Milliman

IT TAKES VISION

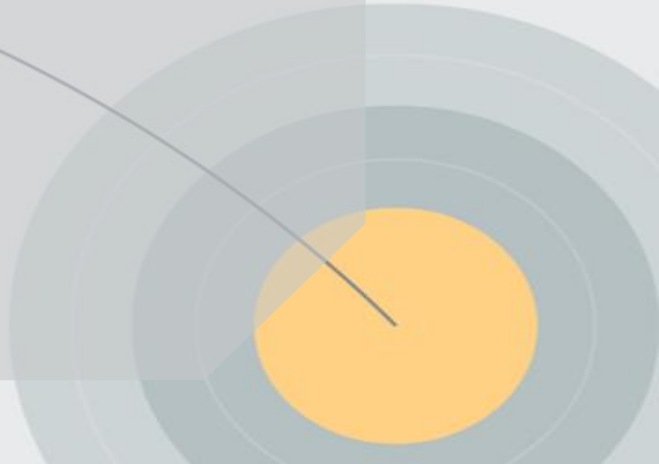
Deep dive into IEV and views from the market

Sanket Kawatkar
Principal and Consulting Actuary

Philip Jackson
Consulting Actuary

Shamit Gupta
Consulting Actuary

11 and 13 October 2017



Disclaimer

The views expressed here are the personal views of the presenters and not that of Milliman.

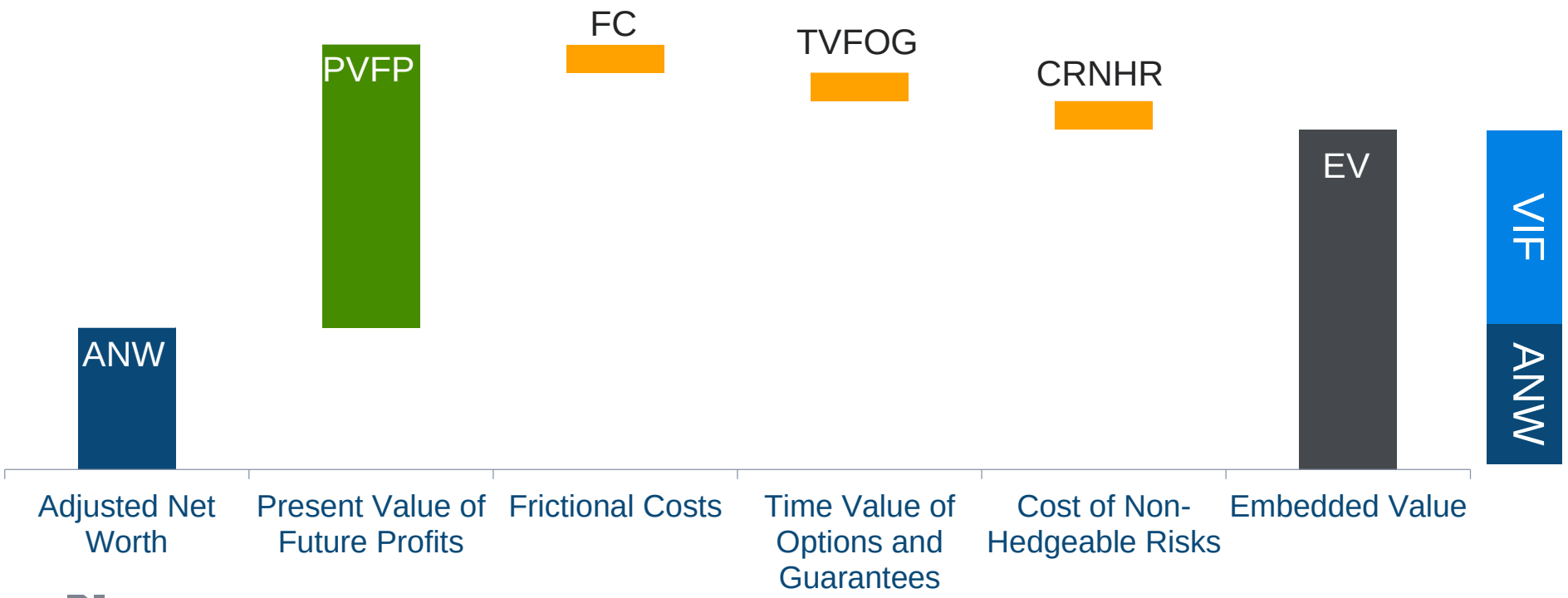
This presentation is intended solely for educational purposes and presents information of a general nature. It is not intended to guide or determine any specific individual situation and persons should consult qualified professionals before taking specific actions. Neither the presenters, nor the presenters' employer, shall have any responsibility or liability to any person or entity with respect to damages alleged to have been caused directly or indirectly by the content of this presentation.

Milliman

IT TAKES VISION

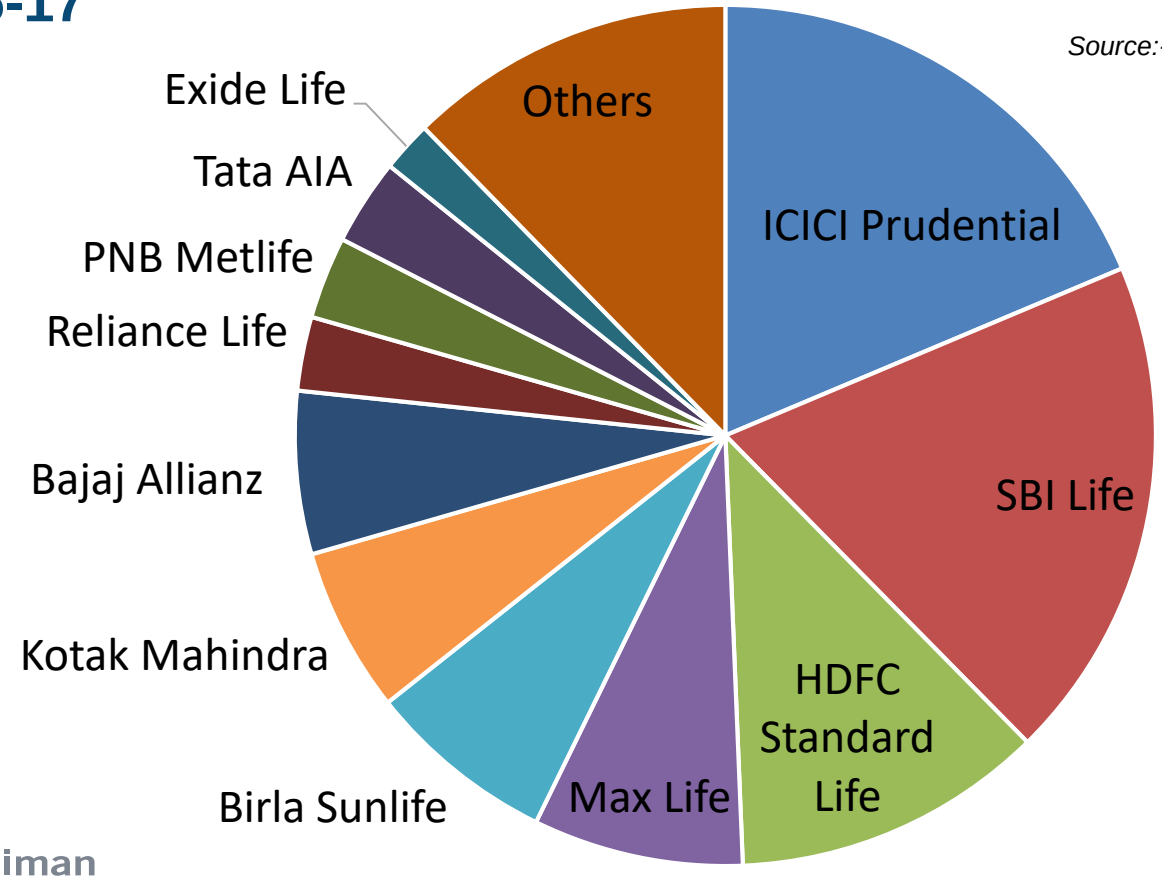
Disclosures and views from investors / analysts

Components of a market consistent embedded value

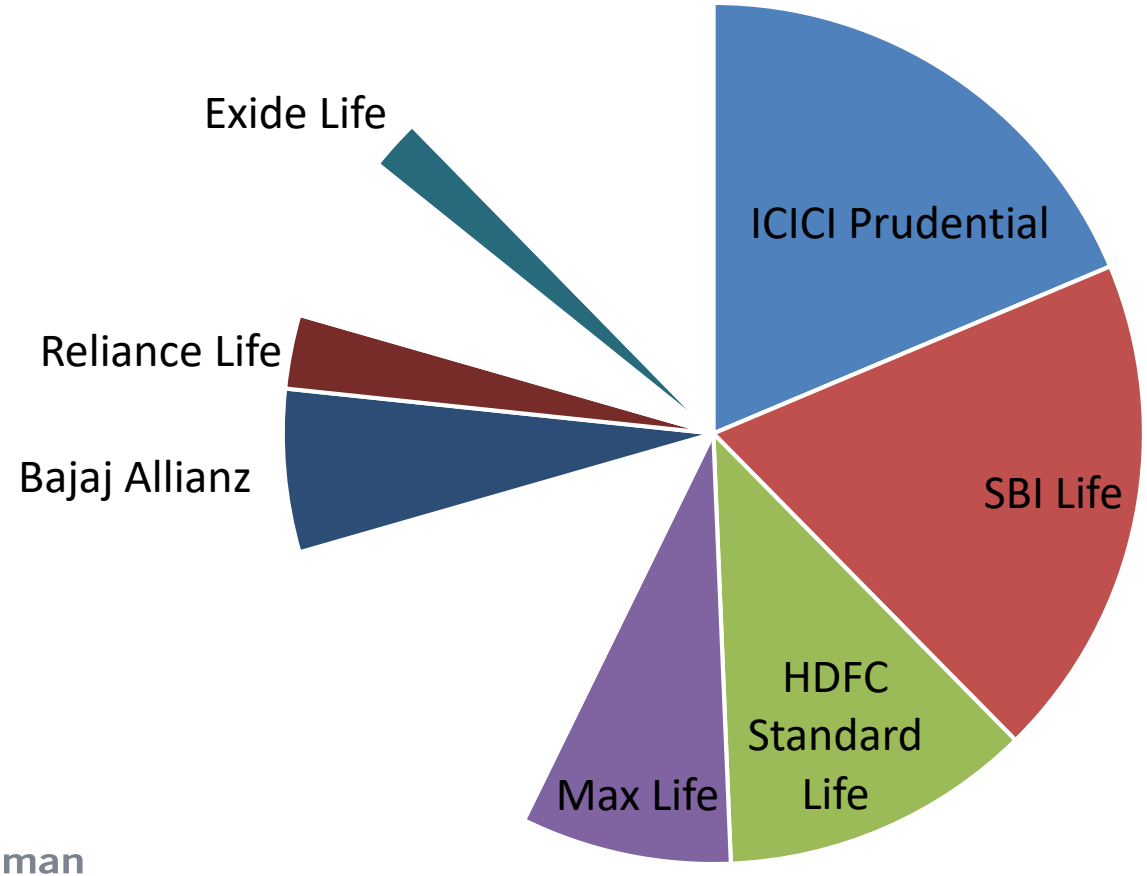


Private life insurers' weighted new business premium FY16-17

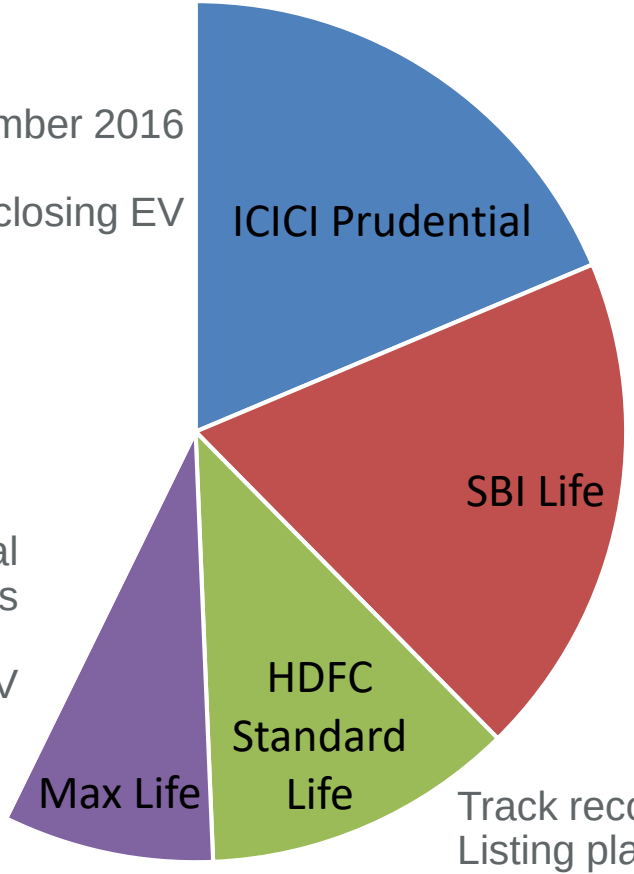
Source:- IRDAI statistics



Companies who disclose EV and / or VNB



Detailed market consistent disclosures



Listed on 29th September 2016

Track record of disclosing EV

First embedded value disclosure in FY15-16.

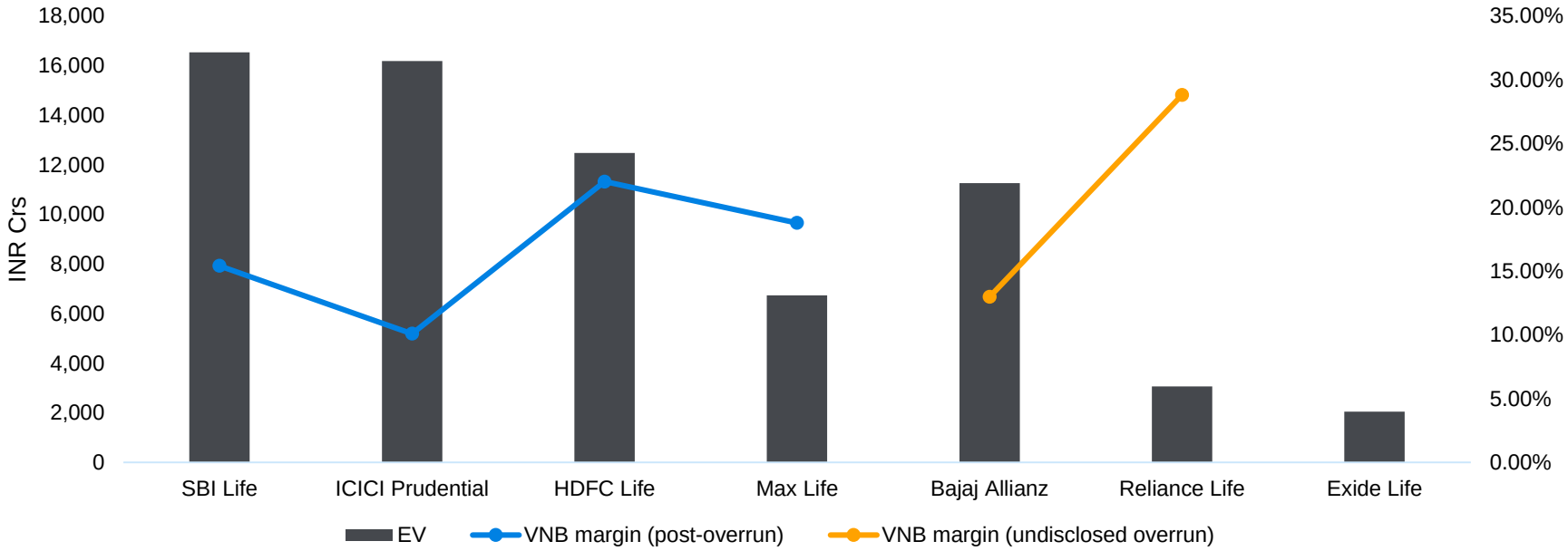
Listed on 3rd October 2017

Indirect listing through Max Financial Services

Track record of disclosing EV

Track record of disclosing EV. Listing planned.

Disclosed EVs / VNBs



Valuation Date	March 2017	March 2017	March 2017	March 2017	March 2017	Sept 2016	March 2017

Views / questions from analysts (1)

- Technical aspects
- Clarity important
- Reasons for differences across companies

Very difficult to understand!

- Prefer stability and consistency from year to year

Generally changes are disliked

- Are the ‘operating variances’ low?
- Is the ‘unexplained’ variance low?
- Consider assumption changes and operating variances together

Credibility of assumptions

Views / questions from analysts (2)

Technical questions

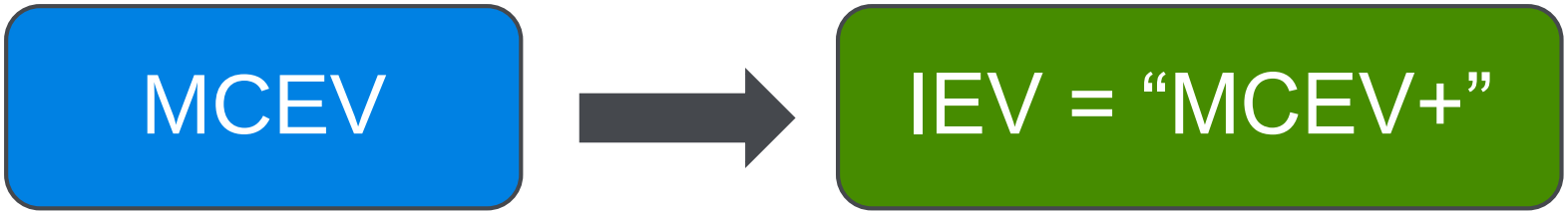
- Why is the VNB margin different across companies?
- Why is the CRNHR as a % of VIF different across companies?
- Why is the assumed risk free rate (RFR) different across companies?
- Is the EVOP margin (i.e. EV operating profit / opening EV) ‘manipulated’?
- Why are the sensitivities different across companies?
- What EVOP margin is sustainable?
- What VNB margin is sustainable?

Milliman

IT TAKES VISION

IEV vs. MCEV

Difference between MCEV and IEV



- Productivity gains / expense efficiencies after valuation date should not be considered
- “Materiality” limit
- Data audit requirements
- A large number of sensitivity disclosures and detailed analysis of movement

Implementing IEV – Operational issues (1)

Timelines achievable?

- First time implementation
- IPO disclosures
- Post-IPO disclosures

Single / regular premium plans

- Treatment consistent across all financial reports?
- Is it suitable to calculate EV for all types of business?

Implementing IEV – Operational issues (2)

Materiality limit

- Set by the Board
- How to set?

Covered business includes all?

- Minor lines of business
- Simplified models / approximations?
- Subsidiaries?

Implementing IEV – Operational issues (3)

PVFP

- Allowance for historical tax losses?
- Timing for release of participating fund FFA – consistency with internal framework and allowance in FC calculations
- EV opening reserves match those in balance sheet?
- Release of global reserves – basis and timelines?
- Recognition of savings in commission on orphan policies?
- Allowance for service tax – consistent with the actual practice?
- Reinsurance cash-flows allowed for?

FC

- What's the RC? Allowance for FFA to be consistent with treatment of FFA
- FC on encumbered capital in subsidiaries?

Implementing IEV – Operational issues (5)

Net worth

- Treatment of market value adjustment on non-par group funds management business
- Tax on the unrealised gains / losses on equities in the balance sheet?
- Presentation of FS and RC – consistency with how RC is treated for FC purposes?
- Treatment of subordinated debt (if any) and consistency with how it is reflected in FC calculation

New business and VNB

- No double counting of ‘new business’ and operating variances in AoM (e.g. increase in premiums during the year)
- VNB to be calculated as at? - Pros and cons
- Allowance for tax if a company is yet to achieve taxable profits?

Implementing IEV – Operational issues (6)

Assumptions

- Granular enough?
- Dynamic validation of assumptions?
- Illiquidity premium for illiquid liabilities (e.g. annuities)?
- One off costs excluded from expense loadings?
- Allowance for CSR?

Sensitivities

- Product category specific impacts analysed?
- Market value adjustments in economic sensitivities?

Milliman

IT TAKES VISION

Reference rates

Reference rates – Key topics

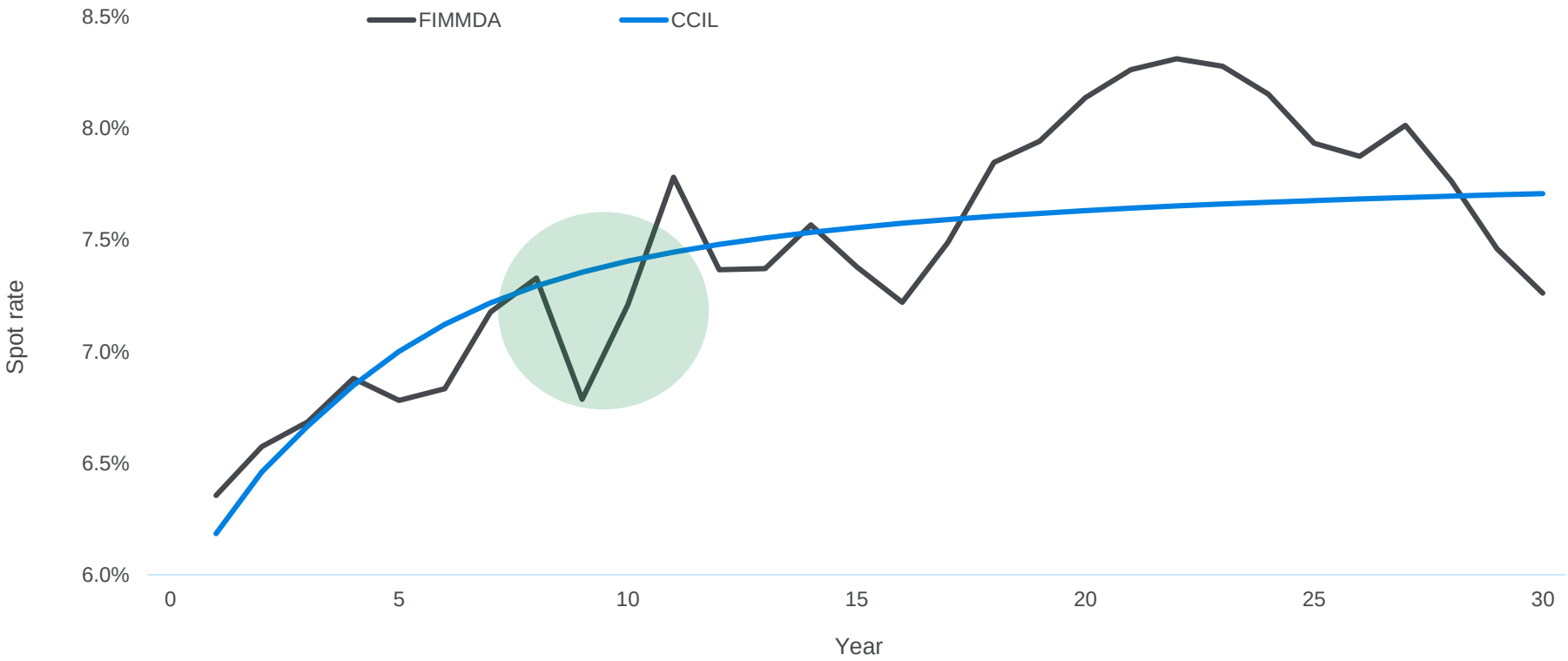
- Selection of source data
- Refinement of source data and selection of fitting methods
- Comparison of common yield curves in the market

Swaps versus G-Sec – 29 September 2017

Maturity	Weighted average rate (%)	Volume (Crs.)	No. of trades
3M	5.9975	300	3
6M	6.0735	5,400	26
9M	6.0754	1,300	13
1Y	6.0948	3,050	31
2Y	5.9922	925	20
3Y	6.0812	525	19
4Y	6.1879	350	12
5Y	6.2693	2,025	52
Total		**13,875**	**176**

Maturity	Volume (Crs.)
Up to 3 years	1,805
3 to 7 years	5,339
7 to 10 years	38,265
More than 10 years	22,638
Total	**68,046**

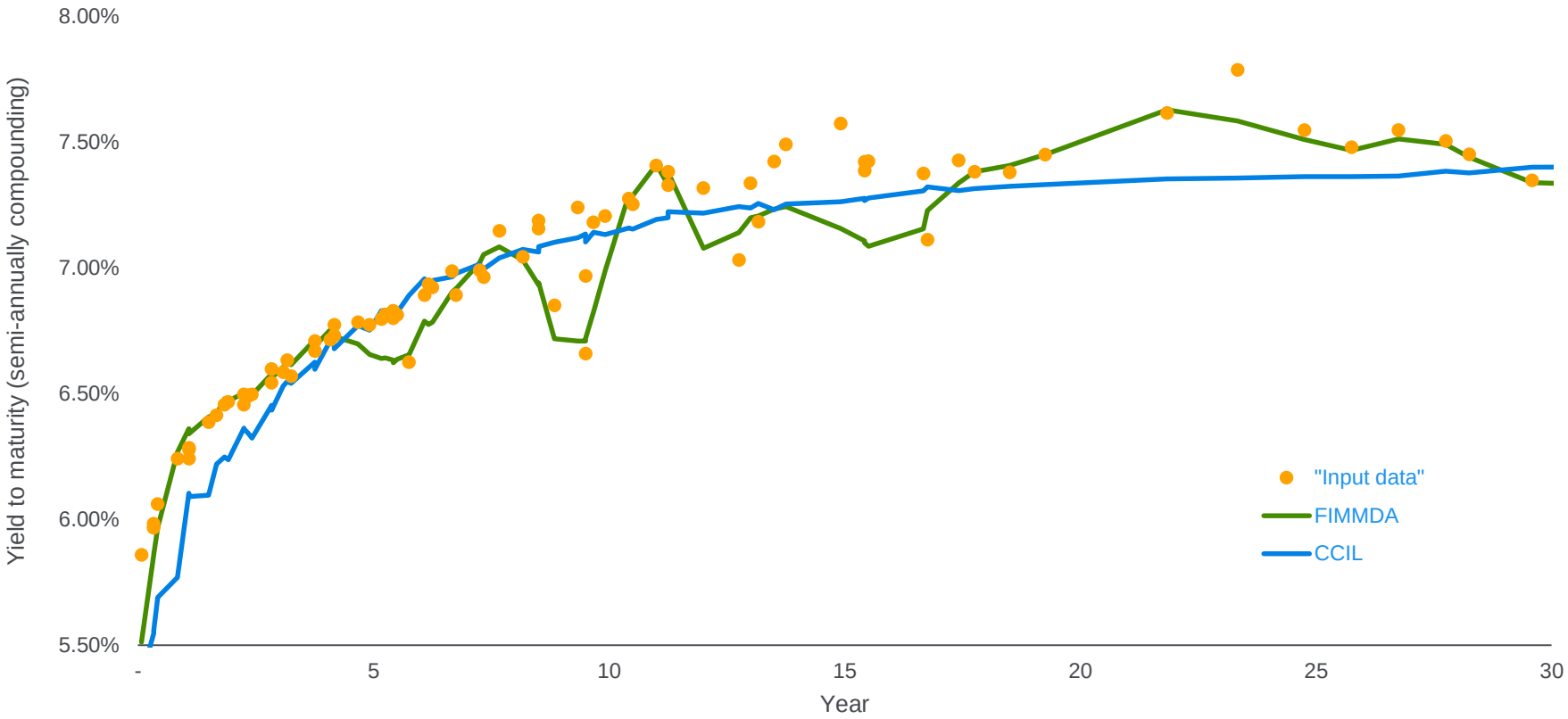
Comparison of common yield curves



Curve fitting

Coupon	Maturity	FIMMDA price	Yield to maturity	FIMMDA price	FIMMDA price error	CCIL price	CCIL price error
7.59%	11/01/2026	1.0480	6.85	1.0570	0.86%	1.0313	1.59%
8.33%	09/07/2026	1.0725	7.24	1.1104	3.53%	1.0810	0.79%
6.97%	06/09/2026	1.0215	6.66	1.0180	0.35%	0.9888	3.20%
10.18%	11/09/2026	1.2194	6.97	1.2391	1.61%	1.2091	0.85%

Availability of data and G-Sec curve fitting

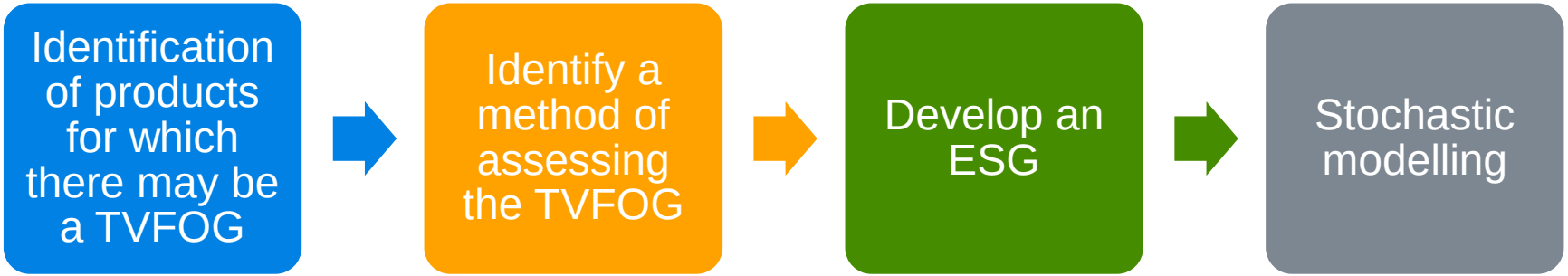


Milliman

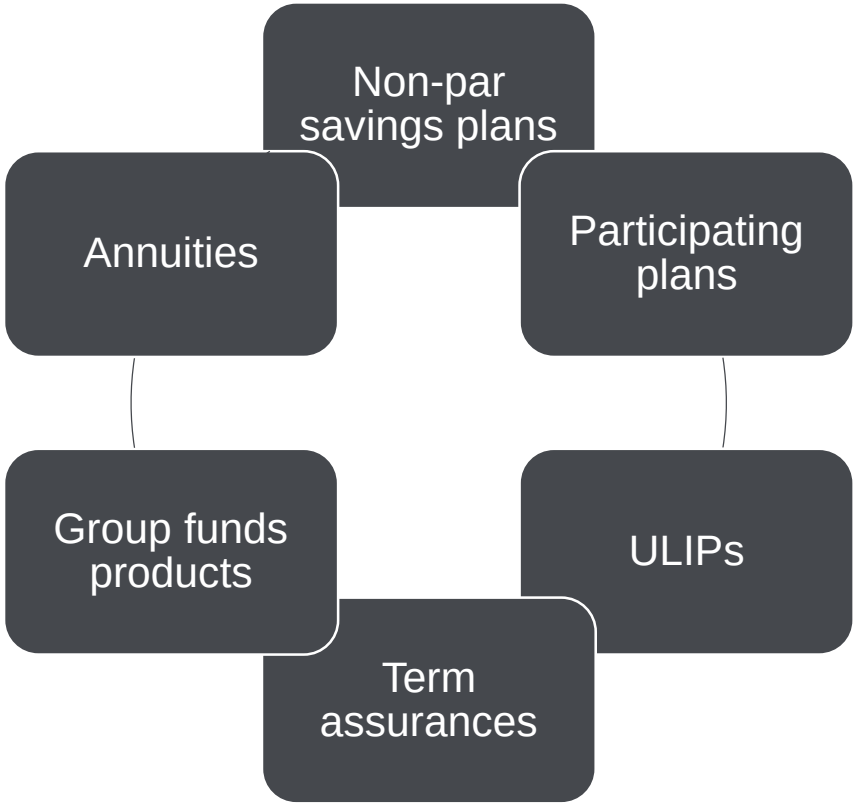
IT TAKES VISION

Time value of financial options and guarantees

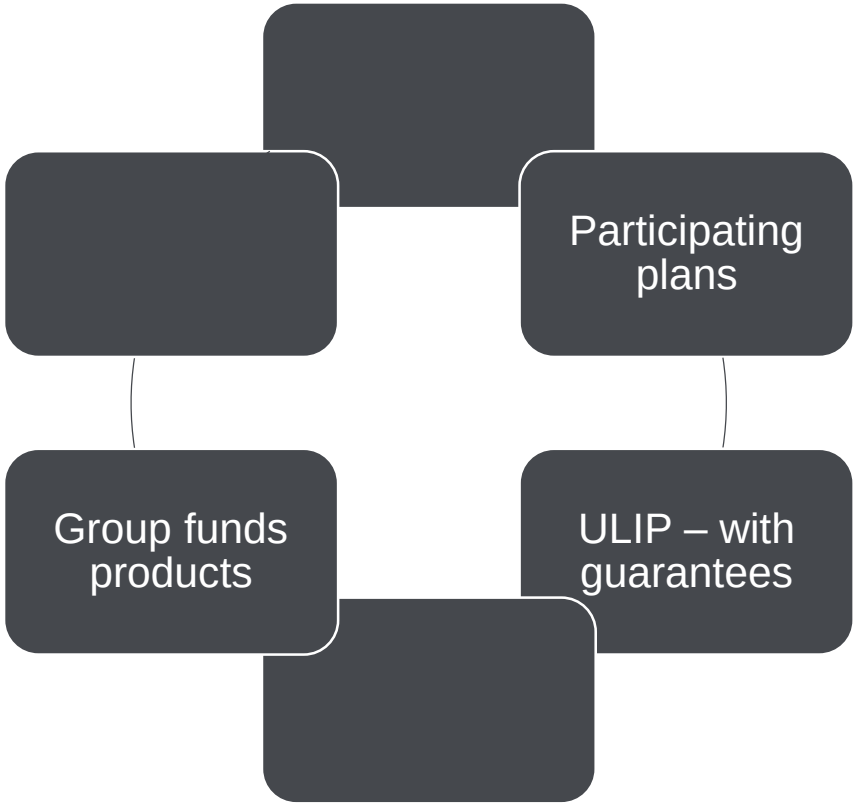
Time value of financial options and guarantees – Key topics



Identification of products for which there may be a TVFOG (1)



Identification of products for which there may be a TVFOG (1)

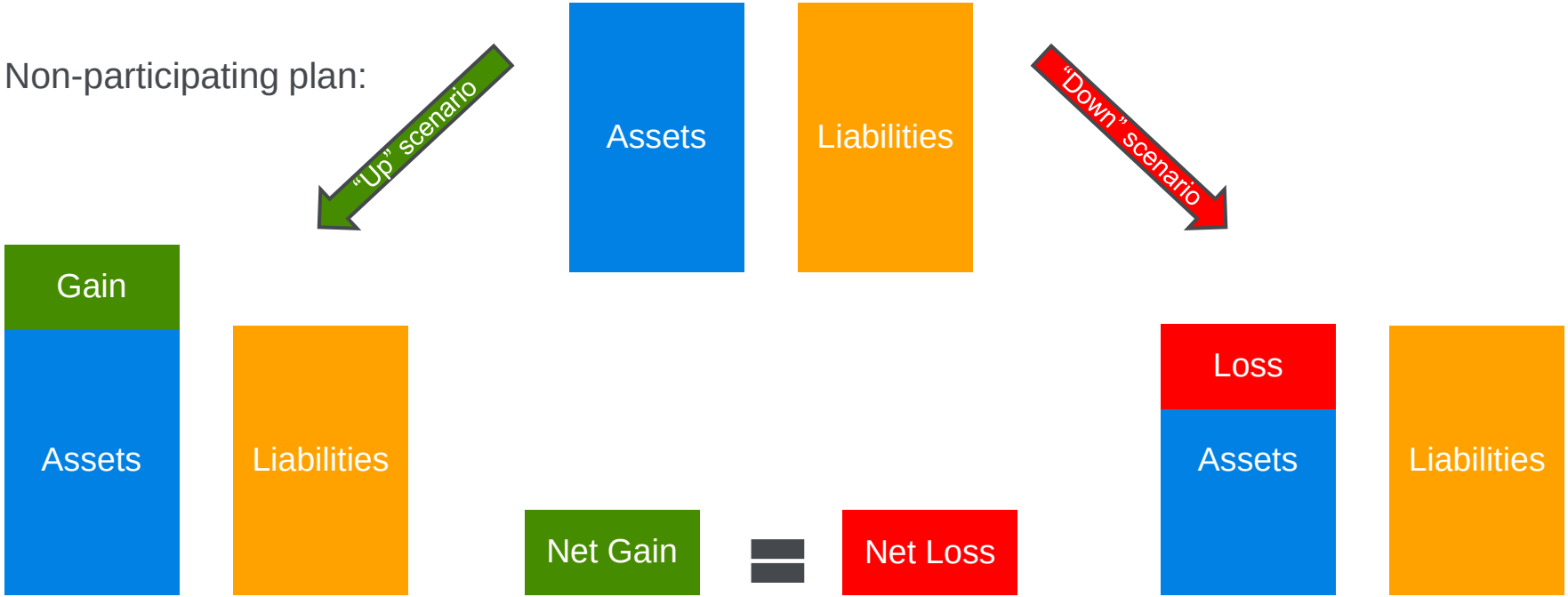


Identification of products for which there may be a TVFOG (2)

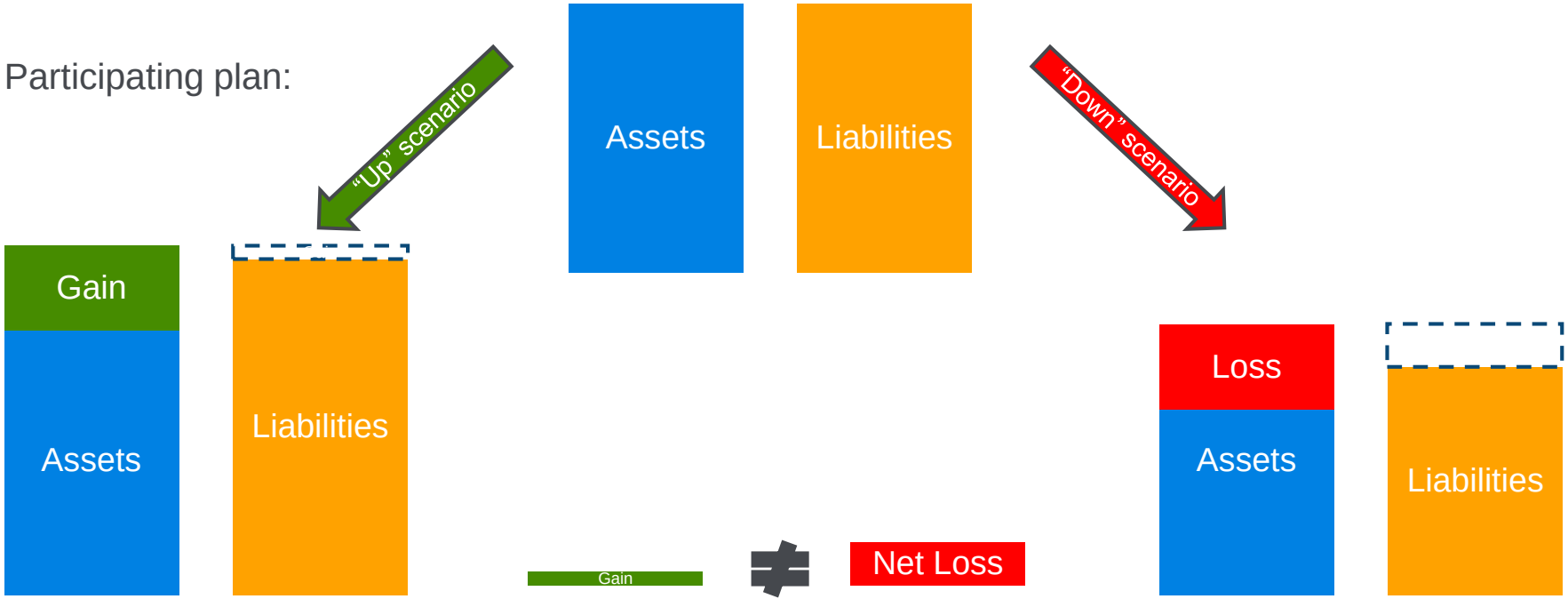
The key to deciding whether a TVFOG may be present is….. **asymmetry**

Are the good scenarios as good as the bad scenarios are bad?

Non-participating plan:



Identification of products for which there may be a TVFOG (3)



Identification of products for which there may be a TVFOG (4)

Product	Feature of the product that leads to asymmetry in shareholder return
Guaranteed maturity benefits – ULIP	In low investment return scenarios, the insurer must honour the guarantee, even if the fund can no longer support this.
Group traditional products	The insurer must guarantee the account value on most exits, and market value adjustments may be ineffective
Traditional participating plans / universal life	Annual bonuses are added to sum assured and maturity benefit. In low investment return scenarios, the insurer must honour the accrued benefits, even if they are no longer supported by asset shares
Highest NAV guarantees - ULIP	The highest NAV guarantee is managed using Constant Proportion Portfolio Insurance (CPPI) and losses can occur if the insurer cannot reverse out of equity positions before a crash – “Gap risk”
Reduction in yield – ULIP & VIP	Insurers must offer products where the 'Reduction in Yield' is less than X% (where X% is given by a table). This means that if the unit growth rate is 10%, the policyholder IRR must be at least (10-X)%. Given that this can lead to the insurer having to add units to the fund in certain scenarios, an asymmetric impact is observed.

Identify a method of assessing the TVFOG

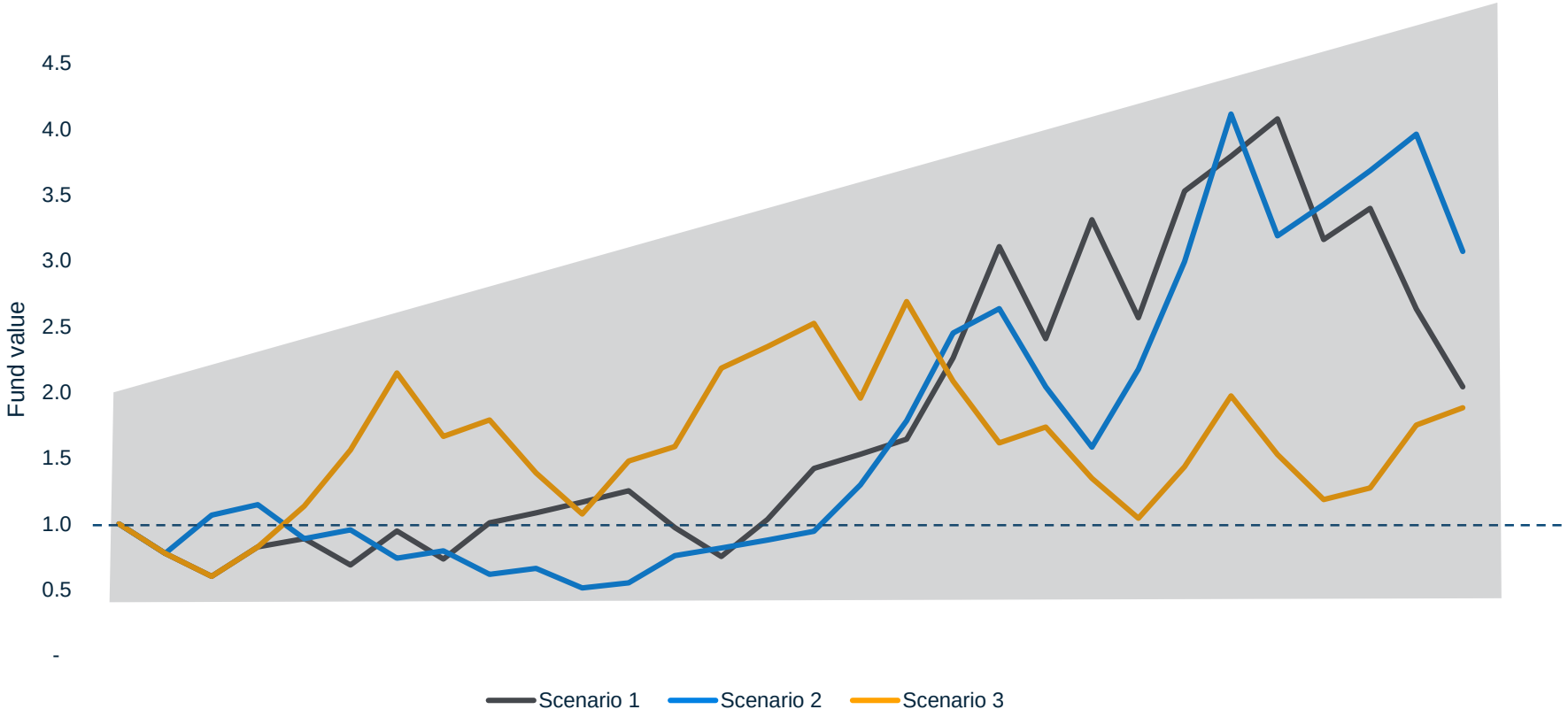
Stochastic asset-liability modelling

Assessing the implied guarantee

Immaterial lines?

Option replication / replicating portfolio

Deterministic scenarios



Stochastic asset-liability modelling – Develop an ESG

- Paucity of interest rate and equity derivatives
- Little information on corporate bonds

Obtain external scenarios e.g. from a third party or from a group company

Stochastic modelling – investment returns

Dynamic asset-liability model	•Assets and liabilities modelling in your actuarial software •Allows for accurate interactions between A&L •Difficult to implement and runtimes can be slow. 'Simple' liability models may help
Dynamic liability model	•Stochastic runs of your existing actuarial model •Assets are assumed to be independent of the liability movements so difficult to allow for the impact of future experience (e.g. persistency) on asset strategy •Run times may be quicker, but still heavy runs
Flexing	•Full asset modelling, but liabilities are adjusted or 'flexed' based on asset movements •May not be appropriate to all lines of business
Simple modelling (e.g. Excel)	•Can employ simplified techniques to adjust liability cash flows externally to the actuarial model, in line with a simple spreadsheet-based asset model

Asset modelling can be complex in India given that solvency is assessed on a book value basis – market value returns from the ESG must be combined with an assumed pattern of future invest/divest-ments to see the full impact of a scenario.

Stochastic modelling – others

Dynamic bonus rates

Participating fund bonus management framework?

Dynamic policyholder behavior

Any historic information?

Can we protect ourselves through choice of bonus methodology?

Milliman

IT TAKES VISION

Cost of residual non-hedgeable risks

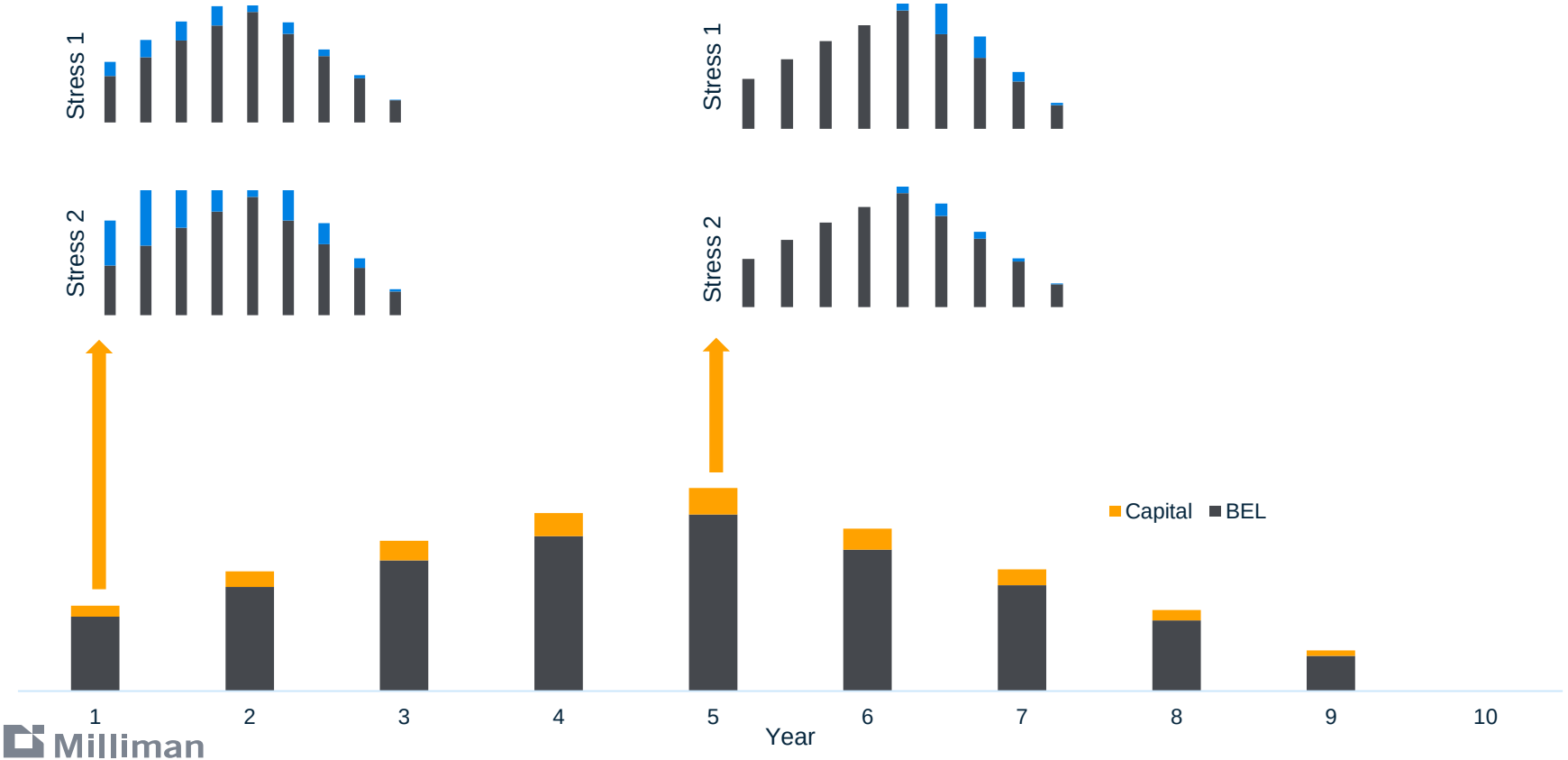
Cost of residual non-hedgeable risks – Key topics

Company	SBI Life	ICICI Prudential	HDFC Life	Max Life
Cost of capital charge	5%	4%	3.5%	5%
CRNHR / PVFP	4.9%	3.1%	4.9%	11.7%

Identifying the economic capital

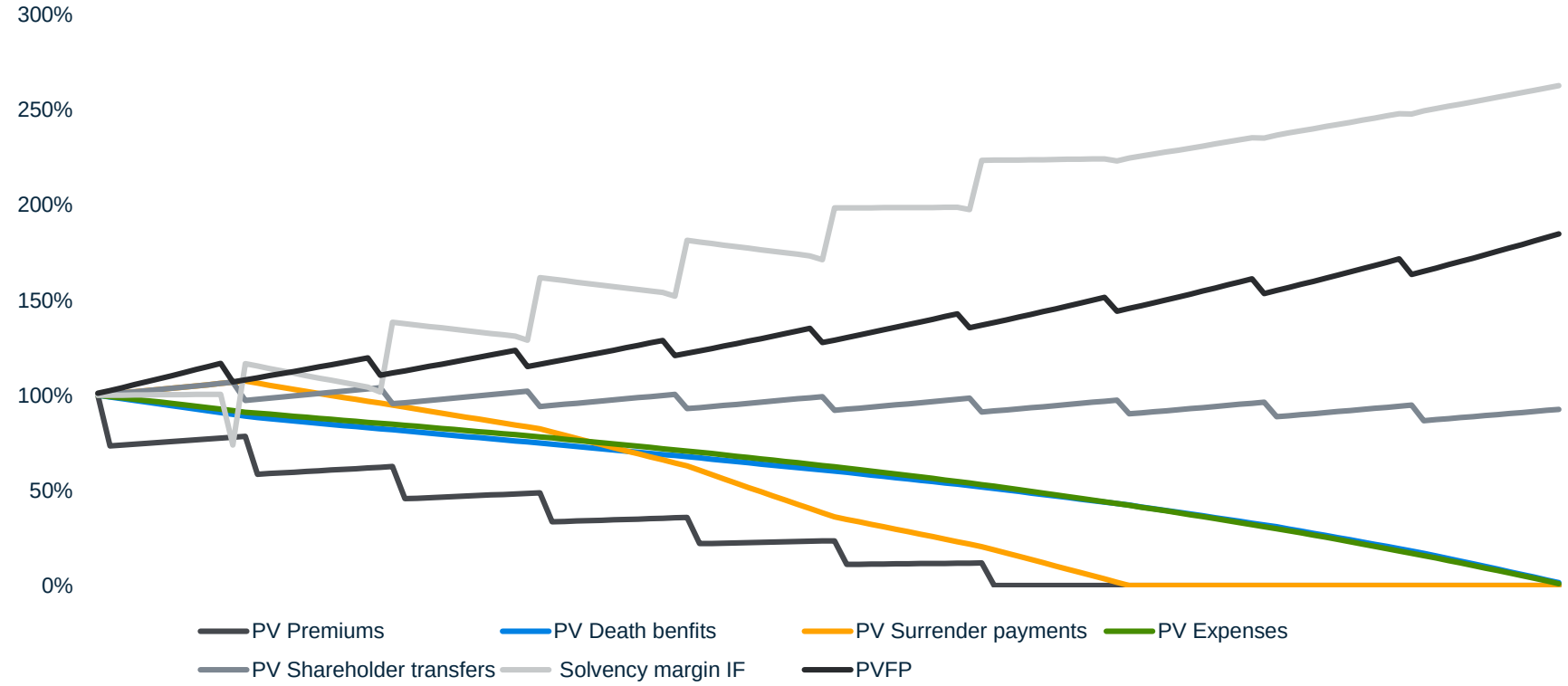
- Most companies already doing some calculations for the IRDAI
- Identify non-hedgeable risks from your economic capital. Non-hedgeable financial risks?
- Solvency II is a common starting point
- Common to make adjustments to the standard formula - How to find 99.5th percentile risks?
- How to allow for participating business?

Projection of economic capital (1)



Milliman

Projection of economic capital (2)



Milliman

IT TAKES VISION

Sensitivities

Minimum disclosures under APS 10

Investment assumptions

- Increase / decrease in reference rates by 100 bps
- Increase / decrease in reference rates by 200 bps
- Shock to the value of equities of -10%
- Shock to the value of equities of -20%
- 25% in the swaption / equity volatilities used to value the options and guarantees

Expenses

- +/- 10% change in maintenance expenses
- +/- 10% change in acquisition expenses

Discontinuance - proportionate

- +/- 10% change in discontinuance (lapse, surrender, paid up etc.) rates
- +/- 50% change in discontinuance (lapse, surrender, paid up etc.) rates

Discontinuance – 'shape change'

- Mass lapsation of 25% and 50% of policies at the end of the surrender penalty period (ULIP)
- +/- 50% change in discontinuance rates after the end of any surrender penalty period
- An absolute increase / decrease of 5% in non-zero policy lapse rates

Others

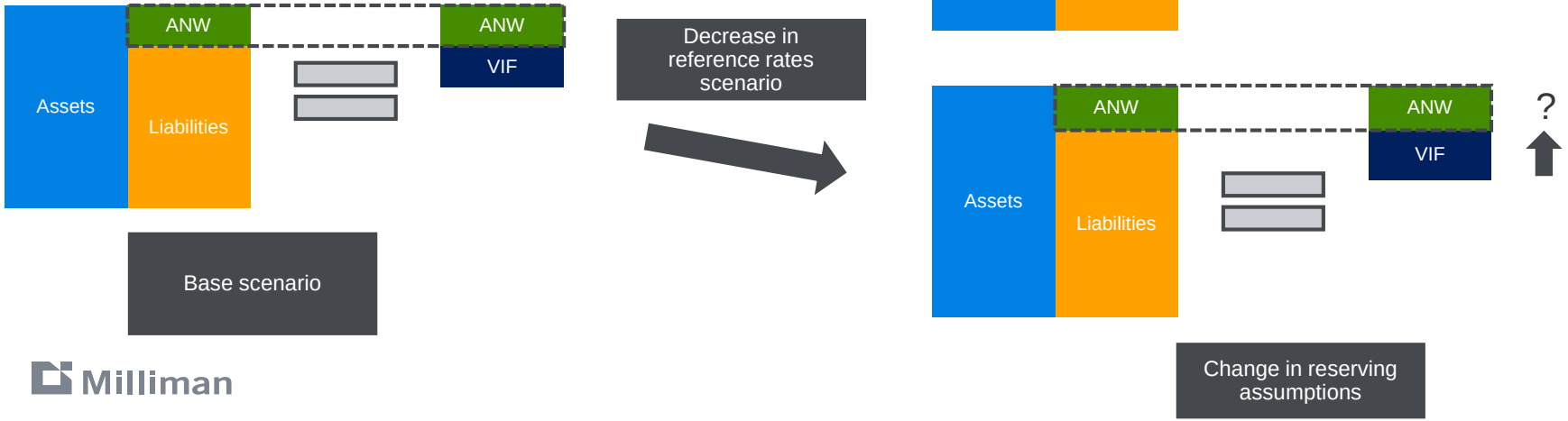
- An increase / decrease of 5% (multiplicative) in the mortality / morbidity rates
- Required capital set equal to the level of solvency capital
- Assumed tax rate increased to match corporation tax rate for other industries

Milliman

Sensitivities – scenario specific considerations (1)

Investment assumptions

- Impact on asset values?
- Impact on reserves?
- Trade-off between high market value adjustments and changing reserving assumptions.
- Where do you apply these sensitivities for VNB?



Sensitivities – scenario specific considerations (2)

Discontinuance - proportionate

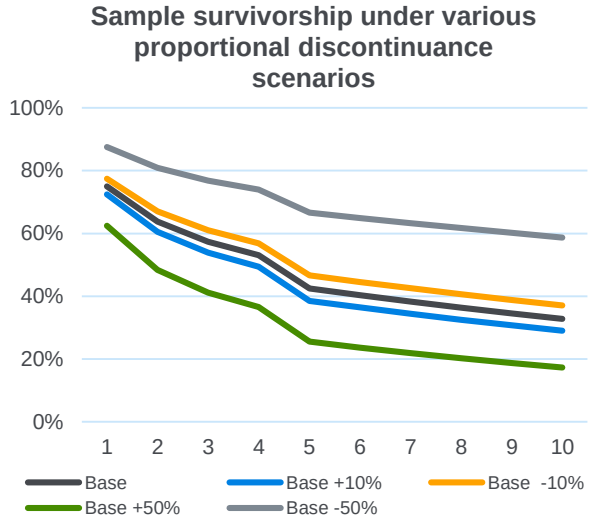
- Would you expect symmetrical results?

Discontinuance – 'shape change'

- How do you define "surrender penalty period"?
  - For new ULIPs, should this be applied at the end of the 4th year or 5th year?
  - What about old ULIPs?
- Should the mass lapse scenario be applied as an addition or a replacement?
- How do you define the "+/- 50% change in discontinuance rates after the end of any surrender penalty period" scenario? Only applicable for ULIPs?
- How do you define "non-zero policy lapse rates"?
- Are upper / lower caps required?

Others

- Any additional sensitivities (e.g. GST)?



Milliman

Sensitivities – general considerations (3)

- Where do you apply the sensitivity for VNB – at POS or as at the valuation date?
- Do you change the reserving assumptions?
- Do you re-do the CRNHR?
- Do you re-do the TVFOG?
- Do you re-do the other adjustments?

Milliman

IT TAKES VISION

Analysis of movement

What is AOM?

Components	Free Surplus	Required Capital	VIF	IEV
Opening IEV				
Opening Adjustments				
Adjusted opening IEV				
Value added by new business during the period				
Expected return on existing business (or unwind)				
Transfers from VIF and RC to Free Surplus				
Variance in operating experience split by major components including mortality / morbidity, policy persistency, etc.				
Change in operating assumptions				
Other operating variance				
Operating IEV earnings				
Economic variances				
Other non operating variance				
Total IEV earnings				
Capital contributions / dividend pay-outs				
Closing adjustments				
Closing IEV				

Starting EV

Attempt to explain the difference

Ending EV

AOM – changes from last valuation

Components	Free Surplus	Required Capital	VIF	IEV
Opening IEV				
Opening Adjustments				
Adjusted opening IEV				
Value added by new business during the period				
Expected return on existing business (or unwind)				
Transfers from VIF and RC to Free Surplus				
Variance in operating experience split by major components including mortality / morbidity, policy persistency, etc.				
Change in operating assumptions				
Other operating variance				
Operating IEV earnings				
Economic variances				
Other non operating variance				
Total IEV earnings				
Capital contributions / dividend pay-outs				
Closing adjustments				
Closing IEV				

Change in model / methodology

Change in operating assumptions: demographic / expenses – BE and reserving.

Change in economic assumptions: reference rates, inflation, valuation interest rate

AOM – value of new business

Components	Free Surplus	Required Capital	VIF	IEV
Opening IEV				
Opening Adjustments				
Adjusted opening IEV				
Value added by new business during the period				
Expected return on existing business (or unwind)				
Transfers from VIF and RC to Free Surplus				
Variance in operating experience split by major components including mortality / morbidity, policy persistency, etc.				
Change in operating assumptions				
Other operating variance				
Operating IEV earnings				
Economic variances				
Other non operating variance				
Total IEV earnings				
Capital contributions / dividend pay-outs				
Closing adjustments				
Closing IEV				

1. Reporting period surplus + contribution to closing VIF.
2. Consistency with reported VNB.
3. Dealing with unwind.

AOM – unwind and transfers

Components	Free Surplus	Required Capital	VIF	IEV
Opening IEV				
Opening Adjustments				
Adjusted opening IEV				
Value added by new business during the period				
Expected return on existing business (or unwind)				
Transfers from VIF and RC to Free Surplus				
Variance in operating experience split by major components including mortality / morbidity, policy persistency, etc.				
Change in operating assumptions				
Other operating variance				
Operating IEV earnings				
Economic variances				
Other non operating variance				
Total IEV earnings				
Capital contributions / dividend pay-outs				
Closing adjustments				
Closing IEV				

Split into:

- Expected investment income at opening reference rate
- Expected investment income using real world assumptions

- The amount of first year surplus expected in the opening VIF – i.e. transfer from VIF to FS
- Different in closing and opening RC
- Impact on IEV should be zero.

$VIF(t) = [VIF(t+1) + CF(t)]/(1+FR(t+1))$

$VIF(t+1) = VIF(t) X [1+FR(t+1)] + CF(t)$

AOM – variance in operating experience

Components	Free Surplus	Required Capital	VIF	IEV
Opening IEV				
Opening Adjustments				
Adjusted opening IEV				
Value added by new business during the period				
Expected return on existing business (or unwind)				
Transfers from VIF and RC to Free Surplus				
Variance in operating experience split by major components including mortality / morbidity, policy persistency, etc.				
Change in operating assumptions				
Other operating variance				
Operating IEV earnings				
Economic variances				
Other non operating variance				
Total IEV earnings				
Capital contributions / dividend pay-outs				
Closing adjustments				
Closing IEV				

- Assess the impact on each component of IEV by changing each item of 'expected' experience during the reporting period to 'actual' one at a time.
- Difference between actual cash-flows from financial statements and 'expected' cash-flows is reflected in FS
- The impact on VIF represents the difference between expected and actual survivorship.
- The goal is to reduce operating variance (includes some items not considered above e.g. bonuses and unexplained)

Experience variance – approaches / considerations

Traditional approach

- Modify the actuarial model to allow for a different set of assumptions during the reporting period.
- Update each assumption for the reporting period in the “opening” model to closely match the “actual” experience and re-run the actuarial model until the variance from the closing VIF is small.
- Allocate changes from each model run to the various sources of surplus and adjust cash-flows in the first year using actual financial statements.

Advantage:
- Easy to setup / understand.

Disadvantages:
- A lot of tweaking required to reduce “unexplained” variances in closing VIF.
- Assumptions may need to be varied across products or even more granular.
- Many re-runs might be required; slowing down results production.

Data-led approach

- Modify the policy data to include opening and closing policy statuses and dates of change, e.g. in-force to lapse, lapse to in-force etc.
- Modify the actuarial model code to capture the impact on the cash-flows form each status change.
- Run the actuarial model for each status change that should be analysed to separate sources of surplus.
- The cash-flows during the reporting period should replicate the actual revenue account, with some adjustments required.
- Unexplained is expected to be very low.

Advantage:
- One run should suffice; quicker results production.

Problems / disadvantages:
- Model setup and ongoing data development can be difficult to understand / setup.

Other hybrid approaches

AOM – economic and other non-operating variance

Components	Free Surplus	Required Capital	VIF	IEV
Opening IEV				
Opening Adjustments				
Adjusted opening IEV				
Value added by new business during the period				
Expected return on existing business (or unwind)				
Transfers from VIF and RC to Free Surplus				
Variance in operating experience split by major components including mortality / morbidity, policy persistency, etc.				
Change in operating assumptions				
Other operating variance				
Operating IEV earnings				
Economic variances				
Other non operating variance				
Total IEV earnings				
Capital contributions / dividend pay-outs				
Closing adjustments				
Closing IEV				

- Change in economic assumptions: reference rates, inflation, valuation interest rate
- Difference between 'actual' investment return earned and the 'real world' return considered in the unwind step.
- How do you allow for new business?

- Any items of variance not considered above – e.g. taxation?

Milliman

AOM – additional items

Components	Free Surplus	Required Capital	VIF	IEV
Opening IEV				
Opening Adjustments				
Adjusted opening IEV				
Value added by new business during the period				
Expected return on existing business (or unwind)				
Transfers from VIF and RC to Free Surplus				
Variance in operating experience split by major components including mortality / morbidity, policy persistency, etc.				
Change in operating assumptions				
Other operating variance				
Operating IEV earnings				
Economic variances				
Other non operating variance				
Total IEV earnings				
Capital contributions / dividend pay-outs				
Closing adjustments				
Closing IEV				

Pay-outs from FS to shareholders or from shareholders into FS.

Not in common use in India – may be things like currency movements?

Other considerations

- Where do you allow for TVFOG?
- Where do you allow for CRNHR?
- Where do you allow for other adjustments?

AOM – key results

Components	Free Surplus	Required Capital	VIF	IEV
Opening IEV				
Opening Adjustments				
Adjusted opening IEV				
Value added by new business during the period				
Expected return on existing business (or unwind)				
Transfers from VIF and RC to Free Surplus				
Variance in operating experience split by major components including mortality / morbidity, policy persistency, etc.				
Change in operating assumptions				
Other operating variance				
Operating IEV earnings				
Economic variances				
Other non operating variance				
Total IEV earnings				
Capital contributions / dividend pay-outs				
Closing adjustments				
Closing IEV				

Return on EV measure used to measure company's performance.

Value comes from:
1. Unwind
2. VNB
3. Operating variance (hopefully small)

Actual measure of performance of a company, but economic variance is not totally in company's control.

Milliman

IT TAKES VISION

Utilising your work

Where can you utilize this work?

- Regular reporting:
  - Post IPO public disclosures
  - Building a narrative for shareholder's / analysts
- Performance management – appraisals / ESOPs?
- Pricing based on IEV?
- Refining assumptions?
- Economic capital calculations using the CRNHR models?
- IFRS 17?
- ALM using the TVFOG models?
- Implicit check on policy data?

Milliman

IT TAKES VISION

Questions?

Questions?

Milliman

IT TAKES VISION

Thank you

IT TAKES VISION.