Equity-Based Insurance Guarantees Conference

Nov. 6-7, 2017

Baltimore, MD

Structured Variable Annuities:
Design, Risk Management and Accounting

Simpa Baiye

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Design, Risk Management and Accounting

2017 Equity-Based Insurance Guarantees
Conference – Session 1B

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PwC

6 November 2017 (1045 – 1215 Hours)

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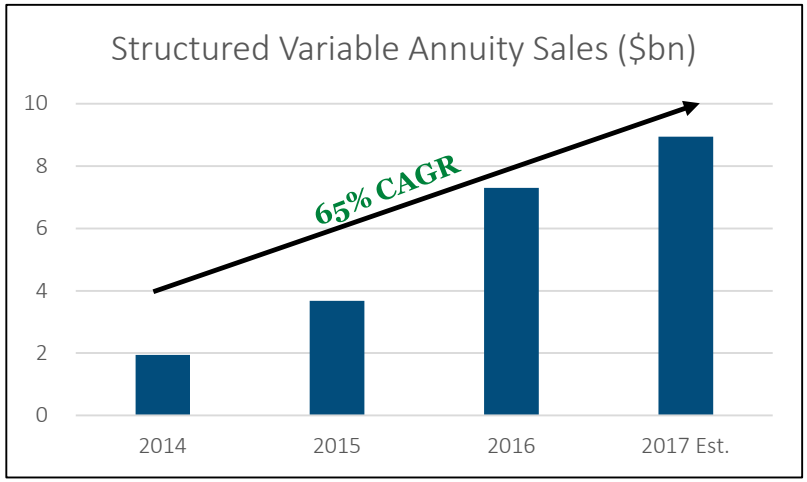
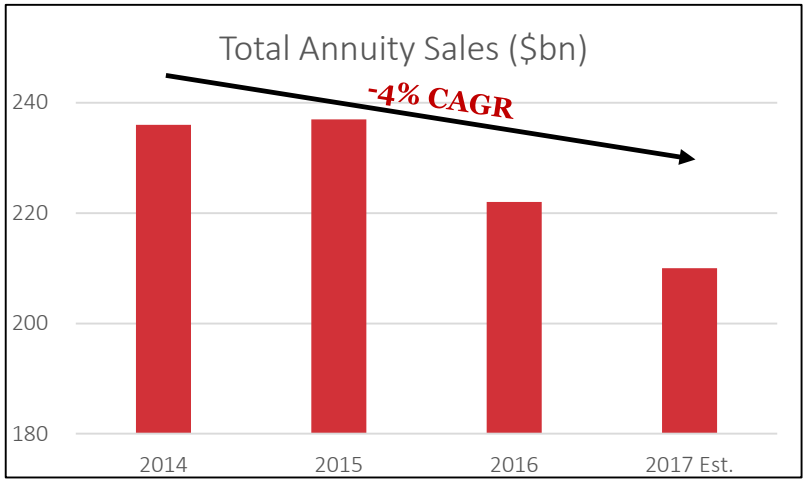
Structured Variable Annuity Agenda

1. **Market Summary**
2. **Design and Risk Management Considerations**
3. **Profitability Drivers and Risk Management**
4. **Regulations, Accounting, and Capital Considerations**

SVA Sales Growth Amidst Total Annuity Sales Decline

- SVAs are sold primarily through wirehouses (e.g. Morgan Stanley, Goldman Sachs, Merrill Lynch) and financial institutions (e.g. Wells Fargo, Chase)
- Appeal of SVAs lies in offer of better accumulation opportunities (relative to indexed annuities and fixed annuities) for pre-retirees and retirees open to modest, tailored amounts of downside risk
- SVAs are very similar to certain structured retail products (which have total annual sales north of $45bn per annum)
- SVAs can offer a competitive alternative to retail structured products due to differences in issuer regulations



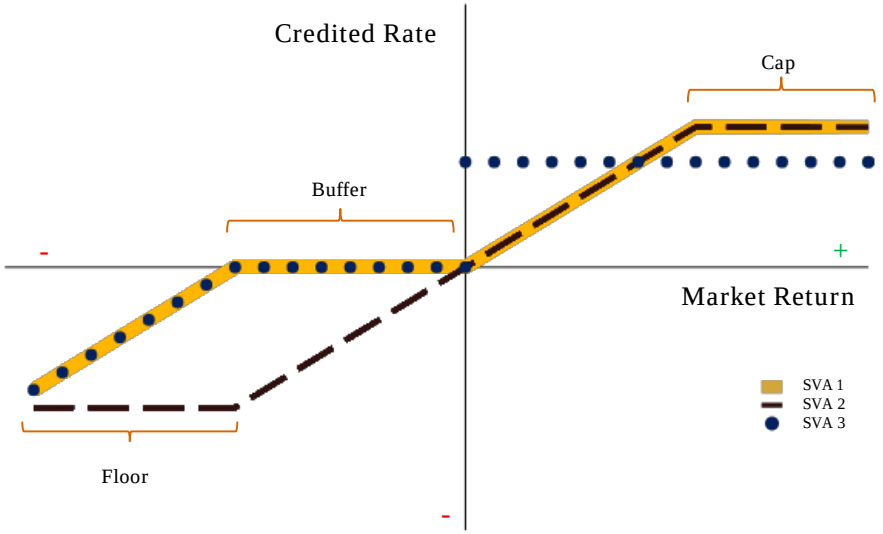


Structured Variable Annuity Issuers and Products

Company	Product Name	Description	Variable Annuity Subaccounts Offered	Riders
Allianz	Index Advantage	Structured investment with three index strategies: *(1) Performance* – growth up to a cap rate with some downside protection up to a buffer rate *(2) Protection* – a fixed growth, Declared Protection Strategy Credit, if index performance is equal or greater than zero *(3) Guard* – growth up to a cap rate with downside risk limited to a floor rate	Government Money Market MVP Balanced Index Strategy MVP Growth Index Strategy	None
AXA	Structured Capital Strategies	Structured investment options with a built-in protection feature providing the opportunity to invest for growth up to a Performance Cap Rate with some downside protection (Buffer). Also offers a Choice option for higher Performance Cap Rate for an annual fee.	Core Bond Index Equity 500 Index Money Market	None
Brighthouse Financial	Shield	Structured investment options with opportunity to invest for growth up to a Cap Rate with a built-in downside protection up to 100% (Shield Rate). Also includes a "Step Rate" feature to lock in predetermined growth if the index performance is equal or greater than zero.	None	Return of Premium Death Benefit
CUNA Mutual	Members Zone	Structured investment with two index strategies: *(1) Secure* – growth up to a cap rate no downside risk *(2) Growth* – growth up to a cap rate with downside risk limited to a floor rate.	None	None

SVA Index Crediting Illustrations

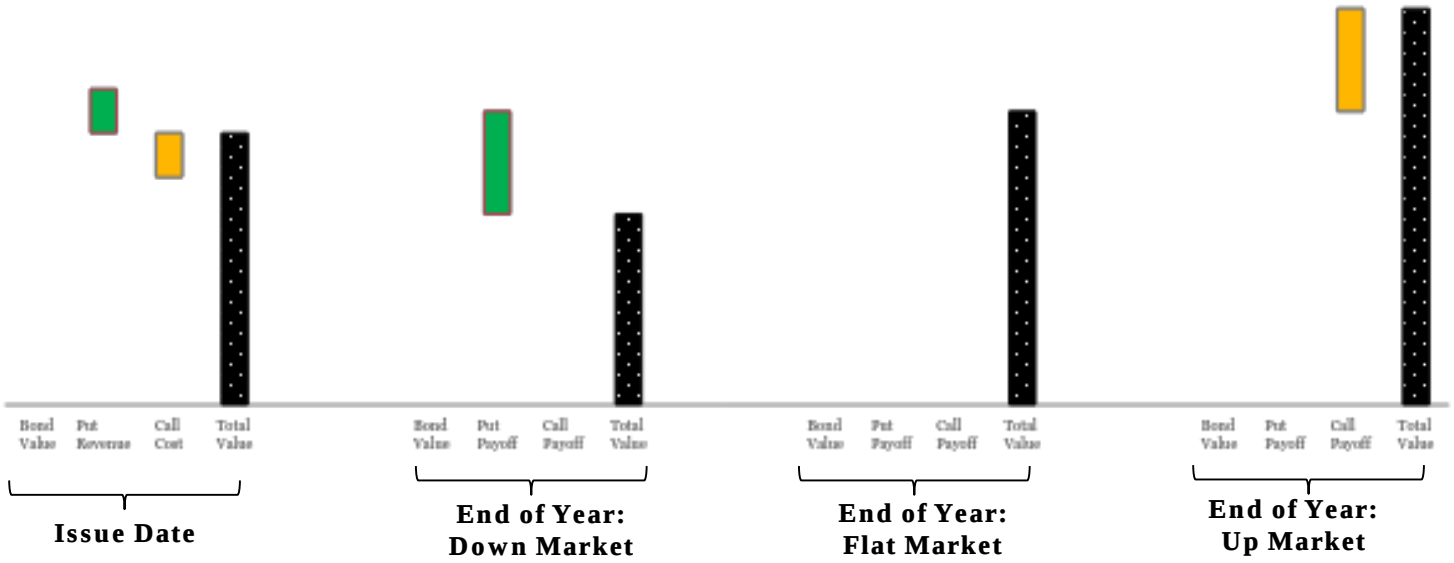
- SVA 1
  - ✓ Upside gain up to a cap
  - ✓ Downside loss in excess of a "buffer" rate
- SVA 2
  - ✓ Upside gain up to a cap
  - ✓ Downside loss floored at predetermined level
- SVA 3
  - ✓ Fixed upside gain if market return is not negative
  - ✓ Downside loss in excess of a "buffer" rate



SVA Building Blocks

Illustrative Financial Building Blocks for SVA 1

- Consists of a zero-coupon bond, a European ATM call spread that is bought, and an OTM European put that is sold
- Building blocks provide a template for asset-liability management and valuation



Interim Value Calculations

- Carriers often provide for interim redemption formulas incorporating product components:

  Derivatives

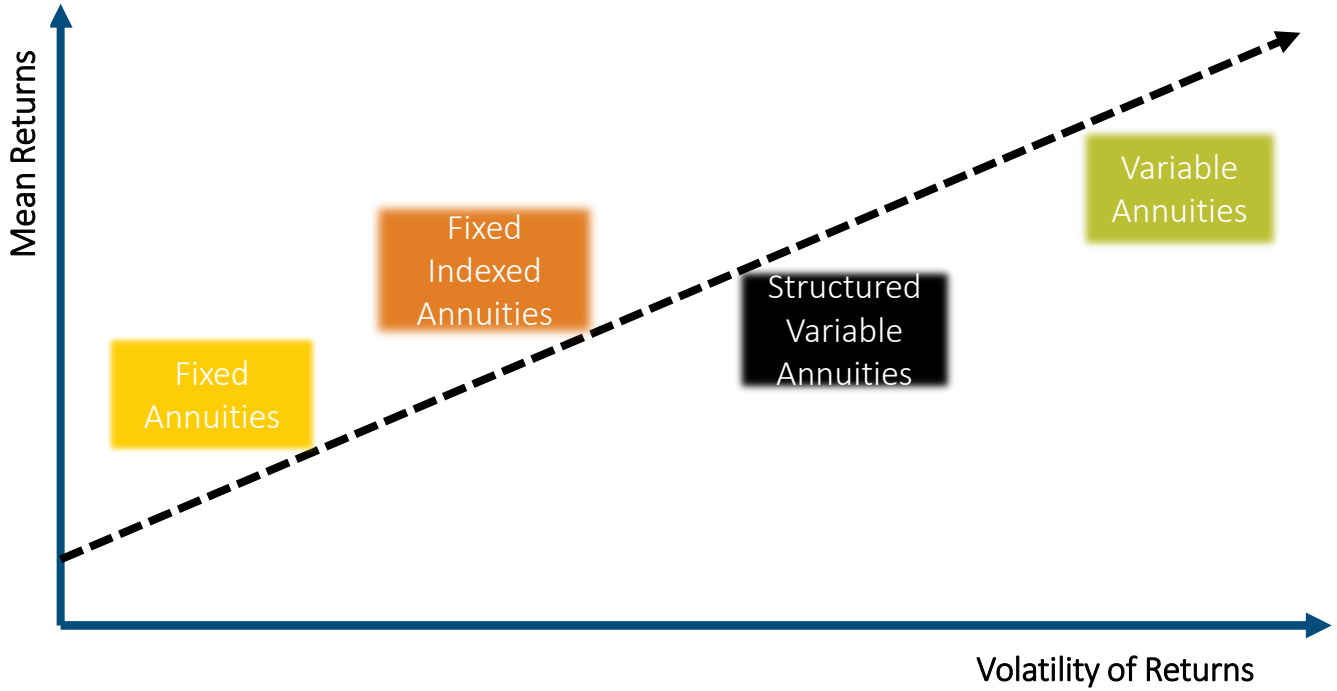
  - Black-Scholes option pricing formulas
  - Third-party quotes for options pricing

  Fixed Income

  - Market-value adjustment formulas to reflect change in “zero-coupon” bond underlying

- Interim formulas often include non-economic adjustments to component market values
  - These adjustments serve to limit upside volatility in surrender values and dis-incentivize lapses

SVA Profitability and the Efficient Frontier



- Risk profile for SVA suggests that long-run target profitability should lie between FIA profitability and VA profitability
- Deviations in relative target profitability possible due to market conditions and regulatory environment

Profitability Drivers

Product fees

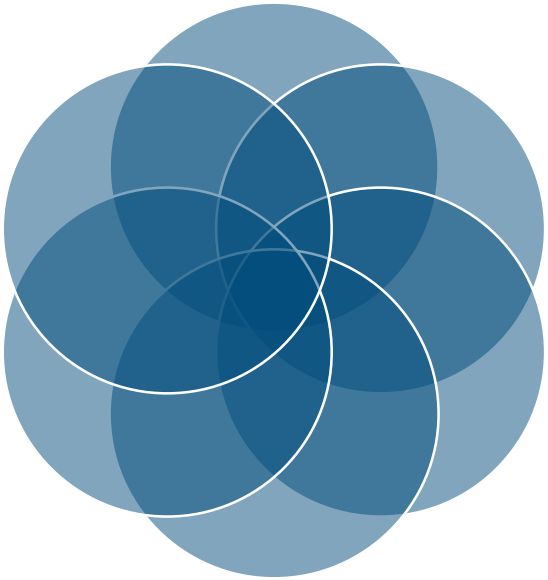
- Explicit charges made to cover expenses

Risk-Based Capital Management

- Optimizing regulatory capital requirements via strategic asset allocation, asset-liability management or reinsurance

Investment income

- Fixed income earned on invested deposits accrues to insurer



Asset-Liability Management

- The interplay between economic risks of index crediting and derivative hedges set up to meet the same

Derivatives revenue

- Derivatives trades (sale of put options and purchase of call options) could generate margins
- Margins could be negative if call options cost more than put option premiums received

Policyholder behavior

- Actual utilization of guarantees and persistency of policyholders

Asset-Liability Management (ALM)

Bond Component

- Hedged by investing in fixed income securities
- Fixed income investments generate yield that accrues to the insurer
- Insurer may take some credit risk, interest rate risk, and liquidity risk
- Duration, liquidity, and credit risk should reflect:
  - Product design
  - Likelihood of withdrawals and redemptions
  - Ongoing need for collateral to back derivatives traded to fund index-linked crediting.

Derivatives Component

- Hedge interest crediting by purchasing a call option and selling a put option simultaneously
- Options can purchased and sold on exchanged-traded or over-the-counter ("OTC") basis

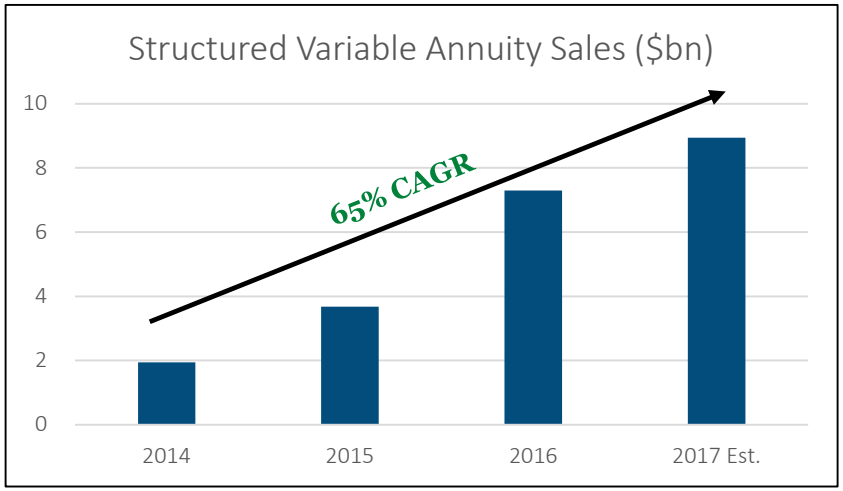
Asset-Liability Management for Structured VA – The Finer Points

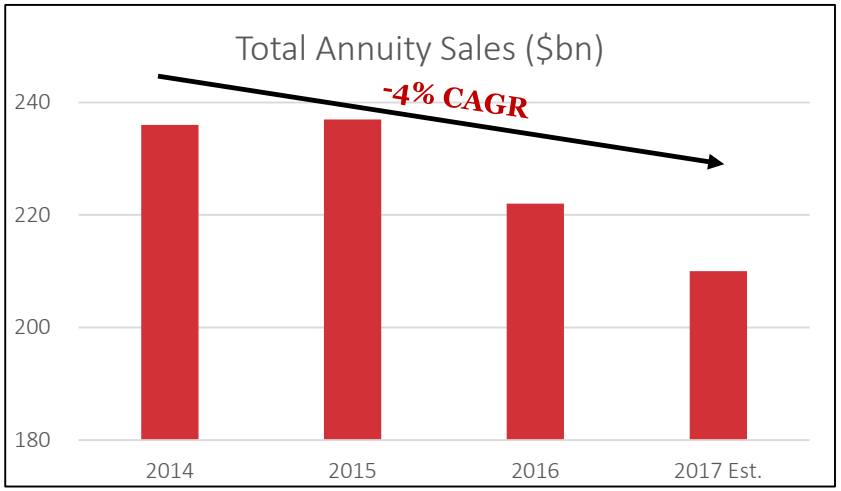
- Short positions in put options require analysis of how deposits should be invested
  - Market values of assets need to meet settlement requirements should short positions mature in-the-money
  - Highly rated, short duration fixed income instruments are typically set aside as collateral

- The statutory valuation basis for fixed-income investments could drive balance sheet volatility
  - Statutory reserve assets could be held at book value or market value in separate accounts
  - Reserves may not necessarily have the same interest rate sensitivity as fixed income assets
  - Surplus volatility could thus result from valuation basis mismatches

- SAP and GAAP balance sheet implications of economic risk-management need to be considered
  - ALM strategies could impact GAAP equity due to STAT/GAAP valuation basis differences

Annuity Portfolio Risk Management via SVA Issuance





Source: LIMRA Secure Retirement Institute, U.S. Individual Annuities survey

- SVA risk management presents potential offset opportunities for VA GMxB risk management
  - Structured VA asset-liability management involves the sale of put options
  - Variable annuity risk management involves the purchase of put options
- The supply and demand for put options could thus be met internally
  - Insurers with legacy VA books could therefore save on derivatives transactions costs via internal offsets

Regulation

- Securities Act of 1933
  - ✓ Product registration due to possibility that policyholders may lose at least part of their initial deposits and would not have standard insurance non-forfeiture provisions

- NY Regulations 47 and 128 (NY domiciled entities only)
  - ✓ Incorporates separate accounting requirements for assets backing SVA liabilities
  - ✓ Effectively places constraints on investments made with SVA product deposits

- Other state-specific regulations regarding the operation of separate accounts

- NAIC Modified Guaranteed Annuity ("MGA") Regulations
  - ✓ For SVA products that meet MGA definition and in applicable states
  - ✓ Prescribes policy features and the valuation basis for assets backing reserves

Product Issuance and Separate Accounts

- State regulations generally require separate accounting for SEC registered products that may result in a loss of value
- Guaranteed separate accounts are most appropriate for SVA
  - ✓ Insurer can generally move assets between separate and general account to meet policyholder obligations and earn margins
- SVAs generally do not meet the requirements for GAAP separate accounting under ASC 944

Separate Account Type	Relevant Products	Legal Insulation from General Account	SEC Filing Basis	SEC Form Filing	Asset Valuation Basis	Asset Valuation/Interest Maintenance Reserve Requirement
Non-guaranteed, unitized Separate Account	Variable annuity subaccounts	Yes	1940 Investment Company Act	N4	Market	None
Guaranteed Separate Account	MVA Annuities, Indexed Variable Annuities	Generally no, but legal insulation could be pursued	1933 Securities Act	S3	Generally market, but amortized cost is generally an option	No IMR if assets are valued at market

Statutory Valuation

Assets

- Separate accounting for SVA typically involves a market valuation of all assets backing reserves
  - ✓ State regulator permission could be sought for an amortized cost approach

Liabilities

- Actuarial Guideline ("AG") 43
  - ✓ Provides a framework for the valuation of SVA
  - ✓ Does not provide explicit guidance on SVA valuation
  - ✓ Floors the reserve result using a standard scenario calculation involving a fixed discount rate
  - ✓ Could also be applied to the valuation of optional guarantee riders
- New York Regulations 128 and 151
  - ✓ Prescribes a minimum valuation requirement for insurers effectively domiciled in NY
  - ✓ Requires a present value calculation of benefits at discount rates that reflects current market yields

GAAP Valuation

Assets

- Derivatives designated as trading securities accounted for at fair value based on ASC 320, Investments
- Fixed income investments can be designated as Available for Sale ("AFS")
  - ✓ Unrealized gains or losses flow through other comprehensive income
  - ✓ Trading securities designation for both fixed income and derivatives can also be obtained
  - ✓ Realized and unrealized gains and losses flow through earnings

Liabilities

- ASC 815-15/ASC 820, Embedded Derivatives (FAS 133 / 157)
  - ✓ Bifurcation of host and embedded derivative
    - o Host contract accounted for at amortized cost
    - o Embedded derivative measured at fair value
  - ✓ Alternative method involves valuing the entire contract via a fair value option election based on ASC 825, Financial Instruments.
- ASC 944-60, Long-Duration Contracts (SOP03-1) for Insurance Guarantees such as GMDB
  - ✓ Reserve determined retrospectively = cumulative Assessments x Benefit ratio – cumulative Excess Claims
  - ✓ Benefit ratio determined periodically by determining the ratio of PV of Excess Claims / PV of Assessments as if standing at contract inception
  - ✓ Benefit ratio has a smoothing effect on change in reserve from period to period

Risk-Based Capital ("RBC") for SVA

Key Components of RBC

Category	Definition	Comments
C-1	Asset Default risk	
C-2	Mortality/Morbidity risk	Not applicable due to minimal mortality risk
C-3	Asset/Liability Mismatch Risk	Composed of market-risk driven ALM risk. C3Phase II framework supports the calculation
C-4	Business Risk	

- Factor-based approach generally applied to various assets, premiums, reserves, etc.

Questions?