



Financial Risk Management for the Life Insurance / Wealth Management Industry

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Agenda

1. Introduction
2. Products with Guarantees
3. Understanding & Managing the Risks



INTRODUCTION

The Argument for Guarantees

- Guarantees can enhance existing products
 - Meet consumer needs
 - Pre (accumulation) / Post retirement (distribution)
 - Focus on Investment linked guarantees
 - Differentiates risk managing institutions from their competitors
 - Profitability and return on capital
 - Improve sales & market share



A Trip Down Memory Lane

- Guaranteed Annuity Options
 - The Equitable
- With Profits / Participating Business
- Variable Annuities
- Defined Benefit Pension Schemes
- These products contained embedded options & guarantees that were;
 - Priced approximately (or not at all)
 - Not well understood
 - Managed (sometimes crudely) but lacked transparency
 - Exposed when markets moved adversely



Implications of Guarantees

- Investment linked guarantees introduce financial risks
 - The guarantee is an embedded option
 - In principle, the guarantee should be;
 - Understood & Quantified
 - Priced accordingly
 - Risk managed appropriately



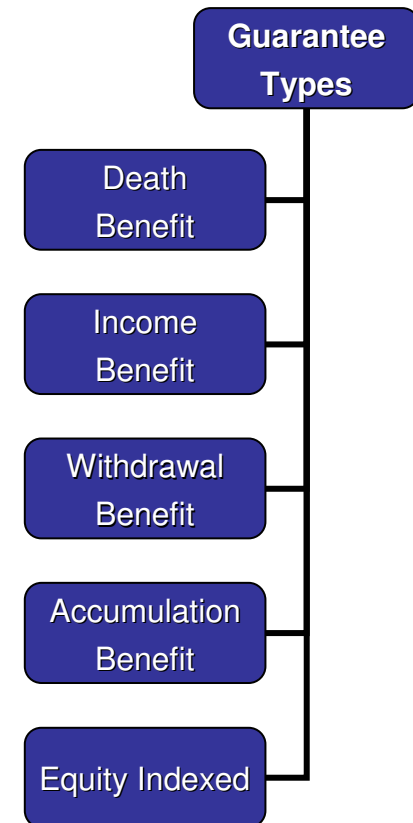
PRODUCTS WITH GUARANTEES

The Product Concept

Characteristic	Comment
Retirement savings	Available for investment purposes
Choice of managed funds	Attractive
Menu of different guarantees	Attractive and differentiable
Offered as optional rider policies	Flexible and Customisable (customer has choice and a feature for sales adviser)
...with commercially attractive charges	Transparent (key to treating customers fairly)
...sufficient to meet the cost of hedging	Profitable and capital efficient

Guaranteed Classes

Product	Features
GMDB (Death)	<ul style="list-style-type: none"> • Guaranteed investment return upon death • Return of premium, roll-up, ratchet, reset, combos
GMIB (Income)	<ul style="list-style-type: none"> • Guaranteed annuitisation factors or minimum income levels • Ideal retirement savings / protection product
GMWB (Withdrawal)	<ul style="list-style-type: none"> • Guaranteed regular withdrawal amounts • Specific term (7% for 15 years) or 5% for life
GMAB (Accumulation)	<ul style="list-style-type: none"> • Guaranteed investment return at future point in time • Various time periods and renewal options available
EIA (Equity Indexed Guarantees)	<ul style="list-style-type: none"> • Credit interest based on equity index performance • Designs include: point-to-point, monthly averaging, monthly sum cap, high water mark, variable participation rates



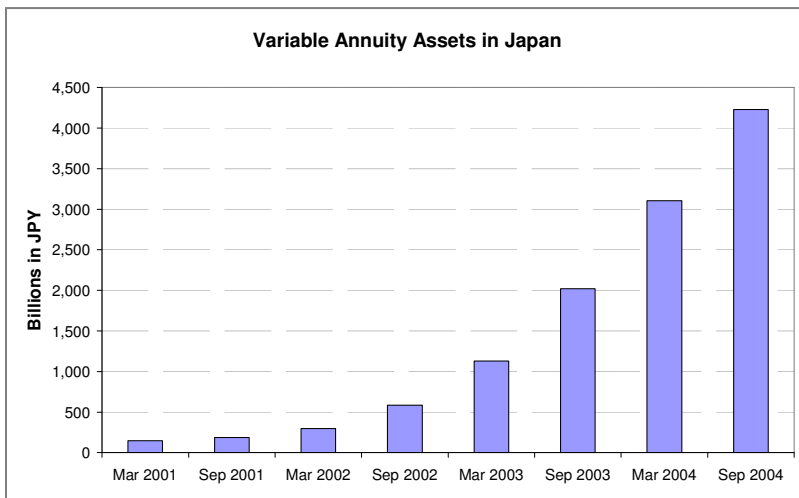
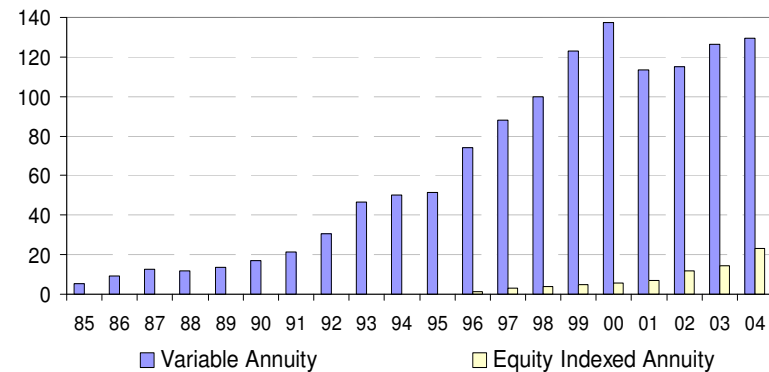
Best Sellers!

U.S Market Development Timeline

- 1980 – GMAB & GMDB
- 1995 – Ratchet GMDB and EIA
- 1996 – GMIB
- 2002 – GMWB and exotic GMAB's
- 2004 – x% for life GMWB
- 2005 – more complex features introduced such as
Bonuses for non-utilisation or ratchets on
withdrawal rates

US Variable Annuity Sales
(Premium \$ Billions)

Source: NAVA



Source: SOA

Other Market Developments

- Considerable activity across Europe
- Japanese market development & growth significantly quicker than the U.S

Illustrative Hedge Costs (bps of AV)

Asset Allocation	Policy Distribution	GMDB Max [Annual Ratchet & 5% Rollup]	GMAB 10 yr waiting period with reset	GMIB Max [5% Rollup & Annual Ratchet]	GMWB 7% Maximum withdrawal amount (15 Year Term)
Aggressive	11%	59	100	47	57
Moderately Aggressive	25%	51	82	42	37
Moderate	40%	39	64	36	14
Moderately Conservative	17%	27	40	34	2
Conservative	7%	20	20	26	0
Total	100%	41	65	38	21

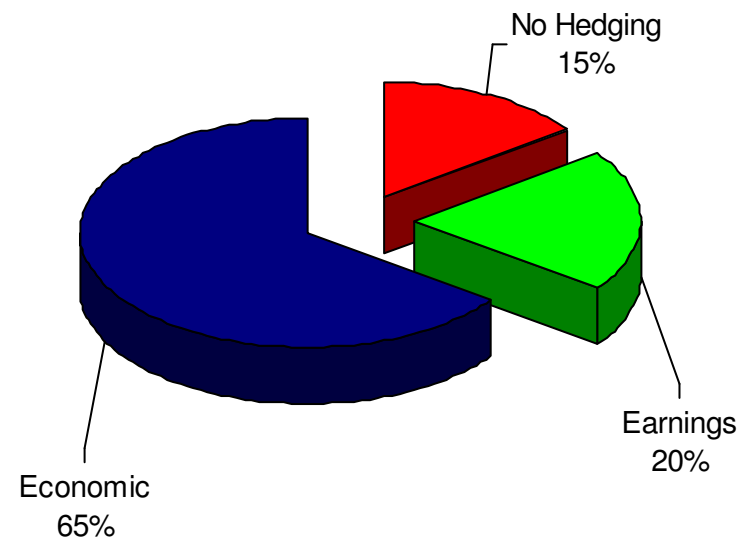


RISK MANAGEMENT

The Goal of Risk Management

- **Appropriate Charges**
 - Product transparency & attractiveness
 - Finance the hedging programme
 - Risk management is an integral part of product design
- **Manage Risk through Hedging**
 - Reduce P&L volatility
 - Reduce the level of required capital (and the volatility of the capital requirement)
 - Economically hedge the liability
- **Consider full or partial hedge, based on risk preferences**

Primary Objectives of the Hedge



Source: Moody's Survey

Risks

- Capital Market
 - Market movements
 - Interest rates
 - Volatility
 - Others
 - Credit, Inflation...

- Actuarial / Policyholder Behaviour
 - Lapse
 - Longevity
 - Take-up Rates
 - Asset Allocation

Beginning of Period Guarantee Value	Beginning of Period Hedge Asset Value
+ Interest	+ Gains on Hedge Assets due to market movements
- Claims	
+ Guarantee Premiums	- Losses on Hedge Assets due to market movements
+ Changes due to market movements	
<i>End of Period Guarantee Value</i>	<i>End of Period Hedge Asset Value</i>



<i>EOP Guarantee Value</i>
- <i>EOP Hedge Asset Value</i>
<i>Net Gain (Loss)</i>



A Lesson in Latin (“the Greeks”)

- **Delta**

- is the sensitivity of the guarantee / option value to market price movements

- **Gamma**

- is the sensitivity of delta to market price movements

- **Rho**

- is the sensitivity of the guarantee / option value to interest rate movements

- **Vega**

- is the sensitivity of the guarantee / option value to changes in implied volatility



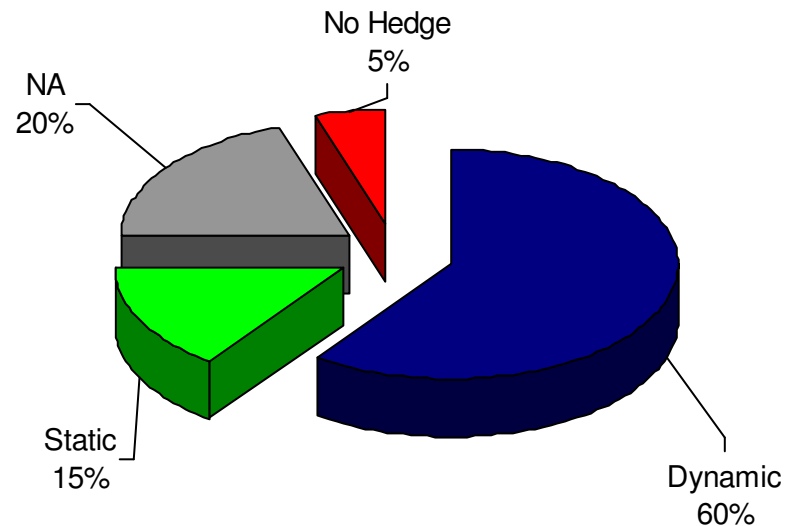
Instruments

	Options (Put / Call / Exotic)	Index Futures & Swaps	Variance Swaps	Interest Rate Futures & Swaps
Delta	✓	✓		
Vega	✓		✓	
Rho	✓	✓		✓

Risk Management Strategies

- Stay Naked
 - Not recommended / sustainable
- Static
 - Involve a bank, but at what cost
- Semi-Static
 - Buy and hold using a portfolio of options
- Dynamic
 - Need to manufacture the risk management internally

GMWB Hedging Strategy By Type

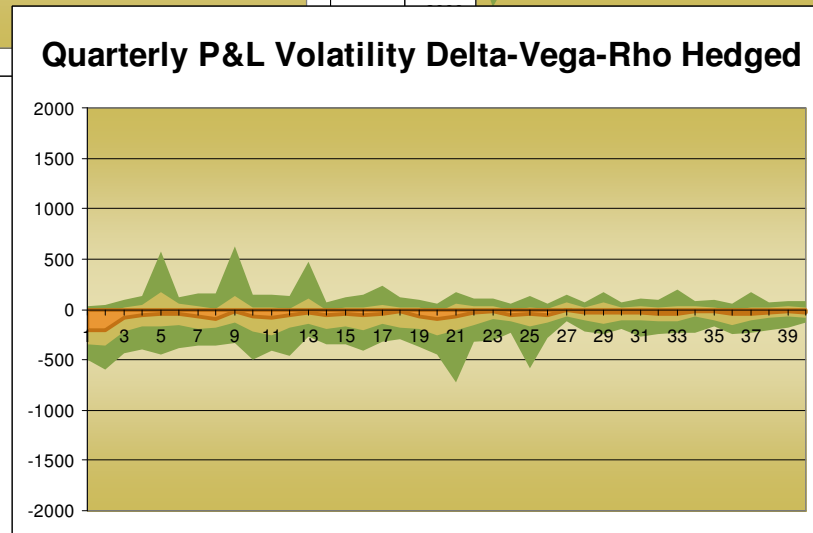
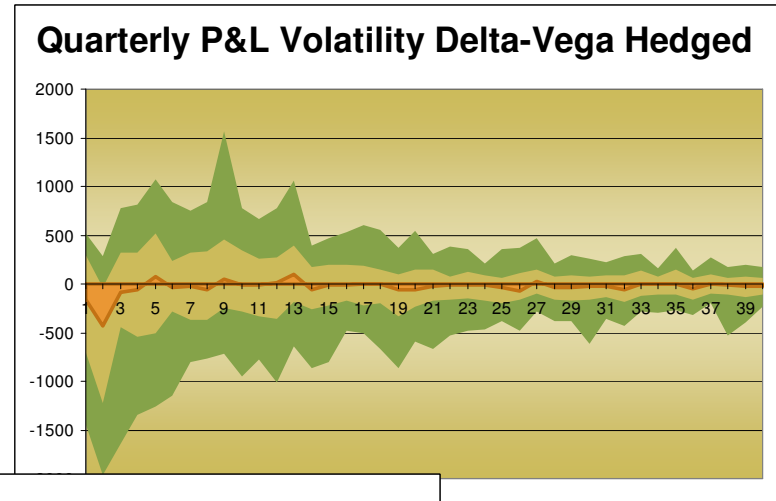
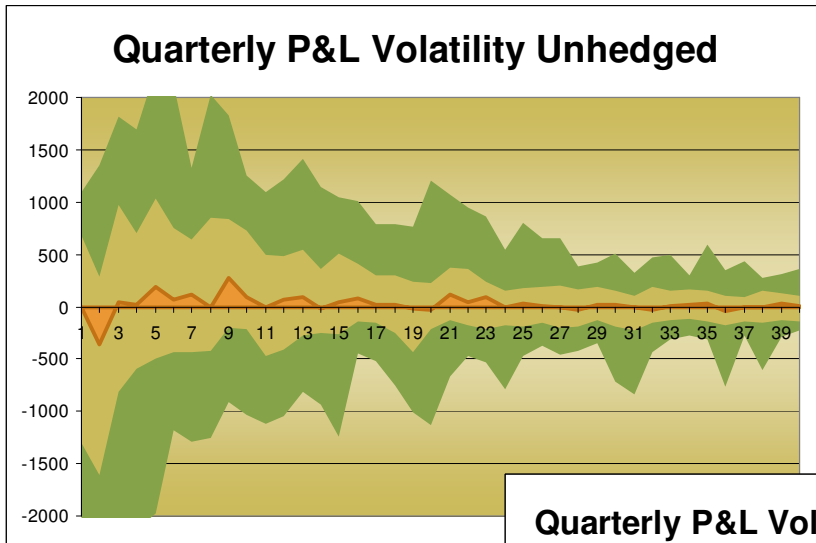


Source: Moody's Survey

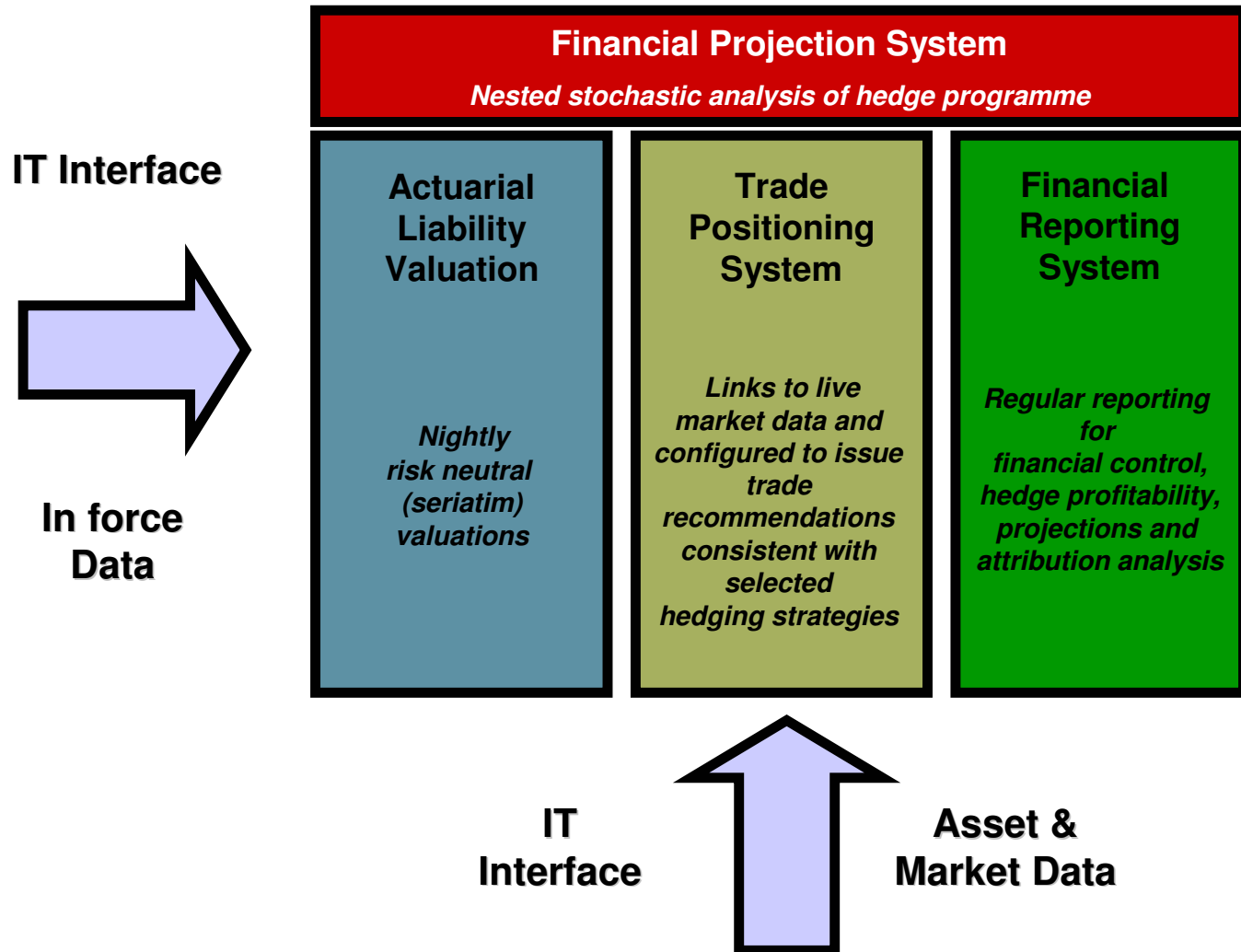
A Numerical Example

Income Statement Projection					
	Projection Year				
	1	2	3	4	5
Total Income	12,274	46,955	98,129	124,681	7,797
Charge Income	668	1,728	3,461	2,902	2,609
Investment Income	11,606	45,227	94,668	121,780	5,188
- Fixed Income Portfolio	244	1,470	4,729	10,155	13,587
- Futures	1,865	6,156	8,421	6,261	334
- Options & Swaps	9,497	37,601	81,517	105,364	-8,732
Total Expenses	9,827	39,441	91,189	125,981	11,271
Increase in Fair Value Liability	9,758	39,292	91,067	125,977	11,271
Interest on Debt	69	150	122	4	0
Pre-Tax Income (Hedged)	2,447	7,514	6,940	-1,300	-3,474
Pre-Tax Income (Unhedged)	-9,158	-37,713	-87,728	-123,080	-8,662
Equity Market Return	-25%	-25%	-25%	-25%	15%
10 Year Interest Rate	5.0%	5.0%	4.0%	4.0%	3.0%

Risk Management Strategies

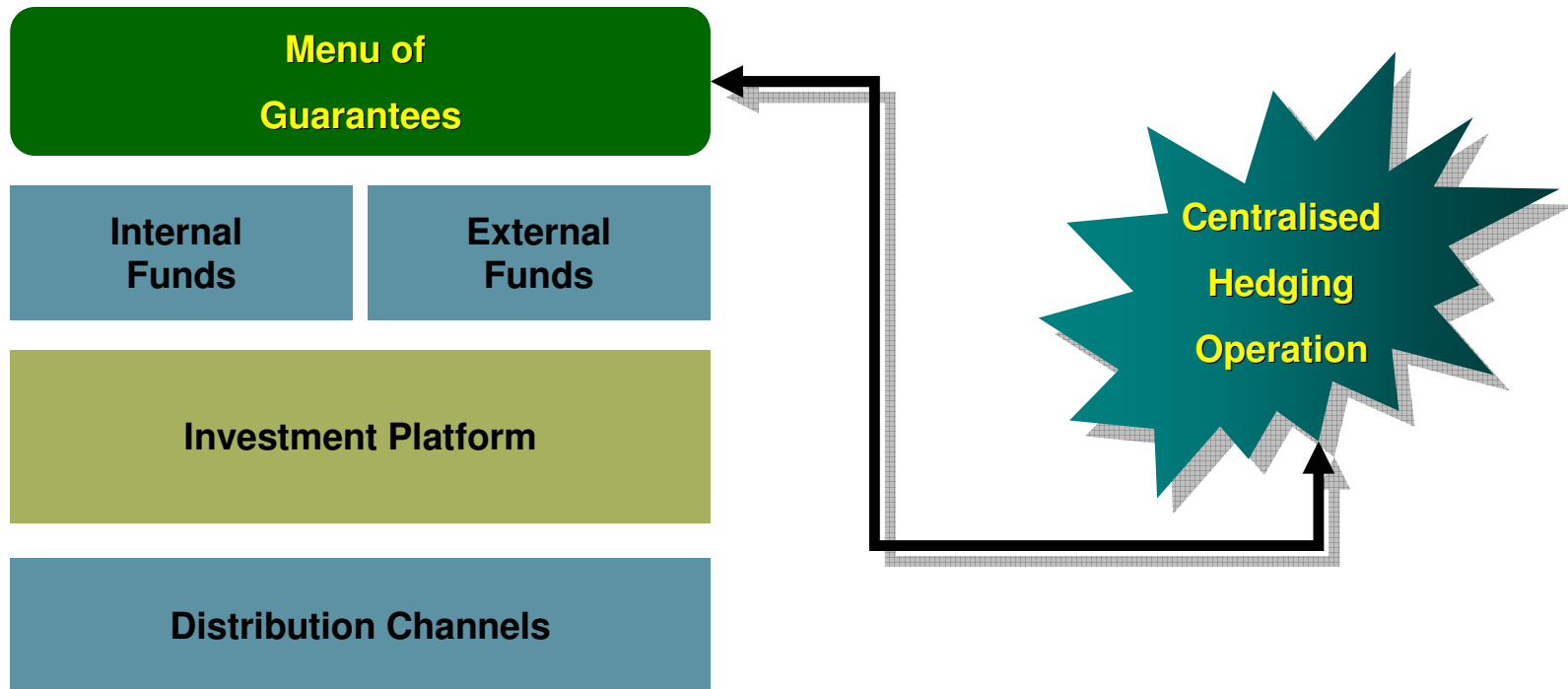


Systems Requirements





The Future?





DISCUSSION

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