt initially at the proceeds received (CU 1,000). This is equal to the contractual cash flows (1,060) discounted at a rate (6%) that reflects the credit characteristics of the liability: Appendix H5-H6.

- However, for any rate of interest reflecting the "credit characteristics of the liability", such as 10%, we would always get CU 1,100/(1+10%) = CU 1000, i.e. the "credit characteristics of the liability" cancel out in the numerator and denominator. As they always cancel out, and the initial amount must always equal CU 1,000, how can it be held that "the initial amount of the debt must include its credit characteristics"?

35 Appendix H6 to the Discussion Paper on *Insurance* (repeating the flawed argument in SFAS 157) also states: "Because it must pay a higher interest rate, a less creditworthy borrower would have received a smaller loan for the same contractual repayment of principal and interest. For example, if a borrower must pay interest at 7 per cent for a comparable one-year loan, it will receive only CU991 for a loan that requires it to repay CU1,060 at maturity – CU1,060 = principal of CU991 plus interest of CU69 (7 per cent of CU991). Therefore, the initial measurement **reflects the possibility that the borrower may default**. That result arises automatically from using the amount of the proceeds received as the initial measurement of liabilities issued for cash." (**emphasis added**)

- So, the first point is again that if it were true that you could invest CU991 at 7%, why would anyone invest as much as CU1,000 at as little as 6%? And why wouldn't you invest CU1,000 at 7%? The example is false because efficient markets compensate for any such arbitrage opportunities: they do not exist.

36 Next, Appendix H of the Discussion Paper on *Insurance* also holds that if the initial measurement of debt excluded the credit characteristics of the debt, a loss would arise at inception because of the difference between the risk-free rate and the contractual rate. For example, discussing debt issued by Entity A of CU1,000 repayable in one year with interest of 6%, Appendix H7 states: "If Issuer A instead discounted the contractual cash flows (CU 1,060) at the risk-free rate (say, 5%), it would recognise at inception a liability of CU 1,010, and a loss of CU 10. Thus, if the initial measurement of debt excluded the credit characteristics of the debt, a loss would arise at inception because of the difference between the risk-free rate and the contractual rate."

- This is a curious contention, because credit risk is supposed to generate a profit for the issuer, not a "loss" and certainly neither a profit nor a loss on inception.

- It is the risk-inclusive nominal rate of 6% to give a nominal return of CU1,060 which compensates for the credit risk in a borrowing of CU1,000 compared to a return of CU1,050 at the risk-free rate of 5%: the expected return on an investment of CU1,000 on an efficient market whatever the creditworthiness of the borrower. The "credit characteristics of the liability" do not affect the value on inception of CU1,000.

- The market-consistent risk-inclusive nominal rate of 6% includes the extra 1% to provide the extra CU10 at the year-end in order to compensate for the expected probabilities of credit default on such borrowings, i.e. the probability of default is CU10/CU1,060, about 1%.

- We can either discount the nominal return of CU1,060 using the traditional equation, CU1,060/1.06 = CU1,000, or we can discount the expected value of that return, CU1,060 – 1% x CU1,060 = CU1,050, at the risk-free rate to give CU1,000.

37 For simplicity, as in the Discussion Paper on *Insurance*, let us now use the example of a claim of CU2,100 arising on an insurance contract if, and only if, an unbiased coin tossed at the end of the year turns up a "tail".

- The expected value of a claim amounts to CU2,100 x ½ + CU0 x ½ = CU1,050. It is still the expected value which must be discounted at the risk-free rate of 5% to give the market-consistent value of the liability on inception of CU1,000.

- Let us now take it that like the debt issuer—Entity A—the insurer also provides a nominal return to compensate for credit risk, i.e. that instead of offering to pay out CU2,100 (2 x CU1,050) it offers to pay out a nominal amount of CU2,120 (2 x CU1,060).

  - This gives an estimated nominal return of CU2,120 x ½ + CU0 x ½ = CU1,060.

  - And, as in the case of Entity A, we can also apply the traditional equation by discounting at the nominal rate of 6%, to give a present value of CU1,060/1.06 = CU1,000.

- What of the expected value?

  - We have already calculated that for the nominal return of CU1,060, which Entity A will only pay out in the event of not defaulting, the expected value is in fact: CU1,060 – 1% x CU1,060 = CU1,050. If we assume the same probability of default applies to the nominal amount of the claim of CU2,120 we obtain the expected value to be CU2,120 – 1% x CU2,120= CU2,100, i.e. just twice CU1,050.

  - This gives an expected return of CU2,100 x ½ + CU0 x ½ = CU1,050.

  - And, it is always the expected value which must be discounted at the risk-free rate of interest to provide market-consistent present values: CU1,050/1.05 = CU1,000.

- Obviously the default probabilities might be different between an Entity A which will pay out CU1,060 if it doesn't default and an insurer which will pay out CU2,120 on a claim if it doesn't default. We shall examine this point below.

38 Hopefully, where the risk-free interest rate amounts to 5% and because the only market-consistent return over a year on CU1,000 is CU1,050, we can now leave it to readers to work out for themselves that if the "credit characteristics of a liability" incorporate a market rating by creditors consistent with a risk of credit default at the end of the year of 50%, the debtor would have to propose a nominal return of 210% on issuing debt.

- If we were to believe SFAS 157, this would mean that the creditor could invest $1,000 to make $2,100 ($1,000 x 210%) at the end of the year!

- If we were to believe the Discussion Paper on *Insurance*, this would mean that the liability accounted for by the debtor should be doubled from CU1,000 to CU2,000 (CU2,100/1.05) at the beginning of the year!

- Hopefully, too, readers will be better aware of some of the flaws in using traditional equations for uncertain cash flows to determine market-consistent values.

39 To paraphrase, and correct, the statement in the Discussion Paper on *Insurance* (35 above), we should have read: "Therefore, the initial measurement **does not reflect the possibility that the borrower may default** and that result arises automatically from using the amount of the proceeds received as the initial measurement of liabilities issued for cash **whatever the credit-worthiness of the debtor**."

- Alternately put, the current exit value of a liability on inception is independent of the "credit characteristics of the liability" because the time value of money must always be identical. Were this not the case, the market would not be efficient, i.e. arbitrage opportunities would obviously exist.

40 This entirely invalidates the chains of argument--Discussion Paper on *Insurance* §231 and Appendix H12--claiming that the credit characteristics of a liability are reflected in its initial measurement and therefore should be reflected in subsequent measurements. To the contrary, we may already suspect that as the credit characteristics of a liability are not reflected in its initial measurement, they should not be reflected in its subsequent measurement.

41 As insurers or employers' contributed funds can only invest premiums/contributions and expect to obtain a return at the risk-free rate on any investment, it follows that the same premium/contribution is required, whatever the guarantor entity's credit standing of its liabilities, to meet the expected value of an insurance claim, or an employee benefit.

42 We shall re-use the example (see 37) of a benefit of CU2,100 payable at the year end if, and only if, an unbiased coin is then tossed and turns up a "tail" and the risk-free interest rate is 5%. It is not contentious that the basic premium or contribution required by a guarantor entity with no default risk, such as a government employer, will amount to CU1,050 discounted at the risk-free rate of 5%, i.e. CU1,000:

- The expected value of the benefit is: CU2,100 x ½ + CU0 x ½ = CU1,050 and its present value is: CU1,050/1.05 = CU1,000.

43 We shall now suppose that the a creditworthiness measure for employers' beneficiaries exists: a perfect estimator of "credit ratings" on the beneficiaries' asset market which would provide the probability of credit default on benefits classed by frequency and severity for various classes of debtors as they affect the fair values of the beneficiaries' assets (but not as we shall see the current exit value of the contractual liability of the debtors). This is taken to be the equivalent for this beneficiaries' market of all the information input to the creditors' of financial debt instruments with respect to the market process providing the quoted asset

valuation of the spot exchange (fair) value of assets corresponding to debtors' liabilities, i.e. the fair values of their asset holdings. This would therefore give the current fair value of employees' future benefits and enable them to trade in them daily, for example, by subrogating their rights to other creditors in consideration for their current (fair value) price.

44 For Employer A, a non-government employer, the estimator indicates that the benefit of CU2,100 arising with a frequency of ½ at the year-end when the risk-free rate is 5% entails a credit default risk of, say, 70% . This means that the beneficiaries' market reacts in exactly the same way as the creditors' market for issued debt instruments. It follows that :

- Beneficiaries require a nominal par value for the benefit of CU2,100 amounting to CU7,000 (CU2,100/30%) to compensate them for the expected defaults.
- This corresponds to an additional interest rate, over and above the 5% risk-free rate, of 2⅓% ([CU7,000/CU2,100 -1] x 100%).
- Compounding the two interest rates, we obtain the nominal interest rate of 3.5% ([1+ 5%] x [1+ 2⅓%] -1).

45 We may now discount the expected benefit at its nominal value by the nominal interest rate:

- The nominal value of the expected benefit is: CU7,000 x ½ + CU0 x ½ = CU3,500.
- Its present value is CU3,500/(1+3.5%) = CU1,000.
- CU1,000 is the basic premium or contribution required, i.e. identical to that required for the government employer.

46 We shall now calculate the basic premium or contribution required discounting the expected benefit at the market-consistent risk-free rate of 5%:

- In the event of a claim, the nominal benefit payable amounts to CU7,000 and the expected cash flow, after taking account of the 70% probability that the employer will default on its payment, amounts to : CU7,000 – 70% x CU7,000 = CU2,100: the expected severity.
- The expected frequency of this occurrence is ½ so that the expected benefits are: ½ x [CU7,000 – 70% x CU7,000] = CU1,050.
- Discounting the expected value of CU1,050 at the risk-free interest rate of 5%, we again have just CU1,000, i.e. the same basic premium or contribution whatever the creditworthiness of the employer or the liability.

47 The above results conform totally to those for debt instruments on financial markets and this must always be so on an efficient market:

- The Board's basic belief is that it is possible to obtain returns at nominal rates that would far exceed the risk-free interest rate. This entirely ignores the fact that the nominal rates are greater to compensate for the credit risks to which they are due (on their own assumptions). They also use traditional equations to discount nominal cash flows as if they were risk-certain.

48 As a result, the Discussion Paper on *Insurance* advocates a contradictory approach to expected values to justify including the "credit characteristics of a liability" as we have already seen. For example:

- Appendix H states, "The exclusion of credit characteristics ignores scenarios in which some or all contractual cash outflows do not occur. That is incompatible with measurements based on expected values (i.e. probability-weighted averages of all scenarios)": H12(c); and, "In many cases, the liability of an insurer's owners is limited to the capital they contributed. The exclusion of credit characteristics ignores that fact by implying that the insurer will meet its obligations in full in scenarios when its assets are insufficient."

49 To demonstrate this contradiction, we need to consider the return on Employer A's assets although in principle liabilities should be evaluated "in a way that captures the characteristics of the liability, not the characteristics of the assets viewed as backing those liabilities": *Insurance* Discussion Paper §69. And we shall assume these assets comprise exclusively the invested basic premium or contribution of CU1,000 with the corresponding liability of CU1,000, say, to simplify, a special purpose vehicle, SPV—without any particular outside "credit enhancement", other obligations or capital.

- In principle, it is not contentious—if the CU1,000 is immediately invested in government bonds, for example, carrying interest at 5% *pa*—that there is no risk of the SPV defaulting. The benefits payable will therefore amount to CU2,100 at the year-end with a frequency of ½ with the liability calculation being: CU2,100 x ½ /1.05 = CU1,000 on inception.
- On the other hand, the SPV might immediately sell the government bonds for CU1,000 and/or (re)invest initially in a new bond issue bearing interest at 75% because the creditors' market expects a probability of default of 40% at the year-end. The proceeds required to do this, as we have seen, amount to: [CU1,750 x 60% + CU0 x 40%]/1.05 = CU1,050/1.05 = CU1,000.

50 The scenarios to which the Discussion Paper refers are then as follows:

Table 1: Asset/Liability scenarios with assets of low creditworthiness

Cash flow (investment return less claim)	probability of occurrence	"probability-weighted" values : CU
Scenario 1: CU1,750 -2,100 = - 350	60% x ½ = 30%	- 350 x 30% = -105 (a loss)
Scenario 2: CU0 - 2,100 = - 2,100	40% x ½ = 20%	- 2,100 x 20% = - 420 (a loss)
Scenario 3: CU1,750 -0 = 1, 750	60% x ½ = 30%	1,750 x 30% = 525 (a profit)
Scenario 4: CU0 -0 = 0	40% x ½ = 20%	0 x 20% = 0
Totals	**100%**	**- 105 - 420 + 525 = CU0**
Discounting the expected value of CU0 at the risk-free interest rate		**CU0/1.05 = CU0**

- Now, whilst there are "scenarios when its assets are insufficient", the only measurement based on and compatible "with measurements based on expected values (i.e. probability-weighted averages of all scenarios)" is that the SPV has net equity equal to the difference between the fair value of its assets of CU1,000 and the current exit value of its liabilities of CU1,000, i.e. CU0 as shown above.

- It would suffice besides that the SPV sell its bonds at their fair value of CU1,000 to acquire the government bonds for this not to be contentious. However, we would still have a scenario "when its assets are insufficient":

Table 2: Asset/Liability scenarios with assets of impeccable creditworthiness

Cash flow (investment return less claim)	probability of occurrence	"probability-weighted" values
Scenario 1: CU1,050 - 2,100 = -1,050	½	-1,050 x ½ = - 525 (a loss)
Scenario 2: CU1,050 - 0 = 1,050	½	1,050 x ½ = 525 (a profit)
Totals	**100%**	**CU0**
Discounting the expected value of CU0 at the risk-free interest rate		**CU0/1.05 = CU0**

- There will always be scenarios when assets might be insufficient precisely because an expected value is a "probability-weighted average of all scenarios".

- Anti-selecting for any one scenario would effectively truncate the applicable probability distribution and give a meaningless result. For example, one could imagine from **Table 2** that the SPV should record a profit on inception (of CU525/1.05 = CU500) as scenario 1 shows that "its assets are insufficient" to pay more than CU1,050 for the claim of CU2,100. This would mean that the liability for benefits should be reduced to CU1,050 x ½/1,05 = CU500.

- Furthermore, the only basic premium or contribution that would eliminate all scenarios showing "its assets are insufficient" would have to equal the present value of the highest claim that could arise; for the SPV: CU2,100/1.05 = CU2,000.

- This would void any economic activity based on uncertain returns (such as investments in debt instruments, insurance etc.) of all meaningfulness unless the actors were all market participants of impeccable creditworthiness, i.e. the returns were not uncertain: *reductio ad absurdum est*.

- This shows again that treating uncertain cash flows as if they are deterministic does not provide market-consistent results.

51 The inference that accounting standards might "require" higher premiums, or equivalently require debtors' financial statements to show "losses" (cf. 36 & 38), or again to **understate their liabilities** (cf. 31 & 94), is a serious one. The same *leitmotiv* is also found for participating contracts which constitute "borderline cases" for consistent accounting, without mismatching, between concepts for accounting for financial instruments and insurance contracts.

- Indeed, the Discussion Paper on *Insurance* considers this is how participating contracts work: §239: "For a participating contract, the insurer charges a larger premium." And §240 illustrates this, setting out an "example" for which the figures have been carefully chosen to show this. It is important to understand that in any activity involving taking risks, including credit default risks, some scenarios inevitably involve "ruinous losses" and other scenarios inevitably involve "windfall profits". This is precisely because, for the same given premium, all these scenarios exist as they do in "measurements based on expected values (i.e. probability-weighted averages of all scenarios)".

- When "windfall profits" actually arise for this given premium, insurers are able to afford "policyholders' dividends" and will often provide participating contracts for competitive reasons.

    - Many "dividends" are discretionary: notably because it is not possible to provide a comprehensive dividend scale for all the possible scenarios. Although a transferee would necessarily require these to be included in the price of transfer, we limit ourselves, without prejudice, to considering the current exit value as the price of the enforceable obligations in the contract to debtors—e.g. to serve the contractual rate of interest on a financial debt instrument and not the cash flows that the creditors procure by buying and selling the corresponding assets, making capital gains and losses, at non-contractual rates of interest prior to the maturity date of the financial debt instrument.

Credit risk effects apprehended by the ASB & EFRAG in the Discussion Paper *The Financial Reporting of Pensions*

The difference between a promise to pay for a return on an investment and providing for a liability

52 Appendix C of the EFRAG Paper gives an example intended to illustrate the effects of including and excluding credit risk for the same liability. Entities with identical credit risk are said:

- Either to borrow cash of CU100,000 on a promise to pay a "risk-inclusive" rate of 6% after 5 years, i.e. promising a return of CU134,000 (about CU100,000 x 1.06^{5}),
- Or to have a liability for a lump sum cash payment of CU134,000 in five years, i.e. giving a present value of CU105,000 (CU134,000/1.05^{5}) after discounting at the risk-free rate of interest of 5%.

53 This is apprehended to mean that the liability accounted for must be CU100,000 if the credit risk is included and CU105,000 (with the difference affecting profit and loss) if the credit risk is excluded. In substance, as already noted in principle:

- The promise to pay a "risk-inclusive" rate of 6% on an investment of CU100,000 over 5 years will provide an expected return of only CU128,000 (CU100,000 x 1.05^{5}). Clearly, this is not the same as providing for a liability of CU134,000 payable in five years. The market-consistent present-day value of money (expected present value of the liability) of CU134,000 is CU105,000 (CU134,000/1.05^{5}). In other words, if CU105,000—not CU100,000—is invested at any "risk-inclusive" rate, including 6%, over 5 years, the expected return always equals CU134,000 because of the risk of default implicit in risk-inclusive interest rates. Were this not so, it would be possible to borrow at 5% and invest at 6%: such arbitrage opportunities do not exist on efficient markets.

54 A promise to pay 6% on CU105,000 gives a nominal return of CU140,000 (CU105,000 x 1.06^{5}). Consequently, the probability of not defaulting is CU134,000/CU140,000, i.e. $(1.05/1.06)^{5}$ about 95%.

- If the credit rating of any issuer or the "credit characteristics" of any issued liability are such that the credit risk is 5%, say, we must calculate the contractual rate of interest required by the market on debt issued as a financial instrument at a par value of CU100,000—i.e. an instrument, unlike many debts, which cannot be "issued" without such a rate. The market will require a contractual return of CU128,000/95%, i.e. CU134,000, to compensate for the credit risk. The contractual annual interest required by market participants on the creditors market is then:
  - $[(134,000/100,000)^{1/5}-1] = 6\%$: the "risk-inclusive" rate required in an efficient market to compensate for the credit risk on issue.
- Whatever the probability of default (and readers still not understanding this should work it out again for themselves using different default probabilities and the corresponding contractual returns required on an efficient market), the "current exit value" of the liability is invariant, i.e. it does not reflect the credit default risk. This value, on a market-consistent basis, is CU105,000 to meet a lump-sum payment in 5 years of CU134,000, an investment of CU105,000 in the issued debt to provide a return of CU134,000 on maturity (the expected value of the investment of CU105,000) or CU100,000 to provide a return of CU128,000 on maturity (the expected value of the investment of CU100,000).
- The EFRAG Paper ascribes the difference between accounting for the liability at CU100,000 or CU105,000 as due to including or excluding the "credit characteristics of the liability". Once again, this is false. The difference is entirely due to the fact that it is not the same liability that is being accounted for.

Effect of changes in the credit risk premium subsequent to inception

55 Subsequent to the credit risk premium increasing from 1% to 2%—i.e. giving a "risk-inclusive" rate of 7% (the risk-free rate of interest remaining at 5%)—Appendix C of the EFRAG Paper provides three figures for the end of Year 1:

(a) column 6 : CU110,000 (CU134,000/1.05^{4}) : the liability supposed to "exclude change in credit risk".
(b) column 3 : CU106,000 (CU134,000/1.06^{4}) : a different liability supposed to "exclude change in credit risk" without explanation.
(c) column 4 : CU102,000 (CU134,000/1.07^{4}) : the liability supposed to "include change in credit risk".

56 But then again, the example only gives three interest rates: (a) 5%, (b) 6% & (c) 7%. Let us discriminate between their use, if any, as meaningful discount rates:

(a) <u>5% : column 6 : CU110,000 (CU134,000/1.05^{4}) : the liability supposed to "exclude change in credit risk"</u>

- There is only one **current exit value** for a given liability of CU134,000 payable in the 4 years after year 1—i.e. its immediate transfer value on the debtors' market. This is always the liability discounted at the risk-free rate, and it is entirely independent of the "credit characteristics of the liability". If the liability in question is CU134,000, it amounts to CU110,000, i.e. CU134,000/1.05^{4}. Discounting at the risk-free interest rate gives the present value of money on a market-consistent basis.
- On the other hand, if the liability is for a financial instrument issued at par for CU100,000 bearing a contractually rolled-up rate of interest of 6% *pa* with 5 years to maturity, the **current exit value** is its contractual value of CU100,000 (CU134,000/1.06^{5}).

Provided this contract is still in existence at the end of the first year—i.e. the debtor has not defaulted—the **current exit value** of that contract with 4 years to maturity is CU106,000 (CU134,000/1.06^4).

Liability 1 On the financial instrument at its expected value in 5 years on inception of CU128,000 where CU100,000 = CU128,000/1.05^5:

- On issue, with an expected probability of not defaulting on a promise to pay CU134,000 in 5 years of 95%, i.e.$(1.05/1.06)^5$, the expected future value for such a financial instrument is 95% of CU134,000 on the creditors' market, i.e. CU128,000. And its expected present value is CU128,000/1.05^5 = CU100,000 on the creditors' market, i.e. the **assets' fair value**.

(b) 6%: column 3: CU106,000 (CU134,000/1.06^4) : a different liability supposed to "exclude change in credit risk" without explanation

Liability 2 On the financial instrument at its expected value in 4 years of CU129,000 at the unchanged rates where CU106,000 = CU129,000/1.05^4:

- At the end of Year 1, if no changes in interest rates on the creditors' market are imputed to the asset value of the financial instrument and no default has occurred, the probability of not defaulting over the residual term has increased from 95% to 96%—i.e.$(1.05/1.06)^4$. The expected future value for the financial instrument is 96% of CU134,000 on the creditors' market, i.e. CU129,000. And its expected present value is CU129,000/1.05^4 = CU106,000 on the creditors' market, i.e. the **assets' fair value**.
    - The increase in the probability of not defaulting from 95% to 96% gives rise to an experience adjustment of CU1,000 (1% x CU134,000/1.05^4): this accounts for the increase in the expected return of 5% on CU100,000, i.e. CU105,000 to CU106,000.
    - Of course, those unaware of how credit risk affects expected values will ignore the experience adjustment and simply consider the amount of CU106,000 as a deterministic result attributable to discounting the contractual return of CU134,000 at 6% (CU134,000/ 1.06^4 = CU106,000). Or, even more unconsciously, as the deterministic result of rolling up the nominal interest of 6% ("unwinding the discount rate") on CU100,000.
    - They will then also believe that the **current exit value** of a debt equals the **assets' fair value**.

(c) 7%: column 4 : CU102,000 (CU134,000/1.07^4) : the liability supposed to "include change in credit risk"

Liability 3 On the financial instrument at its expected value in 4 years of CU124,000 at the changed rates where CU102,000 = CU124,000/1.05^4:

- At the end of Year 1, if the **assets' fair value** quoted for such an instrument on the creditors' market has decreased to CU102,000 implying that the "risk-inclusive" rate has increased to 7% at the end of Year 1 and no default has occurred, the probability of not defaulting over the residual term on the devalued asset will have decreased from 95% to 93%, i.e.$(1.05/1.07)^4$. The expected future value for the financial instrument is 93% of CU134,000 on the creditors' market, i.e. CU124,000. And its expected present value is CU124,000/1.05^4 = CU102,000 on the creditors' market, i.e. the **assets' fair value**.
    - The decrease in the probability of not defaulting from 95% to 93% gives rise to an experience adjustment of minus CU3,000 (2% x CU134,000/1.05^4): this accounts for the decrease in the expected return of 5% on CU100,000, i.e. from CU105,000 to CU102,000.
    - Again, those unaware of how credit risk affects expected values will continue to ignore the experience adjustment and simply consider the amount of CU102,000 as a deterministic result attributable to discounting the contractual return of CU134,000 at the new rate consistent with the creditors' expectations of 7% (CU134,000/ 1.07^4 = CU102,000).
    - They will also believe this is the **current exit value** of the debt despite the fact that they are using a non-contractual rate of return (7% instead of 6%) to derive this value.

57 By now, it should again be obvious that providing for a liability payable at the end of year 5 of CU134,000 is not the same thing as providing for:

Liability 1 On the financial instrument at its expected value in 5 years on inception of CU128,000 where CU100,000 = CU128,000/1.05^5.
Liability 2 On the financial instrument at its expected value in 4 years of CU129,000 at the unchanged rates where CU106,000 = CU129,000/1.05^4.
Liability 3 On the financial instrument at its expected value in 4 years of CU124,000 at the changed rates where CU102,000 = CU124,000/1.05^4.

58 As the present value of Liability 3 of CU102,000 is the fair value of the assets corresponding to the debtor's liability on the creditors' market, it is important to **understand how the change in fair value of the liability due to its "credit characteristics" is supposed to occur. And we shall retrace this on a step-by-step basis from Liability 1 through to Liability 3**.

The inexistent reflection of a price for credit risk in expected finance costs

59 To discover received opinion we shall want to look at what is apprehended when "**no default arises in the first year"** (which should also clarify the principles for subsequent years) firstly by examining a number of other statements in the EFRAG Paper and then in IFRS 7. For example, in the EFRAG Paper we have:

- Chapter 5 §7.2: "A particularly complex and contentious issue is whether the risk that an entity will default on its obligations should be reflected in the measurement of the liability. This risk is reflected in an entity's credit rating. An entity with a lower credit rating will pay a higher interest rate on its borrowings. The present value of a liability discounted at this higher 'risk inclusive' rate will be lower than for an entity with a higher credit rating."

- Chapter 5 §7.6: "Looked at another way, if an entity takes out an unsecured loan, the finance cost (i.e. the difference between the consideration received and the payments the debtor is required to make to the creditor) will reflect a price for the entity's credit risk. If, however, the entity pledges assets as collateral for the loan, it will in general achieve a lower cost of borrowing because the risk that the creditor will not be paid is reduced."

60 We have already established that there is no expected "higher" interest rate on an efficient market, whatever the rate of interest on any debt issued, and that discounting at a higher "risk inclusive" rate does not give the expected present value of a liability. Given the apparently universal failure to apprehend this, we shall now prove it by "unwinding the discount rate" at the "higher" rate of interest on the liabilities between which the EFRAG Paper does not discriminate. Without using the rounding in the EFRAG Paper so as to supply clear annual calculations, we have:

Liability 1 On the financial instrument at its expected value in 5 years on inception of CU127,628 (CU100,000 x 1.05^{5}).
Liability 2 On the financial instrument at its expected value in 4 years of CU128,844 (CU106,000 x 1.05^{4}) at the unchanged rates.
Liability 3 On the financial instrument at its expected value in 4 years of CU124,094 (CU102,092 x 1.05^{4}) at the changed rates.

Establishing appropriate discount rates for estimated cash flows

Liability 1 On the financial instrument at its expected value in 5 years on inception of CU127,628 (CU100,000 x 1.05^{5})

61 On inception of the debt instrument, let us take the expected annual probability of default equal to the credit spread divided by (1 + the 'risk inclusive' rate), i.e. 1%/(1+6%)—about 0.94% *pa*—and examine the expected quotation of the debt issued at par for CU100,000 using a debt amortisation table. We obtain the following:

Table 3: Weighting annual cash flows with the probabilities of credit defaults

Debt amortisation in CU:	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Opening balance	100 000	105 000	110 250	115 763	121 551
Nominal interest at 6%	6 000	6 300	6 615	6 946	7 293
Sub-total before default	**106 000**	**111 300**	**116 865**	**122 709**	**128 844**
Expected default at 0.94%	-1 000	-1 050	-1 102	-1 158	-1 216
Expected closing balance	**105 000**	**110 250**	**115 763**	**121 551**	**127 628**

- As previously: with an expected probability of not defaulting on a promise to pay CU134,000 in 5 years of 95%—i.e.$(1.05/1.06)^{5}$—the expected future value of a financial instrument issued at par for CU100,000 with a nominal "risk-inclusive" interest rate of 6% is CU134,000 at 95% on the debtors' market, i.e. CU128,000 as the closing balance in the above amortisation table indicates (CU128,000 is just the rounding of CU127,628 used in the EFRAG Paper).

62 The EFRAG Paper apprehends (see citations given 59 above) that "the entity with a lower credit rating will pay a higher interest rate on its borrowings" or, looked at another way, that "the finance cost will reflect […] a price for the entity's credit risk". This is again false: the expected, market-consistent finance cost can only be 5%. For example, the expected cost in Year 3 is the nominal interest of 6% on CU110,250 amounting to CU6,615 less the year's expected default in this return of CU1,103: this amounts to CU5,513, which is just 5% of the expected outstanding opening balance of CU110,250. Indeed, as the risk-free rate of 5% is the only possible expected return on an efficient market, the above debt amortisation table might have been represented as follows:

Table 4: Discounting the expected cash flows at the risk-free rate

Debt amortisation in CU:	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Opening balance	100 000	105 000	110 250	115 763	121 551
Expected interest at 5%	5 000	5 250	5 513	5 788	6 077
Closing balance	**105 000**	**110 250**	**115 763**	**121 551**	**127 628**

63 It is again clear from the above tables that the liability here is CU127,628 at the end of Year 5, and that its present value must be obtained by discounting it at the risk-free rate of 5%, i.e. CU127,628/1.05^{5} =CU100,000: the opening balance on inception. This involves no "higher" cost attributable to any "credit characteristics" of a liability or an entity's credit standing/rating whatever the nominal interest rate required on an efficient market, i.e. where the nominal interest rate must always compensate the probabilities of any credit risk. In other words,

- The expected "finance costs" always amount to 5% and never "reflect a price for the entity's credit risk".

The effect of credit risk in the measurement of liabilities

- The statement that "The present value of a liability discounted at this higher 'risk inclusive' rate will be lower than for an entity with a higher credit rating" is equally meaningless.

64 We must now deal with the second liability:

<u>Liability 2</u> On the financial instrument at its expected value in 4 years of CU128,844 (CU106,000 x 1.05^4) at the unchanged rates

Experience adjustments for changes in credit risk

65 A decrease in credit risk is generally understood to give rise to an increase in fair value (cf. IFRS 7 §10). However, as there is no explicit discussion of the probability of credit default, the obvious fact that an experience adjustment for this arises in the event no default occurs is not recognised. Reverting to the above amortisation tables, it is clear that the market-consistent expected fair value of CU105,000 at the end of Year 1 increases to CU106,000 in that event. This adjustment of CU1,000 is known as an experience adjustment–cf. §85(c) of the Insurance Discussion Paper.

66 To make this clear we shall re-do the debt amortisation table with the same expected annual probability of default :

Table 5: Use of a debt amortisation table to establish experience adjustments at unchanged rates

Debt amortisation in CU:	Year 1	Year 2	Year 3	Year 4	Year 5
Opening balance	100 000	106 000	111 300	116 865	122 708
Nominal interest at 6%	6 000	6 360	6 678	7 012	7 362
Sub-total before default	106 000	112 360	117 978	123 877	130 071
Expected default at 0.94%	-1 000	-1 060	-1 113	-1 169	-1 227
Sub-total before adjustment	105 000	111 300	116 865	122 708	128 844
Experience adjustment	1 000				
Closing balance	106 000	111 300	116 865	122 708	128 844

67 Again, as the risk-free rate of 5% is the only possible expected return on an efficient market, the above debt amortisation table might have been represented as follows:

Table 6: Representation of debt amortisation tables using an unchanged risk-free rate

Debt amortisation in CU:	Year 1	Year 2	Year 3	Year 4	Year 5
Opening balance	100 000	106 000	111 300	116 865	122 708
Expected interest at 5%	5 000	5 300	5 565	5 843	6 135
Sub-total before adjustment	105 000	111 300	116 865	122 708	128 844
Experience adjustment	1 000				
Closing balance	106 000	111 300	116 865	122 708	128 844

68 And, of course the present value of the new (adjusted) liability, **Liability 2**, of CU128,844 is CU106,000 (CU128,844/1.05^4), i.e. just the fair value of the quoted assets on the creditors' market, whereas again:

- The expected "finance costs" always amount to 5% and never "reflect a price for the entity's credit risk".

- The statement that "the present value of a liability discounted at this higher 'risk inclusive' rate will be lower than for an entity with a higher credit rating" is again equally meaningless.

69 The adjustment is totally prospective as, in the event no credit default occurred, the probability of not defaulting has increased from 95% –$(1.05/1.06)^5$ to 96% –$(1.05/1.06)^4$ although the expected annual probability of default still amounts to 0.94% when the credit spread is unchanged. It should in fact be obvious that credit risk must in general decrease as the period in which exposure to credit default decreases, i.e. throughout the life of a debt instrument. However, together with the concomitant increase in the expected liability finally payable from **Liability 1**: CU127,628 (rounded to CU128,000 by EFRAG) on inception to **Liability 2**: CU128,844 (rounded to CU129,000) at the end of Year 1, this also is not recognised by received opinion.

70 To make it clear that the unrecognised experience adjustment is prospective, the following table sets out the differences in the expected present values of the liabilities at the end of each year to show that all of their present values at the end of Year 1 amount to just CU1,000:

Table 7: Establishing the experience adjustments at unchanged rates are fully prospective

Debt amortisation in CU:	Year 1	Year 2	Year 3	Year 4	Year 5
Closing balances for Liability 1 - Table 4	105 000	110 250	115 763	121 551	127 628
Closing balances for Liability 2 - Table 6	106 000	111 300	116 865	122 708	128 844
Difference	1 000	1 102	1 157	1 216	1 102
Discount factor to EOY 1	1.05^0	1.05^{-1}	1.05^{-2}	1.05^{-3}	1.05^{-4}
Difference discounted:	1 000	1 000	1 000	1 000	1 000

The effect of credit risk in the measurement of liabilities

71 ***The experience adjustment of CU1,000 arises in the same way as the adjustment in any amortisation table when re-estimating cash flows using revised estimates cf. IAS 39 §AG8 for amortisation at the effective interest rate: "***The entity recalculates the carrying amount by computing the present value of estimated future cash flows [...] The adjustment is recognised as income or expense in profit or loss." Inconsistently, this concept has not been apprehended as applying in accounting for "fair values". The adjustment here of course is not recalculated at the "original effective interest rate" but at the risk-free rate over the next 4 years: 5% *pa*.

72 It is easy to understand that such experience adjustments will be required at the end of every period in the event of no default occurring. In other words, the required experience adjustments, the reversal of the expected loss due to the fact that the issuer has not defaulted, is the expected increase in the liability due to the consequent reduction in credit risk over the future years. Put alternatively, the expected finance costs are always 5% *pa*, but the experience adjustment (where the expected default risk did not transpire) increases the finance costs to 6% *pa*. This increase of 1% *pa* represents an increase in the prospective liability payable equal to the reduction in the credit risk over the remaining, future period during which the financial instrument remains outstanding. **Far from being attributable to a "higher credit risk", the increase in the current year's "finance costs" is entirely attributable to the decrease in the credit risk over future years and the corresponding increase in the actual liability for which provision is being unthinkingly made.**

73 Neither the EFRAG Paper nor IFRS 7 apprehend that the expected credit risk decreases with every year no default arises and only attributes changes in credit risk to "market-consistent" changes in the quoted interest rates of financial instruments on the creditors' market. However, in general and in particular where interest rates and spreads do not change, the credit risk decreases as the likelihood of defaults diminishes over the number of years in which they might arise. This requires apprehending the existence of experience adjustments arising at every reporting date as a result of no expected credit default having previously arisen as well as those arising when market interest rates do, additionally, change.

74 We must now deal with the additional experience adjustment which arises when the credit spread increases from 1% to 2% at the end of Year 1, i.e. the third liability:

<u>Liability 3</u> On the financial instrument at its expected value in 4 years of CU124,094 (CU102,092 x 1.05^4) at the changed rates

Apprehending changes in the "credit characteristics" of a liability

75 At the end of Year 1 the expected annual probability of default equal to the credit spread divided by (1 + the 'risk inclusive' rate) of 1%/(1+6%)—about 0.94% *pa*—on inception changes to 2%/(1+7%) *pa*—about 1.87% *pa*. We again examine the expected quotation by creditors on the asset market for the debt issued at par for CU100,000 using a debt amortisation table for these fair (asset) values:

Table 8: Use of a debt amortisation table to establish experience adjustments at changed rates

Debt amortisation in CU:	Year 1	From EOY 1	Year 2	Year 3	Year 4	Year 5
Opening balance	100 000		102 093	107 197	112 557	118 185
Nominal interest at 6%	6 000	Interest on assets at 7%	7 146	7 504	7 879	8 273
Sub-total before default	106 000		109 239	114 701	120 436	126 458
Default at 0.94%	-1 000	Default at 1.87%	-2 042	-2 144	-2 251	-2 364
Sub-total before adjustment	105 000					
Experience adjustment	-2 907					
Closing balance	102 093		107 197	112 557	118 185	124 094

76 Or, again, as the risk-free rate of 5% is the only possible expected return on an efficient market, the above debt amortisation table might have been represented as follows:

Table 9: Representation of debt amortisation tables using a changed risk-free rate

Debt amortisation in CU:	Year 1	Year 2	Year 3	Year 4	Year 5
Opening balance	100 000	102 093	107 197	112 557	118 185
Expected interest at 5%	5 000	5 105	5 360	5 628	5 909
Sub-total before adjustment	105 000	107 197	112 557	118 185	124 094
Experience adjustment	-2 907				
Closing balance	102 093	107 197	112 557	118 185	124 094

77 ***The experience adjustment of minus CU2,907 arises in the same way as before. We shall leave it readers to prove it is again totally prospective and equals plus CU1,000 (the previously calculated adjustment due to the decrease in credit default risk over the residual period of the debt from 5% to 4%) less CU3,907 (corresponding to the widened credit spread on the creditors' markets resulting in the subsequent increase in credit default risk over the residual period of the debt from 4% to 7%).***

78 The **current exit value** of the liability, i.e. its transfer value between debtors on the debtors' market, would remain at its contractual value of CU106,000 with future interest payable at the contractual rate of 6% *pa*.

The effect of credit risk in the measurement of liabilities

79 But, as previously calculated, the revised expected future liability at the exchange (fair) value of the creditors' assets at the end of Year 5, resulting from the entity's promise to pay 6% *pa* to its creditors but given a value corresponding to a non-contractual interest rate of 7% on the creditors' market, is CU124,000 (93% of CU134,000). This must be discounted at 5% to give the revised expected present value of the liability of CU102,093 (CU124,094/1.05^4) at the end of Year 1.

80 Those without "actuarial textbooks" should still understand this although, as unconscious actuaries, they will no doubt be happier discounting the contractual promise to pay CU134,000 (CU100,000 x 1.06^5) at the creditors' market rate of 7% to obtain CU134,000/1.07^4 = CU102,093 "as if" the nominal rates of 6% and 7% were not attributable to the differing probabilities of credit default, i.e. the underlying credit risks.

Transferring a liability after a change in credit risk

81 It is also important to reiterate that for any given liability, the current exit value does not change, i.e. its transfer value to another debtor for the continuing liability to the same creditor is invariant.

82 The experience adjustment of CU2,907 is only required if we believe the fair value of the debt issued should equal the exchange values of the corresponding assets quoted on the creditors' market at their spot prices–-presumably because the debtor might be able, both financially and contractually, to settle its liability immediately at that price by paying back the creditors without that option affecting its quoted price. We shall be looking at actual debt buy-back options in the context of the fair value option.

83 As the preceding discussion and the above debt amortisation tables show, accounting for the liability at the fair value of the creditors' corresponding assets means accepting a system of belief:

- that we should be accounting for **Liability 3** : CU124,094; a liability based on a non-contractual rate of 7% over the remaining four years.
- that we should not be accounting for **Liability 2** : CU128,844; a liability based on the contractual rate of 6% over the remaining four years.
- and, on inception, that we were not accounting for **Liability 1** : CU127,628 but for a deterministic cash outflow in five years of CU134,000.

84 Alternatively put, such a system of belief:

- denies that any investment of CU100,000 can only provide an expected return on an efficient market at the risk-free rate of 5% *pa,* i.e. CU127,628 in five years although it is precisely the credit risk in the given investment that necessitates the contractual rate of 6%.

- denies that any investment of CU106,000 can only provide an expected return at 5% *pa* over four years of CU128,844 on an efficient market and that CU106,000 would therefore be the cash proceeds required by any issuer or transferee debtor to meet the contractual liability of CU134,000 payable in four years as well as the current exit value of this liability.

- assumes that a transferee would take on this liability at the fair value of the assets of CU102,093 although it could not invest the proceeds of the transfer of CU102,093 in an efficient market and expect to obtain a return at 7% *pa* over four years to meet the contractual liability transferred of CU134,000 (CU102,093 x 1.07^4).

85 Furthermore, over the residual term of four years, assuming no embedded option in the contractual liability enabling debtors to settle the liability prematurely by buying it back at its fair (spot exchange) value on the creditors' market (a debt buy-back option), such a system of belief fails to apprehend that:

- The issuer or any transferee debtor cannot benefit from the trading opportunity created by the reduction in the (fair) value of the debt on the creditors' market, i.e. they cannot benefit from the capital loss realised by the creditors of CU3,907 (CU106,000 - CU102,093).

- Could they do so, they would achieve a trading gain of CU3,907 in exactly the same way that the creditors have made a loss. That loss corresponds to the reduction in the future cash inflow expectations of the creditors from CU128,844 to CU124,094, i.e. CU4,750. In other words, the creditors have lost the benefit of an investment of CU3,907 which, over four years, would have produced a return at 5% *pa* on an efficient market, i.e. CU3,907 x 1.05^4 = CU4,750.

- As the issuer or any transferee debtor cannot benefit from this reduced cash outflow, the current exit value of their debt on an efficient market remains the present-day value of the unchanged cash flow amounting to CU128,844 discounted at the risk-free rate of 5% *pa*, i.e. CU128,844/1.05^4 = CU106,000, as we have already seen.

86 The effects of a debt buy-back option are given below: see ***Credit excision: the value of a fair value option***.

87 Once again, it is important not to confuse the liability on a financial instrument with a liability for another obligation: for a "lump sum" payment: see 56 above & for other general liabilities see 29-32 & 177-180 (covering unfunded contributions for employee benefits).

Credit enhancement: the cost of a put option with a strike price equal to the nominal return

88 The EFRAG Paper not only apprehends that "the finance cost will reflect … a price for the entity's credit risk", discussed above, but also:

- Chapter 5 §7.9 (f): that "… credit enhancement of the liability is a cost to the entity (in effect the company has to buy it). It is to be expected that the entity should then report a loss and an increase in its liability."

89 We have already discussed "credit enhancement" amongst other flawed or unclear concepts in SFAS 157: ***"Credit enhancement" in SFAS 157*** & ***"Credit enhancement" and risk margins in SFAS 157***.

90 Briefly, as we have already seen, the expected present value of a liability to pay CU134,000 (CU100,000 x 1.06^5) in 5 years is CU105,000 (CU134,000/1.05^5) if the risk-free rate is 5% *pa*. The present value of that liability is never CU100,000 as the EFRAG Paper suggests on the basis that:

- CU100,000 invested with an entity making a nominal promise to pay interest of 6% *pa* and that CU100,000 x 1.06^5 = CU134,000.

- To take a 2nd example: Would investing CU50,000 in a junk bond issue promising about 22% *pa* make the present value of that liability CU50,000 because CU50,000 x 1.22^5 = CU134,000?

91 As before, for an issuer who has to propose 6% *pa* instead of 5% *pa*, the probability of not defaulting at term is CU100,000/CU105,000 or about 95%. And for the junk bond CU50,000/CU105,000 or about 48%.

92 It follows that credit enhancement required will cost:

- CU5,000 if the expected probability of default is 5% (100%-95%) on the investment of CU100,000: CU134,000 x 5%/1.05^5 = CU5,000.

- And CU55,000 if that probability is 52% (100%-48%) on investing CU50,000 in the junk bond: CU134,000 x 52%/1.05^5 = CU55,000.

93 So, if the liability to be paid in 5 years amounts to CU134,000 we can choose to invest:

- CU105,000 in any entity (or in a "risk-free" entity paying 5% *pa* if we are risk-averse); or,

- CU100,000 in an entity promising to pay 6% *pa* and a further CU5,000 for a put option with a strike price of CU134,000 at term; or,

- CU50,000 in the junk bond issuer promising to pay about 22% *pa* and a further CU55,000 for a put option with a strike price of CU134,000 at term.

94 In every case, the expected present value of the entity's liability to pay CU134,000 in 5 years is always CU105,000 (the proceeds from the investment and the written put) and consequently it is **not** "to be expected that the entity should then report a loss and an increase in its liability" if that liability is "credit-enhanced". If an entity has to "report a loss and increase its liability" this simply means that it **understated the liability** in the first place, for example by providing for CU100,000 and not CU105,000 on inception or, in the case of the junk bond issuer, for CU50,000 and not CU105,000 on inception.

95 Of course, the entity might have to reinvest the proceeds of any written put with an insurance company. The entity would be unable to pay the exercise price if the "credit characteristics" of the liability for the put were the same as those for the host debt instrument, but see 19 above.

96 Such a put arises naturally in participating contracts and the Discussion Paper on *Insurance Contracts*, §259, suggests that the liability for the put would be included in the current exit value of the liability where the contract guarantees that "the insurer bears the loss if the investment return is negative." However, typically, negative investments engender credit defaults.

97 Whatever, if the contractual liability is to pay CU134,000 in 5 years time, the investment required will always amount to CU105,000 whether the promised rate of return on the debt instrument amounts to 6% or 22%. If the debtor is required to pay for a "credit enhancement" it might have to acquire a credit guarantee for CU5,000 or CU55,000 out of the proceeds of CU105,000 received from the investor.

98 The statement in the EFRAG Paper, "[…] credit enhancement of the liability is a cost to the entity (in effect the company has to buy it). It is to be expected that the entity should then report a loss and an increase in its liability," is therefore untrue:

- To meet the liability of CU134,000 the "entity" will always require an investment of CU105,000 and if it invests part of this in a credit guarantee on behalf of its creditors, this is not "a cost to the entity", this is not "an increase in its liability" and it will not then "report a loss".

Credit excision: the value of a fair value option

99 We must now discuss the value of a "fair value option", i.e. the option that would enable the issuer of a financial instrument bearing a contractual rate of interest to redeem creditors (before its due date) at its fair value on the creditors' market.

100 Taking the risk-free interest rate at 5% *pa* we have already established, whatever the "credit characteristics" of the financial liability or the "credit standing" of the borrower, that:

- a borrowing for cash (or its fair-value equivalent) from a creditor of CU100,000 corresponds to a liability of CU127,628 (CU100,000 x 1.05^5) reimbursable in 5 years on an efficient market and that CU100,000 is the current exit value of the liability on inception.

- if the given debt issued offers a contractual interest rate of 6% *pa*, required on inception to compensate for expected credit risks over the 5 years, and no default has occurred to void the contract of substance, the current exit value is then CU106,000 at the end of the first year, i.e. the current exit values are obtained by accumulating the year's contractual interest of 6% which gives successively:

Table 10: Annual current exit values

Current exit values of the	BOY 1	EOY 1	EOY 2	EOY 3	EOY 4	EOY 5
liability in CU:	100 000	106 000	112 360	119 102	126 248	133 823

101 The contractual return of CU133,823 *in fine* was rounded to CU134,000 in the EFRAG Paper.

102 Although the contractual rate of interest on the borrowing of CU100,000 is 6%, the risk-inclusive rate with a credit spread of 1% on issue, we have also established that, where this market-consistent credit spread increases to 2% at the end of year 1, the expected fair values for the assets traded on the creditors' market are based on the notional interest rate of 7% (provided no other credit downgrades, upgrades or defaults occur over the remaining 4 years) as follows:

Table 11: Annual fair values

Asset amortisation in CU:	**Year 1**	**From EOY 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Opening balance	100 000		102 093	109 239	116 886	125 068
Nominal interest at 6%	6 000	Interest on assets at 7%	7 146	7 647	8 182	8 755
Sub-total before default	**106 000**		**109 239**	**116 886**	**125 068**	**133 823**
Default at 0.94%	-1 000	Default at 1.87%	-2 042	-2 185	-2 338	-2 501
Sub-total before adjustment	**105 000**		**107 197**	**114 701**	**122 730**	**131 322**
Experience adjustment	-2 907	Experience adjustments	2 042	2 185	2 338	2 501
Expected asset fair values	**102 093**		**109 239**	**116 886**	**125 068**	**133 823**

103 We shall now assume that the issued financial instrument contains contractual clauses enabling the issuer to buy back the issued debt at its quoted value on the creditors' market.

- This would justify accounting for the liability corresponding to the issued debt at its exchange value on the creditors' market as opposed to accounting for it at its transfer value on the debtors' market, i.e. using the "fair-value option".

104 This debt buy-back option may be valued by reference to the effect of credit risk: the credit spread on quoted values in the creditors' market, i.e. the "credit excision", for want of a better term, of the current exit values of the liability. This credit excision model:

- is both easy to construct and instructive to understand.

- will be shown to give identical results with the more complicated valuation of the debt buy-back option *per se*: the debtor's American call option exercisable for the fair values of the assets on the creditors' market throughout the lifetime of the host debt instrument.

105 **In the event of default** (for simplicity throughout taken to be total default) the creditor will not recover the current exit value of the debt. Its exchange value on the creditors' market will be zero. For the debtor, these represent asset values attributable to potential savings in cash outflows on buying back the debt on the creditors' market at values that are less than the debt's current exit value. The expected values of this 1st leg of the debt buy-back option are obtained by "weighting" the debt's current exit values with the probabilities of default already derived:

Table 12: 1st leg of a debt buy-back option at asset fair values using the credit excision model

Debt buy-back option: 1st leg in CU	BOY 1	EOY 1	EOY 2	EOY 3	EOY 4	EOY 5
1. Current exit values	100 000	106 000	112 360	119 102	126 248	133 823
2.Probability of no default	$(1.05/1.06)^5$	$(1.05/1.07)^4$	$(1.05/1.07)^3$	$(1.05/1.07)^2$	$(1.05/1.07)^1$	$(1.05/1.07)^0$
3. Idem as a percentage	≈95%	≈93%	≈94%	≈96%	≈98%	100%
4. Probability of default: (100% - 3)	≈5%	≈7%	≈6%	≈4%	≈2%	0%
5. Expected value of savings: (1 x 4)	4 629	7 705	6 184	4 411	2 360	0

106 **In the event of default not occurring** the creditor will recover the contractual value of the liability from the debtor at the end of Year 5 of CU133,823 (CU100,000 x 1.06^5) instead of its expected value on inception of CU127,628 (CU100,000 x 1.05^5).

- At the end of Year 4 the market-consistent present value of the exit value of CU133,823 is CU133,823/1.05 = CU127,450.

- However, the current exit value of the debt at the end of Year 4 is CU126,248 (CU133,823/1.06): its market-consistent value on the debtors' market, i.e. a transferee debtor would receive CU126,248, the contractual amount due from the transferor, to pay out a further 6% thereon to the creditors at the end of Year 5. We have a difference of CU126,248 - CU127,450 = - CU1,202.

- At the end of Year 3, the market-consistent present value of the exit value of CU133,823 is CU133,823/1.05^2 = CU121,381 when the current exit value is CU133,823//1.06^2= CU119,102. We have a difference of CU119,102 - C121,381 = - CU2,279.

- The previous years' market-consistent present values of the exit value will always exceed the expected market consistent current exit values based on the contractual return of 6%.

- For the debtor, these differences are therefore liability values attributable to the additional cash outflows it will have to pay if it cannot otherwise extinguish the debt than by defaulting: i.e. if it cannot buy back the debt, before maturity. The expected values of this second leg of the debt buy-back option are obtained by "weighting" the differences with the probabilities that no default occurs:

Table 13: 2nd leg of a debt buy-back option at asset fair values using the credit excision model

Debt buy-back option: 2nd leg in CU	BOY 1	EOY 1	EOY 2	EOY 3	EOY 4	EOY 5
1. Current exit values	100 000	106 000	112 360	119 102	126 248	133 823
2. Present value of the exit value	104 853	110 096	115 601	121 381	127 450	133 823
3. Difference (1 - 2)	-4 853	-4 096	-3 241	-2 279	-1 202	0
4. Probability of no default	≈95%	≈93%	≈94%	≈96%	≈98%	100%
5. Expected value of additional cash outflows: (3 x 4)	-4 629	-3 798	-3 063	-2 195	-1 180	0

107 The value of the debt buy-back option is then the sum of its two components. As the debt buy-back option would enable the issuer to buy back the debt at its quoted value on the creditors' market, a net saving arises for the issuer here because of the capital loss taken on the fair (exchange) value of the assets on that market.

- In other words, the capital loss represents the reduction in the future cash flows—see 85 above—that the creditors expect to obtain from the debt instrument although the contractual cash flows required have not changed. The debt buy-back option enables the debtor to take advantage of this reduction in the creditors' expected cash flows which do not exist on the debtors' transfer market if this option does not exist in the issued contract.

- The net effects of the debt-buy back option on the recorded liabilities are as follows:

Table 14: Net effect on the current exit values of the host debt instrument with an embedded debt buy-back option

Debt buy-back option : net effect in CU	BOY 1	EOY 1	EOY 2	EOY 3	EOY 4	EOY 5
1. Liability at current exit values	100 000	106 000	112 360	119 102	126 248	133 823
2. Debt buy-back option: 1st leg (savings)	-4 629	-7 705	-6 184	-4 411	-2 360	0
3. Debt buy-back option: 2nd leg (additional outflows)	4 629	3 798	3 063	2 195	1 180	0
4. Net effect of the debt buy-back option: (2+3)	**0**	**-3 907**	**-3 121**	**-2 216**	**-1 180**	**0**
5. Net liability: (1+4) – the assets' fair values	100 000	102 093	109 239	116 886	125 068	133 823

108 With the debt buy-back option, it is immediately clear that the net liability does in fact equal the asset trading (fair) value of the debt on the creditors' market. It is contradictory that:

- the fair value option in IAS 39 actually enables debts to be stated at this value "by designation" even though the debt is not a trading liability and even though the contractual terms of issue do not explicitly include a debt buy-back option.

- the *Implementation Guidance* to IAS 39 states clearly, IAS 39 IG C.1:

  - "[…] an entity may not identify a component that is not specified or may not establish terms of the host debt instrument in a manner that would result in the separation of an embedded derivative that is not already clearly present in the hybrid instrument, that is to say, it cannot create a cash flow that does not exist."

- In enabling a liability to be stated by "designation" at its trading value as an asset on the creditors' market, the fair value option effectively considers that a debt buy-back option not specified contractually in a debt instrument is nevertheless embedded in the host debt instrument thereby creating cash flows that do not exist.

109 We must now of course establish that the fair value of the debt buy-back option is zero on inception, as the debtor could only then buy back the debt at its issue price of CU100,000, i.e. its fair value equivalent.

110 The 1st leg of this option denies the creditors the right to "put" back their asset holdings for their expected value of CU127,628 (CU100,000 x 1.05^5) at the end of Year 5 when its asset trading value might be lower, i.e. zero for any total default occurring over the five years.

- This event would occur with the probability of about 5% established on inception: the promised nominal value at the end of Year 5 is CU133,823 (CU100,000 x 1.06^5) so that the probability of not defaulting is 95% (CU127,628/CU133,823) and the probability of defaulting on inception therefore 5%.

- The price on inception of this 1st leg of the debt buy-back option is therefore 5% of CU127,628 after actualising at the risk-free rate of 5% over 5 years, i.e. 5% x CU127,628/1.05^{5} = CU4,629.

- CU 4,629 is therefore the asset value for the debtor with a debt buy-back option.

111 The 2nd leg of the debt buy-back option denies the debtor the right to acquire the investors' asset at its expected value of CU127,628 when its asset trading value might be greater, i.e. CU133,823 at the end of Year 5: its current exit value at that time if no default occurs over the 5 years.

- In this event, with a probability therefore of about 95%, the debtor will pay out the extra CU6,195 (CU133,823 – CU127,628).

- The price on inception of this 2**nd** leg of the debt buy-back option is therefore 95% of CU6,195 after actualising at the risk-free rate of 5% over 5 years, i.e. 95% x CU6,195/1.05^{5} = CU4,629.

- CU 4,629 is therefore the liability value for the debtor with a debt buy-back option.

112 On inception, the price of the debt buy-back option is therefore CU0 (-CU4,629 + CU4,629) and these values are just those already calculated for the beginning of Year 1 from the above tables (cf. **Table 14**) which also give the calculations of the subsequent values of the debt buy-back option when the default probabilities change.

- In practical terms of course the debt buy-back option could never be a European option exercisable at the end of Year 5. At that time, provided the debtor is not in default, it must pay the creditors the contractual exit value and therefore it no more justifies the debtor accounting for the liability at the assets' fair values, "as if" it could profit from the risk of its own future default, than does the fair value option itself.

- However, as the credit excision valuation model illustrates this whilst perfectly reconciling the differences between the current exit values of the liabilities on the debtors' (transfer) market to the fair (exchange) values of the corresponding assets on the creditors' market at every year end, it is obvious that it is in fact giving the right values of the debt buy-back option at any time–- not just at the end of Year 5.

113 Although abandoning the credit excision model makes the calculations more difficult, it is important to prove this.

114 *Per se*, the debt buy-back option is an American option (and not a European option exercisable only on maturity) with a variable strike price.

- This option is a call option for the debtor and would operate in its favour, but is priced in exactly the same way as a put option held by the creditors. This put option would enable them to sell their underlying assets back to the debtor at their current exit value: the variable strike price.

- The option would be "in the money" at any time if the quoted (fair) asset values decrease below the current exit value of the debt. Exercisable by the debtor as a call option, it enables it to extinguish the debt at its at current exit value by buying back the underlying assets at the lower price quoted on the creditors' market.

- This option, which has no intrinsic value on inception, as the debtor could only then buy back the debt at its issue price of CU100,000, would become an asset to the debtor if the assets' fair value subsequently decreases below the debt's current exit value.

- As the debtor's exercising the option at any time would always provide creditors with the cash equivalent of the fair (asset) value of their holding, the option has no time value, i.e. their consenting this option to the debtor is of no value to them.

- And, of course, it has no time value to the debtor either, as the contractual return fixed on inception would have to be adequate to protect the creditors from any future capital losses expected on its issue of the debt instrument

- Valuing the call option at the beginning of each year, say (to spare readers daily calculations), requires using conditional probabilities because the call may only be exercised in the absence of credit defaults in previous years.

115 If we assume no credit defaults occur, then the exit value at the end of Year 5 amounts to CU133,823 (CU100,000 x 1.06^{5}). Its market-consistent (expected present) value at the beginning of Year 4 is "probability-weighted" with the expected annual probability of not defaulting on the assets of 98% (1.05/1.07) and discounted at the interest-free rate: 98% x CU133,823/1.05 = CU125,068.

- At the beginning of Year 5 the market-consistent (expected value) of this call option to the debtor is then CU126,248 - CU125,068 = CU1,180 as CU126,248 (CU100000 x 1.06^{4}) is the current exit value at the beginning of Year 5.

- Alternatively, the option may be valued as if it were a put option in favour of the creditors at the beginning of Year 5 when their asset value would be CU125,068 provided no default has previously occurred. Provided no default occurs by the end of Year 5, they could then put their assets to the debtor for CU133,823. The market-consistent (expected value) of a put is therefore again 98% x CU133,823/1.05 = CU125,068. Not exercising a put at its current exit value (strike price) of CU126,248 at the beginning of Year 5 would lose the creditors CU1,180. The creditors' loss is the debtor's gain when the option is a call option and therefore adds to its value for the debtors.

- This value of CU1,180 is just the "net effect of the debt buy-back option" already calculated at EOY 4 using the credit excision model: **Table 14**.

116 Assuming now that no credit default arises in Year 4, the probability of which is again 98% (1.05/1.07), the expected present value at the beginning of Year 4 of the call option of CU1,180 at the beginning of Year 5 must again be probability-weighted and discounted at 5%:

- This gives the expected value at the beginning of Year 4 of the call option exercisable at the end of Year 5: 98% x CU1,180/1.05 = CU1,103.

- As the option is an American call option, we must add the expected value at the beginning of Year 4 of the call option exercisable at the end of Year 4.

- If we assume no credit defaults occur then the exit value at the end of Year 4 amounts to CU126,248 (CU100,000 x 1.06^{4}). Its expected present value at the beginning of Year 4 is "probability-weighted" with the expected annual probability of not defaulting on the assets of 98% (1.05/1.07) and discounted at the interest-free rate: 98% x CU126,248 /1.05 = CU117,989.

    - At the beginning of Year 4 the expected value of this call option exercisable at the end of Year 4 is then CU119,102 - CU117, 989 = CU1,113 as CU119,102 (CU100000 x 1.06^{3}) is the current exit value at the beginning of Year 4.

- The value of both call options at the beginning of Year 4 is of course CU1,103 + CU1,113 = CU2,216, i.e. the "net effect of the debt buy-back option" already calculated at EOY 3 using the credit excision model: **Table 14**.

- Alternatively, the option may be valued as if it were a put option in favour of the creditors at the beginning of Year 4 when their asset value would be CU116,886 provided no default has previously occurred. Provided no default occurs by the end of Year 5—i.e. after two years—they could then put their assets to the debtor for CU133,823. The market-consistent (expected value) of a put is therefore $(98\%)^{2}$ x CU133,823/1.05^{2} = CU116,886. Not exercising a put at its the current exit value (strike price) of CU119,102 at the beginning of Year 4 would lose the creditors: CU119,102 – CU116,886 = CU2,216. The creditors' loss is the debtor's gain when the option is a call option and therefore adds to its value for the debtors.

117 Iterating these calculations for the all the years we obtain:

Table 15: Valuing the debt buy-back option: a series of American call options on the fair values of the assets

Debt buy-back option: an American call in CU	EOY 5	BOY 5	BOY 4	BOY 3	BOY 2
1. Liability at current exit values	133 823	126 248	119 102	112 360	106 000
2. Expected present value at beginning of each year: "1"/1.05 x 98%	n/a	125 068	117 989	111 310	105 009
3. Value of the annual call: "1-2"	n/a	1 180	1 113	1 050	991
4. Value of previously calculated calls: "5"/1.05 x 98%	n/a	n/a	1 103	2 071	2 916
5. American call (i.e. total value) at the beginning of the year: "3+4"	n/a	1 180	2 216	3 121	3 907

- These are again just the values already calculated: **Table 14**. However, subsequent to the rate change at EOY 1, we have now proved that these values are indeed those of an American call option embedded in the host debt instrument permitting debtors to buy back the debt from the creditors at any time before its maturity.

118 Hopefully readers will have noted that **the asset value of a debt buy-back option to debtors is just equal to the capital losses of the creditors on their trading of the corresponding assets before maturity at their fair (exchange) value:** the option enables debtors to reduce their debt to the fair (asset) values because it enables debtors to profit immediately from the reduction in the cash flows expected by the creditors accounting for their capital loss.

- But **if a debt buy-back option is not embedded, debtors must pay all the contractual cash flows in the host debt instrument** to maturity, unless they actually do default beforehand.

119 The price of the debt buy-back option on inception is obviously zero, and may again be calculated in the same way, as follows:

- On inception, the probability that no default occurs in any year was 99% (1.05/1.06) —not 98%—and 6% *pa* is the rate of interest proposed on the creditors' markets to compensate for the resulting expected defaults.

- Calculating its value as in **Table 15** we obtain zero:

Table 16: Demonstrating the debt buy-back option: a series of American call options on inception has a value of zero

Debt buy-back option: an American call valued on inception	EOY 5	BOY 5	BOY 4	BOY 3	BOY 2	BOY 1
1. Liability at current exit values	133 823	126 248	119 102	112 360	106 000	100 000
2. Expected present value at beginning of each year: "1"/1.05 x 99%	n/a	126 248	119 102	112 360	106 000	100 000
3. Value of the annual call: "1-2"	n/a	0	0	0	0	0
4. Value of previously calculated calls: "5"/1.05 x 99%	n/a	n/a	0	0	0	0
5. American call (i.e. total value) at the beginning of the year: "3+4"	n/a	0	0	0	0	0

The effect of credit risk in the measurement of liabilities

120 As foreshadowed using the credit excision model, the call options *per se* all take the value already calculated as the "net effect of the debt buy-back option". This completes the demonstration that only an explicit contractual clause, or other enforceable requirement, enabling the issuing entity to call back debt at any time during the term of a financial liability at its exchange value on the creditors' market justifies stating this liability at this fair value as opposed to accounting for it at its current exit value: its transfer price on the debtors' market.

121 Obviously, the existence of this clause would affect the creditors' rating of the liability, i.e. the "credit spread" would reflect not only the issuer's ability to reimburse the debt on maturity but also its trading intentions, buy-back abilities and arbitrage opportunities throughout the term of the instrument. We have ignored this in using the credit spreads given in the example in order to make the principles involved perfectly clear.

122 It is unfortunate that both EFRAG and the ASB have actually propagated, and enlarged upon, the incorrect technical arguments advanced by both the FASB and the IASB to justify adjusting liabilities for own credit risk whilst opposing them in principle.

Credit risk effects apprehended in IFRS 7

The disclosure requirements and their illustration

123 IFRS 7 §10 requires disclosure of the amount of change "in the fair value of the financial liability that is attributable to changes in the credit risk of that liability" (for financial liabilities which are not held for trading but are designated "as at fair value through profit and loss". These would include long-term liabilities whose fair value is supposed to equal their immediate trading value on creditors' markets "as if" the entity had the intention and the enforceable ability to redeem their creditors at every reporting date). How "changes in the credit risk" of the liability are apprehended is illustrated in IFRS IG7-11:

- The example given is that of "a 10-year bond with a par value of CU150,000 and an annual fixed coupon rate of 8 per cent (i.e. CU12,000 *pa*) which is consistent with market rates for bonds with similar characteristics". The proxy for the risk-free rate is LIBOR which decreases from 5% *pa* for each of 10 years on issue to 4.75% *pa* for each of the remaining 9 years at the end of the first year. The credit spread is assumed to decrease from 3% on inception to 2.85%: apparently because the ratio between the credit spread and the risk-free rate is taken to be a constant, i.e. 3%/5% = 2.85%/4.75%= 60%. This highly unlikely occurrence gives the stated market-consistent rate of 4.75% + 2.85% = 7.60% at the end of the first year as opposed to the 8% on issue (5%+3%) and therefore the bond's market value of CU153,811 as opposed to CU150,000.

- At the end of the first year: "the fair value for the bond is CU153,811, consistent with an interest rate of 7.6 per cent" that, it is said, "reflects a shift in LIBOR from 5 per cent to 4.75 per cent and a movement of 0.15 per cent which, in the absence of other relevant changes in market conditions, is assumed to reflect changes in credit risk of the instrument." This statement is apparently either supposed to "explain" that the difference between the credit spreads of 3% and 2.85% is "0.15 per cent" and/or to "justify" using a discount rate of 4.75% + 2.85% + "0.15 per cent" = 7.75% to actualise the nominal cash flows over the next 9 years giving a "present value" at the end of the first year of CU152,367. This is supposed to be the fair value "as if" the credit risks had not changed at the end of the first year.

- At the end of the first year, the issuer, it is said: "discloses CU1,444, which is CU153,811 – CU152,367, as the increase in fair value of the bond that is not attributable to changes in market conditions that give rise to market risk". This loss of CU1,444 would be attributed to "changes in the credit risk" of the liability to satisfy IFRS 7 §10, i.e. that the liability would recorded at CU152,367 if it did not include "changes in the credit risk" as opposed to CU153,811 as a result of all changes in market conditions or CU150,000 if no changes in market conditions had occurred.

Changes in credit risk independent of changes in "fair value"

124 The most remarkable point here is that, as everyone knows, the bond would continue to be quoted at the constant value of CU150,000 if market conditions had not changed. But obviously accountants do not know that this is only because no default has occurred in the first year and do not know how to calculate the bond's value at the end of the first year: its expected value divided by the probability of not defaulting in the year: CU145,833/97% = CU150,000.

125 Notwithstanding, it is clear that IFRS 7 does not apprehend that changes in credit risk occur without any change in the fair value of a financial instrument, i.e. if the market-consistent rates remain at 5% plus 3%.

126 But it should be obvious that the credit risk—the probability of defaulting over the residual period to maturity on the bond with an unchanged fair value of CU150,000, although no changes in market conditions have occurred—diminishes with every year that passes, i.e. as the number of years of exposure to credit default is reduced and in the event that no defaults have occurred in previous years (see 72-73 above).

127 In other words, as already indicated, IFRS 7 ignores the existence of experience adjustments to fair values and their effect on recorded profit and loss (73).

Understanding the probabilities associated with determining credit risk

128 As previously, from first principles, the expected (probability-weighted) return can only equal 5%, i.e. CU7,500 in the first year (5% of CU150,000) and the expected default therefore amounts to CU4,500, i.e. the nominal return of CU12,000 (8% of CU150,000) less the expected return of CU7,500. Excluding partial defaults here by assuming that the expected remaining principal still pays at 8%, the default of CU4,500 is obviously pro-rated between the nominal principal of CU150,000 and coupon of CU12,000, i.e. the

expected remaining principal is CU145,833 and the coupon CU11,667 (CU145,833 at 8% = CU11,667). We then clearly have the following debt amortisation table for the first year (and may complete it for subsequent years in the same way):

Table 17: Debt amortisation on inception

Debt amortisation in CU:	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Opening balance	150 000	145 833	141 782	137 844	134 015	130 292	126 673	123 154	119 733	116 408
Nominal interest at 8%	12 000	11 667	11 343	11 028	10 721	10 423	10 134	9 852	9 579	9 313
Sub-total before default	162 000	157 500	153 125	148 872	144 736	140 716	136 807	133 007	129 312	125 720
Expected default	-4 500	-4 375	-4 253	-4 135	-4 020	-3 909	-3 800	-3 695	-3 592	-3 492
Expected coupon	-11 667	-11 343	-11 028	-10 721	-10 423	-10 134	-9 852	-9 579	-9 313	-9 054
Closing balance	145 833	141 782	137 844	134 015	130 292	126 673	123 154	119 733	116 408	113 174

- The probability of not defaulting in one year is obviously just CU145,833/CU150,000 or CU11,667/CU12,000 or 97% (1.05/1.08). Put alternatively, had the probability distribution been used directly, the ("probability-weighted") expected value of the return is 97% x CU150,000 + 3% x CU0 = CU145,833.

- Completing the debt amortisation table for subsequent years shows that this probability also applies for any year, for example in Year 3: 97% x CU141,782 + 3% x CU0 = CU137,844.

- The debt amortisation table also shows that the probability of not defaulting in two years is $(1.05/1.08)^2$: about 95% and so forth, e.g. for the second two years: 95% x CU141,782 + 5% x CU0 = CU134,015.

- Clearly, the credit risk decreases as the remaining number of years to maturity decreases.

- The probability of not defaulting in ten years is $(1.05/1.08)^{10}$: about 75%, so that the expected value of the tenth year's nominal reimbursement of CU150,000 is just: 75% x CU150,000 +25% x CUO = CU113,174. The expected cash flow on maturity including the final coupon for 75% x CU12,000= CU9,054 therefore amounts to CU113,174 + CU9,054 = CU122,228.

- Again, the expected market-consistent interest for any year is just the risk-free rate of 5%, e.g. for Year 6: (CU10,423-CU3,909)/CU130,292 = 5%.

- As the Discussion Paper on *Insurance* suggests, the present value of these expected ("probability-weighted") cash flows should be actualised at the risk-free rate of 5% to give the expected present value of the liability:

Discounting expected (probability-weighted) cash flows

Table 18: Discounting expected cash flows

Discounting at the risk-free rate of 5%:	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Expected cash flows on inception at EOY	11 667	11 343	11 028	10 721	10 423	10 134	9 852	9 579	9 313	122 228
2. Discount factor to BOY 2	n/a	1.05^{-1}	1.05^{-2}	1.05^{-3}	1.05^{-4}	1.05^{-5}	1.05^{-6}	1.05^{-7}	1.05^{-8}	1.05^{-9}
Expected present value (1 x 2)		10 802	10 002	9 261	8 575	7 940	7 352	6 807	6 303	78 789
Total value at BOY 2, correcting for rounding:	10 802 + 10 002 + 9 261 + 8 575 + 7 940 + 7 352 + 6 807 + 6 303 + 78 789 = 145 833									

129 So, we must again note that CU145,883 is the expected value of the liability at the end of the Year 1—a far cry from CU150,000!

- And that CU150,000 is just the expected present value of the cash flows discounted to BOY 1: i.e. (CU11,667 + CU145,883)/1.05 = CU150,000.

- However, as the probability of not defaulting at the end of Year 1 is 97%, it is more likely than not that the liability will then amount to CU150,000. In that case, it follows that the issuer must account for a loss of CU4,167—i.e. the prospective experience adjustment for the difference between the actual value of CU150,000 and the expected value of CU145,833—and this should then also be reflected in the debt amortisation table.

- Furthermore, if the liability should still amount to CU150,000 at the end of Year 1, then the debt amortisation table over the remaining 9 years may be reconstructed in the same way. It will be found that the present values of the re-estimated expected cash flows have just been deferred by one year (actuaries will recognise the reproductive characteristics of the geometric probability distribution):

Table 19: Debt amortisation and discounting after one year at unchanged rates

Discounting at the risk-free rate of 5%:	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Expected cash flows on inception at EOY	11 667	11 343	11 028	10 721	10 423	10 134	9 852	9 579	125 720
2. Discount factor to BOY 2	1.05^{-1}	1.05^{-2}	1.05^{-3}	1.05^{-4}	1.05^{-5}	1.05^{-6}	1.05^{-7}	1.05^{-8}	1.05^{-9}
Expected present value (1 x 2)	11 111	10 288	9 526	8 820	8 167	7 562	7 002	6 483	81 040
Total value at BOY 2, correcting for rounding:	11 111 + 10 288 + 9 526 + 8 820 + 8 167 + 7 562 + 7 002 + 6 483 + 81 040 = 150 000								

- We may again check Year 10's (new) expected cash flow. The probability of not defaulting in (the remaining) nine years is $(1.05/1.08)^9$: about 78%, so that the expected value of the final nominal reimbursement of CU162,000 (including the coupon of CU12,000) is just 78% x CU162,000 = CU125,720 as reconstructing the debt amortisation table would also show.

130 Now, having re-established the probability distribution implied by the assumptions made with respect to credit spread in the various examples used by the FASB and the IASB, we are in a position to evaluate the decrease in the credit risk, i.e. the present value at the end of Year 1 of the increase in the future cash flows due to the decreased probability of default occurring in (the remaining) 9, as opposed to 10, years—despite the fact that that none of the "market-consistent" interest rates have changed:

- This is of course, from the above tables, just CU150,000 – CU145,833 = CU4,167.

- At a later stage we will require to re-evaluate this fully prospective experience adjustment of CU4,167 when the risk-free rate decreases to 4.75%. It will then amount to CU4,234:

Table 20: Debt amortisation and discounting after one year at the changed risk-free rate

Discounting at the risk-free rate of 4.75%:	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Expected cash flows on inception at EOY	11 343	11 028	10 721	10 423	10 134	9 852	9 579	9 313	122 228
2. Expected cash flows after Year 1 at EOY	11 667	11 343	11 028	10 721	10 423	10 134	9 852	9 579	125 720
3. Increase in expected future cash flows:	324	315	306	298	290	281	274	266	3 492
4. Discount factor to BOY 2	1.0475^{-1}	1.0475^{-2}	1.0475^{-3}	1.0475^{-4}	1.0475^{-5}	1.0475^{-6}	1.0475^{-7}	1.0475^{-8}	1.0475^{-9}
5. Present value of the increase at EOY 1	309	287	267	247	230	213	198	184	2 300
Total, correcting for rounding:	309 + 287 + 267 + 247 + 230 + 213 + 198 + 184 + 2 300 = 4 234								

131 However, before examining any effects of rate changes on credit risk, it follows that the experience adjustment that should be accounted for at the end of Year 1 of CU4,167 is in fact the loss attributable to the decrease in the credit risk over the remaining Years 2 through 10. It represents a "market-consistent" decrease in credit risk even if there is absolutely no change in the "fair value" (CU150,000) of the debt on the creditors' market: a fact which IFRS 7 fails to recognise: cf. the erroneous notion that: "the finance cost will reflect […] a price for the entity's credit risk": see 59, 62 & 72.

- Completing the debt amortisation table for the first year, without considering any effects due to interest rate changes, we would therefore obtain:

Table 21: The debt amortisation table and experience adjustment after one year with unchanged rates

Debt amortisation in CU:	Year 1	Year 2 etc.
Opening balance	150 000	150 000
Nominal interest at 8%	12 000	
Sub-total before default	162 000	
Expected default	-4 500	
Expected coupon	-11 667	
Closing balance before experience adjustment	145 833	
Experience adjustment for expected increases in future cash flows due to reduced credit risks over 9 years	4 167	
Closing balance after experience adjustment	150 000	

Limitations in the use of deterministic equations

132 IFRS 7 obtains the correct value of CU150,000 for the bond at the beginning of the second year by discounting the nominal cash flows at 8%: with the tacit assumptions that no default occurred in the first year and that no defaults will occur in future years!

- It relies on the following equation to do so: CU150,000 = [CU12,000 × (1 − (1 + 0.08)$^{-9}$)/0.08] + CU150,000 × (1 + 0.08)$^{-9}$ –cf. IFRS 7 IG 11 (b) & (c).

133 The equation used in IFRS 7 is just the sum of a geometric series using level (deterministic) annuities. However, credit defaults do not result in level (deterministic) annuities.

- The first useless property of the equation used for discussing credit risk is that it will always give CU150,000 whatever the residual period used. For example, let us suppose the period to maturity of the borrowing is 2,000 years and we wish to calculate its expected value, assuming no change in market conditions, after 1,000 years have gone by.

- Using the equation we obtain: [CU12,000 × (1 − (1 + 0.08)$^{-1000}$)/0.08] + CU150,000 × (1 + 0.08)$^{-1000}$ = CU150,000. In other words:

    - The equation does not give the effect of credit default. Obviously, on the grounds that credit risk exists and that market participants demand a risk-inclusive rate of 8% instead of 5%, we should expect the value of this borrowing to decrease as the exposure to the risk increases.

    - Put alternatively, if you toss an unbiased coin once a year for 1,000 years, you do not expect it to go on turning up "heads" all the time.

- It should be obvious that 1,000 years would be a long enough period for some credit default to have occurred and therefore for the value of the borrowing to decrease.

- Clearly, the equation is simply not fit for purpose. Furthermore the use of such equations has obviously misled accountants into the belief that the market-consistent or expected return on a borrowing will take place at the nominal risk-inclusive rate as opposed to the risk-free rate. We have already discussed this extensively, e.g. 17 above.

- We have also discussed the chains of reasoning given in the Discussion Paper on *Insurance*, which begin with "Few people doubt that the initial measurement of debt issued for cash should reflect the credit characteristics of the debt": §231(a). However, most people know perfectly well that market participants do not pay CU150,000 to suffer an instantaneous impairment on their investment. Furthermore most people also know perfectly well that if the issuer does not offer the "right" nominal risk-inclusive rate, over and above the risk-free rate, to compensate for expected future credit defaults, then market participants will not take up the issue.

- As the initial measurement of the market value of issued debt is just the amount of cash subscribed by market participants, whatever the "credit characteristics of the debt", the only moment at which the equation used in IFRS 7 can be legitimately employed to derive a market-consistent value of a debt issued for cash is on inception. It then gives a value of: $[CU12,000 \times (1 - (1 + 0.08)^{-10})/0.08] + CU150,000 \times (1 + 0.08)^{-10} = CU150,000$: but we already knew this anyway, otherwise no market participants would have subscribed to the issue.

134 As previously, the only valid discount rate is the risk-free rate of 5%. We should obtain expected ("probability-weighted") present values by actualising the expected cash flows using the probability that no credit default occurs of (1.05/1.08), referred to as Pnd below:

Table 22: Probability-weighting for credit risk and discounting cash flows on inception

Discounting at the risk-free rate of 5%:	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Nominal cash flows at EOY	12 000	12 000	12 000	12 000	12 000	12 000	12 000	12 000	12 000	162 000
2. Pnd = (1.05/1.08)	$(Pnd)^1$	$(Pnd)^2$	$(Pnd)^3$	$(Pnd)^4$	$(Pnd)^5$	$(Pnd)^6$	$(Pnd)^7$	$(Pnd)^8$	$(Pnd)^9$	$(Pnd)^{10}$
3. Expected cash flows at EOY (1 x 2)	11 667	11 343	11 028	10 721	10 423	10 134	9 852	9 579	9 313	122 228
4. Discount factor to BOY 1	1.05^{-1}	1.05^{-1}	1.05^{-2}	1.05^{-3}	1.05^{-4}	1.05^{-5}	1.05^{-6}	1.05^{-7}	1.05^{-8}	1.05^{-9}
Expected present value (3 x 4)	11 111	10 288	9 526	8 820	8 167	7 562	7 002	6 483	6 003	75 037
Total, correcting for rounding:	11 111 + 10 288 + 9 526 + 8 820 + 8 167 + 7 562 + 7 002 + 6 483 + 6 003 + 75 037 = 150 000									

135 Whilst the equation used in IFRS 7 also gives CU150,000 it entirely occults the effects of credit risk and therefore cannot provide the experience adjustment of CU4,167: another example of its unconscious use. As demonstrated previously it is not possible to measure the effects of credit risk without measuring them.

The restitution and adjustment of expected cash flows

136 The present value for the expected cash flows at the end of Year 1 are:

Table 23: Restitution of the first year's prospective experience adjustment at unchanged rates

Discounting at the risk-free rate of 5%:	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Nominal cash flows at EOY	12 000	12 000	12 000	12 000	12 000	12 000	12 000	12 000	162 000
2. Pnd = (1.05/1.08)	$(Pnd)^2$	$(Pnd)^3$	$(Pnd)^4$	$(Pnd)^5$	$(Pnd)^6$	$(Pnd)^7$	$(Pnd)^8$	$(Pnd)^9$	$(Pnd)^{10}$
3. Expected cash flows after Year 1 at EOY (1 x 2)	11 343	11 028	10 721	10 423	10 134	9 852	9 579	9 313	122 228
4. Discount factor to BOY 2	1.05^{-1}	1.05^{-2}	1.05^{-3}	1.05^{-4}	1.05^{-5}	1.05^{-6}	1.05^{-7}	1.05^{-8}	1.05^{-9}
Expected present value (3 x 4)	10 802	10 002	9 261	8 575	7 940	7 352	6 807	6 303	78 789
Total, correcting for rounding:	10 802 + 10 002 + 9 261 + 8 575 + 7 940 + 7 352 + 6 807 + 6 303 + 78 789 = 145 833								

137 Again, IFRS 7 makes use of its equation to calculate the new market value of the bond following the risk-inclusive interest rate decrease from 8% to 7.6% at the end of Year 1 to obtain CU153,811, IFRS 7 IG 11 (c):

- $[CU12,000 \times (1 - (1 + 0.076)^{-9})/0.076] + CU150,000 \times (1 + 0.76)^{-9} = CU153,811$.

138 The use of this equation is again highly revelatory because it does not indicate the current exit, i.e. the transfer, value of the debt on the debtors' market, which will still equal CU150,000 unless the original issuer has already defaulted. In other words:

- It does not recognise the contractual obligation to pay 8% but uses a non-contractual rate which is actually derived from the quoted spot exchange value of the bond as an asset on the creditors' market.

- What is actually observed is that the issuer has not defaulted and that the value of the bond on the creditors' asset market has increased from CU150,000 to CU153,811.

- It is of course the actual market value of the bond on the creditors' market that gives us the rate of 7.6% using the equation in IFRS 7: not the other way round.

- This, we may deduce, is because creditors now expect to earn a risk-inclusive rate on that bond that is no longer 8%. But this does not mean that the issuer, or any transferee debtor, does not intend to abide by—or is somehow absolved from respecting—the contractual obligations that bind them with respect to the continuing debt, i.e. to pay interest at 8% on CU150,000.

- If we wish to calculate the expected risk-inclusive rate on the creditors' asset market, say d%, we should be solving the equation for d%, i.e. solving CU153,811 = [CU12,000 × (1 − (1 + d%)$^{-9}$)/d%] + CU150,000 × (1 + d%)$^{-9}$ and this gives us d%=7.6%. So what? :

  - As the market-consistent risk-free rate is 4.75%, we should obtain expected ("probability-weighted") present values by actualising the expected returns using the new probability on the creditors' market that no credit default occurs of (1.0475/1.076), referred to as NPnd below:

Table 24: Restitution of the fair values of the creditors' assets at the end of the first year by discounting probability-weighted cash flows

Discounting at the risk-free rate of 4.75%:	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Nominal cash flows at EOY	12 000	12 000	12 000	12 000	12 000	12 000	12 000	12 000	162 000
2. NPnd = (1.0475/1.076)	$(NPnd)^1$	$(NPnd)^2$	$(NPnd)^3$	$(NPnd)^4$	$(NPnd)^5$	$(NPnd)^6$	$(NPnd)^7$	$(NPnd)^8$	$(NPnd)^9$
3. Creditors expected yearly returns at EOY (1 x 2)	11 682	11 373	11 072	10 778	10 493	10 215	9 944	9 681	127 230
4. Discount factor to BOY 2	1.0475^{-1}	1.0475^{-2}	1.0475^{-3}	1.0475^{-4}	1.0475^{-5}	1.0475^{-6}	1.0475^{-7}	1.0475^{-8}	1.0475^{-9}
Expected present value (3 x 4)	11 152	10 365	9 633	8 952	8 320	7 732	7 186	6 679	83 792
Total, correcting for rounding:	11 152 + 10 365 + 9 633 + 8 952 + 8 320 + 7 732 + 7 186 + 6 679 + 83 792 = 153 811								

  - But , as before, whilst this justifies the spot exchange price of CU153,811 on the creditors' market, it tells us nothing about the current exit value of the debt of CU150,000 (see: **The current exit value of the debt**).

Correcting the disclosure for changes in expected credit risks

139 Once again, IFRS 7 makes use of its equation, asserting on specious grounds that the discount rate to be used is 7.75%, to obtain a present value at the beginning of Year 2 of CU152,367, and therefore that: "the increase in fair value of the bond that is not attributable to changes in market conditions that give rise to market risk" is CU1,444 (CU153,811-CU152,367):

- [CU12,000 × (1 − (1 + 0.0775)$^{-9}$)/0.0775] + CU150,000 × (1 + 0.775)$^{-9}$ = CU152,367 : IFRS 7 IG (b). So what?

- The second useless property of the equation used for discussing credit risk is that for any discount rate (from 0% up to infinity%) it will always give some value (from CUinfinity down to CU0). In other words:

- It will always provide a value for any discount rate but, as the equation does not indicate the effect of credit default, it can only provide the "right" value if the "right" discount rate is used.

- As previously, i.e. because the equation is not fit for purpose, we can only derive the "right" discount rate if we already know the "right" amount and to obtain this amount, as already demonstrated, we can avoid neither discussing nor quantifying credit risk without looking at probabilities and expected default values.

140 Now, if we are looking for a "fair value" with the same exposure to credit risk at risk-free rates of 5% and 4.75%, we know that the annual probabilities of not defaulting are directly related to the term [(1+5%)/(1+8%)] and, obviously, we know that the "market-consistent" rate of return, say d%, that would be required must be such that [(1+4.75%)/(1+d%)] = [(1+5%)/(1+8%)]. This equation is easily solved and gives d% to be about 7.74%.

141 If this rate of return is applied to the equation used in IFRS 7 it gives CU152,435 as compared to the "fair value" of the debt of CU153,811 and therefore a difference of CU1,376 (CU153,811 - CU152,435):

- [CU12,000 × (1 − (1 + 0.0774)$^{-9}$)/0.0774] + CU150,000 × (1 + 0.774)$^{-9}$ = CU152,435. So what?:

- Mathematically, a first order approximation to the ratio [(1+x)/(1+y], where x and y are less than 1, is: 1 + x - y. Speculating, the "actuarial textbook" used by the IASB might therefore have suggested solving 1 + 4.75% - d% = 1 + 5% - 8% which does in fact give d% = 4.75% + 3% = 7.75% instead of 7.74%. Whatever, IFRS 7, together with all the discussion papers, avoids all reference to default probabilities and expected credit risk and we can only speculate on how the discount rate used in IFRS 7 was actually derived.

142 As previously, we must use an adequate approach to determine experience adjustments and we can only discount expected (probability-weighted) cash flows using the risk-free interest rate, i.e. 4.75% as from the beginning of Year 2.

Table 25: Restitution of the fair value for creditors' assets at the end of the first year at unchanged probabilities for credit risk

Discounting at the risk-free rate of 5%:	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Nominal cash flows at EOY	12 000	12 000	12 000	12 000	12 000	12 000	12 000	12 000	162 000
2. Pnd = (1.05/1.08)	$(Pnd)^2$	$(Pnd)^3$	$(Pnd)^4$	$(Pnd)^5$	$(Pnd)^6$	$(Pnd)^7$	$(Pnd)^8$	$(Pnd)^9$	$(Pnd)^{10}$
3. Expected cash flows after Year 1 at EOY (1 x 2)	11 343	11 028	10 721	10 423	10 134	9 852	9 579	9 313	122 228
4. Discount factor to BOY 1	1.0475^{-1}	1.0475^{-2}	1.0475^{-3}	1.0475^{-4}	1.0475^{-5}	1.0475^{-6}	1.0475^{-7}	1.0475^{-8}	1.0475^{-9}
Expected present value (3 x 4)	10 828	10 050	9 328	8 658	8 035	7 458	6 922	6 424	80 498
Total, correcting for rounding:	10 828 + 10 050 + 9 328 + 8 658 + 8 035 + 7 458 + 6 922 + 6 424 + 80 498 = 148 201								

143 CU148,201 – CU145,833 = CU2,368 is just the increase in expected value due to the decrease in the risk-free rate from 5% to 4.75% on the expected cash flows before including any changes due to changes in credit risk.

144 Obviously, CU153,811 – CU148,201 = CU5,610 is then the experience adjustment, i.e. the difference in the expected future cash flows for years 2 through 10 (line 3 of the above table) with the expected cash flows for these years following the changes in rates at the end of Year 1 (line 3 of the previous table) after discounting at the decreased risk-free rate of 4.75%. It will be instructive to prove this in another way:

- We have already evaluated the prospective adjustment ignored in IFRS 7—despite the fact that that none of the "market-consistent" interest rates have changed—to be CU4,167 after discounting the difference in the re-estimated future cash flows at the risk-free rate of 5% and to be CU4,234 as a result of the change in the risk-free rate to 4.75% (see 130).

- Further, if the annual probability of not defaulting in Year 1 remains unchanged in subsequent years, the correct proxy rate of return on the creditors' market is 7.74%, not 7.75%, and gives the proxy asset value to be CU152,435, not CU152,367.

- Now, as the market-consistent risk-free rate is 4.75% we should obtain expected ("probability-weighted") present values by actualising the expected returns using the previous probability on the creditors' market that no credit default occurs of (1.05/1.08), again referred to as Pnd below:

Table 26: Restitution of the fair value for creditors' assets at the end of the first year "as if" unchanged rates did not affect the credit risk

Discounting at the risk-free rate of 4.75%:	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Nominal cash flows at EOY	12 000	12 000	12 000	12 000	12 000	12 000	12 000	12 000	162 000
2. Pnd = (1.05/1.08)	$(Pnd)^1$	$(Pnd)^2$	$(Pnd)^3$	$(Pnd)^4$	$(Pnd)^5$	$(Pnd)^6$	$(Pnd)^7$	$(Pnd)^8$	$(Pnd)^9$
3. Creditors expected yearly returns at EOY (1 x 2)	11 667	11 343	11 028	10 721	10 423	10 134	9 852	9 579	125 720
4. Discount factor to BOY 2	1.0475^{-1}	1.0475^{-2}	1.0475^{-3}	1.0475^{-4}	1.0475^{-5}	1.0475^{-6}	1.0475^{-7}	1.0475^{-8}	1.0475^{-9}
Expected present value (3 x 4)	11 138	10 337	9 594	8 905	8 265	7 671	7 120	6 608	82 798
Total, correcting for rounding:	11 138+ 10 337 + 9 594 + 8 905 + 8 265 + 7 671 + 7 120 + 6 608 + 82 798 = 152 435								

- But , as before, whilst this justifies a proxy spot exchange price of CU152,435 on the creditors' market, it tells us nothing about the current exit value of the debt of CU150,000 (see: **The current exit value of the debt**).

- As the actual spot exchange price on the creditors' market is CU153,811 we again find the difference of CU1,376 (CU153,811 – CU152,435), as we had when using the IFRS 7 equation correctly – see 140. This difference is just the impact that IFRS 7 would attribute to the expected increases in creditors' future cash flows due to reduced credit risk—the probability of annual default having decreased from 2.78% (1-1.05/1.08) to 2.65% (1-1.0475/1.076).

- This is based, as we have seen, on actuarially equivalent "fictitious coupons" to explain, and account for, debts for financial instruments at their spot exchange prices as assets on the creditors' market. And, it entirely fails to recognise, as we have also seen, the part of the fully prospective experience adjustment due to the re-estimation of future cash flows amounting to CU4,234 (see 130) which gives the total prospective experience adjustment of CU1,376 + CU4,234 = CU5,610: already calculated above (see 144).

- Completing the debt amortisation table for the first year, after considering the effects due to rate changes and on the basis that we should be accounting for the debt at its spot exchange (fair) value of CU153,811 as an asset on the creditors' market, we therefore obtain:

Table 27: The debt amortisation table and experience adjustment after one year with the changed rates

Debt amortisation in CU:	Year 1	Year 2 etc.
Opening balance	150 000	153 811
Nominal interest at 8%	12 000	
Sub-total before default	162 000	
Expected default	-4 500	
Expected coupon	-11 667	
Closing balance before experience adjustments	145 833	
Experience adjustment for changes in the risk-free rate (a prospective adjustment): see 143	2 368	
Experience adjustment for changes in expected credit default risks (a prospective adjustment): see 144	5 610	
Closing balance after experience adjustments : the asset (fair) value	153 811	

The effect of credit risk in the measurement of liabilities

145 As before, the current exit value is just the contractual debt of CU150,000. It is not CU153,811, which is just the fair value of the corresponding assets, i.e. their spot exchange value between creditors, unless the contract includes an explicit debt buy-back option enabling the issuer, and any transferee debtor, to buy back the debt at its quoted value on the assets market.

146 This fair value is, as we know, not a contractual value because it is affected by the changes in market conditions including changes in the effects of expected future credit defaults on those asset values. To paraphrase the terminology in the *Insurance* Discussion Paper (§152): "mere words on a piece of paper" are not enough to ensure the creditors are paid their contractual due in the event of default: they value their assets accordingly. Debtors do have contractually-binding obligations to pay creditors the contractual amount of the debt on maturity but they don't have an obligation to pay them a capital gain realisable by the creditors alone—here CU3,811—as well.

The current exit value of the debt

147 We must now prove the current exit value of the debt.

148 From first principles:

- The current exit value of the debt on inception amounts to CU150,000 (the cash proceeds) and this can only return a further 5%, the risk-free rate for the 1st year, i.e. CU157,500 (1.05 x CU150,000), provided the debtor has not defaulted and is able to transfer the debt at its current exit value of CU150,000. As previously, the expected probability that the debtor has not defaulted in the year is just (1+ the risk-free rate)/(1 + the nominal rate), i.e. 97.22% (1.05/1.08) in the 1st year. The expected value at the end of the 1st year, again provided no default has occurred, is just the expected return of CU157,500 divided by the probability of not defaulting: CU157,500/97.22% = CU162,000, i.e. ex-coupon CU162,000 – CU12,000 = CU150,0000.

- The current exit value of the debt at the beginning of the 2nd year therefore amounts to CU150,000 and this can only return a further 4.75%, the risk-free rate for the 2nd year, i.e. CU157,125 (1.0475 x CU150,000), provided the debtor has not defaulted and is able to transfer the debt at its current exit value of CU150,000. As previously, the expected probability that the debtor has not defaulted in the year is just (1+ the risk-free rate)/(1 + the nominal rate), i.e. 96.99% (1.0475/1.08) in the 2nd year. The expected value at the end of the 2nd year, again provided no default has occurred, is just the expected return of CU157,125 divided by the probability of not defaulting: CU157,500/96.99% = CU162,000, i.e. ex-coupon CU162,000 – CU12,000 = CU150,0000.

- Hopefully readers will now find it clear again that the current exit value of the debt is always its contractual amount, i.e. CU150,000, and that it is entirely independent of the "credit characteristics of the liability".

Debt amortisation tables and experience adjustments for current exit values

149 Readers wishing to construct the debt amortisation tables for current exit values should note that the table on inception has already been supplied: **Table 17: Debt amortisation on inception**. As previously, the expected closing balance at the end of Year 1 is still CU145,833. However, if the debt is transferable the contract must still exist, i.e. we must assume that no default has occurred. As above, the current exit value for a transferable debt is of course just CU145,833/97.22% = CU150,000 and the prospective experience adjustment is identical at CU4,167 (CU150,000 - CU145,833).

150 Given the new probability of annual default of 3.01% (100%-96.99), the debt amortisation table for current exit values from the beginning of Year 2 gives:

Table 28: Debt amortisation for current exit values after one year

Debt amortisation in CU:		Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1.	Opening balance	150 000	145 486	141 108	136 862	132 743	128 749	124 874	121 116	117 472
2.	Nominal interest at 8%	12 000	11 639	11 289	10 949	10 619	10 300	9 990	9 689	9 398
3.	Sub-total before default (1+2)	162 000	157 125	152 397	147 811	143 363	139 049	134 864	130 806	126 869
4.	Expected probability of annual default:	3.01%	3.01%	3.01%	3.01%	3.01%	3.01%	3.01%	3.01%	3.01%
5.	Expected default : (-4 x 3)	-4 875	-4 728	-4 586	-4 448	-4 314	-4 184	-4 058	-3 936	-3 818
6.	Expected probability that no default has arisen	96.99%	96.99%	96.99%	96.99%	96.99%	96.99%	96.99%	96.99%	96.99%
7.	Expected coupon detached: (-2 x 6)	-11 639	-11 289	-10 949	-10 619	-10 300	-9 990	-9 689	-9 398	-9 115
8.	Subtotal before experience adjustment	145 486	141 108	136 862	132 743	128 749	124 874	121 116	117 472	113 937
9.	Experience adjustment									
10.	Closing balance	145 486	141 108	136 862	132 743	128 749	124 874	121 116	117 472	113 937

- As before, at the end of the 2nd year, the current exit value for a transferable debt is of course just CU145,486/96.99% = CU150,000 and the experience adjustment, which is again prospective, amounts to CU150,000 – CU145,486 = CU4,514.

151 We should also check that the current exit value of the debt of CU150,000 is the sum of the expected coupons and final reimbursement of CU113,937 (giving the 10th year's expected cash flow of CU9,115 + CU113,937 = CU123,052) discounted at the risk-free rate of 4.75%.

- And, to discuss and compare expected cash flows, derive line 7 for the expected cash flows in the above table (**Table 28: Debt amortisation for current exit values after one year**) in the same way as line 1 for the creditors' returns on fair values in Table 24: Restitution of the fair values of the creditors' assets at the end of the first year by discounting probability-weighted cash flows:

Table 29: Expected cash flows at current exit values cf. line 7 from Table 28: Debt amortisation for current exit values after one year

Discounting at the risk-free rate of 4.75%:	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Nominal cash flows at EOY	12 000	12 000	12 000	12 000	12 000	12 000	12 000	12 000	162 000
2. NPnd = (1.0475/1.08)	$(NPnd)^1$	$(NPnd)^2$	$(NPnd)^3$	$(NPnd)^4$	$(NPnd)^5$	$(NPnd)^6$	$(NPnd)^7$	$(NPnd)^8$	$(NPnd)^9$
3. Creditors expected yearly returns at EOY (1 x 2)	11 639	11 289	10 949	10 619	10 300	9 990	9 689	9 398	123 052
4. Discount factor to BOY 2	1.0475^{-1}	1.0475^{-2}	1.0475^{-3}	1.0475^{-4}	1.0475^{-5}	1.0475^{-6}	1.0475^{-7}	1.0475^{-8}	1.0475^{-9}
Expected present value (3 x 4)	11 111	10 288	9 526	8 820	8 167	7 562	7 002	6 483	81 040
Total, correcting for rounding:	11 111 + 10 288 + 9 526 + 8 820 + 8 167 + 7 562 + 7 002 + 6 483 + 81 040 = 150 000								

Table 24: Restitution of the fair values of the creditors' assets at the end of the first year by discounting probability-weighted cash flows (recopied from above)

Discounting at the risk-free rate of 4.75%:	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1. Nominal cash flows at EOY	12 000	12 000	12 000	12 000	12 000	12 000	12 000	12 000	162 000
2. NPnd = (1.0475/1.076)	$(NPnd)^1$	$(NPnd)^2$	$(NPnd)^3$	$(NPnd)^4$	$(NPnd)^5$	$(NPnd)^6$	$(NPnd)^7$	$(NPnd)^8$	$(NPnd)^9$
3. Creditors expected yearly returns at EOY (1 x 2)	11 682	11 373	11 072	10 778	10 493	10 215	9 944	9 681	127 230
4. Discount factor to BOY 2	1.0475^{-1}	1.0475^{-2}	1.0475^{-3}	1.0475^{-4}	1.0475^{-5}	1.0475^{-6}	1.0475^{-7}	1.0475^{-8}	1.0475^{-9}
Expected present value (3 x 4)	11 152	10 365	9 633	8 952	8 320	7 732	7 186	6 679	83 792
Total, correcting for rounding:	11 152 + 10 365 + 9 633 + 8 952 + 8 320 + 7 732 + 7 186 + 6 679 + 83 792 = 153 811								

- **Table 29** again shows that the current exit value at the end of Year 1 equals CU150,000 and includes an expected cash flow of CU11,639 for Year 2; and,

- Table 24: Restitution of the fair values of the creditors' assets at the end of the first year by discounting probability-weighted cash flows shows the fair values of the corresponding assets on the creditors' market of CU153,811 and includes an expected return of CU11,682 for Year 2.

152 Firstly, we need a clear "explanation" for the differences between the expected cash flows on the debt and the expected returns on the assets, and shall compare the respective amounts of CU11,639 and CU11,682 in the second year for this purpose as well as providing the adapted accounting entries.

Adapted accounting for expected (probability-weighted) cash flows at current exit value and fair value

153 **The amount of CU11,639**:

- This is just the probability-weighted value of the nominal coupon of CU12,000 (8% x CU150,000) payable by the debtor at the end of the second year. The probability of the debtor not defaulting on the liability of CU150,000 in the 2nd year, as we have seen, is 97.99% (1.0475/1.08). The debtor therefore expects to pay CU11,639 and, if it does not default will actually pay CU11,639/96.99 = CU12,000.

- The following accounting entries apply:

Table 30: Accounting entries for current exit values

Accounting entries for Year 2 in CU:	Accounts for:		
+ : Dr & - : Cr	Long-term debt	Interest payable	Profit & Loss
Opening balances	-150 000	n/a	n/a
Reduce the opening balance by the discounted amount included for interest payable at EOY 2	11 111	-11 111	
Provide for the current year's interest at 8% thereon: 8% x 11 111 = 889		-889	889
sub-total (Account balances):	-138 889	-12 000	889
Unwind the discount rate on the residual balance: 4,75% x 138 889 = 6 597	-6 597		6 597
Book the prospective experience adjustment on the residual balance	-4 514		4 514
Total: Closing balances	-150 000	-12 000	12 000

154 **The amount of CU11,682**:

- This is just the probability-weighted value of the nominal coupon of CU12,000 (8% x CU150,000) receivable by the creditors at the end of the second year. The probability of creditors not losing their assets in the 2nd year, as we have seen, is 97% (1.0475/1.076). The creditors therefore expect to receive CU11,682 and, if the debtor does not default, will receive CU11,682/97% = CU12,000.

- This is an asset value based on the expected values of returns only realisable in short-term trading by creditors, i.e. assimilating "cash flows" to fluctuations in fair values as well as including the actual coupon of CU12,000. The values and probabilities of default differ from those for the current exit value of a debt and the only common feature is the uniquely possible risk-free return on efficient markets for which the LIBOR rate is being used as a proxy.

The effect of credit risk in the measurement of liabilities

- IFRS 7 IG 9 states that, at the end of the first year when the LIBOR rate has increased to 4.75%: "the fair value for the bond is CU153,811" —which is a fact—and that this is "consistent with an interest rate of 7.6 per cent" using its equation:

  - $CU153{,}811 = [CU12{,}000 \times (1 - (1 + 0.076)^{-9})/0.076] + CU150{,}000 \times (1 + 0.76)^{-9}$.

- As no further rate changes are considered (and the rate curves are implicitly taken to be flat) IFRS 7 is presuming, supposing no credit default can arise, that the fair value of the assets at the end of the second year will be:

  - $[CU12{,}000 \times (1 - (1 + 0.076)^{-8})/0.076] + CU150{,}000 \times (1 + 0.76)^{-8} = CU153{,}501$.

- This is not a fact and, as already explained, IFRS 7 does not conceptualise expected returns and treats them deterministically. As the debtor may default in the second year and the probability of its not doing so is 97% (1.0475/1.076) the expected fair value of the assets at the end of the second year is just CU153,501 x 97% = CU149,435.

Table 31: Comparing the IFRS 7 conception of creditors' returns on fair values to expected (probability-weighted) returns

Returns to creditors on fair values in the 2nd year in CU & as an interest rate:	The IFRS 7 conception	Probability-weighting	
		Probability	Expected values
Closing balance at year-end	153 501	97%	149 435
Nominal coupon receivable at year-end	12 000	97%	11 682
Less: Opening balance at beginning of Year 2	-153 811	100%	-153 811
Return	**11 690**		**7 306**
Interest rate (Return / Opening balance)	7,60%		4,75%

- When IFRS 7 refers to a "market-consistent" rate of 7.6% it needs to be understood that this is simply the rate of return which creditors expect to compensate exactly for their exposure to credit risk on their asset holdings. These are revalued accordingly so that the spot exchange price, or fair value, of these holdings on the creditors' market is expected to provide the market-consistent return of 4.75%, the only possible "market-consistent" return that can exist in an efficient market.

- In simply recording the return of CU11,690, as apprehended by IFRS 7 inter alia, creditors ignore their expected yearly return of CU7,306 because they do not account for any experience adjustments on re-estimating expected (probability-weighted) cash flows and, if reasoning on the bases already criticised, might not even be aware of the existence of these adjustments as well as the other effects of credit risk.

155 The following accounting entries should apply:

Table 32: Accounting entries for fair values

Accounting entries for Year 2 in CU:	Accounts for:			
-: Dr & + : Cr	Assets available for sale	Interest receivable	Profit & Loss	Comprehensive Income
Opening balances	-153 811	n/a	n/a	n/a
Reduce the opening balance by the discounted amount included for interest payable at EOY 2	11 152	-11 152		
Provide for the current year's interest at the market rate of 7.60% thereon: 7.60% x 11 152 = 848		-848	848	
sub-total (Account balances):	-142 659	-12 000	848	
Unwind the discount rate on the residual balance: 4,75% x 142 659 = 6 776	-6 776		6 776	
Book the prospective experience adjustment on the residual balance	-4 066		4 066	
sub-total (Account balances):	-153 501	-12 000	11 690	
Book the decrease in comprehensive income: 153 501 - 153 811 = -310			310	-310
Total: Closing balances	-153 501	-12 000	12 000	-310

- In the above table, we have reversed the convention "+: Dr & - : Cr" and substituted the "Assets available for sale" and "Interest receivable" accounts for the "Long-term debt" and "Interest payable" accounts in Table 30: Accounting entries for current exit values. This transitional representation of the effect of the fair value option on debt will be completed in Table 33: Accounting entries for a debt at fair values: showing explicitly the additional cash available to creditors on the asset market.

156 Attentive readers will have noted that the future expected cash flows differ between debtors and creditors: e.g. the amounts expected for Year 2 of CU11,639 and CU11,682, respectively, are different. Some will no doubt believe that this is impossible and therefore that, in some way, the current exit value of a financial instrument must still equal the fair values of the corresponding assets on the creditors' market. Consequently, we must address such beliefs.

Inexistent cash flows and the fair value option

157 Why are the cash flows expected by the issuer or transferee debtor less than those expected by their creditors?

158 With an interest rate of 7.60%, the creditors' assets are quoted at CU153,811 at the beginning of the second year and CU153,501 at its end and not CU150,000 because, as we have seen, the asset values anticipate a capital gain of CU3,811. Notwithstanding, the nominal future coupons remain unchanged at CU12,000. Creditors therefore realise additional cash flows in trading the debt instrument on their market and these additional cash flows are reflected in accounting at "fair values".

159 Indeed their return of CU11,690 (7.60% x CU153,811) is just the coupon of CU12,000 received from the debtor reduced by the fall in the capital gains anticipated in trading on the creditors' market amounting to CU310 (CU153,811 - CU153,501), i.e. CU12,000 – CU310 = CU11,690.

160 Debtors have no access to these cash flows unless the host debt instrument incorporates a debt buy-back option.

161 We have already obtained the probability of no credit default occurring on the debtors' transfer market of 96.99% (1.0475/1.08) so that the expected (probability-weighted) cash flow for the nominal coupon of CU12,000 amounts to CU11,639 (96.99% of CU12,000).

162 As we have seen, the equation used in IFRS 7 shows the capital gains on the creditors' market as the result of discounting the nominal cash flows at 7.60% as opposed to 8%. It follows that a capital gain of CU41 (CU12,000/1.076 – CU12,000/1.08) on the second year's coupon of CU12,000 will be realised by the creditors provided no credit default occurs at the end of the second year. The gain creditors will then realise amounts to CU44 (CU41 x 1.076), i.e. CU41 increased at the realised rate of return on the creditors' market. From first principles, the market-consistent expected value of this gain can only amount to CU41 x 1.0475 i.e. CU43 increased at the risk-free rate.

163 Creditors are of course expecting to obtain the expected cash flow of CU11,639 from the debtor as well as the expected capital gain of CU43 on the creditors' market, i.e. CU11,682. Now, we have already established this is the creditors' expected cash flow:

- Indeed, using the probability of no credit default occurring on the creditors' market in Year 2 of (1.0475/1.076) = 97.35%, we have established that the expected (probability-weighted) cash flow for the nominal coupon of CU12,000 to the creditors is 97.35% of CU12,000, i.e. precisely CU11,682.

164 It follows quite obviously that the future expected cash flows do indeed differ between debtors and creditors: e.g. that the amounts expected for Year 2 of CU11,639 and CU11,682, respectively, are different. And that, in the absence of a debt buy-back option:

- Issuers and transferee debtors can only expect cash flows based on the contractual amounts payable.

- But, creditors will expect greater cash flows if their corresponding assets trade at a capital gain and lesser cash flows in the opposite event.

165 Having established these facts, we are now in a position to "amalgamate" **Table 30: Accounting entries for current exit values** and **Table 32: Accounting entries for fair values** to provide a clear picture of the accounting for a debt at fair (asset) values:

Table 33: Accounting entries for a debt at fair values: showing explicitly the additional cash available to creditors on the asset market

Accounting entries for Year 2 in CU:	Accounts for:					
	Long-term debt: Col 1 & Col 2		Col 1 + 2: Long-term debt at fair values	Interest payable	Profit & Loss on:	
+ : Dr & - : Cr	at current exit value	additional cash available to creditors			current exit value	additional cash available to creditors
Opening balances	-150 000	-3 811	-153 811	n/a	n/a	n/a
Reduce the balance for debt by the discounted amount included for interest payable at EOY 2	[12 000/1.08] 11 111	41	[12 000/1.076] 11 152	-11 111		-41
Provide for the year's interest payable by the debtor at the contractual rate : 8% x 11 111 = 889				-889	889	
sub-total (Account balances):	-138 889	-3 770	-142 659	-12 000	889	-41
Unwind the discount rate of 4.75% on the residual balances of: of 138 889, 3 770 & 142 659	-6 597	-179	-6 776		6 597	179
Book the prospective experience adjustment on the residual balances: 138 889 at (8.00% - 4.75%) = 4 514 & 142 659 at (7.60% - 4.75%) = 4066	-4 514	448	-4 066		4 514	-448
Total: Closing balances	-150 000	-3 501	-153 501	-12 000	12 000	-310
					Total: 11 690 (asset yields)	

166 The additional cash is of course only available to creditors, as they alone can buy and sell the "debt" at fair values, unless debtors can also intervene on these markets to buy back their debt prematurely at the prevailing asset prices.

167 Hopefully, following the work on the EFRAG example, we can leave numerate readers with the instructive exercise of constructing the debt buy-back option. As previously, they should be able to prove that the value of this embedded derivative will provide debtors with the inexistent cash flows in the host debt instrument that the fair value option requires debtors to account for as if they did not only exist on the creditors' market.

- Hint: Regular coupon payments require analysing the principal with reference to "age buckets" which we could ignore in the EFRAG example when interest was simply rolled up. Readers should also bear in mind that the principal, say the "fair value" of

CU153,811 at the beginning of the second year, is not "aged" by reference to the IFRS 7 equation but as a series of expected (probability-weighted) cash flows discounted at the risk-free rate of 4.75% as shown in the tables above.

- As a side issue, it is worth noting that this fact is ignored in other standards, e.g. SFAS 109 & IAS 12: in accounting for deferred taxes. This is particularly serious when the rates of revenue and capital gains taxes are different and, for example, as for the capital gains realised on most of the investments in debt instruments by all French insurance companies, where capital losses realised after the end of a reporting period on such instruments (whether acquired before or after the end of the reporting period) can only be offset against the untaxed capital gains already realised.

The Board's desired measurement in *Preliminary Views on Amendments to IAS 19 Employee Benefits*

The application of the measurement attribute illustrated

168 The Discussion Paper on Amendments to IAS 19 Employee Benefits provides an unexamined apprehension of the relevance of a deterministic equation to justify proposing that "the Board's desired measurement is fair value assuming the terms of the benefit promise do not change" —although whether this is in fact fair value §7.40: "is a question that will be addressed in the fair value measurement" [sic].

169 And the "application of this measurement attribute is illustrated in the examples below" §7.39:

> Example 1: An employer promises to pay at retirement a contribution of CU1,000 and a market total equity return per year on that contribution until the employee retires. The benefit vests on the first day of service. The fair value of that promise, assuming the terms of the benefit promise do not change, would include the effect of credit risk and may, therefore, be less than CU1,000.
>
> Example 2: An employer promises to pay at retirement a contribution of CU1,000 and a fixed return of 4 per cent per year until the employee retires. The contribution vests on the first day of service. The fair value of the promise, assuming the terms of the benefit promise do not change, is CU1,000 plus the compound effect of 4 per cent per year discounted at a rate that reflects the credit risk specific to the promise.

170 As "examples" these are somewhat disingenuous.

171 The idea behind both of them is, however, clear:

- A risk-free employer, such as a government, would account for the liability described in examples 1 and 2 on inception at CU1,000. And if, in that case, the contractual payment to the employees on retirement is expected to equal, say, CU10,000, they would receive 100% because 100% would be the probability that no future credit default arises. In other words, the present value of CU10,000 discounted at the risk-free rate over the period to retirement equals CU1,000, i.e. the risk-free discount factor to inception is 10% of the contractual payment. Or, equivalently, the compound risk-free rate over the period to retirement is 900%: CU1,000 x (1+900%) = CU10,000.

- If we now suppose that the probability of not defaulting is only 50%, say, then the "argument" must be that the present value of the contractual liability is only CU500, i.e. less than CU1,000, because the creditors' market would discount the contractual promise using a non-contractual discount factor of 5%. Or, equivalently, at a compound risk-inclusive rate over the period to retirement of 1,900%: CU10,000/(1+1,900%) = CU500.

172 However, no creditors' market is mentioned and the contractual promise is unfunded. We have already demonstrated that if the promise were funded, as for an insurance contract or for a financial instrument, then it would not be discounted using a non-contractual discount factor.

- And we have also shown this by demonstrating the notional effect of credit risk on liabilities for funded contributions in an employer's SPV (a retirement fund accounted for using the concepts in the Insurance Discussion Paper): ***Current exit values for insurance and employers' promises to pay benefits***.

- Then again, these demonstrations would not be pertinent here because the Discussion Paper on *Amendments to IAS 19 Employee Benefits* also states: §7.2: "The credit risk of the contribution-based promise may be affected by other liability-specific matters, such as any funding of the promise."

173 We have also shown the flaws in treating uncertain future cash flows using deterministic equations "as if" the future cash flows were certain—here, we would have a cash flow with a probability of 50% of being either CU10,000 or CU0.

174 The Discussion Paper on *Amendments to IAS 19 Employee Benefits* obviously shares this fundamental unawareness, and therefore the beliefs expressed, in SFAS 157: *Fair Value Measurements*.

- However, there is no discussion of current exit value as in the Discussion Paper on *Insurance* which indicated that it was: §169: "too early to conclude whether current exit value is the same as fair value".

175 We have already dealt with the fair value of an unfunded liability in FASB Concepts Statement 7: *Using Cash Flow Information and Present Value in Accounting Measurements* (the second part of the example that was not reproduced in SFAS 157) above: 29-33.

Whilst the flaws of principle are identical, there seems little point in reproducing it by fitting that example to the "examples" given here.

- Further, the FASB accounting Statements No. 87, *Employers' Accounting for Pensions*, and No. 106, *Employers' Accounting for Postretirement Benefits Other Than Pensions*, do "portray the present value of an obligation such that two entities with the same obligation but different credit standing would report the same carrying amount" : Concepts Statement No. 7: §84. Therefore:

  - It is not clear why the IASB would be relying on the fair value measurements application in US GAAP.

  - It is clear why the IASB are: §7.29: "interested in hearing views on how any practical issues might be resolved".

176 Taking the view that the IASB's approach to current exit value might permit a "conceptually superior" albeit non-convergent practical application, before finalisation of the various related IASB projects—such as the Framework, Fair Value Measurement, Insurance Contracts and so forth—we shall assume no other fair value measurement is intended than "current exit value":

- *Insurance* Discussion Paper: §IN21: "An informative and concise name for a measurement that uses the three building blocks is 'current exit value'. This paper defines current exit value as the amount the insurer would expect to pay at the reporting date to transfer its remaining contractual rights and obligations immediately to another entity."

- Cf. the Discussion Paper on *Amendments to IAS 19 Employee Benefits*: "ITC11 The Board's preliminary view is that entities should measure the liability for a contribution-based promise at fair value assuming the terms of the benefit promise do not change."

Table 34: Comparison of the measurement proposed with current exit value in the Discussion Paper on Insurance Contracts

Preliminary Views on Amendments to IAS 19 Employee Benefits: ITC 11	The Insurance Discussion Paper: IN18
The Board reasons that fair value assuming the terms of the benefit promise do not change meets the measurement objectives described in this paper, i.e. it is based on:	The Board's preliminary view is that an insurer should measure all its insurance liabilities using the following three building blocks:
(a) explicit, unbiased, market-consistent, probability-weighted and current estimates of the cash flows;	(a) explicit, unbiased, market-consistent, probability-weighted and current estimates of the contractual cash flows.
(b) current market discount rates that adjust the estimated future cash flows for the time value of money; and	(b) current market discount rates that adjust the estimated future cash flows for the time value of money.
(c) the effect of risk, other than the risk that the terms of the benefit change	(c) an explicit and unbiased estimate of the margin that market participants require for bearing risk (a risk margin) and for providing other services, if any (a service margin).

- Clearly, the cash flows are those based on the enforceable terms of the benefit promise, i.e. their unmodified "contractual" or constructively contractual terms, and the perception of the effect of risk is rationally that of any market participant (who would not of course require a service margin for "providing other services").

- The Discussion Paper on *Amendments to IAS 19 Employee Benefits* does not explain any of the (other) differences, possibly because there aren't any.

177 The fundamental question posed by the "examples" is whether an enforceable obligation to pay CU10,000 at some future date could be valued at a current exit value on a market-consistent basis at:

- CU1,000 because this is the present-day value of money (i.e. CU10,000 discounted at the compound risk-free rate of 900% to the due date and therefore using a discount factor of 10%).

- Or, whether CU10,000 should be discounted at some other rate, i.e. by multiplying the risk-free discount factor of 10% by the probability of the debtors' not defaulting such as 50% x 10% = 5% and therefore discounting at a compound risk-inclusive rate of 1,900% to the due date.

  - If this could be so, then the present value of that debtors' liability would be 50% x CU1,000 = CU500.

- The question is therefore of a general order: the obligation could, for example, be to pay CU10,000 for the expected outcome of a legal case.

178 The transfer price received by the transferee must enable it to meet the contractual obligation to pay CU10,000 in the event no default occurs: which has a probability of 50%.

- Received opinion therefore assumes that transferees with the same probability of not defaulting of 50% would be the only debtors on the debt-transfer market able to accept a price of CU500 for this liability.

- Now, on an efficient market as we have shown, the transferee cannot invest a transfer price of CU500 and expect to obtain a return at any other rate than the risk-free rate.

- The expected cash flow on the due date from that investment is CU500 divided by the risk-free discount factor: CU500/10% = CU5,000. Or equivalently, multiplied at the compound risk-free rate of return: CU500 x (1+900%) = CU5,000.

- Obviously, CU5,000 is insufficient to pay the contractual liability of CU10,000, i.e. whether the employer actually defaults or not it is totally certain that CU5,000 is insufficient to meet the transferred liability.

- Even if we assume the transferee would only default when the transferor defaults—i.e. that the probabilities of defaulting are both 50% and occur simultaneously—the transferee will still only dispose of CU5,000 to pay the contractual liability: the enforceable debt due of CU10,000 when the transferor does not default.

- Clearly, it follows that the only market consistent current exit value is CU10,000 discounted at the risk-free rate, i.e. CU1,000.

- This is the present-day value of money on an efficient market, whatever the respective creditworthiness of transferors and transferees.

- In other words CU1,000 is the only cash payment for the transfer which will give the required market-consistent return of CU10,000 on the due date of the liability.

179 It follows that the "examples" are incorrect: The fair value of the unfunded promises of CU1,000, assuming the terms of the benefit promise do not change and are therefore binding on the employer, are neither reduced for "the effect of credit risk" (Example 1) nor "discounted at a rate that reflects the credit risk specific to the promise" (Example 2).

180 This, of course, also resolves the "practical issues" and shows "conceptually" that the propositions should converge to the application of US GAAP for employee benefits.

Conclusion

181 This paper measures credit risk using a simple probability distribution for credit defaults which is shown to be compatible with the assumptions made by accountants but not with their pronouncements in accounting standards and discussion papers ("received opinion"). These assumptions explain "creditworthiness" in terms of the differences in interest rates on issued debt and, to establish fair values, presuppose an efficient market, i.e. an arbitrage-free market in which no price imbalances enable market-participants to realise a risk-free profit.

182 On an efficient market investors could not:

- borrow money and expect to invest it to realise a higher risk-free return than the lender.

- disinvest savings and expect to lend them to realise a higher risk-free return than that they could have expected on their savings.

183 Received opinion does not measure the effects of credit risk. It treats future cash flows as if they were risk-certain and therefore not subject to credit risk. In this paper the expected (probability-weighted) value of cash flows is derived to measure the effects of credit risk and to explain the fair values of both assets and liabilities (their current exit values).

184 It is not contentious that the fair values of financial assets corresponding to an issued debt instrument are evidenced by their quoted prices on the creditors' market.

185 The current exit value of a liability is represented as being:

- Discussion Paper *Preliminary Views on Insurance Contracts*: IN21: "An informative and concise name for a measurement that uses the three building blocks is 'current exit value'. This paper defines current exit value as the amount the insurer would expect to pay at the reporting date to transfer its remaining contractual rights and obligations immediately to another entity."

- SFAS 157 *Fair Value Measurements*: "Application to liabilities 15. A fair value measurement assumes that the liability is transferred to a market participant at the measurement date (the liability to the counterparty continues; it is not settled) and that the non-performance risk relating to that liability is the same before and after its transfer. Nonperformance risk refers to the risk that the obligation will not be fulfilled and affects the value at which the liability is transferred. Therefore, the fair value of the liability shall reflect the nonperformance risk relating to that liability. Nonperformance risk includes but may not be limited to the reporting entity's own credit risk."

186 This paper demonstrates that credit default is not a certain event and that in the event that credit default does not occur a debtor will be required to pay its creditors the enforceable or contractual amounts due for any liability. This paper also demonstrates that the liability could not be transferred to any other debtor at a price which could not be expected to provide a return on investment equal to the enforceable or contractual amounts due to the creditors to discharge the liability. Even if credit default on the liability, whether transferred or not, actually occurs at exactly the same moment and with identical probability, this paper demonstrates that the transfer price is invariant and must enable the transferee to meet the obligations assumed whenever credit default does not, in fact, occur.

The effect of credit risk in the measurement of liabilities

187 The current exit value of a liability, its market-consistent "fair value", is then established as the amount a debtor would expect to pay at any date to transfer its remaining contractual rights and obligations immediately to another entity.

188 The current exit value of general (unfunded) liabilities, such as the amount due to settle a legal claim or unfunded contributions to pay employees legally-enforceable retirement benefits, is also demonstrated to be unaffected by credit risk. The market-consistent current exit value of such a liability is therefore the present-day value of money for the enforceable cash flows due discounted at the risk-free rate of return on the market.

189 In this paper, the current exit value of a host debt instrument, on the other hand, is derived by discounting the contractual cash flows at the contractual rate of return due to the creditors, even if the contractual rate is a risk-inclusive rate and therefore greater than the risk-free rate of return on the market. This paper therefore tacitly assumes that a transferee would accept a transfer price equal to the contractual amount due at the date of transfer and could be expected to continue paying the contractual interest due. It follows that the transfer price is less than the present-day value of the contractual cash flows discounted at the risk-free rate of interest. In other words, the "credit characteristics of the liability", the annual probability of credit default, are unchanged. This would typically limit transferees to entities which could only themselves issue debt on the creditors' market at the same contractual rate of interest.

190 Notwithstanding, this paper establishes that the current exit value of a host debt instrument is not equal to the corresponding asset (fair) values on the creditors' market whenever trading on that market enables the creditors to realise short-term capital gains or losses at the exchange (fair value) price of those assets on that market.

191 An explicit option, a debt buy-back option, might be embedded in the debtors' contract. The debt buy-back option would enable debtors to extinguish their future contractual obligations at any time prior to their term, by buying back their debt from the creditors at the spot (fair) values of the corresponding assets quoted on the creditors' market. In that case, this paper:

- demonstrates, by valuing the separable derivative and showing its value is zero on inception, that the current exit value of the whole contract equals the exchange (fair value) price of the corresponding assets on the creditors' market;
- therefore concludes, in the absence of such an explicit embedded derivative, that the fair value option in IAS 39 imputes inexistent cash flows to a host debt instrument;
- infers, from the *Implementation Guidance* to IAS 39, that accountants disallow the valuation of financial instruments based on creating cash flows that do not exist in the contract.

192 Consequently, the current exit value of a host debt instrument is shown to equal its contractual value at any time, including any interest rolled up at the contractual rate by the debtor, provided it has not already defaulted and whatever the probability of future default may be over its residual term.

193 The same technical approach is also used to demonstrate that the current exit values of non-financial liabilities incepted on receiving insurance premiums or funding employee benefits are similarly unaffected by credit risk.

194 This paper therefore shows that:

- in treating future cash flows as if they are risk-certain and not measuring the effects of credit risk, accountants have reached consistently erroneous conclusions as to how credit risks affect the measurement of liabilities.
- the current exit value of a host debt instrument does not equal the fair value of the corresponding assets.
- the fair values of the assets traded at their spot (fair values) are affected by credit risk because the creditors of a host debt instrument trade in short-term cash flows affected by capital gains and/or losses.
- the cash flows on the host debt instrument are the contractual cash flows and exclude the cash flows realised on the creditors' trading market.
- the current exit value of any liability is not reduced by 'own credit risk'.
- the technical approach required to measure liabilities at market-consistent values, whether financial or non-financial, is identical.