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Reinsurance strategies under solvency II

John Woodford
Munich Re

Andy Chan
KPMG



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Solvency II Latest Position and Updates

21 May 2013

Latest position on SII

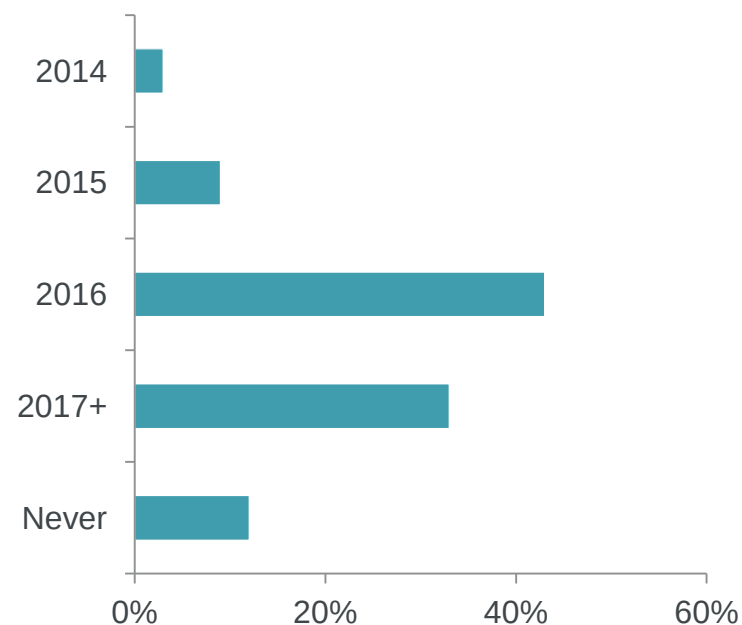
- “...you should not infer that we believe that 2016 is a more realistic implementation date for the Directive. It simply reflects the furthest end of what we regard as a sensible planning period.”

Julian Adams, 22 October 2012

- “Under the best scenario, Solvency II could start to be implemented either 2015 or 2016...At the end of the day, we’ll probably go to 2016, but it is still to be seen.”

Gabriel Bernardino

When do you think Solvency II will commence?



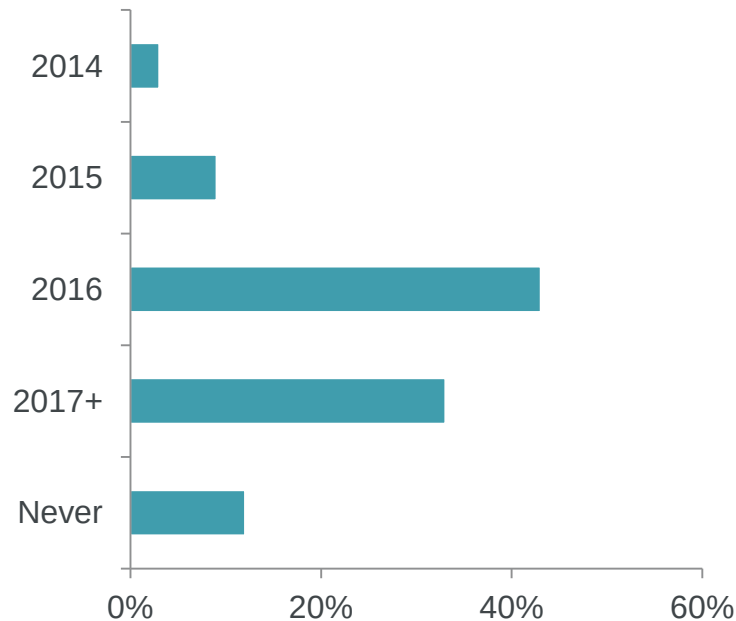
Source: Interactive survey at Life Conference 2012



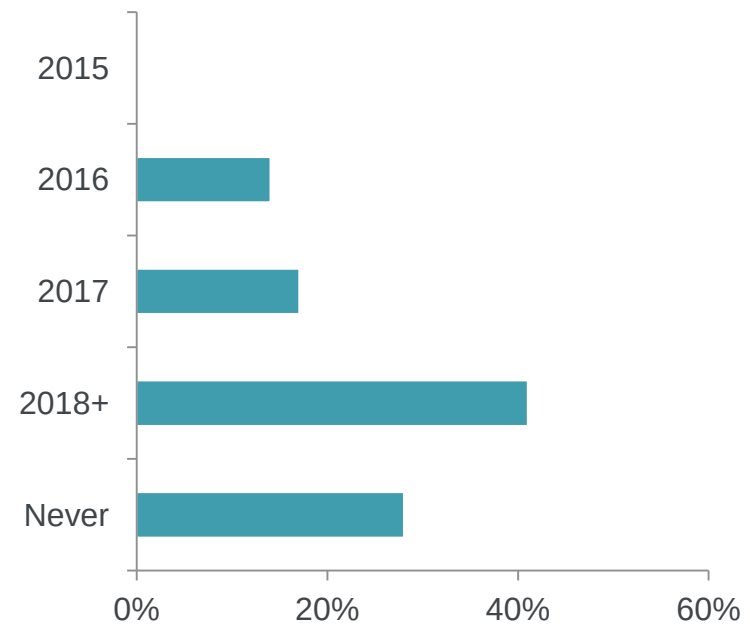
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When do you think Solvency II will commence?

The graphs below show the results of the polls taken during the Solvency II related workshop sessions at the 2012 Life convention (on the left) and the 2013 Health and Care convention (on the right).



Source: Interactive survey at Life Conference 2012



Source: Interactive survey at Health and Care Conference 2013

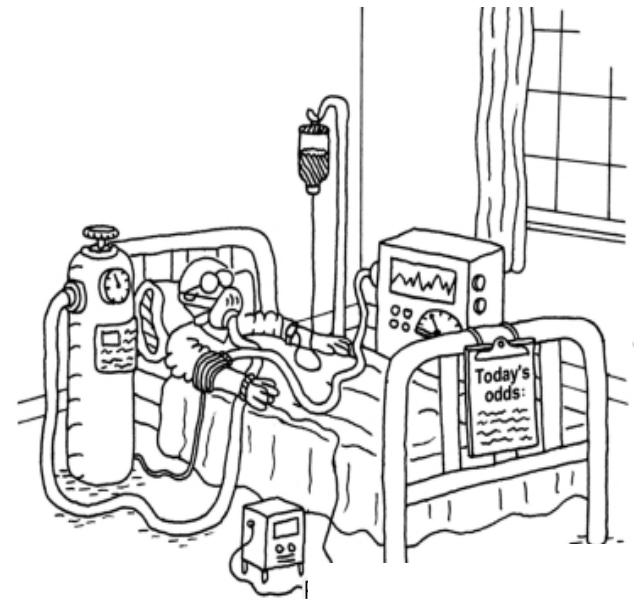


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There is still a faint pulse...

Long Term Guarantees Assessment

- Still trying to get some resolution to the great LTG debate!
- EIOPA report not expected until June
- Will this resolve all the issues and enable Omnibus II to be agreed?
- Parliament vote delayed from June to October 2013
- The outcome will have significant implications for asset strategy and product design



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EIOPA's opinion on interim measures regarding Solvency II

In December 2012, EIOPA published its opinion on areas regulators should focus on as interim measures during the delays to ensure a consistent and convergent approach to prepare for Solvency II.

Interim measures

Four key areas

1. Effective system of governance
2. Effective risk management system (including forward looking assessment)
3. Assessment of insurer's Solvency II readiness through Internal Model Pre-Application Process
4. Request of information necessary for applying a prospective and risk based supervisory approach

Application of proportionality principles in all the above

Source: https://eiopa.europa.eu/fileadmin/tx_dam/files/publications/opinions/EIOPA_Opinion-Interim-Measures-Solvency-II.pdf

Consultation papers on these measures were released in late March



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EIOPA CPs: Guidelines on preparing for Solvency II

Key points

- No surprises, other than fairly onerous reporting requirements
- Need to show demonstrable improvement over the two year period
- System of Governance: Combined Board knowledge and focus on policyholder considerations and Group functions
- ORSA: consideration of longer projection horizon, own funds analysis and Board engagement
- Reporting: annual report (including qualitative information) required for 31/12/14 within 20 weeks. Q3 and Q4 2015 also required within 8 weeks. Onerous SCR requirements, less on TPs and assets
- Pre-app: similar to Level 3, although some changes in validation and documentation requirements (e.g. user manual)

...what can EIOPA actually enforce?



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Recap of Solvency II

21 May 2013

Recap of Solvency II

Main principles

- Solvency II is the new regime for insurance solvency supervision in Europe. It will be a major driver of future reinsurance buying decisions.
- The main principles of Solvency II are:

- Three pillar approach

Solvency II encompasses much more than the calculation of an insurer's solvency position. It also requires appropriate systems of governance to ensure prudent management of insurers' business and greater transparency in reporting.

- Risk based calculation of capital

The required capital should appropriately reflect the risks to which a particular insurer is exposed. Capital requirements are based on the output of probabilistic models. The required capital should provide policyholder protection with a 99.5% level of confidence.

- Market consistent valuation of assets and liabilities

The value of assets and liabilities is that which would be achieved in an arms length transaction between knowledgeable willing parties.

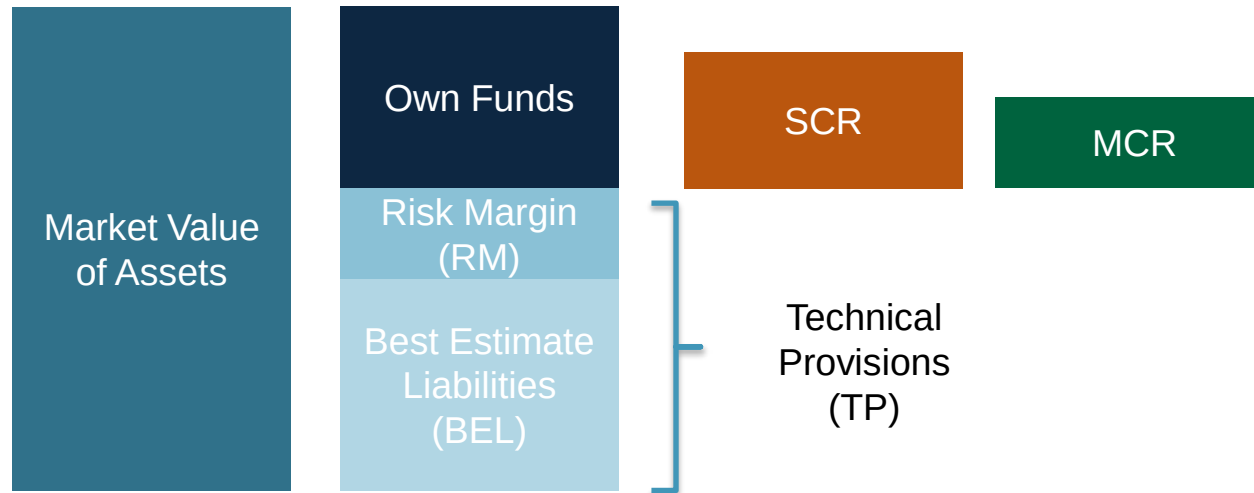


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Recap of Solvency II

Economic Balance Sheet

- An insurer's economic balance sheet under Solvency II can be broken down as follows:



- Risk Margin



The risk margin transforms the actuarial value of liabilities to a market consistent value.

It is the additional amount an insurer will need to pay a third party to take over their liabilities. It reimburses the third party for the cost of holding the capital for non-hedgeable risks.



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Recap of Solvency II

Economic Balance Sheet

SCR and MCR

The Solvency Capital Requirement (SCR) is the amount of capital insurers are required to hold over and above their technical provisions, to provide policyholder protection for adverse experience.

The MCR is the minimum capital insurers are required to hold. There is a progressive “ladder of intervention” as an insurer’s own funds start falling below the SCR which allows regulators to intervene in a progressive manner. Once an insurer can no longer cover its MCR, the regulator will revoke their authorisation to conduct business.

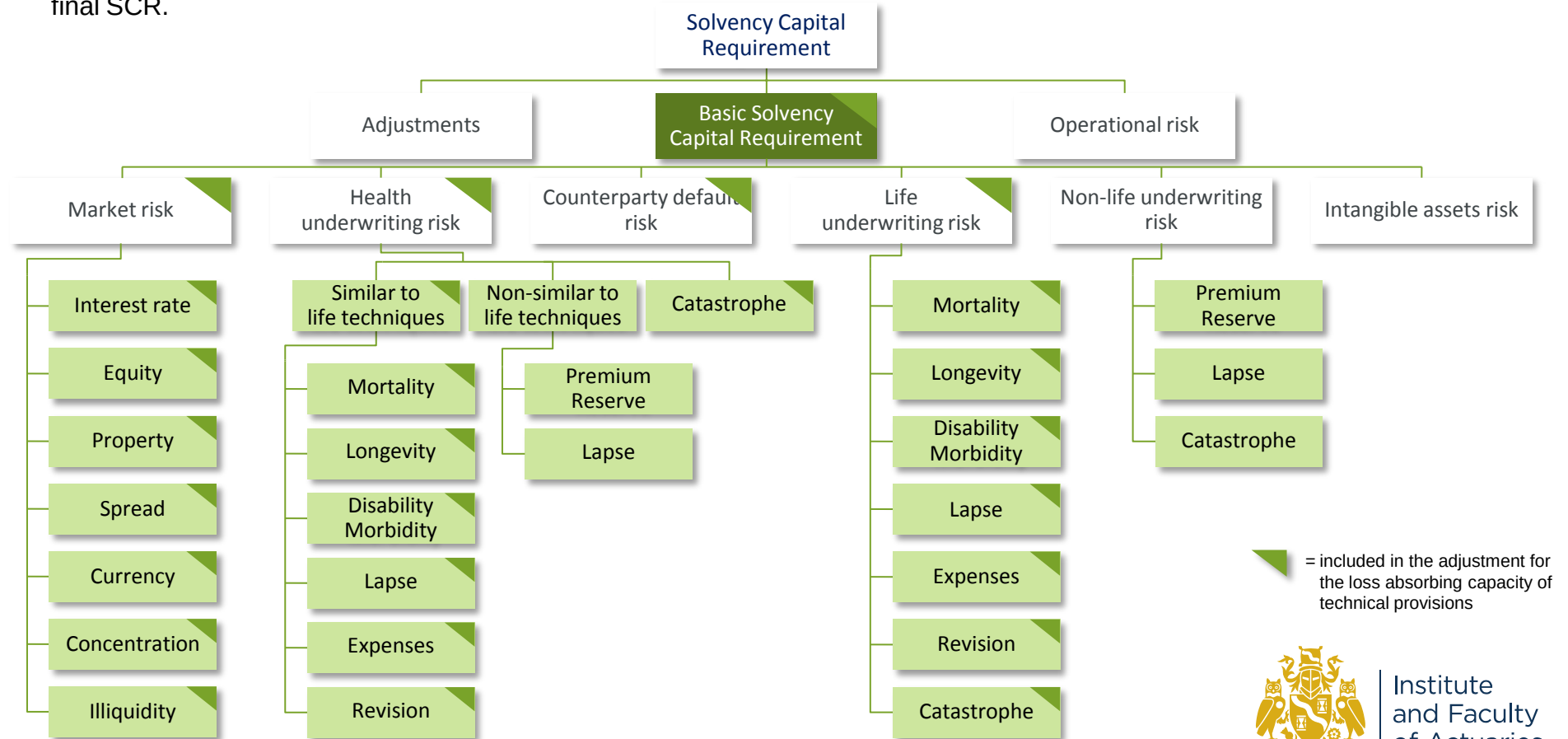


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Recap of Solvency II

Breakdown of Solvency Capital Requirement

- Under the standard formula, the required capital for each risk is calculated in a separate module and then combined to derive the final SCR.



Source: European Commission



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Recap of Solvency II

Diversification

- The outcome of the individual risk modules are combined by allowing for diversification.
- Under the standard formula, diversification is allowed for by use of correlations matrices as the one below for the life underwriting risk module. Internal model users may use more advanced techniques such as copulas.
- A correlation coefficient lower than 1 implies that the diversified capital is lower than the sum of the individual capital components.

	Life _{mort}	Life _{long}	Life _{dis}	Life _{lapse}	Life _{exp}	Life _{rev}	Life _{cat}
Life _{mort}	1	-0.25	0.25	0	0.25	0	0.25
Life _{long}	-0.25	1	0	0.25	0.25	0.25	0
Life _{dis}	0.25	0	1	0	0.5	0	0.25
Life _{lapse}	0	0.25	0	1	0.5	0	0.25
Life _{exp}	0.25	0.25	0.5	0.5	1	0.5	0.25
Life _{rev}	0	0.25	0	0	0.5	1	0
Life _{cat}	0.25	0	0.25	0.25	0.25	0	1



Protection Reinsurance

Impact of Solvency II

- Cessions in UK protection market are high (~90% for mortality)
- Will Solvency II reduce cessions (no real scope for increase)?
- Motivations for reinsurance are wide
- How will reinsurance structures evolve?
- How does annuity business affect reinsurance of term protection?
- The following section looks at the capital requirements for protection business with and without reinsurance.





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Protection Reinsurance Analysis of Solvency II

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Protection Reinsurance

Reinsurance structures

Reinsurance solutions should be designed to improve the solvency position of an insurer. The simplest way of achieving this is by reducing the SCR. However, reinsurance solutions should also consider other ways of improving efficiency in the economic balance sheet, such as providing greater stability of own funds.

Structure	Reinsurance rebates	Abbr	Reinsurance Premium
Risk Premium	None	RP	Typical market quotation basis Select period of rates = term of policy
Net Level Premium	50% of premium for first 4 years	NLP	Typical market quotation
Original Terms	Upfront rebate	OT	Gross office premium



Protection Reinsurance

Model assumptions (Reinsurance)

- 90% Quota Share
- The modelling is based on Munich Re's view of mortality, morbidity and lapse rates for a new business portfolio in the UK life market.
- These assumptions were varied, to ensure that the final conclusions are valid and are not dependent on a particular set of assumptions.
- It was assumed that all policies and the related reinsurance premiums are guaranteed. Although the required capital for a reviewable policy will differ from that of a guaranteed policy, the impact of reinsurance is unlikely to differ.
- For modelling purposes, it is assumed that all policies are written on 1 January 2013.



Protection Reinsurance

Model assumptions (Direct Office)

- Life, CI, LTA, DTA,
- Ages 25 – 60, policy terms 5 – 40 years, males and females, SL, JL
 - Average age at entry ~ 40 years old
 - Average policy term ~ 20 years
- One year new business ~ £1 billion Sum Assured, £2 million AP
- Policyholder premiums ~ Premium rates available via IFAs
- Initial commission is paid on day 1 and earned over Initial Period
- Renewal commission of 5% AP
- Renewal expenses: £20 p.a. with inflation 4%
- Biometric assumptions same as reinsurer
- Level 2 Implementation Measures

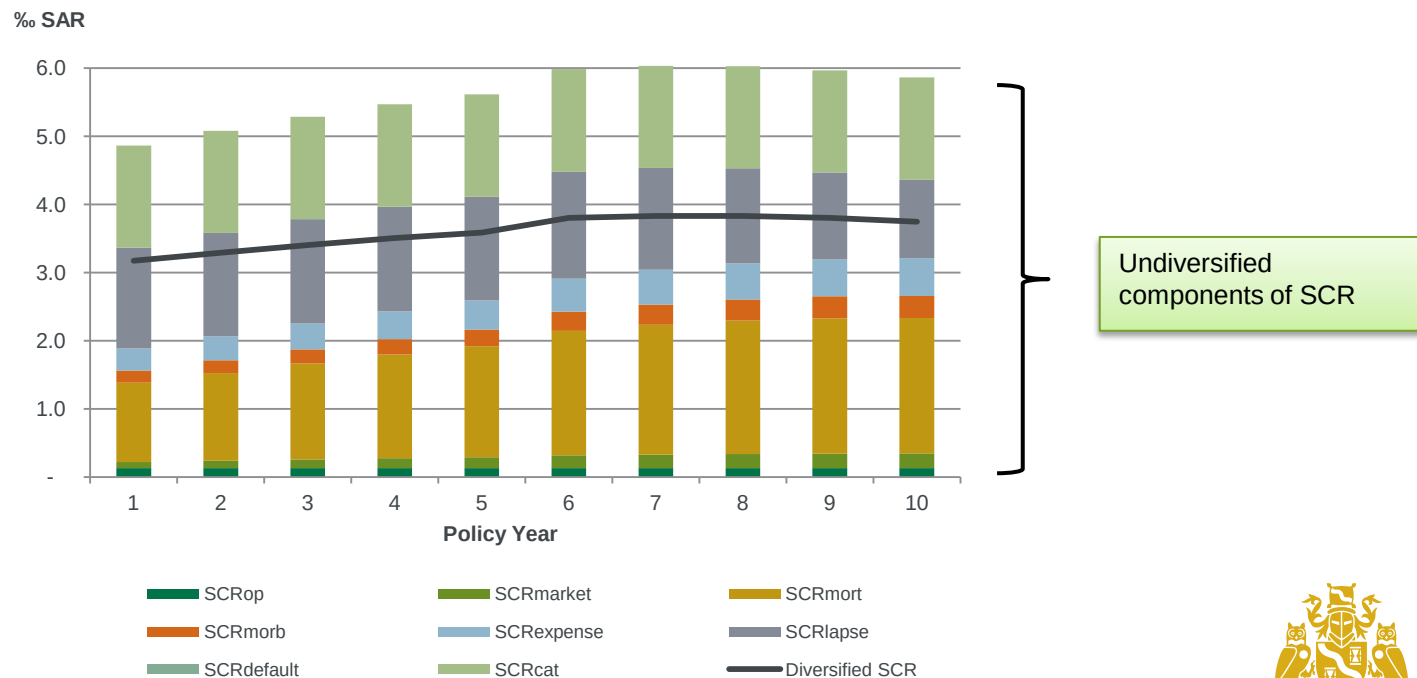


Protection Business

Format of analysis

The impact of the different reinsurance structures will be considered by comparing the overall Solvency II requirement, as per the following graphs:

1. Composition of the SCR
2. Balance sheet (the *liability* side) impact for a sample portfolio



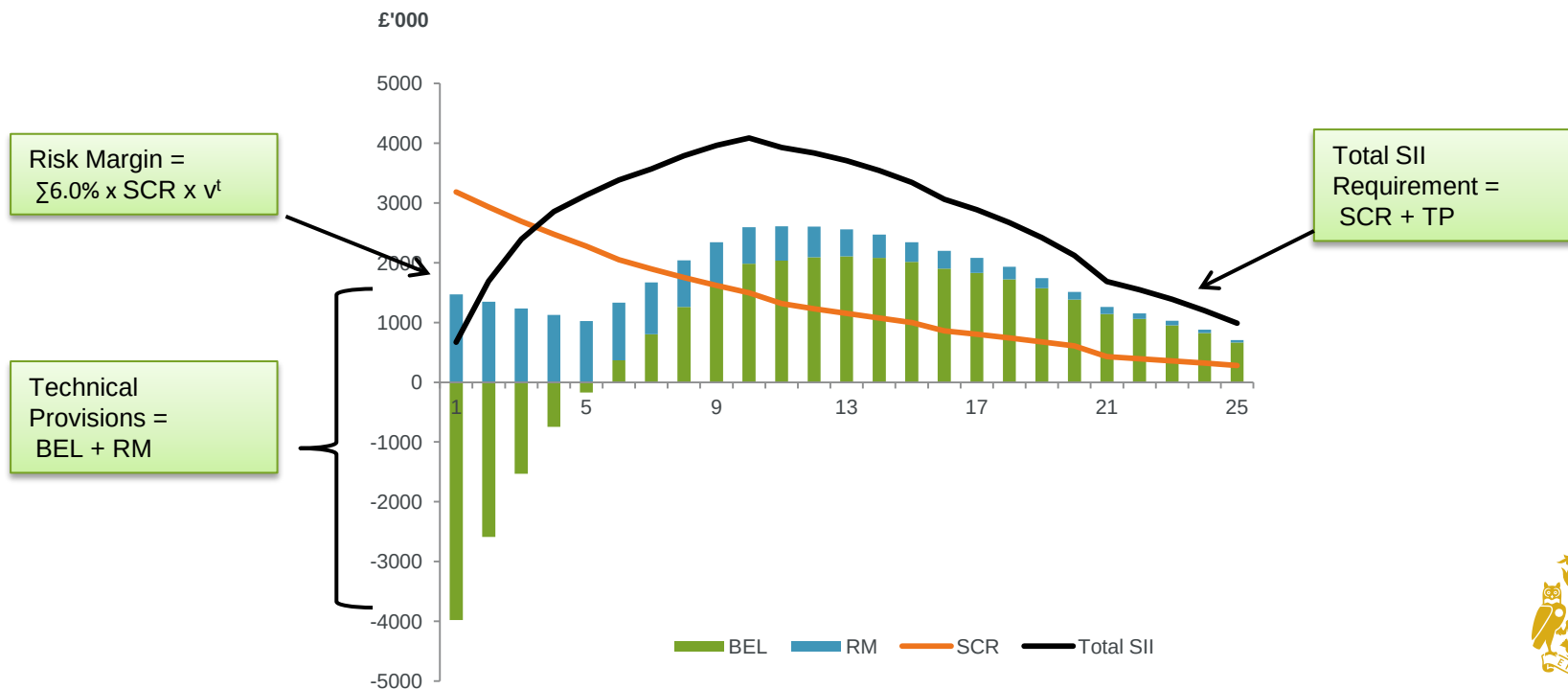
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Protection Business

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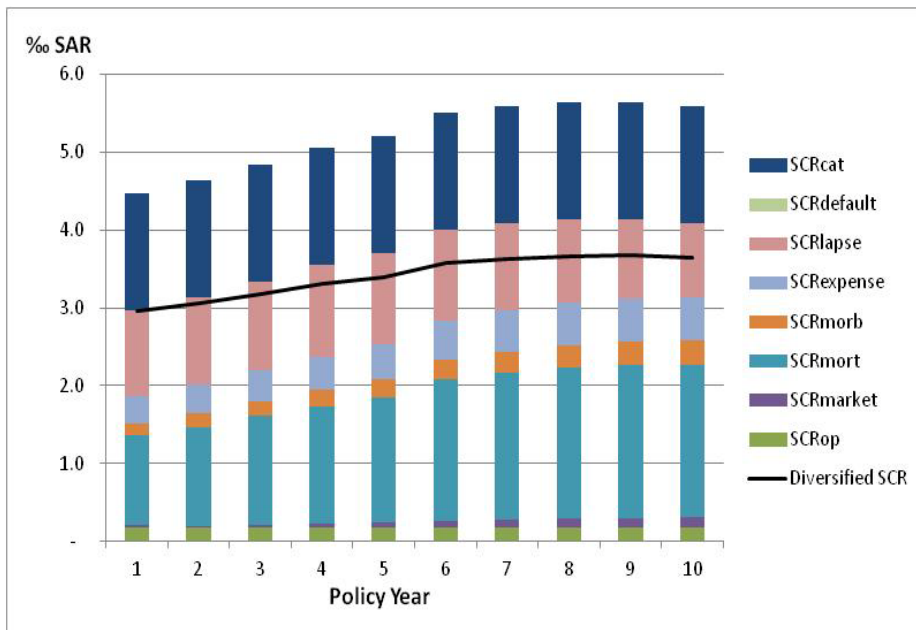


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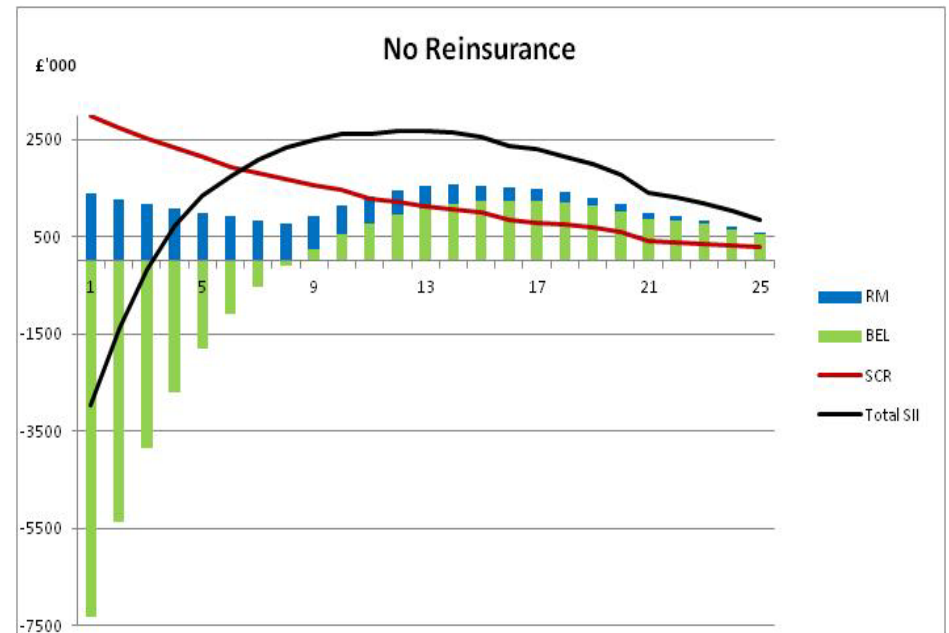
Protection Business

LTA without reinsurance

Composition of SCR



Analysis of liabilities



*Critical illness was modelled as part of the life underwriting risk module, as it is linked to the life policies and accounts for only 5% of the portfolio. This is in line with how many firms treated it for QIS5.

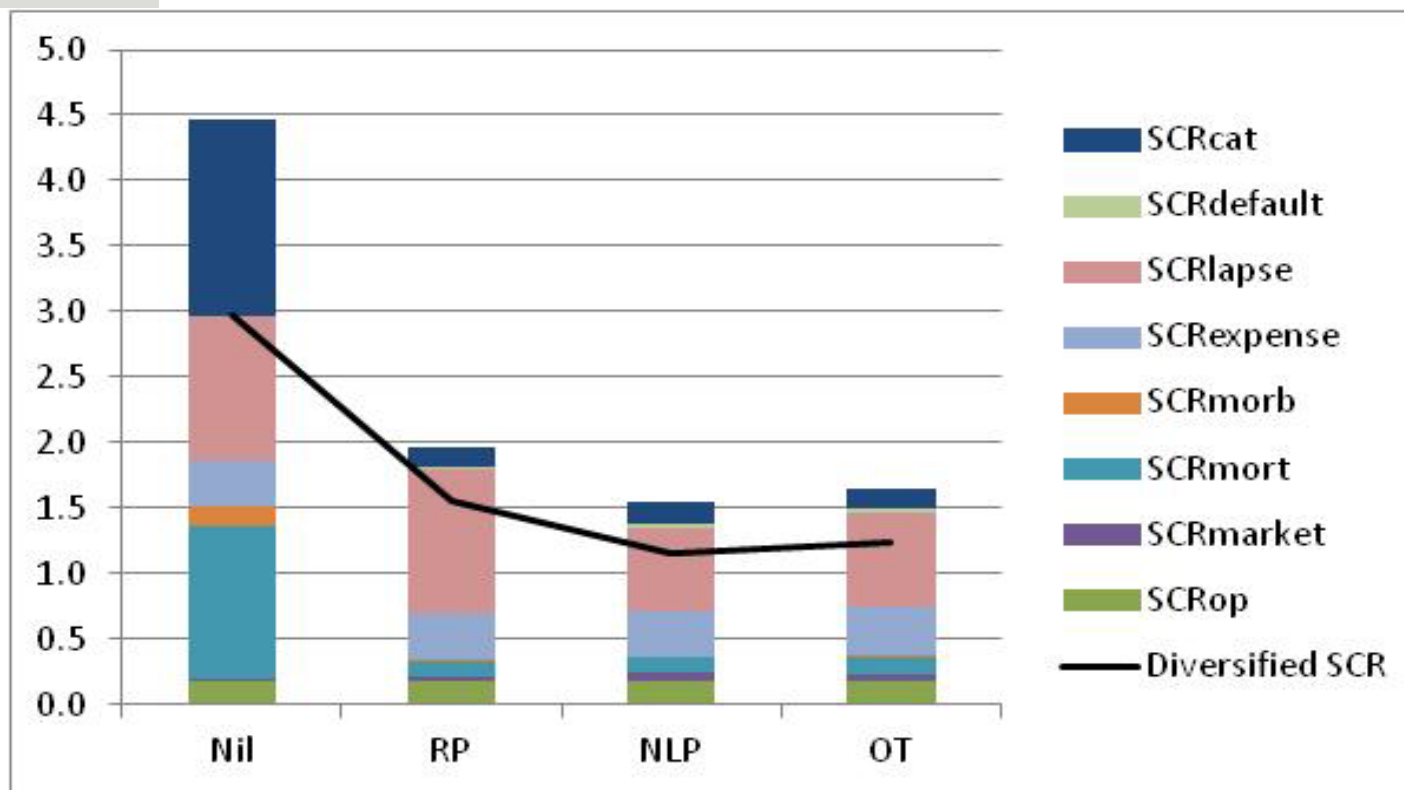


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Protection Business

SCR under different reinsurance structures

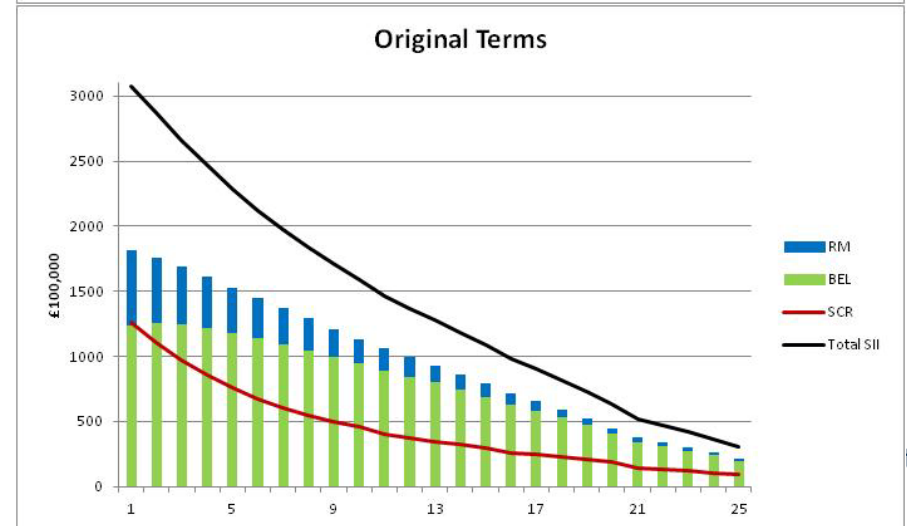
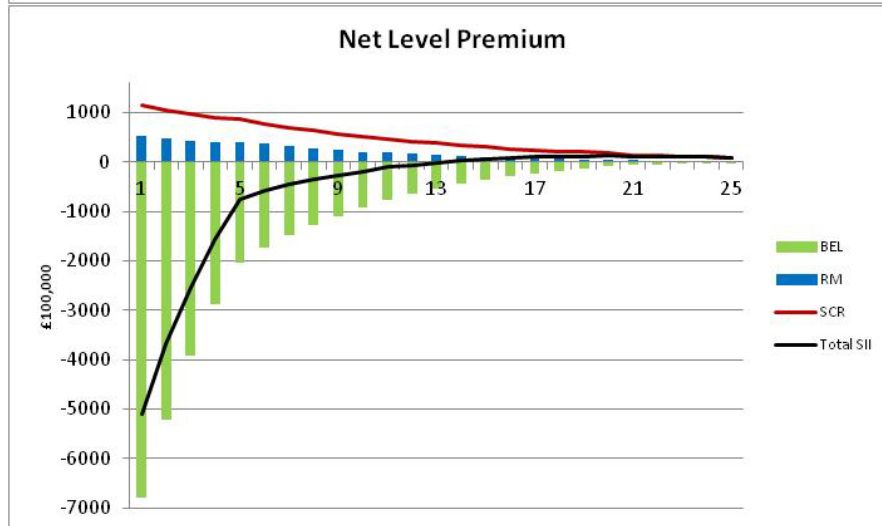
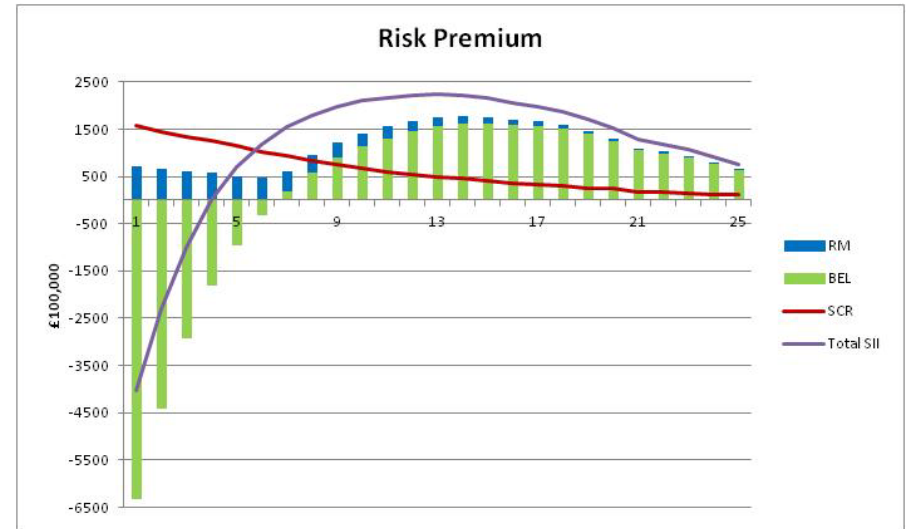
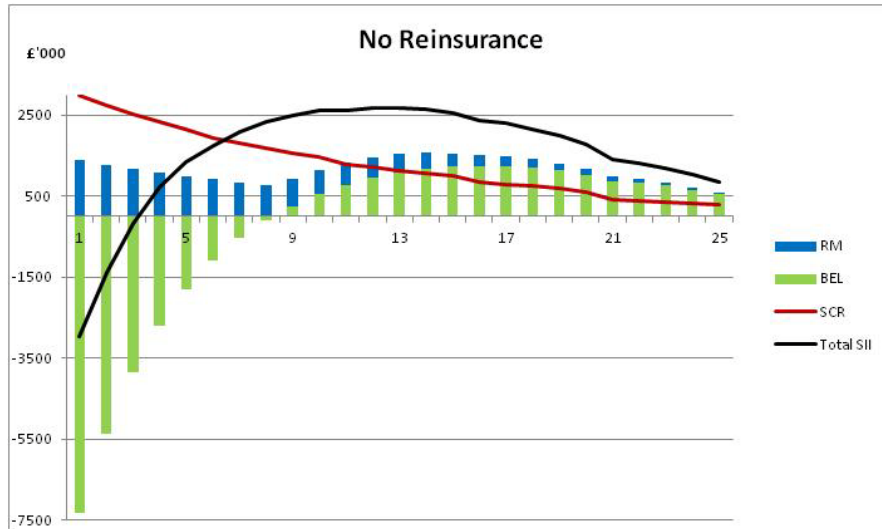
LTA Base case



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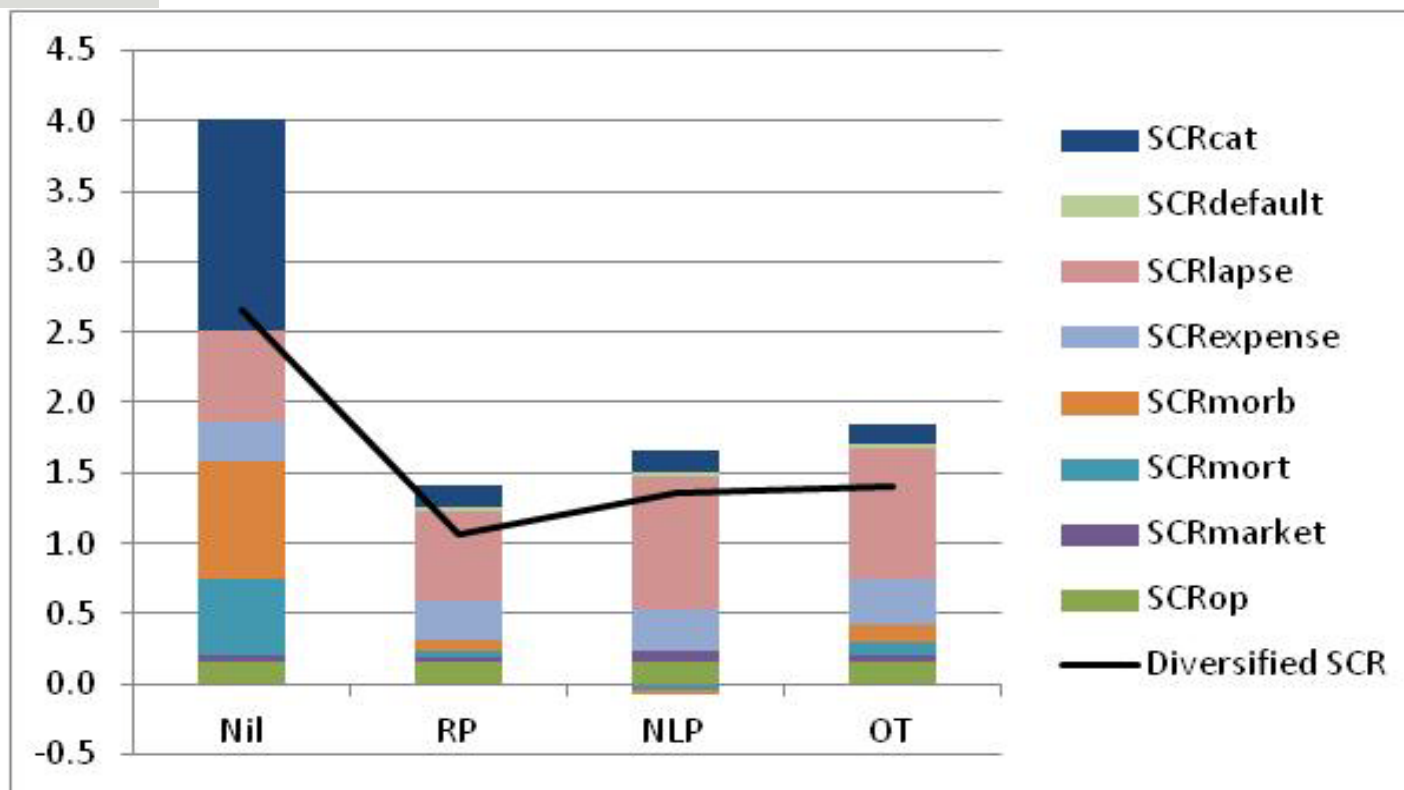
Liabilities under different reinsurance structures (LTA)



Protection Business

SCR under different reinsurance structures

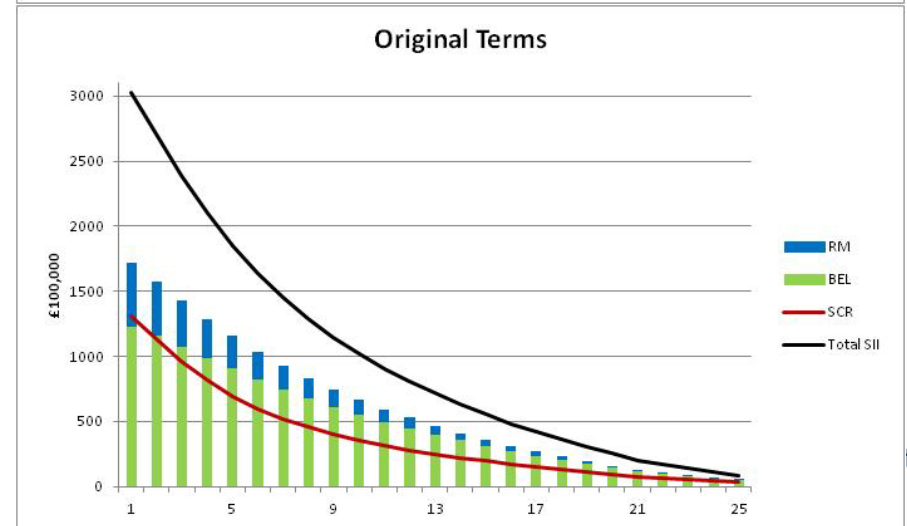
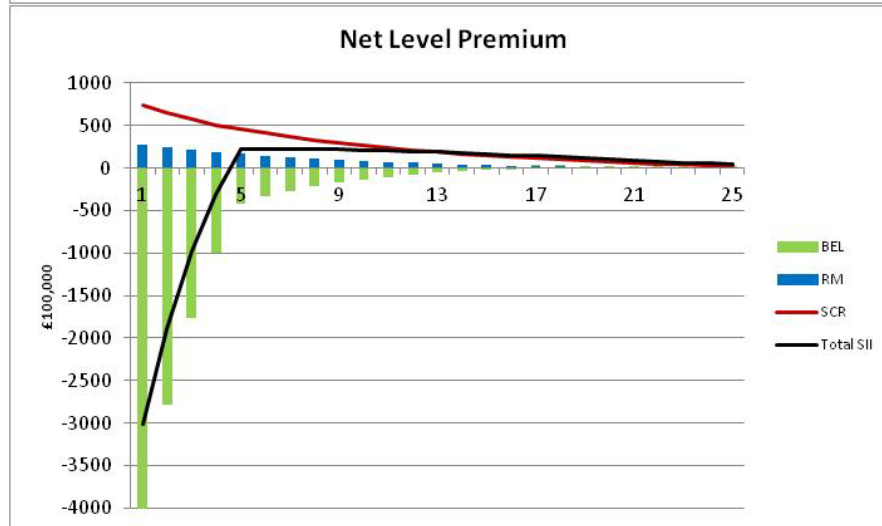
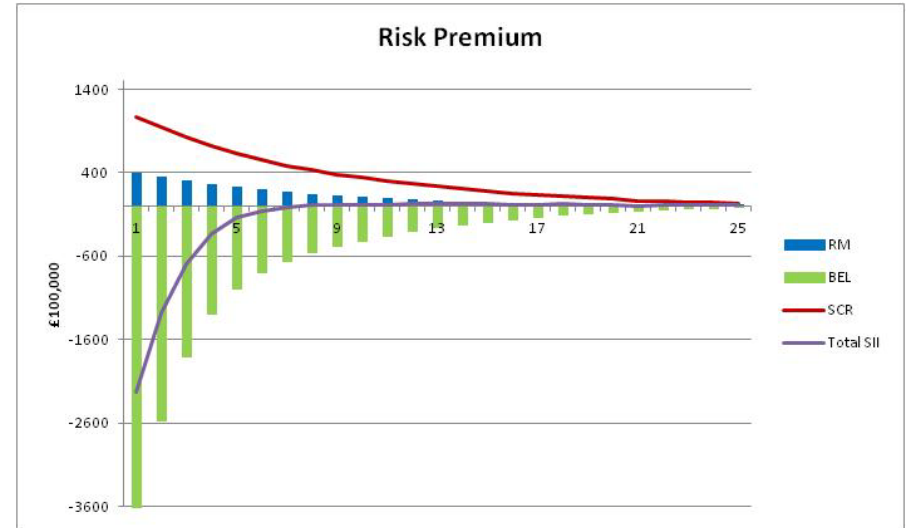
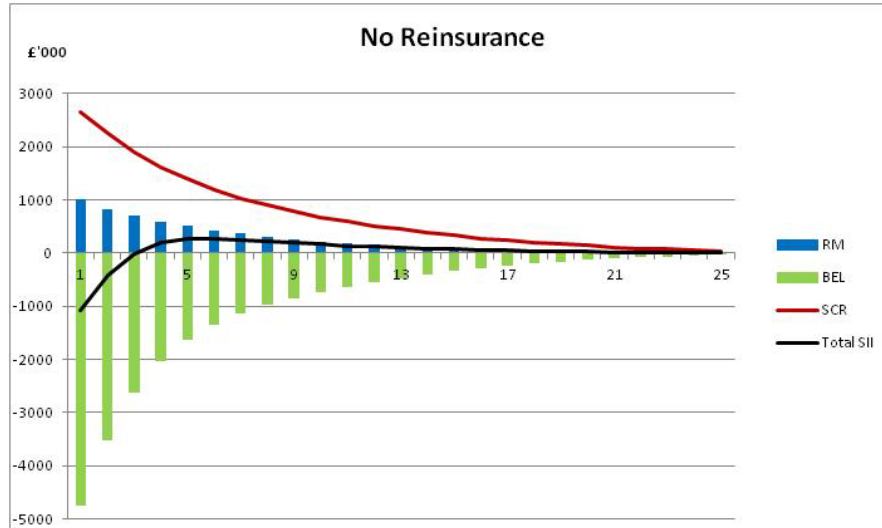
DTA Base case



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Protection Business

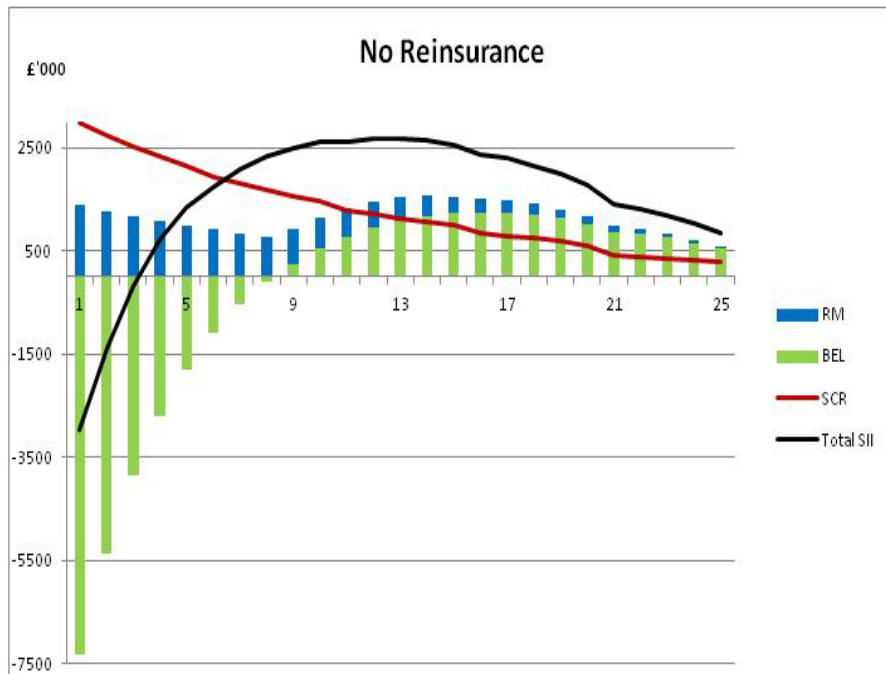
Liabilities under different reinsurance structures (DTA)



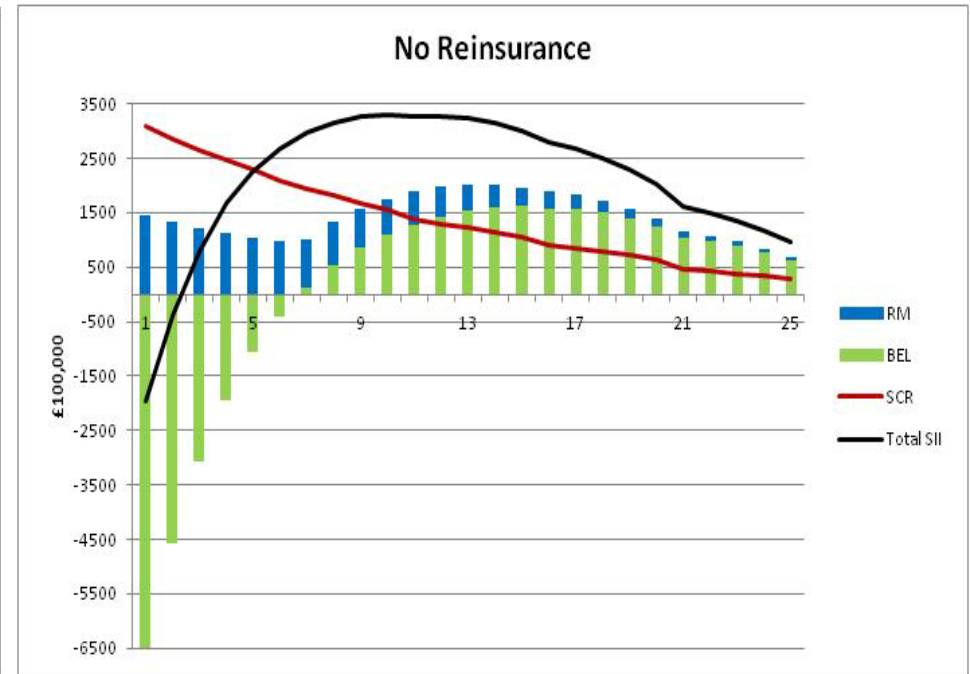
Protection Business

Mortality and morbidity increase by 10%

Base mortality/morbidity



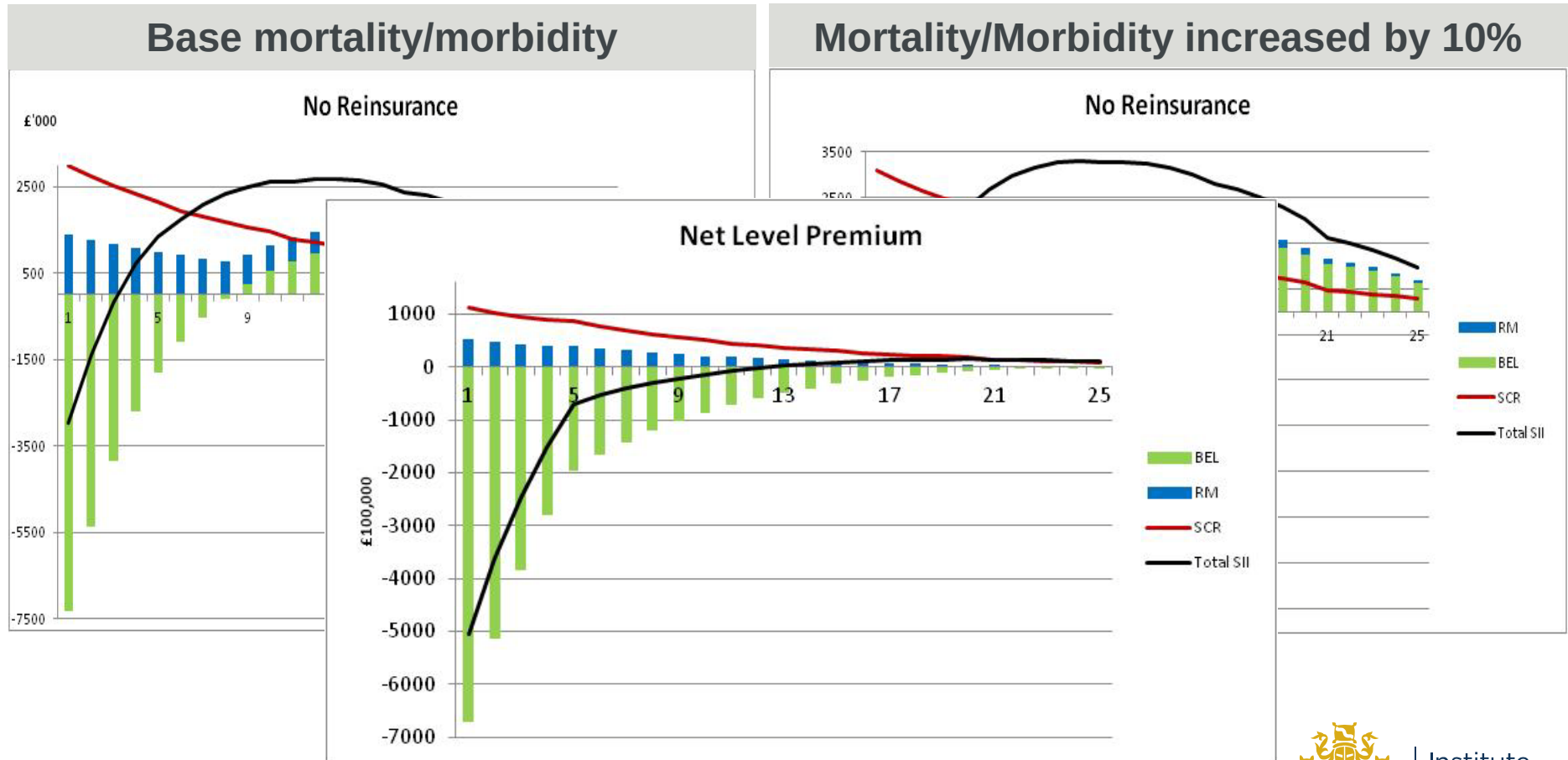
Mortality/Morbidity increased by 10%



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Mortality and morbidity increase by 10%



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Comments

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Comments

Level Term Assurance SCR

- Mortality, catastrophe and lapse risk are the major contributors to the SCR if no reinsurance is in place.
- Market and counterparty ('A' rating) default SCR are tiny.
- All reinsurance structures reduce the capital required for mortality and catastrophe risk proportionally.
 - The impact of reinsurance on the required capital for lapse risk is what distinguishes the different structures.
- The lapse stress under the standard formula consists of three stresses that are applied at an individual policy level, namely:
 - Lapse up: a permanent proportional increase in the level of lapses
 - Lapse down: a permanent proportional decrease in the level of lapses
 - Lapse mass: a one-off mass lapse event at the start of the valuation period

The stress that leads to the highest increase in TP's for an individual policy is used to calculate the required capital for that policy.

A new level premium protection policy is profitable in early years and loss making later on (claims and expenses). The lapse down stress is therefore the stress which bites (*for this assumed risk-free yield curve*) as this results in more policies being in force in later years when the policy is loss making.



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Comments

Level Term Assurance – reinsurance impact on BEL

- The best estimate liabilities are negative reflecting profit margins and margins to fund initial commission.
- The best estimate liabilities under risk premium reinsurance are higher than without reinsurance due to the margin paid to the reinsurer.
- The best estimate liabilities under a net level premium structure is closer to zero as profits are shared with the reinsurer.
 - The BEL increases most quickly in the first 4 years as initial rebates are paid.
 - The BEL remain negative because 90% of claims are converted into a level reinsurance premium.
- The best estimate liabilities under original terms reinsurance are positive because the negative BEL have been monetised. The asset side of the balance sheet would include the reinsurance rebate paid. Monetizing the VIF potentially provides greater stability of the own funds and solvency ratio.



Comments

Level Term Assurance – impact of reinsurance on SCR

- Original terms and net level premium reinsurance have a two-sided effect on the lapse risk of a new protection policy.
 - The reinsurance premium reduces the margin available to insurer to cover expenses and profit contributions in later years and lapse down stress generates a higher capital requirement.
 - These structures exchange increasing claims for a level premium and so smoothes out the profit profile. This reduces the sensitivity to the lapse stresses and hence the required capital.
- The capital efficiency of original terms and net level premium structures depend on the balance of these two dynamics, i.e. the level of rebate. The structures considered here had a relatively low rebate for net level premium and only an upfront rebate for original terms.
 - For net level premium, the smoothing of profits was the dominant dynamic, leading to a reduction in capital for lapse risk.
 - For original terms, the erosion of the margin to cover expenses was dominant, leading to an increase in required capital.
- If a higher rebate is paid for net level premium, the erosion of the margin for expenses will be the dominant dynamic, leading to an increased capital requirement. If the original terms included renewal rebates the lapse risk capital would reduce.



Comments

Level Term Assurance – impact of reinsurance on SCR

- For risk premium reinsurance, the lapse risk is increased. The reinsurance premium is equal to the best estimate claims plus the reinsurer's margin for profit and expenses. The losses in later years are therefore exacerbated, creating a greater sensitivity to the lapse down stress.
- Original terms or net level premium reinsurance result in the lowest SCR (and consequently the Risk Margin).
 - Refinement of rebates will reduce the SCR and RM further.



Comments

Decreasing Term Assurance

- Lapse risk contributes less to the overall SCR than for a level term assurance policy. The profile of profits is much smoother, the increase in mortality rates in later years being offset by the decrease in sum assured leading to a closer alignment with level premiums. Decreasing term assurances are therefore less sensitive to changes in lapse rates.
- As for level term assurances, net level premium and original terms reinsurance structures have a two-sided effect on the lapse risk. However, as the profit profile is already relatively smooth, the erosion of the margin to cover expenses is the dominant dynamic for the rebates tested.
 - If the rebate for net level premium were reduced and the original terms were structured to include a renewal rebate, the smoothing of profits would become the dominant dynamic and these structures will reduce the sensitivity to lapse stresses and therefore the required capital.
- For the structures tested here, risk premium is the most capital efficient reinsurance structure.



Summary of observations

10% Mortality increase

- When mortality and morbidity is 10% higher, Best Estimate of Liabilities increase
- If reinsurance rates are not changed the BEL after reinsurance is closer to the original gross BEL i.e. this is analogous to reinsure pricing for a different best estimate view (or its profit margin reducing)
- The profile of the profit flows remains the same, with profits in early years being offset by losses later on. The lapse down stress therefore still contributes a material part of the SCR.
- The dynamics of the different reinsurance structures is therefore the same, and the net level premium structure remains the most capital efficient.



Internal model considerations

- The results discussed in the preceding sections are based on the standard formula calibration for Solvency II. This section considers how the results may vary if an internal model were used.
- Firstly, under the standard formula, the most efficient reinsurance structure is the one which best matches the underlying profit profile. There should be no reason why this basic principle should not hold when using an internal model and it is therefore likely that the net level premium with rebate structure will also be the most efficient when using an internal model.
- Nonetheless, one can also consider the likely differences in more detail. The final solvency capital requirement for a block of new, profitable protection policies and the impact of reinsurance, will mostly be driven by the following:
 - Mortality stress, including a catastrophe stress
 - Lapse stress
 - Format of model and correlation adjustments



Internal model considerations

- Mortality stress. Any form of proportional reinsurance simply reduces the mortality components proportionally, as the reinsurer pays a proportional share of each claim. There is therefore no reason why the impact of reinsurance on the mortality module should differ materially between an internal model and the standard formula.
- Lapse stress. As discussed before, under the standard formula, the required capital for lapse risk is calculated as the maximum decrease in technical provisions following a lapse up, lapse down or mass lapse stress for an individual policy.
- The stress is therefore relatively prudent and assumes the worst possible outcome, i.e. that each policyholder will lapse selectively against the insurer.



Internal model considerations

- For internal model purposes, a common assumption is that policyholders will not lapse selectively. A 1-in-200 year scenario will affect the lapse experience for all policyholders in the same way. There will be some cross-subsidisation between policies where an increased lapse rate would lead to a loss with those where a decrease in lapse rates would lead to a loss.
- The overall impact of lapses would therefore be lower than under the standard formula.
- The impact of reinsurance on the overall SCR will therefore be less dependent on lapse and the capital efficiency of the different structures will be less distinct.
- Finally, the impact of lapse cross-subsidisation with the back book should be considered.
 - However, most in-force business is already reinsured.





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What is the relevance of an existing annuity book?

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Annuity Business

Hedging Longevity and Mortality Risk

- Distinguish between hedging and diversification
- By “hedging” we mean that total capital decreases when we write another line of business
- By “diversification” we mean that the total capital is less than the sum of the individual components
- Having the optimal balance between mortality and longevity business can therefore greatly improve an insurer’s capital efficiency, as illustrated by the following graph which shows the reduction in the combined SCR due to diversification for different ratios of mortality to longevity business

	Life _{mort}	Life _{long}	Life _{dis}	Life _{lapse}	Life _{exp}	Life _{rev}	Life _{cat}
Life _{mort}	1	-0.25	0.25	0	0.25	0	0.25
Life _{long}	-0.25	1	0	0.25	0.25	0.25	0
Life _{dis}	0.25	0	1	0	0.5	0	0.25
Life _{lapse}	0	0.25	0	1	0.5	0	0.25
Life _{exp}	0.25	0.25	0.5	0.5	1	0.5	0.25
Life _{rev}	0	0.25	0	0	0.5	1	0
Life _{cat}	0.25	0	0.25	0.25	0.25	0	1

$$SCR = \sqrt{\{SCR_x^2 + SCR_y^2 + 2 \times Corr_{xy} \times SCR_x \times SCR_y\}}$$

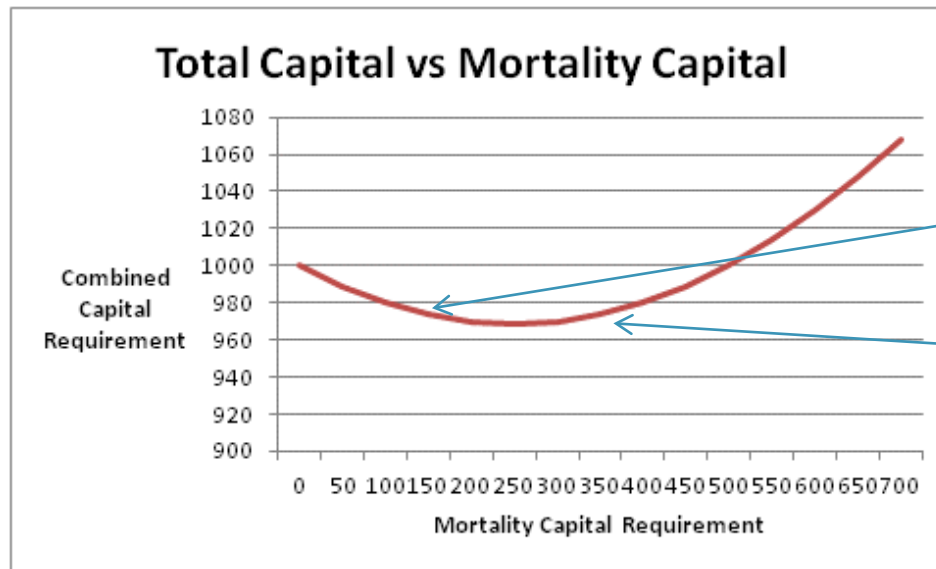


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Annuity Business

Hedging Longevity and Mortality Risk

- Having the optimal balance between mortality and longevity business can therefore greatly improve an insurer's capital efficiency, as illustrated by the following graph which shows the reduction in the combined SCR due to hedging for different ratios of mortality to longevity business



We add increments of mortality capital and the total (longevity + mortality) SCR decreases.

The insurer become mortality heavy and adding increments increases total capital.

- But this doesn't allow for the lapse and CAT SCR that protection business generates



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Hedging Longevity and Mortality Risk

(Simplified) Illustration

£1 billion of annuity liabilities		
	SCR composition	Diversified SCR
SCR		100 million
Market Risk*	50%	50 million
Longevity Risk	40%	40 million
Expense Risk	10%	10 million



£1 billion of Term Assurance Sums Assured		
	SCR composition	Diversified SCR
SCR	3 ‰	3 million
Mortality Risk	1 ‰	1 million
Cat Risk	1 ‰	1 million
Lapse Risk	1 ‰	1 million

	SCR _{mkt}	SCR _{def}	SCR _{life}	SCR _{health}	SCR _{nl}			
SCR _{mkt}	1	0.25	0.25	0.25	0.25			
SCR _{def}	0.25	1	0.25	0.25	0.5			
SCR _{life}	0.25	0.25	1	0.25	0			
SCR _{health}	0.25	0.25	0.25	1	0			
SCR _{nl}	0.25	0.25	0.25	0	1			
	Life _{mort}	Life _{long}	Life _{dis}	Life _{lapse}	Life _{exp}	Life _{rev}	Life _{cat}	
Life _{mort}	1	-0.25	0.25	0	0.25	0	0.25	
Life _{long}	-0.25	1	0	0.25	0.25	0.25	0	
Life _{dis}	0.25	0	1	0	0.5	0	0.25	
Life _{lapse}	0	0.25	0	1	0.5	0	0.25	
Life _{exp}	0.25	0.25	0.5	0.5	1	0.5	0.25	
Life _{rev}	0	0.25	0	0	0.5	1	0	
Life _{cat}	0.25	0	0.25	0.25	0.25	0	1	



**Total
Diversified
SCR = £99
million**



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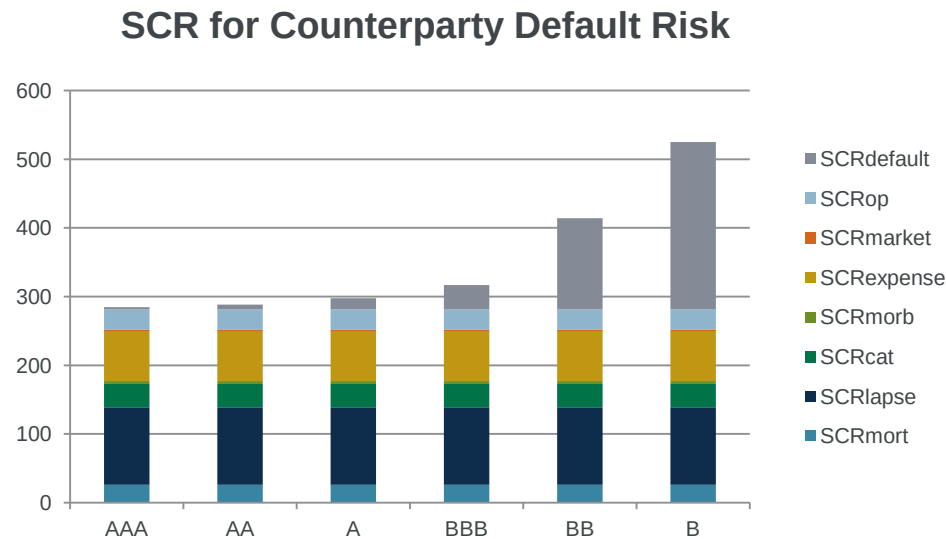
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Other Relevant Issues

Other Relevant Issues

Reinsurer Counterparty Risk

- Solvency II requires insurers to hold capital for the credit risk their counterparties expose them to. For reinsurance, this is the risk that the reinsurer will not honour its obligations under the treaty and the risk mitigation is lost.
- The calibration of the standard formula is such that the required capital is similar for all reinsurers with a credit rating of BBB or higher. Transacting with lower rated reinsurers incur much higher capital requirements. The following graph shows the breakdown of the first year undiversified SCR for the 2011 new business portfolio, assuming 90% is reinsured on a net level premium basis to reinsurers with different credit ratings:



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Other Considerations

Contract Boundaries

Unit-Linked Business

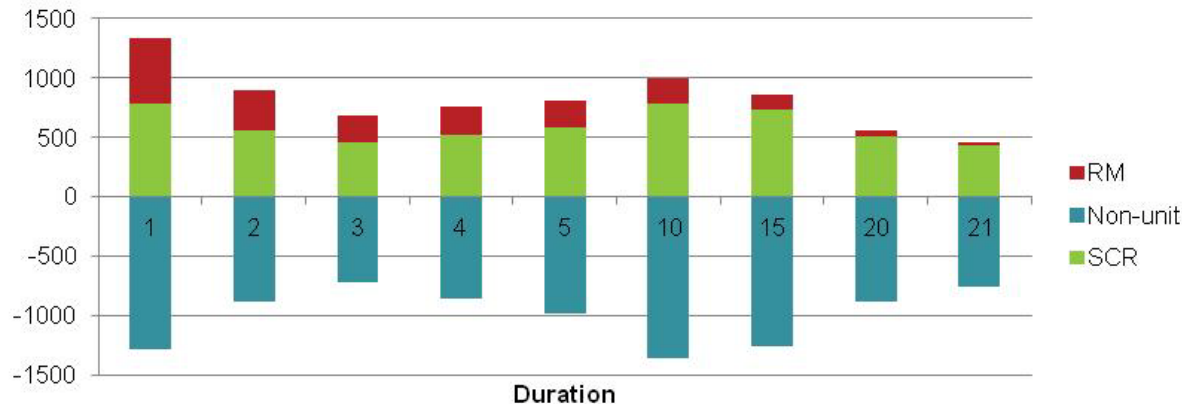
- Paragraph 1(c) of Article 13 TP of the Level 2 implementing measures states that if an insurance contract does not provide cover for an insurance event and does not provide financial guarantees, no future premiums belong to the boundary of the contract.
- Paragraph 4 states that cover of events and guarantees that do not have a material impact on the economics of the contract should be ignored when interpreting paragraph 1(c).
- Unit-linked savings policies in the UK usually have a very limited death benefit (usually return of funds only). The death benefits included in these policies should therefore be ignored for the purposes of paragraph 1 (c). As these policies also do not include any financial guarantees, paragraph 1(c) holds and unit-linked savings policies should therefore **be valued as paid-up**.
- Solvency II allows the present value of future premiums (within the boundaries of the contract) to contribute to an insurer's own funds. The contract boundary implications for unit-linked business is therefore that unit-linked policies do not contribute to the own funds, even if they are expected to be profitable.



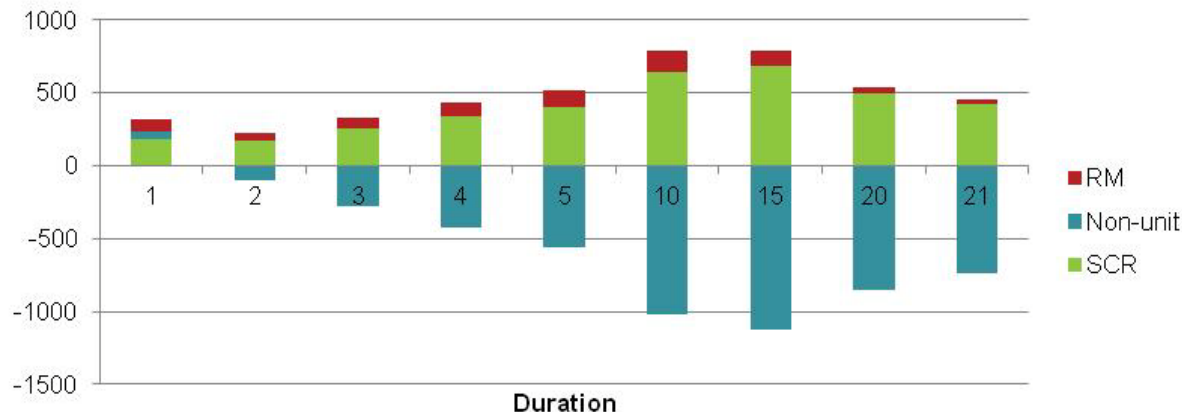
Other Considerations

Contract Boundaries

Non-unit liabilities by duration



Non-unit liabilities by duration – paid-up



- Paid-up contracts do not contribute to own funds in early policy years
 - Negative non-unit reserves are smaller for first 10-15 policy years
- Substantial capital lost in first 10 policy years
- Deficit account financing can help here

Key Assumptions

- Regular premium = €1,200 pa
- Annual management charge = 2.00%
- Surrender rates = 10% pa
- Fund mix is 80% equities / 20% bonds



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Other Considerations

Contract Boundaries

Reinsurance Solution for Unit-Linked Business

- A deficit account treaty where negligible biometric risk is transferred, as is usually the case for financing treaties based on a unit-linked portfolio, is typically classified as a deposit asset under IAS39.
- It appears as if this deposit account can be valued as the financing balance with any write-downs:
 - Paragraph 1(a) of the Solvency II Directive states that assets should be “valued at the amount for which they could be exchanged between knowledgeable willing parties in an arm’s length transaction”.
 - Article 6V2 of the Level 2 Implementing Measures states that “unless otherwise stated, assets and liabilities other than technical provisions shall be recognised in conformity with the international accounting standards, as endorsed by the Commission in accordance with Regulation (EC) No 1606/2002.”
 - Under IFRS, the outstanding amount on a financing treaty is accounted for as a deposit asset.
 - The guidance provided in the QIS5 Technical Specification for valuation of assets and liabilities is that the deposit asset should be valued at fair value.
- The reinsurer will therefore be able to account for the future profits expected from the cash financing treaty as an asset. This allows the reinsurer to cost effectively provide cash to the insurer in respect of future profits on a unit-linked portfolio.



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Observations and Other Considerations

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Observations

- The most efficient reinsurance structure will ultimately depend on the assumptions used to calculate the technical provisions and the calibration of the internal model.
- The most efficient structure would ideally be one that strikes the right balance between the following:
 - The level of matching
 - The cost of reinsurance
 - The efficiency over time



Observations (cont.)

The level of matching

- Solvency II is all about matching.
- This is very apparent in the capital required to cover market risk, which can be reduced significantly if assets and liabilities are matched appropriately.
- The same holds for reinsurance.
- The closer the payments under a reinsurance contract matches the profit profile of a portfolio, including the margin required to cover expenses, the greater the capital reduction that can be achieved from the reinsurance.



Observations (cont.)

The cost of reinsurance

- A closer matching of the underlying profit profile means that more risks are ceded to the reinsurer (in the most ideal structure, even expense risk would be shared with the reinsurer).
- The reinsurer may not be willing to accept all these risks, especially those over which they have limited control.
- For the reinsurer to accept the risk, there will be a cost.



Observations (cont.)

The efficiency over time

- It is apparent from the previous analyses that the SCR and the impact of reinsurance thereon will change over the lifetime of a new protection portfolio.
- The most efficient reinsurance structure may therefore not necessarily be the one which provides the greatest reduction in capital at the outset, but which provides high capital reductions throughout the lifetime of the portfolio.



Other considerations

Internal Model considerations

- The results discussed so far are based on the standard formula calibration for Solvency II.
- Under the standard formula, the most efficient reinsurance structure is the one which best matches the underlying profit profile.
- Would the same basic principle should not hold when using an Internal Model?



Other considerations (cont.)

Further investigations

- Adjustments to allow for the key differences between internal model and standard formula
- Modelling based on own pricing / best estimate assumptions
- Interaction with the back book
- Other reinsurance structure e.g. different rebate structure



Questions

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.



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