A PUBLIC POLICY PRACTICE NOTE

Identification and Valuation of Embedded Derivatives in Modified Coinsurance and Similar Insurance Arrangements

February 2008

American Academy of Actuaries
Life Financial Reporting Committee

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Introduction

This practice note was prepared by a work group organized by the Life Financial Reporting Committee of the American Academy of Actuaries. The work group was charged with developing a description of some of the common practices that might be considered by actuaries in the United States in the application of the Financial Accounting Standards Board's (FASB) Derivatives Implementation Group Statement 133 Implementation Issue No. 36, *Embedded Derivatives: Modified Coinsurance Arrangements and Debt Instruments That Incorporate Credit Risk Exposures That Are Unrelated or Only Partially Related to the Creditworthiness of the Obligor under Those Instruments* (DIG B36). DIG B36 addresses the applicability of FAS 133 to many modified coinsurance (Modco) and similar insurance transactions.

This practice note represents a description of practices believed by the work group to be employed by actuaries in the United States regarding DIG B36. The purpose of this practice note is to assist actuaries with the application of DIG B36.   The authors of this practice note are not accountants and nothing contained within this practice note should be interpreted as constituting accounting advice.

This practice note is not a promulgation of the Actuarial Standards Board, is not an actuarial standard of practice, is not binding upon any actuary and is not a definitive statement as to what constitutes generally accepted practice in the area under discussion. Events occurring subsequent to this publication of the practice note may make the practices described in this practice note irrelevant or obsolete.   In addition, the adoption of FAS 157, *Fair Value Measurements*, will likely impact how companies apply DIG B36 beginning in 2008.

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The practice note has been divided into seven sections:

Section A: Overview of DIG B36 requirements
Section B: Selecting the type of DIG B36 embedded derivative
Section C: Credit default swap method
Section D: Total return swap method
Section E: Valuation of floating and fixed rate total return swaps
Section F: Embedded derivatives in financial reinsurance transactions
Section G: Other considerations

Section A: Overview of DIG B36 Requirements

Q1. What is addressed in DIG B36 and how does it apply to insurance business?

A1. Financial Accounting Statement (FAS) 133 Paragraph 12(a) states that an embedded derivative shall be separated from the host contract and accounted for as a derivative under FAS 133 if "*the economic characteristics and risks of the embedded derivative instrument are not clearly and closely related to the economic characteristics and risks of the host contract*."

The following question is posed and answered by DIG B36:

> *Does a modified coinsurance arrangement, in which funds are withheld by the ceding insurer and a return on those withheld funds is paid based on the ceding company's return on certain of its investments, contain an embedded derivative feature that is not clearly and closely related to the host contract?*

The DIG B36 response indicates that there is an embedded derivative that is not clearly and closely related to the host contract. Under a Modco arrangement, the ceding company generally owns the assets backing the liabilities ceded and passes through to the reinsurer all investment returns, including credit related (as well as interest-rate related) gains and losses. Paraphrasing the response in DIG B36, an embedded derivative exists to the extent the reinsurer has a reinsurance arrangement with the ceding company but is exposed to credit risk of the issuers (i.e., unrelated third parties) of the Modco assets. Hence, the criterion in FAS 133 Paragraph 12(a) is usually met, and the embedded derivative feature will usually be bifurcated and valued consistent with FAS 133.

While not explicitly addressed in DIG B36, similar logic can be applied to the interest rate risk in a funds withheld asset portfolio, where there is no third party credit risk. If any of the conditions mentioned in FAS 133, Paragraph 13 exist, then the interest rate risk of the funds withheld asset portfolio is not clearly and closely related to the host contract and so must be bifurcated and valued as an embedded derivative under FAS 133. This is discussed in more detail in Section B.

While DIG B36 makes specific reference to Modco arrangements, its definitions imply that it is referring more generally to arrangements where funds are withheld by the insurer and a return on those withheld funds is paid to the counterparty. Therefore, DIG B36 has been interpreted to apply to other forms of insurance arrangements where the total return on assets held by the insurer are passed through to the reinsurer or policyholder. For example, this could include other reinsurance transactions such as coinsurance with funds withheld (CFW), and Co/Modco combinations. Also, the conclusion in B36 applies to contracts where the insurer holds the assets and the total return is required by the agreement to be passed to the policyholders, for example an immediate participation guarantee group annuity contract.

Q2. What role do actuaries play in the valuation of derivatives embedded in Modco and other similar arrangements?

A2. The actuary may be called upon to value the embedded derivative. As discussed below, the valuation methods may involve what have traditionally been actuarial calculations, such as projecting insurance cashflows (including changes in reserves), and calculating discounted present values of cashflows under a variety of scenarios. In addition, actuaries may be called upon to assist in the interpretation of the provisions of reinsurance or other insurance arrangements as a company makes the determination as to whether embedded derivatives exist.

Q3. What factors would the actuary usually consider in assisting in the determination of whether a Modco or similar arrangement contains an embedded derivative?

A3. Two key features to consider in assisting with this determination may be: (1) whether the assets are, in fact, owned by the insurer, and (2) whether the investment returns, after considering all of the terms of the arrangement, effectively result in the credit risk and/or interest rate risk of these assets being passed on to the reinsurer or policyholder.

Examples where it might be determined that an embedded derivative does not exist using these criteria include:

- A Modco arrangement whereby the ceding company pays the reinsurer a stated fixed rate or a floating risk-free rate, such as a London Interbank Offered Rates (LIBOR) based rate. In this case, the reinsurer usually has no third party exposure to credit risk, and there is either no interest rate derivative or there is one that is “clearly and closely related” to the host contract.

- Situations where, upon a credit event occurring, the reinsurer can require the insurer to replace the affected assets held for the reinsurance arrangement. Effectively, the material credit gains and losses would remain with the ceding company. However, such situations should be considered carefully because, while a credit derivative would not likely exist in this case, an interest rate derivative may be present.

Q4. If an embedded derivative exists, what does it look like?

A4. Per FAS 133, underlying the arrangement is a "hybrid" contract that can be "bifurcated" into its host contract and embedded derivative components. These two components are then separately valued. Under FAS 133, the embedded derivative is valued using fair value principles.

In the case of a Modco arrangement (or similar arrangements where DIG B36 applies), one interpretation in common use is that the hybrid contract is the agreement to pay a return on the assets backing the arrangement. DIG B36 indicates that the hybrid contract contains an embedded derivative incorporating, at a minimum, the transfer of third party credit risk. In addition, the contract may incorporate the transfer of interest rate risk that is not clearly and closely related to the host contract. Instruments involving the transfer of third party credit risk are generally referred to as ***credit derivatives.***

A credit derivative is an arrangement between two parties, under which one party agrees to provide protection against credit events on certain reference assets, in return for a fee paid by the other party.

There are several types of credit derivatives. The two most common types that are frequently associated with DIG B36 valuations of Modco and similar arrangements are ***credit default swaps*** and ***total return swaps***. A credit default swap is a swap of credit losses, usually for a fixed fee, while a total return swap also incorporates interest rate risk. A total return swap is a swap of the total return on the referenced assets for a fixed or floating rate of return. The main difference between a typical total return swap and a credit default swap is that the latter simply transfers credit risk, while the former transfers all investment return risks of the referenced assets.

In cases where there is no transfer of third party credit risk under the reinsurance arrangement, there may still be transfer of interest rate risk that is not clearly and closely related to the host contract, as specified by FAS 133, Paragraph 13. In this case, the embedded derivative is an ***interest rate swap***.

Q5. Are there any special considerations that the actuary might choose to take into account when valuing embedded derivatives of Modco (and similar) contracts versus valuing other types of derivatives?

A5. Potential items that might be considered include the following:

1. Modco and other insurer arrangements typically have cash flows settled only at periodic times such as calendar quarters, or with a lag such as one month in arrears. Generally, these timing differences might be allowed for by the accounting (i.e., as accrual items), with no special consideration taken into account when valuing the embedded derivative.

2. The cash flows under the credit default swap, total return swap or interest rate swap would normally follow the accounting method for credit events or other capital gains/losses specified in the underlying reinsurance arrangement. These arrangements would typically be based on statutory accounting, including the statutory definition of credit events, and possibly with adjustment for changes in the Asset Valuation Reserve (AVR) and/or Interest Maintenance Reserve (IMR). One consideration is whether sufficient accuracy is attained by application of the methods described in the following Sections C through F, which are commonly found in practice. Where the method may not reflect the exact timing of cashflows, it may be advisable to determine whether it provides a reasonable FAS 133 valuation of the embedded derivative.

3. The Modco or CFW assets would typically be periodically adjusted to balance to the corresponding statutory liabilities. Various balancing rules for assets withheld might apply based on the treaty specifications. Having a varying balance of reference assets for a swap valuation does not normally generate special, additional considerations in valuing the embedded derivative.

Section B: Selecting the Type of DIG B36 Embedded Derivative

Q6. What factors are considered in determining the type of derivative embedded in a fund's withheld arrangement?

A6. It is impossible to answer this question in the abstract. The facts and circumstances of the specific Modco or other financial arrangement ***must*** be considered.

Where "facts and circumstances" lead to more than one possible conclusion for the type of the embedded derivative, practicality issues such as ease of calculation, data availability and impact on earnings volatility may also be considered.

Q7. What are the theoretical considerations for concluding that the embedded derivative is a credit default swap, an interest rate swap or a total return swap?

A7. The company might conclude that the credit risk of the Modco assets is not clearly and closely related to the host contract per FAS 133 and DIG B36, and thereby decide to value the embedded derivative as a type of credit derivative – either a credit default swap or a total return swap – depending on whether there is also interest rate risk present that is not clearly and closely related to the host contract. FAS 133, Paragraph 13 specifies the tests to use to determine whether interest rate risk should be considered to be clearly and closely related to the host contract.

As required by FAS 133 Implementation Issue B15, multiple embedded derivatives should be valued as a combined "compound embedded derivative." Where both the credit and interest rate risk are determined to be not clearly and closely related, the compound embedded derivative may be considered to be a swap of the total investment return on the portfolio for a stated fixed or floating rate, and would thereby be valued as a total return swap. In cases where third party credit risk is present but the associated interest rate risk is considered clearly and closely related to the host (which requires neither of the conditions in Paragraph 13 of FAS 133 to hold), the embedded derivative may be considered to be a credit default swap.

Where it is determined that there is no material third party credit risk present (e.g., because all assets are invested in US government securities), it may still be determined (by using the FAS 133 Paragraph 13 tests) that there is interest rate risk present that is not clearly and closely related, and so needs to be bifurcated under FAS 133. Here, the embedded derivative would be an interest rate swap.

Q8. What are some of the practicality issues that might be considered in choosing a method for valuing the embedded derivative?

A8. While facts and circumstances must always be considered and will usually determine the type of embedded derivative – that is, whether is it a credit default swap, interest rate swap or a total return swap - they may not clearly identify the terms of the swap. For example, facts and circumstances may determine that the embedded derivative is a total return swap, but may not imply whether the other leg of the swap has a fixed or floating rate.

In order to determine the terms of the swap once its type is determined, the following items might be considered:

1. Ease of calculation – It is often easier to calculate the value of a total return swap with a floating leg (i.e., floating interest rate) than the value of a total return swap with a fixed leg. In brief, the embedded derivative can normally be valued by simply reflecting changes in the market to book value of the underlying assets. It is typically more complicated to calculate the value of a total return swap with a fixed leg because it usually involves projections of future reinsurance cashflows and/or reserves. These methods are discussed in further detail in the sections below.

2. Asset classification - The total return swap with a floating leg would usually reflect in earnings all significant realized and unrealized gains in the underlying asset portfolio. However, note that the floating rate swap typically would mirror the financial statement impact of the underlying assets for the ceding company to the extent the underlying assets were classified as trading assets under FASB Statement No 115 (i.e., marked to market with changes reflected in earnings); similarly, there normally would be no impact on equity to the extent the underlying assets were held as available for sale (marked to market with changes reflected in equity). However, in the event the business is recaptured, the insurer would be unable to reclassify the assets and may be left with asset classifications that the insurer believes are less appropriate for an unreinsured block.

Q9. What are the factors the assuming company would usually consider in determining the type of the embedded derivative, and would the classification necessarily be the same as for the ceding company?

A9. The reinsurer is not required to have mirror application of DIG B36. As for the ceding company, facts and circumstances must be considered and will usually determine the type of embedded derivative. The assuming company might also consider the issues in A8 above in determining the terms of the embedded derivative once the type is determined, to the extent that these terms are not otherwise defined by the facts and circumstances.

Note that practicality issues would likely be different for the assuming company than for the ceding company. For example, only the ceding company holds the underlying assets and therefore has the option as to how to classify the assets under FAS 115. As discussed in Q9 above, the ceding company might choose to hold the underlying assets as trading and value the embedded derivative as a total return swap with a floating leg and thereby mitigate earnings volatility. In the case of the reinsurer, however, fair value changes in the embedded derivative would not be offset because the reinsurer holds a receivable asset at book value. The reinsurer might then prefer to select a different method such as total return swap with a fixed, rather than floating leg.

Section C: The Credit Default Swap Method

Q10. What is a credit default swap?

A10. A credit default swap is an arrangement between two parties, under which one party agrees to assume the credit risk on certain reference assets, in return for a fixed periodic premium paid by the other party.

Q11. If a company determines that the embedded derivative is a credit default swap how is the value of the embedded derivative determined?

A11. There may be multiple ways of determining the value of a credit default swap. One method that would appear to be consistent with the underlying valuation theory is to project credit losses using default assumptions consistent with market prices at the valuation date and adjusted for statutory accounting rules, and then subtract the projected fixed periodic premium to arrive at the projected cashflows of the embedded derivative. These cashflows would normally then be discounted at the forward rates implied by the valuation date swap curve.

In order to project the fixed periodic premium under this method, the credit risk spread of the assets underlying the funds withheld is typically captured at point of treaty inception or upon subsequent asset purchase. This Issue Credit Spread (ICS) is the additional yield an instrument is paying over an equivalent risk free instrument (assuming no significant prepayment, liquidity or other risks; otherwise the related risk spreads would be separated out to arrive at the credit spread). Conceptually (ignoring basis spread for cashflow optionality and liquidity), the credit spread would probably be based on one of the following:

A) If the instrument offers a floating rate yield, the spread over LIBOR of the instrument; or

B) If the instrument offers a fixed rate yield, the spread over LIBOR of the instrument if it were swapped to a floating rate yield. If the maturity is indeterminate then the swap would be based on the average life of the instrument.

To approximate the value of credit losses under this method at each subsequent valuation date, the Current Credit Spread (CCS) would be calculated using the same approach but based on current market rates.

One way that the fair value of the embedded credit default swap has been calculated is as the present value of the difference between ICS and CCS, applied to the notional amount of reference assets at each future period, and discounted using the forward rates implied by the valuation date yield curve. Note that, using this valuation methodology, the value of the credit default swap is zero at inception.

Section D: Total Return Swap Method

Q12. What is a Total Return Swap?

A12. For the purpose of this practice note and consistent with common usage, a "Total Return Swap" is a swap where one party agrees to pay the other the total return on certain reference assets in return for receiving a stream of fixed rate (referred to as a "fixed leg") or floating rate (usually LIBOR based and referred to as a "floating leg") cash flows.

Q13. How does a company decide between a Total Return Swap with a fixed leg (TR Fixed) and a floating leg (TR Floating)?

A13. There is no clear guidance on determining whether an embedded total return swap has a fixed leg or a floating leg. Such characteristics generally are based on the stated or implied substantive terms of the hybrid instrument (as specified in the Modco or other agreement). Those terms may include a fixed-rate, floating-rate, zero-coupon, discount or premium, or some combination thereof. However, in many cases, a clear indication of the facts and circumstances of the reinsurance arrangement may not provide the nature of the second leg of the swap. In the absence of stated or implied terms, DIG Issue B19 may provide some guidance in determining the most appropriate characterization of the derivative.

Q14. What is the basic formula to calculate the fair value of a total return swap?

A14. In a total return swap, the total return of the reference assets is typically swapped for a fixed or floating rate return on an underlying "notional loan" balance.

One way to consider the fair value of the total return swap is as the fair value of the assets minus the fair value of the notional loan. Under this interpretation, the basic formula to calculate the fair value of a total return swap is:

(Market Value of Assets minus Book Value of Assets)

Minus

(Market Value of Notional Loan minus Book Value of Notional Loan)

In the calculation, if it is presumed that the book value of the notional loan will always equal the statutory reserve, which generally will equal the statutory book value of the assets, the formula reduces to:

(Market Value of Assets minus Market Value of Notional Loan)

For the transactions where these amounts are not equal, adjustments to balances may be made in order to determine the asset market value to be allocated to the funds withheld. Under many Modco or CFW treaties, assets are equal to statutory reserves, and may or may not reflect items such as IMR or ceding commission withheld. Financial reinsurance treaties might have funds withheld that are other than statutory reserves, for example, accumulated product cashflows.

Q15. Is the value of a total return swap zero at inception?

A15. Per DIG issue B20, the fair value of a non-option type derivative is zero at the inception of the derivative. Since a total return swap is not considered an option type derivative, its value is zero at the inception of the treaty.

Q16. How would the valuation of an embedded total return swap be different if the assets were in the ceding companies' general account rather than in a segregated portfolio?

A16. The same basic approach could be considered to calculate the value of a total return swap whether the assets backing the treaty reside in a ceding company's general account or a segregated account. For general account assets, a pro-rata approach could be considered in determining the market value of the assets.

Section E: Valuation of Floating and Fixed Rate Total Return Swaps

Q17. How can the formula in A14 above be applied to calculate the fair value of a TR Floating Swap?

A17. Since the notional loan is a floating rate instrument so that, at all times, Market Value of Loan equals Book Value of Loan, the formula in A14 reduces to:

Market Value Assets (MVA) - Book Value Assets (BVA)

Q18. How does the company ensure that the value of a TR Floating Swap is zero at inception?

A18. At treaty inception, the fair value of the total return swap should be zero as discussed in A15. However, for some treaties, market value of assets may not equal book value of the assets at treaty inception and so an adjustment is made. The adjustment for the difference between market and book values is part of the embedded derivative, and hence is valued at fair value in theory. How the value of this adjustment changes over time is not well defined. Consequently, companies have considered various approaches to approximate a fair value to this opening difference and amortize into income over time. Following are some methods that have been considered:

(a) Any significant difference is amortized into income as either a deferred profit liability or a ceding commission. One method is to do something analogous to the amortization of deferred acquisition costs and to amortize the difference as a percentage of estimated gross profit.

(b) If detailed asset data is available, a company may be able to track the assets that give rise to the opening difference. As these assets mature or are sold, the opening difference will usually decline and the adjustment will be amortized exactly. In some circumstances, it may also be reasonable to approximate this opening adjustment runoff over the life of the assets using a simplified approach, such as a straight-line or declining-balance method.

(c) A ratio equal to the BVA/MVA at inception could be applied to MVA at each future valuation date.

Which, if any, of these or other potential methods provides a reasonable answer in conformity with GAAP can only be determined by the facts and circumstances of the transaction under consideration.

Q19. How does the company ensure that the value of a TR Fixed Swap is zero at inception?

A19. A18 addressed the calibration of market and book values of assets at inception for a TR Floating Swap. For a TR Fixed Swap, the initial model calibration is more complex. Again, there is no clear guidance on how calibration should be done.

There are two common methods of calibration used in practice:

(a) Book Value Calibration Approach: Under this approach, the market value of the notional loan is calibrated to equal the book value of the notional loan (which often equals the statutory reserve), and the market value of the assets is calibrated to equal the book value of assets (which also often equals statutory reserve) using two separate calibration processes. On the loan side, the loan pay-off pattern is adjusted so that the loan cash flows (which equal the loan principal payoff plus interest on the loan), discounted at the forward swap rates, equals the book value of the loan. The calibration can be done in a number of ways, two of which are described as follows:

(i) Fixed Loan Rate: Assuming there is a satisfactory projection of the loan principal payoff pattern (e.g., a projection of the statutory reserve), this method solves for the fixed loan interest rate (over the term of the notional loan) such that loan cash flows, discounted at the forward swap rates, equals the loan book value, or the starting reserve.

(ii) Multiple of Cash Flows: Assuming there is a satisfactory pattern of loan cash flows (instead of the loan principal payoff pattern), this method solves for the multiple of cash flows, such that loan cash flows, discounted at the forward swap rates, equals the loan book value.

On the asset side, an opening difference between asset market and book values may be accounted for using one of the methods as discussed in A18.

(b) Market Value Calibration Approach: Under this approach, calibration at inception is done to adjust the loan pay-off pattern such that the loan cash flows, discounted using the forward rates, equals ***the market value*** of the assets at inception. Again, the calibration can be done in different ways. Two ways are:

(i) Fixed Loan Rate: Given the loan principal payoff (e.g., the reserve runoff) pattern, solve for the fixed loan interest rate (over the term of the notional loan) such that loan cash flows, discounted at the forward swap rates, equals the opening market value of assets.

(ii) Multiple of Cash Flows: Given a loan cash flow pattern, solve for the multiple of cash flows, such that loan cash flows, discounted at the forward swap rates, equal the opening market value of assets.

Under the market value calibration approach, it is usually not necessary to make a separate adjustment for the initial asset market-to-book value difference. One likely consequence of using this approach is that the book and market values of the loan are not necessarily equal at inception.

Q20. What considerations are made in choosing between calibrating the loan value to the market value or the book value of the assets at inception?

A20. Some prefer Method (a) described in A19 because they prefer that both the book and market values of the loan equal the reserve at inception.

Others prefer Method (b) because they prefer the market value of the loan to equal the market value of assets at inception, so that the embedded derivative at inception will be zero without needing the types of approximate adjustments described in A18.

Q21. What considerations are made in choosing between calibration using the fixed loan rate or a multiple of cashflows?

A21. The type of product covered under the reinsurance agreement is a consideration in selecting a calibration method. If the underlying business is single premium or paid-up business, then the projected reserve pattern is more likely to be a monotonic decreasing function, which can be used as the projected loan principal pattern. Once the actuary has a good projection of the loan principal pattern, then calibration using the fixed loan rate is a suitable method.

However, if the underlying business contains recurring premium products, reserves are likely to increase in the future, creating new loans in the future on existing business, and hence introducing modeling complexities. For recurring premium products, therefore, it may be more practical to estimate a total loan cashflow pattern for the current loan, based on the projected best estimate for future benefits (or other appropriate cashflows), and based on premiums paid to date. In this case, the calibration at inception using the multiple of cashflow approach may be preferred.

Q22. Under these calibration approaches, will the book value of the loan deviate from the reserve at dates after inception?

A22. By the definition of methods (a)(i) and (b)(i), as described in A19, the loan book value equals the reserves at inception and at all dates in the future. Hence, this problem normally will not arise under these two methods.

However, under Method (a)(ii), this may not be the case, because the actual cashflows may not match the elements of the reserve release (i.e., the principal paydown plus interest on notional balance). The difficulty here is that the projected notional balances are not known. To get around this, a practical adjustment could be considered whereby the multiple of the current expected loan cashflow pattern is ***re-calibrated***, such that these cashflows, discounted at the ***inception date*** (as defined in A25) forward rates equal the reserves at subsequent valuation dates.

Method (b)(ii) is not likely to lead to a good validation of the book value of the loan to the reserve at inception, or subsequently. This is partly why other methods provide what may be more appropriate calibration approaches.

Q23. How is the market value of the notional loan determined at each subsequent valuation date?

A23. In order to calculate the market value of the loan, appropriate information concerning the stream of loan cash flows is usually needed. These cash flows (after calibration, where applicable) may then be discounted at the forward rates implied by the valuation date swap curve to determine the market value of the notional loan. The methodology for projecting loan cashflows is determined by the calibration method selected, as described in A19. These two methods give projected loan cashflows as:

> (i) Fixed Loan Rate: This method has a projected stream of the notional balance of the loan (= projected reserves) and a loan interest rate fixed at inception. The combination of these defines the loan cashflows at any valuation date, based on the current best estimate projection of the future reserve run-off.
>
> (ii) Multiple of Cashflows: This method has a projected pattern of cashflows and a valuation-date specific multiple of this pattern, such that the value of these cashflows discounted along the forward rates derived from the ***initial date swap curve*** (as defined in A25), equals the valuation date statutory reserve.

Under both of these loan cashflow methods, the projected stream of loan cashflows is usually discounted at the forward rates implied by the ***valuation date swap curve***.

Q24. Why is the discount rate for the notional loan based on the swap curve?

A24. The swap curve usually determines the "risk free rate" rate in market pricing. In reality, there is a small credit risk premium in the swap curve rates so they are not truly risk free. However, these are the rates used in market pricing and so may be appropriate for FAS 133 valuations. In the DIG B36 embedded derivative valuation, the only credit risk to be considered is that not clearly and closely related to the host contract. Since there is no third party credit risk associated with the notional loan, typically no risk premium is added to the swap rates to determine the market value of the loan.

Q25. Any periodic "valuation date" is well defined and therefore so is the valuation date swap curve. But what about the "initial swap curve date" of the FAS 133 embedded derivative for calibration purposes? Is the "initial swap curve date" of an embedded derivative defined as:

- **Treaty effective date;**

- **Date of purchase of assets; or**

- **Date of issue of policies?**

A25. There is no guidance on how to select the initial swap curve date, and the selection may be influenced by whether the actuary is considering a new treaty for new business, new business under an existing treaty or a new treaty for an in force block. It may also be influenced by the calibration method the actuary selects.

Where a new treaty is entered into for future new business, there normally will be no assets or liabilities at the treaty effective date, and FAS 133 embedded derivatives are generated either as business is issued or as assets are purchased. In this case, one approach is that the initial swap curve date be the asset purchase date(s) because that is what triggers the risks that give rise to the embedded derivative in the first place. This is known as the "asset inception approach" for setting the initial swap curve date.

Another approach is to set the initial swap curve date for an embedded derivative as the date the policies are issued and reserves start to be generated. It is these liabilities that give rise to the need for assets and therefore the embedded derivative. This method is not subject to frequent "turnover" of embedded derivatives caused by asset turnover. This is known as the "liability inception approach" for setting the initial swap curve date.

Where a new treaty covers an in force block, the "liability approach" would set the initial swap curve date at the treaty effective date, instead of the issue date, as this is the date at which the reserves originate under the reinsurance contract. Hence, the initial swap curve date of the embedded derivatives under the liability approach can be summarized as the effective date for an in force block, and the later issue dates for new business.

Under the asset approach, FAS 133 Paragraph 51 may not allow the initial swap curve date to precede the treaty effective date. Hence, the initial swap curve date under the asset approach may be the asset purchase date or the treaty effective date, if later.

Q26. What are the typical considerations in deciding between the asset and liability approaches?

A26. A key distinction between the asset and the liability approaches is usually in determining the new market value of the loan. Under the asset approach, the initial swap curve is established when new assets are purchased, whereas under the liability approach, the initial swap curve is set when the liability is established (either at the treaty effective date or as new business is issued and/or reserves increase for existing business). When an asset is sold, under the asset method, the original swap is viewed as having been settled and a new swap with the new asset is initiated, whereas under the liability method, there is no effect on the loan calculation, assuming the liability is still in place.

The asset approach results in parity of the assuming company recognizing a realized gain or loss at the same time that the ceding company does. While DIG B36 is silent as to whether such a result was intended, some find this parallel result appealing. One feature of the liability approach is that the host is characterized in such a way as to minimize its need to be redefined frequently. Some feel that this is more faithful to the FAS 133 concept of a host instrument. They emphasize that in a typical Modco relationship, the asset turnover is much more frequent than the liability turnover. For this reason, some find the liability method easier to implement and less prone to error as well.

Q27. How often is calibration normally performed? At every asset purchase or liability issue date, or is an average over a period sometimes used?

A27. In theory, calibration should be performed at every asset purchase date under the asset method and at every liability issue date under the liability method. For practical purposes, however, it may be sufficient to aggregate assets purchased over a reporting period (if using the asset method) or liabilities issued over a reporting period (if using the liability method) and develop an "average initial swap curve" based on the swap curve movements and timing of reserve movements or asset turnover over the period. If the reporting period is sufficiently short, it may even be appropriate to use the swap curve as of a certain date within the period (such as start date, end date or mid-point). Whether or not such practical solutions are appropriate depends on whether they can be expected to result in a reasonable approximation of the results that would have been achieved using the theoretically precise methods. This, in turn, depends on the facts and circumstances of the situation.

Where the calibration methods described in A19 (a)(i) and (b)(i) are selected, and new loans arise each reporting period either from new business and/or increases in reserves on existing business, the average initial swap curve for any period is normally used in deriving the fixed loan rate associated with the reserve pattern originating in the corresponding period.

Where method (a)(ii) (Multiple of Cash Flows) is selected, the average initial swap curve for any period generally is used for both the initial calibration and subsequent recalibration of loan cash flows arising from business issued in, or other reserve increases attributable to, the corresponding period.

Section F: Embedded Derivatives in Financial Reinsurance Transactions

Q28. How is DIG B36 applicable for financial reinsurance?

A28. DIG B36 is also applicable to "financial reinsurance" transactions that are on a funds-withheld, modco, or CFW basis. For purposes of this Section, "financial reinsurance" is defined as reinsurance that does not meet the GAAP requirements for reinsurance accounting. Typically in such transactions, there exists an experience refund provision that requires the reinsurer to pay a refund to the ceding company based on the actual performance of the reinsured block of business. This experience refund may reflect a number of factors, such as mortality, expense and investment performance. The investment performance generally will be related to a portfolio of assets backing the underlying business and, consequently, an embedded derivative exists in the experience refund leg as well.

Q29. Is the net value of the embedded derivatives for financial reinsurance always close to zero?

A29. In some financial reinsurance treaties, it may be argued that the two embedded derivatives substantially offset one another, and the resulting net embedded derivative would be negligible. This could happen if, in virtually all plausible scenarios, any investment performance would be returned via the experience refund provision. This same conclusion may be arrived at from two different accounting views, one which views the financial reinsurance contract as containing a single compound embedded derivative and the other which considers the experience refund to be a separate receivable/payable with its own embedded derivative. In the latter case, FIN 39 may apply, resulting in a netting of the two derivatives for the same net value as the former case would develop. A detailed analysis of the agreements would have to be performed to verify that this is indeed the case.

Certain financial reinsurance treaties are more likely to have a significant embedded derivative than others. An example would be a transaction for which there is a more than slight chance of the reinsurer incurring inception-to-date losses related to investment performance that are not expected to be recovered in the future. In general, one would not expect this to be the case at inception of a financial reinsurance agreement, but, if such an agreement has experienced poor performance to date, it may be the case that further poor scenarios would lead to such permanent losses.

Q30. What does the embedded derivative look like?

A30. The host may be seen as including two loans: the first is a loan equal to the Modco reserve or funds withheld loaned to the ceding company; the second is a loan from the ceding company to the reinsurer to support the experience refund.

There may be loss scenarios where the carry-forward account would be valued and could continue indefinitely. In this case, the treaty will most likely not be recaptured by the ceding company, since, in doing so, it would have to repay the reinsurer the amount in the loss carry-forward account.

One approach to structuring and valuing the embedded derivative is to view the combination of both loans as a “put like” option. If there are gains from the assets, the gains will normally be passed on to the reinsurer in the Modco adjustment, and back to ceding company as an experience refund. The derivative value would be zero. If there are losses from the assets, the losses will normally be passed on to the reinsurer. A negative experience refund would usually be set up in the loss carry-forward account. If the ceding company does not recapture, it would in effect “put” the losses to the reinsurer.

Q31. How is the value of this embedded put option determined?

A31. Traditional option pricing methods may be considered in order to value this embedded put option. However, in practice, an exact option valuation may not be feasible. For example, a reinsurer may not have an updated actuarial model in house or from the ceding company. In this case, an approximation method may be necessary. It may also be possible to use deterministic stress scenarios to develop an upper bound for the value of this embedded put option.

Section G: Other Considerations

Q32. What is grandfathering and how is that applicable to DIG Issue B36?

A32. Under the provisions of FAS 133, as amended by FAS 137, an entity was allowed to grandfather all embedded derivatives, including B36 derivatives, on hand prior to a transition date that the entity selected, either 1/1/1998 or 1/1/1999. This provision was applicable to all embedded derivatives existing at the transition date, whether or not the entity had identified the embedded derivatives as such prior to the selected date. The grandfathering decision could not be applied to only some of an entity's individual hybrid instruments and, therefore, had to be applied on an all-or-none basis. If a contract has been grandfathered, but has been substantially modified since the transition date, the contract will be subject to DIG Issue B36 and bifurcation of the embedded derivative will be required.

Q33. What types of contracts other than reinsurance contracts may be affected by DIG B36?

A33. The accounting for contracts under which the contract holder is contractually guaranteed to receive a return based on an underlying portfolio of assets owned by the insurance company may be impacted by DIG B36. These contracts may be interpreted to contain embedded derivatives because the return realized by the contract holder reflects the credit experience of the underlying assets rather than the credit quality of the insurer that wrote the contract, and/or because there is interest rate risk that is not clearly and closely related to the host under FAS 133, paragraph 13. Examples of contracts that may contain these features are participating group annuity contracts and group insurance contracts with experience rating provisions.

Q34. What provisions of group annuity contracts may give rise to DIG B36 requirements?

A34. Many traditional group annuity contracts, specifically of the deposit administration and immediate participation guarantee design but potentially others as well, contain provisions that guarantee a return to the contract holder based on the actual return of a defined portfolio of assets. These contracts may contain embedded derivatives under FAS 133. In assessing whether these contracts contain embedded derivatives, consideration should be made as to whether the mechanism by which investment earnings are credited to contract holders is directly and contractually tied to the asset portfolio, or, conversely, whether by management discretion or the exercise of other contract features, like termination provisions, the direct pass-through of investment earnings may be disrupted. Methods for the valuation of any embedded derivative would usually be comparable to those for reinsurance contracts, discussed earlier, though many consider the total return swap with a floating leg to most closely fit the circumstances of the typical contract. However, because many traditional group annuity contracts are backed by investments (such as commercial mortgages and real estate) to which FAS 115 does not apply, the ability to obtain parallel accounting between assets and liabilities through the total return/floating mechanism may not exist for these contracts.

Q35. What provisions of experience-rated group contracts may give rise to DIG B36 requirements?

A35. Some experience-rated group contracts may contain embedded derivatives as described in FAS 133 and DIG B36. An example of this is a contract where interest credits to the group contract holder may be made with reference to the returns on specific assets underlying the contract. Depending on the specific provisions of the contract, this may indicate an embedded derivative exists within the contract. Experience refund provisions, as well as associated loss carryforward provisions, are potential sources of embedded derivatives as well, depending on the definition of how interest credits are determined within those provisions. While it is usually preferable to consider each contract on its own to determine whether FAS 133 embedded derivatives exist, in many situations the impact of the embedded derivatives from three sources (interest credits, experience refunds, and loss carryforward provisions) could be largely offsetting with a *de minimis* net result. The comments made in Section F with respect to financial reinsurance contracts are often applicable to experience-rated group contracts as well.

Q36. Other types of contracts, like universal life insurance and deferred annuities, often feature credited interest rates that are related to an underlying portfolio of assets. Are these contracts deemed to have embedded derivatives under the DIG B36 rationale?

A36. Variable annuity and variable universal life contracts typically are required to credit policyholders with the actual investment performance of the assets that comprise the variable sub-accounts under the contracts. However, because the recorded liability for such contracts typically equals the fair value of the assets in the underlying sub-account, there is no conflict with the concepts contained in DIG B36. Also FAS 133, paragraph 200, suggests that these contracts do not contain embedded derivatives for the pass-through component.

For fixed annuity and universal life contracts, the liability held often does not equal the fair value of the assets backing them. Many companies develop credited interest rates on these contracts with reference to a pool of assets underlying them. However, when the interest crediting strategy is left to the insurance company with no contractual guarantee to pass through the results of the underlying asset portfolio, DIG B36 does not apply. The lack of a contractual guarantee to pass through performance of the actual portfolio is a key point. Of course, the provisions of each contract are unique, so each contract's language should be considered to determine whether or not DIG B36 applies.