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Variable annuities.

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Audit. Tax. Consulting. Corporate Finance.

Variable Annuities – what are they?

- not variable.....
- and not annuities!
- Unit linked savings contracts with guarantees
- Haven't we seen this before?
  - unit linked pensions with GAOs
  - unit linked pensions with death benefit protection
  - ratchet funds

Variable Annuities - benefits

Life Stage	Protection of	Type of Guarantee	UK Equivalent
Pre-retirement	Principal	GMAB	Return of premium with a ratchet
	Return of principal	GMWB	Drawdown
Retirement	Retirement income	GMIB	GAO
On death	Estate	GMDB	Max of Return of Premium or Fund Value

Current U.S. Variable Annuity Benefit Features

Benefit	Guaranteed Minimum Death Benefit (GMDB)	Guaranteed Minimum Accumulation Benefit (GMAB)	Guaranteed Minimum Withdrawal Benefit (GMWB)	Lifetime GMWB	Guaranteed Minimum Income Benefit (GMIB)
Description	Upon death, pays the greater of: • the current account balance or • the GMDB to the beneficiary.	After specified period, account value set to the greater of: • the current account balance or • the GMAB.	Guarantees a specified annual withdrawal benefit that may be redeemed over a specified period of time or is subject to a specified maximum lifetime amount.	Guarantees a specified annual withdrawal benefit that may be redeemed for life	Guarantees a specified income stream that may be redeemed over a specified period of time, usually life.
Use	Estate Protection	Pre-Retirement Protection of Principal	Retirement Income protection	Retirement Income protection	Retirement Income protection
Variations on Guaranteed Amount	• Initial Premium • Initial Premium + Interest at a specified rate (Roll-up) • Maximum Account Value (Ratchet)	• Initial Premium + Interest (Roll-up) • Optional resets to current account value on specified dates	• Initial Premium, maximum annual withdrawal % of premium •Optional resets to current account value after specified waiting period (e.g. six years)	• Initial Premium, maximum annual withdrawal % of premium	• Initial Premium + Interest at a specified rate (Roll-up) •Maximum Account Value (Ratchet)
Possible Caps/Floors on Benefits	• Cap on overall benefit level	• Cap on overall benefit level • Limits on fund mix • Benefit waiting period	• Cap on overall benefit level • Limits on fund mix • Benefit waiting period • Frequency of reset • Penalties for early withdrawals • Ability to increase fee	• Cap on overall benefit level • Limits on fund mix • Benefit waiting period • Frequency of reset • Penalties for early withdrawals • Ability to increase fee	• Cap on overall benefit level • Limits on fund mix • Benefit waiting period

U.S. Annuity sales climbed steadily through the 1990s, relatively flat since

Industry Dynamics—Individual Annuity Products[1]

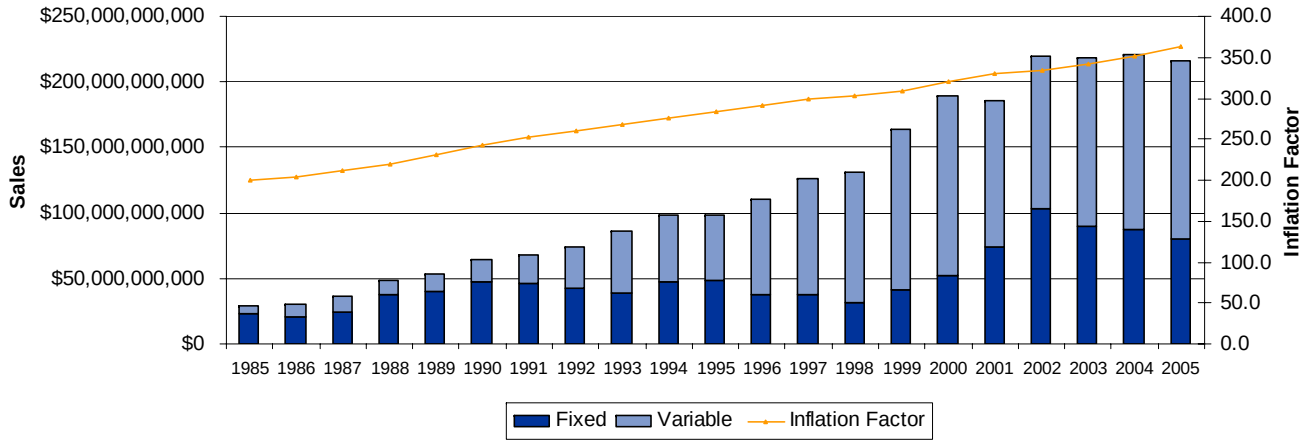
During the 1990's…

- Variable annuity (VA) sales grew substantially, exceeding the inflation rate
- VA sales growth significantly affected overall annuity premium growth
- Contributing factors included strong equity market returns and introduction of living benefit riders
- Gave access to equity exposure

Since the 1990's…

- VA sales have remained relatively flat, lagging the inflation rate
- Due to consolidation of manufacturers, selected individual companies' market shares have increased, while total industry sales have remained unchanged.

Individual Annuity Premiums Deferred and Immediate[1]



Source: 1 The 2005 Individual Annuity Market, LIMRA International, Consumer Price Index for All Urban Consumers, US Department of Labor, Bureau of Labor Statistics.
2 Deloitte Debrief.
Note the Inflation Factor is the CPI rescaled such that calendar year 1975 has a value of 100.

So why now?

UK

- Making pension products attractive again
- manageable, client targeted guarantees
- aiming to be more bought than sold
- should be transparent
  - but hard to price and reserve for

Issues

- guaranteed annuity rate looks poor in a stable low interest environment....
- IFA's concerns
  - value for money
  - new products; understanding, risk of mis-selling

Challenges in the US

- uncovered guarantees
  - delta hedging only
- economic capital costs
  - understanding of risk drivers
- policyholder behaviour
  - recognising the issue
  - lack of evidence
  - lack of mitigating features in existing products
- management understanding
  - lack of technical skill
  - herd mentality

Variable Annuities – Background

- Building on the success of this product in the US:
- In Japan, they were introduced about 2-3 years ago and have been growing rapidly
  - consumers highly value and are willing to pay for downside protection
- They have started to appear in Europe:
  - Axa have launched one in Germany
- In the UK, Aegon, Hartford, AIG, Metlife, Lincoln
  - Most companies are thinking about launching them.
- In the US, all single premium contracts, in Europe, RP also available.
- Charges for guarantee: annual deductions from the fund
- Many of the companies have set up offshore entities to aggregate the guarantees and therefore the consolidate the hedging
  - eg MetLife in Bermuda
  - Tokio Marine in Isle of Man

UK market

- “In the UK, the goal of variable annuities is to overcome two objections to conventional annuities: the fact that on a single day you lock into rates for the remainder of your life; and you lose access to your capital.”
- “Without decent underlying fund performance your income will likely fall in real terms because of inflation, say advisers.”
  - charges for guarantees and investment management
  - commission
- “Some advisers argue that paying additional money for a guaranteed income is not to the investor’s advantage. They also argue that if the investor bought a conventional annuity at outset they would get a much higher starting income. However supporters of variable annuities say that investors still get an income guarantee and that if they get half-decent fund performance their income will rise.”
- Confused? so are IFA’s and consumers

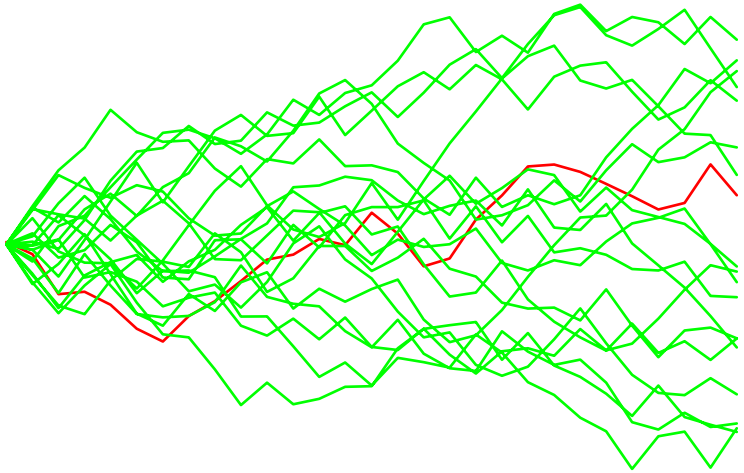
Source: Ellen Kelleher, FT.com 15 June 2007

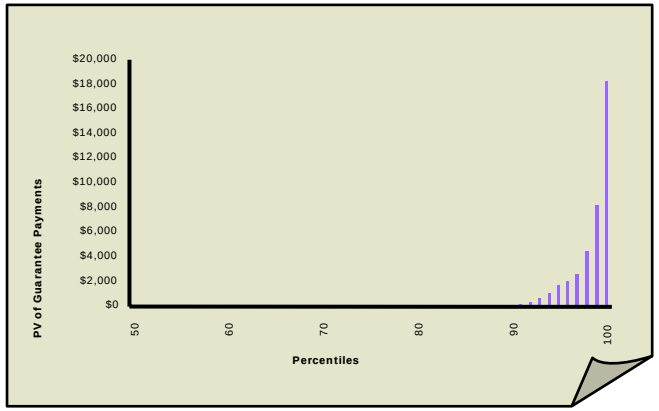
Variable annuity hedging – some issues

- Variable annuity hedging programmes concentrate on hedging the market risk.
- There are, however, other risks that need to be managed
- Lapse and mortality – hedging programmes assume (usually) static lapse and mortality profiles – actual experience will differ
- Tracking error – the hedge may not exactly match the market risk (actual investment fund and the hedge reference assets may differ)
- Policyholder behaviour – policyholders may be more prone to lapse in certain market conditions
- Grouping – the hedge will be provided for groups of policyholders leading to mismatching
- Non linearity issues – if fewer policyholders lapse when markets are low / volatile then the hedges could cost more to put in place
- Rebalancing due to the above
- Frequent monitoring and detailed is required is to analyse actual to expected experience, profits and losses from the hedging programme

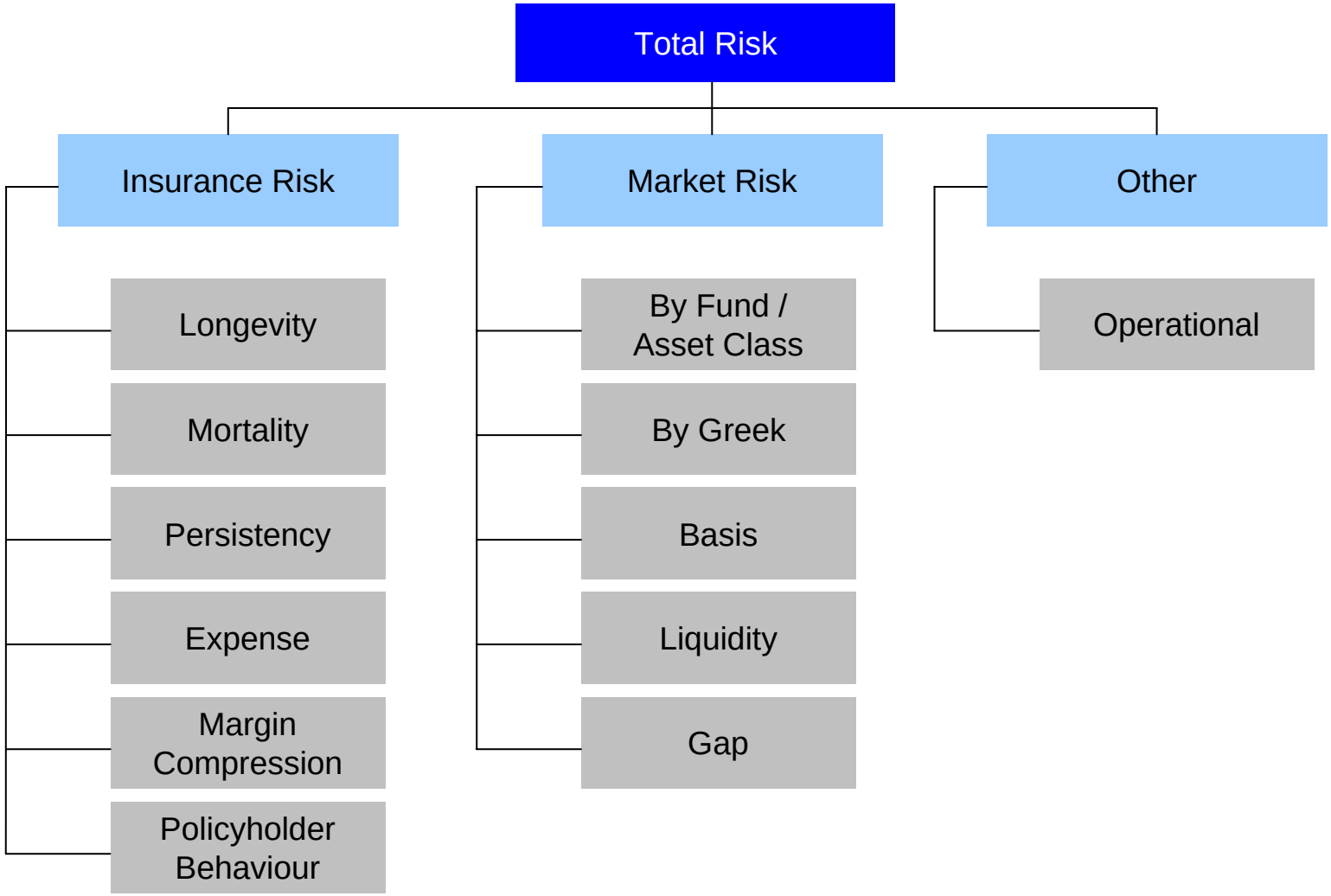
Variable Annuity Risk Factors

- Market Risks
  - Equity returns
  - Interest rates
  - Volatility
  - Systematic, so need to be hedged
- Mortality
  - Diversifiable
- Policyholder behavior
  - Correlated to market performance
  - Depends on insured benefits
  - Unhedgeable
- Risks have asymmetric distributions





Risk Classification

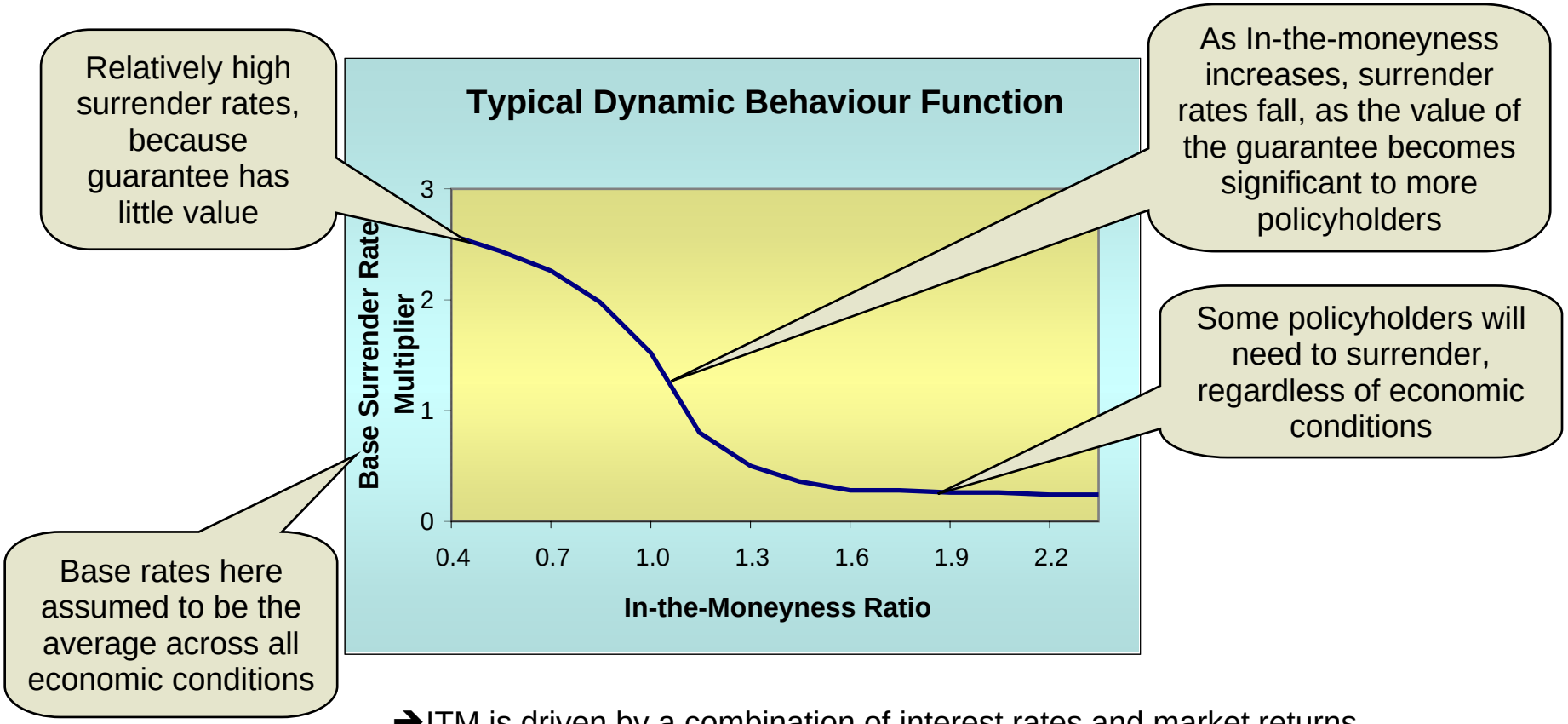


Risk Mitigation

- Avoidance: Product features
  - Caps on maximum benefit levels
  - Limits on funds and switching
  - Limits on policyholder behaviours
  - “Persistency Carrots” (return of fees, bonuses)
- Transfer: Reinsurance
  - Used initially, then market became saturated in US
  - Now seeing new entrants
- Reduction: Hedging
  - Only possible for financial risks
  - Unhedgeable
    - Basis risk
    - Model error risk
    - Assumption risk (especially policyholder behavior)
- Retention
  - Risk capacity
  - Risk appetite

Dynamic Policyholder Behaviour

- Typical shape of a dynamic variable annuity surrender rate function
  - Expressed as a multiple of a base table of rates



➔ITM is driven by a combination of interest rates and market returns

Policyholder Behaviour Assumptions

- Does evidence back up the financially rational policyholder behaviour assumption?
  - A study performed by a European group showed little correlation of lapse with value of guarantees or market movements
  - The biggest correlation was with market sentiment about the company itself
  - Is the Northern Rock another example of this?
- “Hedge fund scenario” the worst case?
- More extreme market conditions may be on the way
- Pricing assumptions
  - Capital requirements: 1 in 200 year event

What do you need to succeed?

- good understanding of client's needs
- access to appropriate distribution
- simple, flexible models
  - product design and pricing
  - reserving
  - capital requirements
  - hedging strategy
- experienced hedging resource
  - in house or external
  - market knowledge
  - interaction with actuaries
- management education and buy-in

Conclusion

- Great opportunity
  - return to providing savings with insurance
  - delivering what the customer needs rather than what the company wants
  - to learn from the expensive lessons in the US
  - to leverage the knowledge and experience of UK actuaries and combine this with new hedging technologies to provide a safe, profitable, client focussed product.

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