Variable Annuities: Risk Management in Emerging Markets

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What is a Variable Annuity?

- Assets in a variable annuity are invested on behalf of the policyholder in a separate account
- The policyholder chooses the subaccounts which his assets will be invested in
- The policyholder, not the insurance company, bears the investment risk
- Living benefit guarantees have become so prevalent in the market that any discussion of VAs must involve guarantees
  - Almost all VA sales were in products that offered an optional living benefit guarantee
  - Majority of policyholders actually purchased a living benefit guarantee

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Guaranteed Minimum Benefits

- Guarantee Minimum Benefits (GMxB)
  - Riders attached to a unit-linked product
  - Protects against loss of principal
    - on death (GMDB), or
    - on annuitization (GMIB), or
    - at maturity (GMAB), or
    - throughout the life of the product (GMWB)
  - Policyholder receives the greater of
    - A) His fund value
    - B) The guaranteed amount

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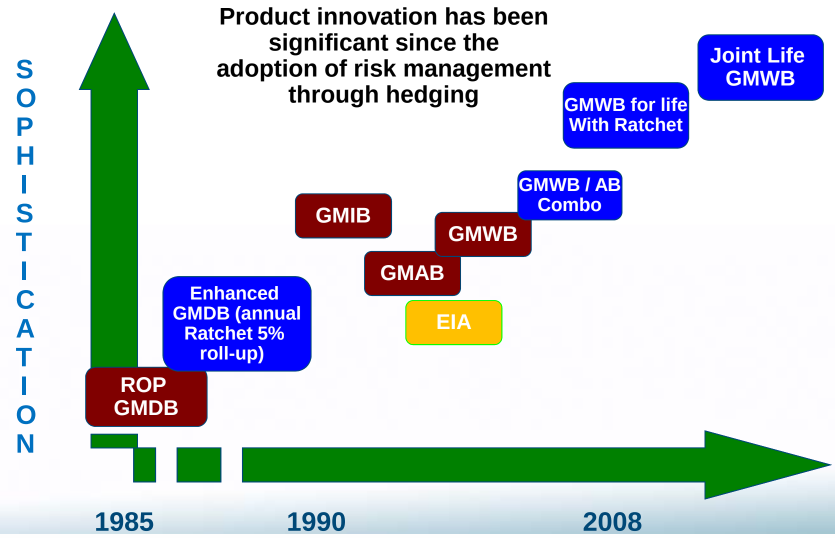
Common Features of GMxBs

- All GMxBs are like put options
- All GMxBs guarantee some minimum return on the policyholder's investment
- All GMxBs have unlimited upside potential, because there is no cap on the fund growth

Flexibility

- GMxBs are competitive in a wide range of market segments, because policyholders can:
  – Mix and match benefits
  – Change the strength and cost of the guarantee
  – Select desired fund separately from guarantee
  – Choose recurring or single premium investments

US Market Product Evolution



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Industry Trends – Product Design

- Competitive situation
  - Companies have focused on moderating sales growth by de-risking of guarantees
    - Lower benefits
    - Increased fees
    - Index funds and model portfolios
  - Consolidation of distribution channels
- Risk-managed product design features
  - Floating-rate withdrawals
    - AXA : bonus linked to treasury rates
    - Allianz and others : withdrawal rates linked to treasury rates
  - Dynamic asset allocation / managed volatility
    - Prudential, Metlife, Lincoln, AEGON, Ohio National, AIG

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Trend: Product De-risking

- Reduced guaranteed benefits
  - Withdrawal rate reduction
  - Bonus rate reduction
  - Age restrictions
  - Investment restrictions
  - Index funds
- Embedded risk management features to reduce capital market risk
  - Risk-managed funds
  - Interest rate linked guarantees

Industry Trends

- Market share consolidation
  - Large players are increasing market share
  - Several companies have exited the market
  - Several have tried reducing sales
- Actuarial assumptions
  - Dynamic policyholder behavior is a key drive of value

Risk Management Trends

- Risk management strategies have tended to stabilize – development of industry best practices
  - Delta / Rho and opportunistic vega
  - Reinsurance capacity is limited
  - Use of structured solutions is minimal
- Hedge objectives moving towards Economic basis
  - GAAP reserving changes -> Non performance risk
  - More companies are moving GLB reserves from Operating Income to Net Income
  - Financial crisis highlighted importance of statutory requirements

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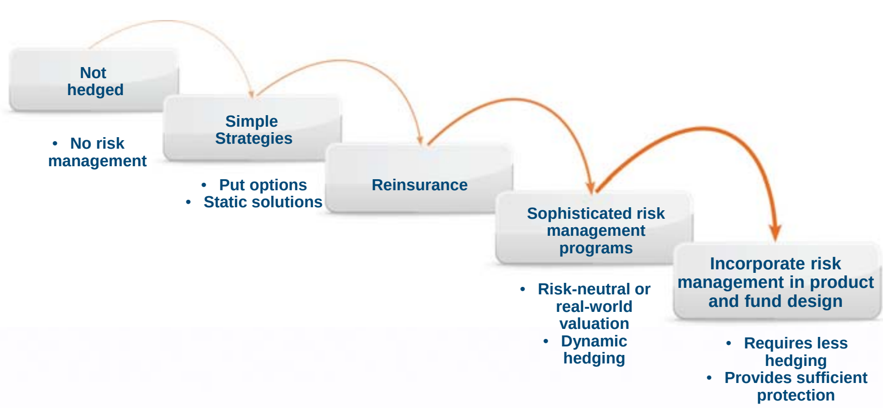
Evolution of Risk Management Strategies



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Lessons from VA Risk Management Evolution

- VA market is consolidated
- It is challenging for smaller VA writers to survive due to the high cost of VA risk management
- VA writers need to be very careful before providing guarantees backed by their balance sheet
- VA products can not provide overly rich benefits due to competitive pressures

Challenges Faced by Emerging Market VA Writers

- Acceptance of the VA product
  - May not have tax benefits
- Regulatory constraints
  - Sales quota
  - Investment limitations
- Availability of hedging instruments
  - Underdeveloped derivatives market
- Risk management expertise

Putting Risk Management In the Funds

- Putting risk management in the funds can be a viable solution for VA writers in emerging markets
- Generally less investment restrictions for mutual funds
- Insurance companies can provide guarantees that mutual funds can not provide
- Mutual funds can directly trade underlying assets without trading derivatives

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VOLATILITY MANAGEMENT

- Current Asset Allocation
  - Targets a specific equity allocation (i.e. 60%) as a proxy for risk
  - Maintains constant equity allocation regardless of market conditions
- Target Volatility Asset Allocation
  - Targets a specific volatility level directly via a futures overlay
  - Prevents portfolio volatility from dramatically increasing during crises

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CAPITAL PROTECTION STRATEGY

- Capital Protection Strategy to reduce losses in adverse market environments
  - The investor's portfolio is mapped to major market indices
  - Example: Use simple, liquid exchange-traded hedge instruments to replicate a 5-year rolling maturity put option
  - This provides a cushion against losses during major market declines
- Decision must be made on what types of hedge assets to use
  - Futures, options, swaps
  - OTC vs. exchange traded
  - Underlying funds

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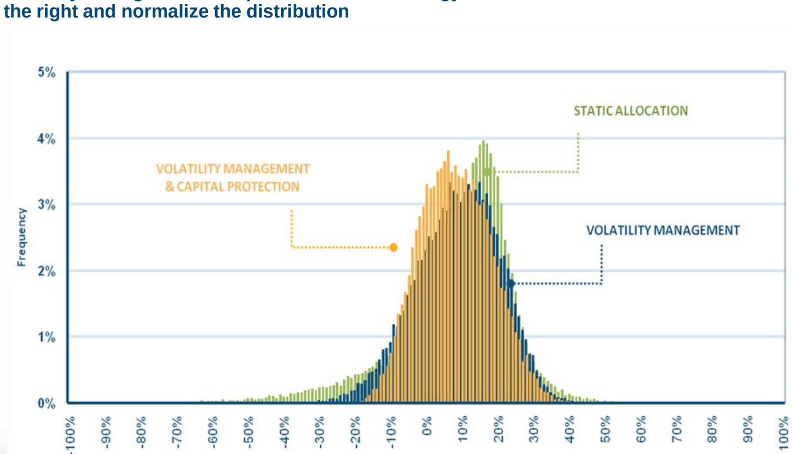
Risk Managed Fund

- Underlying fund's yearly returns have "fat left tail"
- Volatility Management & Capital Protection Strategy skew the returns to the right and normalize the distribution



1,000 stochastically-generated 30-year real-world scenarios were analyzed, and a histogram of the annual returns created

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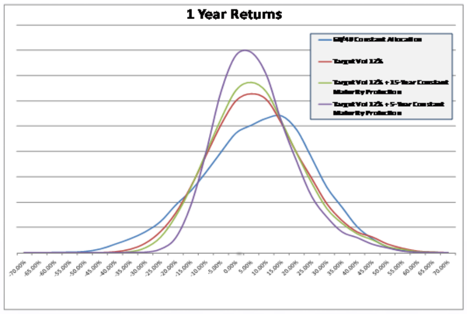
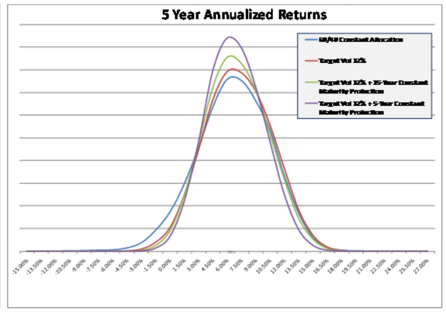
Risk Management and Pricing Benefit





- Including a volatility managed and capital protected fund within a VA Guarantee has many benefits
  - Increasing amounts of protection “normalizes” return distribution
    - Reduced tail risk, lower cumulative volatility
  - Reduced exposures to features like annual ratchets
  - Managed Volatility results in substantially lower vega exposure

    => GAAP earnings benefit

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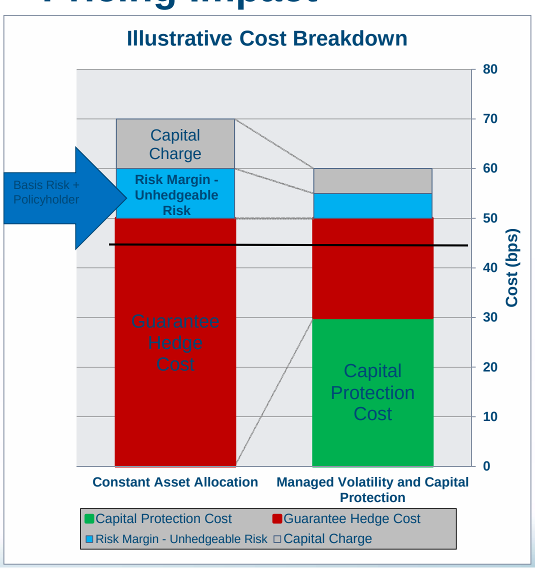
Pricing Impact



- **Total cost** of hedging the same under both models
- **Basis risk and capital charges are insurance company issues**
- **Lower total cost for guarantee**
- **Insurer’s charge decrease by 40bps**
  - **30bps fund hedge cost**
  - **10bps other costs**
- **Lower cost provides several options:**
  - **Offer lower fee guarantee**
  - **Provide richer benefit**

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Hedge Cost Impact

- Significant reduction in hedge cost from Protected Portfolio
  - Volatility management makes vega hedging unnecessary
  - Capital protection reduces tail risk
- Residual risk driven primarily by:
  - Richness of guarantee makes it in-the-money at issue, protection provides reduction from further losses
  - Capital protection is a broad based strategy, not tuned to specific guarantee structure

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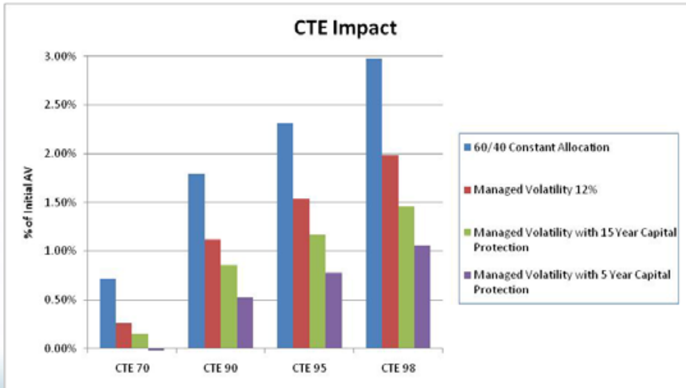
Risk Management Benefit to the Insurer

- Including managed volatility and capital protection funds within VA Guarantees will can substantially reduce Insurer's exposure
- Provides a significant benefit to capital solvency margin
  - Additional diversification benefit since returns will vary from existing business



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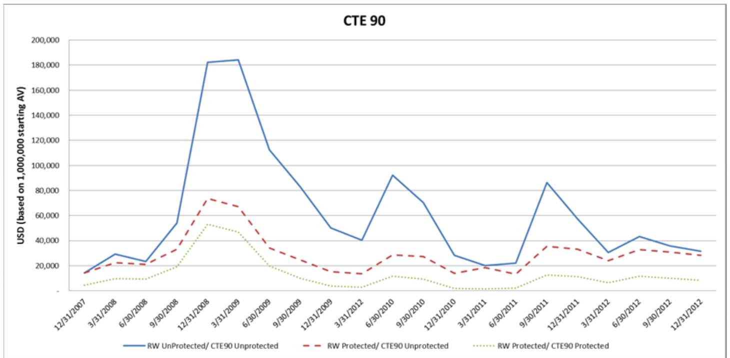
HYPOTHETICAL LIFETIME GMWB CAPITAL – CTE 90

Risk managed funds provide reduced volatility of capital even without credit for protection in reserve scenarios



Volatility of Capital		
RW UnProtected/ CTE90 Unprotected	RW Protected/ CTE90 Unprotected	RW Protected/ CTE90 Protected
48,462	15,685	13,429

The rates of return are hypothetical historical illustrations. There is no assurance that the investment process will consistently lead to successful investing.

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INSURER FINANCIAL MANAGEMENT CONSIDERATIONS

Guarantee Manufacturing Cost Savings from Protected Funds	
Source of Savings	Annual Basis Point Savings
Reduction in expected hedge costs	**40**
Cost of capital savings	**36**
Savings on quarterly earnings volatility mitigation	**20**
Total	96

Cost of Capital Savings	
Hurdle Rate	**12%**
Tax Rate	**35%**
Pre-Tax Yield on Capital	**4.00%**
Required Capital: Traditional Funds	**4.50%**
Required Capital: Protected Funds	**2.00%**
Capital Savings	**2.50%**
Cost of Capital Savings	0.36%

Notes:
1.Reduction in expected hedge costs based on business sold in 2011; valued as of 12/31/11.
2. Cost of capital savings = Capital Savings * (Hurdle Rate / (1 - tax rate)- Pre-Tax Yield on Capital)
3. Quarterly earnings volatility mitigation includes impact of actions to reduce risk after significant market declines & impact of DAC write-offs.
4. Additional savings are likely from a reduction in behavior risk which is NOT included in the values shown above.

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Summary

- Demographic trends worldwide virtually ensure continued importance of VA market
- Managed risk funds have altered the VA landscape
- Lower & more stable reserves & capital
- Reduced on-balance sheet hedging costs
- Stabilized M&E fee revenue
- Emerging market VA writers should start with the latest best practice in risk management

Thank you

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