



SAS General Insurance Conference Solvency II Discussion

1 June 2012

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Aon Benfield Analytics | Risk & Capital Strategy

AON BENFIELD

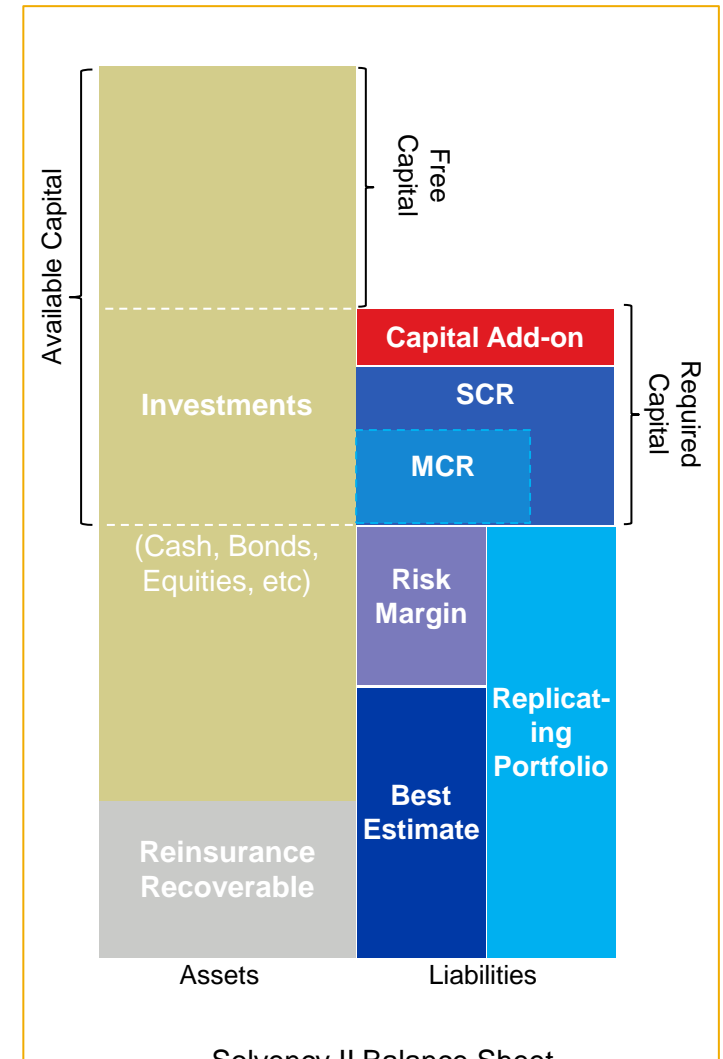
Section 1: Solvency II Introduction and Development

Solvency II: “Three Pillars”

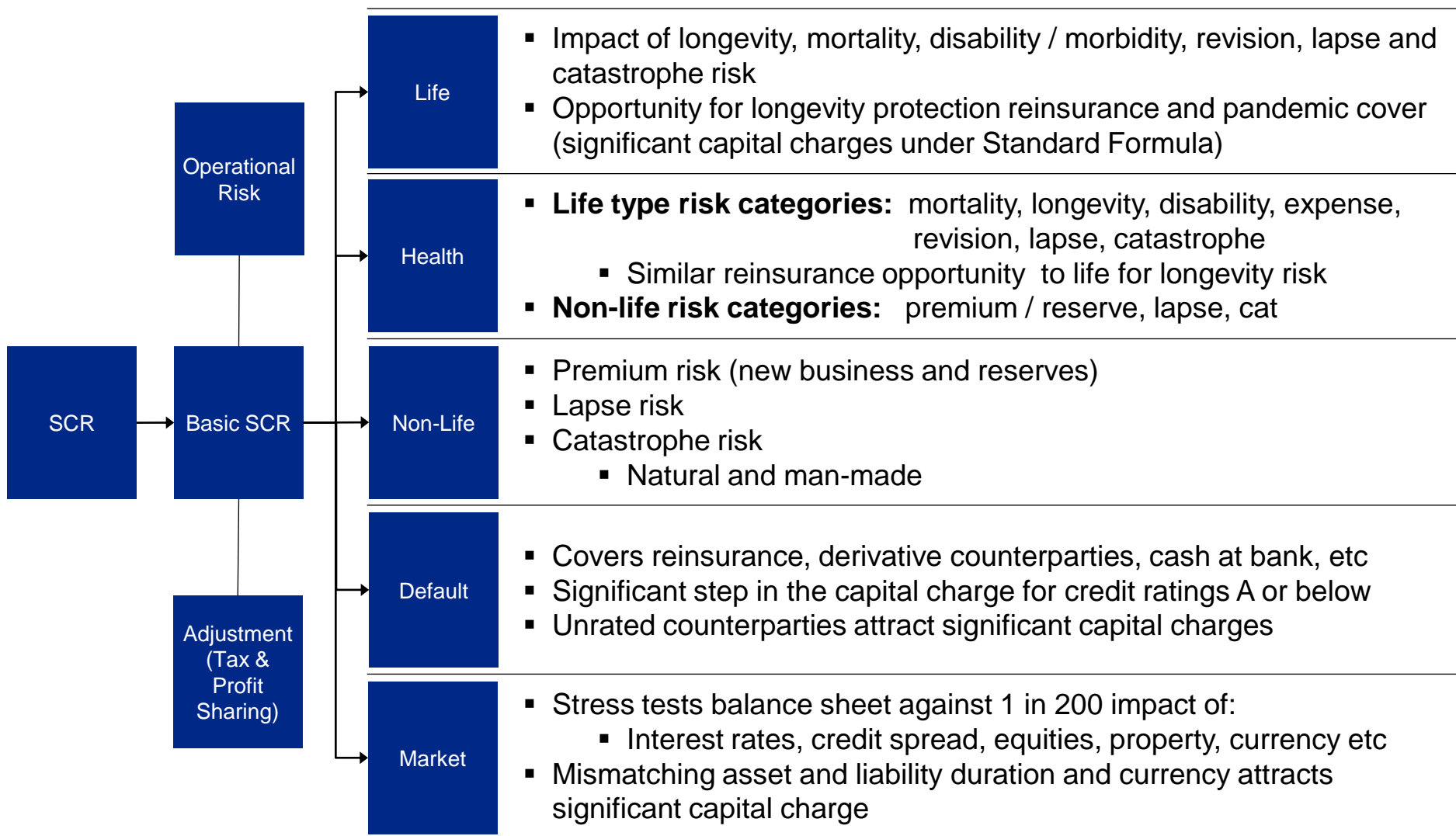
Pillar 1 Quantitative Requirements	Pillar 2 Supervisory Review	Pillar 3 Disclosure Requirements
<ul style="list-style-type: none">▪ Fair value balance sheet▪ Capital Requirements<ul style="list-style-type: none">▪ Solvency Capital Requirement (SCR)▪ Minimum Capital Requirement (MCR)	<ul style="list-style-type: none">▪ Systems of governance▪ Own Solvency Risk Assessment (ORSA)▪ Supervisory review process<ul style="list-style-type: none">▪ Assessment of quantitative and qualitative requirements	<ul style="list-style-type: none">▪ Solvency and Financial Condition Report (SFCR)<ul style="list-style-type: none">▪ Greater transparency to investors▪ Report to Supervisors (RSR)<ul style="list-style-type: none">▪ Quarterly and annual reporting requirements

Solvency II: Balance Sheet

Item	Description
Market Consistent Valuation	<ul style="list-style-type: none"> Assets and liabilities should be assessed in market consistent method
Best Estimate Liabilities	<ul style="list-style-type: none"> Reserves are discounted (swap curve + liquidity premium) No equalisation reserves / buffers
Risk Margin	<ul style="list-style-type: none"> Explicit margin above best estimate to reflect the market consistent price of a liability
SCR	<ul style="list-style-type: none"> Solvency Capital Requirement is the loss in assets and increase in liabilities following a 1 in 200 year event over a 1 year time horizon Use Standard Formula or an internal model
Capital Add-on	<ul style="list-style-type: none"> If SCR is not representative of the risks of the insurer's risk profile, the supervisor can impose a capital add-on
MCR	<ul style="list-style-type: none"> Minimum Capital Requirement, between 25% and 45% of SCR
Asset Valuation	<ul style="list-style-type: none"> Assets are measured mark to market Reinsurance recoverable haircut to reflect expected losses according to credit rating



Standard Formula: Overview of Capital Charges



Standard Formula: Overview of Capital Charges (Market)

Risk	Sub-risk	Capital Charge	Implications
Market Risk	Interest Rate	<ul style="list-style-type: none"> Interest rate capital charge is calculated as the worst case impact on net asset value (assets less liabilities) of an upward and downward shock to the risk-free yield curve 	<ul style="list-style-type: none"> Mismatching asset and liability duration attracts significant capital charge
	Equity	<ul style="list-style-type: none"> Global Equity: 39% capital charge (listed equities) Other Equity: 49% (hedge funds, private equity, infrastructure etc) Strategic Participations: 22% 	<ul style="list-style-type: none"> Significant capital charge for equities Partial internal model incentive
	Property	<ul style="list-style-type: none"> Property charge is 25% of market value 	<ul style="list-style-type: none"> Leaseback of own premises
	Currency	<ul style="list-style-type: none"> Currency capital charge is computed as the worst case impact on the value assets less liabilities of a 25% upward or downward shock in exchange rates 	<ul style="list-style-type: none"> Matching of assets and liabilities by currency is key
	Conc.	<ul style="list-style-type: none"> Captures concentration risk to single counterparty (e.g. bond issuer) Charge only applies to holdings in excess of 3% of total assets for credit ratings A or above and 1.5% of total assets for ratings BBB or lower 	<ul style="list-style-type: none"> Limit exposure to any single counterparty below concentration threshold

Standard Formula: Overview of Capital Charges (Market)

Risk	Sub-risk	Capital Charge	Implications																																																				
Market Risk	Spread	<ul style="list-style-type: none"> This is the risk of spreads widening reducing value of fixed income assets <table border="1"> <thead> <tr> <th rowspan="2">Rating</th> <th rowspan="2">Duration Factor</th> <th colspan="4">Capital Charge by Duration</th> </tr> <tr> <th>1</th> <th>3</th> <th>5</th> <th>10</th> </tr> </thead> <tbody> <tr> <td>AAA</td> <td>0.9%</td> <td>0.9%</td> <td>2.7%</td> <td>4.5%</td> <td>9.0%</td> </tr> <tr> <td>AA</td> <td>1.1%</td> <td>1.1%</td> <td>3.3%</td> <td>5.5%</td> <td>11.0%</td> </tr> <tr> <td>A</td> <td>1.4%</td> <td>1.4%</td> <td>4.2%</td> <td>7.0%</td> <td>14.0%</td> </tr> <tr> <td>BBB</td> <td>2.5%</td> <td>2.5%</td> <td>7.5%</td> <td>12.5%</td> <td>25.0%</td> </tr> <tr> <td>BB</td> <td>4.5%</td> <td>4.5%</td> <td>13.5%</td> <td>22.5%</td> <td>45.0%</td> </tr> <tr> <td>B or lower</td> <td>7.5%</td> <td>7.5%</td> <td>22.5%</td> <td>37.5%</td> <td>60.0%</td> </tr> <tr> <td>Unrated</td> <td>3.0%</td> <td>3.0%</td> <td>9.0%</td> <td>15.0%</td> <td>30.0%</td> </tr> </tbody> </table>	Rating	Duration Factor	Capital Charge by Duration				1	3	5	10	AAA	0.9%	0.9%	2.7%	4.5%	9.0%	AA	1.1%	1.1%	3.3%	5.5%	11.0%	A	1.4%	1.4%	4.2%	7.0%	14.0%	BBB	2.5%	2.5%	7.5%	12.5%	25.0%	BB	4.5%	4.5%	13.5%	22.5%	45.0%	B or lower	7.5%	7.5%	22.5%	37.5%	60.0%	Unrated	3.0%	3.0%	9.0%	15.0%	30.0%	<ul style="list-style-type: none"> Fixed income should be rated at least BBB for insurers under Solvency II Long duration corporate bonds and structured products are not capital efficient Under Solvency II demand for short duration corporate bonds may increase Anomaly for unrated bonds
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	Illiquidity	<ul style="list-style-type: none"> New capital charge computed as impact on the liabilities of a 65% fall in the illiquidity premium observed in the financial markets 	<ul style="list-style-type: none"> Some capital saving is possible through fixed income offset 																																																				

Standard Formula: Overview of Capital Charges (Non-life)

Risk	Sub-risk	Capital Charge
Non-life Risk	Premium & Reserve	<ul style="list-style-type: none"> Capital charge for new business and reserves Assumes 100% loss ratio (no allowance for profit) <ul style="list-style-type: none"> Overstates capital requirement for profitable lines of business Capital is calculated as 1 in 200 return period of the log-normal distribution Volatilities across lines of business are aggregated using conservative prescribed correlation assumptions (25% or 50%) Combined volatility for premium and reserve risk assumes 50% correlation
	Lapse	<ul style="list-style-type: none"> Potential impact on the insurer of the take up rate for policyholder options being different to that expected, e.g. <ul style="list-style-type: none"> Options to terminate a contract before the end of the previously agreed insurance period Options to renew contracts according to previously agreed conditions Not usually significant unless the portfolio includes profitable tacit renewals
	Catastrophe	<ul style="list-style-type: none"> Natural cat: standard formula not granular enough (CRESTA zone only) <ul style="list-style-type: none"> Standardised scenarios provide poor representation of risk compared to cat models Granularity of data is completely ignored Man-made cat: e.g. Mont Blanc tunnel collision: significant new capital charge

Standard Formula: Overview of Capital Charges (Default)

Risk	Sub-risk	Capital Charge	Implications
Default	Type 1 Default	<ul style="list-style-type: none"> ▪ These are exposures that cannot be easily diversified and where the counterparty is likely to be rated and broadly includes: <ul style="list-style-type: none"> ▪ All risk mitigating contracts ▪ Cash at bank and deposits / guarantees / letters of credit etc where the number of counterparties does not exceed 15 ▪ Calculation is complex, some important properties of the approach are: <ul style="list-style-type: none"> ▪ Probabilities of default increase in time of systemic stress. ▪ The effect of latent shocks was introduced in the model in order to include systemic risk (impacting all counterparties) ▪ The model only covers the unexpected default. The impact of a change in credit rating is not covered 	<ul style="list-style-type: none"> ▪ The significant step in the capital charge for credit ratings A or below may drive a flight to quality from reinsurance buyers ▪ It is more capital efficient to have a single AA rated reinsurer than 10 A rated reinsurers

Standard Formula: Overview of Capital Charges (Default)

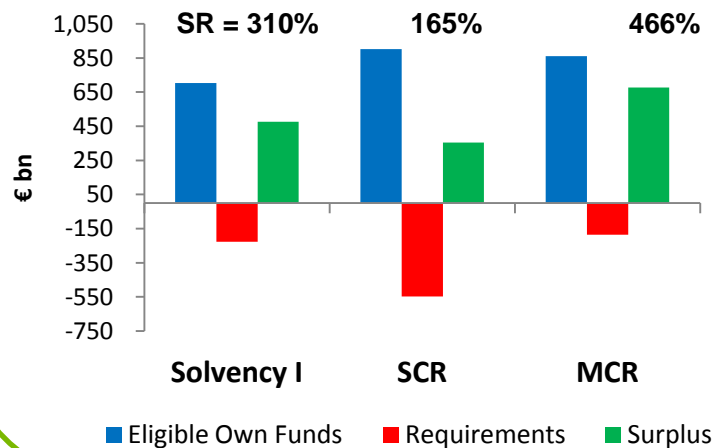
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Default	Type 1 Default	<ul style="list-style-type: none"> The probability of default factors penalises lower rated counterparties: <table border="1"> <thead> <tr> <th rowspan="2">Rating</th> <th rowspan="2">P</th> <th colspan="4">Capital Charge Per Unit Exposure</th> </tr> <tr> <th>1</th> <th>2</th> <th>5</th> <th>10</th> </tr> </thead> <tbody> <tr> <td>AAA</td> <td>0.002%</td> <td>0.71%</td> <td>0.58%</td> <td>0.49%</td> <td>0.46%</td> </tr> <tr> <td>AA</td> <td>0.01%</td> <td>1.59%</td> <td>1.31%</td> <td>1.11%</td> <td>1.03%</td> </tr> <tr> <td>A</td> <td>0.05%</td> <td>3.54%</td> <td>2.92%</td> <td>2.47%</td> <td>2.30%</td> </tr> <tr> <td>BBB</td> <td>0.24%</td> <td>12.85%</td> <td>6.36%</td> <td>5.40%</td> <td>5.03%</td> </tr> <tr> <td>BB</td> <td>1.20%</td> <td>27.83%</td> <td>23.12%</td> <td>19.76%</td> <td>18.50%</td> </tr> <tr> <td>B</td> <td>6.04%</td> <td>50.00%</td> <td>46.76%</td> <td>41.16%</td> <td>39.12%</td> </tr> <tr> <td>CCC or lower</td> <td>30.41%</td> <td>50.00%</td> <td>50.00%</td> <td>50.00%</td> <td>50.00%</td> </tr> </tbody> </table>	Rating	P	Capital Charge Per Unit Exposure				1	2	5	10	AAA	0.002%	0.71%	0.58%	0.49%	0.46%	AA	0.01%	1.59%	1.31%	1.11%	1.03%	A	0.05%	3.54%	2.92%	2.47%	2.30%	BBB	0.24%	12.85%	6.36%	5.40%	5.03%	BB	1.20%	27.83%	23.12%	19.76%	18.50%	B	6.04%	50.00%	46.76%	41.16%	39.12%	CCC or lower	30.41%	50.00%	50.00%	50.00%	50.00%	<ul style="list-style-type: none"> It is more capital efficient to have a single AA rated reinsurer than 10 A rated reinsurers
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	Type 2 Default	<ul style="list-style-type: none"> Type II exposures capture those counterparty risks that can be diversified and where the counterparties are usually not rated. The calculation of the capital charge is based on a simple pre-determined shock of a 15% of the value of Type II exposures due within 3 months and 90% of the value of exposures due after 3 months. 	<ul style="list-style-type: none"> Type 2 exposures attract significant capital charges 																																																				
<p>The overall counterparty default risk capital charge is computed by aggregating together the capital charges for Type I and Type II exposures, assuming a 75% correlation</p>																																																							

Summary: Surplus under Solvency II

Surplus: Solvency I to QIS 5

- Overall levels of surplus for European industry have decreased by 30% representing a €120bn reduction
- The margin under the MCR has increased by €200bn
- Industry wide Solvency II ratio is 165% under QIS 5

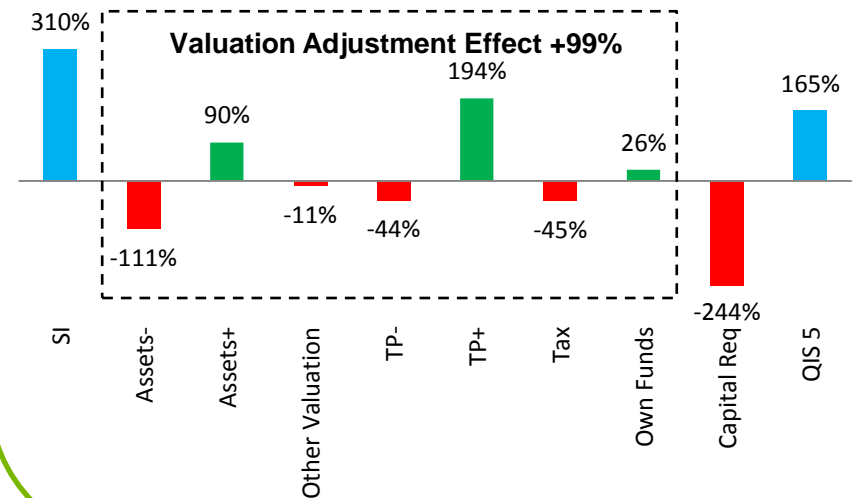
Surplus: Solvency I to II



Analysis of Surplus Movement

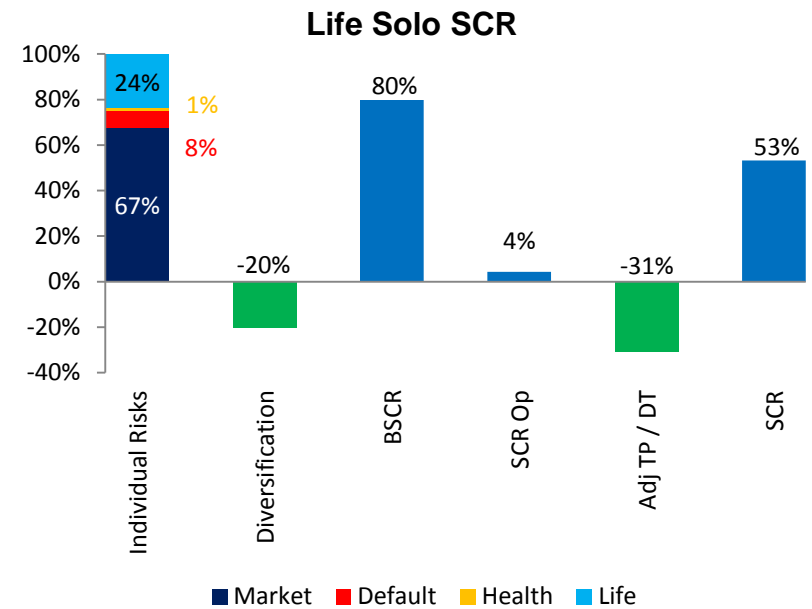
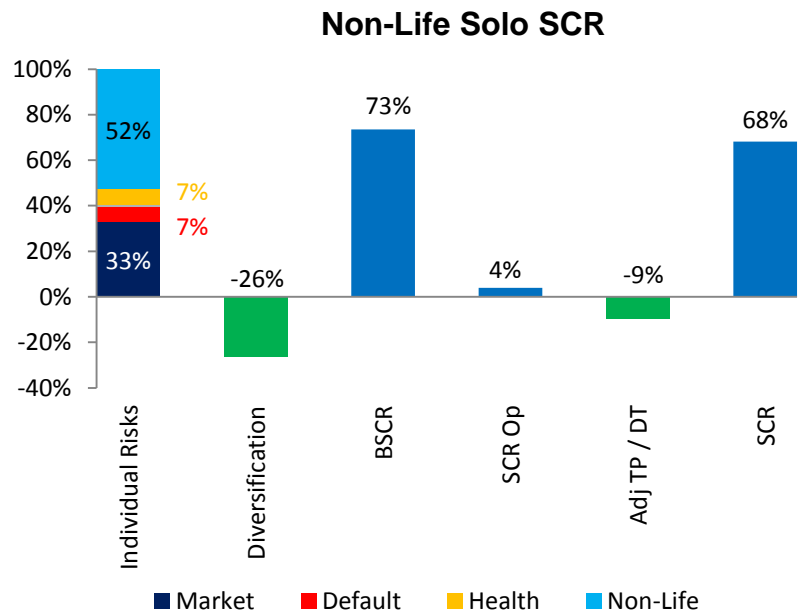
- Market consistent valuation of assets under Solvency II reduces Solvency II ratio by 21%
- Technical provisions assessed at fair value increases Solvency II ratio by 150%
- Risk based capital requirements are key driver of reduction in Solvency II ratio

Movement in Solvency Ratio from SI to QIS 5



Summary: Solvency Capital Requirement

- Average capital requirement for non-life insurers is higher than life insurers under Solvency II
 - This is driven by the loss absorbency of technical provisions
- Greater diversification in the BSCR for non-life insurers
- Market risk is largest component of life insurance capital requirement

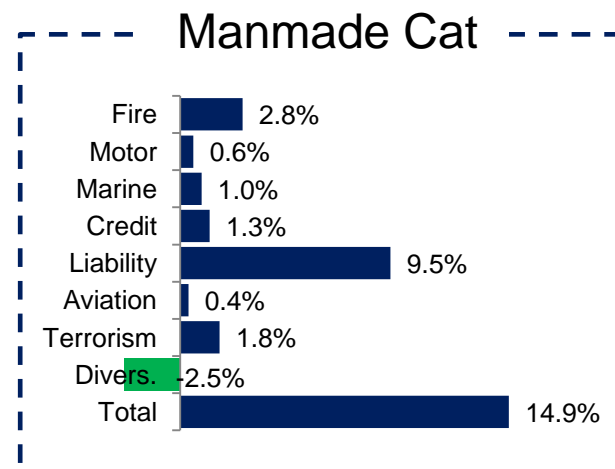
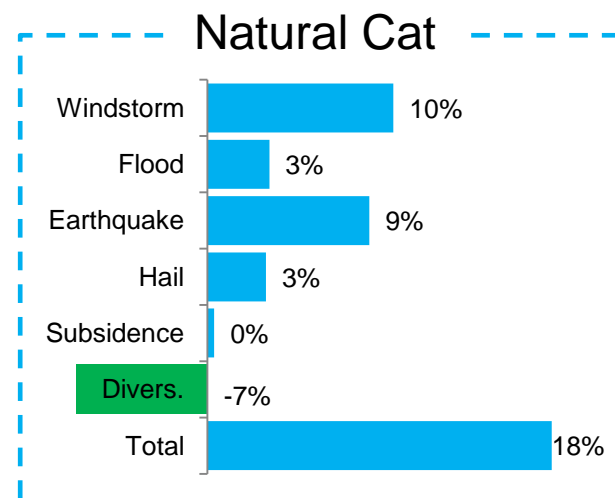
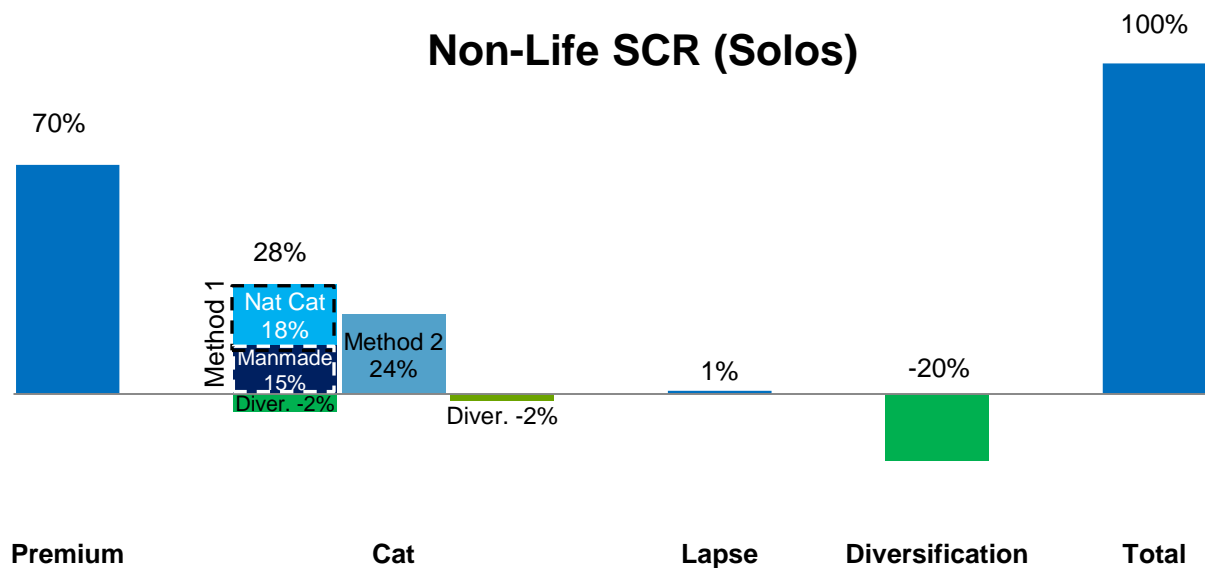


* Adjustment for tax is estimated for non-life SCR based on group value provided in EIOPA report on QIS 5.

** Diversification is estimated using QIS 5 correlations and non-life / life individual risk SCR's post-diversification

Non-life SCR (Solos)

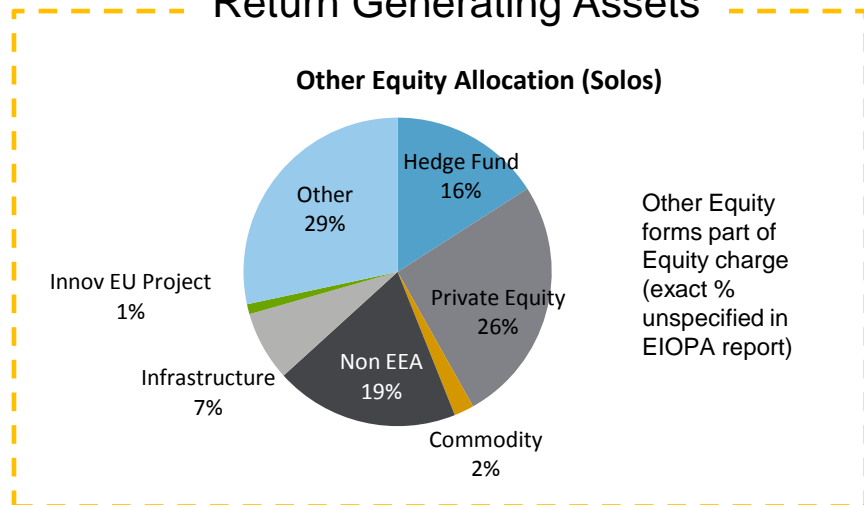
- Premium risk largest driver of non-life capital
 - Most entities did not use USP's or NP adjustment
- Cat risk split fairly evenly between Method 1 and 2
 - Non-EEA cat risk carries significant capital charge
- Manmade cat charge similar to Nat cat
 - Does this make sense for a risk not currently explicitly modelled?
- Lapse assumed nil by most companies



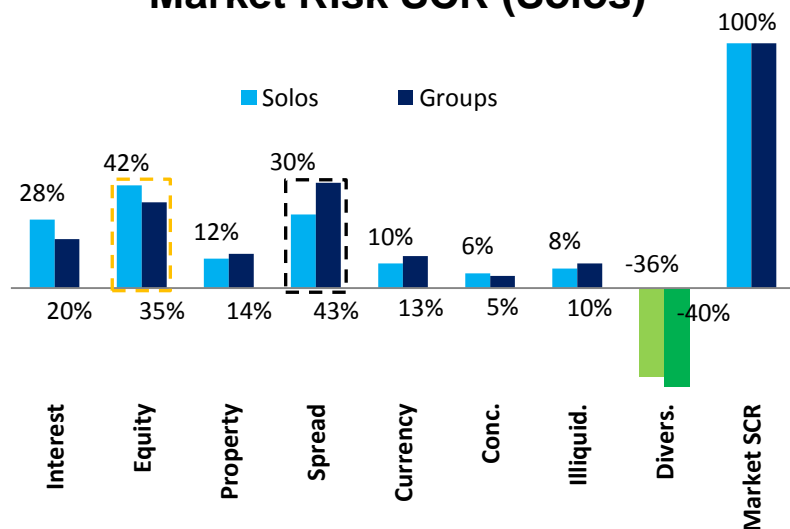
Market Risk SCR (Solos)

- Equity and spread risk are most significant
 - Both criticised as too penal
 - Spread risk excludes Sovereign risk
 - Note EIOPA stress test includes it
- Currency risk: counterintuitive to hold assets in reporting currency instead of the liabilities
- Counterparty risk: too complicated and cash at bank too penal relative to equivalent spread risk

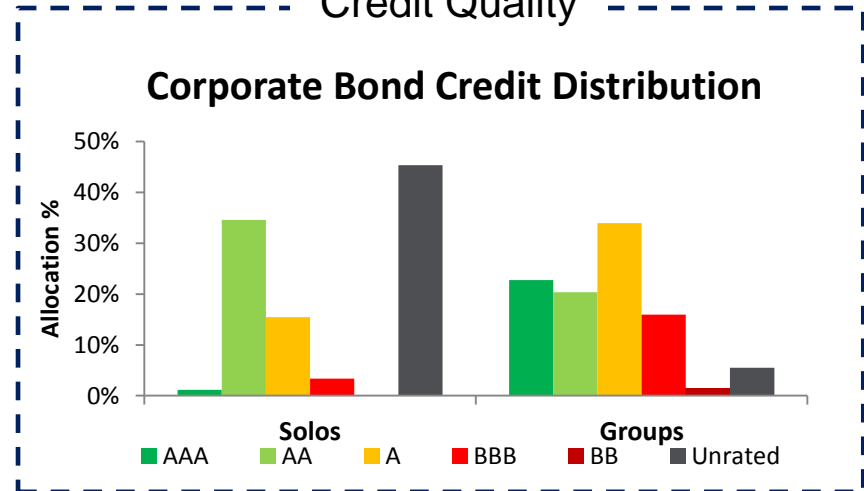
Return Generating Assets



Market Risk SCR (Solos)



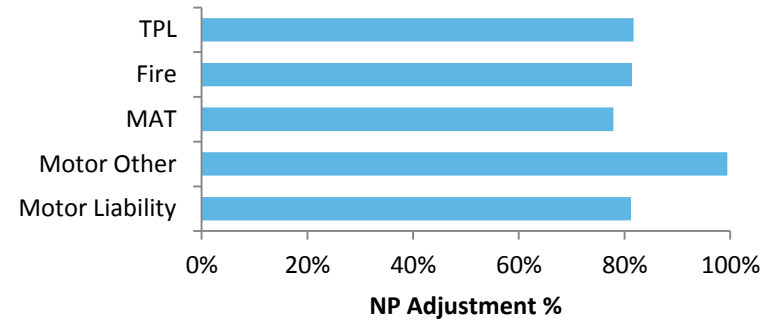
Credit Quality



Non-life: Undertaking Specific Parameters and Non-Proportional Adjustment

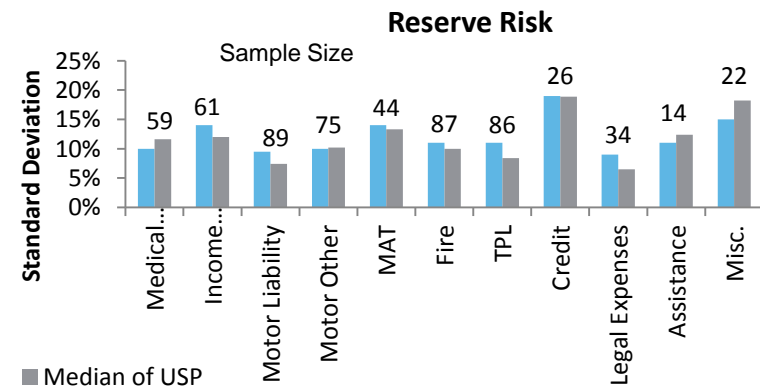
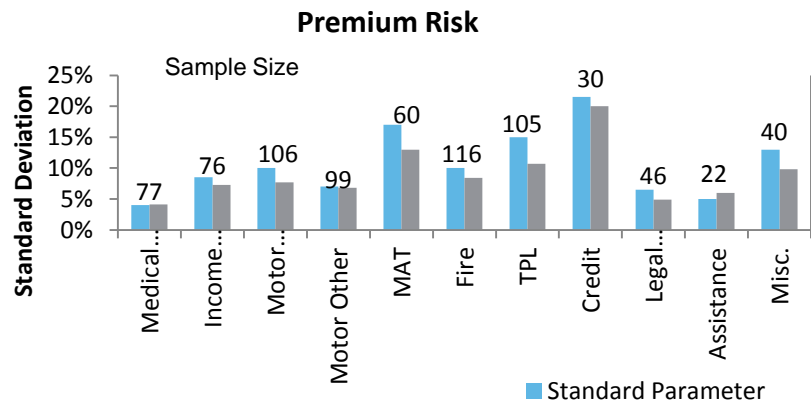
Non-Proportional Adjustment

- Approximate 20% reduction in underwriting volatility under non-proportional adjustment for liability and fire
- Significant area of feedback:
 - Too complex, most undertakings did not complete
 - Not suitable for different types of non-proportional reinsurance
 - Data requirements onerous



Undertaking Specific Parameters

- USP's submitted to supervisors under QIS 5 generally provide a significant reduction in volatility
 - Especially for liability classes
- Some concern about cherry-picking and USP's not becoming an "internal model lite"



Fundamentals of Third Countries Equivalence

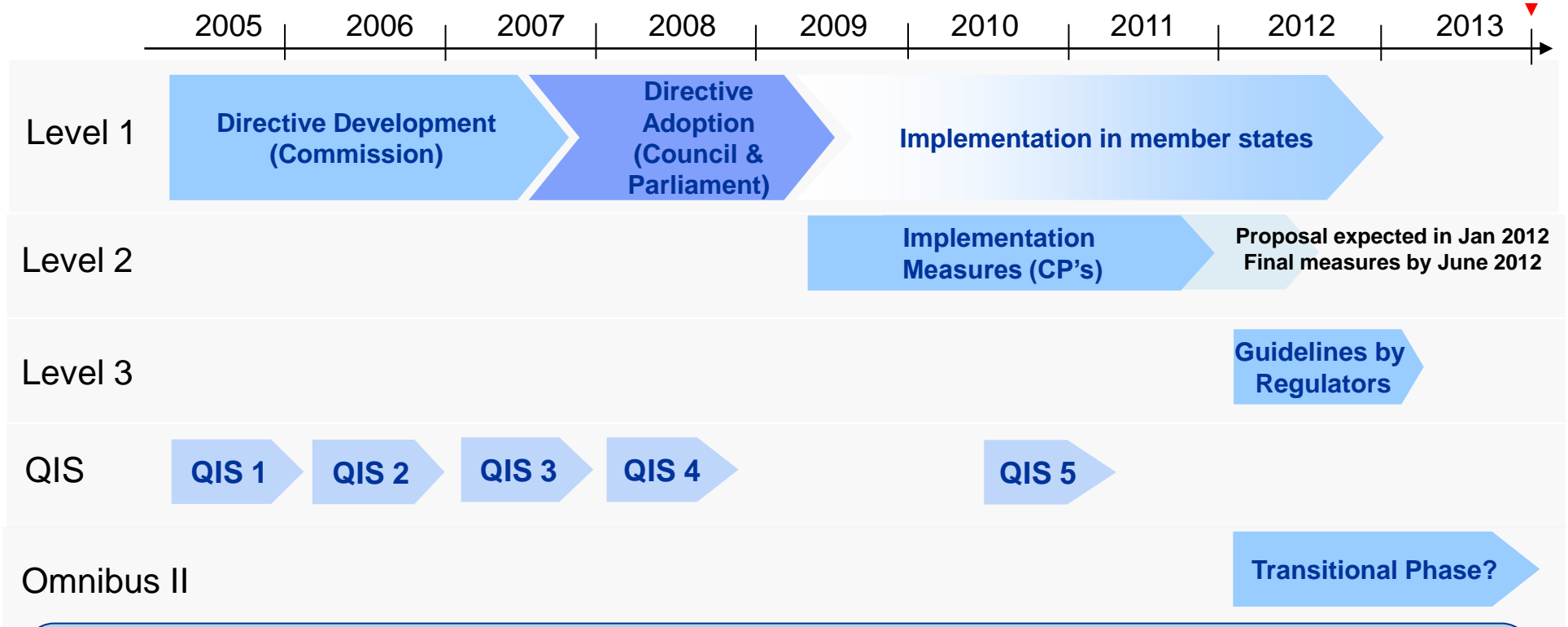
Area	Considerations	Implications
Third Country (Re)insurers	<ul style="list-style-type: none"> ▪ Solvency II applies to all insurers operating within the EEA ▪ (Re)insurers are classified as “third country” (re)insurers if they: <ul style="list-style-type: none"> ▪ Operate in the EEA on a non-admitted basis (insurance or reinsurance contracts) ▪ Have an EEA establishment and are domiciled outside the EEA (e.g. European branch) ▪ Are subsidiaries of groups domiciled outside of the EEA ▪ In order to ensure adequate policyholder protection specific rules apply to third country (re)insurers 	<ul style="list-style-type: none"> ▪ A new equivalence will be applied to US ▪ Non-equivalent third country reinsurers may be required to post collateral for European reinsurance contracts ▪ Non-equivalent groups may be required to: <ul style="list-style-type: none"> ▪ Set up an EEA based holding company for European subsidiaries ▪ Hold capital at the group level on a Solvency II basis
Equivalence	<ul style="list-style-type: none"> ▪ The European Commission has power to assess third country regulatory regimes as equivalent to Solvency II ▪ Full equivalence allows insurers to operate more freely in the EEA and hold capital under the rules of their local regulatory regime ▪ EIOPA has assessed Switzerland, Bermuda and Japan for Solvency II equivalence. ▪ Many countries have expressed interest in the OII transitional regime for reinsurance, group capital, and group supervisory purposes 	<ul style="list-style-type: none"> ▪ Increase in group capital requirements for European groups with operations outside of EEA ▪ Solvency II is likely to become a global standard
Group Capital & Group Supervision	<ul style="list-style-type: none"> ▪ For EEA domiciled groups, the group assessment rules require: <ul style="list-style-type: none"> ▪ EEA subsidiaries hold capital under Solvency II rules ▪ Non-EEA subsidiaries in equivalent third countries assessed under local capital requirements ▪ Non-equivalent third country subsidiaries assessed under Solvency II requirements ▪ Equivalent third country groups hold capital under local regime ▪ For non-equivalent third country groups with subsidiaries or establishments in the EEA, group capital requirements undecided 	<ul style="list-style-type: none"> ▪ Increase in group capital requirements for European groups with operations outside of EEA ▪ Solvency II is likely to become a global standard

Solvency II: Recent Developments

- Non-life underwriting modules
 - A Joint Working Group (JWG) has performed a recalibration exercise for the underwriting risk parameters
 - The Catastrophe Risk Task Force was reactivated to reconsider the catastrophe risk sub-module of the SCR Standard Formula
- Matching Premium
 - Now called the matching symmetrical adjuster or matching adjustment
 - Removes the undue volatility the asset liability management of insurance portfolios
 - A solution for insurers with long-term predictable obligations operating a buy-and-hold asset strategy
 - Does not affect the valuation of the Assets
- Counter-cyclical premium
 - Smooth the effects of the extreme market volatility
 - Manage short-term volatility between asset and liability values
 - Replaces the illiquidity premium used in QIS5 and will also include exposure to sovereign debt – something the illiquidity premium did not
 - Companies which apply the matching adjustment cannot also apply the counter-cyclical premium

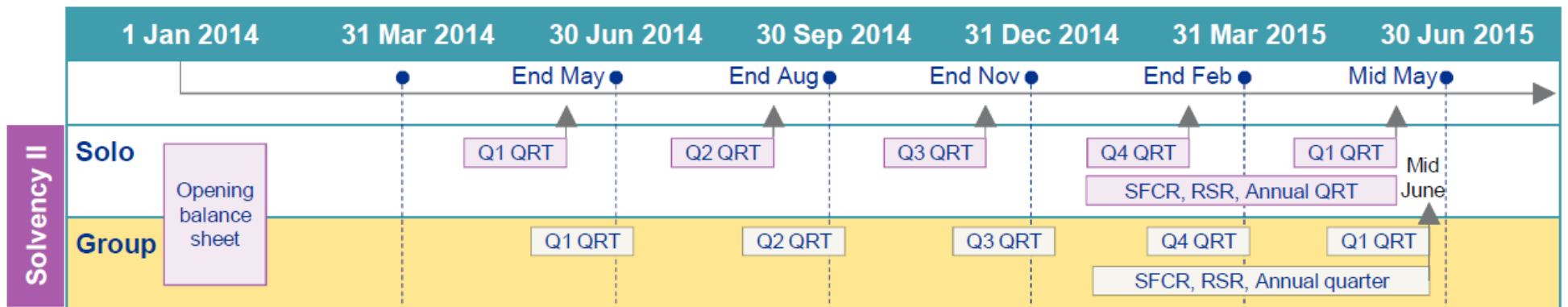
Solvency II Implementation Timetable

Solvency II Start Date
1 Jan 2014



Solvency II Implementation Timetable

- Level 1 (Omnibus II) : normally voted on 24/25th January, but delayed to March 2012 by ECON. EU Parliament to approve September-October.
- Level 2 to be published within 6 months after approving Level 1
- Level 3 to be published by year end 2012?

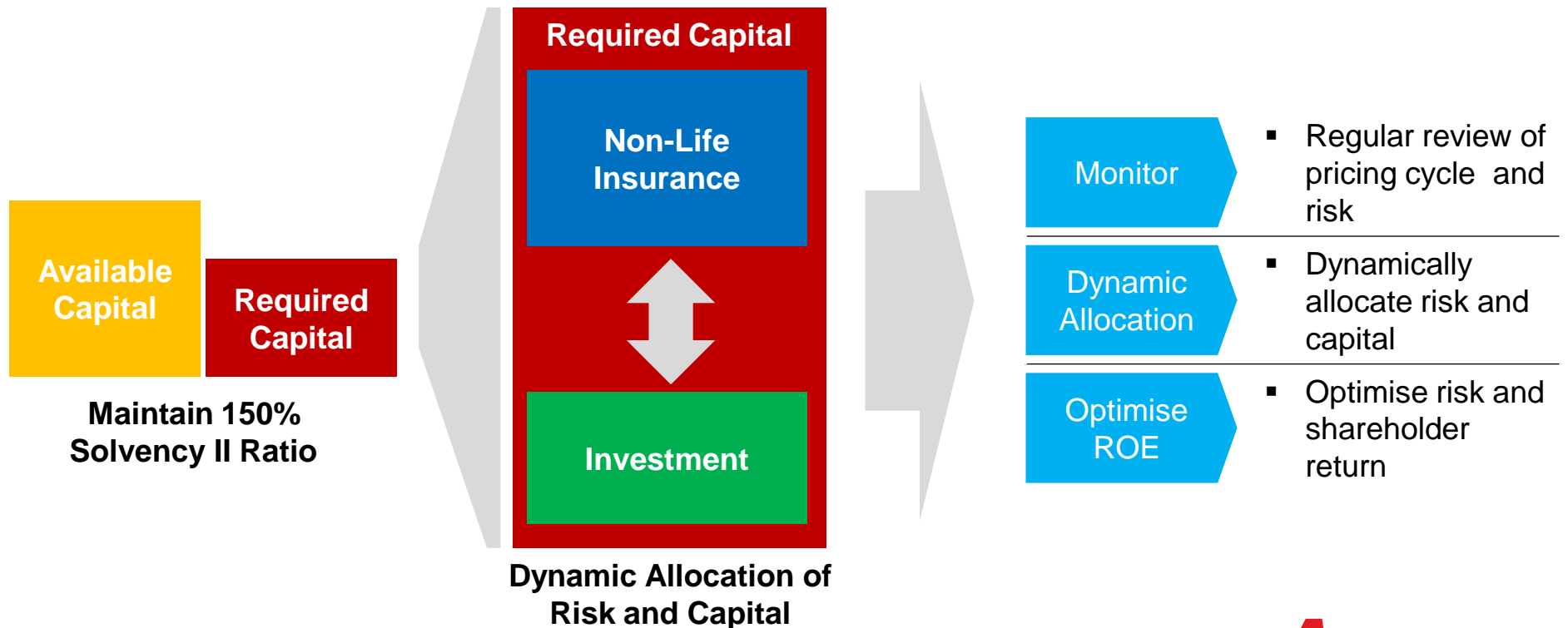


	2014	2015	2016	2017+
SFCR	20 Weeks	18 Weeks	16 Weeks	14 Weeks
RSR (if applicable)	20 Weeks	18 Weeks	16 Weeks	14 Weeks
Annual QRT	20 Weeks	18 Weeks	16 Weeks	14 Weeks
Quarterly QRT	8 Weeks	7 Weeks	6 Weeks	5 Weeks
ORSA Supervisory Report	In line with RSR and/or within 2 weeks of concluding the ORSA			

- Templates cover:
 - the reinsurance programme; and
 - exposure to reinsurers.
- Specific template for SPVs

Solvency II: Holistic Risk and Capital Allocation

- Solvency II provides an opportunity to rethink the approach to risk and capital allocation across underwriting and investment
 - Shareholders reward insurers that optimise their underwriting strategy and maximise the risk-adjusted return of their insurance portfolio
 - Objective of investment strategy for non-life insurance should be to enhance the firm's return on equity within the remaining risk and capital budget



Solvency II: Reallocation of Insurance Assets

- Solvency II could lead to a major reallocation of up to €7trn of insurance asset and will create significant market distortions as well as investor opportunities
 - Corporate bonds
 - Higher capital charge than sovereign debt, but an attractive return
 - 55% of €3trn of bonds assets in corporate debt in European insurers
 - High-rated corporate bonds with durations of less than three-five years are more attractive to European insurers
 - Equity
 - In combination with IFRS 9, high charges drive insurance sector more and more out of equity class
 - French insurers reduced the equity holdings during last three years
 - UK insurers have small proportion equities
- The European sovereign debt crisis highlighted the problems of investing in what used to be seen riskless asset.
- Zero capital charge against sovereign “doesn’t feel right”
 - No capital charge for EEA sovereign bonds under standard formula
 - Huge volatility in European bonds over the last three years
 - European insurers reduce the exposures to “peripheral” countries
 - Generally sovereign debt remains a significant part of insurers portfolios

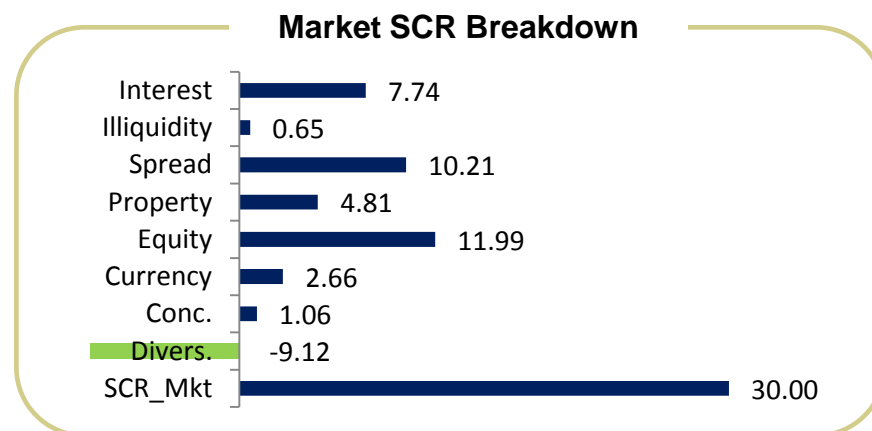
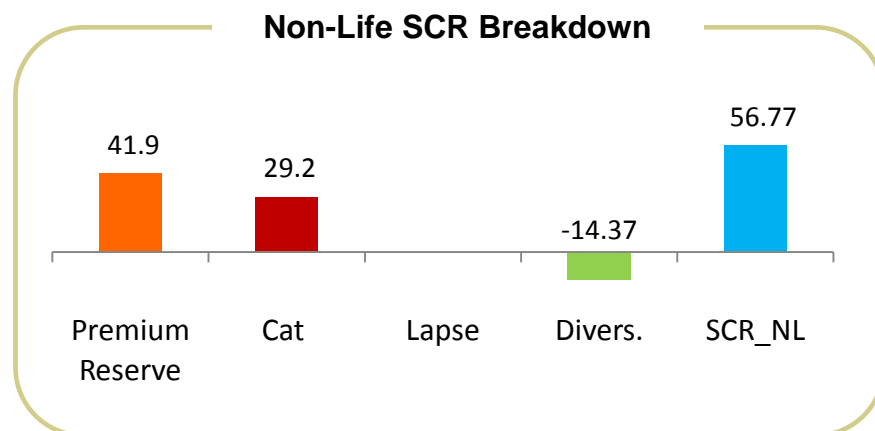
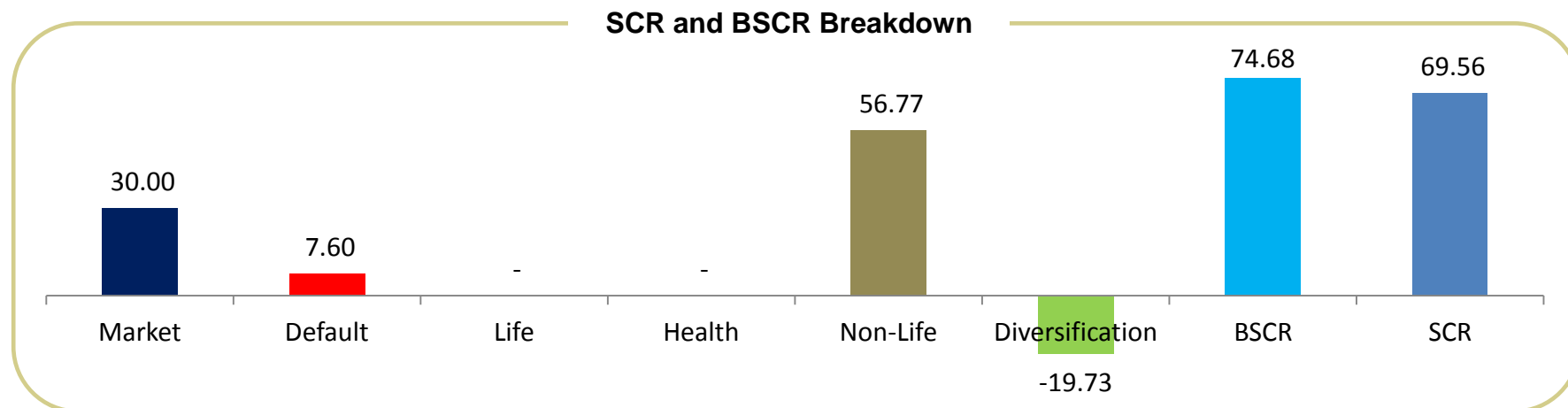
Solvency II: Reinsurance Treatment (Non-Life)

Area	Considerations
Premium Risk Impact	<ul style="list-style-type: none">▪ Proportional reinsurance impact fully captured by reducing premium volume▪ Non-proportional impact through reducing volatility▪ Using Undertaking Specific Parameters (USP) or non-proportional adjustment factor<ul style="list-style-type: none">▪ Non-Proportional Adjustment factor suitable for per-risk XL reinsurance but not as effective for other types of non-proportional reinsurance
Reserve Risk Impact	<ul style="list-style-type: none">▪ Proportional reinsurance (eg. Loss Portfolio Transfer) impact fully captured by reducing reserve volume▪ Non-proportional impact (eg. Adverse Development Cover) can be effective in reducing capital charge and may be more cost effective than an LPT
Natural & Man-made Catastrophe	<ul style="list-style-type: none">▪ Reinsurance fully reflected by applying actual programme to Standard Formula scenarios▪ Netting procedure has to be provided to regulator▪ Aggregate limits can be used to limit the cat charge<ul style="list-style-type: none">▪ Underwriting limits (max loss insured)▪ Reinsurance limits (stop loss, umbrella)

Section 2: An Optimal Insurer in a Post-Solvency II World

Case Study : A Notional European Non-Life Insurer Today

- Our notional non-life company writes a net premium volume of €100m, has an average Solvency Ratio of 165% and an average SCR breakdown:



Case Study : A Notional European Non-Life Insurer Today

- Our notional non-life insurer has an opening balance sheet given by:

Opening Balance Sheet

Investments	240.28	87.23	Net Asset Value
RI share of the Premium Provisions	3.35	30.90	Gross Premium Provisions
RI Share of Claims Reserve	42.86	168.43	Gross Claims Reserve
Total Assets	286.56	286.56	Total Liabilities

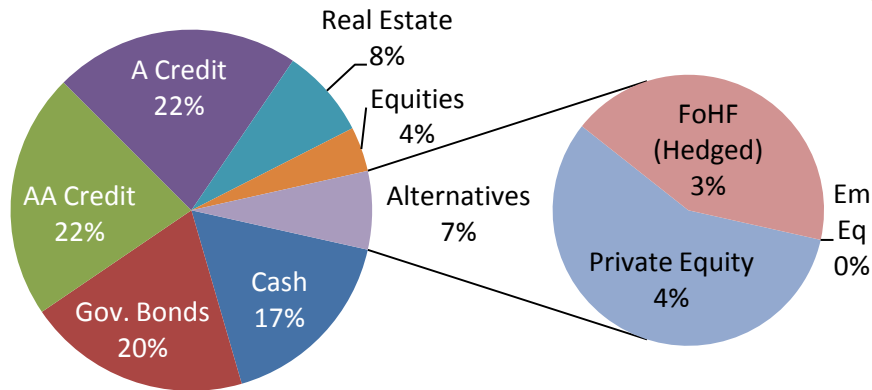
[NOTE: Total Investments are set to achieve a Solvency Ratio of **165%**]

- The breakdown of net premium and net claims reserves for our notional insurer are:

Class	Net Premium (€ m)	Net Claims Reserves (€ m)
Motor, vehicle liability	33.19	39.8
Motor, other classes	18.01	4.5
Marine, aviation and transport	3.67	7.6
Fire and other damage to property	30.09	21.3
General Liability	11.51	49.4
Credit and Suretyship	3.53	2.9
Total	100.00	125.6

Case Study : A Notional European Non-Life Insurer Today

Initial Asset Strategy



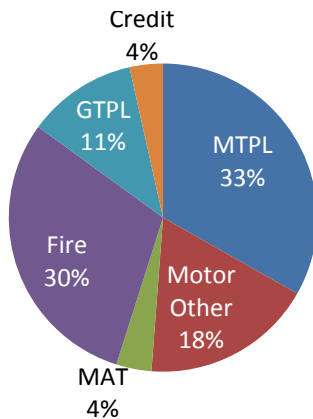
Initial Results

Asset Results	
Profit	11.89
Volatility	3.43%
SCR_Mkt	30.00
Sharpe Ratio	32.17%
Return on Equity	10.36%

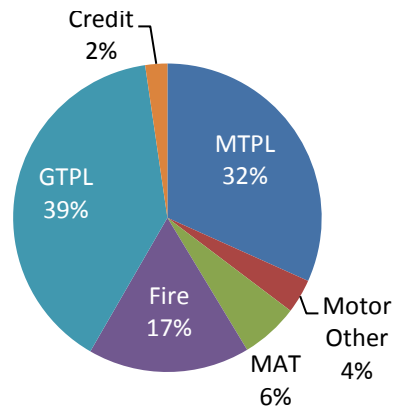
Liability Results	
Profit	3.34
Volatility	8.62%
SCR (Non-Life & Default)	64.37
Sharpe Ratio	24.45%
Return on Equity	2.91%

Initial Insurance Strategy

Underwriting



Reserve



Company Results

Profit	15.23
Volatility	9.97%
SCR	69.56
Sharpe Ratio	29.15%
Return on Equity	13.27%
Solvency II Ratio	165.00%

Balance Sheet Optimisation: Process

- Our process for optimising the firm's overall business strategy across insurance and asset risk is shown below:

Insurance Asset Strategy Optimisation		
1 Articulate the firm's overall risk appetite, capital target and driver of shareholder value	2 Identify optimal allocation of insurance risk under selected risk and capital measure	3 Utilise remaining risk and capital budget to develop optimal investment strategy
Risk <ul style="list-style-type: none"> Articulate risk appetite statement Identify qualitative constraints 	Insurance Classes <ul style="list-style-type: none"> Identify universe of insurance risks Quantify risk and return characteristics 	Asset Classes & Constraints <ul style="list-style-type: none"> Identify admissible assets for firm Insurance specific asset constraints
Capital <ul style="list-style-type: none"> Identify binding capital measure, e.g. 150% Solvency II ratio Standard formula vs. Internal model 	Insurance Constraints <ul style="list-style-type: none"> Min / max allocations relative to current strategy Overall premium volume 	Insurance & Asset Risk Model <ul style="list-style-type: none"> Full model of insurance and asset risk Quantify overall balance sheet risk and capital requirement
Value <ul style="list-style-type: none"> Shareholders reward stable earnings volatility combined with attractive ROE 	Optimise Insurance Strategy <ul style="list-style-type: none"> Criteria for optimisation Economic efficiency and capital efficiency 	Optimise Asset Strategy <ul style="list-style-type: none"> Strategic asset allocation to identify portfolios that maximise return within risk budget and capital budget

A Unified Framework for Insurance and Asset Optimisation

1 Risk, Capital and Value

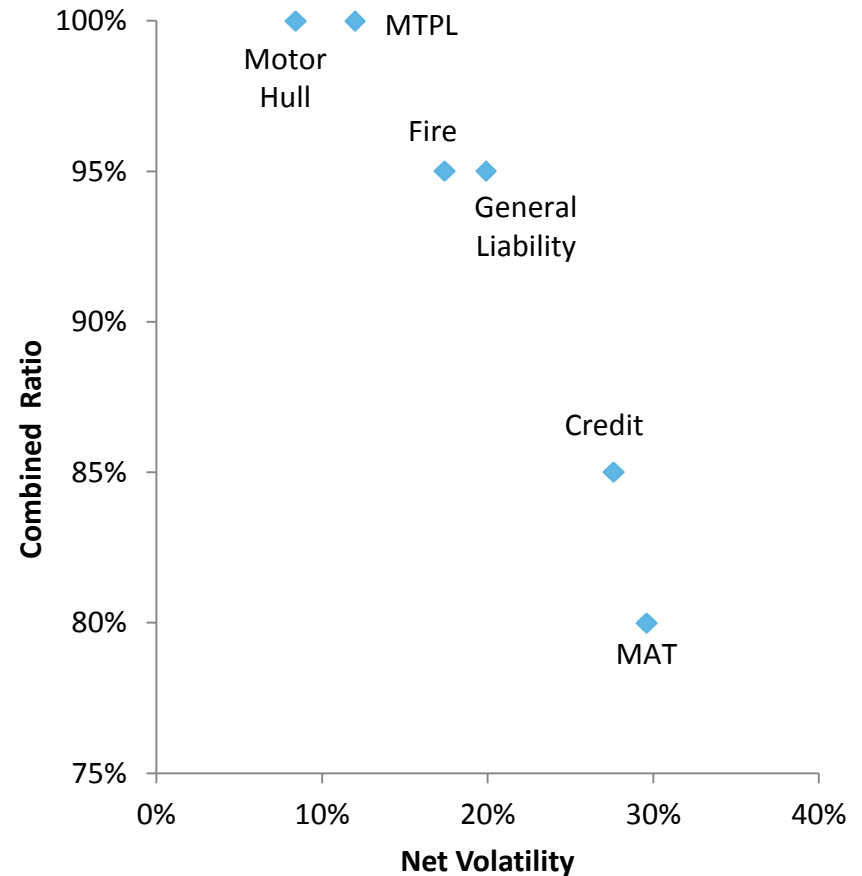
Area	Description
Risk	<ul style="list-style-type: none">Overall risk will be quantified as the volatility of surplus<ul style="list-style-type: none">This is the volatility of assets less liabilities from all sources of insurance and asset risksAn internal model of the full balance sheet will be utilised to measure surplus volatility and to consistently allocate risk between insurance and asset risks.The overall risk appetite for the company has been articulated as 10.0% surplus volatility across both insurance and asset risk, hence maintaining the firm's existing level of overall balance sheet risk
Capital	<ul style="list-style-type: none">The binding capital metric for the company is the Solvency II capital requirement ("SCR") under the Standard FormulaTheir existing Solvency II ratio of 165% has been judged an appropriate long term position and the strategy review should maintain this level of capital adequacy
Value	<ul style="list-style-type: none">Aon Benfield's price-to-book regression study points to a volatility based measure of risk as best capturing investor risk tolerances.

Understanding the link between risk, volatility, capital and value is key to optimising strategy

2 Optimising Insurance Strategy: Insurance Universe

Insurance Assumptions

- Capital measured for non-life under Standard Formula
- Reserve risk assumed fixed (retrospective reinsurance could be used here)
- SCR_NL computed from Premium and Reserve risk and Cat risk (Method 2)
- Expected loss ratio and underwriting volatilities shown opposite (volatilities are from the Aon Benfield Insurance Risk Study)
- Expense ratios based on European averages
- Correlations between underwriting classes from the Aon Benfield Insurance Risk Study



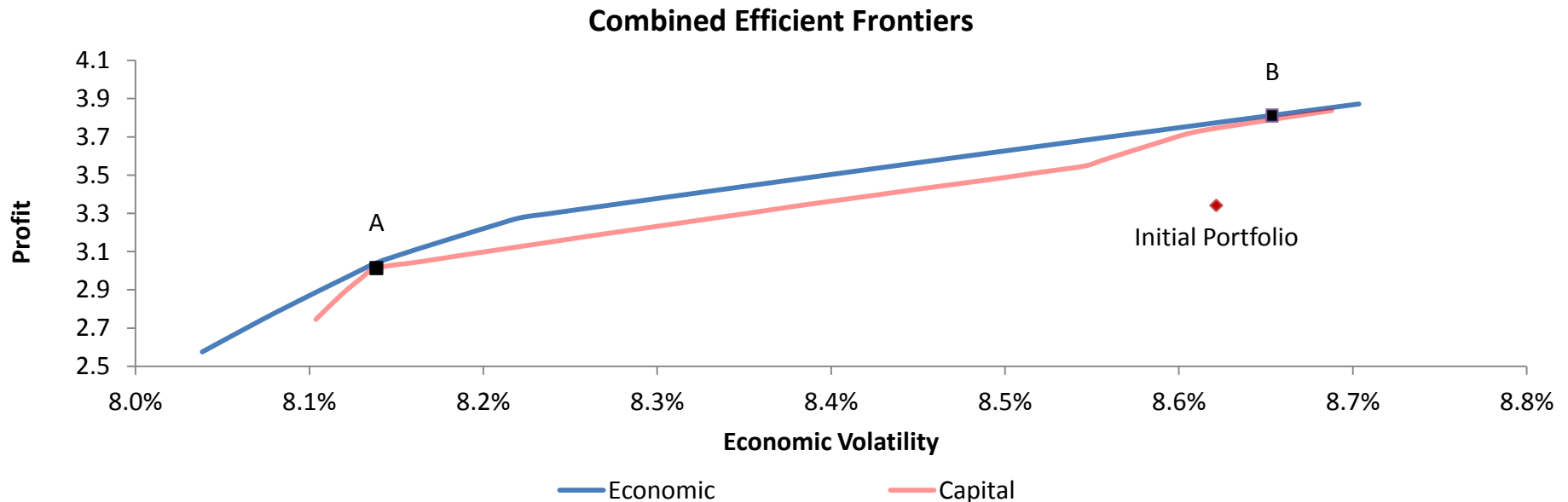
2 Optimising Insurance Strategy: Insurance Constraints

- Our notional company writes €100m of net premium, initially allocated across many classes
- The management have assessed for each class of business a potential range for premium volume growth and reduction
 - This can be achieved through use of reinsurance and business growth over longer term
- Overall limit on premium to be within 85% to 100% of current level
 - It may be possible to improve financial results by reducing premium volume and taking more targeted risk positions

LOB	Allocation		
	Initial	Min	Max
Motor, vehicle liability	33%	28.0%	38.0%
Motor, other classes	18%	15.5%	21.0%
Marine, aviation and transport	4%	2.5%	4.5%
Fire and other damage to property	30%	25.5%	34.5%
General Liability	12%	8.5%	14.5%
Credit and suretyship	4%	2.5%	4.5%
Total	100%	85%	100%

2 Optimising Insurance Strategy: Identification of Economic and Capital Efficient Portfolios

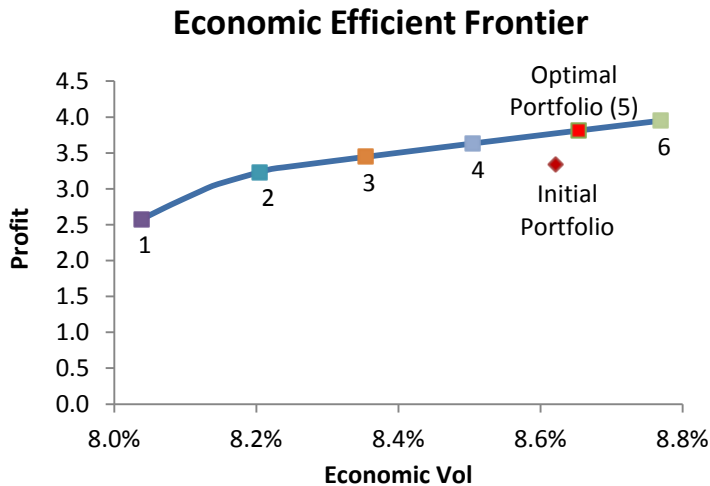
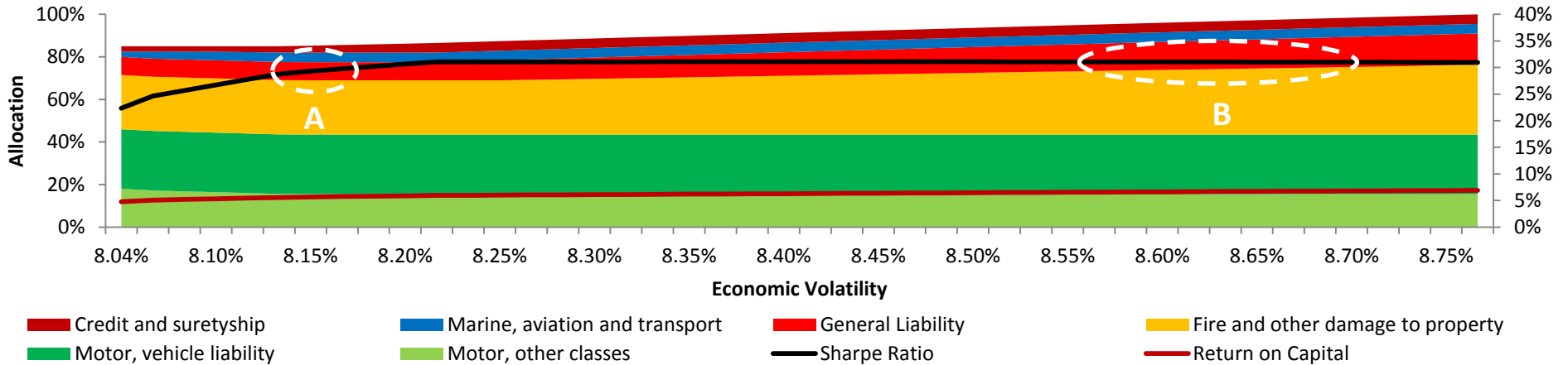
- The identification of jointly efficient portfolios is achieved by comparing the economic and capital efficient frontiers and seeking portfolios that **lie on economic frontier** at the **intersection of the two frontiers**
 - These provide maximum return for the corresponding level of risk or capital
 - In our example, the economic and capital efficient frontiers coincide in locations A and B,
 - Note the **initial portfolio is both capital and economically inefficient**
- In order to decide which mix of insurance risk is preferable, it is necessary to consider performance metrics at the two candidate portfolios



2 Optimising Insurance Strategy: Identification of Economic and Capital Efficient Portfolios

- Region B provides greater profit per unit of risk and capital than region A

Insurance Portfolio Composition Along Economic Efficient Frontier



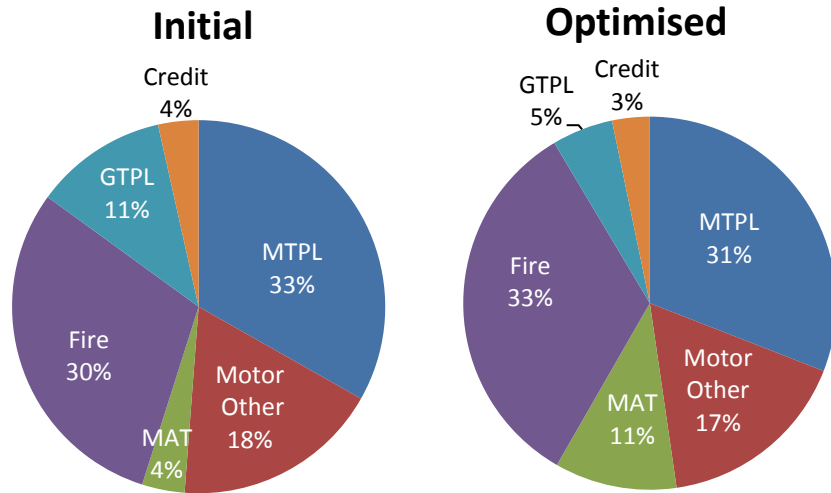
		Portfolio						
		Initial	1	2	3	4	5 (Optimal)	6
Statistics	Economic Volatility	8.62%	8.0%	8.2%	8.4%	8.5%	8.65%	8.77%
	Profit	3.3	2.6	3.2	3.4	3.6	3.8	4.0
	SCR_NL	56.8	54.1	55.0	55.7	56.3	56.86	57.3
	Sharpe Ratio	10.2%	22.3%	30.6%	31.1%	31.1%	31.0%	31.0%
	Return on Capital	5.9%	4.8%	5.9%	6.2%	6.5%	6.7%	6.9%
Allocation	Motor, vehicle liability	33.2%	28.0%	28.0%	28.0%	28.0%	28.0%	28.0%
	Motor, other classes	18.0%	18.0%	15.5%	15.5%	15.5%	15.5%	15.5%
	Marine, aviation and transport	3.7%	2.5%	4.5%	4.5%	4.5%	4.5%	4.5%
	Fire and other damage to property	30.1%	25.5%	25.5%	26.9%	29.0%	31.1%	33.0%
	General Liability	11.5%	8.5%	8.5%	10.5%	12.1%	13.7%	14.5%
	Credit and suretyship	3.5%	2.5%	4.2%	4.5%	4.5%	4.5%	4.5%
	Total	100.0%	85.0%	97.3%	89.9%	93.6%	97.3%	100.0%

2 Optimising Insurance Strategy: Results

- Optimal insurance strategy has increased profitability by 14% and provides greater economic and capital efficiency than the initial strategy

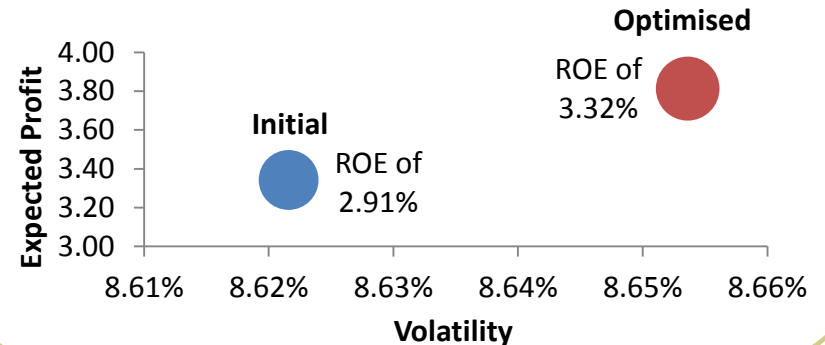
Underwriting Strategy

- Greater diversification and targeting risk on opportunities with higher return



Financial Results

Statistic	Insurance Results	
	Initial	Optimal
Profit	3.34	3.81
Volatility	8.62%	8.65%
SCR (Non-Life & Default)	64.37	64.46
Sharpe Ratio	24.45%	31.03%
Return on Equity	2.91%	3.32%

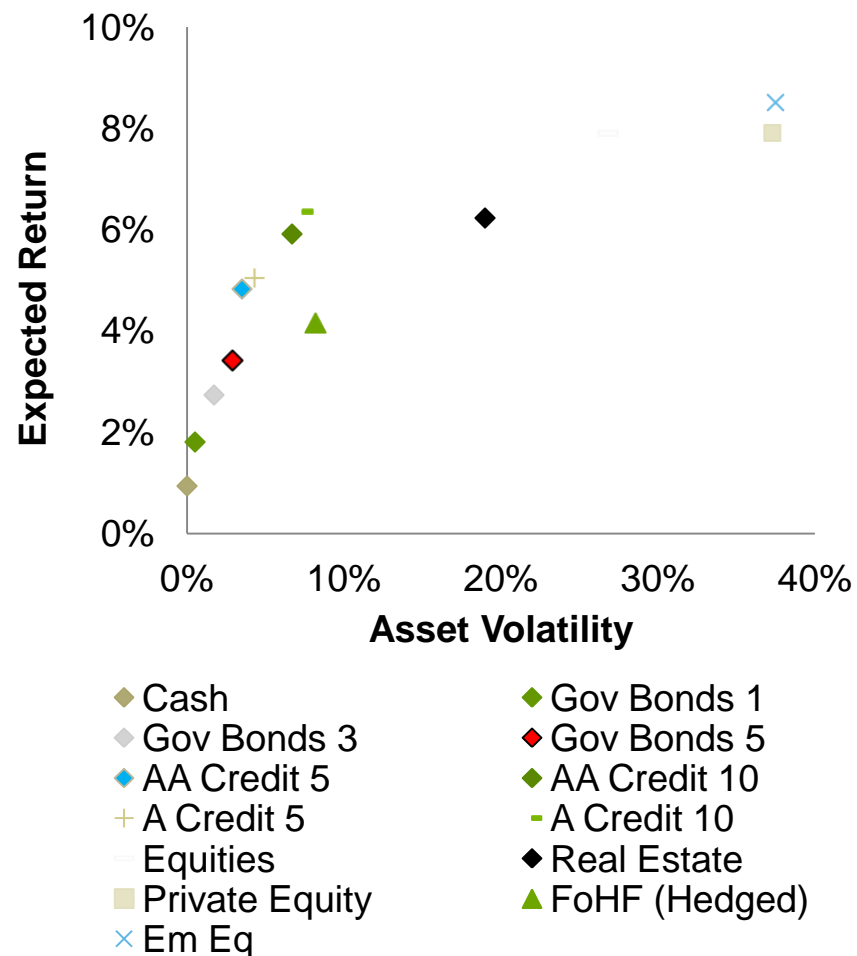


- The optimised portfolio is higher risk than the original insurance allocation but provides **greater economic and capital efficiency**
 - To maintain the same Solvency II Ratio, market risk will need to be reduced

3 Optimising Asset Strategy: Asset Universe

Asset Assumptions

- Aon Hewitt economic assumptions
- All major asset classes included for consideration
 - Non-admissible assets excluded: commodities
 - Returns exclude active management
- Swaps excluded from investment universe
 - Not necessary to meet duration characteristics of non-life liabilities
- Currency forwards are allowed for hedging purposes, e.g. accessing US corporates



3 Optimising Asset Strategy: Asset Constraints

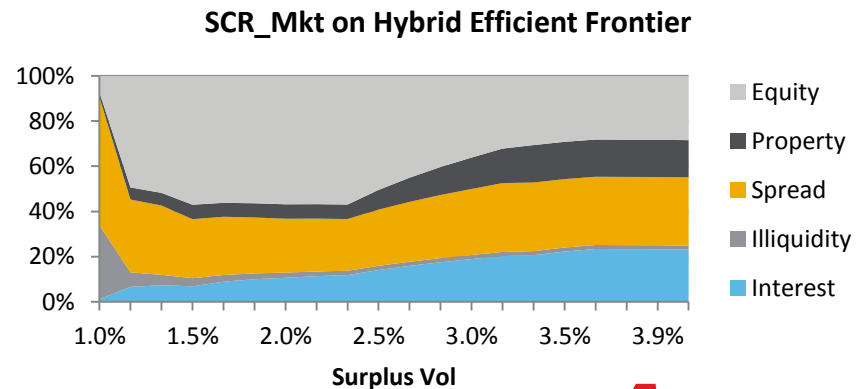
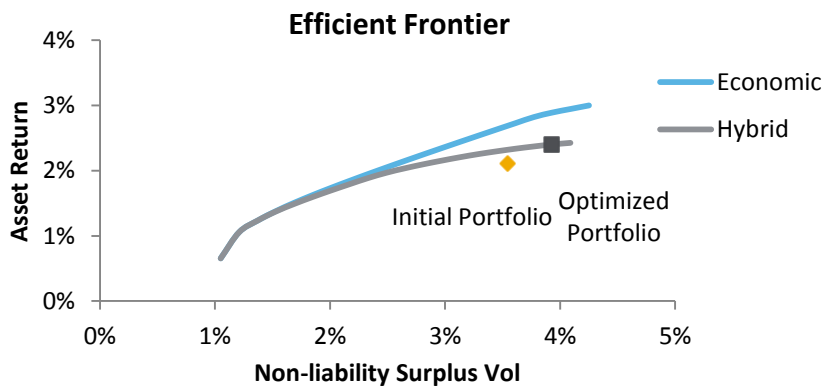
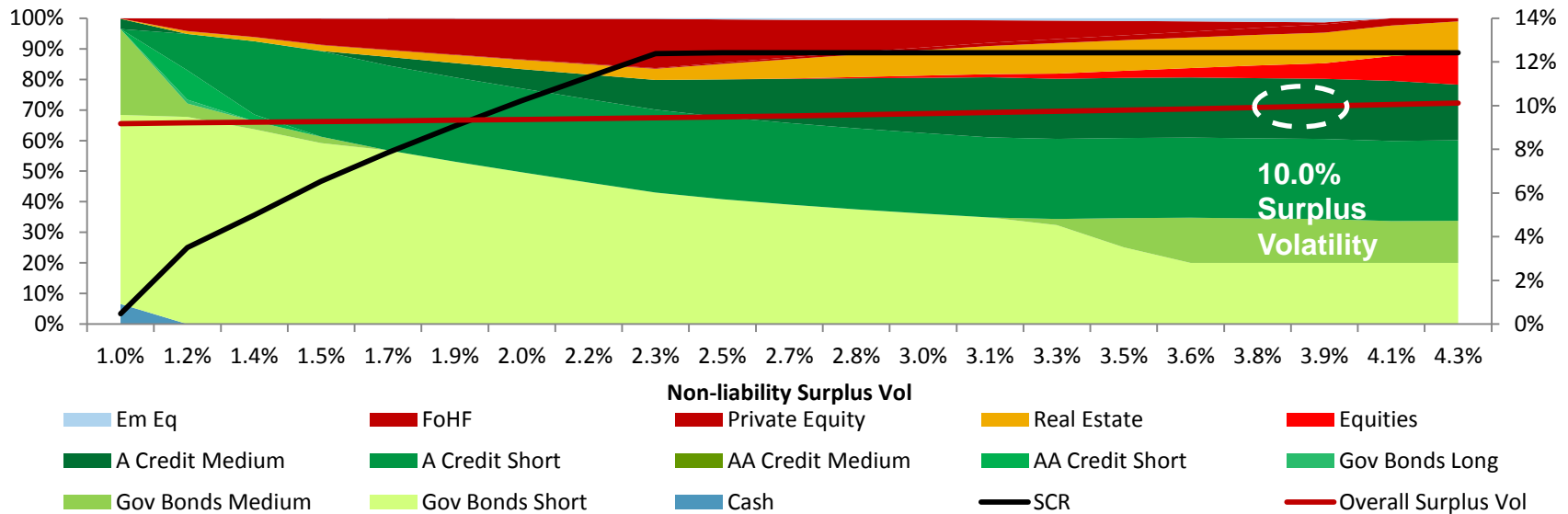
- The SCR_Mkt for the original portfolio is € 30.00m
- In order to maintain the overall Solvency Ratio, the SCR_Mkt for the optimised insurer must be € 29.86m
- In addition the contribution of market risk should be such that overall surplus volatility does not exceed 10.0%
- We refine the asset strategy by overlaying qualitative constraints for insurance, e.g.:
 - Minimum cash equivalent assets of 20% for liquidity purposes (e.g. cat events)
 - Maximum assets / liabilities mismatch of ± 1 years at each key rate duration
 - Maximum allocation to real estate and return generating assets of 10%
- This will provide better asset liability characteristics for non-life insurance and protect against interest rate movements (level, slope, curvature)

		Insurance Portfolio	
		Initial	Optimal
Profit		3.34	3.81
SCR	Non-life Insurance	56.77	56.86
	Default	7.60	7.60
	Market	30.00	29.86
	BSCR	74.68	74.68
	SCR	69.56	69.56
Surplus Vol.	Insurance	8.62%	8.65%
	Market	3.43%	?
	Total	9.97%	9.97%

3 Optimising Asset Strategy: Identification of Optimal Strategy

- Using hybrid capital / economic optimisation, the efficient frontier is identified:

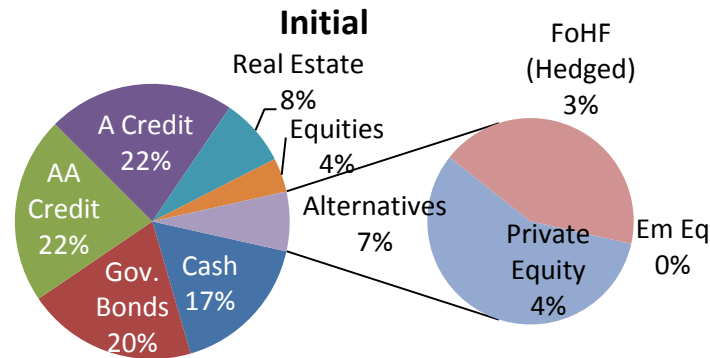
Portfolio Composition Along Hybrid Efficient Frontier



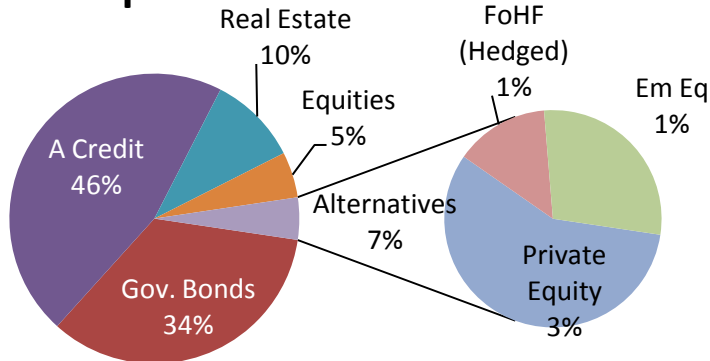
3 Optimising Asset Strategy: Results

- Optimal asset strategy has increased expected economic profit by 7% and meets qualitative constraints for insurance and quantitative constraints for risk and capital

Asset Strategy



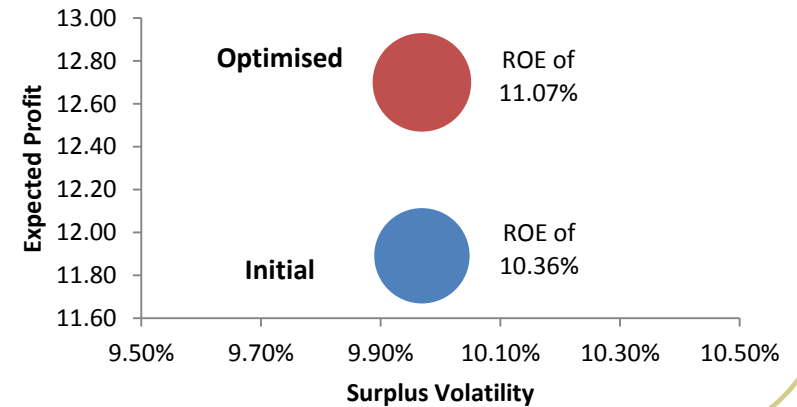
Optimal Asset Allocation



Financial Results

Statistic	Asset Results	
	Initial	Optimal
Profit	11.89	12.70
Economic Surplus Volatility	3.43%	3.93%
Surplus Volatility	10.0%	10.0%
SCR Market	30.00	29.86
Surplus Sharpe Ratio	32.17%	36.61%
Return on Equity	10.36%	11.07%

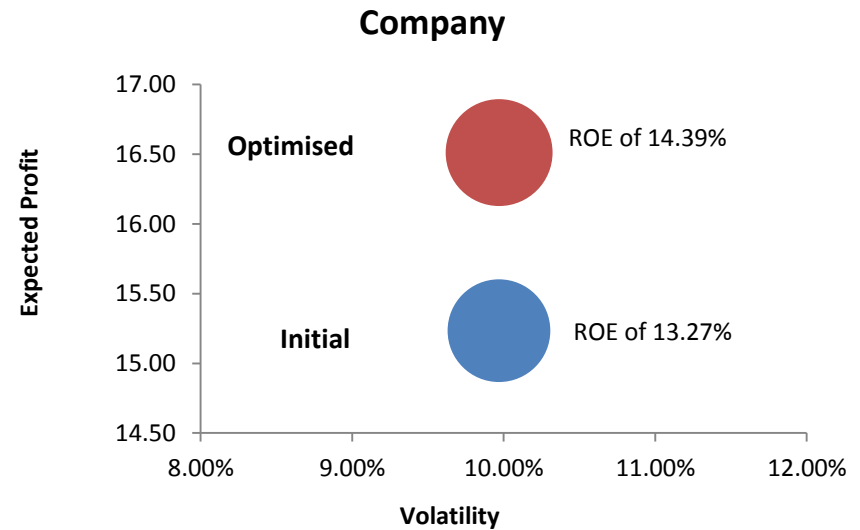
Assets



Overall Optimisation Results

- Under our proprietary optimisation framework we have transformed the firm's economic and financial characteristics:
 - Underwriting performance has been enhanced under realistic constraints to limit significant deviation from the initial underwriting strategy
 - Asset strategy fully utilises the remaining risk and capital budget and provides optimal return whilst meeting bespoke qualitative constraints specific to insurance
- Increase to expected profit of €1.3m
- Improvement of shareholder return from 13.3% to 14.4%
- **No increase in surplus volatility or capital requirement under Solvency II**

		Profit	Vol.	SCR	Sharpe Ratio	ROE
Liabilities	Initial	3.34	8.62%	64.37	24.45%	2.91%
	Optimal	3.81	8.65%	64.46	31.03%	3.32%
Assets	Initial	11.89	3.43%	30.00	32.17%	10.36%
	Optimal	12.70	3.93%	29.86	36.61%	11.07%
Company	Initial	15.23	9.97%	69.56	29.15%	13.27%
	Optimal	16.51				14.39%



Concluding Comments

- Solvency II is driving more non-life insurers to think holistically about risk, capital, volatility and value generation
- Business strategy should be fluid and adjust with the pricing cycle in order to maximise shareholder return
- Optimal underwriting strategy can be found by looking for portfolios of risk which are jointly optimal from an economic and capital perspective
 - This will either release or consume more capital than existing strategy
 - Remaining capital can be deployed for investment (or released to investors if preferable)
- Investment strategy is optimised by identifying the economic efficient frontier constrained to maintain capital consumption within the remaining capital budget
- **By leveraging the Solvency II investment, insurers can optimise business strategy, to improve both shareholder return and economic efficiency**

Appendix: Insurance Assumptions

- Aon Benfield Insurance Risk Study 2010 underwriting risk assumptions

Class	Net Loss Ratio	Net Volatility		Motor, vehicle liability	Motor, other classes	Marine, aviation and transport	Fire and other damage to property	General Liability	Credit and suretyship
Motor, vehicle liability	71%	12.0%							
Motor, other classes	71%	8.4%	Motor, vehicle liability	100%	50%	50%	8%	42%	25%
Marine, aviation and transport	70%	29.6%	Motor, other classes	50%	100%	20%	8%	42%	25%
Fire and other damage to property	56%	17.4%	Marine, aviation and transport	50%	20%	100%	22%	25%	25%
General Liability	64%	19.9%	Fire and other damage to property	8%	8%	22%	100%	-2%	25%
Credit and suretyship	45%	27.6%	General Liability	42%	42%	25%	-2%	100%	50%
			Credit and suretyship	25%	25%	25%	25%	50%	100%

Questions?

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