



# Pricing & Financial Reporting Topics

---

## GAAP Financial Reporting

Actuarial Resources Corporation

# GAAP Financial Reporting

---

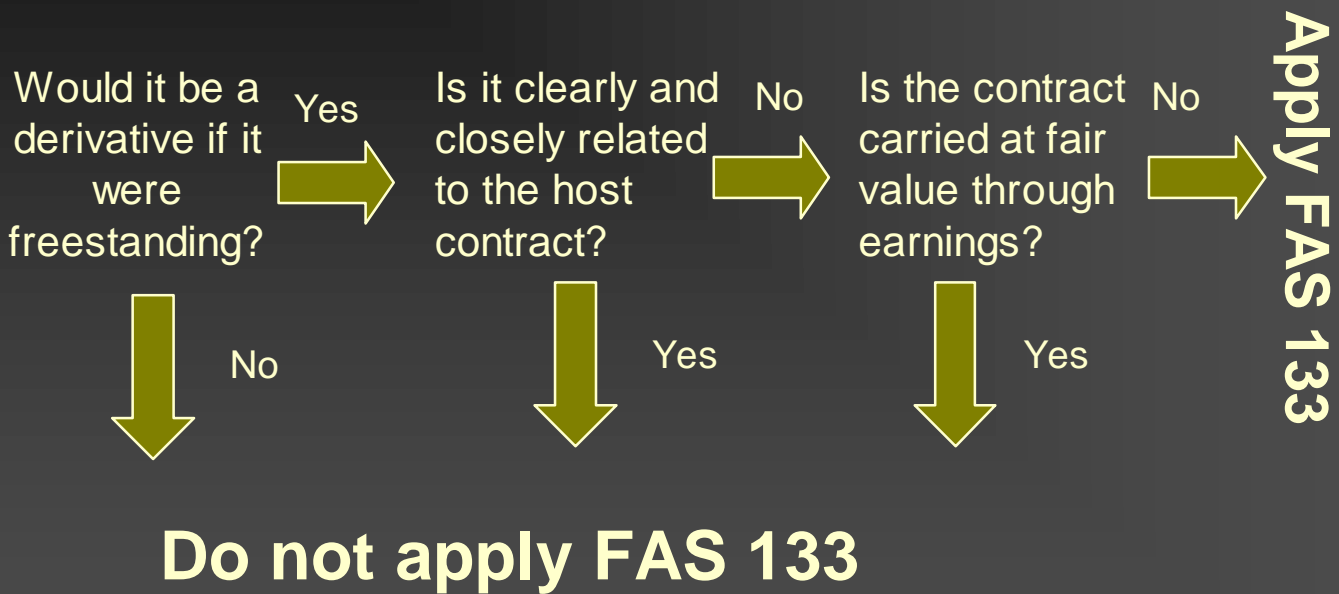
- Questions From Attendees
- SFAS 133/138
- SFAS 97

# Directed Questions

---

- Valuing Short Term Disability
- Ranges & Point Estimates for Unpaid Claim Liability
- Combining Unpaid Claim Liabilities by Segments

# FAS 133 Decision Tree



# FAS 133 – Products Affected

---

- EIA's
- EI UL's
- VA's w/ guaranteed accumulation
- Synthetic GICs

# FAS 133 – Products Not Affected

---

- No-lapse guarantees
- VA's w/ guaranteed benefit payouts (see Issue B25)
- MVA Annuities
- Indexed death benefits

# FAS 133 – Accounting

---

“Bifurcation”

This decade’s “Buttafuoco”

# Point – to – Point EIA Example

## ■ Product Factors

- Five year point-to-point
- \$10,000 original deposit
- Underlying guarantee of 3% growth on 90% of the original deposit
- 75% participation rate
- No equity credit given before maturity
- No equity crediting beyond the fifth year

## ■ Market Factors

- Implied volatility of 22%
- Five year risk free rate of 6%
- Dividend assumption of 1.25%
- Assume that 90% of annuitants will persist to maturity



## Point – to – Point EIA at Issue

---

- Using Black-Scholes and persistency, the embedded derivative is \$1,730
- The remainder of the deposit, \$8,270, is the host liability at issue
- The host must accrete at 4.76% interest (without regard to persistency) to \$10,433 at the end of five years

# Point – to – Point EIA Example

---

One year later....

The market has declined by 10%.

The four year risk free rate is 5.8%.

Volatility stays constant.

---

# Point – to – Point EIA Example

---

## One year later....

- Using Black-Scholes and persistency, the value of the embedded derivative declined to \$1,079
- The value of the host increased to \$8,664
- The total liability is \$9,743 – less than the original deposit

# More Complicated EIAs

---

- How Do We Value These?
- Initial Response was to set derivative value only for the current year

# More Complicated EIAs

- Issue B29 – requires treating periods as part of one compound derivative
- Black-Scholes is not applicable to these valuation models



# Complex EIAs – A Generic Approach

---

- For any design, including point-to-point, a Monte Carlo or stochastic model may be developed
- Must consider economic and non-economic variables

# Stochastic Model Considerations

---

- Measure the portion of the projected account balance that is attributable to movement in the index at each event (lapse, death, free partial withdrawal)
- Contingencies may be dynamic (e.g. lapses)
- Grouping considerations should consider
  - Cost factors
  - Moneyiness
  - Issue date

# What is Being Measured?





# Stochastic Model Considerations

---

- For each scenario, develop an expected cash flow of the embedded derivative
- For each scenario, discount the cash flows by the path-wise risk-free rate

# Stochastic Modeling

---

Stochastic modeling of an EIA is the only alternative that will produce the complete economic picture of the product.

# A Simple Alternative

---

- For ratchet design products where the minimum equity participation is remote (e.g. 0% participation)
- Management's best estimate is that equity crediting will remain within profitability parameters (a "budget" for equity participation rates)

## Simple Alternative (Continued...)

---

- Combine the first two required considerations of B29 to develop projected account balances and required cash flows to value the embedded derivative
- Discount the cash flows attributable to movement in the index by the appropriate risk-free spot rate

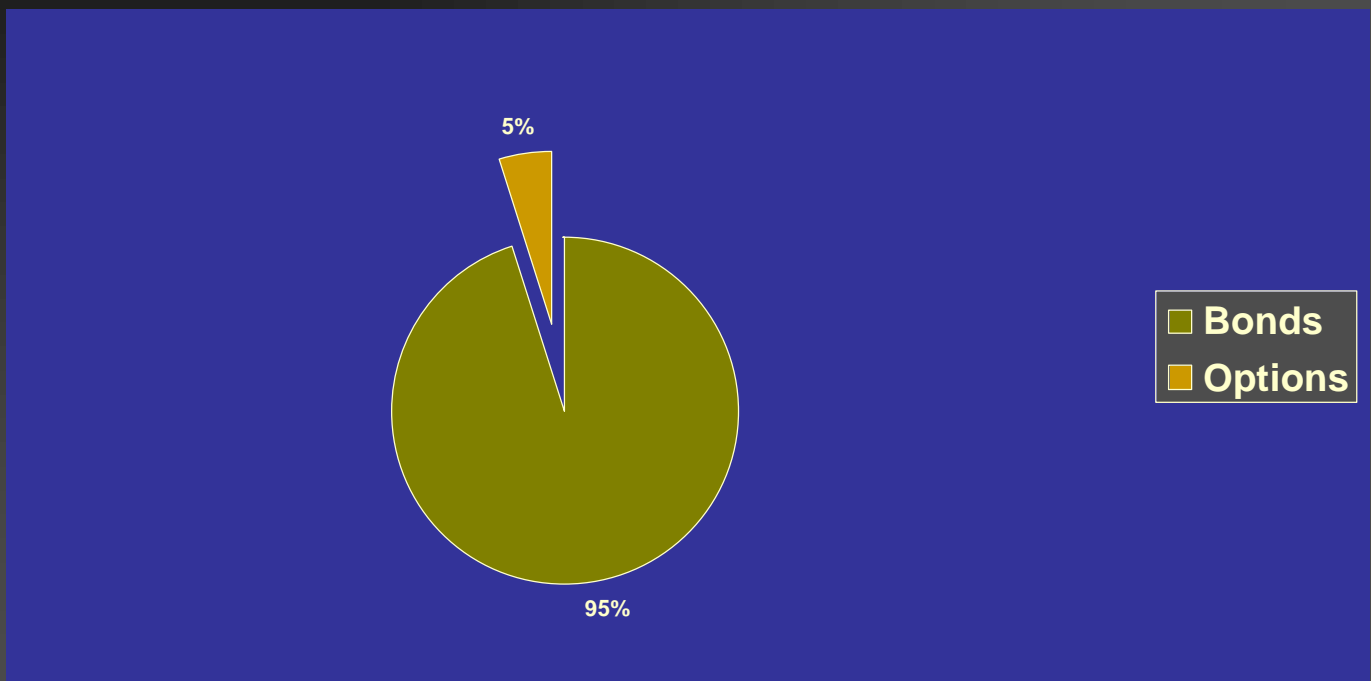
# Simple Alternative (Continued...)

---

Based on 2 Basic Assumptions

- The value of the next call option is the present value of the expected equity crediting
- Products are managed to a target profitability ***budget*** (some call this the ***Budget Method***)

# Budgeted Asset Allocation



## Simple Alternative (Continued...)

---

The value of each of these option purchases will accumulate each year at the risk free forward rate. A budget of 5% with a risk free forward rate of 5.2% will have an estimated accumulation of 5.26%.

---

# Annual Ratchet Example

---

## ■ Product Factors

- Annual reset product
- \$10,000 original deposit
- Underlying guarantee of 3% growth on 90% of the original deposit
- 5% percent budget
- 5 years to maturity with no equity participation beyond that time

## ■ Market Factors

- Risk free forward rates of 4.5%, 4.7%, 4.9%, 5.1%, and 5.3%
- Assume that 2% of all annuitants terminate on anniversary

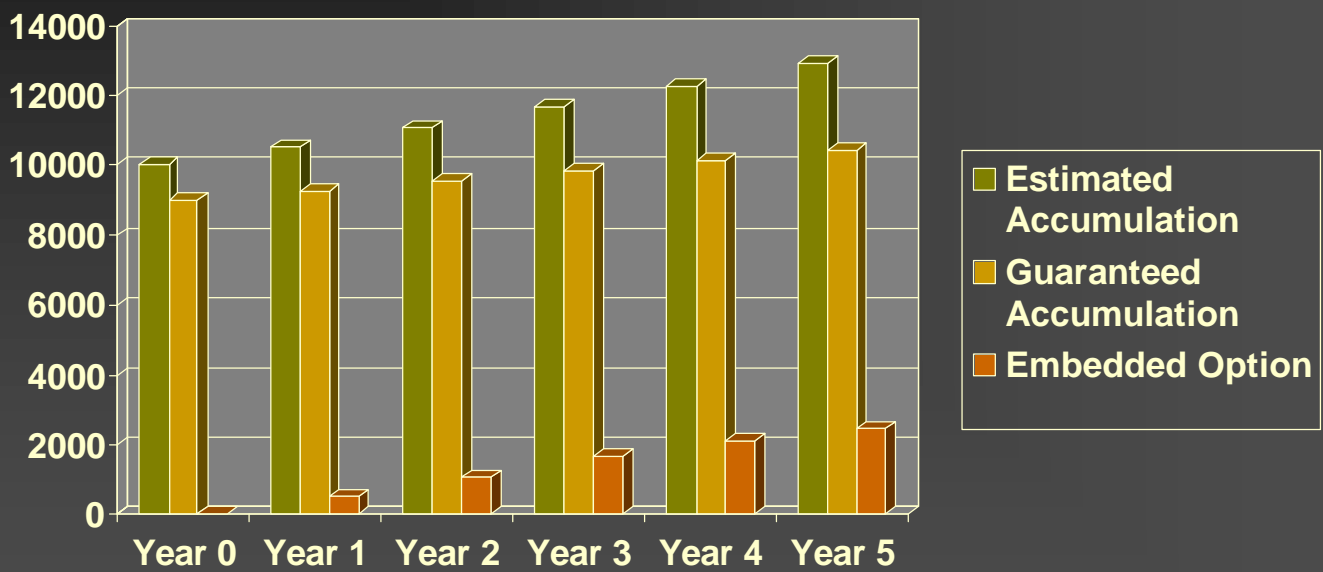


# Annual Ratchet – At Issue

---

- Using the Budget Method, the embedded option at issue is \$1,890
- The remainder of the deposit, \$8,110, is the host liability at issue
- The host must accrete at 5.17% interest (without regard to persistency) to \$10,433 at the end of five years

# Annual Ratchet – At Issue



# Annual Ratchet – At Issue

	Embedded	Discount		Lapse	
Year	Option	Factor	L(x)	Rate	Value
1	523	1.045	1.0000	.02	10.01
2	1,073	1.094	.9800	.02	19.22
3	1,654	1.148	.9604	.02	27.68
4	2,137	1.206	.9412	.02	33.35
5	2,479	1.270	.9224	1.00	1,800.16
					1,890.42

# Annual Ratchet – Year 1

---

- The market has declined by 10%.
- The risk free forward rates change to 4.6%, 4.8%, 5.0%, and 5.2%.
- Volatility changes have no Effect!!

# Annual Ratchet – Year 1

---

- Using the new projection of funds and persistency, the value of the embedded derivative declined to \$1,481
- The value of the host increased to \$8,529
- The total liability is \$10,010 – greater than the original deposit and greater than the current account balance of \$10,000

# Annual Ratchet – Year 1

	Embedded	Discount		Lapse	
Year	Option	Factor	L(x)	Rate	Value
2	523	1.046	1.0000	.02	10.00
3	1,074	1.096	.9800	.02	19.21
4	1,526	1.151	.9604	.02	25.47
5	1,835	1.211	.9412	1.00	1,426.66
					1,481.34

# Other Considerations of Budget Method

---

- The budget is based largely on the other fixed investment portfolio
- The budget may change with time due to market conditions, reinvestments, or changes in non-economic assumptions (e.g. lapses)
- Another alternative is to base the budget on a spread to forward rates

# Limitations of Budget Method

- The minimum equity participation should produce no or very minute potential value
- Maintaining the budget must be a reasonable assumption
- The effect of equity participation and the underlying guarantee should be considered
- A single scenario will not capture the entire economics of the product



# FAS 133 – FAS 115 Implications

---

- Asset Category Holiday
- Cannot Hedge Interest Risk of HTM Assets

# FAS 133 - Resources

---

## ■ Web Sites

- [www.FASB.org](http://www.FASB.org)
- [www.ArthurAnderson.com](http://www.ArthurAnderson.com)
- [www.Deloitte.com](http://www.Deloitte.com)
- [www.EY.com](http://www.EY.com)
- [www.KPMG.com](http://www.KPMG.com)
- [www.PWCGlobal.com](http://www.PWCGlobal.com)

# FAS 133 - Resources

---

- Society of Actuaries
  - Financial Reporter
  - Record
  - Valuation Actuary Symposium

# FAS 97 – Unlocking

---

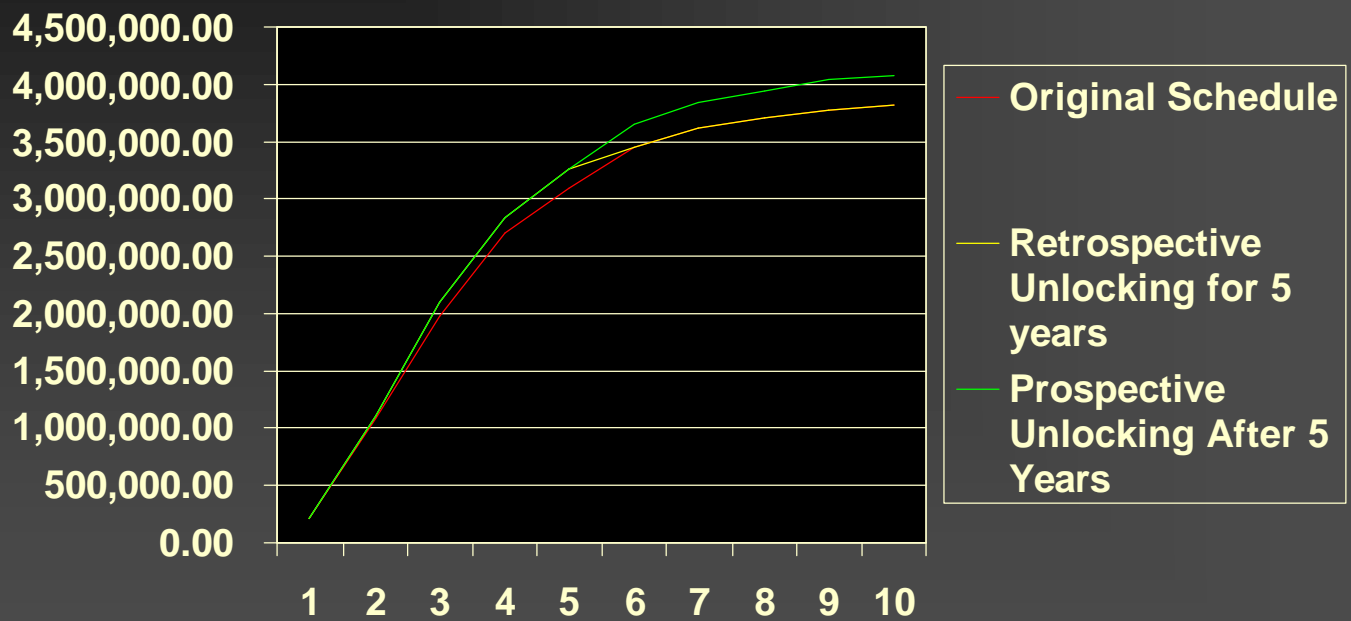
## A Potential Dilemma For Actuaries

# FAS 97 – An Example

## Interest Spreads

	<b>Original</b>	
<b>Duration</b>	<b>Assumption</b>	<b>Experience</b>
Years 1 – 3	120 bp's	150 bp's
Year 4	130	160
Year 5	140	170
Year 6+	150	

# FAS 97 Unlocking– An Example



# FAS 97 Unlocking – An Example

## Dollar Impact of \$10,000,000 Deferral

Original	77.1%	
Retrospective Only	76.5%	\$600,000 more amortization
Prospective	77.6%	\$1,000,000 less amortization

# FAS 97 - Unlocking

---

“A Russki’s got to have a plan...”

Fred Thompson



# FAS 97 Unlocking

---

- SEC Staff Accounting Bulletin # 99

# FAS 97 Unlocking - Resources

---

- [www.sec.gov](http://www.sec.gov)
- “Managing the Volatility of GAAP Earnings” – NAAJ, January 2000
- “Stochastic DAC Unlocking for Variable Annuity Products” – The Financial Reporter, March 2001