Autumn Investor Seminar

Workshops

Managing Variable Annuity Risk

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redefining / standards

Cautionary statements concerning forward-looking statements

Certain statements contained herein are forward-looking statements including, but not limited to, statements that are predictions of or indicate future events, trends, plans or objectives. Undue reliance should not be placed on such statements because, by their nature, they are subject to known and unknown risks and uncertainties. Please refer to AXA's Annual Report on Form 20-F and AXA's Document de Référence for the year ended December 31, 2007, for a description of certain important factors, risks and uncertainties that may affect AXA's business.

In particular, please refer to the section "Special Note Regarding Forward-Looking Statements" in AXA's Annual Report on Form 20-F. AXA undertakes no obligation to publicly update or revise any of these forward-looking statements, whether to reflect new information, future events or circumstances or otherwise.

Agenda

- **Introduction to VA economics**
- **Key risks associated to management of the guarantee**
- **Focus on financial risks management**
- **Managing financial risks (Delta, Rho, convexity & volatility)**
- **Conclusion**
- **Appendices**
  - Managing insurance risks
  - Managing other risks
  - Illustrative GMxB features

Introduction to VA economics

		Loadings	Costs
Base product	**Acquisition**	+ % of initial premium	- Commission - Acquisition expense
	Management	+ % of account value + Mutual fund fee	- Administrative expenses - Mutual funds commissions
Guarantee	**Hedging**	+ % of benefit base*	- Economic Hedge cost (DB, IB, WB) - Hedging platform costs

* in % of Account Value in Europe & Japan (Account Value of € 1.9bn as of September 30, 2008)

Profitable product:
NBV Margin *(including cost of capital)* **> 20%**
Average duration of 10 years

Guarantee to attract customer: No margin expected over the cycle
(positive until 1H07, negative in 2008)

> **Attractive and profitable product requiring high skills to manage guarantees**

Key risks associated to the management of the guarantee

Financial risk

- **Equity markets**
  - Drop in equity markets (Delta)
  - Acceleration of delta in fast decreasing markets (Convexity / Gamma)
  - Volatility of equity markets
- **Interest rate**
  - Drop in interest rates (Rho)
  - Acceleration of interest rate change in fast decreasing markets (Convexity / Gamma)
  - Volatility of interest rates markets
- **Basis risk**
  - Deviation between expected vs. actual funds performance due to:
    - Correlation risk (not replicate the benchmark of the fund)
    - Underperformance risk
- **FX risk**
  - Potential mismatch due to assets invested in foreign currencies vs. fees and costs in local currency

Insurance risk

- **Policyholder behavior**

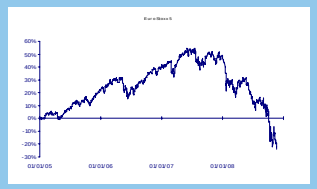
  Deviation from pricing and valuation assumptions on:
  - Surrenders
  - Mortality/longevity
  - Annuitization

Other Risks

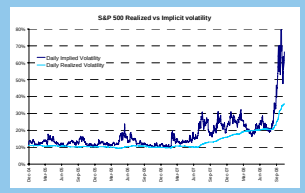
- **Operational risk**
- **Counterparty risk**
- **Liquidity risk**

Focus on financial risks management

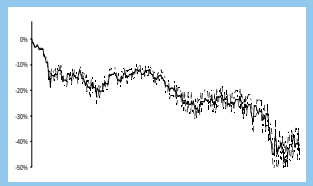
Drop in equity markets



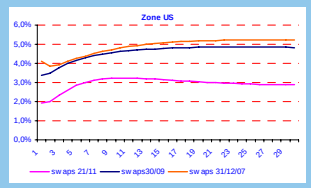
Increase in volatility



Higher Basis impacts



Drop in interest rates



Perfect storm in financial risk

Insurance risk ✓

Other risks ✓

US VA risk management – Hedging cost

What is at stake?

Margin on VA guarantees(1)

In Euro million	9M08	October 2008
Equity market volatility	-25	-80
Interest rates movements	-20	N/S
Basis risk & other	-142	-110
TOTAL	**-187**	**-190**

(1) Post -tax and DAC reactivity ~40%. Excluding base product margin

An extreme environment

	9M08	October 2008
Volatility(2)	From 16% to 25%	From 25% to 35%
Interest rates(3)	-42bps	-26 bps
Equities(4)	-21%	-17%
Credit spreads(5)	+57bps	+33bps

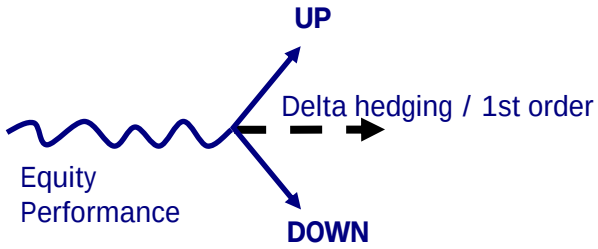
(2) Daily equity realized volatility
(3) 10 year USD govies
(4) S&P 500
(5) Itraxx main Europe 5 years

Managing financial risks: Equity risk (1/2)

Risk drivers

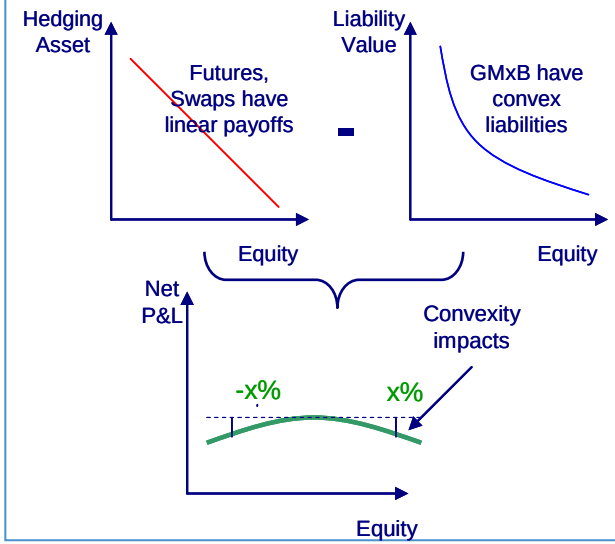
- Equity market movements (ups and downs)
- Acceleration of delta in fast decreasing markets (convexity)

Directional exposure managed by short futures



- Full hedge of equity market movements through Delta hedging using liquid Equity Index Futures

Limited exposure to convexity due to dynamic delta hedging



- Dynamic hedging allows to adapt Delta to market movements and mitigate convexity exposure
- Low gamma risk as GMxB products are long dated options with low convexity (notably at inception)

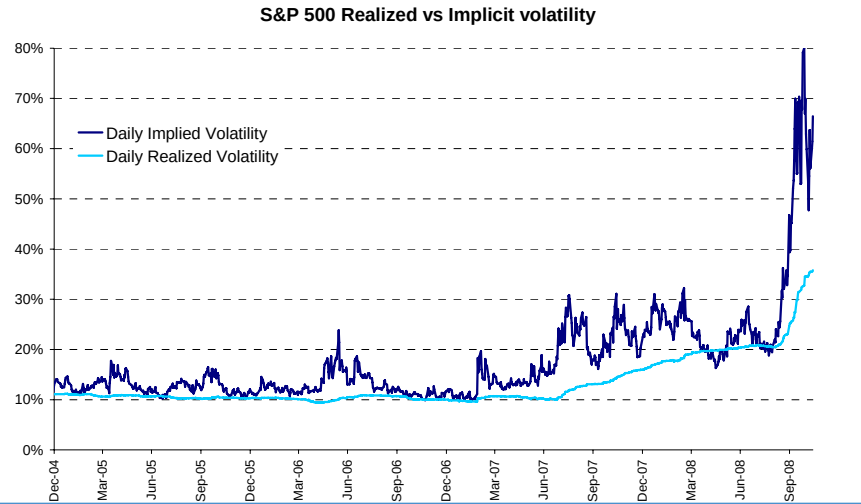
> **Full delta hedging with limited gamma risk**

Managing financial risks: Equity risk (2/2)

Risk drivers ■ **Equity markets realized volatility**

Two volatility measures

- **Implied Volatility**
  - Future volatility of underlying asset implied by the market
  - Price to pay to be hedged against future volatility
  - Used in MCEV framework
- **Realized Volatility**
  - Actual volatility of underlying asset
  - Materialize in the underlying earnings when exceeding volatility's price assumptions



- Historical long-term average realized volatility is below our pricing assumptions (95th percentile ~25%) but 2008 volatility levels reaching unprecedented levels, are reflected in underlying earnings
- Analysis and action plan:
  - Dynamic hedging has been efficient in the current turmoil
  - Confirm necessity of conservative pricing
  - From time to time utilize short-term options for gamma risk in periods of lower implied volatility to protect against future spikes in volatility

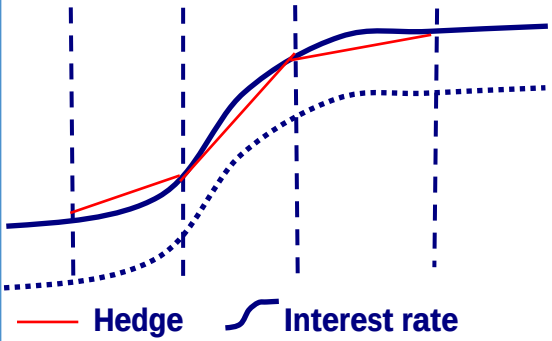
> **Impact of realized volatility mitigated by conservative pricing**

Managing financial risk: Interest rate risk (1/2)

Risk drivers

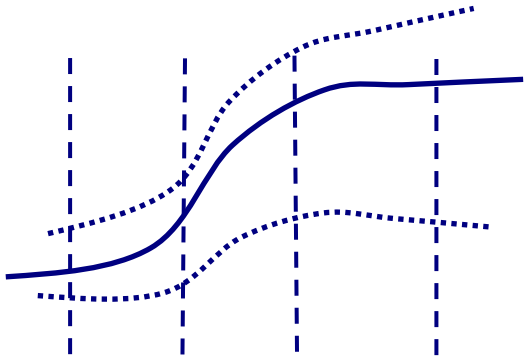
- Guaranteed roll-up
- Fixed Income funds
- Annuitization rate

Directional exposure hedged with derivatives



- Hedge of interest rate movements:
  - using exchange-traded futures and OTC swaps and floors
  - closely monitored by time buckets (coverage against parallel shifts and small rotation of IR curves)

Limited exposure to convexity thanks to dynamic interest rates hedging



- Dynamic hedging allows us to adapt to market movements and mitigate convexity exposure
- Gamma risk can be hedged through swaptions if market conditions available

> **Interest rates hedged at inception**
> **Closely monitored convexity exposure**

Managing financial risk: Interest rate risk (2/2)

Risk drivers

- **Interest rates realized volatility**

Two volatility measures

- **Implied Volatility**
  - Future volatility of underlying asset implied by the market
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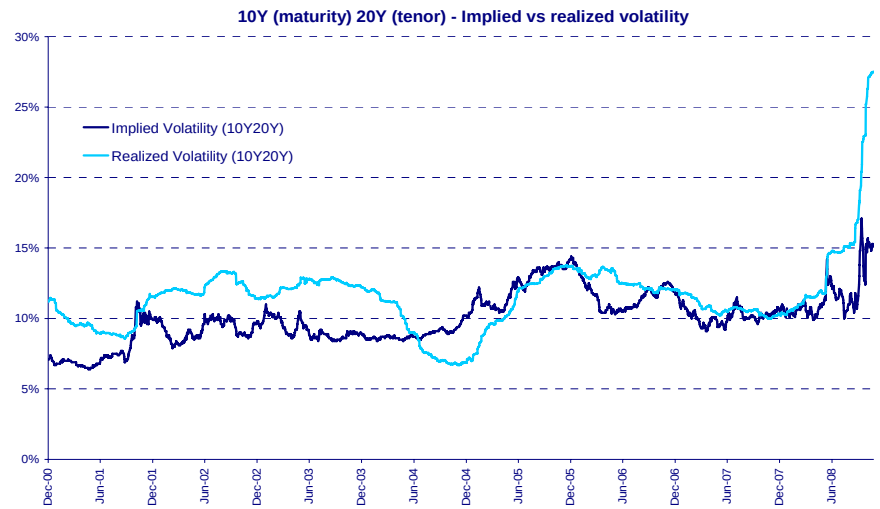
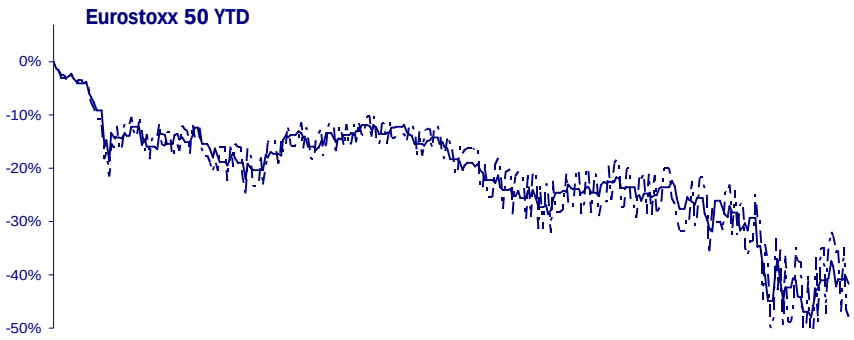


- Historical long-term average volatility is below pricing assumptions (95th percentile equivalent to 150% of implied volatility end of 2007)
- Swaption market offers attractive prices from time to time
- Analyses and action plan:
  - Confirm necessity of conservative pricing
  - We can utilize long-term options in periods of lower implied volatility

> **Cost of realized volatility mitigated by conservative pricing**

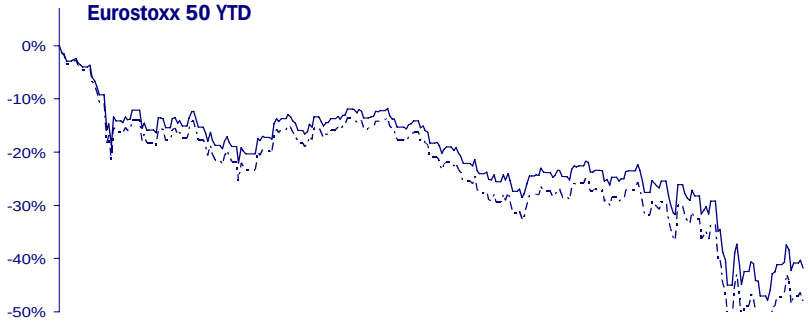
Managing financial risk: Basis risk management (1/2)

Tracking error: 60% of YTD basis risk



- Risk of not replicating the benchmark of the underlying fund

Underperformance risk: 40% of YTD basis risk

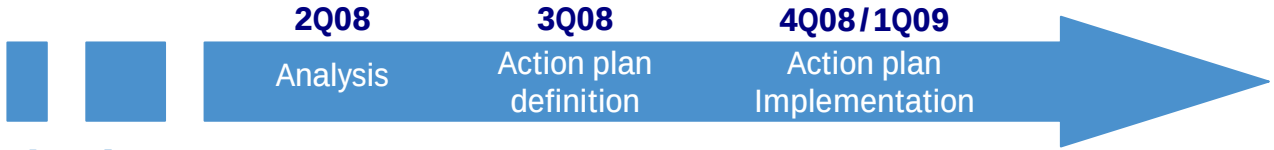


- Risk of a fund (equity and fixed income) underperforming its relative benchmark

Action plan

- Limit funds to narrow tracking error
- Utilize more index funds
- Stricter fund selection
- Lower number of funds offered

Managing financial risk: Basis risk management (2/2)



Inforce business

- Replace fund managers and styles reducing volatility and improving performance
- Restructured allocation funds
- Restructured certain direct Separate Account funds

New business

- Accumulator 8.0
- Accumulator 9.0

Pricing and Product Development

- Incorporate hedge risk measures into pricing for new product design
- Measure probable basis risk for product design and scenario testing based on richness of benefit

Conclusion

A consistent approach to economic exposure

RIGOROUS HEDGING PROCESS + **HEDGING OF FULL SPECTRUM OF RISKS**

Action plan

- Increase utilization of allocation fund to lower separate account volatility for AXA and its clients
- Reduce basis risk impact
  - Action plans: Improve alignment between commercial proposition and funds used for hedging
- Optimize convexity management
  - Action plan: contemplate adding option strategies to current delta hedging approach
- Improve underlying earnings impacts from extreme volatile scenarios
  - Action plan: review product offering to lower or discontinue benefits and/or increase pricing

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U.S. Managing Variable Annuity risk
Appendices

redefining / standards

Appendices

- Managing insurance risks
- Managing other risks
- Illustrative GMxB features

Managing insurance risk: policyholders' behavior management

Lapse assumptions

- Long experience allowing to establish back tested surrender assumptions
- Additional level of prudence added through the introduction of dynamic surrender factor applied on base rate

Base lapse according to experience ⊗ **Lapse factor** (inferior to 1 and depending of in the moneyness of the option)

=

Lapse rate used for pricing and hedging

Mortality / longevity assumptions

- Core AXA business risk:
  - Sophisticated model on longevity
  - Large client database
- Product design
  - Risk limits
    - per age,
    - per client (<1.5 m$)
  - Natural hedge between IB & DB (Guarantee paid twice while benefit is either DB or IB) that are taken by most clients

> **Conservative assumptions on surrenders and mortality / longevity**

Managing insurance risk: policyholders' behavior management

Annuitization assumptions

- For a GMIB product in the US, the policyholder can elect to annuitize after 10 years waiting period and at each following anniversary
- Policyholder annuitization election depends upon:
  - In-the-moneyness of the guarantee
  - Anniversary date
  - Interest rates at time of annuitization
- Election rate: experience vs. assumptions

% in the money	Historical experience (per year)	Election rate priced (per year)
0%-20% I.T.M.*	<1.0%	5%
20%-50% I.T.M.*	<2.5%	10%
50%-> I.T.M.*	<4%	15%

*: % of I.T.M. represented by Account value/Benefit base-1

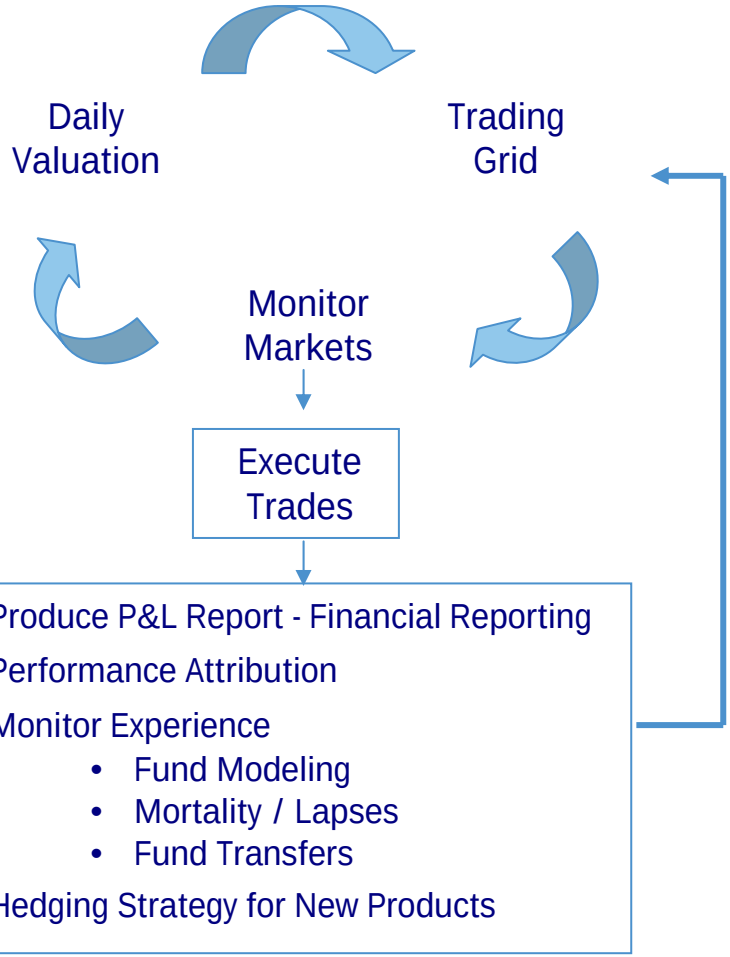
Given bundled sales between IB and DB options, doubling of election rate assumption would not materially impact AXA's reserves

Illustrative example: in the 0%-20% ITM, 100% people would have elected after 20 years

> **Prudent annuitization assumptions**

Managing other risks: Operational risk (1/2)

- **Daily**
  - Perform seriatim valuation
  - Monitor market
  - Produce trading grid
- **Weekly**
  - Rebalance futures portfolio (daily is possible)
  - Update inforce data
- **Monthly / quarterly**



Dynamic hedging involves regular rebalancing

Managing other risks: Operational risk (2/2)

Risk tolerance and hedge program defined at early stage of product design

Group Management Board review before go live

Continuous monitoring and modeling of actual experience that may trigger product repricing or restyling

- Best risk management starts with product design:
  - Entities are in charge of product design in coordination with central risk management
  - The hedging strategy is agreed between the entity and the VA hedging platform

Managing other risks: FX, counterparty and liquidity risks

Risk drivers

- **FX exposure**
- **Counterparty default**
- **Liquidity at AXA**

FX exposure dynamically hedged

- FX risk comes from the mismatch between assets invested in foreign asset classes whereas fees and costs (e.g. guarantee) are in local currency
- Risk dynamically hedged thanks to Forex futures

No counterparty risk

- Delta hedging implemented through futures on organized markets with cash calls
- Margin calls on convexity hedging
- No reinsurance of new business

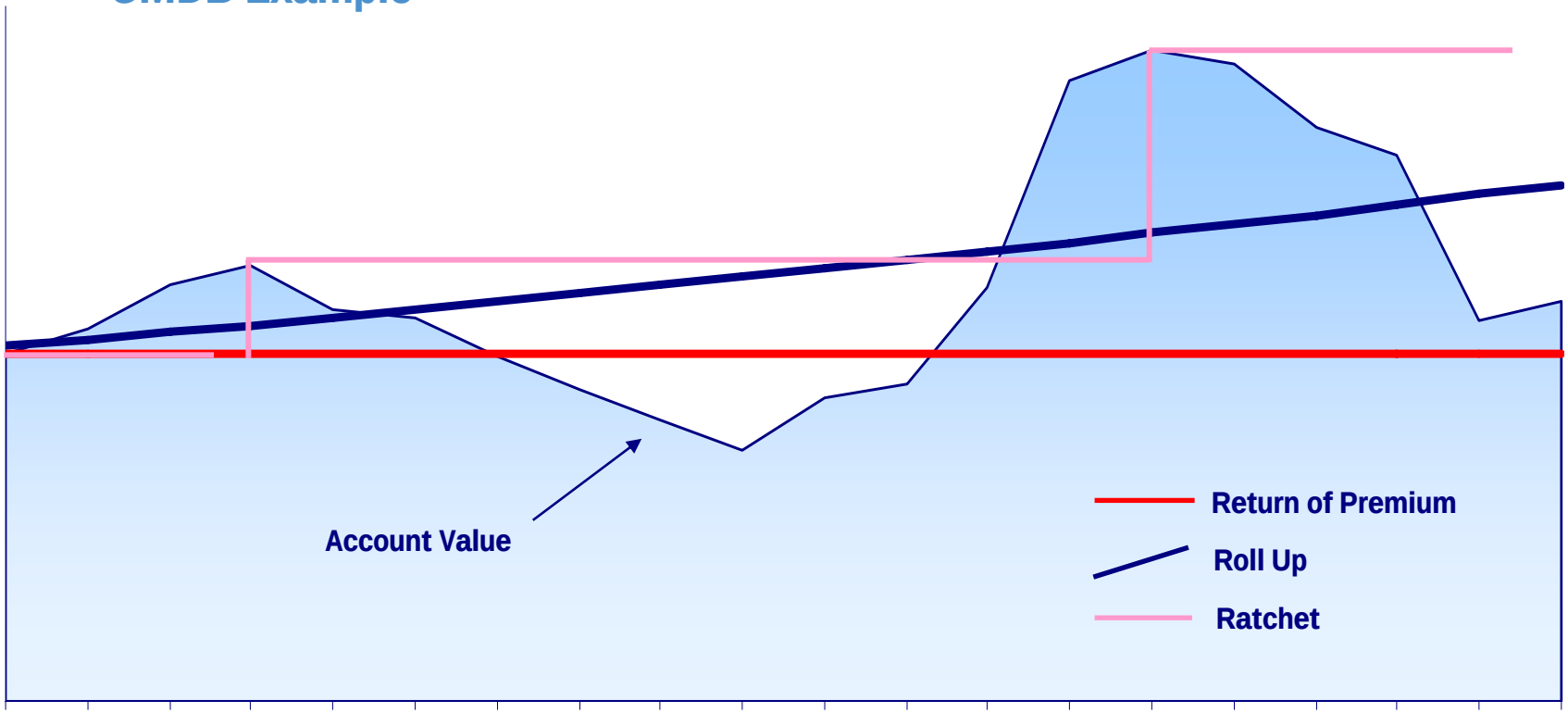
Liquidity

- Insurance companies have strong and liquid balance sheets vs. other financial companies
- Strong capacity to finance margin calls
- AXA liquidity position is strong

Illustrative example of features
GMDB – Death Benefit Options

- **Return of Premium:** higher of total premium or account value, adjusted for withdrawals
- **Roll-up:** premiums paid accumulated at guaranteed rate, adjusted for withdrawals
- **Ratchet:** highest account value at contract anniversary dates, adjusted for withdrawals
- **"Greater of" Ratchet or Roll-up:** greater of annual ratchet or roll-up amount

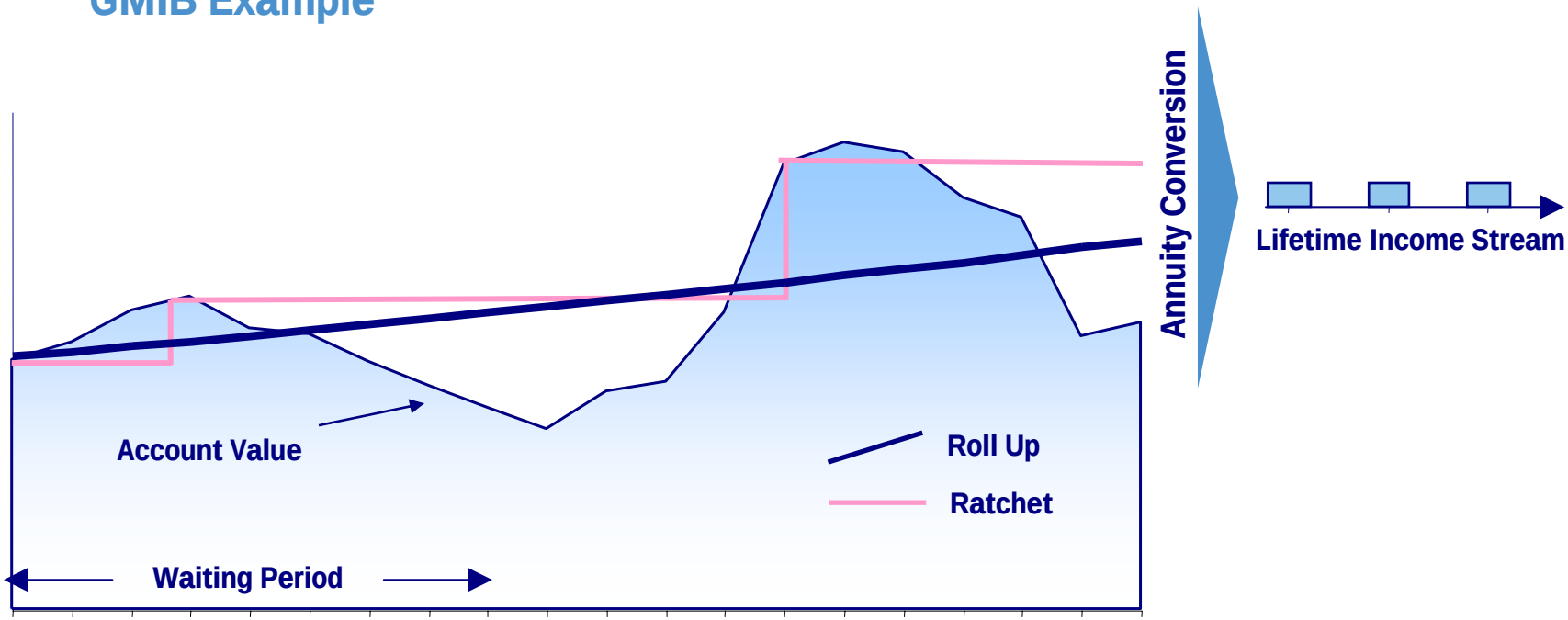
GMDB Example



GMIB guarantees minimum annual income when annuitization option elected

- Guaranteed Minimum Income Benefit calculated based upon Benefit Base
- Benefit Base is not an account value - only used to calculate guaranteed annual income if policyholder elects to annuitize after waiting period
- Benefit Base is the greater of 6% roll-up and annual ratchet, adjusted for withdrawals, up to certain attained age
- Benefit "in-the-money" when guaranteed benefit exceeds what Account Value could purchase at the then current interest environment

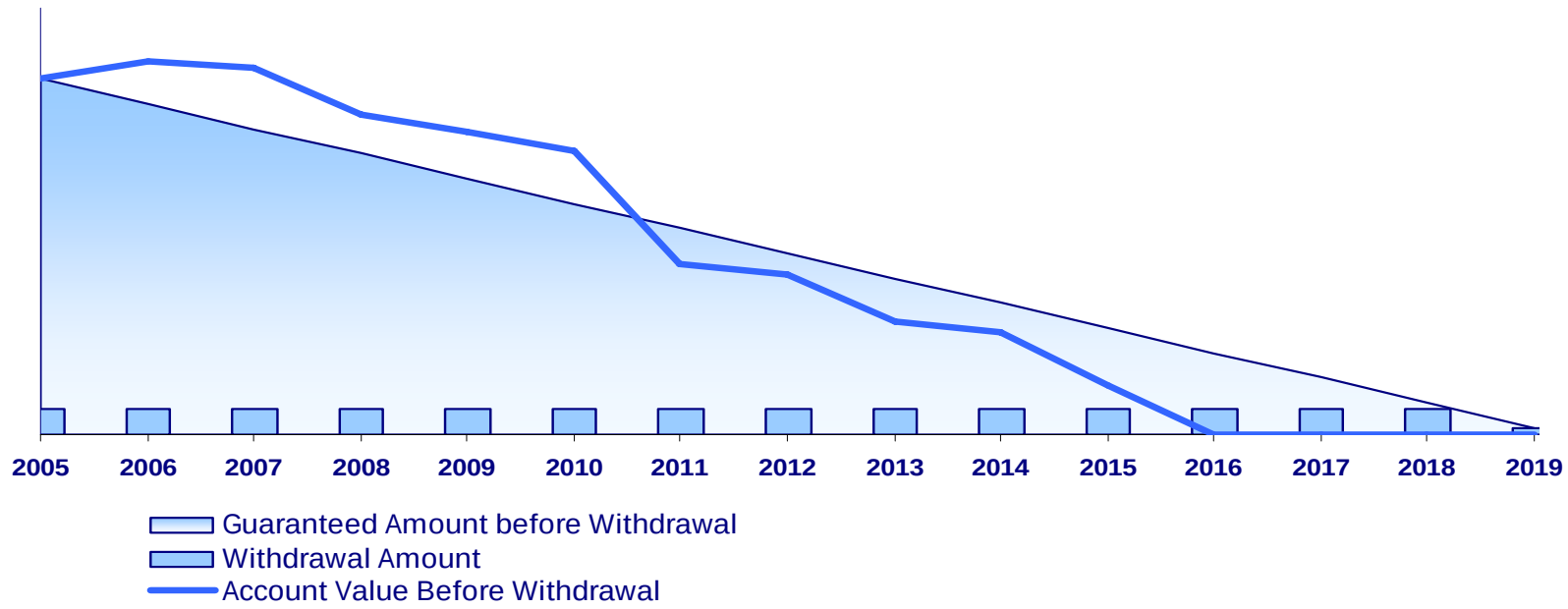
GMIB Example



GMWB provides return of principal through periodic withdrawals over a number of years

- Guaranteed Amount: the value that will be returned over time through withdrawals is equal to the initial deposit or contract value at time of election, even if account value drops to zero
- GMWB rider: includes reset options in which the remaining guaranteed amount may be stepped up to the account value
- Benefit payment amount: equal to a pre-stated percentage, is maximum withdrawal that may be taken each year

GMWB Example: Account value drops to zero



redefining / standards