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**International Financial Reporting for Insurers:
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Session 11: Embedded Derivatives – SFAS 133

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Introduction to FAS 133



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FAS 133: The Big Picture

- In summary:
 - Broadly defines a derivative
 - Introduces embedded derivatives
 - All derivatives at fair value on the balance sheet
 - Default accounting – mark-to-market in earnings
 - Limited hedge accounting permitted



Definition of a Derivative

Any contract with ALL of the following:

- Financial instrument or contract
 - ◆ Underlying
 - ◆ Notional amount or payment provision
- No (or smaller) investment at inception
- Requires or permits net settlement or de facto net settlement



Definition of a Derivative

Examples of Notionals and Underlyings:

<u>Derivative</u>	<u>Underlying</u>	<u>Notional</u>
Stock option	Stock price	Number of shares
Currency forward	Exchange rate	Amount of currency
Commodity future	Commodity price	Number of commodity units
Interest rate swap	Interest rate index	Dollar amount
Purchase order computers	Price of computers	Number of computers

FAS 149 – include occurrence / nonoccurrence of specified events



Net Settlement

- Neither party must deliver the underlying asset and the contract settles on a net basis
 - Net cash or share settlement
- One party must deliver the underlying asset, but
 - There is a mechanism that facilitates net settlement (e.g. exchange, assignment)

- or -

 - The asset is readily convertible to cash or is itself a derivative (e.g. publicly traded securities)



Derivatives – Common and not so common

Common

- Options (caps/floors)
- Forwards
- Swaps

Not So Common

- Certain Reinsurance Contracts
- Embedded features (convertible bonds, equity-linked notes, embedded in leases, insurance, other agreements)
- Minimum guarantees



What is an Embedded Derivative?

- Many contracts do not meet the definition of a derivative, but may contain “embedded derivatives”
 - Implicit or explicit terms that affect some or all of the cash flows or the value of other exchanges, in a manner similar to a derivative
 - If certain criteria are met, separate such a **Hybrid Instrument** into “host contract” and “embedded derivative”

FASB – can't hide a derivative by incorporating into another instrument



What is an Embedded Derivative?

An embedded derivative instrument (ED) shall be separated from the host contract and accounted for as a derivative instrument pursuant to SFAS 133 if it satisfies the following conditions:

- (a) ED is not clearly and closely related to the host
- (b) The hybrid contract is not re-measured at fair value
- (c) A separate instrument with the same terms of the ED would be a derivative instrument subject to the SFAS 133 requirement



Embedded Derivatives Key Terminology

- Found in non-derivative contracts (“**Host**”)
- **Host** contract + **embedded** derivative = **hybrid** contract
- Annuity + equity option = equity-linked annuity



What is Clearly and Closely Related?

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- Clearly and closely related refers to:
 - ◆ Economic characteristics
 - ◆ Risks
 - ◆ *Defined mostly by examples* in FAS 133
- Factors to consider
 - ◆ Type of host
 - ◆ Underlying



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Insurance Contract Exclusion

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- SFAS 133 paragraph 10(c)
- An insurance contract is not subject to SFAS 133 if it entitles the holder (a) to be compensated only if, as a result of an identifiable insurable event (b) incurs a liability or (c) there is an adverse change in the value of a specific asset or liability for which the holder is at risk
- Examples:
 - Traditional life insurance contracts
 - Traditional property and casualty contracts



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Products Generally Not Subject to FAS 133

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- Variable Annuity GMDB (insurance exclusion)
- Variable Annuity GMIB (not settled in cash)
- Market value adjustment annuity (clearly and closely related to host contract)
- Fixed annuities with crediting rates tied to an external interest index (clearly and closely related to host contract)
- Fixed annuities with crediting rates tied to an external cost of living adjustment index (clearly and closely related to host contract)



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Products Generally Subject to FAS 133

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- Equity Indexed Annuities (EIA)
- Equity indexed universal life (EIUL)
- Variable annuity with GMWB and GMAB
- Reinsurance of VA GMIB where assuming company settles with the ceding company in cash at annuitization
- Modified Coinsurance treaties



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Identifying Embedded Derivatives



Separate Account Variable Annuities

- Traditional
 - SA assets legally isolated from general account
 - ◆ Policyholder not subject to insurance company's risk of default
 - SA assets' performance accrued 100% to policyholder
 - ◆ Policy holder subject to investment risk (not shared)
 - Redeemable at any time (subject to surrender charges)
 - FAS 133 conclusion:
 - ◆ 100% beneficial interests in assets
 - ◆ No embedded derivatives



Separate Account Variable Annuities

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- Non-traditional features
 - Most features are not clearly and closely related because result in sharing of investment risk
 - However, many such features do not meet definition of derivative



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Guaranteed Minimum Death Benefits

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- Host contract
 - Annuity
- Embedded derivative
 - Option
- Clearly and closely related?
 - No!
 - Embedded derivative scoped out as insurance



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Guaranteed Minimum Accumulation Benefits

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Separate account A issues variable annuity for \$1 million. Separate account guarantees a minimum account value of \$1 million at end of accumulation period. If policyholder terminates before end of accumulation period, the policyholder will receive the account value less surrender charges.



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Guaranteed Minimum Accumulation Benefits

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- Host contract
 - Annuity
- Embedded derivative
 - Option
- Clearly and closely related?
 - No!
 - Sharing of investment risk

It's an embedded



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Guaranteed Minimum Withdrawal Benefits

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Separate account A issues variable annuity for \$1 million. Variable annuity contains a GMWB. GMWB guarantees \$1 million value through fixed payouts that don't exceed 7% of the guaranteed remaining balance per year.



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Guaranteed Minimum Withdrawal Benefits

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- Host contract
 - Annuity
- Embedded derivative
 - Option
- Clearly and closely related?
 - No!
 - Sharing of investment risk

It's an embedded



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GMWB for Life

Separate account A issues variable annuity for \$1 million. Variable annuity contains a GMWB for Life. GMWB guarantees \$1 million value through fixed payouts that don't exceed 7% of the guaranteed remaining balance per year. Once the account value falls below \$0, the 7% payments continue to for life



GMWB for Life (for Life Component)


- Host contract
 - Annuity
- Embedded derivative
 - Option
- Clearly and closely related?
 - No!
 - Sharing of investment risk
 - Life contingent portion scoped out as insurance


It's an embedded



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So, How Do You Account for Embedded Derivatives?




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Accounting Implications

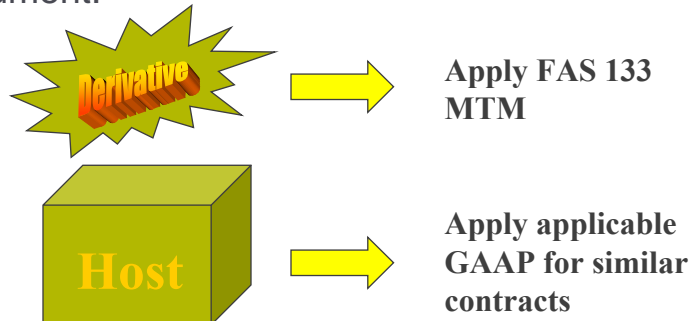
- Embedded derivative or not?

No	→	SOP 03-1	<div style="border: 1px solid black; background-color: #92d050; padding: 5px; display: inline-block;"> GMDB GMIB? </div>
Yes	→	FAS 133	<div style="border: 1px solid black; background-color: #92d050; padding: 5px; display: inline-block;"> GMWB? GMAB </div>
Yes & No	→	FAS 133 & SOP 03-1 (bifurcation)	<div style="border: 1px solid black; background-color: #92d050; padding: 5px; display: inline-block;"> GMIB? GMWB? </div>

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Embedded Derivative Instruments

If all criteria met and embedded derivative can be reliably identified and measured, **BIFURCATE** hybrid instrument:



Can't Bifurcate?

If the embedded derivative cannot be reliably measured:

- Account for entire contract at fair value through earnings
- Hybrid may not be used as a hedging instrument
- Should be RARE



What is “Fair Value”?

Definition of a fair value:

The amount at which an asset (or liability) can be bought (or incurred) or sold (or settled) in a current transaction between willing parties, other than in a forced or liquidation sale.

- > Quoted market prices are the best evidence of fair value (e.g., the price of stock traded on the NYSE)
- > In the absence of quoted prices, use other valuation techniques (e.g., present value techniques or option or other pricing models)
- > Definition clarified under FAS 157



FAS 133 Valuation of GMWB

- Risk neutral stochastic models generally a must – these are complex options
- Calculate PV Expected Benefit cost
 - ◆ Value at the Mean
 - ◆ Discount using risk-free spot rates
- At inception, FV of embedded derivative is zero
- Solve for a Valuation Net Premium or Ascribed Fee
 - ◆ PV Valuation NP at $t=0$ equals PV Expected Benefits
- Future Liability/Asset
 - ◆ Updated PV Expected Benefit less PV Valuation NP (Ascribed Fee)
 - ◆ Updating assumptions, inforce, stochastic model parameters



Embedded Derivatives

Asset or Liability?

- After initial valuation, market conditions may change such that embedded derivative value is “negative”
 - ◆ The contract is valued as an asset rather than a liability
- SEC staff have indicated view that a written option is a “noncontingent obligation to stand ready to perform”
- This view would not support recording such a derivative at fair value if it would be an asset
- Implication is a mismatch with respect to hedging programs supported by market-traded derivative contracts



FAS 133 Mechanics

- Ascribed fee for the GMxB must be determined (typically expressed as basis points of AV)
- Solve for fee to produce zero liability at issue
- Remaining rider fee goes through operating income
- Liability is calculated as risk-neutral PV of GMxB benefits (pay leg) less PV of ascribed fee (receive leg)
- Assumptions must be updated each period



Modeling Considerations

- Typically monthly or quarterly cohorts
- Additional Deposits
- Careful consideration should be given to the interplay of various guarantees
 - ◆ Model mortality and associated GMDB in valuation of GMWB, and vice-versa
- Changes in value of embedded derivative should flow through EGPs
- Assumptions
 - ◆ Mortality, persistency, utilization, fund growth, volatility
 - ◆ Best estimates, unlocked as warranted, generally consistent with DAC assumptions except fund growth and volatility



Modeling Considerations (continued)

- Need relatively granular model
 - ◆ Minimize offsetting effect of different levels of in-the-moneyness
- Model prospective policyholder behavior vs. static assumptions
 - ◆ Benefit utilization and Reset
 - ◆ Dynamic lapse and withdrawal
 - ◆ Utilization varies with “in-the-moneyness” at future point in time
- Important to validate model against market inputs



Modeling Considerations (continued)

- Number of scenarios must be sufficient to minimize standard error
 - ◆ Several thousand under model cell approach
 - ◆ Several hundred under seriatim approach, regenerated for each policy
- Importance of controls
 - ◆ Small changes to models can have a material impact
 - ◆ Model risk is substantial



Operational/Model Issues

- Fair Value methodology
 - ◆ Design and approval
 - ◆ Documentation (Valuation technique a required disclosure item)
- Valuation models and tools
 - ◆ Development or acquisition
 - ◆ Implementation
 - ◆ Documentation
 - ◆ Validation
- Valuation process
 - ◆ Design and documentation of process and procedures
 - ◆ Production of F/S values and required disclosure items
 - ◆ Integration with overall Fair Value implementation project



Stay tuned...

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- Continuation of discussion under FAS 157



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