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International
Accounting Standards
Board

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> *These notes are based on the staff papers prepared for the IASB. Paragraph numbers correspond to paragraph numbers used in the IASB papers. However, because these notes are less detailed, some paragraph numbers are not used.*

INFORMATION FOR OBSERVERS

Board Meeting: **16 November 2006, London**

Project: **Financial Instruments – Due Process Document (DPD)**

Subject: **Recognition and Measurement (Agenda Paper 5C)**

CONTENTS OF PAPER

1. This paper discusses the measurement of certain options and embedded options.

2. The question of whether or not to recognize certain items discussed in this paper that meet the definition of a financial instrument is addressed in paper 5D.

BACKGROUND

3. In discussing the proposed definition of a financial instrument for the DPD in September, the Boards briefly touched on the issue of whether a financial instrument, such as a written option, can create future economic benefits for the writer. This issue is all about **what** expected cash flows we should use in valuing the **present contractual rights and obligations** an entity has. More specifically:

    a. Should the cash flows used assume exercise of the option only in those circumstances in which a securities option would be exercised (that is, when

the exercise price of an option to buy an item is less than the market price for the same item[1])?

b. Or, should we use the expected cash flows a market participant would be expected to consider in valuing the option contract – that is, to use **all** the possible cash flows arising from the operation of the existing contract?

4. If the valuation of the option uses only those cash flows that would arise when the option exercise price is less than the comparable market price, then an additional question arises; should we recognize some or all of the additional value market participants attribute to the operation of the contract (reasons we might want to do so include the practicality of measurement and to provide decision useful information)? If so, then should this be recognized and presented separately from the contract itself?

5. Before continuing, Board members may wish to read Appendix A of this paper, which is a refresher on valuation techniques used by market participants.

MEASUREMENT OF STANDALONE OPTIONS

6. Securities options are only exercised when the exercise price for the security is more favorable to the option holder than the market price. That is, the exercise price and the market price are the only factors that need to be considered to estimate future cash flows from that option.

7. However, how should the fair value to the writer of an option be measured if the holder of the option is expected to exercise the option when the exercise price is **less** favorable than the market price to the option holder?[2] That is, the option holder decides to exercise the option for other reasons?

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[1] And vice-versa for an option to sell.
[2] This question ignores the possibility that the option writer and holder may transact in different markets for the underlying item. In other words, the holder of a (call) option to buy an item may not be able to access a price for the item that is lower than the exercise price of the option – and hence will exercise the option. The writer of the option (and other similar entities) may have access to a different market for the item in which the price for the item is **lower** than the exercise price. Hence, there may be a range of market prices for the item in which it is actually beneficial to both parties for the option to be exercised. Furthermore, the writer of the option may be able to sell the contract to another entity that also has access to that alternative market for the item and receive consideration selling the contract.

Credit Card Option to Borrow

8. An example of this is the option a credit card company writes to the holder of the credit card, under which the holder can either obtain a cash advance or use the card to purchase goods or services from a third-party. (The card issuer pays cash to the third party in exchange for a promise to pay from the cardholder.)

9. Many cardholders exercise the option to borrow when the interest rate on the card is higher than other unsecured borrowings with similar payment terms[3]. They exercise an out-of-the-money option because of other factors. Two of those other factors are convenience and safety (that is, the card holder does not have to carry cash). In addition, a credit card may be the only way to make an immediate purchase by telephone or on the internet, and some merchants (such as car hire companies and hotels) may require a large cash deposit if the customer does not present a credit card.

10. Such exercises of credit card options result in net economic benefit to the card issuer. The credit card company expects future net cash inflows because the interest rate charged on the card is higher than the market rate of interest when the option to borrow is exercised. In addition, if the option is exercised the card company might receive other fees and commissions, such as interchange fees charged to the third-party retailer[4].

11. The expectation of future net economic benefit is evidenced by the fact that the market is often willing to pay more than face value in transactions involving credit card receivables[5]. The market includes in its measurement all possible cash flows arising from the operation of the contract.

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[3] Of course, it is also possible that the creditworthiness of the cardholder has deteriorated since the option to borrow was written, so that the interest on the card is actually lower than on other similar borrowings.
[4] The credit card company also incurs costs, such as servicing and promotional costs. In addition, there may be credit losses.
[5] Such transactions provide evidence that the credit card company controls the option contract (and the ability to transfer the option contract) – and hence any economic benefits from the expected cash flows arising from the operation of the existing contract.

12. The transactions involving credit card portfolios often cover a number of items. These items typically include:

   a. The option to borrow (as discussed above)–a financial instrument

   b. Existing receivables from cardholders–a financial instrument

   c. Other possible non-contractual benefits arising from the credit card relationship (for example, sales of goods or services or other transactions that may occur in the future because the credit card relationship exists)–not a financial instrument.

13. A transaction involving all these items might be illustrated as follows:
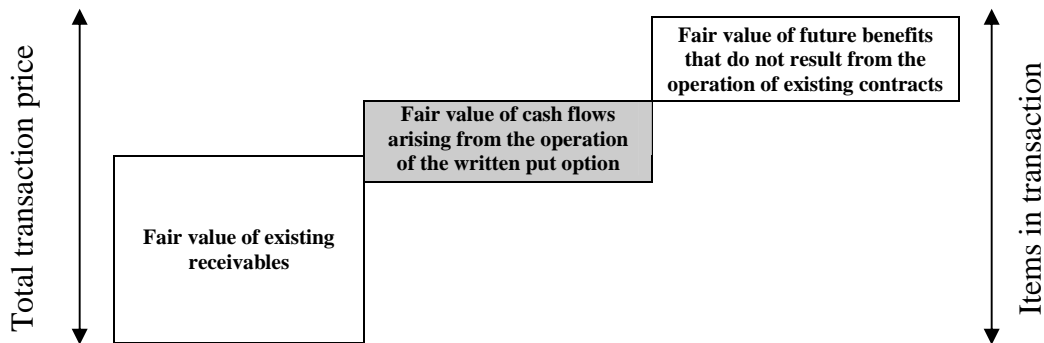
14. Transactions involving **only** the existing receivables do occur, especially as securitizations. However, transactions involving only the written option do not usually occur–and that is what we are seeking to measure.

**Valuation of the Option to Borrow by Market Participants**

15. The measurement of any option considers the range of possible outcomes and the probability of those outcomes occurring.

16. In measuring the cash flows arising from the operation of the written put option, a market participant would consider all the possible outcomes. The two basic outcomes are that the option to borrow is either exercised or not exercised.

17. If the option to borrow is not exercised, that outcome has no value.

18. Therefore, the only reason that market participants are willing to attribute value to this option arises from the probability that the option will be exercised. The probability that the option will be exercised can be estimated from past experience.

19. In valuing **any** option, market participants would always consider all possible outcomes.

Measurement of the Option for Accounting Purposes

20. The two possible approaches to measuring written options, other than "plain vanilla" securities options, are:

    a. Approach A–to base the measurement on the same assumptions used in pricing securities options. That means that exercise will be assumed to occur only when it is detrimental to the writer–that is, when interest rates on the card are lower than interest rates on other sources of borrowings with comparable terms.

    b. Approach B–to base the measurement on the assumptions that market participants would use in setting a price for that option (or portfolio of options).

21. Approach A is based on assumptions that market participants use in pricing securities options. It assumes that any future benefits that might arise for the option writer do not arise from the present contractual rights and obligations embodied in the written option. That is, the credit card company has no contractual right to compel the card holder to exercise the option (either when it is in the money or out of the money).

22. Under Approach A, written options (such as the credit card option to borrow) would have negligible value, as they would only consider a small part of the distribution of possible outcomes for the option–namely when exercise of the option would be detrimental to the writer.

23. Under Approach A, no written option would ever be assumed to create economic benefits to the writer of the option. That ignores the true economics of some options. If that represented economic reality, credit card companies would not write such options for little or no premium, and market participants would not purchase them as assets.

24. Using the graphic representation of a transaction involving a credit card, Approach A would only capture the shaded component of the total value that market participants would attribute to the written option, as illustrated below.
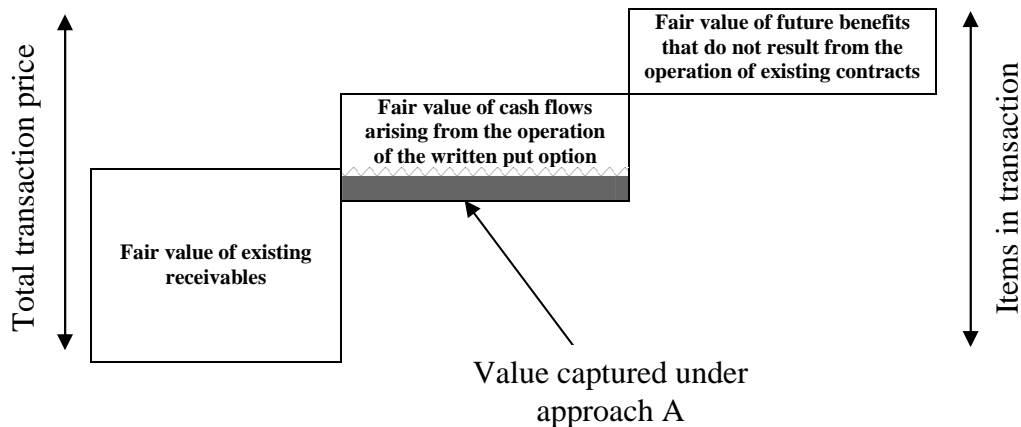
25. Approach B is a market participant approach. That is, it is based on the same assumptions that market participants would use in setting an exchange price for portfolios of the written options in question. Approach B would consider the possibilities of exercise based on past experience with similar instruments and would thereby include in the expected cash flows the entire distribution of possible outcomes.

26. Under Approach B, a written option **could** create future economic benefit for the writer.

The Non-contractual Components of a Credit Card Transaction

27. The non-contractual benefits (for example, cross-selling opportunities) are clearly not based on contractual rights and are not financial instruments and therefore are not within the scope of the DPD.

28. However, card transactions typically involve only the existing receivables **or** all three components.

29. It may therefore be practically difficult to determine directly which part of the total price in the sale of credit card contracts is attributable to the written option and which part of the total price is attributable to the non-contractual benefits.

MEASUREMENT OF OPTIONS EMBEDDED IN ANOTHER INSTRUMENT

30. In the previous section, we considered how to measure a standalone written option. This section considers how to measure an option embedded in another financial instrument.

31. Take, for example, a prepayment option in a loan contract. The borrower, under the terms of the contract, has the right to repay the loan before its stated contractual maturity. That is, the borrower holds a call option over its own debt.

32. One reason that borrowers would exercise an option to call back a loan (prepay) is that they are able to re-issue the loan (or refinance) on similar terms at a more beneficial rate; that is, when market interest rates on comparable loans are below the interest rate on the existing loan instrument. If that were the only consideration, the borrower would always exercise its call option when market rates are below the contract rate and would never exercise that call option if market rates are not below the contract rate.

33. Obviously, however, there are many other factors that affect a borrower's decision to repay. For example, a borrower may want to sell the collateral property or a borrower may have free cash that it cannot invest at a rate higher than the contract rate on the loan. The time and effort required to refinance also may make refinancing

uneconomical, or if the borrower is an unsophisticated consumer, that borrower may not even be aware of current market interest rates.

34. Market participants who hold prepayable loans as assets or are considering investing in prepayable loans consider all outcomes with nonzero probabilities. These possible outcomes will include prepayments and non-prepayments due to factors other than interest rates.

35. The following two approaches to measuring the fair value of prepayable loan assets are comparable with the two approaches identified in paragraph 20 as applicable to standalone options:

    a. Approach A –to base the measurement on the assumption that borrowers will always exercise their call option (prepay) when comparable market interest rates are lower than the contract rate and will never exercise their call options (to prepay) when comparable market interest rates are not lower than the contract rate.

    b. Approach B –to base the measurement on the factors that market participants would include in setting a price for those loans, even if that means assuming that the borrowers will sometimes prepay when comparable rates are higher than the contract rate and will sometimes not prepay when comparable rates are lower than the contract rate.

36. As previously discussed, Approach A considers only part of the distribution of outcomes that have nonzero probabilities. Approach B takes into account the entire distribution of possible outcomes with nonzero probabilities.

Possible Differences between Standalone and Embedded Options

37. It has been argued in the past that differences between standalone options and embedded options justify a different approach to measurement.

38. Some possible differences that were set out in the draft standard *Financial Instruments and Similar Items* issued by the Joint Working Group were (in summary form) that:

    a. An option embedded in another instrument is an integral part of the terms and conditions of that instrument, and therefore partially define the rights and obligations arising from that instrument. The lender's rights to the contractual cash flows from the loan instrument are constrained by the option, and the probability of prepayment will enter into the determination of the cash flows market participants will use in estimating the fair value of the loan instrument.

    b. The fair value of an option embedded in another instrument is not conditional on anticipating benefits arising from future transactions with customers. It relates only to estimating the future cash flows to be received from the existing loan instrument. As such, it is not as easy to create financial income and assets as with a standalone option.

39. The FASB Preliminary Views on *Reporting Financial Instruments and Certain Related Assets & Liabilities at Fair Value* included an alternative view of two Board members relating to the issue of how to measure certain options. This is reproduced in Appendix B for the convenience of Board members.

THE INSURANCE PROJECT

40. The issue of how to measure a contract that is, effectively, a series of written options has been most recently been discussed in the Insurance project being led by the IASB.

41. For example, a long-term life insurance contract under which a policyholder has a right (but no obligation) to pay a fixed (or otherwise contractually restrained) premium to continue insurance coverage could be characterized as a series of options (or options on options) which the policyholder may exercise to obtain insurance for the specified period. In pricing such contracts, the insurer (or an entity who might purchase the portfolio of contracts) considers the range of possible outcomes – namely that the options will be exercised or will not be exercised (that is, the policy

lapses). If the options are exercised, the outcome may either be favorable to the insurer (because the policyholder is still in good health and so is not very likely to make a claim) or unfavorable to the insurer (the policyholder's health has deteriorated and so is more likely to make a claim). A probability is attached to each possible outcome.

42. Using such an approach to valuing these contracts would often result in net economic benefit to the insurer in aggregate, especially at the beginning of the period during which the insurer has guaranteed insurability.

Preliminary Views of the IASB Board in the Insurance Project

43. The IASB Board has reached the following preliminary views with regard to the measurement of such contracts:

   a. The insurer has an asset relating to the future premiums that the policyholder must make to retain a right to guaranteed insurability[6] (less additional benefits that result from those premiums).

   b. Conceptually, that asset is a portion of a customer relationship, not a contractual right.

   c. When the insurer becomes a party to the contract, the insurer should recognize that portion of the customer relationship (but not the rest of the customer relationship relating to future contracts)

   d. The insurer should measure that portion of the customer relationship and the related liability in the same way, and should present them together. Although the customer relationship is conceptually separate from the contractual rights and contractual obligations, separate recognition and measurement would be impracticable and, arguably, not useful.

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[6] The right that permits continued coverage without reconfirmation of the policyholder's risk profile, at a price that is contractually constrained.

44. If the Boards decide to use Approach A (to base the measurement on the same assumptions used in pricing securities options –that exercise will be assumed to occur only when it is detrimental to the writer) to measure standalone financial options, then the staff suggests that the Boards consider whether an approach similar to that used in the Insurance project is applicable.

45. **Questions to the Boards:**

   a. **Should standalone options and embedded options be measured using Approach A (to base the measurement on the same assumptions used in pricing securities options –that exercise will be assumed to occur only when it is detrimental to the writer) or Approach B (to base the measurement on the assumptions that market participants would use in setting a price for that option)?**

   b. **If different approaches should be used for standalone options compared to embedded options, what are the reasons? Should the DPD consider an approach similar to that taken in the Insurance project?**

   c. **If you are not prepared to answer these questions, what additional information do you need?**

APPENDIX A – Refresher on valuation techniques used by market participants

When using a discounted cash flows technique, fair value is determined based on expected cash flows, which means probability weighted. Instruments with cash flows, the amounts and dates of which are known, are relatively easy to value using simple spreadsheet applications. For example, if a cash flow of CU100 is certain to occur in one year, CU100 is discounted for one year using the interest rate on a risk-free instrument with a one-year term. If the risk free rate is 5 percent, the result of computation will be approximately CU95.24 (100/1.05).

An instrument with a limited number of possible cash flows increases the difficulties slightly. For example, if the risk free interest rate is 5 percent, the fair value of an instrument would that would pay CU100 if a coin flip results in "heads" and CU50 in one year if the coin turns up "tails" would be computed as follows:

CU100 is discounted for one year using the risk free rate and the result is multiplied by 50%, which is the probability that the coin will turn up heads.	100 divided by 1.05 = 95.24 95.24 times 50% = 47.62
CU50 is discounted for one year using the risk free rate and the result is multiplied by 50%, which is the probability that the coin will turn up tails.	50 divided by 1.05 = 47.62 47.62 times 50% = 23.81
The results of the two computations are added	47.62 + 23.81 = 71.43

In that example, the discounted expected (probability weighted) cash flows are 71.43.

Estimating fair value using discounted expected cash flows becomes more difficult as the number of possible cash flow scenarios increase. For example, the second example assumes only two possible amounts and one possible date. If instead of occurring in one year, the cash flows could occur at after 90 days, 180 days, 270 days, or 360 days, 8 computations would be necessary (2 possible amounts, each of which could occur on 4

different dates). If all of the dates are equally probable and the probability of each amount is still 50 percent, each of the 8 possibilities has a 12.5 percent probability.

Cash Flow Amount	Probability of date and amount	Weighted amount	Discount rate	Discount period	Discounted result
100	0.125	12.5	0.05	90	12.35
50	0.125	6.25	0.05	90	6.17
100	0.125	12.5	0.05	180	12.20
50	0.125	6.25	0.05	180	6.10
100	0.125	12.5	0.05	270	12.05
50	0.125	6.25	0.05	270	6.02
100	0.125	12.5	0.05	360	11.90
50	0.125	6.25	0.05	360	5.95

Probability weighted discounted cash flow   72.74

At some point the probabilities become so numerous and difficult to identify that a spreadsheet computation becomes impractical.

Option pricing models were developed to cope with very complicated cash flow probabilities.

A lattice model, like the binomial, builds a table like the one above (generally described as a "tree" because the range of possibilities increases over time as the value of option's underlying has more and more time to change, and a chart of the probability weighting would have more and more branches as time passes).

The "tree" for the example above might look like the following:
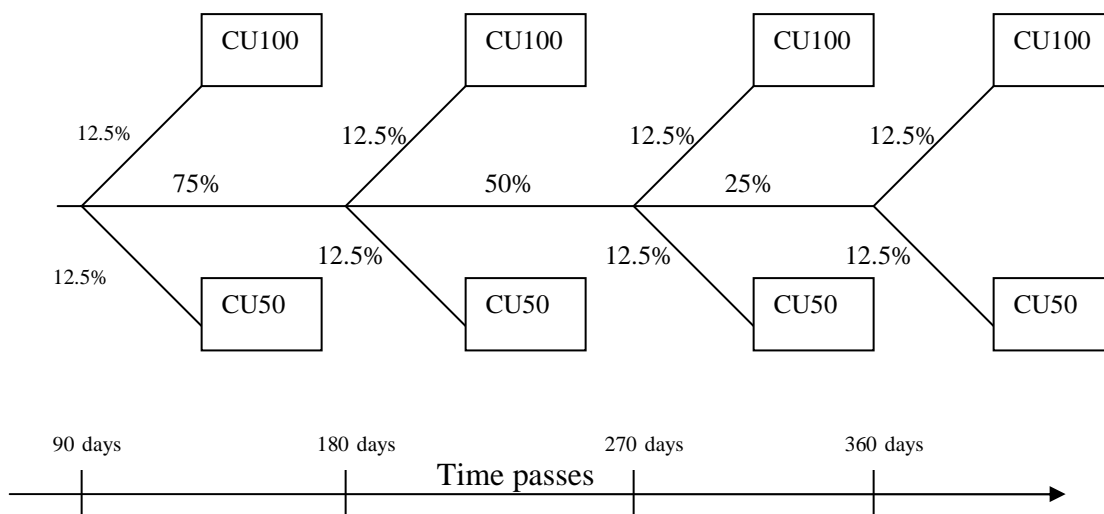
Each of the end points (CU100s and CU50s) represents a possible outcome. Starting at the left (the 90 day mark), the tree shows a 12.5 percent probability of a CU 100 outcome, a 12.5 percent probability of a CU 50 outcome, and a 75 percent probability of neither outcome. There are two outcomes at the 180 day mark, the 270 day mark, and the 360 day mark. At the 360 day mark, the tree ends because there are no more possibilities (the percentages add to 100 percent).

As you can imagine, the tree becomes more complicated as other possibilities are added. It would be difficult to draw a tree for an instrument for which an outcome can occur at any time and for which the possible outcomes are not limited to two currency amounts and especially for which there is a possibility of more than one outcome occurring (that is, multiple cash flows instead of just one). In addition, different discount rates might be used for different time periods on the tree to reflect the yield curve (time structure of interest rates).

Stock option models use a number of simplifying assumptions to reduce the incredible number of possibilities. One obvious assumption is that a call option will only be

exercised if the strike price is less than the market price, because there is no reason anyone would do that on purpose. Probably, someone has exercised a stock option when it was not "in the money" by mistake, but the probability of that occurring is so small that it can be ignored in valuing the option.

However, that assumption is not appropriate for some other types of options, for example, a loan commitment or a credit card contract, both of which can be viewed as put options on the holder's own debt instrument. The party with the loan commitment can borrow at a committed rate by "putting" a mortgage loan or other instrument to the writer of the option (the bank issuing the commitment). Similarly, the holder of a credit card can "put" a debt instrument to the card issuer (the writer of the put option).

Unlike holders of stock options, however, holders of those options may exercise their options for more than one reason. The holder of a loan commitment probably would exercise the option if the interest rate on the loan is lower than the market rate on other borrowings of similar terms. Presumably, the holder would not have paid for the loan commitment if that holder were not expecting to need to borrow money. The holder might also exercise its right to borrow even if a lower rate were available somewhere else because of the difficulty in qualifying for a loan and all of the necessary paperwork and verifications. Also, the holder might simply be unsophisticated and not be aware of other possibilities. Finally, even if interest rates have increased since the commitment date and the committed rate is lower than the current market rate, the lender might be able to sell the resulting loan in the secondary market at a profit. A binomial tree to measure the fair value of a loan commitment would need to include all those possibilities and observable transactions provide evidence that market participants are considering them. That is, loan commitments are assigned a positive value even though they are obligations of the issuer. (We cannot know whether buyers and sellers used a binomial tree or simply considered past experience and statistical evidence to assign a value, but that does not affect the validity of this argument.)

The same logic applies to credit card contracts, but they are even more complicated because unlike either a loan commitment or a stock option, the credit card option is

renewable. Even if I reach my credit limit, I can borrow again as soon as I pay down my balance. Thus, credit card contracts would be among the most complicated types of options to model.

It has been suggested that the assumption of "in the money" exercise in a stock option model should also be applied in a model to measure the other options in loan commitments, credit card contracts, and other similar things. In other words, a written option can only be a liability regardless of the type of option it is. Certain written options are assets as demonstrated by observable transactions, and to act otherwise would not result in representing a "real world" phenomenon as discussed in the conceptual framework project.

It has also been said that the asset value of a written option is not the value of a financial instrument, but the value of a customer relationship intangible. However, the asset value is computed from the same type of binomial tree as the liability value. There certainly is no comparable asset value for a stock option because we can observe that it will only be exercised when it is in the money. That is a real world phenomenon, not a theory. The same simply is not true for certain loan commitments and credit card contracts. The asset value comes directly from the exercise of the options.   There may be cross-selling opportunities or other associated customer relationship values that do not come directly from exercise of the options, but those are more akin to customer lists than financial instruments, and if they can be separated from observed transaction prices, it would be appropriate to consider them intangibles.
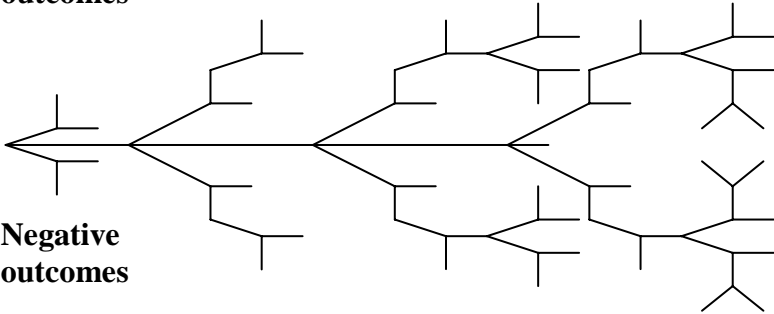
The following binomial tree diagrams illustrate possible payoff profiles market participants might use in assessing the fair value of:

   (a) A stock option

   (b) A loan commitment

   (c) A credit card contract
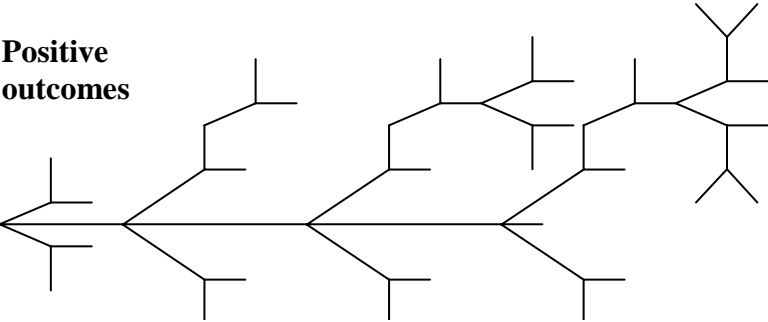
Hypothetical binomial tree for a stock option

Positive outcomes[1]

Negative outcomes

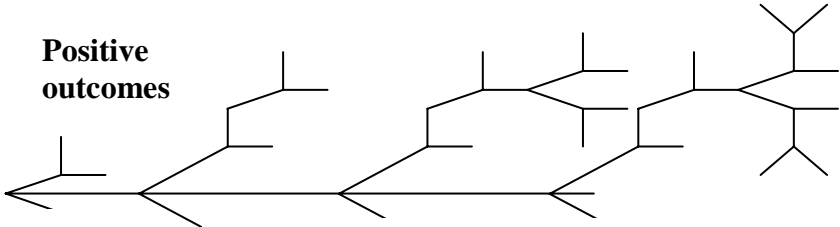**Hypothetical binomial tree for a loan commitment**

Positive outcomes

Negative outcomes

Hypothetical binomial tree for a credit card contract

Positive outcomes

Negative outcomes

[1] Each end point represents a possible outcome and would have an amount, timing, and probability associated with it.

APPENDIX B – extract from the FASB Preliminary Views on *Reporting Financial Instruments and Certain Related Assets & Liabilities at Fair Value*

ALTERNATIVE VIEW

145. Two Board members, who support measuring all financial instruments at fair values and support the conclusions of this Preliminary Views, disagree with a portion of the analysis of an unresolved issue in paragraphs 107 and 108 and with one of the alternatives in paragraph 100 for resolving that issue.

146. This Preliminary Views concludes that in certain circumstances an option can be an asset of the entity that has written that option. Two Board members believe that written options can only represent liabilities—they cannot be assets. Those Board members acknowledge that circumstances may occur or other factors may be present that will cause an option holder to exercise an option that would otherwise not be exercised, thereby having a positive impact on the writer of the option. However, even if one concludes there may be a benefit to the writer of the option, that benefit does not make the option an asset of the writer because exercise of the option and whatever positive impact that may entail are controlled solely by the holder of the option—the option writer does not control whether any benefit is received. Furthermore, it is clear that the option is not a liability of the option holder.

147. Those Board members acknowledge that in pricing credit card contracts and other financial instruments, it can be observed that the market considers the combination of the option together with other factors and circumstances. They believe, however,

that it is only those other factors and circumstances that produce value to the contract and that those other factors and circumstances are external to and independent of the option itself. Those other factors may represent an intangible asset, but not a financial instrument, and they are distinct from the written option, which is a financial instrument.

148. To elaborate on their concern, those Board members believe that the value to the issuer of a credit card contract stems not from the written option in that contract, but from the elements that are associated with the customer relationship that arises from the contract. They note that the only element of the contract (apart from any existing receivable or payable) that is a financial instrument is a written option of the issuer. They believe it is the other aspects of the contract, such as convenience of use, that will cause the holder to exercise what might otherwise be considered a disadvantageous option and produce some benefit to the issuer. The potential to receive interchange fees from third parties and the right to solicit the holder for other business also provides value to the issuer. Consequently, those Board members believe that, despite there being a written option (a financial instrument) in the contract, the value as an asset of such contracts is entirely nonfinancial—little different from other customer relationships.

149. Those Board members do not object to the recognition of intangible assets that result from customer relationships if those intangibles meet the definition of assets, and the recognition criteria of the FASB conceptual framework. However, they believe that those intangible assets that result from customer relationships that meet

the definition of assets should be recognized in all circumstances, not only when they are related to a financial instrument.