



RISK MANAGEMENT IN LIFE INSURANCE

ASSAL 2015

Regional Training Seminar for Insurance Supervisors of Latin America

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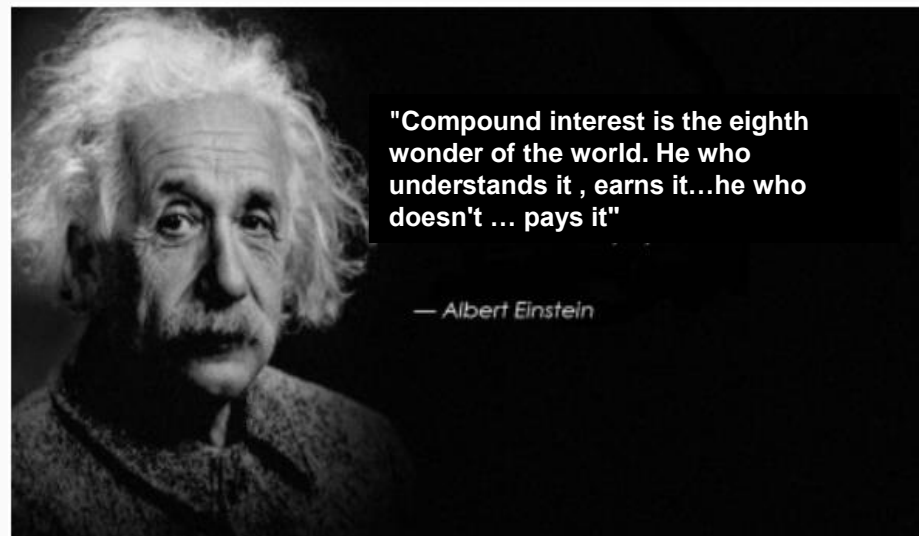
Agenda

- I. Tough times for the industry
- II. Solvency II impact
- III. Risk/Capital Management Solutions through Life Reinsurance

Is Europe getting close to Japan?

It was not a compound interest, but a drop in the interest rate in Japan triggered relevant consequences

- Companies could not reinvest mature bonds into new assets with rates as high as before
- Investment return of insurance companies were lower than policy interest rate
- It took more than 20 years and the failure of 8 insurers to lower its guaranteed rates and shorten duration mismatches
- Japanese companies have to be more than 10 years absorbing losses from saving business
- Asset mix was conducted to a lower exposure on stock Exchange

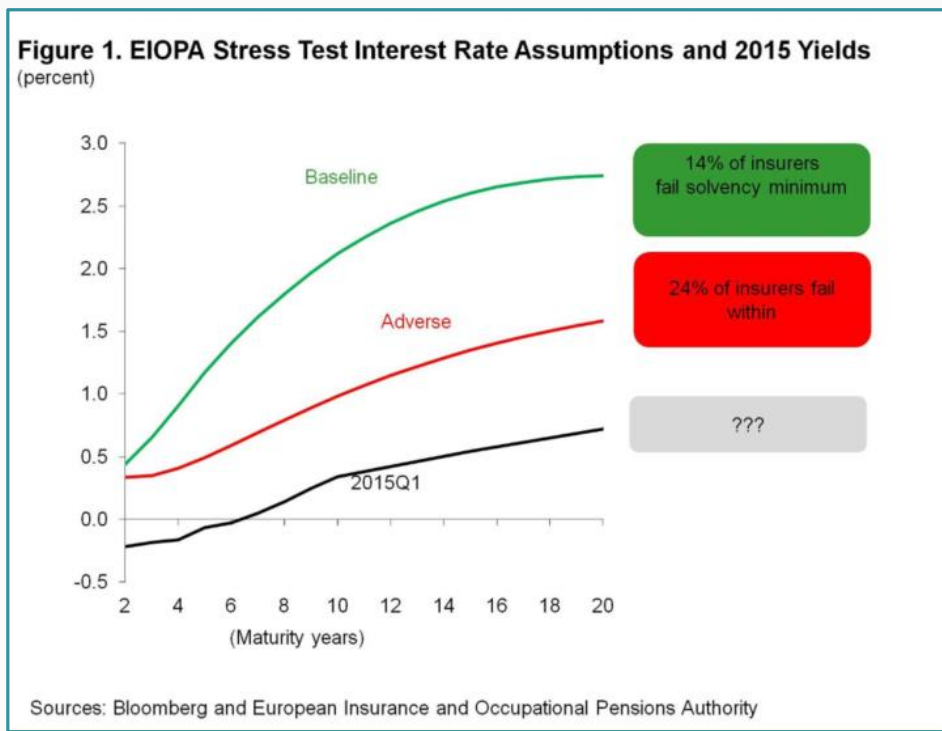


Christine Lagarde (IMF) showed her concern about the impact of low interest rates for European insurers

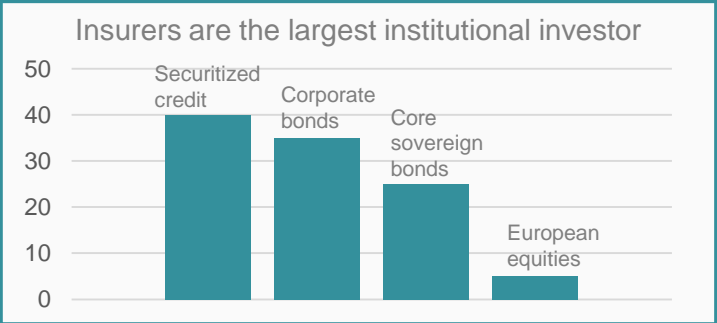
The serious concern of the low rate of interest



Stress test conducted by EIOPA in 2014 showed European life insurers' vulnerability to a "Japanese-like" scenario with a prolonged period of low interest rates



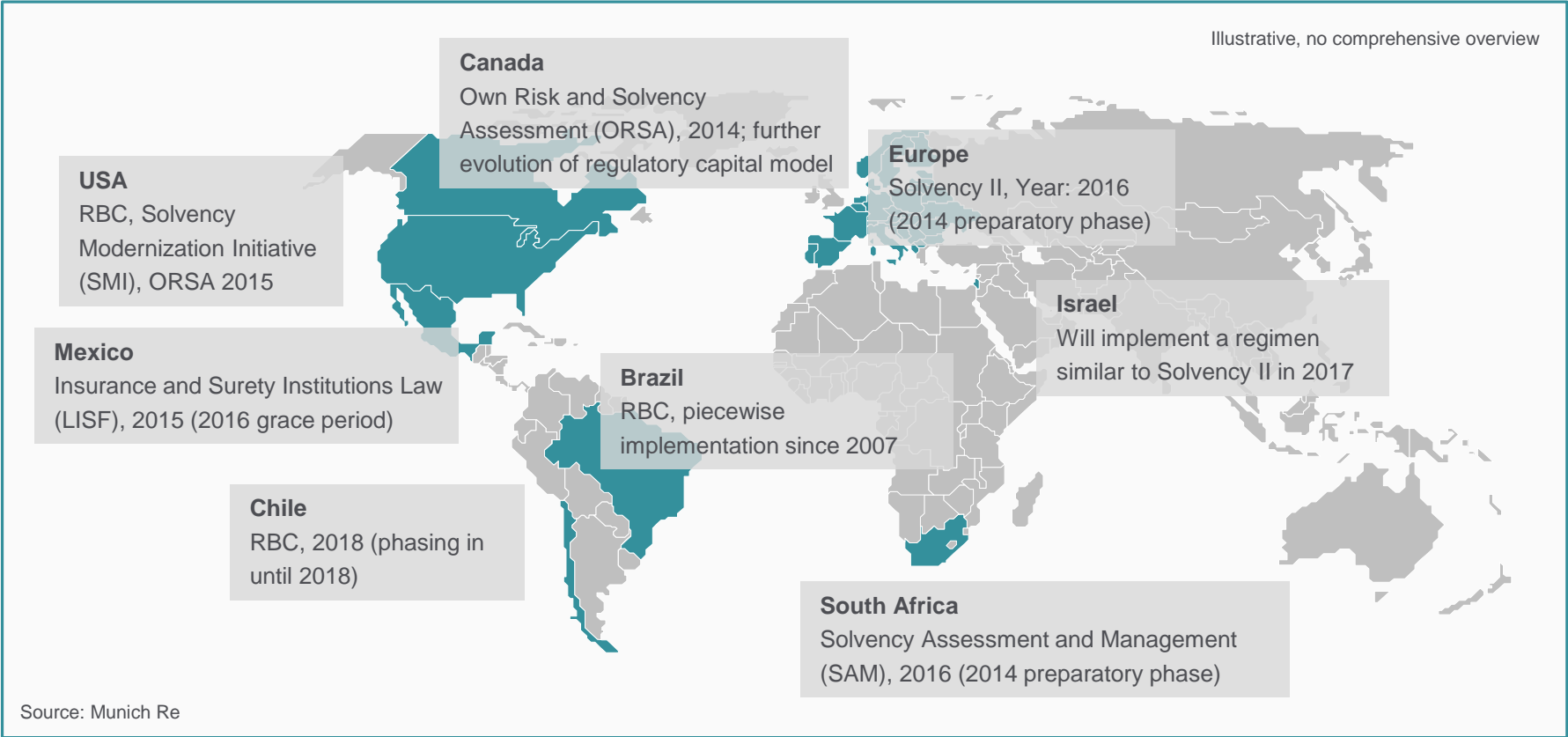
The Industry has €4.4 trillion invested in the European private sector



2014 MCEV of the Munich Re German life primary insurance drop by -€1.916m. The change was driven by both the decrease in PVFP and the increase on TVFOG and it was partially offset by the positive effect of tightening credit spreads....

Source: <http://blog-imfdirect.imf.org/2015/05/05/european-life-insurers-unsustainable-business-model>

Supervision and new regulations are one of the main global challenges for our industry



A global trend towards risk-based supervision is clearly visible



Solvency II impacts each and every aspect of an Insurance company...



Product & Investments

- Development of products balancing capital/client demand
- Change asset allocation and asset mixed

Competitiveness

- Increased pressure on smaller, less diversified players; being global means a competitive advantage
- High cost of compliance raising barriers to entry

Transparency

- Enhanced comparability between insurance companies across different business models and countries
- Predefined reporting templates should ensure market-wide consistency

Governance

- Necessary for integrating capital model implications in business decisions and development of multidimensional and quantified stress test
- New roles (CRO) and new perceptions of the old ones

Business opportunities through reinsurance

- Risk transfer from insurer to well-diversified reinsurer beneficial for both
- Financial strength of reinsurer to provide a clearer competitive edge

..., which implies relevant changes

If you change the way the game is scored, you change the way the game is played (*Equity analyst*)

Fundamental Changes to Financial Statements, Risk Management and Capital Requirements

- Solvency: (Europe: Solvency I to Solvency II)
 - Risk Governance Stability
 - More economic focus
 - More transparency
- but...*
- More complexity
 - More data and more load work
 - More volatility

Internal Model of Munich Re developed in the last decade to meet the rising risk management requirements



Munich Re already provides r/i solutions under the new environment, for instance:



Unit Linked Income Stabilization

Unit Linked Solvency II valuation
New regulatory concepts give rise to new thoughts

Solvency I

- Reserve = Fund Value
- S I Capital = 1% Reserve

Solvency II

- Reserve = Fund Value + "non-unit liabilities"
- Risk margin
- PVFP =: PV(future fees) – PV (Cost) – PV (Claims)
- S II Capital -> SCR
- Market risk (shock on fund value reduces fee income & increase S@Risk)
- Mass lapse risk (loss of future income, 40% shock)
- Life Cat risk when protection component is significant (S@Risk >> 10% Reserve)

Reserves and Required Capital by term

Non-unit liabilities & SCR by term

Earnings Stabilization

Earning Stabilisation Reinsurance:
Economic impact compared to known structures

Trad Solvency QS | **VIF Financing** | **Earning Protection RI**

Best Estimate Scenario

Stressed Scenario

PI expected profit 120 | PI expected profit 110 | PI realized profit 120

PI realized profit 35 | PI realized profit 110 | PI realized profit 120

Lapses

Solvency II Lapse Capital Requirements

Illustration of Solvency II Lapse Stress Tests'

Scope for 1 Year Capital Relief

- Lapse stress equal to maximum of 3 lapse scenarios (persistent decrease, persistent increase and instant shock)
- For policies with lapse sum at risk (best-estimate benefit + reserve) mass lapse is typically the highest stress
- 40% mass lapse stress is highest when annual lapse rate is lower than 10%, per annum (10% at duration 5)
- Using 8 years as a representative range for duration, mass lapse stress is highest when annual lapse rate is lower than 7.5% (12% at duration 5)
- With lapse cover attaching at 30% mass lapse will still be highest stress when annual lapse rate is lower than 7.5% (12% at duration 5)
- For portfolios with positive lapse sum at risk and long term lapse assumptions below these levels, full relief should be available for the layer of mass lapse between 30% and 40%

Interest Rate Solution

New Modified Coinsurance
Motivation: Cedent's Solvency Position

German standard portfolio (mainly endowments & deferred annuities)

Liability structure	30 years - duration 12 years after policyholder participation - duration 18 years without policyholder participation
Asset allocation	Traditional "low risk" - mainly fixed income, duration 8 years
Average technical rate	3.0%
Average risk free rate	2.7% - but current average coupon 3.5% (-> hidden reserves 3%)

Solvency I Balance Sheet

ASSETS	LIABILITIES
Invested Assets 771m	Statutory Reserve 719m
	Required Capital: 36m €
	Solvency rate: 144%

Solvency II Balance Sheet

ASSETS	LIABILITIES
Invested Assets 790m	B.E. Reserve (before phid. part.) 702m
	TP(PP) 48m
	RM 8m
	Required Capital: 96m €
	Solvency rate: 33%

Longevity

Longevity Risk Under Solvency II

Historic & Projected Annual Population Mortality Rates for a Dutch Male Age 70

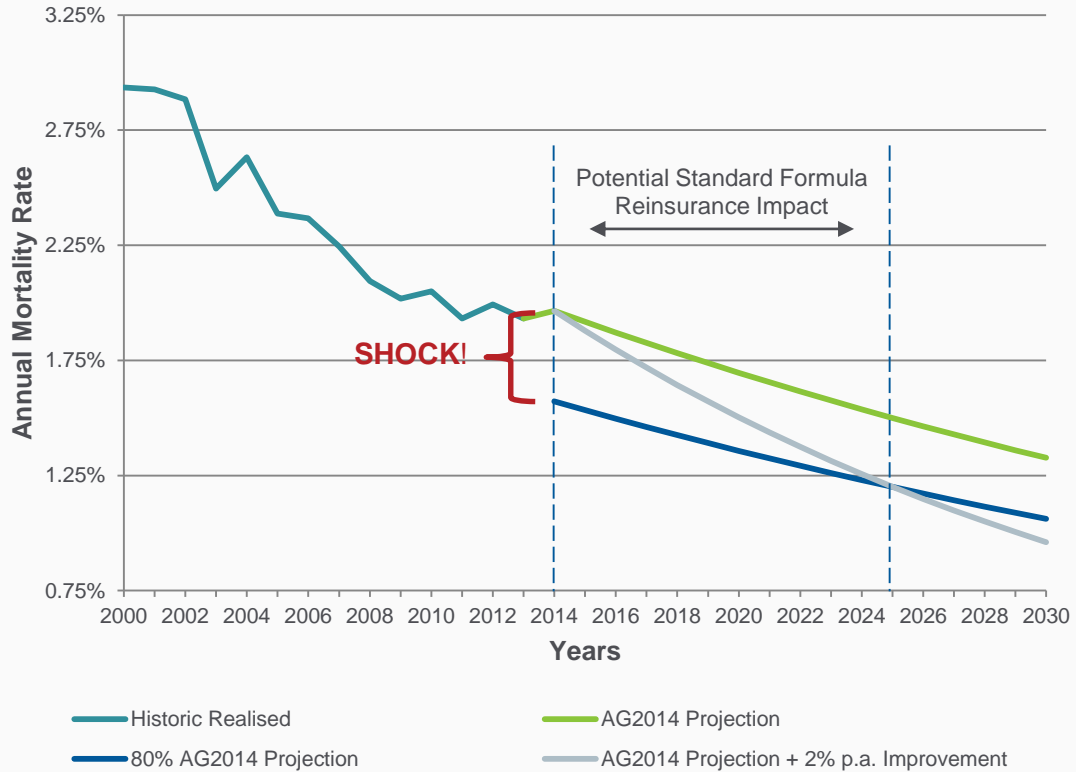
Standard Formula vs Actual Risk

- Systemic longevity risk develops as persistent annual reductions in rates of mortality (i.e. mortality improvements)
- Solvency II standard formula simplifies the representation of the risk as a flat 20% fall in all future mortality rates
- In early years (0-4) the stress is unrealistically severe relative to the potential development of improvements
- In later years (12+) the stress is lighter than would be appropriate for a 1200 year scenario
- On average over the life of an annuity portfolio, the stress may be considered reasonable
- A transaction providing a payout against extreme falls in mortality rates in early years may provide a standard formula capital benefit without transferring material longevity risk
- Transaction may reference population rates rather than portfolio experience as DLU define their mortality basis by reference to population mortality

Smoothing the Longevity Shock ...



Historic & Projected Annual Population Mortality Rates for a Dutch Male Age 70



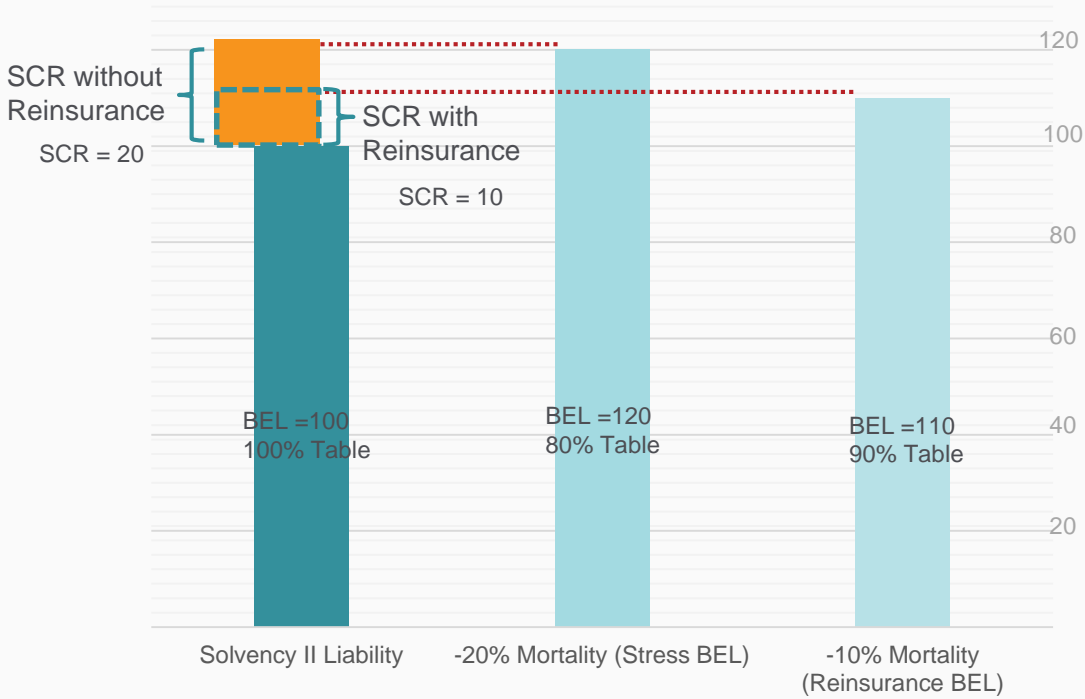
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- A transaction providing a payout against extreme falls in mortality rates in early years may provide a standard formula capital benefit
- Transaction may reference to population rates rather than portfolio experience as a company could define their mortality basis by reference to population mortality

Source of historic data: Centraal Bureau voor de Statistiek
 AG2014 is the best estimate mortality table for the Dutch population provided by Royal Actuarial Association (Koninklijk Actuariel Genootschap, AG) & Actuarial Institute (AI) in Netherlands, <http://www.ag-ai.nl/download/20475-AG2014.xls>

...and therefore reducing the Longevity's SCR

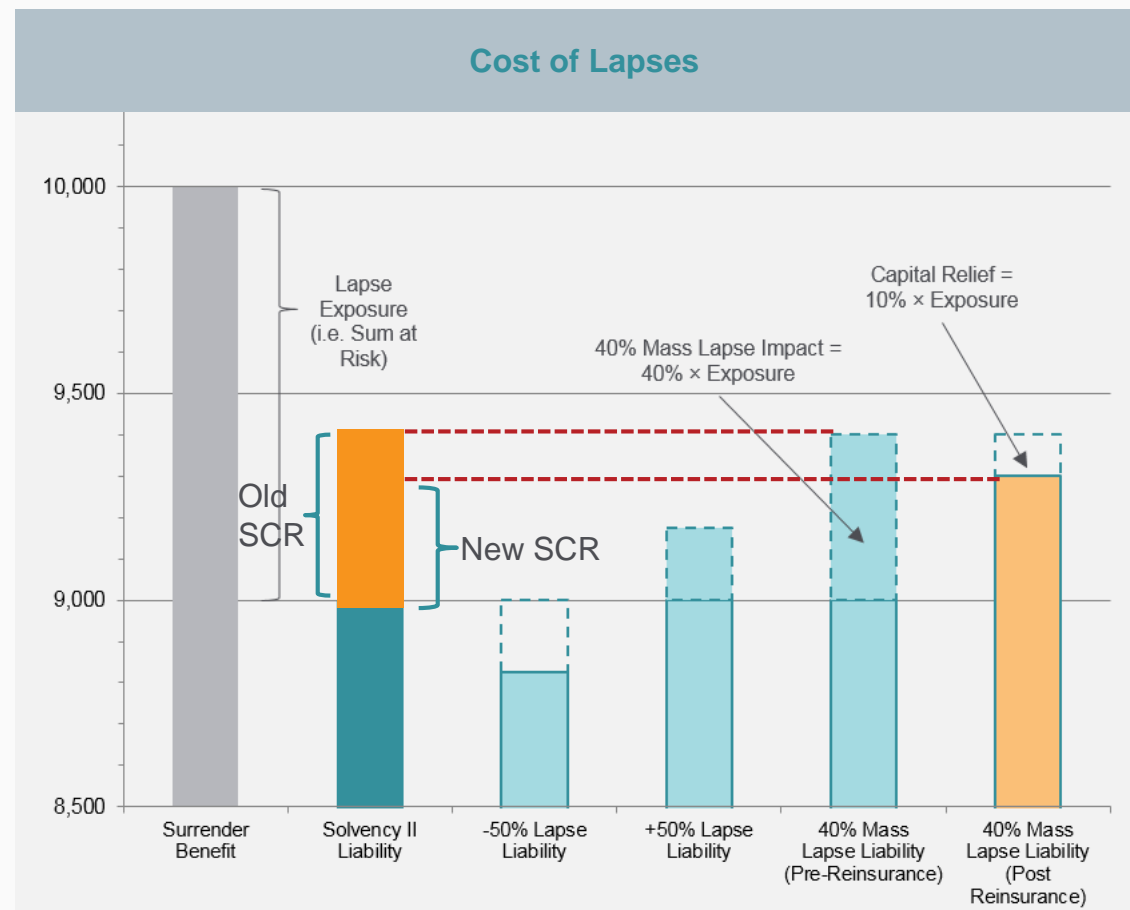
BEL's Fluctuation -EXAMPLE



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Protecting against the Mass Lapse Risk



- Scope for 1 Year Capital Relief**
- Lapse stress equal to maximum of 3 lapse scenarios (persistent decrease, persistent increase and instant shock)
 - For policies with lapse sum at risk (surrender benefit > reserve) mass lapse is typically the highest stress
 - 40% mass lapse stress is highest when annual lapse rates × 50% × duration is less than 40%
 - For portfolios with positive lapse sum at risk and long term lapse assumptions significantly below 10%, full relief should be available for a significant layer of mass lapse up to 40%

Solvency II Lapse Capital Requirement =
 MAX [-50% Lapse , +50% Lapse , 40%Mass Lapse]

A new era for all the players in the industry


- Insurance margins should consider the COST OF CAPITAL (not only biometric risk and financial margin)

- Under new regulations (risk based), business losses will be somehow reflected in TODAY's Balance Sheet. Insurers should respond with :

- Proper ALM measures
- New product design (more market oriented)
- Different asset mix

- As IMF said, Regulators should help companies to:

- "Promptly tackle the challenges facing life insurers"* and encourage them to offer guarantees more market oriented.
- Strengthen transparency including through the publication of comprehensive stress test results



"There are lot of ways to lose money in insurance, and the industry never ceases searching for new one".

Reinsurance can help insurers bearing the current environment through different RISK management solutions as CAPITAL matters...

...always involving the Supervisor for its specific approval in advance!



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