

ACE LFV-Canada Errata
Spring 2017 Edition
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Study Guide

After the initial syllabus was released the SOA added *CIA Educational Note: Considerations in Valuation of Segregated Fund Products*.

The proceeding pages of this errata contain an updated to the study guide. Please note that this impacted the first printing and future printings and e-products will be updated.

Flash Cards

There were two flash cards added between cards #124 and #125. The proceeding pages of this errata contain an updated to the flash cards. Please note that this impacted the first printing and future printings and e-products will be updated.

Audio CDs

Since there were two flash cards added, future printings of the audio CDs will contain those tracks.

Considerations in the Valuation of Segregated Fund Products (Canada Only)

Key Concepts

- More considerations for segregated fund products (amortization of AAE, term of liabilities, etc.)
- Pay attention to examples in the study note

1) Introduction

- a) This study note will discuss considerations when valuing segregated fund products under Canadian GAAP
- b) Abbreviations → it's good to read through these

2) Valuation method

- a) General approaches → two methods for amortizing an AAE
 - i) Bifurcated approach
 - (1) Need to separate revenue used to write down the AAE and revenue used to fund the guarantee
 - (2) The allocation of revenue does not change from period to period
 - ii) Whole contract approach
 - (1) Do not separate revenue, rather calculate the total liability considering all relevant cash flows
 - (2) The study note gives some basic formulas:
 - (a) Total Liability = PV(Future Guarantee Costs and Expenses) – PV(Future Revenue)
 - (b) Liability for Guarantee = Max(0, Total Liability + Unamortized AAE)

So as you can see, in the whole contract approach, the total liability is solved for first, and then the separate pieces can be calculated.

b) Considerations

- i) The total liability under the whole contract approach is likely to be smaller than the bifurcated approach (using all revenue)
- ii) The liability for the guarantee is likely to be negative under the whole contract approach
- iii) Under the whole contract approach, the AAE has first priority of revenue

c) Examples → see appendix A

3) Term of the liability for segregated fund guarantees

a) General considerations

- i) The term of the liability for segregated fund guarantees ends at the balance sheet date if the liability is negative (in other words, you set the liability to zero)
- ii) Only set the term to beyond the balance sheet date if it will increase the liability

b) Hedging

- i) Segregated fund guarantees are often hedged using derivatives
- ii) The liability is often set to zero at the balance sheet date → as the guarantee becomes in the money, the derivative will increase in value (the value of the liability may or may not increase in value due to being floored at zero)

The study note walks through an example of how if markets go up, the guarantee is worthless and the liability is still floored at zero. However you lost money on the derivative hedge, so there is a mismatch of assets and liabilities.

- c) Conclusion → it may be appropriate to hold a negative liability for segregated fund guarantees that are hedged

- 4) Recoverability testing for the allowance for acquisition expenses
 - a) Amortization period for AAE and extended term for recoverability testing
 - i) The amortization periods should be consistent with original term of the liabilities
 - ii) Need to do recoverability testing at least annually to ensure there is future profits to offset amortization of acquisition costs
 - b) Choice of CTE level
 - i) CTE(0) à you can think of this as a 50/50 chance that the AAE is recoverable
 - ii) CTE(60-80) à consistent with other policy liabilities (AAE is considered a negative liability)
 - iii) CTE(95) à this would be consistent with a solvency application, not appropriate for a GAAP liability
- 5) Level of aggregation
 - a) The level of aggregation is up to the actuary

The study note walks through an example. As you can read in the study note, there are two cohorts. One is in the money, and the other is out of the money.

- b) Approach 1 à this approach will separate the two cohorts and calculate separate liabilities
 - c) Approach 2 à the combined results are not appropriate since the two cohorts have different risk profiles
 - d) Summary
 - i) The recommended approach is not #1 or #2 à need to combine the cohorts and solve for the term that maximizes the liability at each duration
 - ii) When determining the level of aggregation, need to consider the homogeneity of policies with respect to key risk parameters (market performance, product features, lapse, mortality, guarantee resets behavior, etc.)
- 6) Discounting and C3 PfAD
 - a) C3 risk depends on the mismatch between liabilities and assets
 - b) Need to consider a mismatch in the term OR cash flows
 - c) When determining C3 PfAD, should consider: (1) Stochastic or deterministic methods, (2) approximations, including the discounted cash flow method, and (3) the policy liability may be negative/zero
 - d) The greater the mismatch between assets and liabilities, the higher the required C3 PfAD
 - 7) Policyholder related assumptions
 - a) Principles when selecting assumptions:
 - i) The exercise of options is strongly correlated with being in-the-money
 - ii) Anti-selection will result in increased exercise of the more valuable options
 - iii) Policyholder decisions will tend to serve their perceived interest and not serve the insurer's interest unless the two run together
 - iv) The actuary's best estimate would depend on the sophistication and perceived interest of the policyholder
 - v) The actuary need not assume that all policyholders always act in a rational manner, or that they do so with perfect efficiency
 - vi) Model output should be used as a reasonableness check for assumptions
 - b) Best estimate assumptions
 - i) Mortality à based on credible actual data, similar data, or industry data
 - ii) Surrenders
 - (1) Key assumption
 - (2) Use industry data or CIA guidance
 - (3) Needs to be dynamic – when the guarantee is in the money, lapses should be very low

- iii) Partial withdrawals → since these will happen in real life, they need to be considered and modeled
 - iv) Fund transfers → should be based on historical experience
 - v) Elective resets of the guaranteed amount
 - (1) Utilization rate should vary by: duration, fund value, in-the-money-ness
 - (2) Should be based on credible experience
 - vi) Elective resets of the maturity dates → some contracts allow the policyholder to reset the maturity date
 - vii) Future deposits → need to make an assumption of how much, low long, and fund allocation
 - c) Margins for adverse deviations
 - i) Need to add on margins for all assumptions are that not dynamic
 - ii) 5-20% margin is common
- 8) Provisions for adverse deviations
- a) A PfAD is the difference between the best estimate reserve and the actual reserve
 - b) Example 1
 - i) Bifurcated approach
 - (1) The key take-a-away is that the calculated liability is negative, so the booked liability is zero
 - (2) When you add on a PfAD, the liability is still zero (ie, there is no PfAD)
 - (3) The “additional margin” is the difference between the negative liability and what was booked
 - ii) Whole contract approach
 - (1) Similar to the bifurcated approach → no PfAD
 - c) Example 2 → this example the guarantee is in the money so it should result in a positive liability. Since the liability is greater than zero, there will be a PfAD.
- 9) Sampling/number of scenarios → 1000 is cited as a minimum number of scenarios
- 10) Appendix A: Bifurcated vs. Whole Contract Approach

This appendix will discuss the two different valuation methods and how they respond to changes in the environment. The two methods are not equivalent.

- a) Description
- b) Example 1
 - i) State 1 – Initial
 - (1) 90 basis points of revenue is required to amortize the AAE
 - (2) The whole contract approach produces a lower liability since it uses all revenue
 - ii) State 2 – Modest market correction of 3%
 - (1) When markets go down, revenue goes down
 - (2) Need more basis points of revenue to amortize the same acquisition expenses
 - (3) The total liability goes up
 - iii) State 3 – More severe market correction of 15%
 - (1) Same situation as state 2, but more exaggerated
 - (2) The AAE is now not recoverable, so it must be written down
 - iv) State 4 – Most severe correction of 42%
 - (1) Same situation as state 3, but more exaggerated
 - (2) The whole contract approach and the bifurcated approach are now equivalent because they use the same amount of aggregate revenue
 - v) State 5 – Market recovery to state 3
 - (1) Once the AAE is written down it cannot be increased
 - (2) *As you can see, market swings can impact future results*
- c) Example 2 → similar example, but this time the guarantee liability starts negative

Methods to Value Guarantees and AAE in Segregated Fund Products

1. Bifurcated approach
 - a. Separate revenue to write down AAE and revenue to fund guarantee
 - b. The allocation of revenue does not change from period to period

2. Whole contract approach
 - a. Calculate the total liability considering all relevant cash flows
 - b. Total Liability = $PV(\text{Future Guarantee Costs and Expenses}) - PV(\text{Future Revenue})$
 - c. Liability for Guarantee = $\text{Max}(0, \text{Total Liability} + \text{Unamortized AAE})$

3. Considerations
 - a. Total liability under the whole contract approach is likely to be smaller than the bifurcated approach
 - b. The initial liability for the guarantee is likely to be negative under the whole contract approach

Valuing Segregated Fund Products:
Term of the Liability, Recoverability Testing
AAE, Level of Aggregation, and C3 PfAD

Term of the Liability

1. The term of the liability ends at the balance sheet date if the liability < 0
2. Only set term beyond balance sheet date if it will increase the liability

Recoverability Testing

1. Need to do recoverability testing at least annually
2. CTE(60-80) is appropriate

Level of aggregation --> need to consider the homogeneity of policies with respect to key risk parameters (market performance, product features, lapse, mortality, guarantee resets behavior, etc.)

Considerations when determining C3 PfAD

1. Stochastic or deterministic methods
2. Approximations, including the discounted cash flow method
3. The policy liability may be negative/zero