

September 22, 2010

BLUE PAPER



Solvency 2: Quantitative & Strategic Impact

The Tide is Going Out

Our Morgan Stanley / Oliver Wyman proprietary QIS5 model estimates a decline in the solvency ratio for the listed European Insurers from ~200% to 135%. However, the Solvency 2 debate is broader than pure capital adequacy – and although we have performed detailed quantitative analysis – the strategic implications are equally important.

We see Solvency 2 as a catalyst for a fundamental reappraisal of traditional insurance business models. European insurers have been under sustained pressure from falling bond yields, inefficient and expensive distribution, substitution by asset management products and legacy IT systems – we think the pace of change will quicken.

The transparency brought by Solvency 2 will expose the economic volatility of balance sheets. This will allow investors to differentiate between those insurers that have volatile businesses (i.e. from taking mis-match risk) and those that generate high-quality, sustainable profit streams. In the short term, we see a risk that the cost of capital could increase due to the volatility of balance sheets and the complexity of the new regime.

We see reinsurers as relative winners, while small insurers including many mutuals may struggle. We expect a continued shift away from participating life business. Reinsurers have an opportunity to provide capital to weaker players. European groups may reconsider their position in markets with non-equivalent regulation – e.g. the US.

MORGAN STANLEY RESEARCH
EUROPE

European Insurance

Farooq Hanif 
+44 20 7425 6477

Jon Hocking 
+44 20 7425 2307

¹Morgan Stanley & Co. International plc.*

OLIVER WYMAN

Astrid Jaekel 
+49 69 971 73 597

Lukas Ziewer 
+44 20 7333 8333

Oliver Wyman is an international management consultancy firm. For more information, visit www.oliverwyman.com.

Oliver Wyman is not Authorised nor regulated by the FSA and as such is not providing investment advice. Oliver Wyman authors are not research analysts and are neither FSA nor FINRA registered.

For disclosures specifically pertaining to Oliver Wyman please see the Disclosure Section, located at the end of this report.

What is Solvency 2?

See page 75 for an overview

Morgan Stanley does and seeks to do business with companies covered in Morgan Stanley Research. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of Morgan Stanley Research. Investors should consider Morgan Stanley Research as only a single factor in making their investment decision.

For analyst certification and other important disclosures, refer to the Disclosure Section, located at the end of this report.

*= Analysts employed by non-U.S. affiliates are not registered with FINRA, may not be associated persons of the member and may not be subject to NASD/NYSE restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account.

Table of Contents

Executive Summary	3
Headline Conclusions in Pictures	4
Aggregate Impact of Solvency 2 – Key Strategic Conclusions	6
The Quantitative Impact of Solvency 2 (QIS5) – Our Model Outputs	16
Our Quantitative Model – How it Works	20
Mosaic Composite Company	24
Mystic Global Life	28
Fantasy Re	32
Accidental P&C	36
Key Outstanding Debates	40
Implications for Life Insurance Products	49
Implications for Non-life and Reinsurance	57
Implications for Asset-Liability Management	63
Internal Models – Adoption Likely by all the Major Players	67
How Insurers Might Adapt Corporate Structures	70
Appendix: A Guide to Solvency 2	75

Executive Summary

Our Morgan Stanley / Oliver Wyman proprietary QIS5 model estimates a decline in the headline solvency ratio for the listed European Insurers from ~200% to 135%.

We have used our model to gain deep quantitative insights into the impact of Solvency 2 for four fictitious European-based insurers – a global composite (Mosaic), a global life company (Mystic Life), a reinsurer (Fantasy Re) and a pure primary non-life business (Accidental P&C). Our key findings are:

- **The solvency ratios for the non-life oriented insurers show sharp declines under QIS5.** Fantasy Re's solvency ratio falls from 305% to 173%, while Accidental's ratio declines from 224% to 119%. Although we believe that in most instances (i.e. for larger listed groups) rating agency requirements will still be the binding constraint, there is a major increase in capital requirements for non-life risks under the current rules. This could create pressures as it coincides with a soft part of the non-life cycle.
- **Reinsurers are likely to see a major decline in reported solvency ratio, but demand for reinsurance should increase** – especially from undiversified insurers and mutuals without easy access to capital, and from an increase in the use of reinsurance as a risk mitigation tool. However, this may not be material enough to lift pricing.
- **For life, the major impact is for participating (with-profit) policies.** Despite a release of prudential margins, we see an increase in the total resource requirement (i.e. solvency capital plus liabilities) for participating contracts of 5-10%. This will be felt more in continental Europe than the UK (where there are already realistic liabilities), and may accelerate the relative decline of the product.
- **We calculate that the majority of the industry's capital requirement comes from a combination of market risk and participating contracts.** These areas will be a focus for insurers looking to optimise returns on capital – we see a consequent step change in the application of ALM techniques.
- **Diversification benefits will also be a key driver of the Solvency 2 capital requirements.** We calculate a diversification benefit of 33% for Mosaic, falling to

24% for Accidental P&C. In our view, monolines are disadvantaged by the new regime. Our work suggests that, without diversification benefit, most insurers would have little or no surplus capital under QIS5.

- **Solvency 2 capital ratios will be fundamentally more volatile than those reported under Solvency 1.** We believe the complexity of the regime could result in a higher observed cost of capital for the sector – at least in the short run.
- **European insurers may become competitively challenged in markets with 'non-Solvency 2 equivalent' regimes** (i.e. have to hold more capital than local players). A key debate is whether the United States is ultimately granted equivalence.

The majority of large insurers are likely to seek approval to use an internal model. In our view, this will be particularly important for non-life insurers and reinsurers – where the standard model poorly reflects the nuances of the business. However, national regulators may not have sufficient capacity to approve all models in time.

"The tide is going out" – real change is needed

To quote Warren Buffett *"only when the tide goes out do you discover who's been swimming naked"*.

We see Solvency 2 as a catalyst for a fundamental reappraisal of traditional insurance business models. These have been under structural pressure for more than a decade from a combination of declining bond yields, inefficient and expensive distribution, substitution by asset management products and legacy IT systems.

We think the pace of strategic change will dramatically increase – with M&A as a key tool to achieve this. The transparency brought by Solvency 2 will reveal those insurers that have fundamentally volatile balance sheets (i.e. that are running large economic mis-matches) and those that generate high-quality, sustainable profit streams.

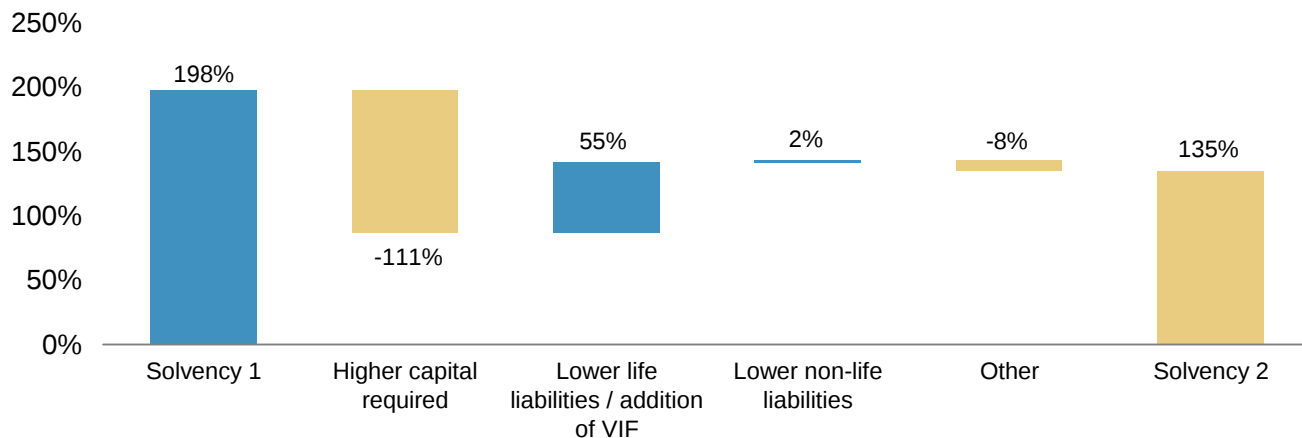
'Winners' are not simply those companies that experience the smallest decline in solvency ratio versus the existing regime – but those that are demonstrably and sustainably creating economic value. In our view, strongly capitalised reinsurers are best positioned, while geographically narrow mutuals are most challenged.

September 22, 2010
European Insurance: Solvency 2

Solvency 2: Headline Conclusions in Pictures

Exhibit 1

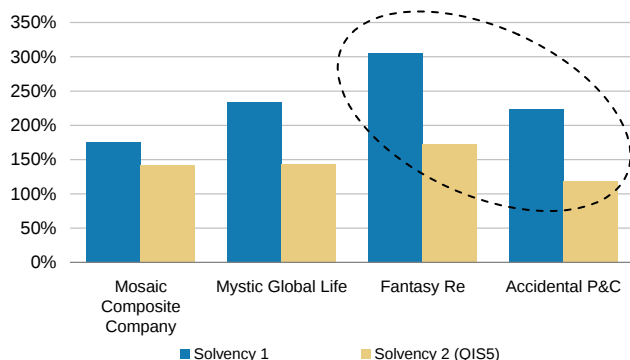
We believe the sector's solvency ratio falls to 135% under Solvency 2 – high enough to avoid capital raising



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 2

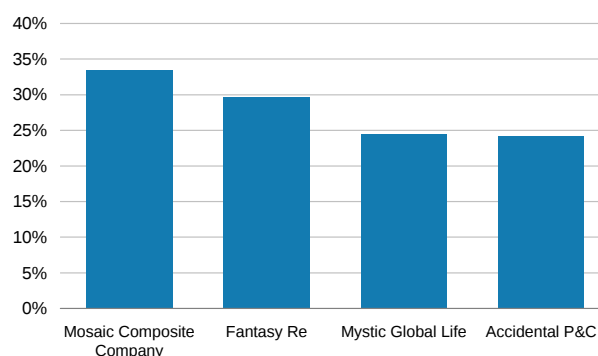
Our model suggests non-life companies will see the greatest reduction in solvency ratios



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 4

Our model suggests a 25-35% diversification benefit, with composites benefiting the most



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 3

In life insurance, traditional participating products experience higher requirements and lower RoC

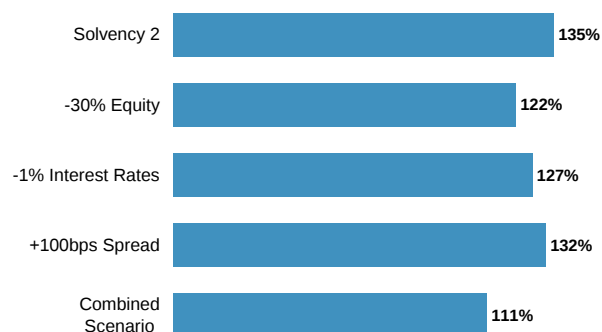
Life Product	Total resource requirement ¹	Return on required capital
Traditional participating/with-profits	↑	↓
Unit-linked	↓	↑
Variable Annuities	→	→
Annuities	→	→
Risk	↓	↑

¹ Total resource requirements = technical provisions + solvency capital requirement

Source: Morgan Stanley Research, Oliver Wyman

Exhibit 5

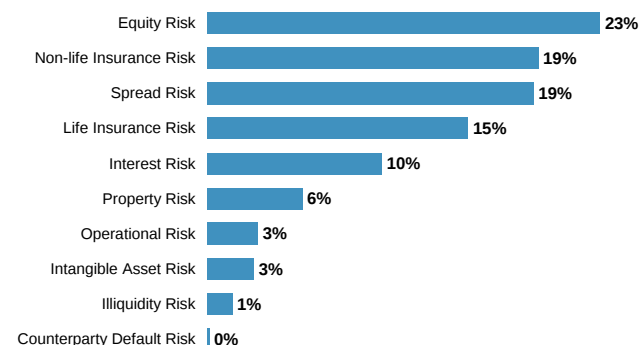
Sector's solvency ratio is likely to be highly volatile under Solvency 2, particularly to markets



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 6

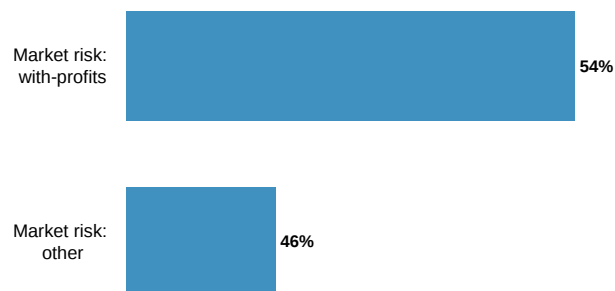
We estimate ~60% of the sector's S2 capital requirement (pre-divers.) relates to market risk



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 7

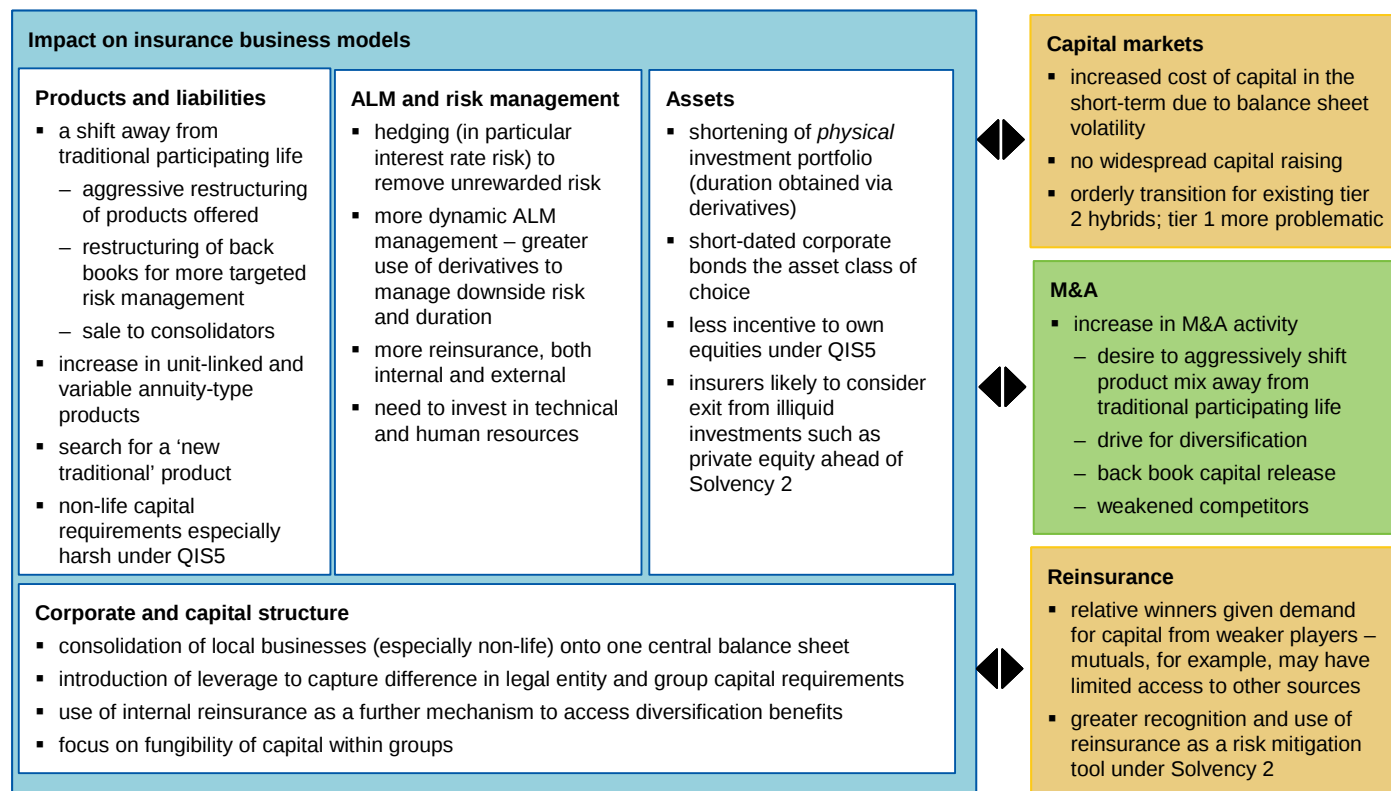
With-profit (or 'participating') life policies account for 54% of the sector's market risk, we estimate



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 8

We believe Solvency 2 will have far-reaching strategic implications for the European insurance industry. While the focus has been on capital adequacy, we see the new rules as a catalyst for profound strategic change. We believe reinsurers are relative winners, and small insurers including many mutuals relative losers.



Source: Morgan Stanley Research, Oliver Wyman

Aggregate Impact of Solvency 2 – Key Strategic Conclusions

1) An acceleration of the shift away from participating (with-profits) life business

Although insurers have generally de-emphasised traditional life business in the last ten years, it remains an important product in many markets. There are several reasons for this:

- **it is an easy product to sell to consumers** (guarantees are valued more than ever in the current volatile environment); and
- **it is often the only mechanism by which insurers can extract value from orphan estates.**

However, for continental European insurers, the inherent volatility and risk associated with participating (with-profit) contracts has hitherto been masked from view. This is increasingly becoming an issue with the continued decline in long-term interest rates.

We see several catalysts for deep restructuring – and strategic de-emphasis – of European participating life businesses:

- **The move to mark-to-market will severely challenge participating products in those markets where a 'book yield' (i.e. historical cost accounting) approach has been applied.** These products have profit-sharing mechanisms that were simply not designed to operate in a market value environment. In addition to creating operational complexity for insurers, it will also create substantial governance challenges (life policies often refer explicitly to Solvency 1 metrics). While some may try initially to treat Solvency 2 as solely a 'reporting framework', those that are using internal models may find this approach to be inconsistent with the regulatory 'use' test.
- **An increase in capital required for taking market risks against interest rate guarantees will deter insurers from investing in risky asset classes, reducing upside potential for policyholders.**
- **Higher capital requirements are also likely to reduce the appetite of insurers for writing new traditional business – with many seeing a substantial reduction in the policyholder capital**

buffers that historically have been used to subsidise returns.

- **Once a participating fund suffers from a depleted capital surplus, it does not make sense for shareholders to sponsor a recapitalisation – as the consequent returns on that capital have to be shared with policyholders.** This is due to the asymmetry of the product, whereby shareholders *participate* in the emerging surplus but assume 100% of the downside risks.

However, although we expect the product to be de-emphasised, the experience in the UK suggests that the strongest players will continue to sell the participating products – which can be a source of significant competitive advantage. While shareholder companies that sponsor weaker participating funds will find the new regime challenging (as we believe that shareholders are unlikely to accept the low returns generated on economic capital), the situation is different for mutuals.

Unless the fund's surplus is severely depleted by the new rules, such that the business cannot continue in its current form, the ownership structure of a mutual means that a low return on capital (or 'surplus') is not necessarily an issue.

Consequently, only shareholder companies with robust policyholder capital buffers and strongly capitalised mutuals are likely to continue to actively market participating products post Solvency 2.

Exhibit 9

We expect required resources to increase and returns on capital to fall for participating products

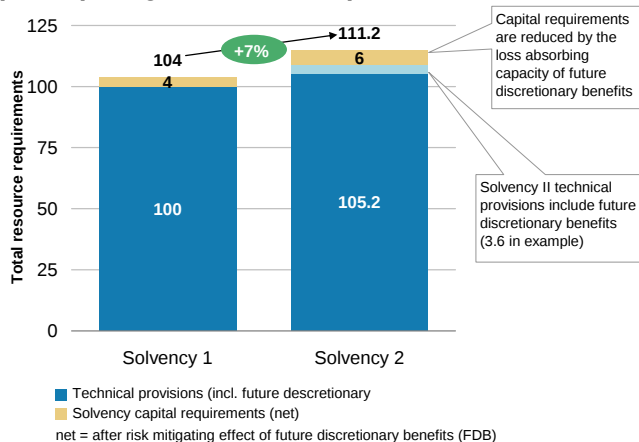
Life Product	Total resource requirement ¹	Return on required capital
Traditional participating/with-profits	↑	↓
Unit-linked	↓	↑
Variable Annuities	→	→
Annuities	→	→
Risk	↓	↑

¹ Total resource requirements = technical provisions + solvency capital requirement

Source: Morgan Stanley Research, Oliver Wyman

Exhibit 10

Quantitative impact of Solvency 2 on with-profits / participating life insurance products



Assumes average guaranteed rate of 3% and policyholder surplus of 6% of Solvency 1 technical provisions.

Source: Morgan Stanley Research, Oliver Wyman

Nonetheless, we see several implications of higher capital requirements for participating business:

- **A significant restructuring of new business written in this space:** This will include increased prices, lower guarantees and changes in the types of guarantees written – e.g. moving from annual return guarantees to maturity guarantees. In time, this may develop into broader adoption of variable annuity-style products in Europe.
- **Much more active risk management and risk mitigation for back books:** Insurers will seek to reduce the Solvency Capital Requirement for traditional participating business by tighter asset liability matching and hedging of market risks. While this will reduce shareholder risk, it will also reduce policyholder returns.
- **For those policyholder funds with very low capital surplus (where it does not make sense for shareholders to recapitalise), we expect some insurers to attempt to dispose or release capital from back books.** In the medium term, the likely reduction in new business flows will create unit-cost pressures as some of the traditional funds run off. We see roles for both a European 'Resolution'-type vehicle and an outsourcing segment willing to assume 'unit-cost' risk and create scale for a declining industry.

- **The decline of traditional participating life business could also cause challenges for existing agency distribution structures.** Agents are a high-cost channel given the fixed cost base – and potentially might not be sustainable if the size of the traditional life funds declines. A reduction in the size of agency forces could potentially create the conditions for the emergence of the broker channel in some European markets, as individuals seek new careers.
- **A further challenge for insurers is that they may find it difficult to quickly change the product mix sold through agents.** Selling variable annuity-style and unit-linked products – particularly those involving a wide selection of underlying third party funds – involves different skills than selling traditional products and may require re-training programmes for agents.

2) Strong diversified global reinsurers are relative winners – but the impact on pricing is uncertain

Global diversified reinsurers are likely to be relative winners from Solvency 2, benefitting from a number of pressure points on primary insurers (particularly non-life) that may increase demand for reinsurance.

We believe that global reinsurers are technically in a stronger position to achieve internal model accreditation (in terms of data, seasoned modeling capabilities and internal human resources) and are likely to be able to harvest greater diversification benefits than most other players in the industry.

- **QIS5 benefits 'AA'-rated reinsurers as the counterparty risk charge for cedants is less than for lower-rated competitors.** Primary insurers are better off using a single 'AA' counterparty rather than sharing risk among several lower-rated peers.
- **Non-life capital requirements are substantially higher under Solvency 2.** This is not a surprise in itself, given existing rating agency requirements, but the key point is that we believe the Solvency Capital Requirement will be 20-30% greater than suggested by internal models. This could create pressures given the current soft phase of the non-life cycle.

- **Smaller, niche primary insurers may be at a disadvantage** if they do not have sufficient data and resources to have internal models ready for Solvency 2. This may increase reinsurance demand, especially if they are able to 'import' the superior diversification benefits and lower capital requirements of reinsurers through such contracts.
- **Solvency 2 exposes new explicit capital risks and, therefore, reasons for risk mitigation.** Primary companies will be incentivised to reduce tail risks and use reinsurance programmes more tailored to Solvency 2.
- **The ILS market may not immediately meet increased demand.** The Insurance-Linked Securities (ILS) market – which securitises underwriting risks to capital markets – is relatively immature and may not provide sufficient capacity to meet initial increased demand (although it will grow in the longer term).

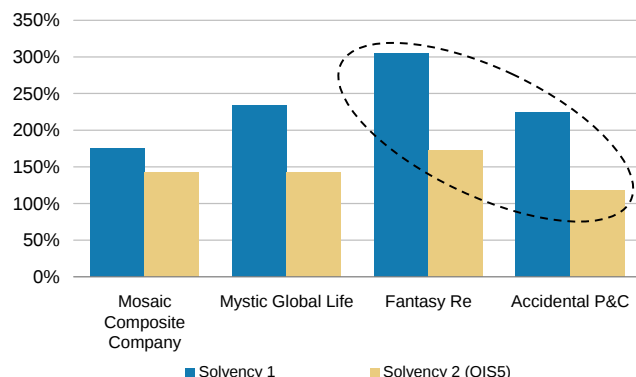
We believe such factors could ultimately increase European reinsurance volumes by 10-20%.

However, it is not yet clear how this will affect risk pricing for reinsurance. We believe that this increase in demand will probably be met by existing risk capacity in the reinsurance industry.

Our calculations suggest that higher reinsurance volumes as a result of Solvency 2 may result in increased capital consumption equivalent to 15-25% of the existing surplus capital in the global industry.

Exhibit 11

Our model shows non-life insurers and reinsurers see the greatest fall in solvency ratios under QIS5



Source: Morgan Stanley Research, Oliver Wyman

While the increased demand from Solvency 2 may have some positive impact on pricing at the margin, it is probably not going to be sufficient in itself to move overall market pricing for reinsurance in Europe.

3) Elimination of unrewarded risk – more ALM

Economically, insurers will be incentivised to closely match liabilities, therefore we believe that holding risky assets on-balance sheet is not optimal. Instead, insurers will increasingly follow liability benchmarks, seeking to achieve upside through structured – and Solvency 2 friendly means (for example, derivatives).

The liability benchmark under Solvency 2 is the swaps curve (plus the appropriate liquidity premium) – so this is logically what insurers should seek to match. By swaps, we refer to the market for swapping variable short-term interest rates into long-term fixed yields.

Solvency 2 will create a laser focus on how insurers are deploying capital – as specific risks require a specific allocation of capital (i.e. there will be an explicit consideration of the expected return on Solvency Capital Requirement). Consequently, we expect management teams to consider very carefully whether it makes sense to retain a given risk or remove it from the balance sheet.

However, there are several constraints to achieving this in practice:

- **The need to consider the accounting impact.** Although in an ideal world insurers would look to maximise economic returns, guided by Solvency 2 requirements – accounting is unfortunately often inconsistent, with many management teams cognisant of the presentational impact of a given ALM strategy, even if it is economically optimal. This is especially pertinent given the complexity of the expected transition to IFRS phase 2 rules.
- **Governance constraints.** In our view, the optimal ALM strategy is likely to include substantial use of derivative instruments – however, we recognise that boards of directors that exercise oversight are often nervous about the perceived complexity and inherent risk of these products. This could delay the adoption rate for optimal Solvency 2 ALM strategies.

- **Optimal timing of implementing a strategy.** Deciding when to move one's ALM approach to Solvency 2 is a difficult decision. In theory there is a single date for the switch; however, we believe that insurers will transition gradually to the new rules – for example, starting with shortening the duration of credit portfolios and looking to reduce exposure to private equity investments (which make take time to exit). Liquidity is another key consideration. Although the swaps market (for example) is very liquid, even fairly modest shifts in asset allocation for the industry could take a long time to execute. For example, European insurers hold several hundred times the average daily trading volume of corporate bonds. Rebalancing the portfolio towards shorter durations has the potential to move the market and will require time.
- **Need to build internal technical capability.** Some of the larger insurers already have sophisticated in-house ALM / hedging teams, but this capability may have to be built for some of the smaller companies.
- **We also believe that it is important to distinguish between strategy and tactics.** A good example of this can be observed currently at the long-end of the yield curve. *Strategically*, under Solvency 2 one should seek to match the swaps curve (as this is the basis of the discount rate applied to liabilities); however, at present, due to economic conditions, certain long-dated government yields are actually *higher* than swaps. One could therefore decide to wait before hedging the swaps rate (in certain countries).

Despite these practical constraints, we still expect to see a dramatic expansion of ALM techniques within the sector – in particular:

- **government bonds and swaps have zero direct capital requirement** – insurers will be highly incentivised to invest in these asset classes; especially since they can help match liabilities (subject to taking a view on sovereign risk).
- **a reduction in the appetite for on balance sheet 'vanilla' equity exposure**, although 'off balance sheet' exposure to equities through unit-linked products or asset management will remain key;

- **routine use of derivatives to 'outsource' unrewarded risk** – for example, we see more use of swaps and swaptions to manage interest rate and duration risk, caps and collars to manage equity risk; and
- **3-5 year duration corporate bonds to become the asset class of choice for European insurers** – owing to the better expected return on economic capital versus other asset classes.

Exhibit 12 shows the relative returns on capital for investing in different asset classes for non-profit liabilities, i.e. the type of liabilities where the shareholders bear all of the market risk, assuming that any interest rate risk is hedged using swaps and other interest rate derivatives.

The credit spread capital requirement is driven by spread volatility and duration, and is much higher for long-term bonds than short-term bonds. Consequently, short-term bonds look most attractive in terms of expected return on SCR.

Equities also look relatively unattractive in Exhibit 12. It is important to note that the capital requirements for equities could increase further (i.e. returns on capital would be even lower) if used to back interest rate guarantees – e.g. in participating liabilities. This depends on the level of buffer capital within participating funds – well-capitalised funds with high policyholder surplus could hold higher levels of equities.

Exhibit 13 shows how one might construct an optimised asset allocation strategy for a non-profit liability – i.e. a liability where shareholders bear all market risk – depending on risk appetite. This analysis assumes that all interest rate risk is hedged using swaps and other interest rate derivatives.

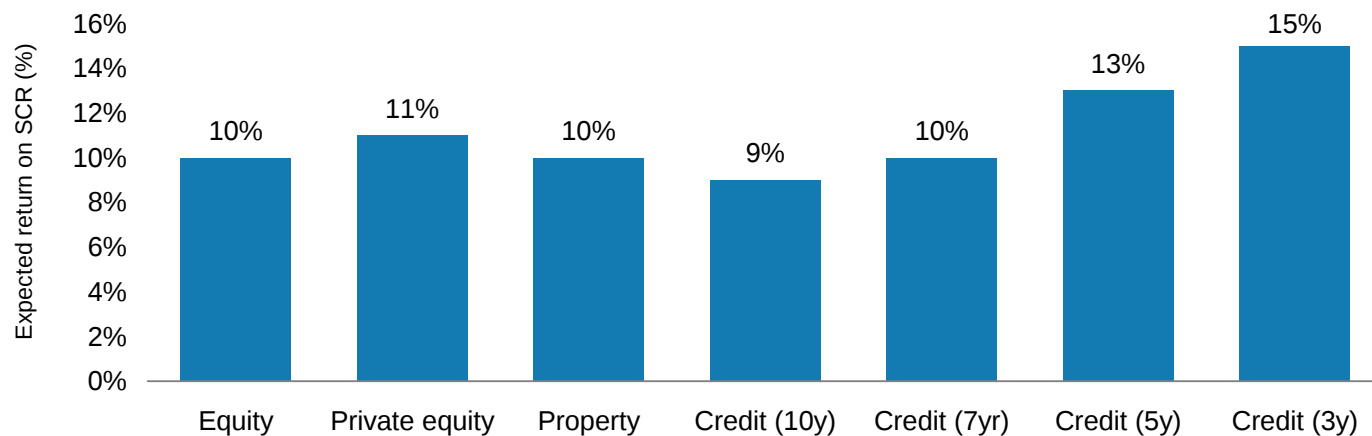
The greater the risk budget (in terms of SCR as a percentage of technical provisions) that is made available, the higher the allocation to risky assets.

Up to a market risk SCR of 7.5% of technical provisions, the optimal asset portfolio is dominated by a matching portfolio consisting of swaps, government bonds and short-dated credit.

Equity and property only get a significant allocation for those insurers with a very high market risk appetite.

Exhibit 12

Risk-adjusted return on capital from different asset classes under Solvency 2 – short-dated credit appears relatively attractive (compared to other ‘risky’ assets). However the most capital efficient assets to hold for insurers will be swaps and EEA government bonds given a zero direct capital requirement

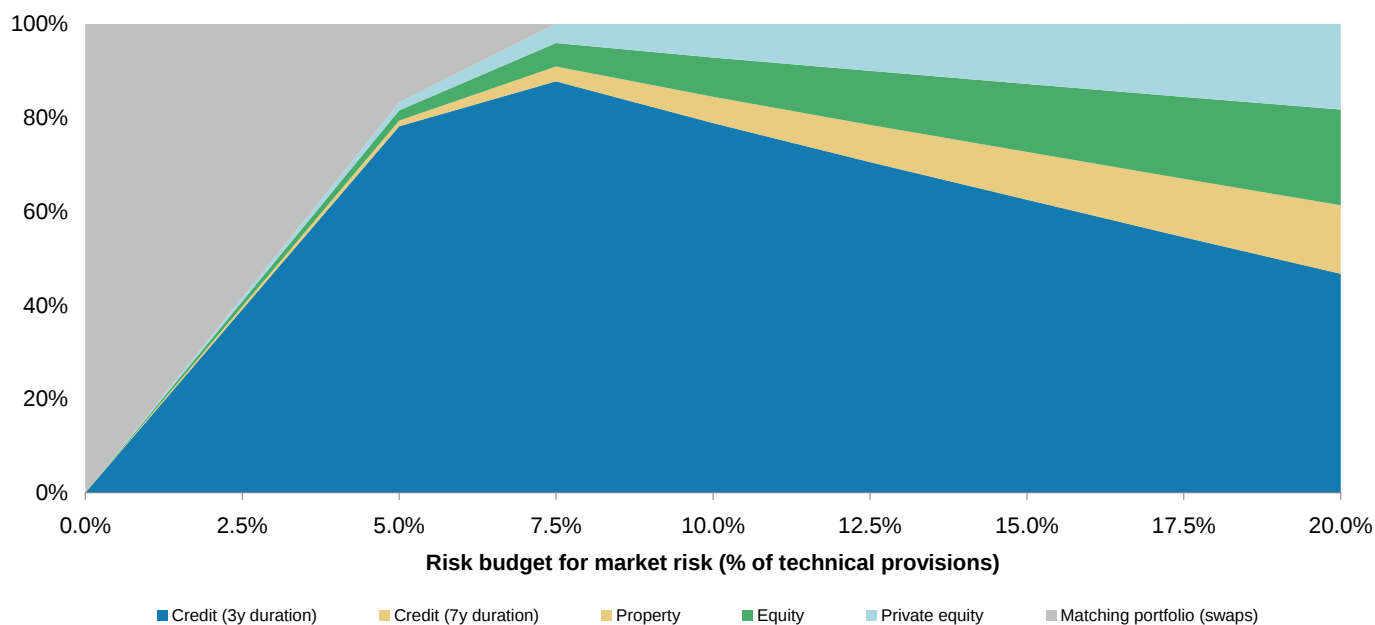


Standalone capital requirement (%)	39.0	49.0	25.0	16.5	11.5	8.2	4.9
Expected excess return (%)	3.3	4.3	1.9	1.3	1.2	1.1	0.9

Assumes that liabilities are cashflow-matched using swaps and other interest rate derivatives.
Source: QIS5 technical specifications, Bloomberg, Morgan Stanley Research, Oliver Wyman

Exhibit 13

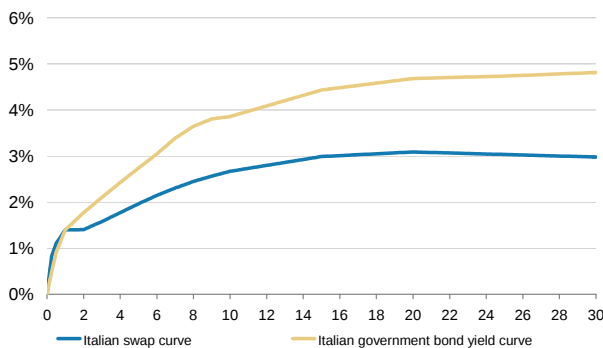
Optimal investment portfolio for general account liabilities: short-dated credit dominates the portfolio



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 14

Italian swaps vs government yields – significant yield pick-up potential in government bonds



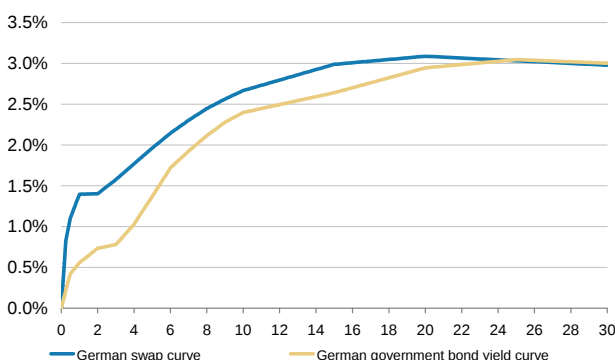
Source: Bloomberg, Morgan Stanley Research, Oliver Wyman

Insurers are large players in investment markets, with potential macro implications from their asset allocation decisions. For example:

- **Insurers are unlikely to markedly increase equity allocations** given their less attractive return on Solvency 2 capital relative to bonds; in the longer term, exposure to equities may grow through unit-linked funds;
- **demand for long-duration corporate bonds will likely decrease**, affecting corporates' ability to issue longer maturity bonds;
- **insurers may continue to have an appetite for longer duration swaps, swaptions and, importantly, government bonds, which carry no direct capital requirements**; this may affect supply / demand dynamics and the shape of yield curves;

Exhibit 15

Less advantage in holding government bonds in Germany compared to liability swap benchmark



Source: Bloomberg, Morgan Stanley Research, Oliver Wyman

- **government bonds are an attractive asset in those markets where government yields exceed swap rates.** This is true at the moment, for example, at the long end of the curve in the UK, France, Italy and Spain, where insurers could gain a substantial yield pick-up. Government bonds are currently less attractive in Germany, given their lower yields than the benchmark swap used to value liabilities.

4) Substantial increase in M&A activity

Solvency 2 could catalyse a major increase in M&A activity in the industry. There is likely to be a first mover advantage for those insurers that can quickly understand and assimilate the implications of the new solvency regime.

Although Solvency 2 is not due to be implemented until end 2012, we believe some insurers will look to anticipate its introduction once the rules become a little more settled. In our view, this process could start gathering momentum during 2011.

We believe there has been considerable 'pent-up' M&A activity – both as a consequence of the hiatus caused by the financial crisis and the lack of clarity on the future solvency regime.

We would highlight the following drivers for M&A:

- **Acquiring non-correlated businesses to access diversification benefits.** Our modeling suggests diversification benefits could reduce capital required by 25-35% for larger companies, with the greatest benefit coming from mixing different business lines (e.g. life / non-life). This provides a clear capital incentive for M&A, particularly if it improves the diversity of business lines.
- **M&A as a mechanism to accelerate a desired shift in product mix** or to reduce dependence on the agency distribution channel. Given the long-term nature of insurance and the slow 'recycle time' of the balance sheet, it is very hard for an insurer to change strategic direction rapidly on an organic basis.
- **Opportunistic taking advantage of the weakness of competitors.** Smaller entities may find it technically very demanding to comply with Solvency 2 and may decide to sell themselves to a larger competitor. This could be especially true for

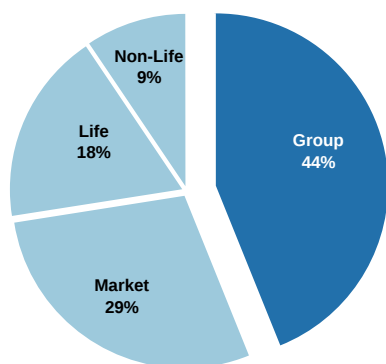
non-life insurers, where we believe that the adoption of an internal model will be particularly important.

- **Releasing capital from back books.** Capital will become an ever scarcer resource, and we believe insurers will look to release capital that is locked into backing long duration, low return portfolios. Selling a back book to a consolidator is an obvious way of achieving this.
- **Pursuing consolidation as a way of enhancing returns in certain product segments.** Much of European insurance is not a high return activity, and with limited growth we see increased focus on achieving cost leadership in chosen markets.
- **Providing an exit route for weaker mutuals** that lack access to capital. Rising capital requirements will be a particular challenge for the mutuals. We note the demutualisation and IPO of Standard Life that was at least in part triggered by the introduction of risk-based capital for with-profits business in the UK.
- **Some strong mutuals may want to consider demutualising and subsequently listing** as a mechanism to raise capital to expand product diversity and geographic reach – taking advantage of the opportunities in the post Solvency 2 landscape.

- **Acquisition of bank-owned insurers.** We believe that the implementation of Basel 3 will incentivise banks with significant insurance subsidiaries (as a percentage of tier 1 capital) to consider divestment – as the historical double leverage capital benefit is diluted. However, we note that certain banks are likely to dispose of insurance units as a consequence of European Union state aid requirements. Furthermore, the complexity of Solvency 2 is such that we think there is a deeper structural problem that banks and insurers operate using very different 'risk languages'. In our view, this makes it harder for the boards of banks to confidently exercise oversight of an insurance unit.
- **Continuation of efforts to acquire growth in emerging markets.** Given the global leadership position the European industry occupies, we expect to see insurers continue efforts to acquire 'genuine' growth in markets such as Asia, CEE and Latin America – however, the likely 'non-equivalence' of some of these territories is likely to dissuade the acquisition of certain portfolios.
- **Unless the equivalence issue is addressed, insurers may consider divesting or spinning off certain international subsidiaries, such as the US units.** While, for most European groups, the strategic and diversification benefits of having a global business outweigh the drawbacks of potentially having to hold more capital, this may not be the case in all instances.

Exhibit 16

Proportion of diversification from different sources – 'group' is the largest single component for composites. This could catalyse M&A activity



Source: Morgan Stanley Research, Oliver Wyman

5) Higher cost of capital for the industry?

"You can't handle the truth" – Colonel Jessep, A Few Good Men (1992)

Although analysts and investors have been demanding ever-increasing transparency, we believe that revealing the true volatility of the European insurance sector's balance sheet could actually *increase* the cost of capital – at least in the short term.

In our view, the small number of European insurers already running and reporting their businesses along economic lines suffer from a lack of investor understanding and high observed costs of capital.

Non-life insurers – often seen as a relatively stable segment by capital providers – could also see financing costs increase

as the move to the discounting of loss provisions increases observed volatility.

Confusion among analysts and investors is likely to be exacerbated by the introduction of IFRS Phase 2 for insurers (originally planned for 2012, but still subject to confirmation). Although the new IFRS standard is also based on market consistent principles, it uses a different liability valuation approach. Rather than calculating 'best estimate' liabilities, it potentially introduces the concept of a 'residual margin', which is part of liabilities (under Solvency 2, this 'residual margin' will in effect be shown as part of equity). Unusually, we will have a regime where the accounting liability is *higher* than on the regulatory basis.

The combination of near synchronous changes to the accounting and solvency regime will create significant operational challenges for insurers. This will especially be true for those that have complex corporate structures and a large number of legal entities.

The financial leverage of insurers post Solvency 2 is also an interesting debate. On a headline basis, the leverage ratios of insurers will decline (due to the increase in reported equity, as prudential liability margins are released). However, the apparent volatility of the balance sheet will increase, suggesting that the overall amount of leverage may not materially alter. We expect the rating agencies to retain an important role in setting acceptable debt levels for the industry.

Furthermore, the complexity of the Solvency 2 regime raises serious questions about the capacity of regulators to effectively police the sector – particularly as most major insurers will adopt an internal model. The recent history of complex financial models in anticipating and averting crises is not encouraging.

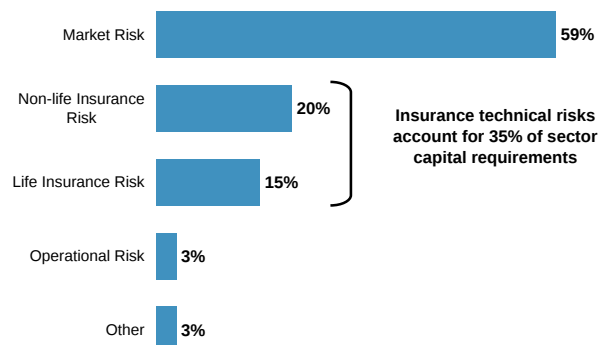
6) Focus on underwriting and asset management

As Exhibit 17 shows, only around 35% of the sector's risk budget comes from 'technical' risks, with market risk being the dominant source.

As discussed above, we do not believe that traditional participating life business is the 'product of the future', and so we expect insurers to invest considerable resources in the development of new products. This is likely to have wide-ranging implications – in particular for distribution strategy, as in many markets both customers and agents alike are

Exhibit 17

Only around 35% of the sector's capital requirement currently comes from 'technical' risk



Source: Morgan Stanley Research, Oliver Wyman

used to the security and certainty offered by traditional products.

Products that generate technical margins – uncorrelated to capital markets – are clear winners from Solvency 2.

We expect insurers to seek to adjust product mix, notably through the following means:

- **More emphasis on unit-linked business – and potentially in time variable annuity products.** We acknowledge, however, that many insurers are reluctant to focus on unit-linked, owing to concerns over gradual erosion of margins (especially given the inevitable trend to use of third-party funds). Variable annuities bring different challenges – not least managing the complexity of hedging.
- **The search for a 'new traditional' product.** This would seek to fulfil the customer demands of a traditional life contract (offering guarantees and certainty) but in a capital-efficient manner. Possible approaches include unit-linked products with guarantees (but simpler than a full variable annuity) or structured products.
- **Asset management to become a focus profit centre** in its own right. Insurers have long debated whether asset management should be a core competence or outsourced. We increasingly believe it should be a core part of any insurance business.
- **Examination of the stand-alone protection product segment in continental Europe.** While

this is likely to remain a relatively small segment – given generous welfare benefits, relatively lower home ownership (e.g. versus UK / Netherlands) and the existence of traditional endowment products (which include protection on a bundled basis) – there could be some opportunity here.

- **Consideration of health insurance as a possible growth opportunity** – particularly in light of the pressure on government balance sheets. However, this sector is politically controversial in many countries.

A challenge for insurers – particularly in those markets where policyholder capital funded traditional products have been dominant – is to manage a profitable transition to shareholder financed alternatives.

There is a risk that the returns available on 'new' products are unattractive, as insurers all follow similar strategies simultaneously.

We note similar trends were seen in the UK market after the demise of with-profits business in 2001-2003 and the subsequent introduction of economic capital requirements.

7) Fungibility of capital / corporate structures

With diversification benefit becoming a major component of capital relief in an insurance company, a key question is how companies can practically harness this benefit.

Diversification benefit will be greatest for the Group Solvency Capital Requirement at the holding company level, since insurers will be required to hold a Solvency Capital Requirement at the local subsidiary level that does not benefit from the group's total business mix.

Consequently, we think that insurers will look to structure themselves to take maximum advantage of the diversification benefits that are available.

We believe that insurers could go down one of three routes in terms of corporate structure to address these challenges:

1. **Use of internal debt** – using leverage at the group level to inject equity (for example) into a local business to ensure that the entity covers its SCR.

2. **Internal reinsurance** – this approach reinsures all the group business onto one balance sheet, which allows the capture of diversification benefit in one legal entity. However, certain residual risks such as counterparty and operational risks will remain locally.
3. **Migrating as much business as possible to a single European balance sheet.** However, this approach works much better for non-life and new unit-linked business – it is difficult to implement for back books of life companies given their duration.

It is possible that insurers will have to inject more capital into subsidiaries to meet local SCR requirements.

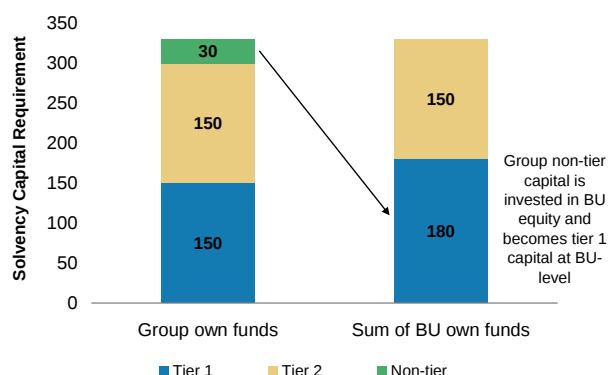
Historically, local subsidiaries have been capitalised at the higher of internal economic capital, rating agency or Solvency 1 requirements. To the extent that the Solvency 2 SCR is higher than this, groups may have to top up local capital. However, the majority of the largest groups will most likely use internal models for material subsidiaries – so in practice requirements will be lower than the standard SCR.

Throughout the financial crisis we have also seen heightened concerns about the fungibility of capital within insurance groups, particularly as some regulators restricted the flow of internal dividends to protect local interests.

QIS5 specifically deals with the fungibility of capital, with only fungible capital in excess of the local SCR eligible to contribute towards the group requirement. To be deemed fungible, capital must be available and transferrable within nine months.

Exhibit 18

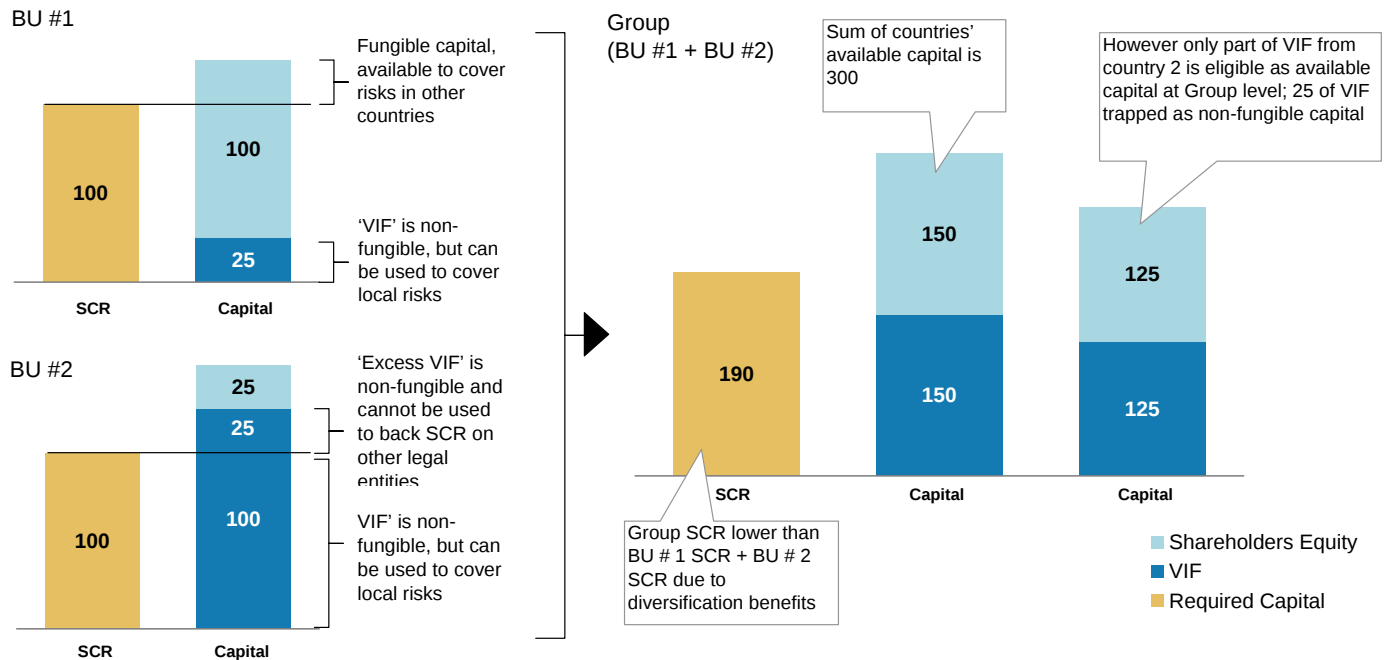
Insurers could use internal debt at the group centre to access diversification benefits



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 19

Capital fungibility constraints also need to be captured in the measurement of group available capital



- Only certain parts of own funds are considered fungible and can be fully included in Group own funds
- If VIF > SCR, excess of VIF over SCR cannot be used outside of the relevant legal entity and is "trapped", i.e. not available as Group own funds
- Some transactions (such as branch structure) allow working around fungibility and transferability constraints to a certain extent

Source: Morgan Stanley Research, Oliver Wyman

The Quantitative Impact of Solvency 2 (QIS5) – Our Model Outputs

Morgan Stanley Equity Research and Oliver Wyman have collaborated to create a detailed Solvency 2 model that calculates the impact of this regulatory change on individual companies.

By running a number of fictitious companies through this model, representing each of the important insurance sub-sectors, we have been able to build up a picture of the aggregate and relative quantitative impact of Solvency 2 on the listed European insurance sector.

We show some of the detail behind our company-by-company analysis of Solvency 2 in the following section, together with a brief description of how the model works.

However, in this section we bring out some of the broad quantitative conclusions for the sector as a whole.

1) We estimate the sector's solvency falls to 135% under Solvency 2, from ~200% under Solvency 1

Exhibit 20 shows our estimate of the change in the sector's average solvency ratio under Solvency 2 and the key stepping stones. This shows that the sector's solvency ratio falls substantially under Solvency 2 (QIS5) to 135%, from ~200% (Solvency 1) at end 2009. Although this is a big drop, we believe a 135% Solvency 2 SCR coverage ratio provides

a sufficient buffer for the sector to largely avoid the need to raise capital, and reflects better the actual view of risk appetite in the European insurance industry.

Under the QIS5 specifications, capital requirements go up substantially relative to Solvency 1 and are much more tailored to risk. Capital requirements more than double for the sector as a whole – although the impact varies significantly between different types of companies and risks.

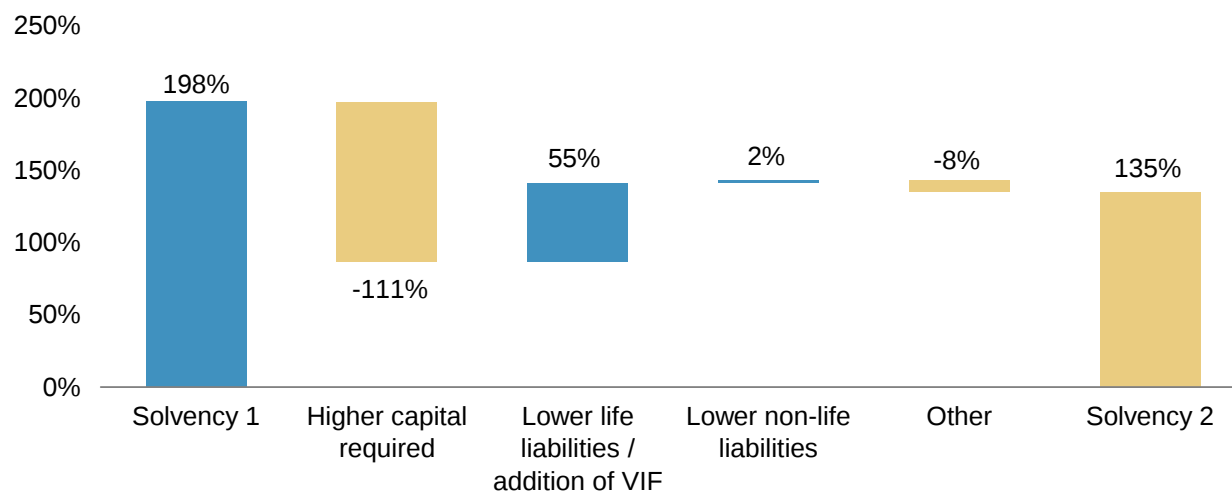
However, this is offset by a substantial reduction in liabilities as the whole balance sheet is overhauled and transformed to a mark-to-market basis.

This comes mainly from a reduction in life insurance liabilities as these are recalculated on a best estimate basis, removing highly prudent buffers in current regulatory liability calculations, and capitalising expected profits from the contracts. Non-life insurance liabilities also fall, although the impact is smaller owing to their shorter duration.

The reduction in life and non-life liabilities is offset by the inclusion of a risk margin (included in our estimate of the liabilities), which replaces prudential buffers but to a smaller degree. This margin represents the potential cost of capital incurred by third parties if they had to assume these liabilities (e.g. in the event the company was shut down).

Exhibit 20

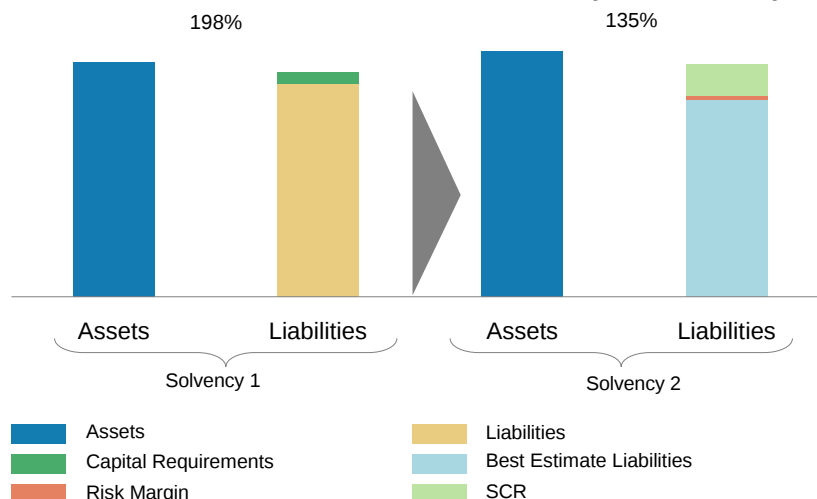
Our estimate of the key movements between the Solvency 1 and Solvency 2 (QIS5) regimes – we believe the proprietary insurance sector's solvency ratio falls to 135% under Solvency 2, enough to avoid capital raising



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 21

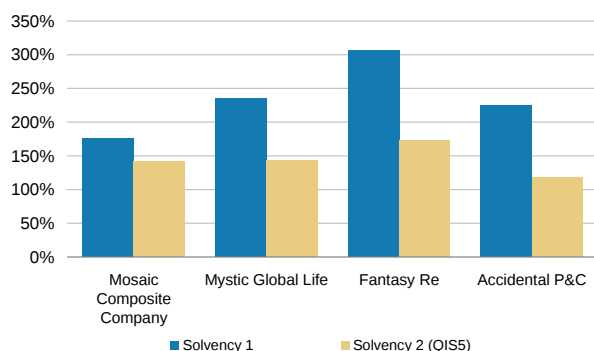
How the aggregate balance sheet moves for the sector from Solvency 1 to Solvency 2



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 22

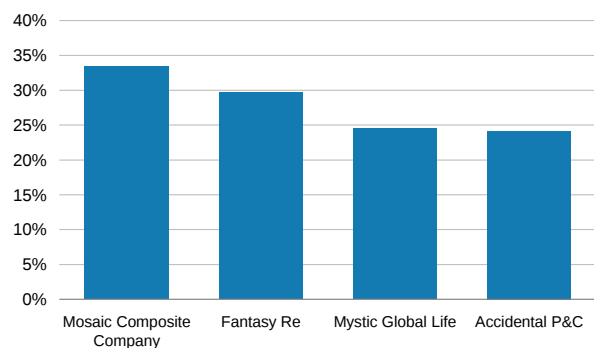
Our model suggests non-life companies will see the greatest reduction in solvency ratios



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 23

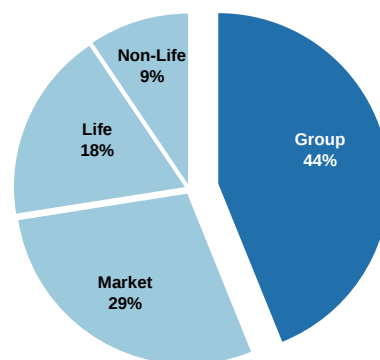
Our model suggests a 25-35% diversification benefit, with composites benefitting the most



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 24

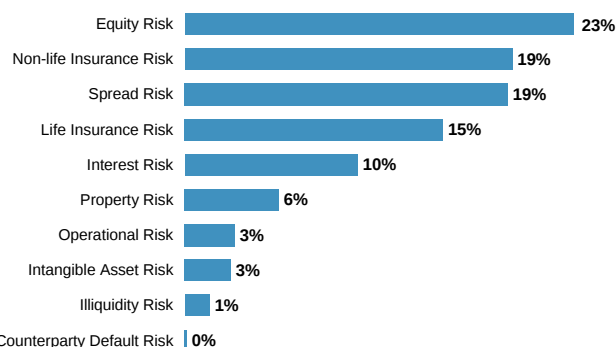
Sources of diversification benefit – group diversification is the largest contributor



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 25

We estimate ~60% of the sector's S2 capital requirement relates to market risk



Source: Morgan Stanley Research, Oliver Wyman

2) Non-life companies may experience the greatest reduction in capital ratios

Our company analysis suggests that non-life companies will see the greatest increase in capital requirements and the most reduced solvency ratios.

Exhibit 22 shows the change in the solvency ratio between Solvency 1 and Solvency 2 for the four fictitious companies used in our model, which include a diversified reinsurer (Fantasy Re) and a pure primary non-life company (Accidental P&C). Both of these companies suffer from a larger drop in regulatory solvency coverage than the pure life company (Mystic Global Life) and the composite (Mosaic Composite).

This will not come as a surprise to many of the larger companies that already manage to risk-based rating agency capital models. Solvency 1 non-life regulatory capital requirements have long been recognised by the rating agencies as an inadequate measure of risk.

We expect the major reinsurers, in particular, to maintain good Solvency 2 buffers on the standard QIS5 model, and this may be further improved through the use of internal models. As we discuss below, reinsurers benefit from a strong diversification benefit.

However, it is possible that many non-life insurers find the capital requirements quite steep – particularly given the increase in many of the capital charges for non-life risk between QIS4 and QIS5. Companies that do not have the resources or data to use company-specific factors, full or partial internal models may be at a particular disadvantage.

3) Diversification benefit becomes a major driver

We expect diversification benefit to become a major component of capital requirements, potentially reducing capital requirements by 25-35%. Our modeling probably understates the benefit, since we do not explicitly allow for geographical diversification or other forms of diversification that may be picked up in an internal model, but not under QIS5. The impact varies significantly between different types of companies:

- Composite insurers benefit the most, owing to the low correlation between their mixed life and non-life risks.

- Reinsurers also get a good benefit, given a wide range of reinsured risks and geographical diversification; however, this is especially true for those that write both life and non-life reinsurance.
- Unsurprisingly, pure play life / non-life insurers see a lower diversification benefit (although this is still significant in absolute terms) – around one third lower than composites. This may incentivise M&A in order to increase business line diversity.

A key point we note from our individual company models is that *diversification benefit is the main source of surplus capital* under the QIS5 model. That is, without diversification benefit, companies would have little or no surplus. Therefore, how companies harness diversification benefit in the group becomes a key strategic question.

4) The largest proportion of sector capital requirement relates to market risk

We show our estimate of the different sources of capital requirement under the QIS5 SCR for the sector as a whole (weighted by market capitalisation) in Exhibit 25.

This suggests that ~60% of Solvency 2 capital requirements come from some form of market risk. In order of importance, the main market risks are equity risk, spread risk and interest rate risk.

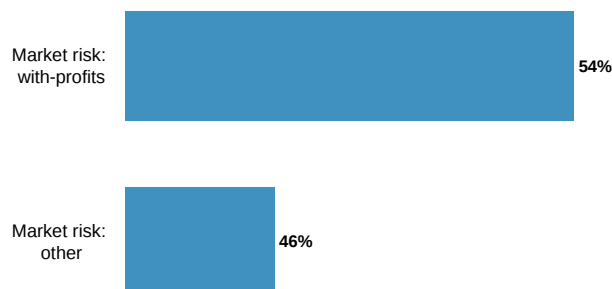
As we discuss in the ALM section later in this report, we believe Solvency 2 will have a major impact on companies' approach to asset-liability management. It will also affect the relative attraction of different asset classes to insurers seeking to maximise capital efficiency *as well as* expected return.

An important point to note is that the majority of the sector's market risk appears to come from one product area: exposure to traditional 'participating' or 'with-profit' life insurance savings policies.

These policies typically carry interest rate guarantees and may offer options such as surrender at a book value that is greater than underlying market value. They operate through a mechanism of profit sharing between policyholders and shareholders. Insurers make most of their profit from investment margins (i.e. by taking asset risk against minimum guarantees). Although these products have been in relative decline in many markets, they remain a major part of European life and composite insurers' back books.

Exhibit 26

With-profit (or 'participating') life insurance policies account for 54% of sector's market risk



Source: Morgan Stanley Research, Oliver Wyman

As insurers try to deal with the problem of low bond yields, we feel that they will look to reduce exposure to market risk – especially in with-profit and traditional life savings contracts.

It is likely that the return on capital on these products will look far less attractive under a Solvency 2 regime than current regulatory approaches.

We expect this to hasten the search for alternatives to the traditional with-profits product.

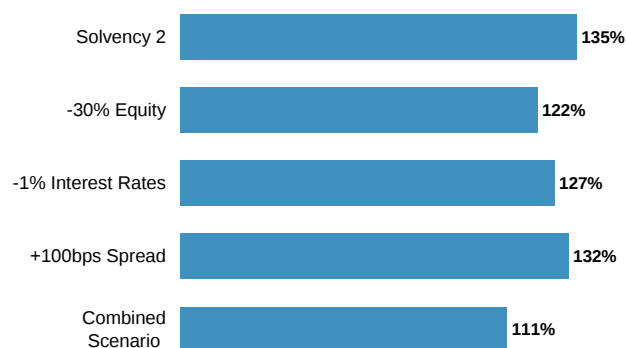
5) The sector's solvency ratios are likely to become far more volatile

Exhibit 27 shows the sector's sensitivities of solvency to adverse equity market, interest rate and credit market movements. The key point to draw out here is that the sector's solvency ratio is likely to become more volatile under Solvency 2.

This is partly due to the high market risks in the sector that we have already talked about.

Exhibit 27

The sector's solvency ratios are likely to be highly volatile under Solvency 2, particularly to market risks, forcing companies to hold buffers



Source: Morgan Stanley Research, Oliver Wyman

Sensitivity to capital markets will clearly be higher for life insurers or composites with a greater exposure to market risks than reinsurers or pure non-life companies.

However, we also expect a greater degree of volatility in capital ratios at non-life companies.

- **This is partly due to the mark-to-market valuation of assets** that affects non-life companies to a lesser extent than life companies – but is still an important driver.
- **It is also due to the introduction of discounting of non-life insurance liabilities**, using market-consistent yield curves. Again, non-life companies will be less sensitive than life companies, owing to their shorter duration liabilities. However, this could introduce greater volatility than the current regime, where discounting is not generally recognised for regulatory capital purposes in most countries.
- **The move to a best estimate approach may reduce non-life companies' ability to smooth underwriting profits** – although we will have to wait to see how reserving levels are affected by Solvency 2.

Our Quantitative Model: How it Works

Our Proprietary Quantitative Solvency 2 Model

Our Solvency 2 model calculates the impact on the whole balance sheet and capital requirements for a particular input company, and is based on applying QIS5 Solvency Capital Requirements (SCR). We have not made any adjustments for the application of full internal or partial internal models. Our model is tailored towards proprietary (i.e. listed) European insurers and does not deal with the mutual model.

In the next few sections, we present our analysis of the detailed quantitative outputs from our model, as well as a brief description of how it works.

We have tried to explore the quantitative impact of Solvency 2 by modeling four fictitious insurance companies:

- **Mosaic Composite Company:** a composite insurer, writing mainly life business, with exposure to US life.
- **Mystic Global Life:** a pure global life insurer with a US life business.
- **Fantasy Re:** a diversified reinsurer, writing both life and non-life reinsurance business.
- **Accidental P&C:** a primary commercial and retail non-life insurer that does not write life business.

We use the data from these companies to infer the impact of Solvency 2 on the European Insurance sector overall. Although we are not attempting to replicate real-life companies, these provide us with the building blocks to understand how Solvency 2 will affect different sub-sectors.

Our model does not aim to replicate the detailed models used by companies. For example:

- **We only consider insurance businesses at the group level** without allowing for complications of different corporate structures – and assume no other business lines (e.g. banking or asset management).
- **We do not make any explicit assumptions about geographical diversification** beyond the implied diversification already baked into the SCR factors under QIS5.

- **We are agnostic about the eligibility and definition of hybrid capital and our model assumes grandfathering of existing hybrid capital** under a Solvency 1 regime into Solvency 2. Therefore, we do not make any adjustments for a change in the eligibility of hybrid capital instruments – although we allow for the limits on the amounts of tier 1, tier 2 and tier 3 capital that are eligible under Solvency 2 rules.
- **In addition, we consider only certain types of life and non-life insurance products** and we try to value the impact of options and guarantees using an option-formula based approach, rather than through stochastic simulation.

Key life insurance products considered in our model are:

- pure protection policies, e.g. term insurance
- traditional participating or 'with-profits' savings
- payout annuities, either retail or bulk
- US-style variable and fixed annuities, with both death benefit and living benefit guarantees in variable annuities (we assume no equivalence for the US)
- simple unit-linked contracts, that contain little or no guarantees.

In non-life, we consider the product categories mentioned in the draft QIS5 calibration, namely:

- motor insurance, third-party and other
- marine, aviation & transport
- general liability
- fire & damage
- other miscellaneous lines (e.g. assistance or credit)
- non-proportional reinsurance of MAT, property and casualty.

We illustrate the basic structure of our quantitative model in Exhibit 28.

We start by defining the company's key assets and liabilities and building up a picture of the Solvency 1 balance sheet.

On the asset side we allow for:

- **a mixture of tangible and intangible assets**, some of which are eliminated in calculating the Solvency 1 capital ratio;
- **a variety of asset valuation methodologies** under Solvency 1, consistent with current practice (e.g. market value vs. amortised cost); and
- **different forms of hybrid capital**, which we ultimately divide into tiers.

On the liability side of the balance sheet:

- **We build up a profile of the company's liabilities** according to the different product categories. This involves inputting premium data for each product type and inputting or estimating the Solvency 1 technical provision for each liability.
- **We allow for the granularity of different types of policyholders in long-term life insurance policies – through the use of 'model points'.** Model points represent groups of similar policyholders in each product category, for example based on factors such as sex, age, outstanding term of policy, type of benefit / guarantee or choice of asset allocation within savings policies. This is important for defining the 'shape' of the back book and affects how the liabilities react to the applied stress tests.

We then construct and estimate a Solvency 1 balance sheet. After defining the balance sheet, we adjust the shareholders' equity and add in any solvency-qualifying hybrid capital to estimate regulatory available capital.

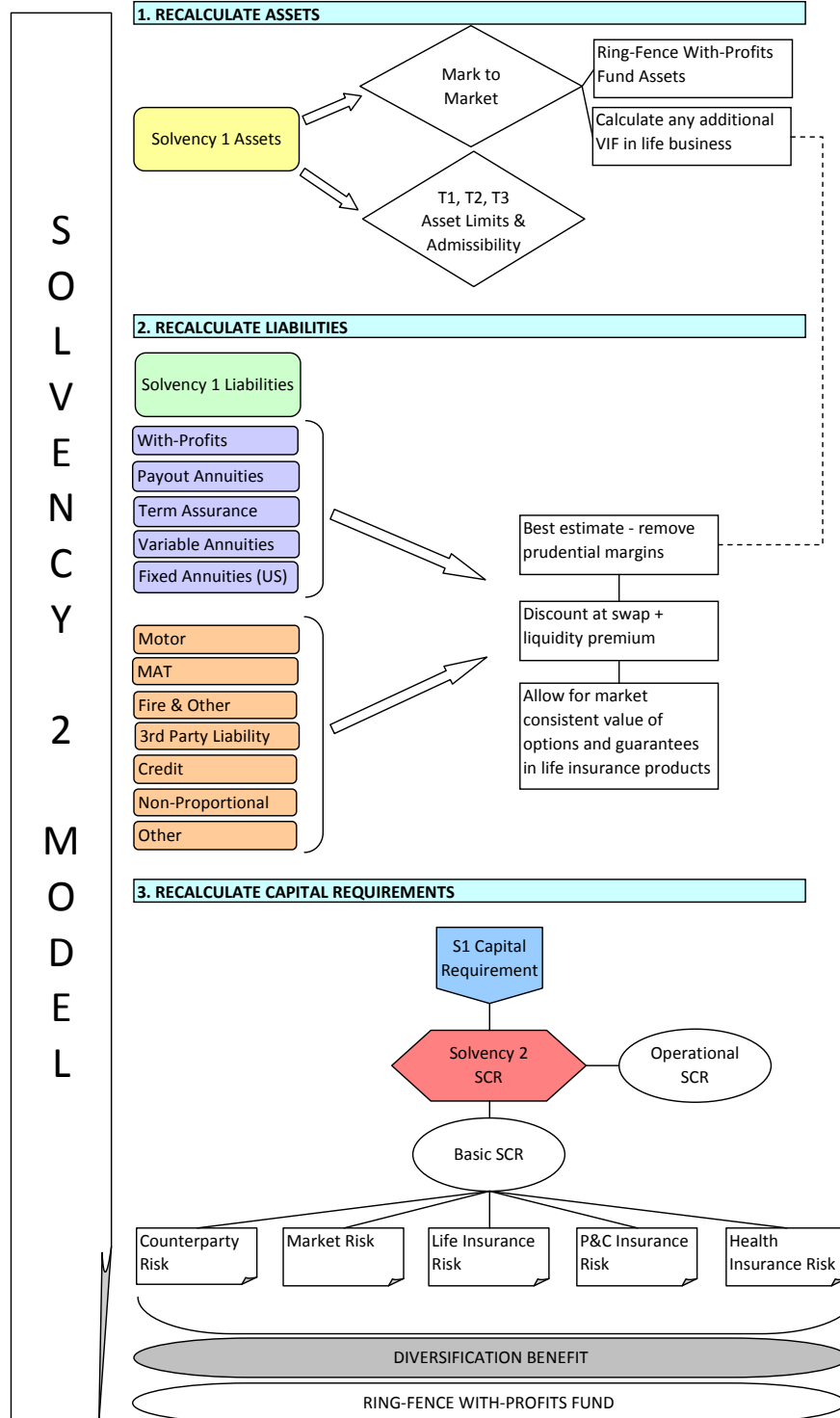
We estimate simple Solvency 1 capital requirements for life and non-life insurance product categories to estimate the group Solvency 1 ratio.

Our next step is to 'translate' this into a Solvency 2 balance sheet. This involves re-calculating assets and liabilities, as well as capital requirements.

- **Assets are marked to market value.**
- **Liabilities are calculated according to Solvency 2 principles**, i.e. best estimate based on a market consistent valuation, plus a risk margin using the standard cost of capital approach. We discount liabilities using QIS5 specified yield curves (according to geography) and using different liquidity premium allowances. For example, 100% liquidity premium is given to payout annuity business, but only 50% to US fixed annuities. We estimate risk margins explicitly by projecting forward the SCR for non-correlated risks in our forecast horizon, applying our cost of capital assumption and discounting this back for each product.
- **We calculate the time value of options and guarantees in life insurance products using closed form option valuation techniques**, rather than stochastic modeling. For example, we estimate investment guarantee costs through the value of a replicating portfolio of options that match the characteristics of the 'model points' in each of our life insurance products. We value annuitisation and income guarantee costs (e.g. in US variable annuity policies) using a replicating portfolio of swaptions.
- **Where there are liabilities in 'participating' traditional life insurance policies, where assets and liabilities are typically ring-fenced from shareholder capital, we allow for the use of policyholder capital** (i.e. excess of assets over liabilities in these funds, which predominantly belongs to policyholders). Specifically, we determine future discretionary benefits (FDB) arising from policyholder capital as well as their risk absorbing capacity in stress scenarios. Policyholder capital effectively absorbs some or all of the cost of options and guarantees as well as some of the gross Solvency Capital Requirements in our model. However, we assume that any surplus capital in these funds, after covering capital requirements, is not fungible and cannot be used to support capital requirements elsewhere in the group.
- **For non-life liabilities, we calculate best estimate liabilities by projecting loss development** using a reserving triangle approach. We reduce our assumption about ultimate losses to release some prudential margins in the loss projection.

Exhibit 28

Structure of the Morgan Stanley / Oliver Wyman proprietary Solvency 2 (QIS5) model



Source: Morgan Stanley Research, Oliver Wyman

In most cases, liabilities are actually lower under Solvency 2 than Solvency 1. It is important to recognise that Solvency 2 is not just about capital requirements but involves a complete restatement of the balance sheet, with both assets and liabilities recalculated according to fair value principles. Technical liabilities are likely to be lower due to the Solvency 2 principle of using a 'best-estimate' rather than 'prudent' calculation basis. In addition, non-life liabilities will be discounted and life insurers may (in many cases) use higher discount rates than current regulatory requirements. This increases shareholder equity, which partially offsets higher capital requirements under Solvency 2.

For life insurance, Solvency 2 effectively capitalises some of the VIF (value in-force) emerging from products on a best estimate basis. Our model recognises this asset as capital – in-line with QIS5 guidance. Although we have not separately disclosed it in our output, our model is able to distinguish between VIF on in-force business and that created through *future premiums*.

We then calculate Solvency 2 capital requirements for product groups and risk areas in accordance with QIS5 SCR guidance. Although we have had to make some simplifications – for example in our calculation of catastrophe risk, where the strict QIS5 requirements are highly complex and require some internal company modeling – we have tried to adhere as closely as possible to the QIS5 Solvency Capital Requirements stress tests.

We apply correlation matrices, as specified by QIS5, to estimate diversification. Our model distinguishes between

diversification within product groups (e.g. between different lines in a non-life business unit) and across different products and risk areas (e.g. the diversification between non-life insurance underwriting risk and market risk). Our diversification benefit calculation adjusts for fungibility issues – e.g. as mentioned above the difficulty of using surplus capital in participating life funds to diversify against capital risks elsewhere in the group.

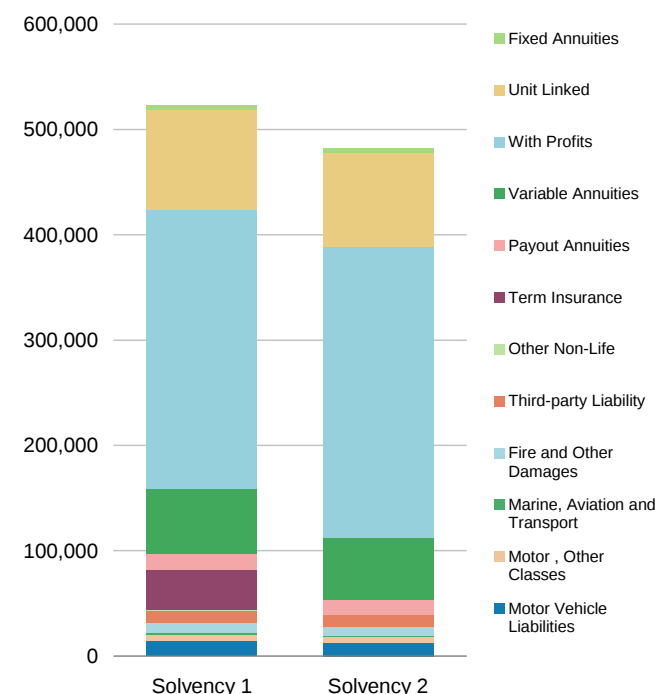
We allow for hedging and reinsurance as risk mitigation techniques in our stress-testing. This is important in dampening the impact of market risk stress tests on assets. However, it is also highly relevant to our modeling of US variable annuities, where product guarantee features are assumed to be delta hedged. We allow for a lack of full hedge effectiveness in our model – replicating the regulatory approach of not giving full credit for hedging, but also allowing for actual real-world experience of sometimes ineffective hedging in the insurance industry. For example, we assume 50-60% hedge effectiveness in US variable annuity contracts.

By re-defining both assets and liabilities in a Solvency 2 world, and estimating capital requirements, we derive a Solvency 2 capital ratio. We recognise that Solvency 2 ratios are not directly comparable with Solvency 1, since Solvency 2 is a far more conservative, robust and risk-based methodology. However, our model outputs allow us to test the volatility of the Solvency 2 capital ratio under market stress scenarios.

Mosaic Composite Company: Life and Non-life Operating Globally

Exhibit 29

Mosaic's product mix by liability value – a broad mixture of life and non-life products. Participating life is the largest single component of liabilities



Source: Morgan Stanley Research, Oliver Wyman

Mosaic is a composite insurer with an approximate 60/40 split of life / non-life premiums. It has diversified exposure to most life and non-life insurance product types in both retail and commercial lines – with the exception of reinsurance business. Its most sizeable liability is a large book of 'with-profits' (or participating life) contracts, containing guarantees and based on profit-sharing between shareholders and policyholders. This is written in a variety of European countries. It also has a sizeable portfolio of unit-linked life policies – which is an important part of new business sales. In addition, it has a significant US life insurance business focused mainly on variable annuities.

It has a reasonably mixed asset allocation, with some exposure to equities, but mainly geared to bonds. Roughly half of its bond exposure is in government bonds and half in corporate credit. Equity exposure has been managed downwards and a large proportion of Mosaic's gearing to equities now comes from its unit-linked portfolio and variable annuities, where assets are invested mainly in equity funds. We assume variable annuities contain a mixture of death and living benefits, with hedging of these guarantees (e.g with options and swaptions) at ~50% hedge effectiveness. The credit quality of the corporate bond portfolio is strong with >70% of corporate bonds rated >A.

Its current group Solvency 1 ratio is 176%. Solvency 1 ratios tend to be fairly difficult to compare between companies and countries, due to calculation differences. However, this represents a reasonably comfortable buffer.

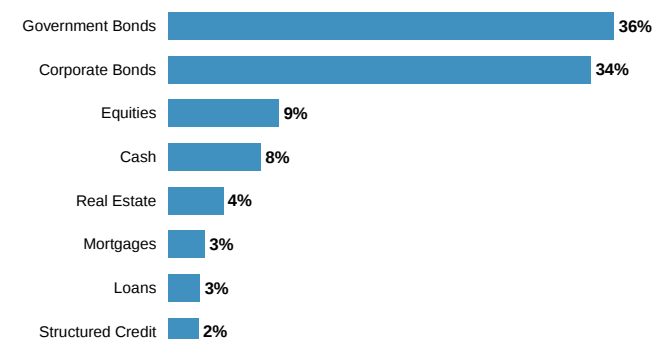
What is the impact of Solvency 2?

Mosaic has a lower but adequate buffer under QIS5 – with the group Solvency 2 ratio falling to 142%. We would stress that a lower capital ratio does not necessarily imply weaker solvency – the two bases are simply not comparable and the underlying capital requirements under Solvency 2 are more stringent. We believe this is an adequate buffer.

Lower life insurance liabilities offset higher capital requirements. As our analysis in Exhibits 31-34 shows, there is a substantial increase in capital requirements under QIS5. However, this is offset by a jump in the level of capital available. This additional capital arises mainly from a reduction in the calculation of life insurance liabilities under Solvency 2, as well as the capitalisation of 'VIF' into equity.

Exhibit 30

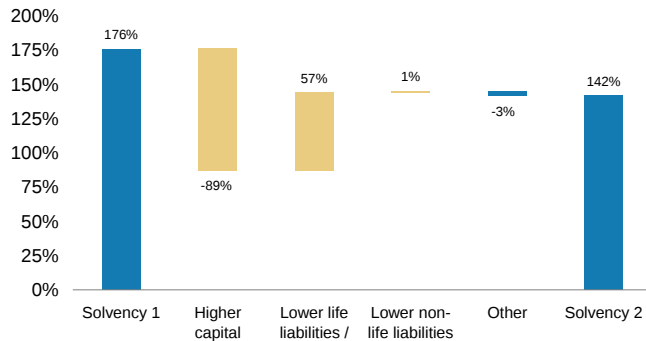
Asset allocation – mainly bonds, including corporates, with 9% equity exposure. Over time Mosaic has been reducing equity exposure



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 31

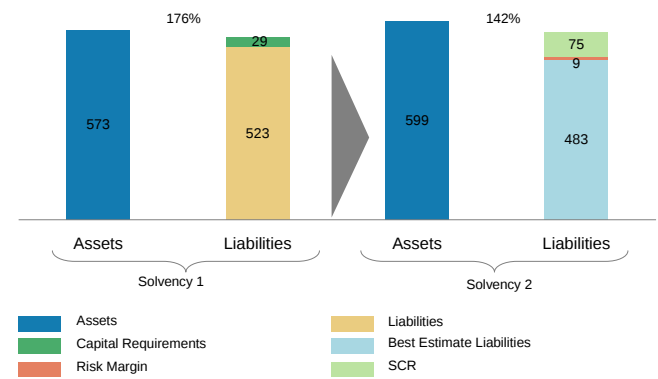
Movement in Mosaic's solvency from S1 to S2



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 32

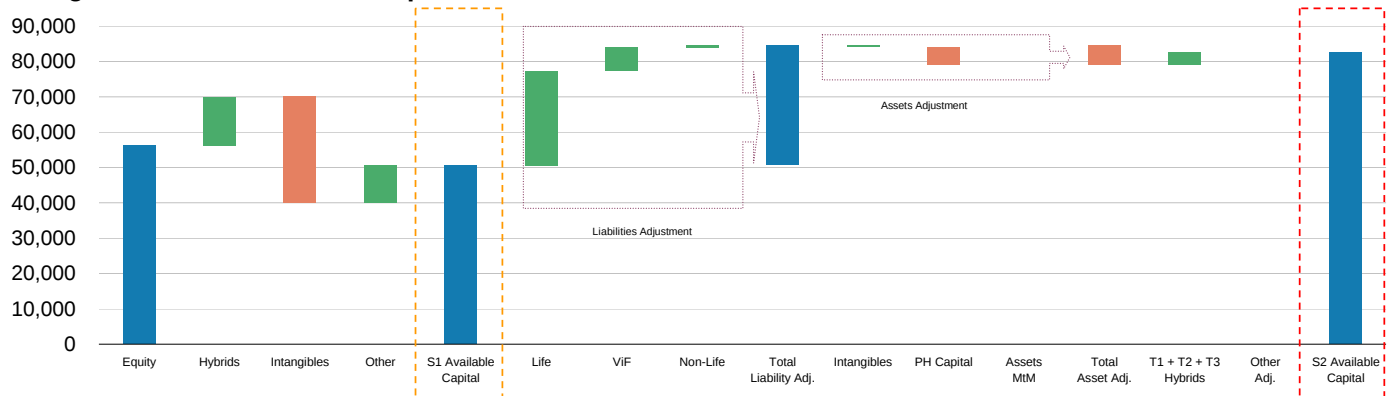
Change in Mosaic's assets and liabilities



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 33

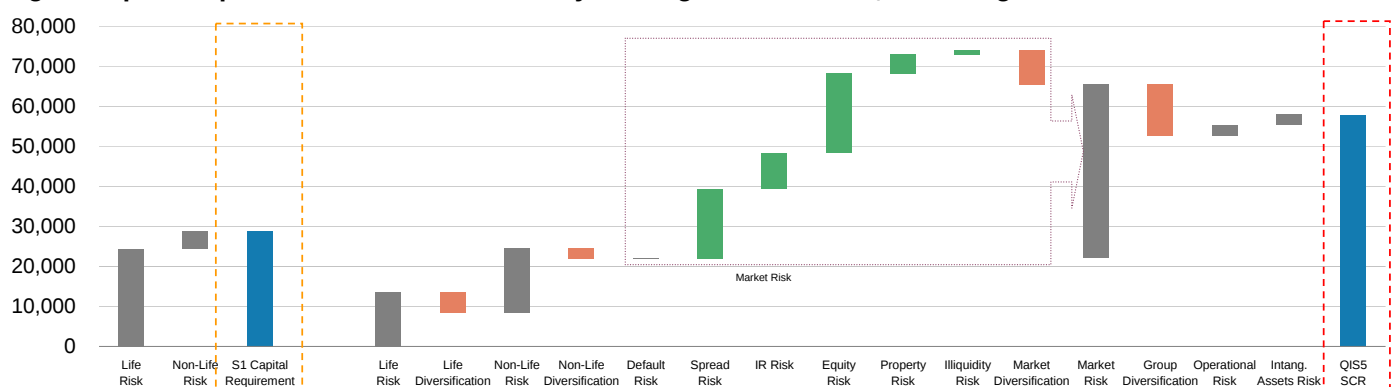
Change in Mosaic's available capital between S1 and S2 – increases due to lower life liabilities



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 34

Higher capital requirements under S2 – mainly relating to market risk, with a significant diversification benefit



Source: Morgan Stanley Research, Oliver Wyman

The reduction in life insurance liabilities is primarily due to:

- **The removal of prudential margins in calculating life liabilities**, moving to a best estimate plus 'risk margin' basis, as required by Solvency 2.
- **The use of a market-consistent yield curve plus liquidity premium results in a higher discount rate than the current regulatory discount rate for many life insurance liabilities.** 50% of the maximum liquidity premium is available for all liabilities, but 75% for with-profits business that form a significant proportion of Mosaic's liabilities.

Mosaic's capital requirements dominated by market risk and traditional with-profits business

Market risks are the major component of Mosaic's required Solvency 2 capital. We show this in Exhibit 35: 60% of Mosaic's capital requirements come from investment market risk, primarily equity, credit and interest rate risk. About half of this market risk comes from one product area: Mosaic's large book of with-profits or traditional 'participating' life policies. In fact, the with-profits business accounts for 45% of Mosaic's total capital requirements. This is not surprising given the large proportion of liabilities in the with-profits product. However, this has significant consequences, we believe, for Mosaic's product and investment strategy.

The higher the market risk, the more volatile the Solvency 2 ratio. Exhibit 38 shows estimates of how Mosaic's Solvency 2 ratio varies under a number of asset stress scenarios. A combination of yield curve, equity market and credit spread market movements are likely to lead to a high degree of volatility in Mosaic's Solvency 2 ratio. This may mean that Mosaic finds it needs to hold a higher natural capital buffer than other insurers with less volatile capital positions. A more volatile Solvency 2 position may also raise Mosaic's cost of equity to investors, at least in the early years of implementation.

Solvency 2 is, therefore, likely to become a key driver of investment strategy for Mosaic. As well as considering potential expected returns, management is likely to be highly focused on the *risk / reward* of investment decisions. For example, Mosaic's equity portfolio is less than a third of the size of its corporate bond assets; however, the capital requirements for equity and spread risk are similar. In addition, the Solvency 2 capital ratio is more sensitive to equity market movements than movements in credit spreads. This suggests equities require a higher expected return

hurdle to achieve a similar return on capital to corporate bonds. This may lead Mosaic to question its current allocation to equities, or prefer to reinvest new cash in corporate bonds, government bonds and swaps.

Market risk and high capital requirements potentially pressure the traditional with-profits product. Market risks in participating with-profit products are geared by guarantees in these products. This results in an asymmetry of returns, with a larger downside risk from low returns and yields than the upside potential from strong investment returns. Our model does not make explicit predictions for returns on capital; however, for Mosaic, the skew of required capital towards the traditional with-profits life business, driven primarily by market risks, is probably not matched by the earnings contribution from this business. This may pressure total returns on capital generated by Mosaic and lead management to question the rationale for writing new with-profits business – particularly in a low yield environment – and search for alternatives.

This may be exacerbated by the low flexibility and fungibility of surplus capital allocated to the with-profits business, a lot of which may be in the form of *policyholder capital* that is ring-fenced from the rest of the group and, therefore, cannot be used to support other areas of the business.

Strong diversification benefit supports Mosaic's composite model

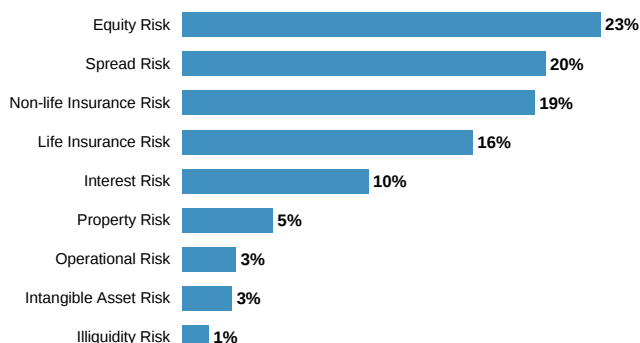
Mosaic enjoys a strong diversification benefit of 33% of capital requirements. Mosaic has the greatest diversification benefit, as a percentage of capital requirements, of all of the four companies considered in our analysis. As Exhibit 37 shows, the largest portion of this capital benefit comes from 'group' diversification, i.e. the amalgamation of the wide variety of business lines, liabilities and risks that Mosaic writes – especially the composite mixture of uncorrelated life and non-life risks together in one group. Note that our model does not make any explicit allowance for geographical diversification, which could raise the overall diversification benefit further.

Therefore, Solvency 2 will provide significant support for the composite model and M&A. Exhibit 36 shows that without diversification credit, Mosaic would not have a capital surplus on the QIS5 basis. Therefore, there is strong support for diversification and Mosaic's composite life / non-life model. Diversification benefit is likely to become an important driver of M&A decisions and provides additional rationale for inorganic growth.

September 22, 2010
European Insurance: Solvency 2

Exhibit 35

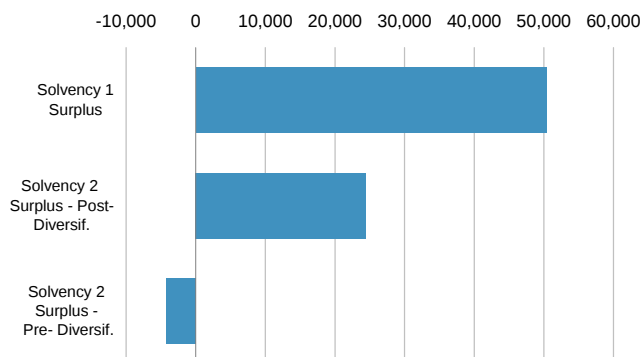
Sources of capital risk: 60% from investment market risks – mainly equity and spread risk



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 36

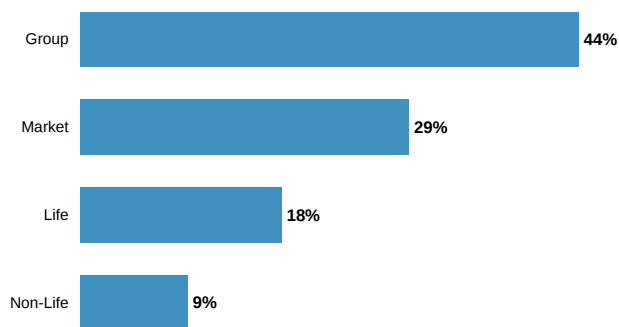
Diversification reduces capital required by 33%



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 37

Most diversification benefit comes from group diversification across business lines



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 38

Solvency 2 ratio sensitivities to market movements – Mosaic is quite sensitive to markets



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 39

Participating (with-profits) life is a major driver of Solvency 2 capital requirements



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 40

With-profits business is also the main contributor to market risk capital charge



Source: Morgan Stanley Research, Oliver Wyman

Mystic Global Life: A Pure Play Life Insurer

Exhibit 41

Mystic Global Life's product mix by liability value – pure life, with a broad mix of product types. Participating business is predominantly UK-based



Source: Morgan Stanley Research, Oliver Wyman

Mystic Global is a pure play life insurer operating worldwide. Its largest single liability block relates to with-profit (participating) business – which is predominantly written in the UK and enjoys a healthy buffer of policyholder capital. Mystic also has a material amount of UK-style immediate annuity business. In addition, there is a large quantity of plain vanilla unit-linked business (i.e. without any attached guarantees) and some term assurance. Mystic also has a US business, which brings with it blocks of fixed and variable annuities.

Corporate bonds are the dominant asset class for Mystic, although there is an unusually high amount of equity exposure for a life company. The weighting toward corporate bonds is a consequence of the UK annuity and US fixed annuity businesses – however, some of the corporate bonds back with-profit liabilities. Corporate bonds within the US business are typically rated 'A' or 'BBB' versus the 'AA' more typical in the UK unit.

Mystic's equities are mainly within its UK with-profits fund – which has the benefit of being well-capitalised under the existing UK realistic balance sheet regime. In addition, it is also exposed to equities through its global unit-linked life and US variable annuities business.

The current group Solvency 2 ratio is a comfortable 234%. Although we would stress the lack of international comparability, this is a robust starting point for Mystic.

However, given the high exposure to risky assets (equities and corporate bonds) and translational foreign exchange rate risk it is important for the group to maintain a buffer to absorb volatility.

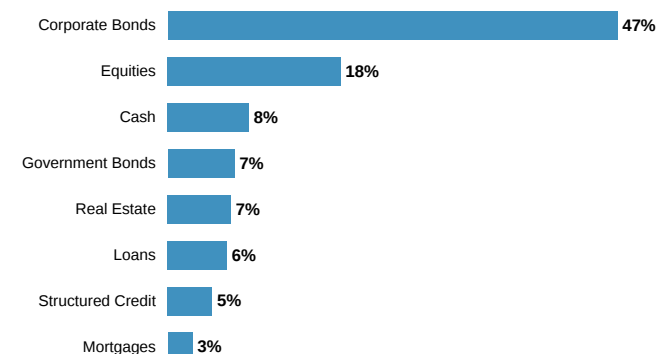
What is the impact of Solvency 2?

Under QIS5, Mystic's capital buffer falls sharply – to a solvency ratio of 143%. The decline does not necessarily indicate that the economic capital position is weaker – as the two calculations are fundamentally different. Although there is a much smaller buffer, we believe that this remains sufficient capital in order to run the business.

Capital requirements increase, but there is a natural offset from reduced liabilities. Exhibits 43-46 reconcile the solvency ratio under the existing regime and QIS5. Increased capital requirements are the major movement, with some modest offset from lower liabilities.

Exhibit 42

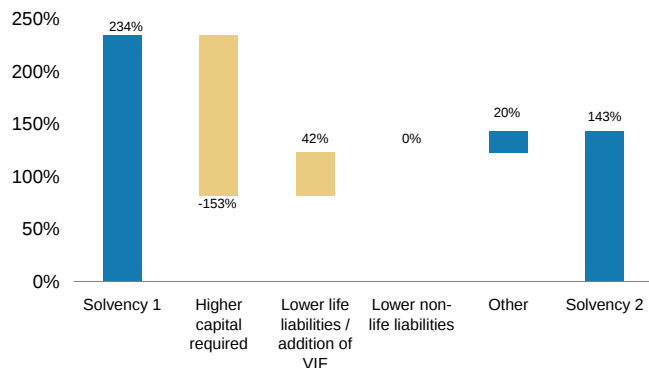
Asset allocation – mainly bonds, although there is a material amount of equities within with-profits. Corporate bonds mainly back UK and US annuities



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 43

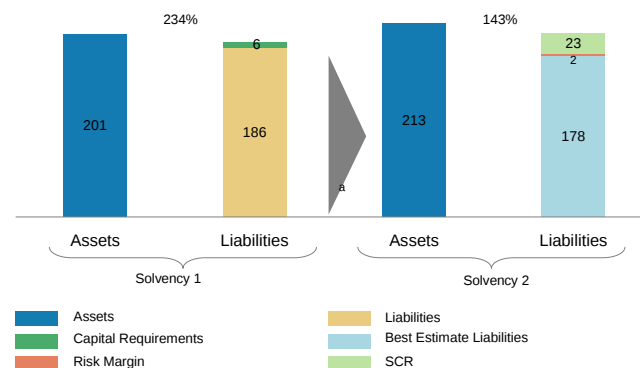
Movement in Mystic's solvency from S1 to S2



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 44

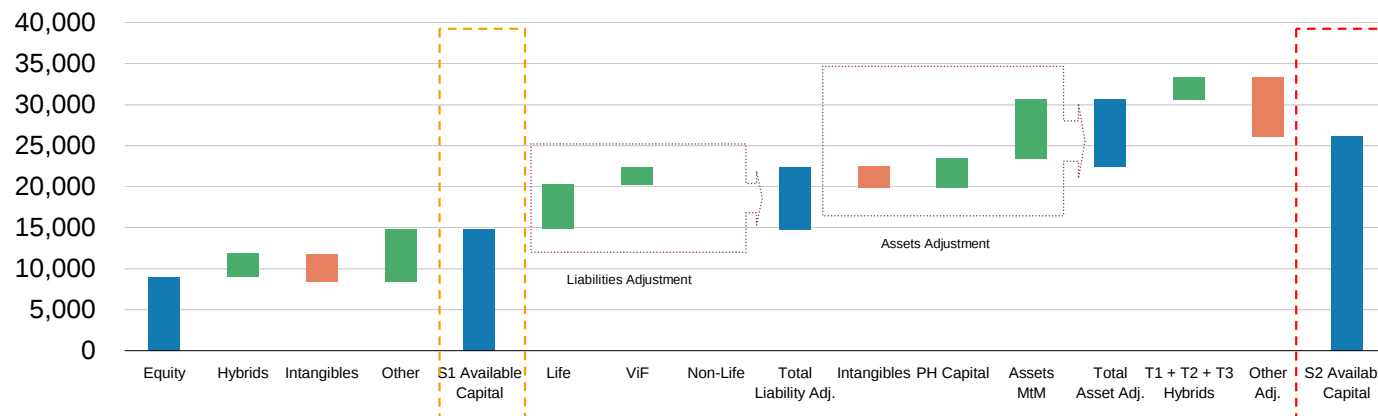
Shift in Mystic's assets and liabilities



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 45

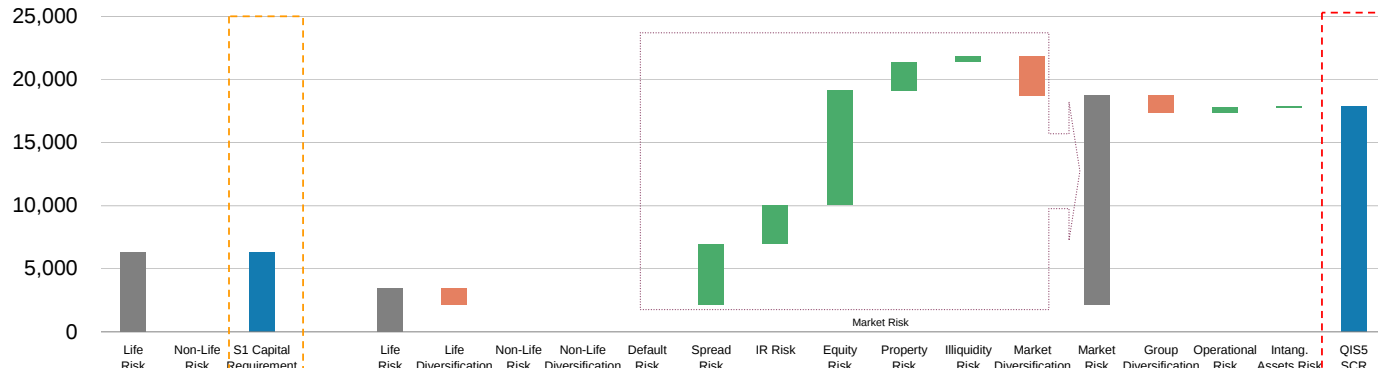
Mystic sees an increase in available capital between S1 and S2 – mainly due to lower life liabilities



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 46

Capital requirements jump for Mystic, driven by market risk – in particular equity and spread risk



Source: Morgan Stanley Research, Oliver Wyman

The reduction in the life insurance liabilities is primarily a consequence of:

- **The move from 'prudent' liabilities to best estimate liabilities (inclusive of a risk margin)** – note that best estimate liabilities allow insurers to take credit for management actions (such as shifting asset allocation at times of stress).
- **In particular, the use of a higher discount rate than used under the current regime – based on a market-consistent yield curve plus a liquidity premium.** Mystic will benefit from 50% of the liquidity premium on all its liabilities, 75% on the with-profits tranche and 100% on its illiquid UK annuity liabilities (although as we discuss later, this illiquidity premium is itself subject to a stress test).

However, it is worth noting that relative to our composite insurer Mosaic, where the participating liabilities are mainly continental European, the reduction in liabilities for Mystic is a little lower as it has a higher proportionate UK weighting (where liabilities are already best estimate in nature).

Market risk and the with-profits business drive Mystic Global Life's capital requirements. As illustrated in Exhibit 47, 58% of Mystic's capital risk comes from equity risk and spread risk. The with-profits business, despite comprising only 40% of S2 liabilities (38% of S1) accounts for 63% of the gross Solvency Capital Requirements (i.e. before accounting for the loss-absorbing capacity of future discretionary benefits – see Exhibit 51).

This skew is driven by the high equity allocation within the with-profits business – evidenced by the fact that 65% of Mystic's market risk comes from this product. This is despite the presence of shareholder-backed businesses – such as US fixed annuities and UK immediate annuities – which invest in corporate bonds.

Given the high level of market risk, Mystic's solvency ratio is quite volatile. Exhibit 50 stresses the Solvency 2 capital ratio under a number of different scenarios – it is relatively insensitive to interest rate or spread shocks, but very sensitive to equities.

In our view, this again highlights the structural problem for insurers holding equities within traditional participating life portfolios. Given this, we would expect insurers to implement hedging strategies (our modeling

assumes no hedging of asset risk) in order to ameliorate the very high capital requirements under Solvency 2.

As we discuss later on in this report, we believe that short-dated credit will become an asset class of choice for European insurers. Equity exposure has been on a downward trend for some years for the European insurers, but we believe Solvency 2 will accelerate this still further.

Given the specific issues the UK insurers faced in 2001-2003 with high equity exposures in with-profits funds, many of these funds have substantially de-risked assets. Sales of new with-profits products have all but ceased for many players. Indeed, the UK moved to an economic balance sheet world for with-profits business in 2005.

However, some of the stronger companies have been able to maintain a reasonable degree of equity exposure under the new regime – principally those players which retained a material amount of policyholder capital in the fund.

What makes analysis of current UK with-profits liabilities difficult is that the *Individual Capital Guidance (ICG)* buffer that the FSA requires firms to hold above the risk capital margin (RCM) is not a public disclosure. Given this, it is hard to say *categorically* whether Solvency 2 will be harsher than the current regime – however, our working assumption is that this will be the case.

We see an acceleration of the strategic shift towards non-profit and linked products. In our view Solvency 2 will accelerate the shift towards unit-linked, term assurance and appropriately risk-managed (i.e. duration matched) UK annuity style products.

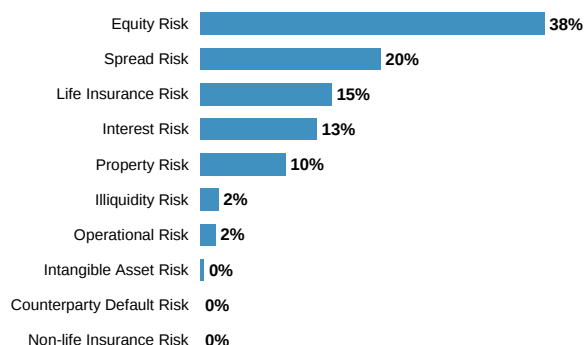
We estimate that the diversification benefit available under Solvency 2 will reduce Mystic's capital requirements by around 25%. Relative to composites, this diversification benefit is lower – for example, we calculate a 33% benefit for Mosaic. While around a quarter of the benefit comes from 'group' – i.e. the impact of the aggregation of the various risks run by Mystic – market risk is the greatest source of diversification.

Although Mystic would retain a modest solvency buffer under Solvency 2 without diversification (Exhibit 48) – in reality diversification underpins much of the capital flexibility the business enjoys.

In our view, strategically the management of Mystic will most likely look to reduce market risk and increase diversification benefits by diluting the with-profits back book through emphasising more capital efficient sales.

Exhibit 47

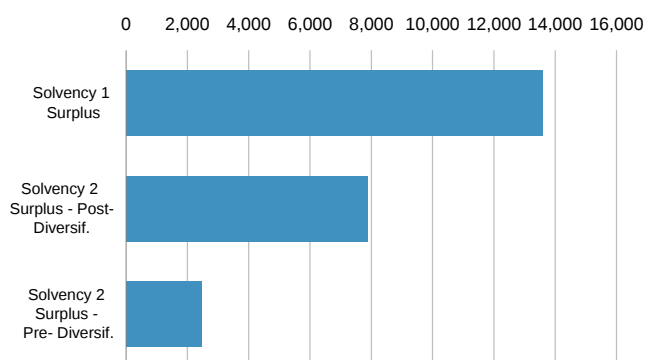
Sources of capital risk: 58% from equity and spread – equity risk dominates.



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 48

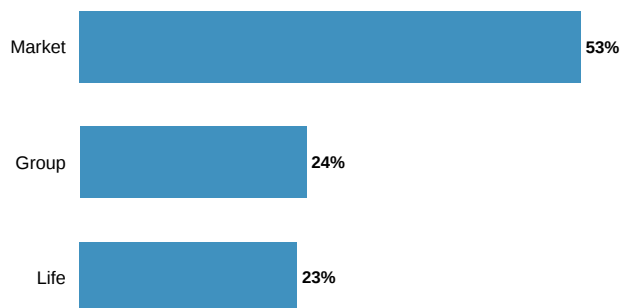
Diversification reduces capital required by 25%



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 49

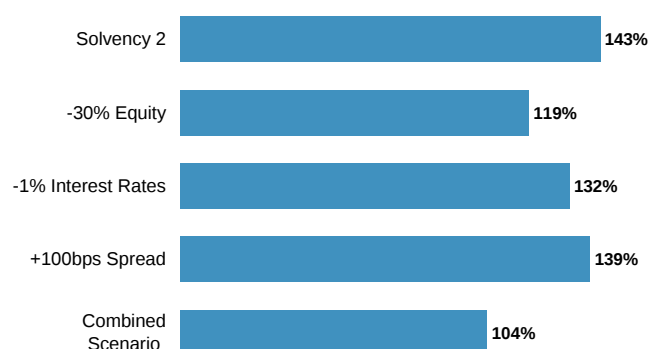
Most diversification comes from market risk – i.e. between different assets classes



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 50

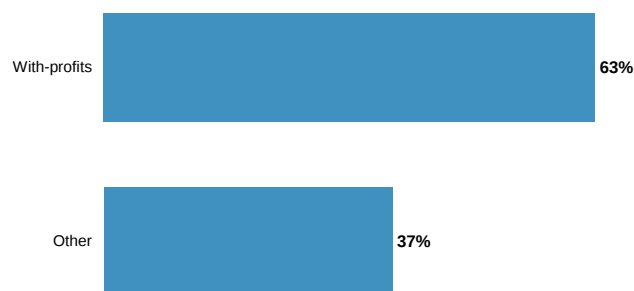
Solvency 2 ratio sensitivities to market movements – Mystic is quite sensitive (especially to equities)



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 51

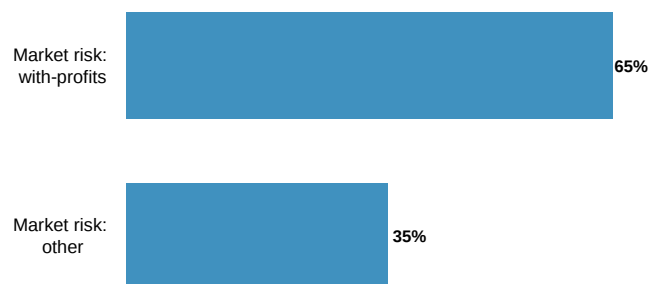
Solvency 2 capital requirements for Mystic are dominated by the traditional with-profits business



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 52

With-profits business is also the main contributor to Mystic's market risk capital charge

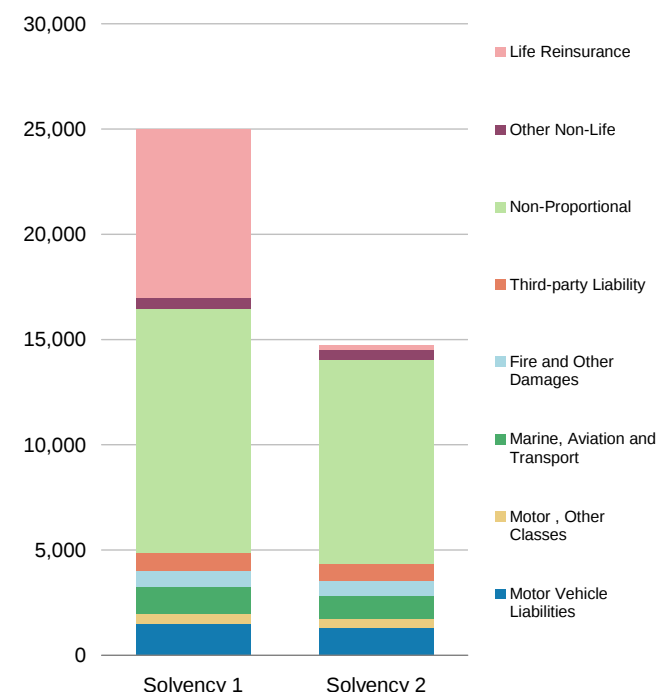


Source: Morgan Stanley Research, Oliver Wyman

Fantasy Re: A Diversified Global Reinsurer

Exhibit 53

Fantasy Re's product mix – mainly non-proportional non-life and life reinsurance. Life reinsurance liabilities shrink materially under S2



Source: Morgan Stanley Research, Oliver Wyman

Fantasy Re is a non-life and life reinsurer, with a large exposure to non-proportional reinsurance. Non-proportional lines include a mixture of property, liability and specialist marine, aviation and transport policies. It also writes some proportional insurance across a variety of different retail and commercial lines. Finally, it has a relatively significant life reinsurance business focused entirely on mortality and protection risk (mainly proportional).

It has a relatively conservative asset portfolio. Fantasy Re's business model is focused on generating underwriting profitability and it has not depended on investment in volatile investment classes to improve expected return.

Investment in equities is close to zero, corporate bonds and structured credit allocation is only 24%, and the majority of the portfolio is invested in government bonds or cash.

Its current group Solvency 1 ratio is high at 305%, but this measure is less relevant than rating agency metrics. Like most non-life companies, Solvency 1 has long ceased to be the binding constraint given perceived low capital requirements for non-life risks, relative to rating agency capital models. Fantasy Re is an AA-rated reinsurer – important for its commercial franchise – and directs capital management efforts towards maintaining this rating.

What is the impact of Solvency 2?

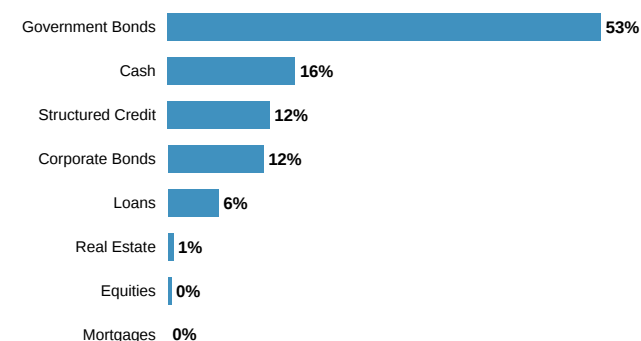
Although Fantasy Re's solvency ratio falls under Solvency 2 – it continues to be solidly capitalised. As Exhibit 55 shows, Fantasy Re's capital ratio falls to 173% in our Solvency 2 calculation. Although this is a large drop, this simply reflects the use of a more risk-based capital approach to assessing solvency as opposed to the simplistic and low non-life requirements under Solvency 1.

In some respects, Solvency 2 brings capital regulation for non-life companies closer to the internal and rating agency approaches to capital. As we discuss below, since Fantasy Re has a low market risk exposure, 173% represents a *solid capital buffer*.

Note that Fantasy Re's available capital is boosted under Solvency 2 due to lower technical liabilities. The increase in capital requirements is offset significantly by lower life reinsurance and non-life liabilities.

Exhibit 54

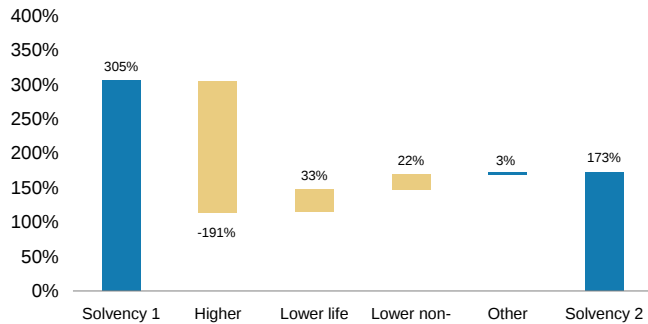
Asset allocation – highly conservative with ~70% in cash and government bonds, consequently market risk is not really a concern for Fantasy Re



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 55

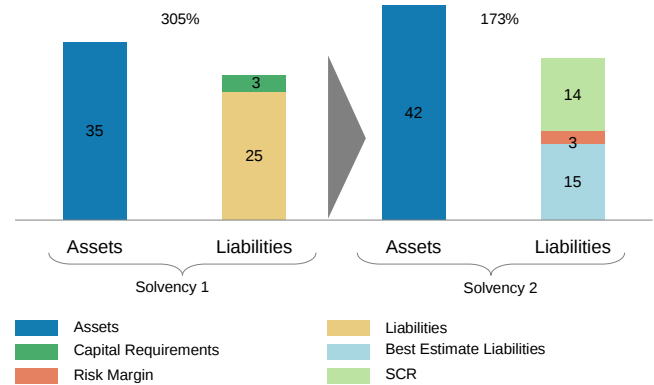
Movement in Fantasy Re's solvency from S1 to S2



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 56

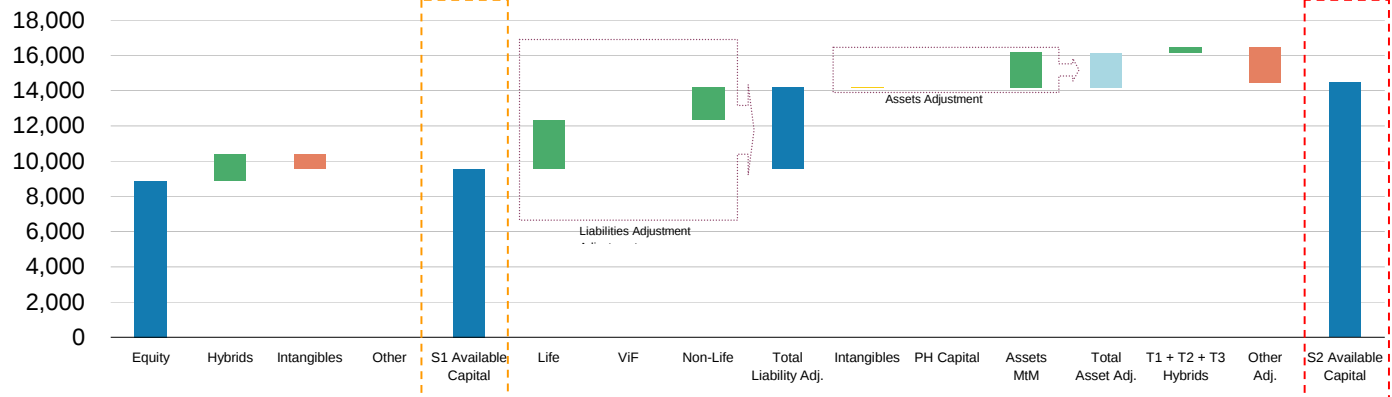
Change in Fantasy Re's assets and liabilities



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 57

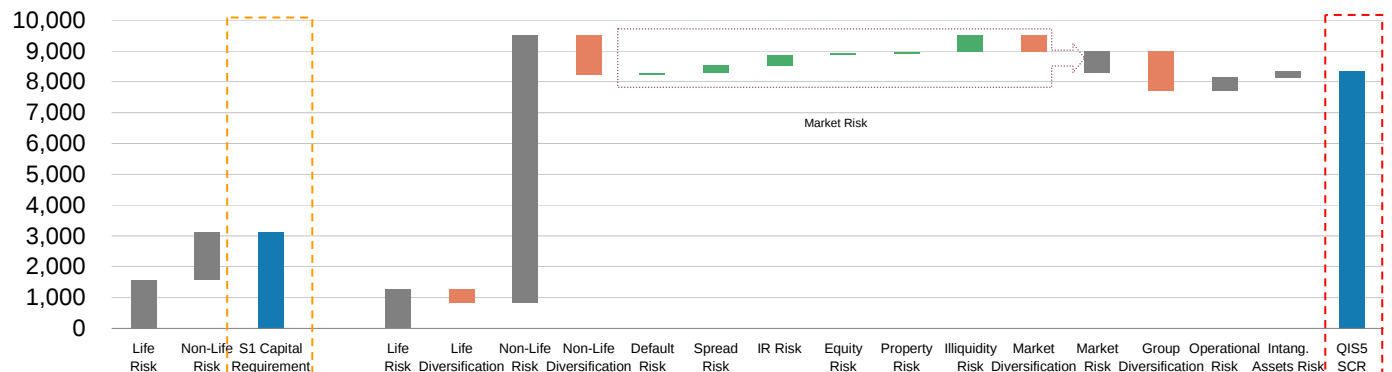
Change in Fantasy Re's available capital boosted in S2 by lower life and non-life liabilities



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 58

Higher capital requirements under S2 – non-life insurance risk dominates, market risk is less relevant



Source: Morgan Stanley Research, Oliver Wyman

This is primarily due to:

- **The discounting of non-life liabilities, which is not generally permitted under Solvency 1.** This has a greater impact on the longer-duration liabilities, which form a core part of a reinsurers' book.
- **The use of a best estimate, rather than prudent, basis for calculating life reinsurance protection liabilities.** Liabilities are the difference between the present value of expected future premiums and the present value of expected claims. Under a best estimate basis, this results in a significant VIF at the start of a contract (since premiums received should be greater than benefits paid out, if the contract is correctly priced).

Fantasy Re's required capital is mainly in non-proportional lines and may be lowered through the use of internal models

Non-proportional insurance capital requirements are relatively simplistic and may be too high under QIS5. As Exhibits 59 and 63 show, the majority of Fantasy Re's Solvency 2 capital requirement comes from its non-life business (with little market risk) and most of this is in non-proportional reinsurance. Current QIS5 capital requirements are potentially quite simplistic for non-proportional risks (there are three categories only: property, casualty and marine, aviation & transport – MAT). It is unlikely that the calibrations to reach the premium and reserving risk capital requirements on these risks will fully allow for the nuances of Fantasy Re's exposures. Internal models could result in significantly lower capital requirements – especially given that QIS5 capital requirements are greater than QIS4, which was judged by the industry to result in higher capital requirements than internal company models.

Therefore, it is important for Fantasy Re to be able to use an internal capital model. We believe internal models will be a key tool for reinsurers and will more accurately reflect their specific risks – the standard Solvency 2 metrics (as drafted in QIS5) appear too 'blunt'. It is possible that Fantasy Re's internal model could produce capital requirements 20-30% lower than the *standard* model.

A key strategic issue is how much capital relief Fantasy Re's customers (primary insurers) get for taking reinsurance. The QIS5 rules make an allowance for

reinsurance programmes in calculating capital requirements for non-life risks for primary insurers. However, these do not deal well with all types of non-proportional reinsurance programmes and may require quite complex models to estimate the impact, even in the standard model. Uncertainty over the level (and adequacy) of capital relief for non-proportional reinsurance could feasibly affect demand. However, we would expect this issue to be ironed out after the QIS5 process.

Diversification benefits and relatively low market risks are key business model advantages

Fantasy Re's capital position is virtually insensitive to markets. Market risk accounts for only 10% of Fantasy Re's capital requirement. As Exhibit 62 shows, therefore, Fantasy Re's capital position has a very low sensitivity to key market risks. This means that its capital position is likely to be fairly stable and less volatile than many other companies. We believe this will be an important competitive advantage allowing Fantasy Re to better use its capital buffer to fund growth and thereby:

- **reducing investors' assessment of Fantasy Re's cost of equity** relative to companies in other sub-sectors; and
- **allowing Fantasy Re to maintain a stable outlook with rating agencies.**

Fantasy Re can make a profit out of exporting its diversification benefit to its customers. Exhibit 60 suggests that Fantasy Re has a diversification benefit equivalent to 30% of required capital under Solvency 2 – a relatively high number. This arises mainly from the amalgamation of different non-life risks with low correlation. In addition, there is a group benefit from the mixture of life and non-life reinsurance.

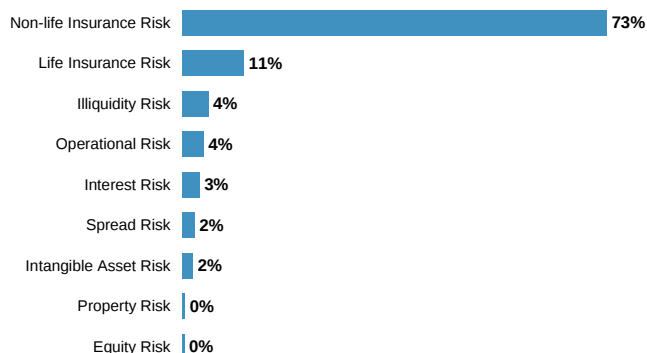
Given that we are not explicitly taking into account geographical diversification in our assessment, the underlying benefit could be even higher than this. Particularly with the adoption of an internal capital model (which we expect Fantasy Re to do) Fantasy Re can 'export' its diversification credit and capital benefit to its customers.

Solvency 2 helps to institutionalise and quantify Fantasy Re's reinsurance business model by allowing it to reduce the tail risks of its customers at a lower regulatory cost of capital than they can achieve by themselves.

September 22, 2010
European Insurance: Solvency 2

Exhibit 59

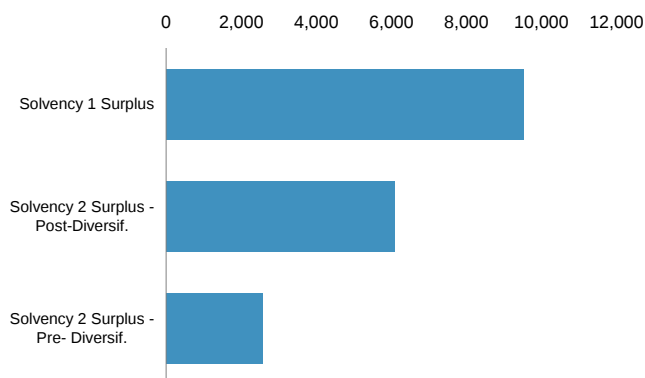
Fantasy Re's sources of capital risk – non-life is the main component and market risk is very low



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 60

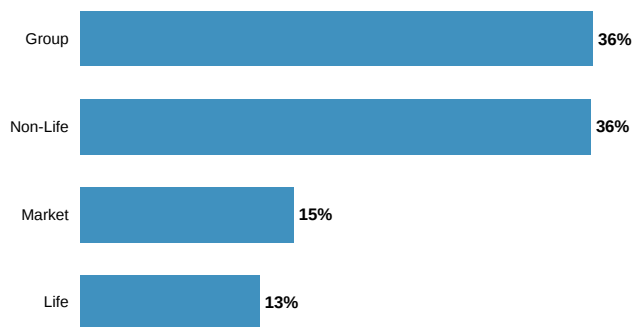
Diversification reduces capital required by 30%



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 61

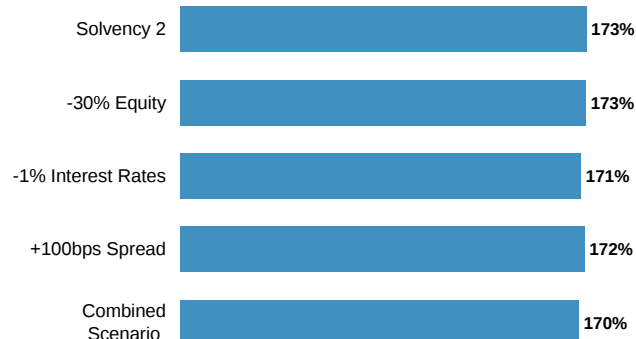
A large part the diversification benefit is within the non-life business, as well as across business lines



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 62

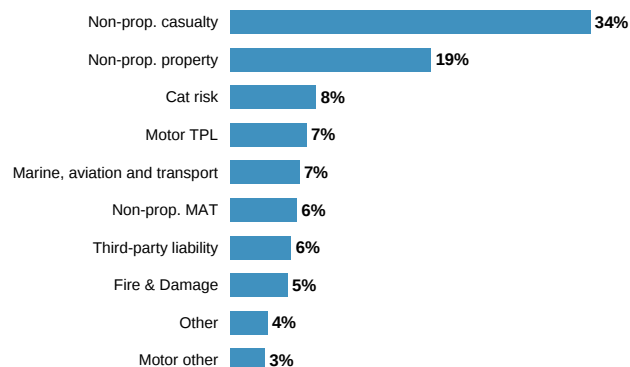
Fantasy Re's Solvency 2 ratio is insensitive to markets – giving a strong and stable buffer



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 63

Unsurprisingly, Fantasy Re's non-life S2 required capital is dominated by non-proportional risks



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 64

Fantasy Re's life reinsurance capital requirements are evenly spread

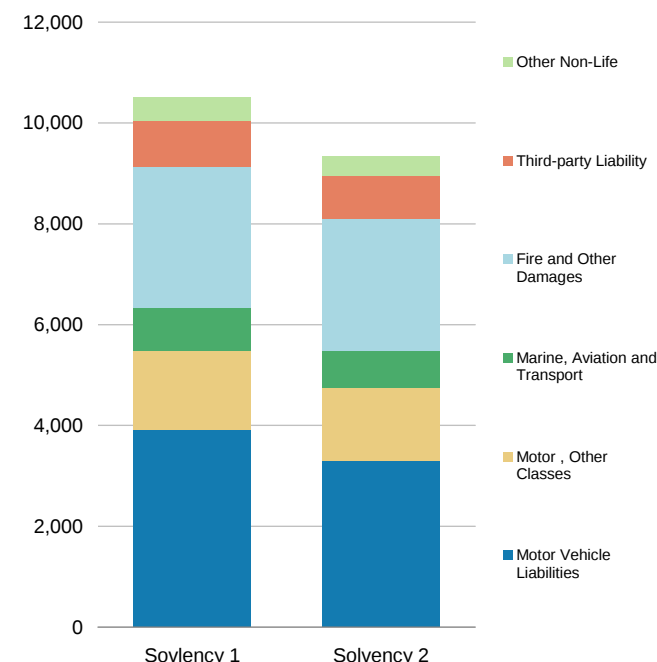


Source: Morgan Stanley Research, Oliver Wyman

Accidental P&C Company: Pure Play Primary Non-life

Exhibit 65

Accidental's product mix – a mixture of primary non-life retail and commercial risks, but with no non-proportional business



Source: Morgan Stanley Research, Oliver Wyman

Accidental P&C is a primary non-life insurer (with no life business) writing a mixture of risks in both retail and commercial lines. It has no non-proportional exposure and reinsures all of its underwriting risks to varying degrees (reinsurance cedes between 5% and 20% of premiums dependent on business line). Motor insurance accounts for the largest proportion of its liabilities and just over 40% of its gross written premiums. It also has a substantial exposure to other property risks, but limited exposure to general third-party liability.

It has a mixed asset portfolio, focused mainly on bonds, but with 7% in equities. Accidental has reduced its equity exposure significantly in recent years and focused on a mixture of government and corporate bonds to better match its liabilities. Corporate bonds form more than 40% of the portfolio (the largest asset class), but tend to be relatively short term in nature (duration of 2-3 years). Credit quality is very high, with over 80% of corporate bonds rated AAA or above credits.

Its current group Solvency 1 ratio is high at 224%, primarily reflecting the low current capital requirements for non-life risks compared to rating agency capital requirements. Rating agency capital is probably a more important (and more binding) metric for Accidental, which writes significant volumes of commercial lines business.

What is the impact of Solvency 2?

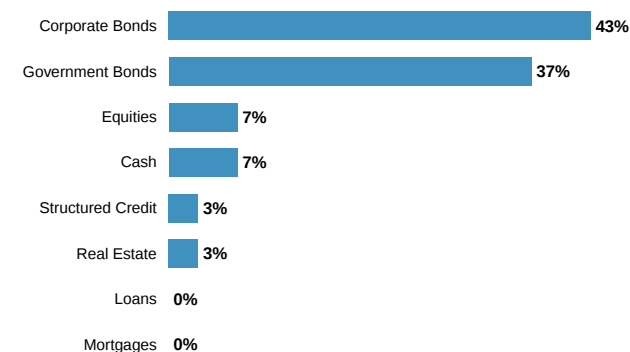
Accidental P&C's solvency ratio falls quite substantially to 119% under QIS5. This is clearly a significant drop and leaves Accidental with a lower buffer than it had under Solvency 1, mainly due to the far more stringent and risk-based capital standards (like the rating agencies) under Solvency 2.

This is slightly offset by an increase in Accidental's ability to use more hybrid capital. However, there is little benefit from lower liabilities, despite the introduction of discounting of non-life technical reserves, given the relatively short-term nature of these liabilities.

We believe Accidental P&C's buffer is adequate, but not strong. In particular, investment losses or major catastrophes could lead to Accidental's solvency dropping below the threshold. Accidental's management is likely to be concerned over the reduced ratio and focused on strategies to stabilise or raise this.

Exhibit 66

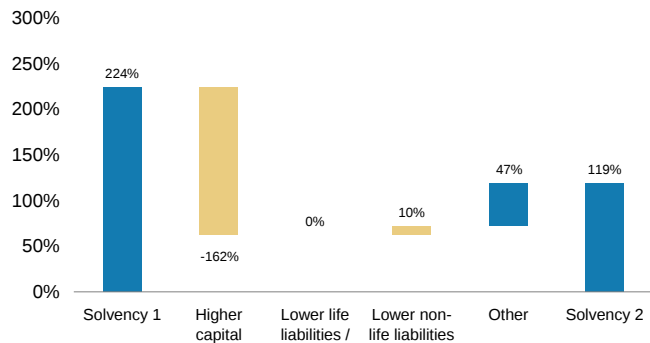
Asset allocation: mainly government and corporate bonds, with a large proportion of AAA credits – with 80% of corporate bonds rated AAA or above



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 67

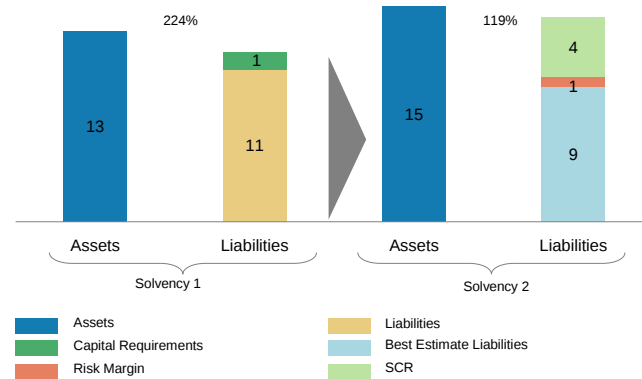
Movement in Accidental's solvency from S1 to S2



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 68

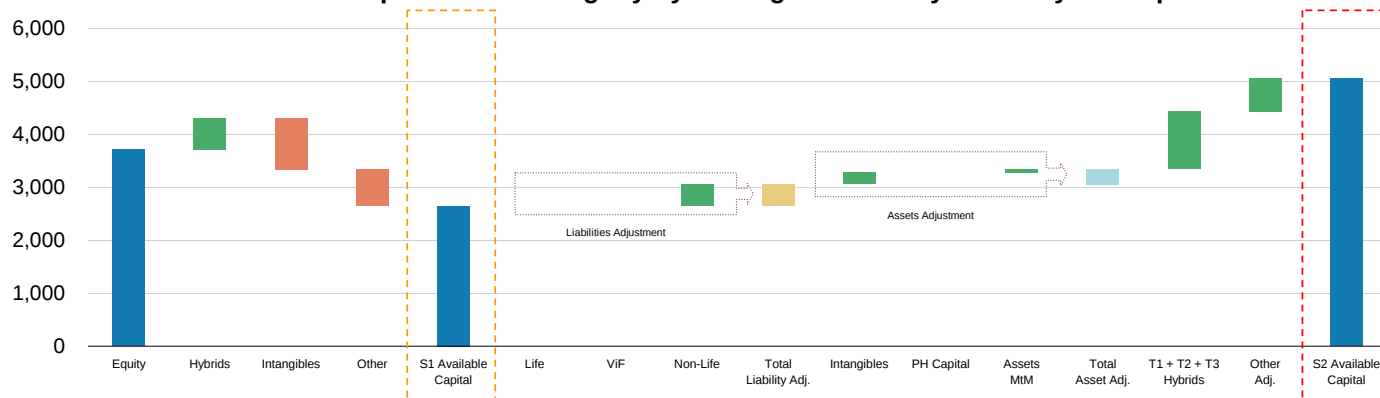
Change in Accidental's assets and liabilities



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 69

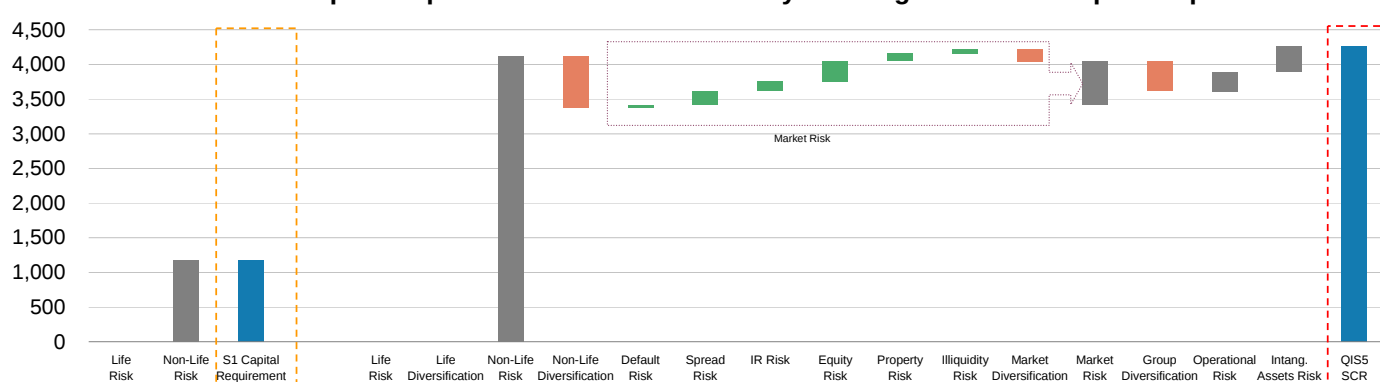
Accidental P&C's available capital boosted slightly by some greater ability to use hybrid capital



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 70

Substantial increase in capital requirements under S2 – mainly from higher non-life capital required



Source: Morgan Stanley Research, Oliver Wyman

Accidental P&C – dealing with significantly higher non-life capital requirements

The drop in Solvency 2 capital ratio to 119% leaves it above the SCR, but this is far lower than the buffer suggested by its Solvency 1 ratio due to the strong increase in non-life capital requirements. Although Accidental has relatively low market risk, and therefore does not suffer from as volatile a Solvency 2 position as life or composite companies, variations in market levels could still bring its capital ratio down to uncomfortable levels in extreme scenarios (see Exhibit 74).

In addition, under Solvency 2 it is relying partly on the ability to use more hybrid capital, which significantly increases its leverage ratio of hybrids to total capital to over 30%.

Therefore, we believe Accidental is likely to take a number of ‘evasive’ actions. We would suggest the following:

- **Move to using an internal model.** QIS5 capital ratios for non-life companies suggest significantly higher capital requirements than QIS4. However, at the time of the QIS4 tests many non-life companies in the sector were claiming internal capital models that suggested lower capital requirements than the QIS4 calibration. Therefore, we would expect a significant capital benefit from moving to an internal capital model. We estimate this may reduce capital requirements by 20-30%.
- **However, there are a number of practical hurdles to overcome in getting an internal model approved** by the regulators. Firstly, Accidental must prove it has a sufficient quantity of data to perform its own statistical analysis of its risks (both in terms of the number of data points and the time-frame over which these have been collected). Secondly, it needs the internal infrastructure to create and test an internal model, including sufficiently qualified staff, expenditure on IT systems and management control processes. Luckily, in Accidental P&C's case, management has already been building an internal model capability for many years.
- **Increase amount and sophistication of reinsurance programmes.** Another solution to high non-life capital requirements is to increase the use

of non-proportional and proportional reinsurance to reduce tail risks. This can be more tailored than currently to the requirements of Solvency 2 (e.g. targeting those areas that contribute most to the capital requirements, and using programmes that maximize capital with minimum cost). Accidental may consider options such as surplus relief or tailored non-proportional protection against extreme losses. In addition, it may consider issuing insurance linked securities (ILS) to protect against certain risks – e.g. catastrophe bonds. Reduction in risk from such securities can be recognised in Solvency 2 calculations (subject to regulatory approval).

- **Increase diversification benefit.** Accidental's 24% diversification benefit is valuable (and without it, it would have insufficient group capital – Exhibit 72). Our model does not take into account geographical diversification, which would raise this benefit. Accidental could theoretically improve group diversification (and its group capital position) through selective inorganic growth or entry into new business lines. Solvency 2 capital considerations may form an important part of Accidental's future M&A strategy.
- **Further reduce or hedge asset risk.** Accidental's asset allocation is not overly risky; however, ~15% of its capital requirements relate to market risk. It could act to reduce this risk (e.g. hedging its equity portfolio, or further reducing equity allocation in favour of corporate bonds).

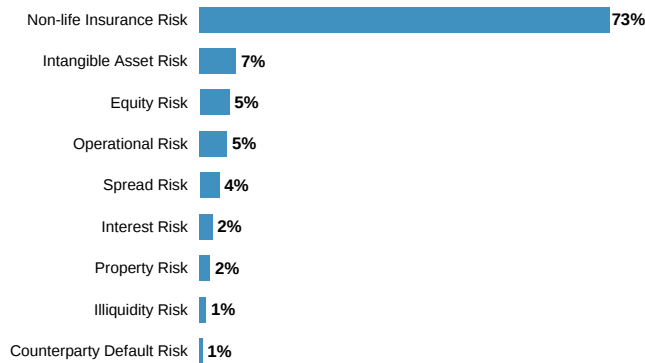
Rating agencies likely to remain the key constraint for Accidental P&C

Rating agencies likely to remain influential, particularly for Accidental P&C's commercial business lines. As with Fantasy Re, we believe the rating agency capital requirements and a desire to maintain a certain rating is likely to remain the key capital target for Accidental. It is uncertain how rating agencies will adapt their capital tests in light of Solvency 2, but we certainly expect them to adapt their models – and make use of Solvency 2 standard capital requirements and company internal models to inform their decisions. Given the calibration of Solvency 2 to represent the capital required to withstand a 1-in-200 year event, we would expect rating agencies to require capital buffers above Solvency 2 levels to justify A, AA or AAA ratings.

September 22, 2010
European Insurance: Solvency 2

Exhibit 71

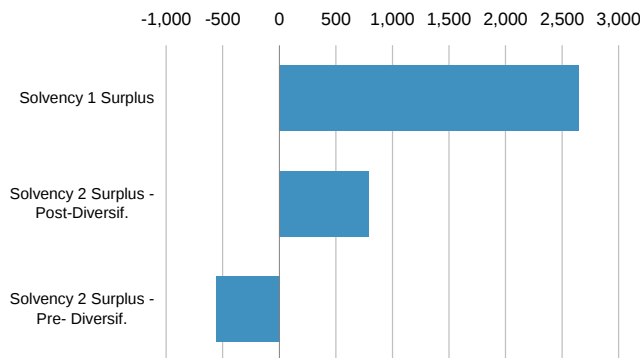
Accidental's sources of capital risk – non-life is the main component and market risk is relatively low



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 72

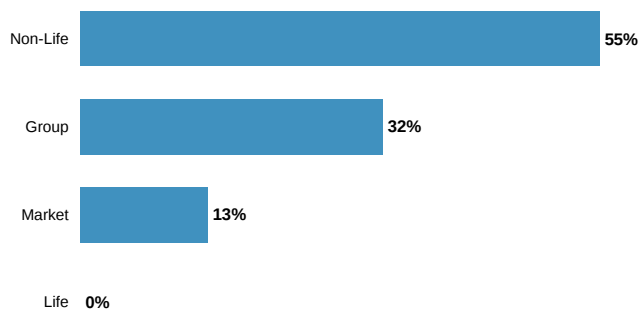
Diversification reduces capital required by 24%



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 73

A large part the diversification benefit is within the non-life business, as well as across business lines



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 74

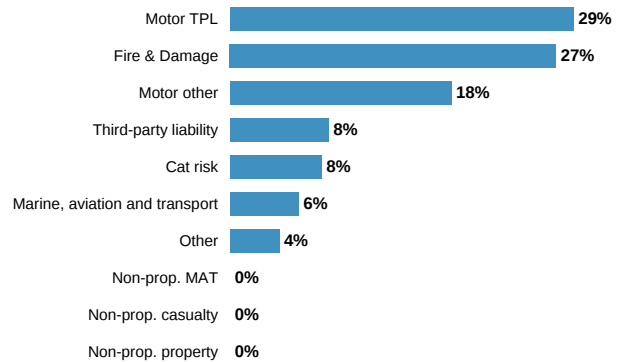
Accidental's Solvency 2 ratio is not too sensitive to markets; however, its low buffer leaves it exposed



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 75

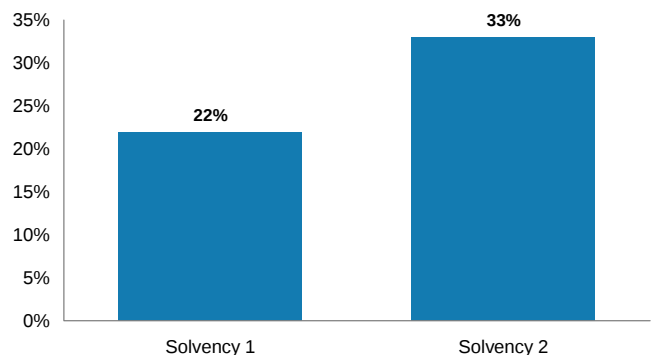
Accidental's non-life capital risks are quite diversified



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 76

The increase in use of hybrids under S2 increases Accidental's leverage (hybrid / capital available)



Source: Morgan Stanley Research, Oliver Wyman

Solvency 2 – Key Outstanding Debates

In the previous sections, we analysed the quantitative impact of Solvency 2 and highlighted some of the key strategic conclusions that we believe can be drawn.

However, in many areas there are outstanding issues that we believe could significantly change the impact of Solvency 2. We explore these areas below.

1) Reporting – the implications of Solvency 2 for accounting profits and the balance sheet

There remains uncertainty over how Solvency 2 will interact with IFRS accounting and reporting mechanisms before IFRS 2 is introduced.

Solvency 2, and its dependence on 'fair value' and mark-to-market, is at odds with the majority of existing insurance accounting practices across Europe. Importantly, it is also at odds with statutory accounting that typically still relies on cost valuations and 'book yield' measures of investment return.

There are areas of potential inconsistency between Solvency 2 and accounting, which may conflict in some cases and have consequences for company governance.

- **Later introduction of IFRS 'Phase 2' relative to Solvency 2.** The IASB and FASB are developing IFRS Phase 2, a global accounting standard based on market consistent valuation principles. However, this may take longer to introduce than Solvency 2. In the meantime, the mark-to-market world of Solvency 2 may jar with existing IFRS reporting, leading to incongruous results – and potential investor confusion. Will insurers simply restate their assets and liabilities consistent with Solvency 2, or will they continue to use two reporting bases?
- **Differences between IFRS Phase 2 and Solvency 2.** Although they are based on similar fair value principles, there appear to be differences emerging between IFRS Phase 2 and Solvency 2, particularly in the calculation of liabilities and the recognition of profit. Therefore, insurers may find that risk management of one reporting basis results in undesired consequences in another.
- **Implications for participating products based on non-market value accounting.** In many

continental European countries, the traditional participating life product is designed, managed and regulated around the principle of 'book investment yield' and cost accounting. This limits accounting volatility for shareholders and allows insurers to smooth day-to-day investment market volatility in the annual payouts made to policyholders. A move to mark-to-market regulatory balance sheets could, therefore, be completely inconsistent with the way these products work. How will insurers deal with this inconsistency, and importantly what allowances will regulators make?

2) Equivalence – Bermuda and Switzerland to be included in the first wave, United States excluded

Given the international reach of many European insurance groups, one of the key challenges is how to deal with non-EU domiciled subsidiaries. Should insurers be able at the group level to capitalise these to local standards or be required to use Solvency 2 rules?

Exhibit 77 summarises the different categories of so-called third country equivalence issues.

In order for an insurer to continue using the local rules, the regulatory regime has to be declared 'equivalent' to Solvency 2. Whether a regime is considered equivalent or not is relevant with regard to reinsurance obtained from companies domiciled in non-EU countries and to the Group supervision of non-EU groups.

There has been an ongoing discussion about whether the US will gain equivalence, which is particularly pertinent given the strategic importance of the market to European insurers.

The European Commission asked CEIOPS to take into account a series of factors when determining which countries to include in the first wave considered for equivalence:

- whether the country has a supervisory regime that is fully risk-based or has taken measures to move toward such a system;
- the materiality of an equivalence finding to EU insurance and reinsurance undertakings and their policyholders;

Exhibit 77

Equivalence of non-EU countries has implications with regard to three different aspects

REINSURANCE EQUIVALENCE	If a country is equivalent for reinsurance then EU companies can count its policies as protection, without additional collateral
NON-EU SUBSIDIARIES	If an EU firm has an equivalent non-EU subsidiary, it can count that subsidiary on its local basis for the group calculation
NON-EU GROUPS	- If a non-EU group is equivalent then –it can do the group solvency calculation on a local basis –it can be the lead regulator - But all local stand alone EU calculations must be done on a S2 basis

Source: Morgan Stanley Research, Oliver Wyman

- the number of related undertakings situated in the country held by EU insurance and reinsurance undertakings;
- the importance to the insurance market in the country of the equivalence finding; and
- the existence of mutual recognition or equivalent arrangements between countries and member states.

Based on this framework, CEIOPS has recommended (advice published on 31 August 2010) that only Bermuda and Switzerland be included in the first wave of assessments.

However, there is still a significant debate about the United States.

Although the US Congress recently passed legislation creating a Federal Insurance Office (within the US Treasury), CEIOPS notes that “the day-to-day supervision of insurance and reinsurance companies will remain an individual state competence”.

Given this, there are several hurdles to the US gaining equivalence in the first wave:

- CEIOPS may need to assess individual state regulators** – which would be time consuming and require significant resources. This would probably be very challenging, given the 2012 implementation date. Any decision to prioritise certain states could

be seen as distorting competition between insurers based in these states and those based elsewhere in the US.

- The NAIC (National Association of Insurance Commissioners) does not currently supervise groups** (individual legal entities are regulated on a state by state basis) – and although there are discussions ongoing (the NAIC is drawing up a roadmap for the “Solvency Modernisation Initiative”) any conclusion is some way off. Group supervision is one of the key tenets of Solvency 2.
- The need to be able to exchange information under conditions of professional secrecy creates issues** (as this is a fundamental requirement of Solvency 2). CEIOPS members are restricted from exchanging information with the NAIC, as it is not a “competent authority” for insurance supervisory persons. To circumvent this, CEIOPS members would have to explore the possibility of a joint agreement with the US state supervisory authorities collectively.

While CEIOPS is clearly minded not to include the United States in the first wave, it could still be over-ruled by the European Commission.

In this case, a possible ‘fast track’ approach has been outlined by CEIOPS, which includes reliance on the NAIC’s own accreditation process, gap analysis and undertaking visits to a small number of state regulators.

However, given the uncertainty, **we believe it is prudent to assume that the United States will not be included as an equivalent regime on day 1 of Solvency 2.**

Consequently, our quantitative model includes any US operations on a Solvency 2 basis, i.e. we assume that European groups have to determine the Solvency 2 capital requirement for their US subsidiaries in their group assessment and cannot use the local capital requirement. We note that many of the European insurers with material US operations (for instance AEGON and AXA) have commented that they are contingency planning for the US to be excluded at outset.

In our view, assessing US operations on a Solvency 2 basis will likely impact the future strategic choices that European insurers make. Exhibit 78 shows the total resource requirements (technical provisions plus Solvency Capital Requirement) for US fixed annuities on a local statutory basis compared to the Solvency 2 basis. Local capital requirements reflect the so-called *Company Action Level*, which is what most European insurers currently aggregate up in their required capital calculations under the *Insurance Groups Directive (IGD)*.

Due to the significant capital charge for spread risk, capital requirements for US fixed annuities on the Solvency 2 basis are significantly higher than under the local statutory basis. Even considering that diversification benefits at group level could reduce the capital requirement by another ~15-20%, the product looks much less attractive than under the current IGD approach.

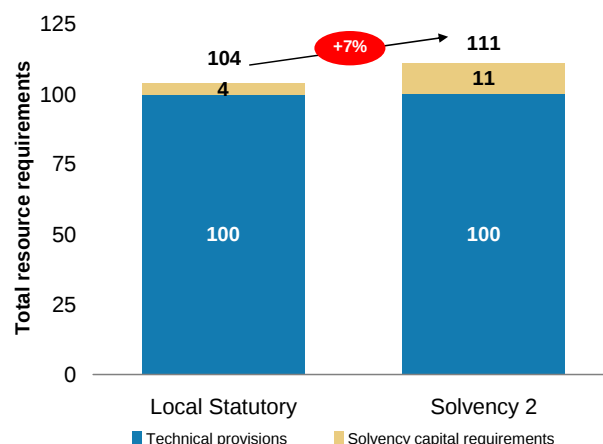
Hence it is not surprising that US fixed annuity business has been steadily de-emphasised by European insurers for some years.

In addition, one can already see that several insurers have withdrawn from the GIC (Guaranteed Investment Contract) market – which is also very capital consumptive, yet offers low margins.

AEGON and Prudential have both withdrawn from the GIC market – although AEGON remains active in the synthetic GIC market (which does not involve assuming a material amount of asset risk). According to management guidance, AEGON expects most of its back book of traditional GICs to run off by the end of 2012 – in time for the implementation of Solvency 2.

Exhibit 78

Total resource requirement for US fixed annuities is materially higher under S2 than local standards



Source: Morgan Stanley Research, Oliver Wyman

Nevertheless, most European insurers with a US presence continue to maintain some general account businesses in order to offer it as an investment option to variable annuity customers and also because of the risk of expense over-runs were the funds to begin to materially shrink in size.

We do not expect uncertainty over equivalence status to result in material European insurer exits from the US insurance market at this stage. However, we expect to continue to see adjustments to product strategy, notably through product re-launches in the variable annuity market, motivated in large part, we believe, by Solvency 2.

If Solvency 2 results in overly onerous capital requirements for the US subsidiaries of European insurers, relative to domestically based insurers, then there remains a possibility that some insurers will reconsider their position in the US market in the longer term.

3) Resources required to calculate and manage Solvency 2 are significant and potentially scarce

The time, staff and systems resources required to calculate and manage Solvency 2 are immense. We think this will put significant pressure on some companies.

Our own experience of producing a QIS5 model has highlighted to us the complexity of calculating Solvency 2. Our model is not as sophisticated as those that insurers themselves need to build. The staff resources and time taken

to manage such a project are likely to be very high and will represent a significant burden for companies, in our view.

In addition, Solvency 2 will require a complete change in risk management mindset, a change in internal management information and external reporting systems, and a potential re-education of employees on capital and profitability management.

The costs are likely to be very high – and it is possible that many smaller companies and niche insurers find that Solvency 2 is beyond their reach. **Perhaps more importantly, we think it could become increasingly difficult to find sufficient actuarial / technical staff with the required grasp of the subject to build and manage the Solvency 2 systems.**

Since Solvency 2 requires a potential overhaul of the total balance sheet of an insurer, we believe that ‘off-the-shelf’ solutions may not be adequate for the task.

This is likely to add further pressure to the industry, affecting those companies that have been slower to respond to Solvency 2 the most. It is possible that the intense resource requirements also acts as a catalyst for consolidation in the industry.

4) The role of rating agencies

Given the limitations of Solvency 1, in many ways the rating agencies have been the *de facto* regulators of the European insurance industry.

Rating agencies have been applying risk-based capital techniques for many years. In particular, Standard & Poor’s model has received wide publicity and recognition.

However, the advent of Solvency 2 – especially with the introduction of risk-based capital requirements and regulatory accreditation of internal models – poses a challenge to the business model of the rating agencies. It is unclear how they will adapt their rating methodologies and approach, given the greater sophistication of Solvency 2.

It will be of particular interest to see whether current ratings are consistent with Solvency 2 capital ratios – for example, would it be possible for an insurer with a modest buffer over its SCR to maintain a ‘AA’-rating? This could create significant challenges for the agencies – especially as some have a globally consistent framework for assessing capital adequacy.

Nevertheless, we believe rating agencies will continue to play an important role in assessing leverage and promoting capital strength. Financial strength ratings will remain an important factor in insurers’ ability to be active in commercial and reinsurance markets, raise debt or hybrid capital and participate in derivative markets. In addition, ratings play an important part of Solvency 2 requirements themselves (e.g. in determining counterparty risk).

Our analysis of non-life capital requirements suggests that the typical target of a ‘AA’ standard of capital strength across the industry (particularly important for reinsurers) will most likely remain a binding capital constraint for companies involved in wholesale insurance and reinsurance activities.

However, it is likely that rating agencies will increasingly become ‘auditors’ of insurers’ risk management processes (and potentially also arbiters on the quality of insurers’ internal capital models – although, given their inherent complexity, it is questionable whether agencies will be able to add material value in this respect). Ratings could then become a function of insurers’ own Solvency 2 disclosures.

Some rating agencies (notably S&P) have already been active in forming opinions on insurers’ risk management functions and issue assessments on these standards. We believe Solvency 2 will accelerate this trend.

5) Solvency “2.0” – future development of the rules

Given its complexity and the seismic nature of the change, it is very unlikely that Solvency 2 will be completely settled by 2012.

We think that the process will be iterative and that the rules will evolve over time – in many ways we think of the rules as Solvency “2.0” rather than Solvency 2.

However, in our view, it is unlikely that there will be a QIS6.

Taking into account the re-drafting of the technical rules, the consultation period, insurers calculating the implied solvency ratios and the feedback process, a QIS round takes around 18-24 months to complete.

Although we anticipate many changes and refinements following the assimilation of the QIS5 results, we do not think there is sufficient time for a QIS6 process to be inserted while sticking to the 2012 implementation date.

In 2015, regulators will revisit the issue of 'group supervision'. This relates to the issue of how to view and assess group solvency, particularly with regard to the recognition of diversification benefit throughout the group.

6) Occupational pension funds remain excluded

Occupational pension schemes are specifically excluded from the scope of Solvency 2 – although they fall within the remit of CEIOPS (the 'OP' element).

The European Commission recently published a Green Paper on pensions (7 July 2010), with the objective of "providing greater security, efficiency and adequacy in retirement provision".

However, it states very clearly that "this Green Paper does *not* question Member States' prerogatives in pensions or the role of social partners and it does *not* suggest that there is one 'ideal' one-size-fits-all pension system design".

Although the document considers pension provision in its broadest sense (including state benefits), corporate provision is discussed.

In 2008, the Commission conducted a consultation on the various approaches taken in member states to protecting acquired pension rights. The various stakeholders felt that there should be a 'unique' solvency regime drawn up for pension funds.

The Green Paper suggests that "the Solvency 2 approach could be a good starting point, subject to adjustments to take account of the nature and duration of the pension promise."

At this stage, it is far too early to foresee what changes could emerge from this process; however, we would highlight the substantial differences in asset allocation between insurers and pension schemes used to back similar liabilities.

While insurers are moving towards discounting liabilities using the swap curve adjusted for the inclusion of a liquidity premium, pension schemes often (but not always) use a materially higher discount rate.

Any requirement for corporates to hold hypothecated capital against pension scheme liabilities would also be very controversial. However, it is possible that there is a long-term convergence in the approach to measuring liabilities (and maintaining capital surplus) between insurers and pension schemes.

7) Hybrid capital / quality of capital

Solvency 2 includes specific rules on the limits and eligibility of available capital, reflecting the recent high-profile failure of hybrid debt instruments in the banking sector to support businesses as going concerns during periods of extreme stress.

Exhibit 79 illustrates the different tiers of equity and hybrid capital that insurers can take into account in their own funds, under QIS5.

It is clear from QIS5 and other discussion papers that material changes to hybrid capital rules will result from Solvency 2, providing stronger protection for regulatory capital and policyholders than current instruments. Rules are also expected to necessitate a full scale replacement of existing instruments.

Current tier 2 proposals involve in the main relatively minor adjustments to existing tier 2 instruments in the market, in our view. The most significant change to existing structures is probably the requirement to 'lock in' capital, thereby preventing redemption, even at maturity dates in the event of a SCR breach. As a result, we argue that the higher-quality European insurance names should be able to issue Solvency 2-compliant tier 2 instruments in size at a modest or no incremental cost. We note that AXA recently demonstrated this and in doing so opened the door for further issuance from the sector.

By comparison, current tier 1 proposals are radical, they requiring features such as: principal loss absorption mechanisms (e.g. equity conversion or write down/up) upon a specified trigger; and the removal of any incentive to redeem the instrument (e.g. an interest rate step-up at the bond's first call date). There remains a great deal of uncertainty with regard to investor appetite for these structures.

As with the banking sector, to alleviate near-term stress, we expect grandfathering arrangements to be put in place to support the transition of insurer capital structures to the new regime. Recently announced Basel 3 'grandfathering' proposals from the G20 state that, from January 1, 2013, 90% of all bank tier 1 and 2 then in issue will enter transition arrangements, being phased out over a ten-year period using a linear amortisation schedule (10% per annum). The exception is the subset of instruments with incentives to redeem, which will become redundant at their effective maturity date, i.e., first call date.

We see a very strong read across to insurers from the proposed grandfathering for hybrid capital announced for the banking sector. In anticipation, bonds including incentives to redeem (such as interest rate step-ups) should be traded to call, in our view, as from that date our working assumption is that they will lose regulatory capital credit.

Given their strong market access and investor acceptance of structural changes included in recent issuances, we believe the largest insurers in Europe should be able to refinance existing tier 2 instruments at the first call date with Solvency 2 compliant ones.

The challenge is greater for tier 1 however. If economically priced 'new' tier 1 fails to materialise, we believe that most insurers can refinance forthcoming tier 1 calls from retained earnings over a relatively short transition period. However, insurers will need to plan ahead if they want to achieve this comfortably. Unsurprisingly given lack of detail over transition periods, no insurers have as yet discussed how they intend to make the tier 1 transition.

Insurance liabilities / balance sheet structures are different from the banks – however, investors are likely to prefer equity to hybrid capital. The insurance industry has argued that the positive cash flow nature of its business model (with assets shorter duration than liabilities in many cases), as well as the long-term and illiquid nature of liabilities, means that it shouldn't be exposed to the same quality of capital debate as the banks.

However, it is possible some investors may ultimately apply lower cost of equity to less leveraged companies, with less

reliance on hybrid capital. This may become more relevant for those companies that experience a relatively volatile solvency ratio (e.g. due to high market risk).

8) Taxation – Solvency 2 likely to cause changes

Insurance taxation – and in particular life insurance taxation – is a particularly complex topic.

Taxation in most member states is based on the current local Solvency 1 regulatory returns, rather than the GAAP or IFRS financial statements.

Given that these local regulatory standards will be replaced by Solvency 2, this creates a challenge – particularly as taxation remains the responsibility of individual European member states.

In the UK, HM Treasury and HM Revenue & Customs have recently completed a consultation about the impact of Solvency 2 on taxation of insurers. The intention is to include the final legislation within the Finance Bill 2011.

In addition to changes made necessary by Solvency 2, the proposals take the opportunity to "consider possibilities for wider ranging reform of the life insurance taxation regime".

The UK considered three possible approaches to changing the regime:

- **continue with the current system** (i.e. calculate the Solvency 1 surplus – and produce returns – specifically for tax purposes);

Exhibit 79

Requirements for instruments qualifying as tier 1, 2 and 3 capital for own funds calculation

Criteria	Tier 1	Tier 2	Tier 3
Loss absorbency	Immediately available to absorb losses. Losses absorbed first via interest and then principal	Not necessarily immediately available to absorb losses. No need for principal loss absorption	Not necessarily immediately available to absorb losses
Subordination	Deeply subordinated, senior only to the most deeply subordinated item in a winding up (e.g. equity)	Ranks below policyholders, beneficiaries and non-subordinated creditors	Ranks below policyholders, beneficiaries and non-subordinated creditors
Duration	Undated or at least 10 years maturity. Not redeemed (or replaced equivalently) on breach of SCR	Undated or at least 5 years maturity. Not redeemed (or replaced equivalently) on breach of SCR	Undated or at least 3 years maturity. Not redeemed (or replaced equivalently) on breach of SCR
Incentives to redeem	None, such as interest step ups permitted. Only redeemed at option of insurer.	Only redeemed at option of insurer, but moderate incentives to redeem (e.g. step-ups) allowed	Incentives to redeem (e.g. step-ups) allowed
Mandatory fixed charges	Possible to suspend redemption and cancel coupons (no deferral) on breach of SCR	Suspend redemption and defer coupons on breach of SCR	Possible to suspend redemption on breach of SCR, deferral of coupons on breach of MCR
Encumbrances	Not connected with other transactions, no restrictions, charges or guarantees	Not connected with other transactions, no restrictions, charges or guarantees	Not connected with other transactions, no restrictions, charges or guarantees

Source: Morgan Stanley Research, Oliver Wyman

- use a profit figure, appropriately adjusted, from the Solvency 2 regulatory return;
- use a profit figure, appropriately adjusted, from the statutory (i.e. GAAP) accounts.

The extra expense of the first option and the uncertainty over the nature of the 'profit' shown in the second has led to a strong preference for using a profit based on accounting profits.

However, given the proposed changes to IFRS for insurance companies, even this pragmatic approach creates an uncertain outcome.

We see the following risks to the industry from changes to taxation:

- in these times of stretched government budgets, there is a risk that the overall tax burden on insurers opportunistically increases; and
- on a slightly different tack, there is a risk that the tax breaks given to life and pension products are scaled back – as public spending is focused on those parts of the population with the lowest incomes.

Key Technical Debates

In addition to the key debates outlined above, we would highlight the following issues that have been informed by the construction of our model.

9) Treatment of value of in-force (VIF)

A key debate that has exercised insurers and analysts alike is the level of credit that insurers will be able to take in their own funds calculation for future expected profits in life insurance policies, otherwise known as VIF.

A large part of the implied future profits from life insurance policies will come through (on a market consistent basis) through the use of best estimate liabilities and risk margins. Best estimate liabilities should, by definition, generate a profit greater than the risk margin at the outset of a contract, otherwise they could not be aligned with insurers' expectations of generating value when they set premiums.

Therefore, a reduction in liabilities under Solvency 2, due to the removal of prudential buffers in calculating

liabilities, automatically generates additional equity capital (all other things being equal). **We believe this form of 'VIF' is appropriately considered as tier 1 capital** (which it is for QIS5), and we think it is unlikely that regulators or the industry is likely to push back on this.

There is potentially a greater debate about VIF generated from *future in-force premiums* (termed 'expected profits included in future premiums (EPIFP) in QIS5). Since these premiums have not yet been received, it is easier to argue that they do not form part of an insurers' tangible equity.

However, there are valid reasons to keep this form of VIF, in our opinion. If future in-force premiums were not received then some in-force liabilities may also be reduced (e.g. due to termination of an insurance contract).

In addition, any VIF included in insurers' equity capital is subject to the same stress tests in determining capital requirements as all other assets and liabilities. Therefore, if it is being 'stressed', it should continue to be included in an insurers' net asset value.

We think this debate will continue after the QIS5 process. We believe the VIF on future premiums will ultimately continue to be included in the capital available for Solvency 2. **However, in a worst case scenario, it is possible that 'future premiums' VIF may be demoted to a lower standard of capital, e.g. tier 3.** This could have significant implications for European insurers' solvency – in particular if there is no corresponding adjustment to the calculation of the SCR – as the VIF related to future in-force premiums amounts to approximately €100 billion across Europe.

10) Liability discount rate / liquidity premium

Earlier quantitative studies and Solvency 2 principles before QIS5 were based around the use of government bond curves as the appropriate 'risk-free' rate for discounting liabilities. Many industry participants argued that the use of 'swap' curves was more relevant to the non-risk free nature of insurers' liability commitments, and also more liquid, more flexible in duration and easier to hedge.

QIS5 has now moved to using swap curves to value liabilities. However, the recent pressure on the sovereign bonds of certain European countries has raised the issue of a lack of consistency between European government bond curves and swap curves. Which is the appropriate risk-free rate to use, particularly in the context of zero direct capital

requirement under Solvency 2 for holding government bonds?

We believe this debate will continue and remain key. It is hard to say at this stage what the ultimate decision of the European Commission might be.

An additional technical debate is the liquidity premium. The European Commission has adopted a methodology of a standard calculation of liquidity premium in the main markets in which insurers operate, which is published by the regulators and used for the QIS5 test.

The implied liquidity premiums in these standard curves vary widely between countries; some with less deep and widespread corporate bond markets, or those where credit fears are less pronounced, have relatively low liquidity premiums at end 2009.

In addition, the QIS5 rules apply four broad buckets for the proportion of liquidity premium that may be applied to different products (50% for all products of at least a year in duration, 75% for with-profits or participating life contracts and 100% for certain forms of annuity products, e.g. those with UK-annuity style features).

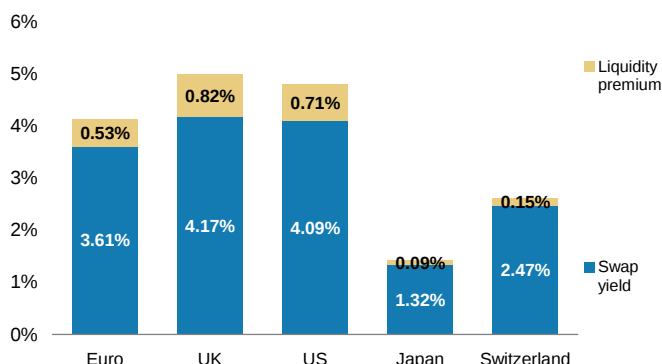
The liquidity premium and how much can be used could have a dramatic impact on the relative attraction of different products – and may create an uneven product playing field.

Some market participants could argue that a liquidity premium is unjustified (although we believe the majority of insurers are in support of the principle).

Exhibit 80

Maximum liquidity premium at 10 year duration specified in QIS5 parameters / assumptions

Swap curve + 100% liquidity premium at 10 years



Source: Morgan Stanley Research, Oliver Wyman

It is possible that there is pushback on this issue when the final QIS5 results are announced. Regulators may use the liquidity premium as a means of adjusting the overall calibration of Solvency 2, if it is deemed to be too 'generous'.

We believe that some form of liquidity premium will remain, and that this will be a significant number. The long-term nature of insurance liabilities and the relatively stable lapse experience of contracts during the financial crisis (indeed the inability to lapse contracts early in some contracts without loss), suggests that a liquidity premium is a justified principle.

We note that QIS5 offsets some of the benefit of liquidity premium through the introduction of a liquidity premium stress test.

The discussion around the base for the liability discount rate and the liquidity premium is significant. Moving back to government bond yields or removing the liquidity premium from the liability discount rate could each increase the technical provisions of European insurers by €100 billion.

11) Shape of the yield curve

The shape of the yield curve could be just as important as its absolute level in affecting the sector's Solvency 2 position. Cash flows discounted to estimate liabilities are discounted at the implied interest rate from the relevant duration of the yield curve. That means that shorter duration non-life liabilities are more sensitive to shorter-term interest rates, while some longer-term life liabilities (e.g. pensions, annuities and long-term participating traditional life savings) are far more sensitive to the long end of the curve.

A negatively sloping curve could, therefore, create some hard-to-explain liability movements, and insurers' available capital and balance sheet could become more volatile as a result of this. We believe this issue may be of some concern to insurers exposed to long-term life liabilities. Importantly, this issue could increase the opacity of both balance sheets and capital management to an already confused investor audience.

Another important factor is the issue of extrapolation of yield curves. In some markets there may not be a sufficiently long duration government or swap market to value some insurers' long-term liabilities. These include long-duration annuity and participating life contracts. QIS5 uses a standard formulaic approach to define an 'ultimate' long-term yield (which is independent of current yield curves) to which it is assumed that all yield curves converge.

The theoretical correctness of such an approach is potentially up for debate, as is the precise level of 'ultimate' yield chosen by regulators. The choice of long-term yield, and how this is determined, has consequences for the way that companies hedge their interest rate risks, as well as for profitability and capital management of long-term contracts.

12) Calibration of the non-life requirements

As we explain later in this report, the calibration of non-life capital requirements appears high relative to insurers' internal models and rating agency calibrations for a 'BBB' level of financial strength. In addition, non-life capital factors are arguably quite simplistic, since they have been derived broadly from aggregate data in what is quite a disparate and geographically diverse sector. **Therefore, aggregate capital factors are likely to overstate the capital risks of large, diversified and sophisticated non-life groups.**

This may be especially relevant for reinsurers writing non-proportional reinsurance, for example. Currently there are only three risk factor categories for non-proportional non-life reinsurance; these cannot accurately reflect the specific risks of the diverse range of non-proportional policies, in our view.

This is likely to push non-life insurers strongly towards using company-specific factors, full or partial internal models. Companies that can demonstrate sufficient statistical

evidence can use company-specific factors to calculate non-life capital requirements. More sophisticated companies may opt for full or partial internal models (where these show a further reduction in required capital); although these will require a greater degree of regulatory scrutiny and sign-off. We believe that such models could generate capital requirements that are at least 20-30% lower than the Standard Model used under QIS5.

However, not all companies will be able to get sign-off. Creating, managing and getting regulatory approval for internal models or even company-specific factors is a non-trivial exercise. We think it is unlikely that all non-life insurers will get sign-off in time, and many players (with less data or resources to produce an internal model or justify company-specific factors) could find themselves at a disadvantage. This could then create an 'uneven' playing field, which may run counter to the spirit of what Solvency 2 is trying to achieve.

We believe there could be some pushback on the calibration of non-life capital requirements after QIS5, especially given the fact that premium and reserve standard capital factors are ~15% greater, on average, than those used for QIS4.

Implications for Life Insurance Products

Solvency 2 will affect life products in different ways, with – in our view – profound implications for product strategy

The change in capital requirements differs across product types. Consequently, the relative profitability and economic attractiveness of products will change under the new solvency regime.

For life products, the following changes can be observed (as summarised in Exhibit 81 below):

- **Higher capital requirements for participating products – in contrast to other life products.** In general, the total resource requirement (the sum of technical liabilities and Solvency Capital Requirement) for traditional participating life products increases. However, at a company level, the impact depends very much on the capital surpluses and buffers available in the with-profit fund.
- **Lower total resources required for unit-linked and ‘risk’ products.** Technical provisions may be lower under Solvency 2 for unit-linked and risk products that have a positive value of in-force (VIF), as the value of expected future net cash flows reduces technical provisions. Low market risk in these products means that capital requirements are also likely to be lower.
- **Payout annuities – no overall change to resources required?** While a significant increase in total resource requirements for annuity products had been projected based on CEIOPS Level 2 draft advice, the inclusion of a liquidity premium in QIS5 technical specifications means that total resource requirements for payout are expected to remain more or less unchanged.
- **UK immediate payout annuities may see a slight increase in total resource requirements.** In the UK, insurers are already subject to a form of economic capital for annuity business – the Internal Capital Assessment (ICA) regime used by the FSA. We estimate a slight increase in capital requirements between the ICA and the QIS5 regimes for immediate UK annuities. For deferred bulk annuities, which insure the liabilities of closed down defined benefit pension schemes, QIS5 may result in a larger

increase in total resource requirements. This is due to the long duration of these contracts and, consequently, a higher ‘risk margin’ added to Solvency 2 best estimate liabilities. For both bulk and immediate annuities, we do not believe higher capital requirements are likely to make these products unprofitable, given existing high margins.

- **Total resource requirements for variable annuities to remain unchanged,** although this depends on the specifics of guarantees provided, the degree to which these policies are ‘out’ or ‘in-the-money’ and other factors such as hedging policy.

Higher capital required implies lower return on capital.

For in-force products, increases in total resource requirements imply that return on required capital decreases, along with the market-consistent embedded value of these products. This implies that existing participating life policies in insurers’ back books may experience lower returns on capital.

For new business, we believe that product design and pricing needs to be adjusted to reflect the changes in technical provisions and capital requirements and to maintain current levels of profitability.

We discuss this in more detail later in this section.

Traditional participating life insurance products

For traditional participating / with-profits life insurance products, we expect a significant increase in total resource requirements (sum of technical provisions and solvency capital requirement).

This increase in total resource requirements is due to two main drivers:

- **in many European countries, technical provisions of participating products will increase** as the value of options and guarantees is explicitly captured and as part of the discretionary payments to policyholders is included in technical provisions in line with the fund’s crediting policy. This is less likely to be the case in UK with-profits business, which is already subject to a ‘realistic’ reserving and economic capital regime.

Exhibit 81

How required resources may change for different products under Solvency 2

Life Product	Total resource requirement ¹	Return on required capital
Traditional participating/with-profits		
Unit-linked		
Variable Annuities		
Annuities		
Risk		

¹ Total resource requirements = technical provisions + solvency capital requirement

Source: Morgan Stanley Research, Oliver Wyman

- the solvency capital requirement will increase due to the investment risk in with-profits funds and the explicit charge for market and interest rate risks under Solvency 2. These will particularly affect those with a high degree of investment in equities or relatively high / inflexible guarantees.

Policyholder capital is key. The risks to shareholder capital from increased resource requirements depends on the size of surplus buffers in participating life funds.

These are largely composed of what we refer to as 'policyholder capital', i.e. surplus funds not yet distributed to policyholders or shareholders. The exact nature of these risk-mitigating buffers varies across countries:

- surplus 'estate' in the UK;
- collective and individual bonus potential in the Nordics;
- the Participation pour Provisions aux Excédents (PPE) in France ; and
- Rückstellungen für Beitragsrückerstattungen (RfB) in Germany.

Likewise, the level of these buffers differs across with-profit funds.

We illustrate the impact of policyholder capital mitigating shareholder capital requirements in Exhibit 82. Exhibits 83-84 illustrate the change in technical provisions and capital requirements for a continental-style participating product with

a guaranteed rate of 3%, policyholder surplus of 6% of technical provisions and an asset allocation similar to that of Mosaic Composite Company.

In this example:

- Under Solvency 2, the value of options and guarantees is included in technical provisions, increasing these by ~2% compared to Solvency 1.** Likewise, future discretionary benefits stemming from surplus funds (or policyholder capital) are also captured in the Solvency 2 technical provisions, increasing them by another 3.6% (Exhibit 83). These are 'discretionary', so by definition they can be reduced in a stress scenario to limit downside risk.
- In a stress scenario, discretionary benefits (by definition) can be reduced to absorb losses.** In our example of the impact of a stress test (Exhibit 84) we assume that all of the discretionary benefits can be eliminated, providing 3.6% of capital relief. Therefore, the Solvency 2 SCR is reduced to 6.0% instead of a gross amount of 9.6%.
- It should be noted that under Solvency 2 expected future net cash flows to shareholders reduce technical provisions and increase own funds** by 0.8% of Solvency 1 technical provisions in the example. As a result the extra capital that shareholders would need to put in to back with-profits liabilities is 'only' 5.2% of Solvency 1 technical provisions.

The sensitivity of the net shareholder capital requirement to the policyholder surplus is enormous (Exhibit 85).

Hence, there will be some companies that need to set aside a significant amount of capital to cover the net solvency capital requirement for their with-profit funds and others that don't require any shareholder capital for their with-profit funds but will be in a very good position to write new business at competitive rates.

Furthermore, the degree to which insurers will either reprice or move away from traditional products also depends on the existing local regulation of these products. In the UK, where insurers have already been required to determine market-consistent liability values and to calculate value-at-risk-type capital requirements under the realistic balance sheets regime, we expect little change in the offering and pricing of with-profits products.

In other countries, the typical product designs of traditional participating contracts vary in their flexibility to respond to Solvency 2. For example, in France the majority of participating life policies contain guarantees that are linked to movements in government bond yields, therefore reducing interest rate risk.

In some countries, such as Italy, some contracts contain guarantees that are not enforceable annually, but instead only on maturity of the contracts. This also reduces risk and potentially capital requirements.

Countries with potentially less flexible regimes for these products include Germany, where there are defined rules for profit-sharing between policyholders and shareholders and potentially less flexible guarantee structures.

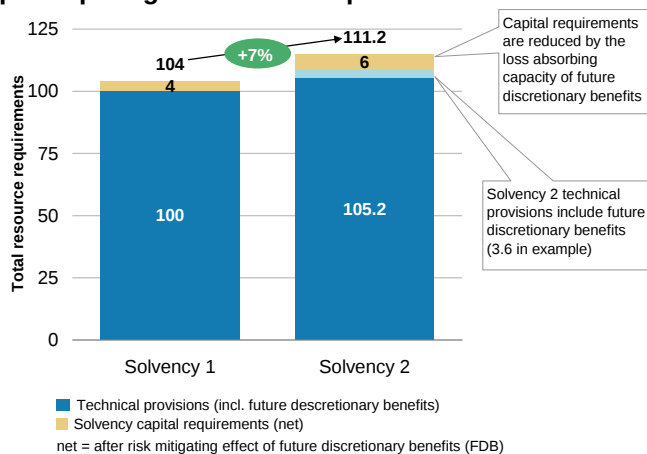
Overall, we still expect most shareholder-owned insurance companies to seek to reduce exposure to participating products over time due to the increase in resource requirements and the asymmetric risks for shareholders associated with guarantees in these contracts. We believe exceptions to this will be those shareholder companies with large policyholder surplus buffer capital, or mutuals where considerations of return on economic capital are not a driver.

Unit-linked products – a beneficiary of Solvency 2

For unit-linked products, on average, we expect to see a decrease in total resource requirements, i.e. capital will be released from the unit-linked in-force.

Exhibit 82

Quantitative impact of Solvency 2 on with-profits / participating life insurance products



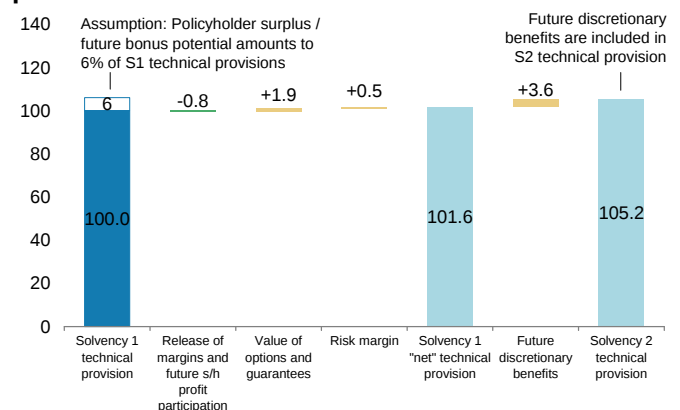
Assumes average guaranteed rate of 3% and policyholder surplus of 6% of Solvency 1 technical provisions.

Source: Morgan Stanley Research, Oliver Wyman

- **The value of in-force (VIF) becomes an asset, or a reduction in technical liabilities.** The precise way that VIF is taken into account in Solvency 2 is still under discussion. However, it is possible that technical provisions decrease as the unit value is reduced by the present value of expected future net cash flows to shareholders, i.e. fees to be received minus best estimate expenses and insurance charges to be received minus cash flows to policyholders due to insurance risks. This is consistent with the best estimate approach to calculating liabilities under Solvency 2.
- **At the same time, the solvency capital requirement increases.** The reason for this is that the stress scenarios for calculating capital requirements is applied to the VIF as well as the value of the funds. This is the flip side of allowing VIF to reduce technical provisions.
- **VIF to provide additional surplus capital for the group?** As the decrease in technical provisions and hence the increase in own funds exceeds the increase in required capital, unit-linked products are expected to provide additional surplus capital that can be used to cross-subsidise the capital requirements of other products and parts of the balance sheet, subject to fungibility constraints. Clearly, this is subject to a final decision on the classification and use of VIF under Solvency 2.

Exhibit 83

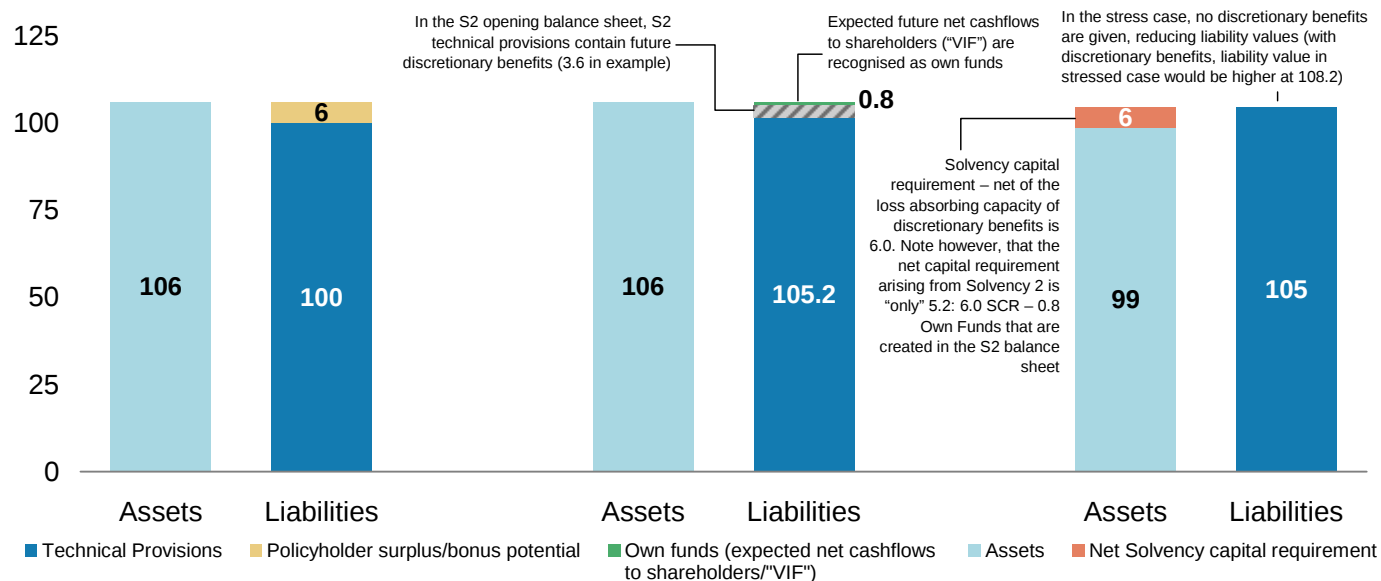
Comparison of Solvency 1 and Solvency 2 technical provisions for traditional participating / with-profits products



Assumes average guaranteed rate of 3% and policyholder surplus of 6% of Solvency 1 technical provisions.

Source: Morgan Stanley Research, Oliver Wyman

Exhibit 84

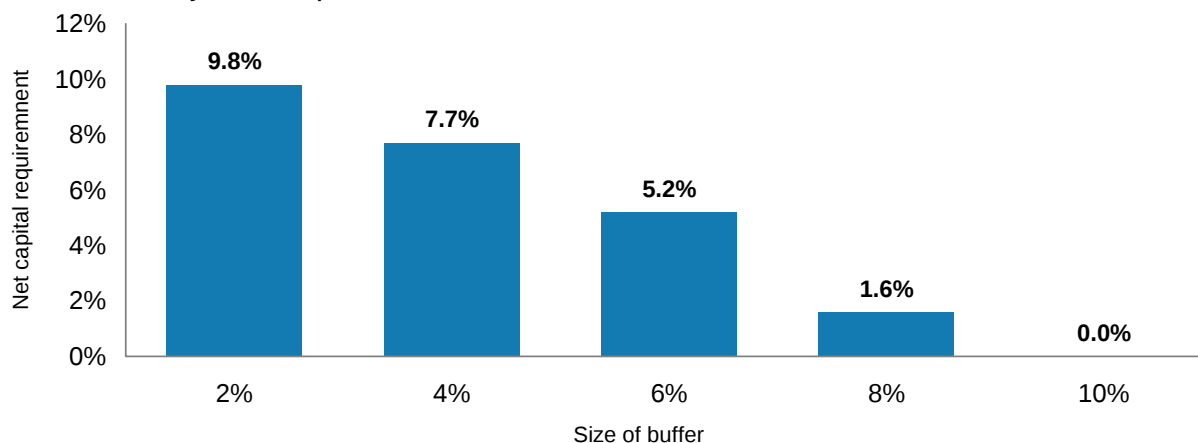
An illustration of the use of discretionary benefit buffers (policyholder capital) to reduce shareholder capital requirements in the participating with-profit product

Source: Morgan Stanley Research, Oliver Wyman

Exhibit 85

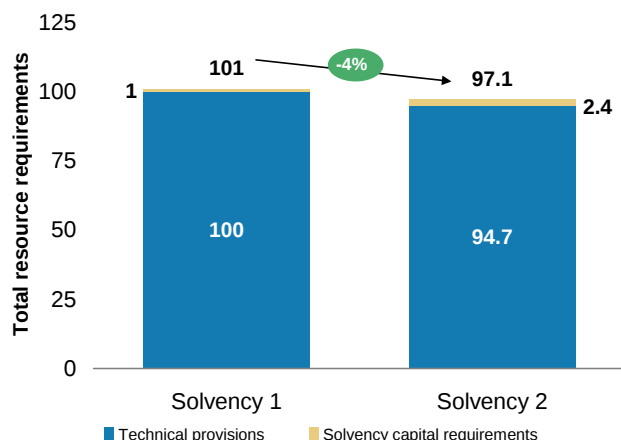
The net shareholder capital requirement for with-profits business is very sensitive to the size of the policyholder capital buffer – ranging from zero shareholder capital with a 10% policyholder buffer to 10% of technical provisions with a 2% policyholder buffer

Net capital requirement for with-profit business by size of buffers
Indexed to Solvency 1 technical provisions



Net capital is defined as the S2 Solvency Capital Requirement less the increase in own funds due to the recognition of expected future net cash flows to shareholders (VIF) under Solvency 2
Source: Morgan Stanley Research, Oliver Wyman

Exhibit 86

Quantitative impact of Solvency 2 on unit-linked products

Source: Morgan Stanley Research, Oliver Wyman

Variable annuities – depends on hedging strategy

With the exclusion of implied volatility shocks from the QIS5 final technical specifications, total resource requirements for variable annuities are expected to increase slightly, by ~1%, relative to Solvency 1.

- **Overall, the release of VIF from technical provisions will lead to lower technical liabilities or additional assets.** On the one hand, the value of options and guarantees is explicitly captured under Solvency 2 and increases technical provisions. On the other hand, the value of expected future net cash flows to shareholders (or VIF) reduces the technical provisions – and increases own funds, in a similar way to unit-linked products.
- **Capital requirements increase**, primarily because of the market risk inherent in the value of options and guarantees offered to policyholders.

The resulting impact of Solvency 2 on variable annuities is very moderate, even slightly positive, compared to other business, such as traditional participating business.

However, this result is dependent on a solid hedging strategy for the embedded options and guarantees. For our estimates of the quantitative impact, we have assumed that a static hedging program is in place, with a hedge effectiveness of 50%.

As for all of our analysis, our results are based on the standard formula under QIS5. This only allows static hedging. In practice, the larger players have dynamic hedging programs in place. Companies will need to get internal model approval to be able to capture the risk-mitigating effects of dynamic hedging.

Payout annuities

Helped by the inclusion of liquidity premium, especially in the UK. The lobbying around the inclusion of a liquidity premium in the liability discount rate, which was primarily driven by concerns about products such as UK-style annuities, has been successful.

We estimate that under the QIS5 test total resource requirements for payout annuities remain more or less unchanged. However, as we discuss above, the requirements for UK annuities might increase slightly relative to the current UK ICA capital regime.

- **Lower technical provisions.** Due to the inclusion of a liquidity premium in the liability discount rate and the move to best estimate liabilities, the value of technical provisions decreases.
- **Higher capital requirements.** At the same time, the solvency capital requirement increases significantly – a large portion of this is due to longevity risk.

We show the impact on total resources on payout annuities in moving from Solvency 1 to Solvency 2 in Exhibit 88. Note that the results shown refer to annuities in payout. For bulk annuities with a portion of deferred annuitants, we expect to see an increase in total resource requirements.

Risk products (e.g. life protection)

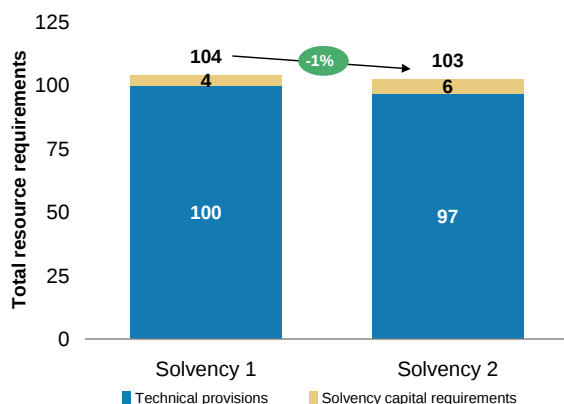
For risk products, we expect a significant decrease in total resource requirements.

We have modelled term assurance as a sample risk product.

- **Future profits capitalised up-front.** We see a significant decrease in technical provisions, due to the offsetting effect of expected future net cash flows. On a best estimate basis, the expected present value of future premiums should be greater (on average) than expected value of death benefit payouts at the outset of a term assurance contract.

Exhibit 87

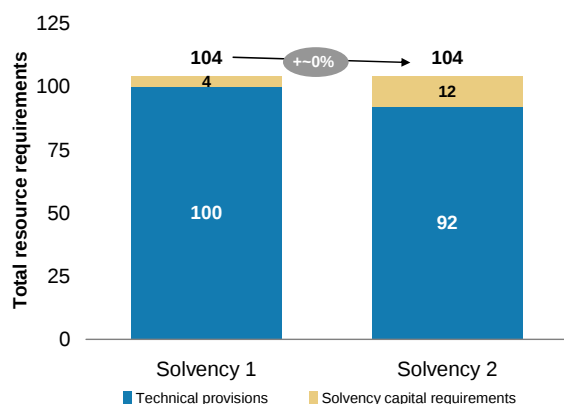
Quantitative impact of Solvency 2 on variable annuities



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 88

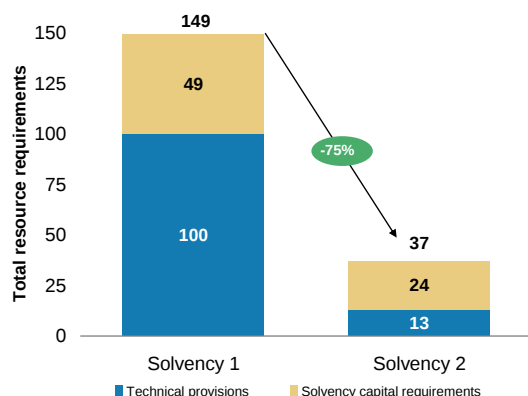
Quantitative impact of Solvency 2 on payout annuities



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 89

Quantitative impact of Solvency 2 on term assurance



Source: Morgan Stanley Research, Oliver Wyman

- **Capital requirements also lower due to 'sum at risk'.** Likewise, capital requirements will decrease under QIS5. Under Solvency 1, the 'sum at risk' charge in the capital requirements, which involves holding 0.3% of the difference between liability reserves and the aggregate mortality benefit, dominates capital requirements. This leads to a higher capital requirement for term assurance under Solvency 1 than Solvency 2.

Impact on overall diversification benefits and risk

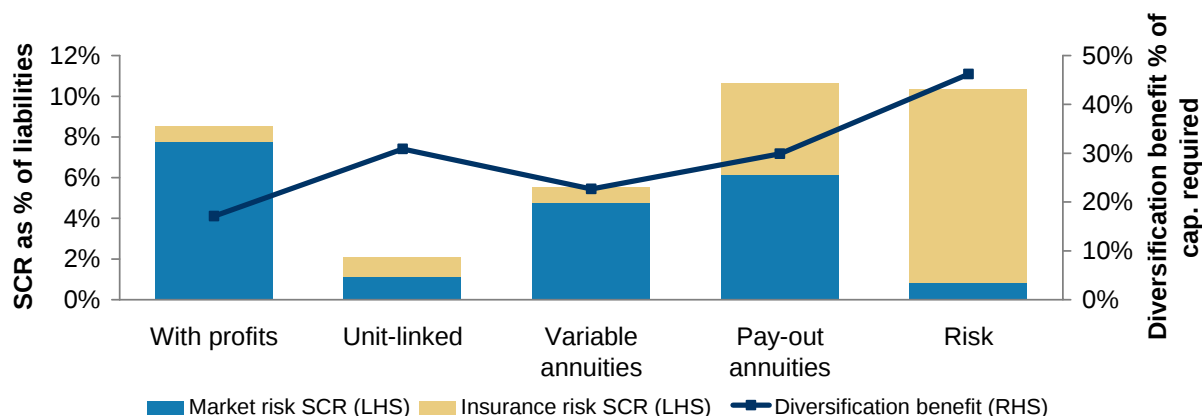
Comparing the impact of Solvency 2 across life products, we see that products with good inherent diversification and products that do not rely on spread-based impact subject to significant market risk are less negatively affected – we illustrate this in Exhibit 90.

- **For savings products, market risks dominate the risk profile.** The only exception is unit-linked products. Here, lapse and other life underwriting risks are significant contributors to the risk profile. This is because fluctuations in these risks have a material impact on the present value of expected future net cash flows (essentially VIF) that decrease the value of technical provisions under Solvency 2. Products with fee-based income, such as unit-linked and variable annuities, are generally less negatively affected than products with spread-based income and shareholder profit participation, such as traditional with-profits products.
- **Underwriting risks are more important for risk and annuities.** With the introduction of the liquidity premium, longevity risk is now the dominant risk for annuities. Not surprisingly, underwriting risks dominate the risk profile for risk products.
- **A balanced risk profile implies higher diversification benefits,** reducing the Solvency Capital Requirement. Hence, products with a good mixture of underwriting and market risks enjoy higher diversification benefits than accumulation products that are dominated by market risks.

So what life products will insurers sell in future?

We expect insurers to expend significant resources on repositioning their new product offerings as a consequence of Solvency 2.

Exhibit 90

Typical breakdown of standard capital requirements (SCR) and diversification benefit by life product

Source: Morgan Stanley Research, Oliver Wyman

Traditional guaranteed business has been the dominant feature of most continental European insurers' product mix – and one should not underestimate the cultural, strategic and operational challenges in de-emphasizing this product.

The obvious route for insurers is to try to find a capital-efficient way of replicating the consumer proposition of traditional participating life products.

The search for a 'new traditional' product. This would seek to offer guarantees and certainty but in a capital 'light' manner. Possible approaches include unit-linked products with guarantees (but with a much simpler structure than a full US-style variable annuity) or structured products.

Although the return on economic capital might be attractive on such a product, it may not generate sufficient gross margins to sustain current distribution structures. Care would also have to be taken to ensure that any new product could easily be sold through existing distribution.

Another approach would be to put more emphasis on 'vanilla' unit-linked business. However, we acknowledge that many insurers are reluctant to go down this route, owing to concerns over disintermediation and the gradual erosion of margins (especially given the inevitable trend of use of third-party fund managers).

The recent experience of the UK industry, which saw a structural shift towards unit-linked products with long payback periods and low margins, is not an encouraging road map in this regard.

Variable annuities are an interesting medium-term option, but we do not believe that they are a viable option in the short term. In our view, insurers are likely to have been discouraged by the widespread losses and incidences of hedge 'breakage' in the US during the recent financial crisis. Although we do not believe that European product necessarily needs to be as complicated as that sold in the US, management teams are likely to remain wary.

Relative to traditional products, variable annuities are harder to explain to distributors – and ultimately prospective policyholders. Substantial effort would be required to retrain existing agency forces to sell the product.

Furthermore, we believe there is a practical constraint in terms of the amount of technical and actuarial resource that is required by Solvency 2. We doubt whether many companies have the scope to invest considerable time and effort in a complex variable annuity project in the next 18-24 months.

Asset management is likely to become a focus profit centre in its own right. Insurers have long debated whether asset management should be a core competence or outsourced. We increasingly believe it should be a core part of any insurance business.

However, we think it is important to distinguish between the need to retain in-house expertise in ALM and setting investment policy – and selling third-party product.

Although we believe that it may still make sense for insurers to outsource certain investment mandates (where the in-

house unit lacks specialist expertise), we see strong arguments for putting a strategic emphasis on developing an asset management business with a focus on growing third-party assets.

We believe it could be worthwhile for insurers to explore the potential of the stand-alone protection product segment in continental Europe. However, we believe this is likely to remain a small segment that will not 'turn the dial' at the industry level.

Relative to, say, the UK and Dutch markets (where protection is a significant product segment), in many European countries, protection sales are small. There are several structural reasons for this, including generous welfare benefits, relatively lower home ownership (protection is often bought alongside a mortgage) and the existence of traditional endowment products (which include protection on a bundled basis).

While Solvency 2 will likely result in a shift away from traditional life, we are doubtful whether the protection opportunity is large enough in the near term.

Health insurance could be a possible growth opportunity – particularly in light of the pressure on government balance sheets. However, this sector is often controversial politically in many countries.

Shifting away from using policyholder capital

A challenge for insurers – particularly in those markets where policyholder capital funded traditional products have been dominant – is to manage a profitable transition to shareholder-financed alternatives.

This is obviously less relevant for mutuals, and for companies that retain large policyholder capital buffers it may only be a longer-term consideration.

However, there is a real risk that the returns available on 'new' products are unattractive, as insurers all follow similar strategies and 'prices' are pushed downward.

We note similar trends were observed in the UK market after the demise of with-profits business in the 2001-2003 period.

Implications for Non-Life and Reinsurance

Capital requirements for non-life insurers are substantially higher under QIS5

QIS5 capital requirements for non-life insurers (before diversification) have been raised by ~15% over QIS4 and are approximately 3-4 times greater than Solvency 1 capital requirements. As Exhibit 92 shows, the increase in capital requirements, relative to the simple premium-based factors under Solvency 1, varies greatly by line of product – reflecting the risk-based nature of Solvency 2. For example, capital requirements for non-proportional lines are 5-6 times Solvency 1 levels, while those for motor are 1-2 times.

The net effect of these changes is offset to some extent by the discounting of liabilities in Solvency 2. However, our quantitative modeling confirms that solvency ratios are likely to fall substantially: e.g. Accidental P&C's solvency ratio falls from 224% to 119% on a similar basis.

We believe the strong increase in capital requirements will create pressure points in the industry that will ultimately benefit large diversified global reinsurers, as we discuss below. We would highlight the following key issues highlighted by our analysis:

- **A higher capital requirement under Solvency 2 in itself is not a surprise for major non-life insurance groups,** since such companies are already used to managing capital using risk-based rating agency models, with capital requirements far above the Solvency 1 regime. Such companies can soften capital requirements with diversification benefits, and are more likely to be ready with internal models to reduce capital requirements further.
- **However, it may put greater pressure on smaller, less well-prepared companies.** Such companies will have lower diversification credit, and potentially more volatile or insufficient data to use internal models. They may also include mutuals without easy access to market capital.
- **Standard capital factors may be too 'general' for the specific risks of more sophisticated and diversified insurers,** such that these may inadequately reflect the actual risks taken. A key example is the capital charges for non-proportional risk written by reinsurers: there are only three categories, which is unlikely to represent accurately

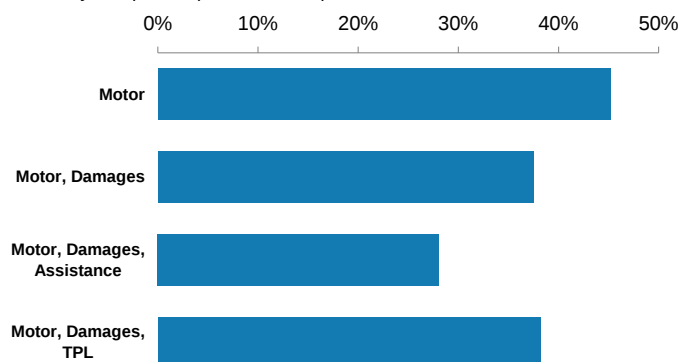
the diversity of risks written. We would expect this to encourage companies to derive more bespoke 'company specific factors' – which is allowed under QIS5 – or even internal models. However, the technology / data to achieve this could be beyond the reach of many smaller companies.

- **In addition, we expect Solvency 2 to create greater volatility in non-life earnings and balance sheets.** Non-life liabilities will be marked-to-market and calculated on a best estimate basis. Many of the conventional smoothing mechanisms used by non-life insurers may no longer be effective or possible.
- **Diversification provides a clear capital advantage, depending on the types of risk written.** We illustrate this in Exhibit 91, which shows the theoretical capital requirements for insurers writing different business lines (in equal volumes). This shows that more diversified groups are likely to face lower capital requirements than mono-lines. However, the precise benefits depend on the types of risks brought together – suggesting the existence of an 'efficient frontier'. For example, an insurer writing equal volumes of Motor, Fire & Damage and Assistance business may have substantially lower capital requirements than one writing Motor, Fire & Damage and Third-Party Liability (TPL).

Exhibit 91

Examples of diversification benefit for different non-life business combinations – suggesting an 'efficient frontier'

Solvency 2 capital required as % of premium

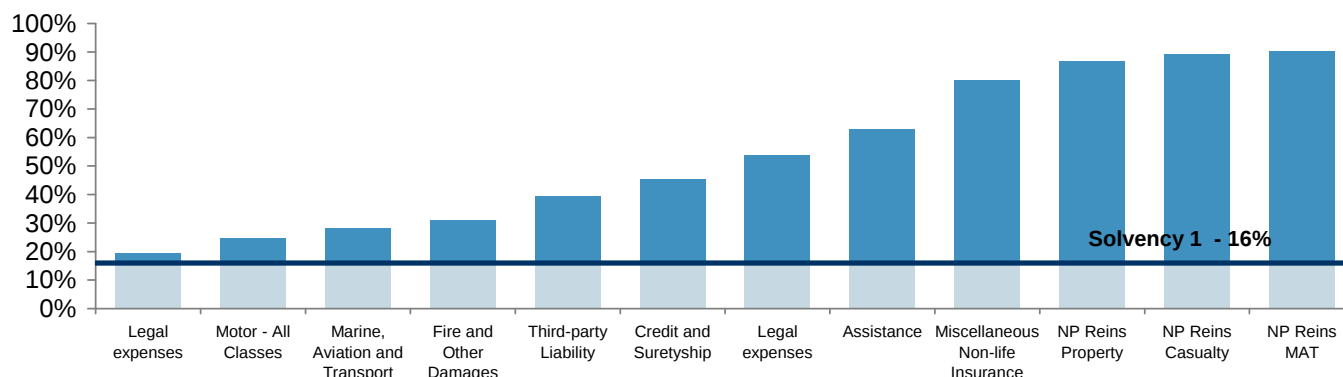


Source: Morgan Stanley Research, Oliver Wyman

Exhibit 92

Solvency 2 capital requirements are significantly greater than Solvency 1 in some business lines – on average 3-4x stronger capital requirements under Solvency 2, allowing for netting effect of lower technical provisions

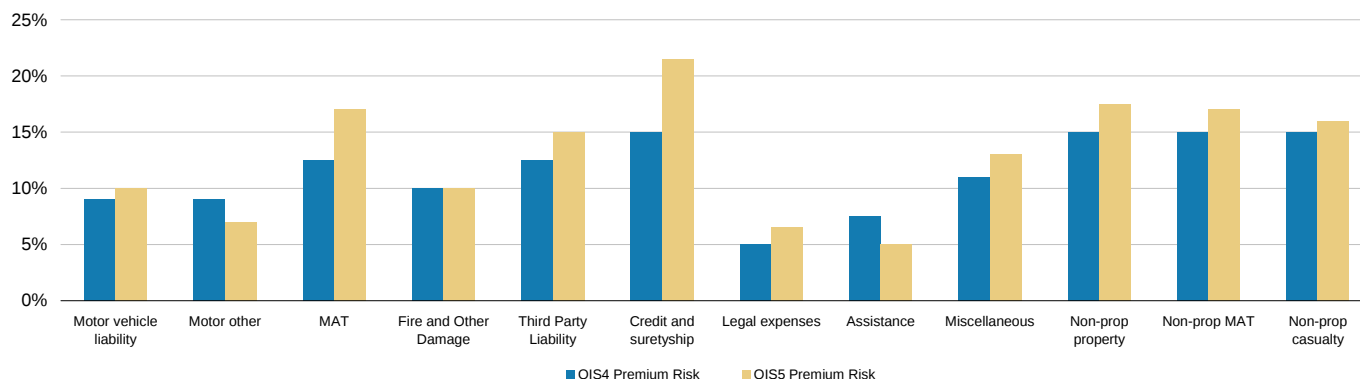
Solvency 2 capital requirements, net of lower technical provisions, as % of premiums



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 93

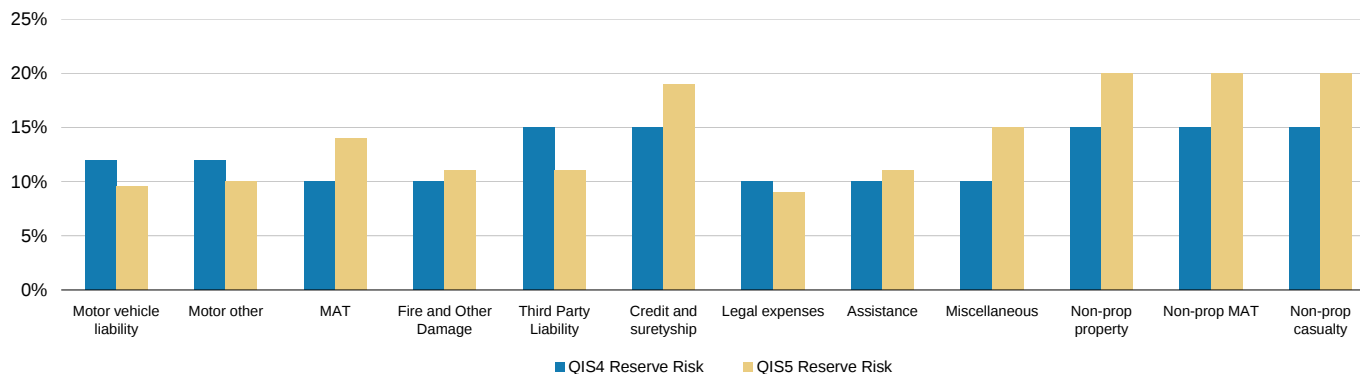
QIS5 premium risk factors are ~15% higher than QIS4



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 94

QIS5 reserve risk factors are also ~15% higher than QIS4



Source: Morgan Stanley Research, Oliver Wyman

We would also highlight the complexity of parts of the QIS5 calculations – catastrophe risk, in particular. The calculation of catastrophe risk in the EEA area uses standard scenarios for natural catastrophe risk according to CRESTA zones and specific scenarios for man-made catastrophes. CRESTA stands for 'Catastrophe Risk Evaluating and Standardising Target Accumulations' – an organisation set up by the insurance industry to establish a uniform system for collecting, assessing and reporting catastrophe risk data.

These can take into account companies' specific reinsurance programmes, and are then aggregated using correlation matrices that allow for geographical diversification. Putting this all together is unlikely to be a straightforward exercise – especially for companies with limited statistical data or resources to carry out such modeling.

The standardised catastrophe scenarios apply only to EEA countries. For non-EEA risks, companies may need to use factor-based capital requirements for QIS5 – these factors are likely to result in relatively high capital requirements.

One of the levers to reduce the impact of Solvency 2 is for companies to use internal models. We believe in some cases internal models could reduce capital requirements by 20-30% compared to the Standard QIS5 model.

However, this technology will not be available to all companies, who need to obtain regulatory approval for their internal model and demonstrate sufficient data quality. Some companies (especially smaller companies, niche players, mutuals) may not have sufficient resources to do this.

In addition, regulators need to have capacity to audit and sign off models – it is possible that this may not be fully achieved by the time Solvency 2 first comes into force. We expect most of the larger proprietary non-life groups to gain internal model sign-off before or close to the start of Solvency 2. However, we also believe many mid-sized or smaller companies will find it difficult to gain approval in this timeframe.

Solvency 2 and QIS5 standard capital requirements are likely to be used as a benchmark to assess internal models. Any company wishing to submit an internal model for review needs to participate in QIS5. We believe regulators will be sensitive to any outsized deviations from the capital requirements suggested by the standard capital model. Therefore, companies may find it more difficult to justify internal models that suggest large deviations from the standard model.

Another lever to manage capital is to try to maximise diversification benefit. This is most obviously achieved through M&A, but also companies may seek to enter new business lines through organic means or by forming new distribution partnerships. This may make sense where there is some strategic rationale (e.g. a personal lines motor insurer deciding to enter the personal lines home and buildings insurance market).

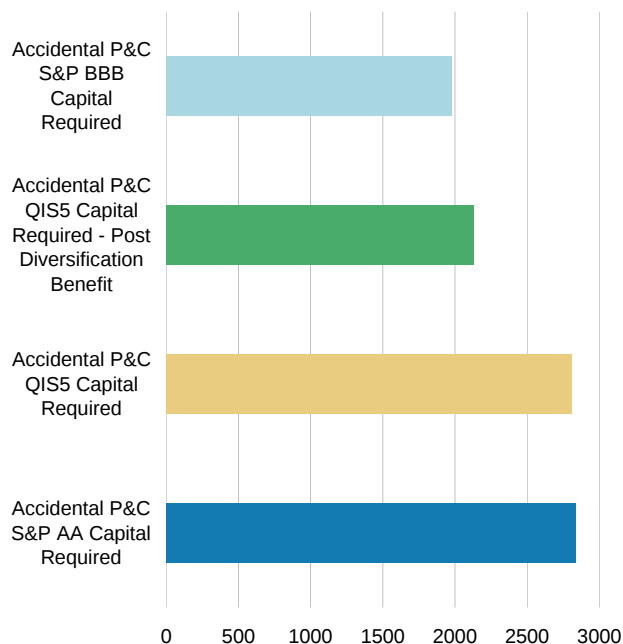
QIS5 vs. rating agencies

It is interesting to compare QIS5 capital requirements for non-life risks with rating agency models. We do this in Exhibits 95 and 96 for Fantasy Re and Accidental P&C. Note that these comparisons are imperfect due to differences in basis. However, we would make the following observations on these charts:

- **An S&P AA rating is still the binding capital constraint for these two companies.** Rating agencies may be forced to update their models and solvency methodology under a more sophisticated Solvency 2 regime. We think it is likely that rating agencies will rely to a greater extent on companies' Solvency 2 or internal model disclosure to determine ratings post Solvency 2. However, we still think rating agencies will remain an important driver of capital management and will play a central role for non-life capital management.
- **However, QIS5 appears to be calibrated at a higher level than an S&P BBB requirement.** We understand that QIS5 is meant to emulate a 'BBB' standard of capital coverage. As Exhibits 95 and 96 show, the pure premium / reserving risk capital charge for both Accidental P&C and Fantasy Re appears to be of similar strength to an AA requirement *before* diversification benefit is taken into account. If we make an allowance for group diversification benefit (e.g. 25% for Accidental P&C), then capital requirements fall back below AA requirements, closer to an S&P BBB level of capital, but still around 10% higher than this.
- **The gap between QIS5 and rating agency requirements will increase for less diversified groups.** Such groups may face a significantly higher capital requirement under Solvency 2 than suggested by rating agency models.

Exhibit 95

Our estimate of Accidental P&C's premium and reserve risk capital requirements under rating agency and QIS5 models



Source: Morgan Stanley Research, Oliver Wyman

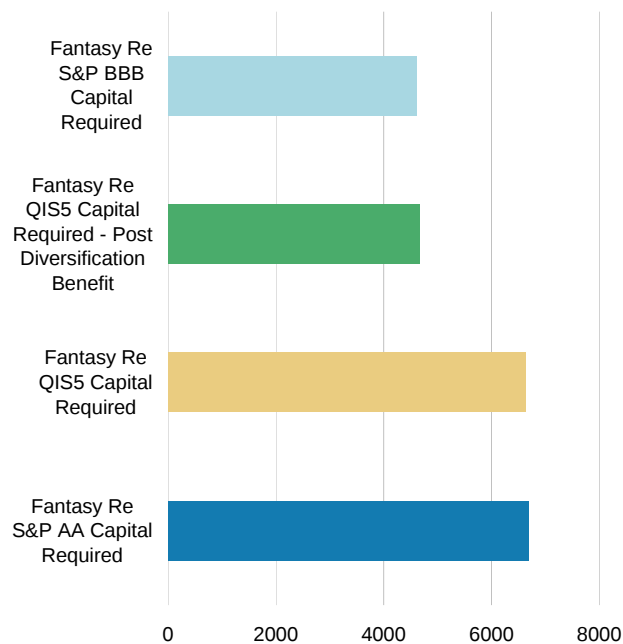
Diversified global reinsurers may be relative winners due to increased demand

All of our analysis points to an uplift in demand for reinsurance.

- **Using reinsurance to 'import' reinsurers' better capital efficiency.** Global reinsurers are in a good position to benefit from early internal model sign-off and higher than average diversification benefit. Primary non-life companies without these advantages can 'import' the better capital position of reinsurers through a reinsurance contract. Theoretically, this could create a 'win-win' situation for reinsurers and primary insurers, with primary insurers getting capital relief and reducing volatility, and reinsurers being able to make a margin from their more efficient balance sheets.
- **Greater tailoring of reinsurance to Solvency 2 creates opportunities.** Solvency 2 is likely to create significantly greater volatility in non-life company balance sheets. Therefore, we expect primary insurers to tailor their reinsurance programmes more closely to managing Solvency 2

Exhibit 96

Our estimate of Fantasy Re's premium and reserve risk capital requirements under rating agency and QIS5 models



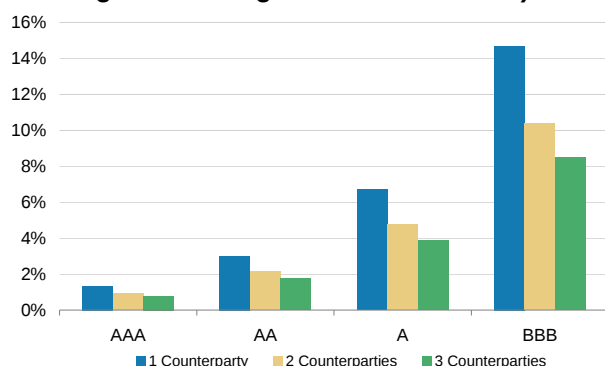
Source: Morgan Stanley Research, Oliver Wyman

exposures, which could lead to increased opportunities for reinsurers – for example, primary insurers taking specialist non-proportional cover to reduce tail risks (e.g. very high layer, 'out-of-the-money' stop loss policies). Other opportunities include portfolio transfers of back books to reinsurers and surplus relief (quota share) reinsurance. We also expect life insurers to consider greater use of reinsurance to reduce tail risks in life underwriting, for example longevity risk in annuity policies and surplus relief policies.

- **The rules benefit more strongly capitalised reinsurers.** Primary insurers will be sensitive to the 'counterparty risk' capital requirements of their reinsurers. These are substantially lower for better rated reinsurers (again strengthening the role of rating agencies in setting non-life capital requirements). As Exhibit 97 illustrates, the counterparty risk capital requirement for an 'A' rated reinsurer is over two times greater than that for a 'AA' rated reinsurer. This is a further competitive advantage for the larger global diversified reinsurers that are able to maintain relatively strong financial strength ratings post Solvency 2.

Exhibit 97

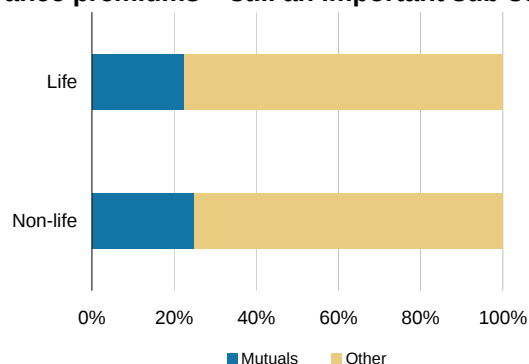
Counterparty risk capital charges under QIS5 by rating of reinsurer and number of counterparties (assuming same loss given default of each)



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 98

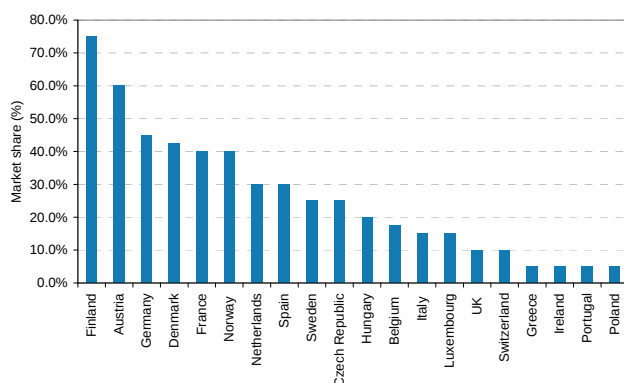
Mutuals account for ~20-25% of European insurance premiums – still an important sub-sector



Published 2010, based on 2008 data; Source: Association of Mutual Insurers and insurance Co-operatives in Europe, Morgan Stanley Research, Oliver Wyman

Exhibit 99

Market share of mutual and co-operative insurers by country



Published 2010, based on 2008 data; Source: Association of Mutual Insurers and insurance Co-operatives in Europe, Morgan Stanley Research, Oliver Wyman

We estimate that Solvency 2 could increase demand for reinsurance in Europe by 10-20%. We would expect the bulk of this demand to come from smaller non-life primary insurers with limited geographical or business line diversification and inadequate resources to create more sophisticated internal models.

However, better capitalised, or 'Solvency 2 ready', primary non-life insurers are also likely to review their reinsurance arrangements, given the potential for greater volatility in their balance sheets. For example, in our company analysis Accidental P&C suffers from a sharp fall in capital buffer under Solvency 2 and may decide to protect this through increasing its reinsurance cover.

In particular, we think Solvency 2 may put pressure on mutual insurers, many of which may have been able to benefit from the low capital requirements of Solvency 1, or have been less dependent on rating agency models.

As Exhibit 98 indicates, mutuals remain important in many European markets – accounting for around 20-25% of business in both life and non-life.

Our estimate of potential incremental reinsurance demand assumes a 50-60% increase in ceded premiums from smaller companies and mutuals and a 5-7% increase from other proprietary non-life insurers.

We are uncertain about the impact of increased volumes on reinsurance pricing, since we estimate this increased demand could be met by existing capacity from existing surplus capital in the reinsurance industry.

We estimate that a 10-20% increase in reinsurance premiums in Europe will require Solvency 2 capital that is approximately 15-25% of the existing surplus capital of the global reinsurance industry. This could soak up some capacity and help pricing, but might not create sufficient capital pressures for a sharp increase in reinsurance prices.

There will be some barriers to entry in the opportunity to benefit from increased demand. For example, Solvency 2 benefits better capitalised, larger and globally diversified reinsurers.

However, if prices react too sharply, we would expect some greater inflow of capital into reinsurance. In particular, a strong improvement in pricing may create better conditions

for growth in the ILS market, allowing in capital external to the reinsurance industry.

One potential stumbling block is the complexity of modeling the benefit of non-proportional reinsurance.

The catastrophe risk capital calculations can take into account non-proportional reinsurance in a relatively satisfactory way by allowing them to model their specific loss exposures in quite a granular way. This allows primary insurers to recognise a capital benefit for this protection in estimating catastrophe risk capital. However, the modeling of non-proportional reinsurance in calculating premium and reserving risks is perhaps more problematic (e.g. through the use of gross-to-net combined ratio factors in premium risk) and may not accurately reflect the level of risk reduction from non-proportional reinsurance that may be better reflected in a more detailed internal model.

There is always a risk that this deters primary insurers from investing in upgrading or increasing their non-proportional covers. However, it is likely, in our view, that the European Commission and CEIOPS will give further guidance on this issue during and after the QIS5 process. It is therefore possible that some of the inadequacies of dealing with non-proportional risk mitigation will be ironed out by the time Solvency 2 comes into force.

In conclusion, we clearly see a growth opportunity for diversified 'internal model' capable reinsurers; however, the impact on pricing from Solvency 2 remains uncertain.

There may be greater demand for Insurance Linked Securities, but not in the short term

Primary companies using ILS to securitise their risks may be better able to take into account the risk-mitigating properties of these vehicles than under Solvency 1. However, regulatory approval may be required to gain a capital benefit from the SPVs used. We think there are many reasons why the ILS market may not grow straight away, including the relative immaturity of the ILS market, its complexity and other factors, such as basis risk.

Therefore, in the early years of Solvency 2, we expect primary insurers to seek more conventional reinsurance. This reduces the immediate risk of disintermediation of the reinsurance industry or increased capacity entering the reinsurance markets from alternative providers of capital.

This may benefit reinsurance pricing to some extent by limiting the capital capacity from ILS. However, we see this

as a long-term growth area that reinsurers may actually benefit from rather than be threatened by.

We expect reinsurers to be key players in ILS, through 'warehousing' diversified pools of risks and issuing securities based off these. The non-correlated nature of a diversified book of non-life insurance risks could be a key attraction supporting the ILS market in the longer term.

Less upside for life reinsurance?

Solvency 2 may not be as positive for life reinsurance as the non-life reinsurance market. It is easier to gain diversification benefit within mortality books, and under Solvency 2 the total resource requirements for mortality / morbidity protection business falls substantially.

Primary protection writers are able to benefit from a significant capitalisation of VIF under Solvency 2, and a reduction in capital requirements. This potentially lessens the need for protection reinsurance.

More generally, if companies receive credit for VIF in their Solvency 2 calculations, there will be less demand for VIF securitisations or associated 'financial life reinsurance'. Where primary companies need protection against market risks, they are more likely to seek more conventional capital market hedging solutions, which will now receive a more 'economic' regulatory capital treatment, than turning to life reinsurers.

One area of opportunity is a potential demand for longevity risk protection in annuity portfolios. As discussed above, with the introduction of a 100% liquidity premium for UK-style payout annuity (or bulk annuity) products, a key driver of capital risk in such products is now longevity risk. In the absence of a significant capital markets solution for hedging longevity risk, life reinsurers may increasingly write longevity protection contracts.

Implications for Asset-Liability Management

Closer ALM and changes in asset allocation

Solvency 2 implies a step change in the way market risks are assessed for solvency purposes. Under Solvency 1, solvency capital requirements were based on fixed factors that did not reflect the asset liability mismatch and market risk taken. The bottom-up, risk-based calculation of the Solvency Capital Requirement under Solvency 2 reflects both asset liability duration mismatches and the market risk of different investment classes.

We expect insurers to respond to this significant change in the calculation of Solvency Capital Requirements in two ways:

1. **We expect closer asset-liability matching – or at least a greater emphasis on monitoring this.** Insurers will adjust their interest rate position and start managing their assets relative to the Solvency 2 liability profile. Up until now, asset duration was managed relative to Solvency 1 liabilities; with the movement to Solvency 2 and the corresponding change in technical provisions, an adjustment is necessary. This will be done by adjusting the duration of bonds and by entering fixed income derivatives positions. While we expect insurers to

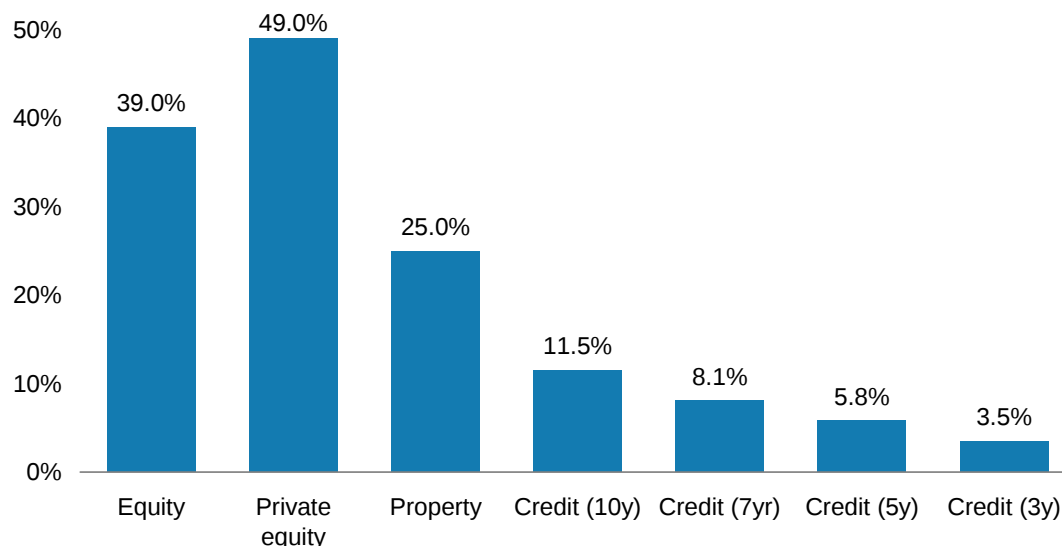
consciously maintain some interest rate risk positions as part of their investment strategy, we expect that the solvency capital requirement for our sample companies will be approximately halved by this ALM adjustment. Given the volatility of the Solvency 2 balance sheet, insurers will also have to monitor their asset liability mismatch position much more actively. Over time, we expect to see larger and more sophisticated ALM functions in insurance companies and a more frequent adjustment of the ALM position via more frequent trading in interest rate and other derivatives.

2. **Capital requirements will create an ‘unlevel’ playing field in the risk-reward between different asset classes.** Insurers will adjust the asset allocation of their investment portfolios to reflect the new capital requirements and to optimise return on capital in the new world.

Exhibit 100 below shows the standalone (i.e. before diversification) capital requirements for different market risk types. These reflect the volatility in assets' market prices. Long-dated credit attracts a higher capital charge for spread risk than short-dated credit, as the effect of increasing spreads is bigger due to higher duration.

Exhibit 100

Standalone standard solvency capital requirement by asset class



Equity and private equity capital charges reflect long-term capital requirements (i.e. without equity dampener). For credit, calculations are based on the model portfolio specified in QIS5 draft specifications (2.0% AAA, 20.7% AA, 47.9% A, 29.3% BBB), assume that all assets are invested in this model portfolio and focus on credit spread capital. Interest rate risk / asset liability duration mismatch capital requirements are not considered.
Source: Morgan Stanley Research, Oliver Wyman

When making investment decisions, insurers will focus on optimising return on solvency capital.

We have analysed the expected return on solvency capital by selected asset classes for general account liabilities (in euros).

The results of this analysis are shown in Exhibit 101. We assume:

- **the cash flow profile of the liabilities is matched using swaps and other interest rate derivatives**, i.e. there is no SCR due to interest rate risk;
- **an equity risk premium of ~4% over government bonds**, and risk premiums of ~5% and ~3% for private equity and property, respectively;
- **standalone required solvency capital (i.e. no allowance for diversification)** and capital is assumed to earn a risk-free rate of 2.5%;
- **credit reflects the 'model credit portfolio' that was included in QIS5 draft specifications** (2% AAA, 21% AA, 48% A, 29% BBB); and
- **excess returns are in excess of the liability discount rate**, i.e. swap rates plus 50% of the liquidity premium prescribed by QIS5.

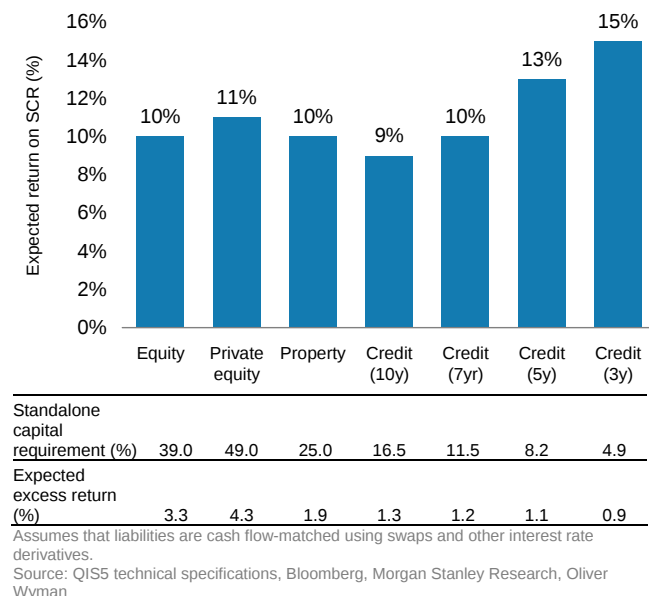
This analysis shows that there can be significant differences in expected return on the Solvency Capital Requirement between asset classes.

While the expected return on SCR for assets backing general account liabilities are similar for equity, private equity and property, significant differences can be observed for credit investments of different durations. For example, three-year credit has approximately three times the expected theoretical return of 10-year credit. **This is due to the higher capital requirement for credit spread risk for longer credit investments in a mark-to-market world.**

Given a zero capital requirement for EEA government bonds and swaps, we expect insurers to invest significantly in these asset classes to help manage their asset-liability duration risks. Interest rate risks can also be managed through swaption programmes, where insurers choose to hold physical assets that are too short in duration, such as shorter-dated credit or equities.

Exhibit 101

Risk-adjusted return on capital from different asset classes under Solvency 2



What is the optimal investment portfolio?

We have analysed the optimal investment portfolio, given the expected return on capital illustrated above and the correlation structure prescribed in the standard formula.

Companies' individual preferences for taking risk in their investment strategy will vary with their level of surplus capital under Solvency 2, and the level of capital they wish to allocate towards market risk (i.e. the 'risk budget' for investment strategy).

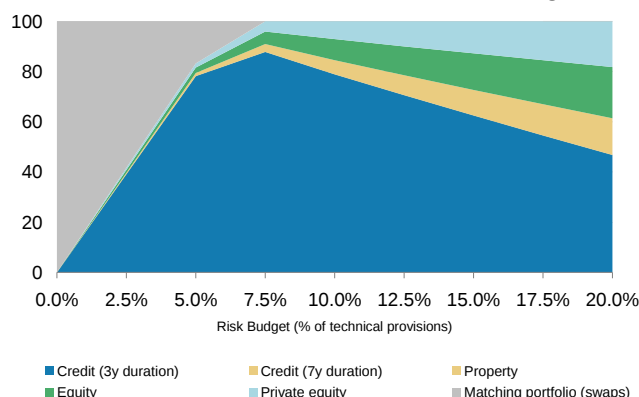
Given the high expected returns on SCR for short-dated credit investment, it is not surprising that the optimal portfolio for general account liabilities shown in Exhibit 102 is dominated by short-dated credit investments. Again, this analysis assumes that liabilities are always cash flow matched using swaps and other interest rate liabilities, no matter what the duration of the physical asset portfolio is.

The analysis suggests that up to a market risk SCR budget of 5% of technical provisions, the optimal investment portfolio consists almost exclusively of short credit investments and risk-free assets.

Only where insurers' risk appetite for market risk SCR exceeds 5% of technical provisions, do equity and property have a significant weight in the optimal asset portfolio.

Exhibit 102

Optimal investment portfolio for general account liabilities, and how this varies with risk budget



Source: Morgan Stanley Research, Oliver Wyman

Government bonds vs. swaps

Historically, swap yields tend to be higher than government bond yields reflecting their greater expected credit risk. Given swaps now form the basis for discounting and valuing liabilities, we would expect insurers to have a preference for swaps over government bonds where there is sufficient liquidity and a significant 'spread' of swap yields over government bond yields.

However, this is not currently the case in many European markets, with government bonds yielding more than swaps – for example, in the UK, France, Italy and Spain. We show some yield curves in Exhibit 103-108. At the long end of the yield curve there is a substantial potential pick-up in yield by investing in government bonds rather than swaps in Italy and Spain, in particular (currently this could be 100-200bps).

In such markets, we would expect strong insurer demand for government bonds to match their liabilities, while being cogniscent of sovereign risk.

What are the likely asset allocation trends?

In summary, we expect the following changes to insurers' asset allocation:

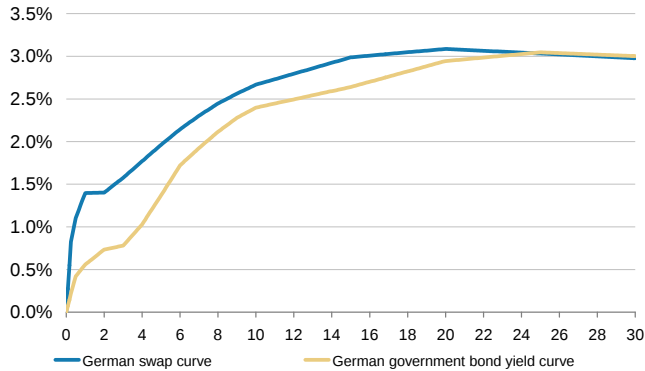
- **Shift towards short-dated credit investments and a 'divorce' of the duration of the physical investment portfolio and liability duration.** Due to the attractive return on SCR of short-dated credit,

we expect short-term corporate bonds (~3 years) to become the risky asset class of choice for many insurers. Swaps and other interest rate derivatives will be used to match liability durations – although, as we point out above, in some markets government bonds may be a more attractive asset class.

- **Maintaining low allocations to equity and property.** We expect a lower appetite for these asset classes due to their less attractive returns on capital; however, companies may still hold such assets tactically together with derivatives to help maximise portfolio returns. We believe insurers will gain exposure to equity markets mainly through their asset management functions and through unit-linked funds in unit-linked life policies, de-emphasising direct equity exposure through the 'general account'.
- **Greater use of derivatives for risk management.** Through derivatives, insurers can protect their portfolio from market tail risks and therefore reduce capital requirements. We would expect a pick-up in the use of equity derivatives to help manage on-balance sheet equity risk (although we have seen a trend towards this already in recent years). In addition, we expect a marked increase in the use of swaptions to help manage interest rate and duration mismatch risk – particularly if companies move to shorter duration credit investments.
- **Taking tactical risks where risk budgets allow.** We expect insurers to move to a more closely matched position under Solvency 2, to protect themselves from volatility of capital. In situations where insurers can take more risk (e.g. where Solvency 2 capital buffers are large), they are clearly able to take tactical investment risks to maximise returns. This may come through increasing equity investment or moving into longer-dated credits. However, we believe this is also an opportunity for insurers to make greater use of derivatives as a more efficient way of taking risk. For example, a strategy may include buying equities to increase expected returns at the same time as buying out-of-the-money downside equity derivative protection to limit capital required.

Exhibit 103

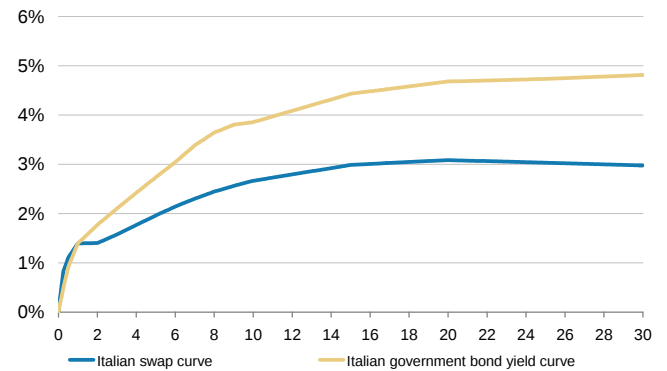
German swaps vs. government bond yield curve



Source: Bloomberg, Morgan Stanley Research, Oliver Wyman

Exhibit 106

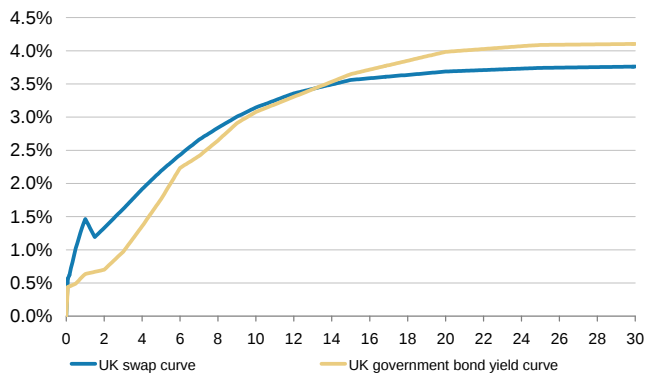
Italian swaps vs. government bond yield curve



Source: Bloomberg, Morgan Stanley Research, Oliver Wyman

Exhibit 104

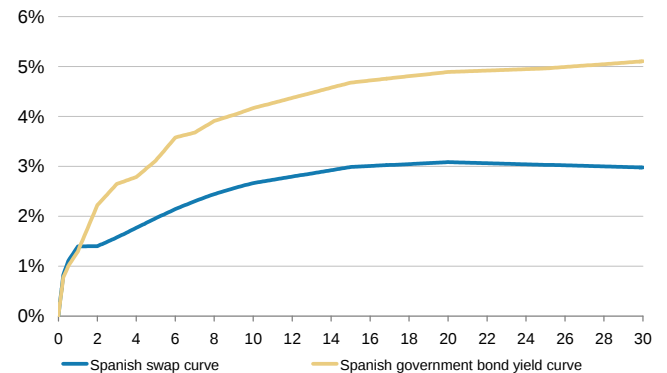
UK swaps vs. government bond yield curve



Source: Bloomberg, Morgan Stanley Research, Oliver Wyman

Exhibit 107

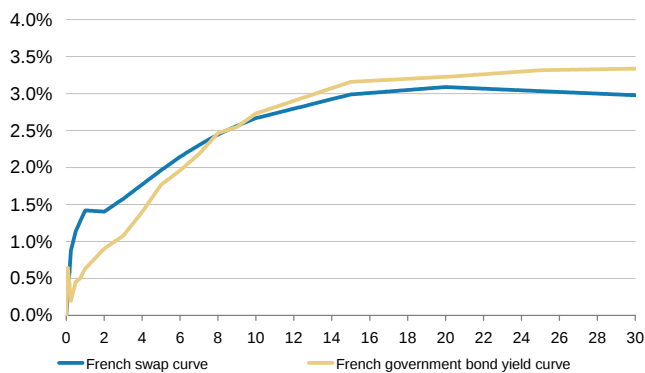
Spanish swaps vs. government bond yield curve



Source: Bloomberg, Morgan Stanley Research, Oliver Wyman

Exhibit 105

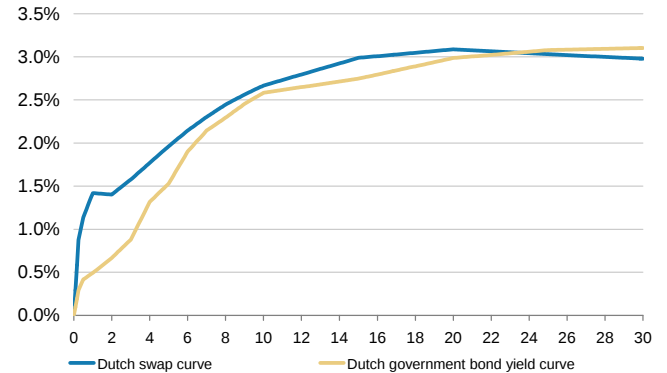
French swaps vs. government bond yield curve



Source: Bloomberg, Morgan Stanley Research, Oliver Wyman

Exhibit 108

Dutch swaps vs. government bond yield curve



Source: Bloomberg, Morgan Stanley Research, Oliver Wyman

Internal Models – Adoption Likely by All the Major Players

The use of internal models under Solvency 2 is a fundamental change in approach versus the previous regulatory regime for insurers in Europe, and indeed worldwide.

Although our detailed financial modeling underpinning this report focuses on the standard formula with QIS5 parameters, in practice we believe that the majority of the listed insurers will seek permission to use an internal model. However, participation in QIS5 is likely to be a requirement for any insurer wanting to use an internal model – not least because it is very important for both the insurer and the regulator to fully understand the differences versus the standard formula.

Why use an internal model?

An internal model gives an insurer a bespoke view of the risk profile of its business and ultimately leads to a more appropriate – and crucially in most cases lower – capital requirement.

The standard formula is necessarily a ‘one-size-fits-all’ solution and, although in practice it is actually very complex, it does not deal well with the all nuances seen in insurance.

One of the reasons for this is that the standard formula is calibrated on ‘average’ data across the entire European industry, which may not reflect the particular characteristics of an individual insurer’s business.

We think that adjustments to the standard formula will be particularly necessary for non-life insurers as it does not deal well with catastrophe risk or the specific nature of individual insurers’ portfolios (this will be true particularly for those with specialist or niche business lines). In our view, it will be difficult to argue for lower capital charges for ‘macro’ risks such as equity exposure, and easier to argue for on ‘underwriting’ style risks (although this must be supported by high-quality, relevant and back-tested data).

It will be possible for insurers to use partial internal models. Partial internal models might make sense where the standard model works well for the majority of the business, but where a specific portfolio would create an issue. In these circumstances, the insurer would be allowed to submit an internal model for that particular portfolio and use the standardised approach for the rest of the business.

Non-life insurers can apply to use company-specific factors instead of the standard factors for non-life risks.

Under QIS5, insurers will be able to assume company-specific factors instead of the standard model. Under Solvency 2, such parameters will only be allowed after regulatory approval, but for the purposes of QIS5 companies can assume they have received such approval. Company-specific factors may be appropriate for insurers not wanting to go down the route of a more detailed internal model.

However, calculating company specific parameters is not a straightforward exercise. Companies have to use a variety of statistical methods to estimate the parameters and justify the method they have used. The credibility of the data and the parameters is also crucial. The calculation methodology overall could prove to be quite complex. It is likely that when Solvency 2 comes into force, regulators will scrutinise insurers’ methods in choosing company-specific factors quite carefully – particularly where there is a significant discrepancy against the standard factors.

The requirements of an internal model

CEIOPS has prescribed in detail the requirements of an internal model under Solvency 2 – see Exhibit 109.

The ‘use test’ is of fundamental importance to the regulators – i.e. does the management team of the insurer actually rely on the model to inform decisions?

In addition, there are strict requirements around the quality of the data (must be statistically relevant). The model must also be calibrated appropriately. Internal models should also be well documented, with this documentation updated when any changes are made.

What about the approval process?

Approving and assessing internal models creates significant challenges for regulators – both in terms of resourcing (particularly difficult when appropriately skilled actuarial and technical staff are in short supply) and the inherent complexity of insurers’ businesses.

Maintaining consistency of approach is also a major challenge for the regulators – one of the major policy goals of Solvency 2 is to have a level playing field across Europe.

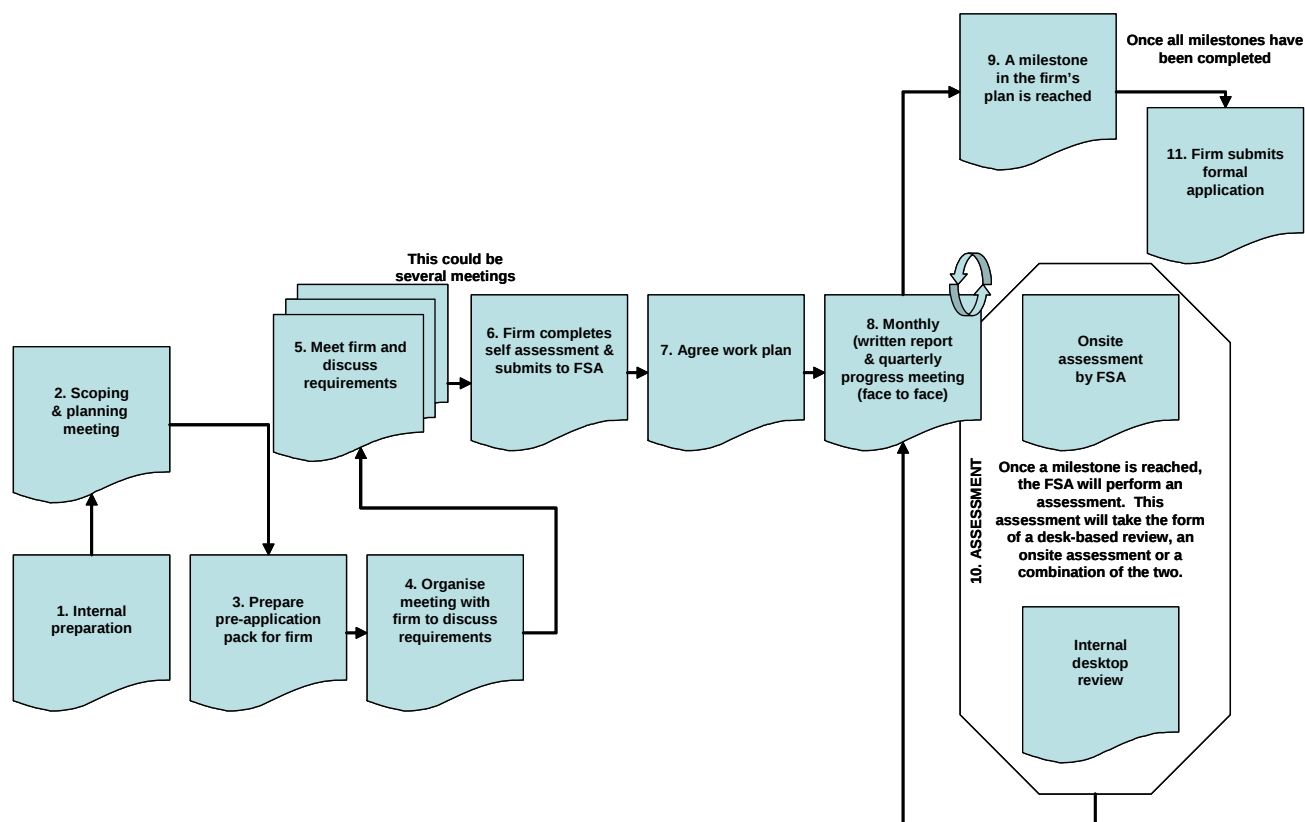
Exhibit 109

The requirements of an internal model – the ‘use’ test is paramount for the approval by regulators

Model requirements	Description
1 Use test	- The internal model must form an integral part of the company's system of governance, in particular the – Risk-management system and decision-making process and – Economic and solvency capital assessment and allocation processes
2 Statistical quality standards	- The model should be based on adequate actuarial and statistical techniques consistent with methods used to calculate technical provisions - The model should cover all material risks the company is exposed to
3 Calibration standards	- The model must be calibrated to give results that are equivalent to the level of protection required by the SCR (99.5% VaR, one-year time horizon) – Authorities may require model to be run using external data and benchmark portfolios to verify calibration
4 Validation standards	- The company must regularly monitor the performance of the model and review the on-going appropriateness of the specification of the model - This should include an effective statistical process to demonstrate that capital requirements are appropriate, an analysis of the stability and sensitivity of results and an assessment of the data used by the model
5 Profit and loss attribution	- Analysis of profit and loss by cause/source for each major business, at least annually - Demonstrate how categorisation of risk chosen explains the causes/source of P&L
6 Documentation standards	The design and operational details of the model must be documented, including the theory, assumptions and mathematical and empirical basis underlying the internal model
7 External models and data	- The use of a model or data from a third-party is as acceptable as in-house development; however, this does not exempt firms from complying with the internal models requirement - Will be a key area of interest for supervisors, especially with regard to appropriateness to insurers' business, transparency of models, correlation with other risks and associated sensitivity and scenario testing

Source: Morgan Stanley Research, Oliver Wyman

Exhibit 110

FSA process chart for internal model approval – the pre-application process commenced in April 2010

Source: FSA ("Solvency II – IMAP Update, Pre-application process" – April 2010), Morgan Stanley Research, Oliver Wyman

In addition, large geographically diversified groups may have to deal with more than one regulator, although the Solvency 2 process is meant to operate through a 'college' of associated regulators for any one company.

The majority of European national regulators have set very clear timelines for those insurers seeking to gain internal model approval – with, for example, participation in QIS5 usually compulsory. While the UK FSA has said that it expects around 100 firms to apply for use of an internal model – and has the capacity to approve these (provided they apply in time) – other national regulators are likely to severely restrict the number of eligible companies. The German regulator (Bafin) is running a very intensive on-site assessment with a selected number of insurance groups and is unlikely to repeat this for a larger portion of the many companies in this market before the implementation of Solvency 2.

In all member states, gaining approval for an internal model is likely to be an involved process – with Exhibit 110 showing the process published by the FSA.

What if the internal model is not approved?

Currently, we believe that very few European insurers have internal models operating to the required standard for Solvency 2. Given the very tight timetable for the implementation, there is a real risk that insurers do not have approval from day one and have to use the standard formula.

Although it might only be a temporary issue, not receiving approval would be a competitive disadvantage in terms of having to hold more capital than peers.

Furthermore, we note that some regulators (the FSA, for example) have said that they intend to publicise when an insurer *receives* internal model approval. However, there may be some stigma attached to insurers that do not receive early internal model approval.

How Insurers Might Adapt Their Corporate Structures

Two seemingly contradicting aspects drive the impact of Solvency 2 on corporate structures:

- **Each legal entity in an insurance group needs to hold adequate statutory capital (i.e. the SCR) and cannot benefit from diversification with other group businesses as there is no provision in QIS5 for 'Group support'** (i.e. where a local unit holds less than the SCR and relies on the corporate centre for the balance). 'Group support' was originally proposed, but failed to get sufficient political support given the desire of local regulators to see capital retained in legal entities during the financial crisis. It has been put on hold at least until 2015, when this decision is scheduled to be reviewed; **but**
- **In the calculation of the Group Solvency Capital Requirement, diversification benefits between legal entities can be considered**, even in the standard formula.

These regulations will inevitably lead to situations where the Group Solvency Capital Requirement is lower than the sum of local Solvency Capital Requirements and hence the sum of own funds that needs to be held in the local entities

exceeds the amount of own funds that is required in the Group, as illustrated in Exhibit 111.

This likely situation of local entity capital requirements exceeding group capital requirements should be seen in the context of increasing capital scarcity.

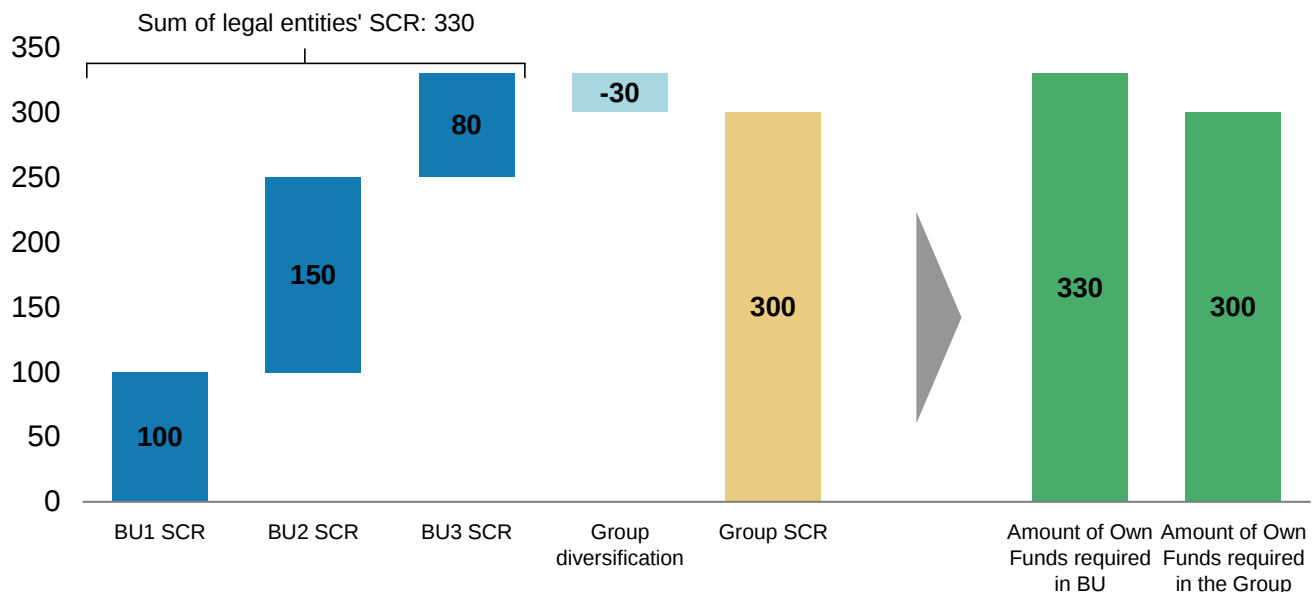
Under Solvency 2, the binding constraint that determines the actual level of capital held in a European insurance entity is much more likely to be the regulatory solvency requirement; whereas in the past, it was usually a company's own risk appetite or rating requirements that determined that level.

Therefore, in many instances a well capitalised group will need to increase capital in some of its subsidiaries as a result of Solvency 2 capital requirements.

The extent to which this is true will depend on the level of new requirements relative to existing capital policy. A further consideration is that most large insurers will most likely be using internal models, so the amount of capital required locally will probably be lower than the SCR. Whether this will cause problems for companies will depend in part on their flexibility to downstream more capital and fungibility considerations (which we discuss later).

Exhibit 111

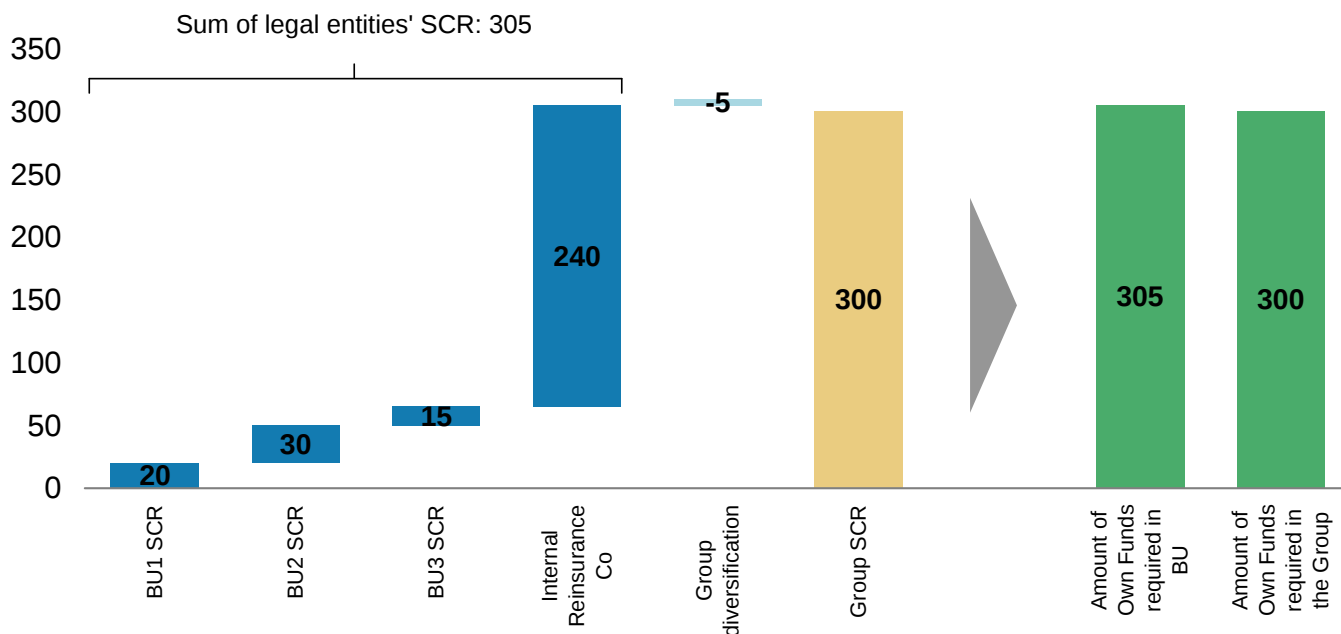
The QIS5 rules will inevitably lead to situations where the Group Solvency Capital Requirement is lower than the sum of the local SCRs – we think this will drive structures to maximise diversification benefits



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 112

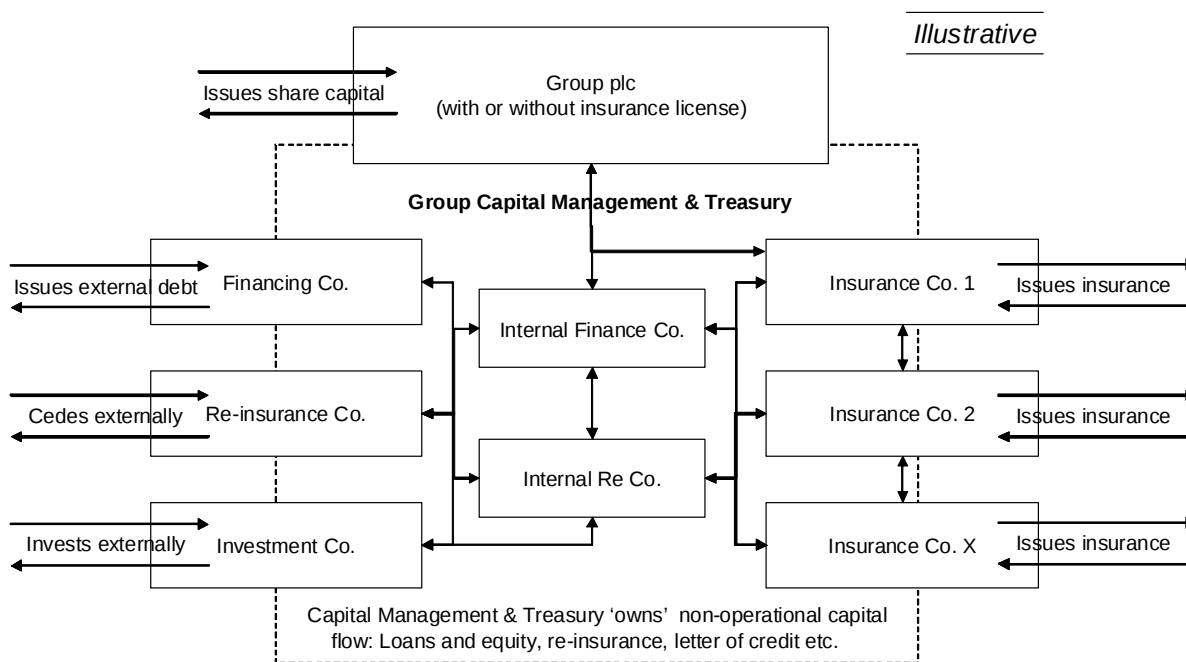
Internal reinsurance is one approach to achieve an optimal group structure under Solvency 2



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 113

Consolidation of subsidiaries into one legal entity could be a further approach to harvest diversification



Source: Morgan Stanley Research, Oliver Wyman

Given this context, insurers will seek to capitalise the diversification benefit they get at Group level and aim to optimise their capital structure such that there is no difference between the sum of legal entity SCR and Group SCR. They will adjust their corporate and capital structures such that they can use the Group diversification benefit even without Group support.

There are three major levers for achieving this:

- **internal reinsurance**
- **consolidation of subsidiaries into one legal entity**
- **introduction of leverage into the Group's capital structure.**

We discuss each in turn.

1) Use of internal reinsurance

Internal reinsurance is an instrument to transfer all risks onto one balance sheet – the one of the internal reinsurance company – and hence capture the Group diversification benefit within one legal entity.

Exhibit 112 demonstrates the mechanics: the SCR in the local entities decreases, and the SCR of the reinsurance company is lower than the sum of the local entities' SCR for the ceded risk, as the reinsurance company makes use of the diversification benefits between these risks. It should be noted, however, that some risk and hence some SCR will remain in the local entities (in particular counterparty default and operational risk) and due to this remaining fragmentation of SCRs, the Group SCR is still somewhat lower than the sum of the local entities' SCRs.

2) Consolidation onto a single balance sheet

Consolidation of subsidiaries into one legal entity with local branches is an obvious step to capture the full diversification benefits. If all the business units in Exhibit 113 sat on the same balance sheet, their Solvency Capital Requirement would be 300 as they could make use of the diversification benefit of 30 within one legal entity.

This consolidation process will be facilitated by the fact that it has become possible to sell insurance from one legal entity into EU markets (EU plus Norway and Liechtenstein) as well as by the European SE company structure. Nevertheless,

there are significant strategic, managerial and operational challenges in doing so.

Some groups still have several insurance carriers in single markets (e.g., to support different brands or distribution channels). Such structures are very inefficient from a capital perspective, and are likely to disappear altogether.

Consolidation of insurance carriers across European markets is more complicated, but very likely to happen, as demonstrated by the examples of Zurich Financial Services, which has consolidated all its EU general insurance business in Ireland, and Allianz, which has set up a European SE company.

Running a European business from a single balance sheet works best for non-life – as the contracts are typically one year in duration and upon renewal can be issued by a different legal entity. Product structures also tend to be more homogenous between member states.

However, for life insurance back books, contracts are longer term (often 20-30 years) with more complex (and locally tailored) structures that make centralisation prohibitively difficult. Unit-linked 'new' business could make sense to centralise in a European hub, as the product is much simpler.

3) Internal leverage as a mechanism

Finally, the Group could introduce leverage in its capital structure. By funding equity investments into the local entities by non-tier capital, the Group essentially creates tier 1 capital at local entity level without having to raise expensive 'tier' capital at Group level.

In our example, the Group could make use of the diversification benefit of 30 by investing 30 of non-tier capital into the local entities' equity. As a result an extra 30 of tier 1 capital would be created at local entity level, as illustrated in Exhibit 114.

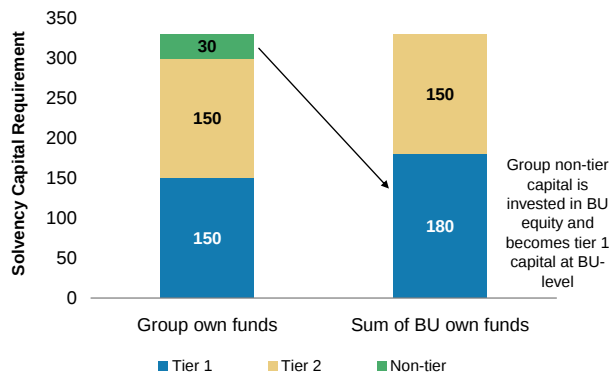
Fungibility of capital

There is increasing focus from the investment community on the ability of insurers to generate cash flow – and a growing awareness of the inherent complexities of group structures.

The fungibility of capital is an important consideration under Solvency 2, as only transferrable (i.e. fungible) capital in excess of a local SCR can be taken into consideration at the group level.

Exhibit 114

Use of leverage is another mechanism for insurers to harvest the benefits of diversification



Source: Morgan Stanley Research, Oliver Wyman

In order to qualify as fungible under QIS5, funds need to be available and transferable within a maximum of nine months.

We explain some of the issues in detail in Exhibit 115.

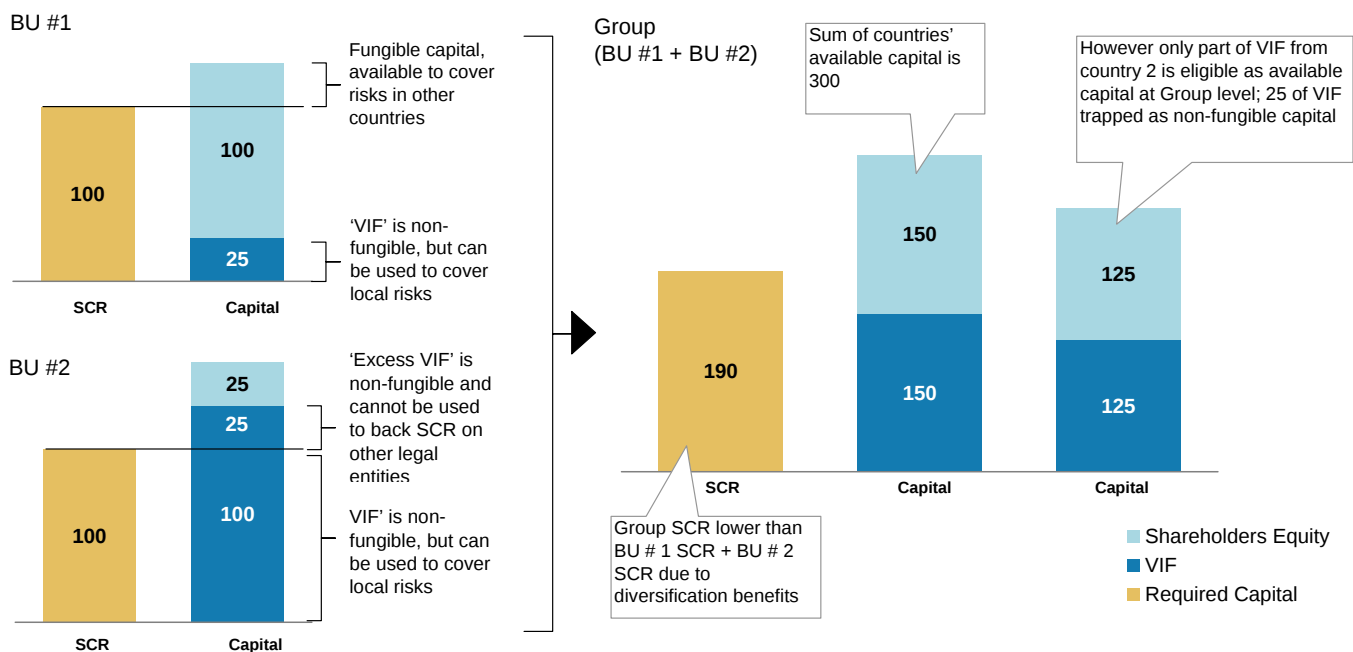
Organisational changes likely

To manage capital optimisation via reinsurance, leverage and other instruments, we expect more insurers to set up Group Balance Sheet and Capital Management functions.

In complex groups, a separate organisational unit is already in place, taking responsibility for organising these internal capital flows, based on account statutory solvency requirements, rating agency perspectives, and other considerations such as taxes.

Exhibit 115

Capital fungibility constraints also need to be captured in the measurement of group available capital



- Only certain parts of own funds are considered fungible and can be fully included in Group own funds
- If VIF > SCR, excess of VIF over SCR cannot be used outside of the relevant legal entity and is "trapped", i.e. not available as Group own funds
- Some transactions (such as branch structure) allow working around fungibility and transferability constraints to a certain extent

Source: Morgan Stanley Research, Oliver Wyman

Equivalence / international operations

Insurers will also need to take into consideration the impact of non-European subsidiaries or parents. Under Solvency 2, the group capital requirement can have the effect that European groups are forced to hold Solvency 2 capital for non-European business if this is higher than the local standards. This will be the case where jurisdictions are not deemed to be 'equivalent' to Solvency 2.

In relation to business outside the EU, there are several situations to consider.

- **Some groups such as MetLife are based in a non-equivalent state (as the US is likely to be), and have business in Europe.** They need to make sure that Solvency 2 only applies to their European legal entities and not the group.
- **In other cases, such as AEGON, Munich Re etc., the group is based in Europe but has substantial business in a non-equivalent state.** For these companies, in effect the higher capital requirement of Solvency 2 group regulation and the regulation of local entities in the non-equivalent state applies. It could therefore lead to a competitive disadvantage for European groups in those markets. As a consequence, companies will need to consider whether they want to divest activities in non-equivalent markets.

- **We don't expect European insurers with US subsidiaries to consider exiting the US in the near term.** However, if the debate on US equivalence lingers with no resolution in the medium term, it is possible some companies will reconsider this. We view US life insurance subsidiaries as most exposed to an 'unlevel' playing field if the US is not declared an equivalent regime.
- **Finally, reinsurers – and others with insurance business that can be operated in the EU from third countries (such as large-risk P&C) –** could consider whether domiciles in equivalent states such as Bermuda or Switzerland could be more attractive than the EU. That depends on the regulatory as well as the operating environment.

On balance, in the short term we expect limited impact on group structures of mainstream companies, but a significant increase in intra-group capital optimisation via reinsurance and levered capital structures.

Appendix: A Guide to Solvency 2

What is the genesis of Solvency 2 and its timeline?

Insurance regulators have acknowledged for a while that insurance solvency rules need to be reformed. In the 1990s and early 2000s, there were a number of initiatives to reform the regulatory capital requirements of EU insurers through a series of Insurance Directives. These aimed to harmonise the often disparate capital rules in different countries. This led to the current framework we know as Solvency 1. However, companies and regulators have felt for a while that a more fundamental overhaul of solvency regulation is necessary to improve consistency and achieve a better correlation of capital requirements to economic risk – in a manner similar to the Basel 2 capital project for the banks.

This gave birth to the Solvency 2 project. In 2004, the European Commission (EC) started a consultation process with the committee of European regulators, CEIOPS (Committee of European Insurance and Occupational Pensions Supervisors) to start to design Solvency 2.

Solvency 2 is now at an advanced stage, with the underlying framework formally agreed. We show a timeline of key events in Exhibit 116, but the broad framework, the 'Level 1 Framework Directive', was agreed by the European Parliament on April 22, 2009. This means that the key elements and methodology for calculating the regulatory balance sheet (assets, technical provisions or insurance liabilities and capital requirements) are now set in stone.

There remain a number of steps to complete, most importantly the final calibration of the capital tests. CEIOPS has acted as the key body running the Solvency 2 project, issuing consultation papers on the shape of Solvency 2 and running a number of Quantitative Impact Studies (QIS) with the industry. CEIOPS is responsible for issuing the final advice to the EC after consultation with the industry. The next steps are as follows:

- **A fifth Quantitative Impact Study (QIS5).** CEIOPS has coordinated four quantitative impact studies involving insurers submitting test capital models on a voluntary basis. Each successive QIS has introduced greater detail, new calibration of the tests and involved a wider array of participants. These tests have been used to quantify the impact of proposed rules on the industry and help fine tune the capital test. The calibration of QIS5, the latest test, forms the basis for this report.

Together with CEIOPS, after significant consultation with the industry, the EC issued final technical specifications for the study in July 2010. The testing process is currently taking place, and companies are expected to submit their results to CEIOPS in October / November 2010. We expect the results to be published in April 2011. ***QIS5 will help establish the final calibration of the solvency test.***

- **Further quantitative studies could be possible.** If the results of QIS5 throw up a large number of problems or additional industry debate, it is possible that the industry carries out further quantitative studies. However, we believe the timeline is quite tight for implementation.
- **Finalising Solvency 2 by 2012.** In the Level 1 Framework Directive, the EC committed to finalising the rules of Solvency 2 by October 2011, and applying Solvency 2 from October 2012. A set of 'Level 3' guidelines will be issued in late 2011. This implies that companies may be required to report Solvency 2 from the end 2012 balance sheet.

What is the basic structure of Solvency 2?

Solvency 2 will apply to EU insurance companies and is a risk-based, economic measure of capital requirements. Rather than the current system of flat percentage capital requirements, Solvency 2 will employ an array of detailed insurance and market risk stress tests to determine how much capital insurance companies will need to hold. Therefore, capital requirements may vary widely depending on the degree of risk taken by different companies.

Solvency 2 will overhaul insurance company balance sheets, according to fair-value principles. Insurers will use the market value of assets, but will also calculate an estimated 'fair value' of liabilities. This dramatically changes the current approach in many European jurisdictions, where liabilities are 'fixed' in nature and not marked-to-market. This will have implications for accounting, since the net assets of a company will probably change (and could go up) under Solvency 2. It is likely that the Phase 2 of IFRS accounting for insurers will use similar fair-value principles to Solvency 2 – although there may be other offsets, and international accounting standards are a separate work stream.

Exhibit 116

Solvency 2 Timeline

	1970s	1997 - 2004	2005	2006	2007	2008	2009	2010/11	2012
Former Solvency Regulation	First EU Directives on solvency margins	Solvency I Aim of reviewing old solvency requirements. Implemented in 2004 Solvency II Initiated in 2001 to reform Solvency I							
QIS			QIS 1 Winter 05 published Mar 06	QIS 2 May-Jul 06 published Dec 06	QIS 3 Apr-Jul 07 published Nov 07	QIS 4 Apr-Jul 08 published Nov 08	QIS 5 drafted by CEIOPS Nov 09-Mar 10 and reviewed by EIOPC Apr-May 10 QIS 5 study takes place Aug 10 and findings to be published Apr 11		
Level 1						Adoption by European Parliament in Apr 09 and Council of Ministers in May 09	Publication in EU Official journal Oct - Dec 09		Solvency II compliance Insurance undertakings expected to have implemented new solvency requirements by Oct 2012
Level 2						CEIOPS consultation period Technical provisions, SCR, own funds, MCR, etc Mar 09 – Jan 10 1 st round papers released Mar 09 2 nd round papers released Jul 09 3 rd round papers released Nov 09 - comments by Dec 09	Remaining Final advice by CEIOPS due Jan 10		EC committed to finalising Solvency II by Oct 2011, one year before new rules applied
Level 3								CEIOPS final level 3 guidelines related to level 2 advice expected Dec 11	
Company Actions						Develop Solvency II plan	Detailed specifications	Development & documentation Test & train	Ready for Solvency II

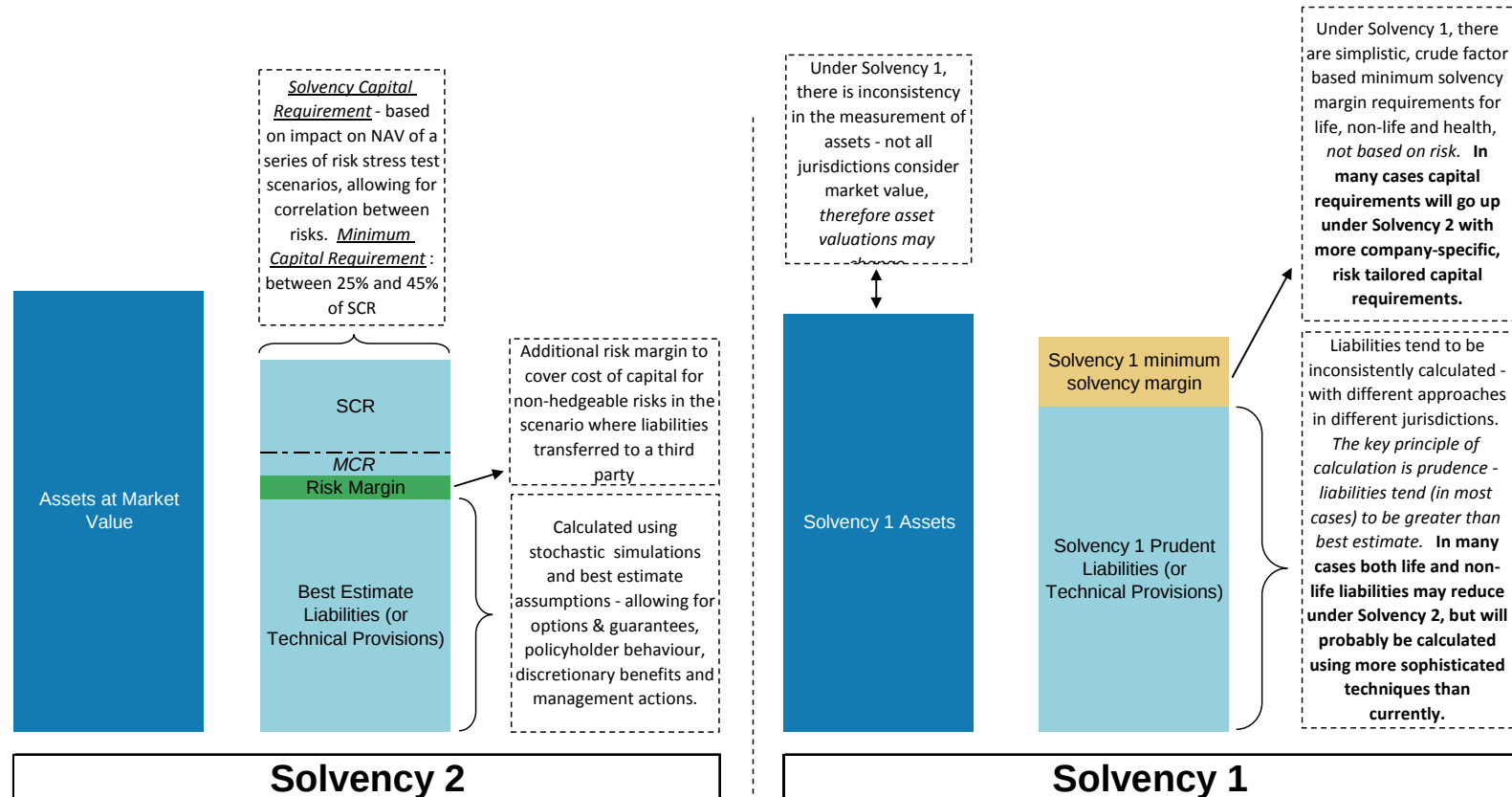
Source: CEIOPS, Morgan Stanley Research, Oliver Wyman

We show the basic structure of Solvency 1 vs. Solvency 2 in Exhibit 117. The key elements are as follows:

- **Balance sheet and capital requirements will be measured consistently** across different European jurisdictions, which is not currently the case. While the broad outline of Solvency 1 is similar across different countries, the valuation of assets, liabilities and the type of eligible capital varies significantly between different companies and countries. For example, some countries allow the use of intangible assets to meet capital requirements. Some countries use the market value of assets, while others use amortised cost. Some have started to measure the time value of options and guarantees in technical provisions and introduce more economic balance sheet measures; others are still in a non-mark-to-market world.
- **Using a market-consistent approach for valuing assets and liabilities.** This also departs from many current regimes. As we have already mentioned, this means measuring all assets at market value. While market value is used in some countries (e.g. in the UK and the Netherlands), others still use amortised cost. Market-consistency also means using a fair-value approach to measure liabilities, i.e. a philosophy that measures the value of liabilities consistently with traded assets that have a similar cash flow.
- **Best estimate liabilities (or 'technical provisions').** This implies that companies should not add implicit margins for prudence in the calculation of liabilities, and cash flows are to be discounted using market-based interest rates. The current proposals require the use of appropriate swap rates *with an allowance for a liquidity premium*. The swap rates and the amount of liquidity premium are stipulated by the QIS5 test. 50% of the liquidity premium may be applied to the calculation of all liabilities, but 75% to with-profit (or participating business), and 100% to business with similar cash flow and contract characteristics to UK-style annuities (where the main actuarial risk is mortality, and clients are unable to lapse the contract with a surrender value).
- **Liability cash flows are based on stochastic simulations**, i.e. using probabilistic, Monte-Carlo type models that capture the optionality and *time value* of guarantees in some life insurance products. These simulations take into account variations in policyholder behaviour in different economic outcomes, the ability to take 'management actions' in adverse scenarios and the payment of discretionary benefits.
- **This differs from the current practice of relatively fixed liabilities with high margins for 'prudence'** under Solvency 1. Although it is not the case everywhere, many countries currently require a high degree of 'prudence' in insurance technical provisions. For life insurance products, this may mean discounting cash flows at rates below current market yields, or making prudent assumptions for mortality or the recoverability of expenses. In non-life insurance the outstanding claims reserves are often not allowed to be discounted to allow for the time-value of money, and may be quite simplistically determined without regard to dynamic modelling techniques or allowing for variability and risk. Therefore, current Solvency 1 technical provisions are likely to be above the best estimate fair value.
- **Adding a 'risk margin' over liabilities for the cost of capital on non-hedgeable risks.** The purpose of this risk margin is to facilitate the potential transfer of technical provisions to a third party on wind-down of the insurance business. Buyers of liabilities will need compensation for the capital they may need to hold against these liabilities to allow for risks they cannot hedge. The 'risk margin' is essentially the cost of capital for these capital requirements.
- **A risk-based 'Solvency Capital Requirement' (SCR) calibrated to 99.5% confidence.** Capital requirements are based on an array of stress tests that are to be calibrated to a 99.5% confidence level over a one-year period. There are standard stress tests for market, underwriting and other non-insurance risks. We provide some of the detail behind these at the end of this Appendix – and how these have changed between the previous QIS4 and the current QIS5 tests. These generally involve factors such as calculating the impact on net asset value of an adverse movement in markets or insurance claims or expenses. The key point is that this SCR will vary according to the risk profile of the insurer. We expect the SCR to be significantly higher than current minimum solvency margin requirements for both life and non-life insurers.

Exhibit 117

Solvency 2 vs. Solvency 1



Source: Morgan Stanley Research, Oliver Wyman

- **Breach of the SCR does not automatically force regulatory intervention.** The SCR is meant to be the level of capital surplus below which there will be increased regulatory scrutiny. It may also trigger conversion of hybrid capital securities, or restrictions on coupon payments or redemption. However, it will not automatically force companies to shut down their operations.
- **An allowance for 'diversification benefits'.** The SCR is estimated initially using individual risk modules per line of business. However, the aggregate SCR also allows for imperfect correlation between different risks (e.g. market stresses in equities and bonds may not occur together). This results in a diversification benefit, which means that the total capital requirements may be lower than the sum of the individual parts. This is to be assessed using sets of standard 'correlation matrices'.
- **Minimum Capital Requirement (MCR) between 25% and 45% of the SCR.** The MCR is meant to be an absolute minimum level of capital that can be simply calculated and calibrated at a level below the SCR. Unlike the SCR, breach of the MCR may result in a company's authorisation to carry out insurance business being withdrawn. The MCR will be based on simple factor-based capital charges, but CEIOPS proposes a corridor for the MCR between 25% and 45% of the SCR.
- **Standard vs. internal models.** The SCR may also be calculated using internal company-specific models. Such models will need regulatory approval. We believe the ultimate aim of the EC and CEIOPS is to encourage the use of robust internal models that are integrated with group risk management and management decisions. It is possible that a lower SCR calculated under an internal model is acceptable as long as the model is approved.
- **Calculation of group solvency.** The structure of Solvency 2 requires the aggregation and calculation of a consolidated capital requirement and solvency test at the group level. The aim is to harmonise requirements and to eliminate double-counting of capital or intra-group transactions that do not contribute to consolidated capital. There may also be

some diversification benefit recognised at the group level that is not available at the subsidiary level.

- **Rules on the limits and eligibility of available capital.** We cover this in more detail later in this section. Solvency 2 proposals set out the types of capital instruments that may be used to meet the SCR and MCR, and the limits on using different 'tiering' of the quality of capital.

How is the SCR calculated?

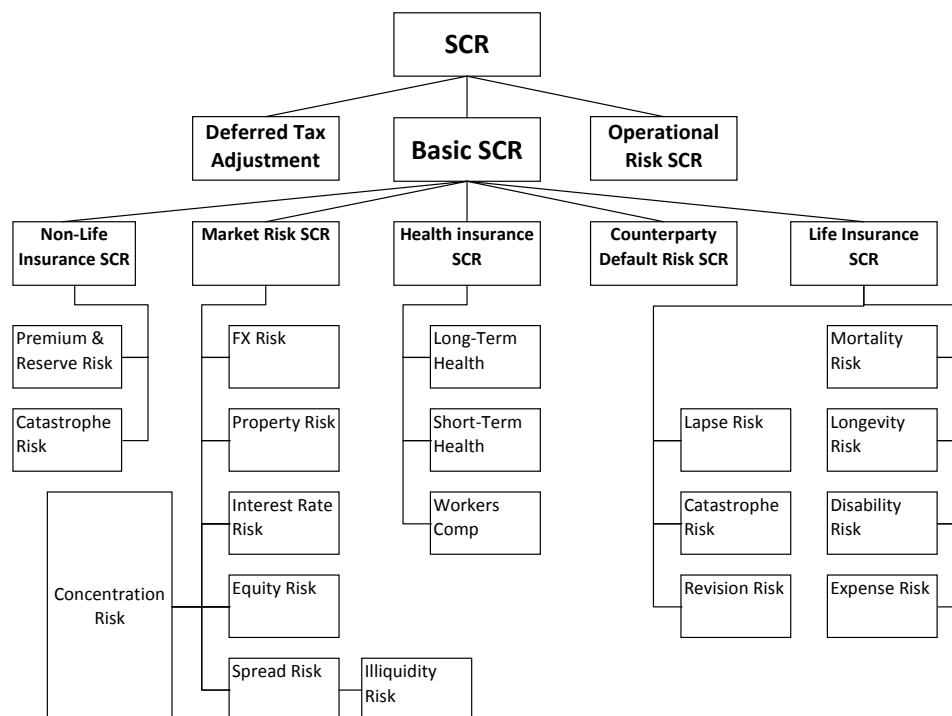
The SCR is calculated by aggregating the impact of an array of stress tests categorised by type or risk, called 'risk modules'. We illustrate this in Exhibit 118. Under the 'basic' SCR, there are modules for market risk, life / non-life / health underwriting risk and counterparty default risk. In addition to the Basic SCR, companies need to make an adjustment for deferred tax and add an allowance for group operational risk.

We describe some of the key assumptions used to derive the standard SCR for each risk module in Exhibits 120-124. These show the transition in the capital requirements for market risk, life and non-life insurance risk from QIS4 to CEIOPS final advice for QIS5 to the final technical specifications issued by the EC for the QIS5 test. It is important to note that the EC's final specifications are significantly softer than those proposed by CEIOPS for QIS5. *However, they still represent a substantial increase in capital requirements over QIS4.*

We would make the following comments:

- **The individual capital requirements for different risks are combined using 'correlation matrices'.** These essentially allow for the diversification benefit from imperfect correlation between different types of risks, i.e. the chance that it is unlikely that two different types of risk will occur together. This means that the aggregate capital requirement is less than the sum of the parts because not all risks are likely to occur simultaneously. Correlation matrices are used in each group of risks (e.g. market risk, life risk etc.) as well as at the total Basic SCR level. We show some of the latest correlation matrices used in QIS5, in Exhibit 125. For example, this shows that equity market risks and credit spread risks are assumed to have a 75% correlation.

Exhibit 118

Structure of the Solvency Capital Requirement under Solvency 2 (SCR)

Source: Morgan Stanley Research, Oliver Wyman

- Market risk is calculated from the impact of specified adverse market stress scenarios.** The capital requirement for each type of market risk is set equal to the movement in the net asset value (i.e. assets minus liabilities) from an adverse market scenario, e.g. a drop in the equity markets. A further adjustment is made for concentration risk across particular asset classes.
- Equity, spread and interest rate risks are the largest contributors to market risk.** Stress tests for some of these have been increased since QIS4 – although the European Commission has not introduced proposals for the introduction of stress tests on equity and interest rate volatility. For equity markets, the proposals include a ‘dampener’ to reduce pro-cyclicality, i.e. the equity market stress can be reduced (or increased) by up to 10% to allow for recent market movements. The spread risk stress-test does not adjust for the impact of widening spreads on the illiquidity premium that can be used in the discount rate to calculate liabilities – instead this is implicitly assumed in the spread risk test. An additional stress-test to look at the impact of a reduction in illiquidity premiums has been added to QIS5.
- Non-life underwriting risk capital is determined by applying standard factors to premiums and reserves** separately for different business lines. There are three different risk factors considered: premium risk, reserve risk and catastrophe risk. These factors have been calibrated based on statistical analysis of the variance of premium and reserving risks for these lines of business.
- Life underwriting risk is based on stress-testing the assumptions for different types of actuarial risk**, and looking at the change in NAV – similar to the market risk module. For example, scenarios involve an adverse movement in assumptions for factors such as mortality or expenses, affecting the calculation of technical provisions. The change in NAV resulting from these scenarios is used to judge the required capital.
- The health underwriting risk calculation is a mix of the approach for life and non-life** reflecting the

shorter versus longer-term nature of different types of health risk.

- **Counterparty default risk looks at aspects such as reinsurance or securitisation** and models the risk of the counterparty defaulting on agreements that may affect the level of insurance or other liabilities (or assets). The approach is to look at the potential loss given default vs. the risk of default. This assessment is subjective and is to be calculated by line of business.
- **Operational risk is a separate category to the Basic SCR and looks at the risk of inadequate processes** in the business from personnel or systems. The approach is to apply simple factors to different metrics such as life and non-life technical provisions, premiums and Basic SCR.
- **Adjustments for the loss absorbency potential of technical provisions and deferred tax assets.** The tests recognise that management actions can be used to reduce technical provisions during times of stress – this may be allowed for in the calculation of the Basic SCR by looking at the impact of the capital stress tests *before* and *after* such management actions are allowed for. A number of options have been proposed for calculating this. In making such assessments, companies also need to take into account the extent to which current deferred tax assets will be available to meet losses.

What are the limits on type of capital used to meet capital requirements?

In Exhibit 119, we illustrate the proposals for the capital tier combinations that are allowed to meet the SCR and MCR. CEIOPS defines three tiers of capital and has set limits on their use. The key limits for the capital eligible to meet the SCR are as follows:

- a *minimum* of 50% of the SCR must be met with tier 1 capital;
- a *maximum* of 15% of the SCR can be met with tier 3 capital;
- in addition, the proportion of tier 1 capital must be greater than the proportion of tier 2 capital, which in turn must be greater than the proportion of tier 3 capital; and

- any amount of tier 2 capital is allowed as long as these limits are not breached.

Exhibit 119 shows some possible combinations that are allowed and not allowed under these rules. For the MCR, it is suggested that at least 80% of this requirement must be met with tier 1 capital and no tier 3 capital may be used. As we stated earlier, CEIOPS proposes a target for the MCR at between 25% and 45% of the SCR.

A key lesson learned from the crisis is that insurance companies need their own funds at times of stress to fully absorb losses – very few capital instruments other than ordinary share capital fully absorb such losses. CEIOPS observed there has been virtually no deferral of interest on hybrid capital instruments during the recent crisis, while dividends on ordinary shares have been significantly reduced or withheld.

- **Tier 1 will largely consist of ordinary share capital or instruments that may convert to share capital** to absorb losses or equity-like hybrid capital instruments. Hybrid tier 1 capital cannot account for more than 20% of total tier 1 capital. The key properties of hybrid instruments to qualify as tier 1 are that they absorb losses first or rank *pari passu* with equity, are deeply subordinated in the event of winding up, and are free from mandatory redemption, mandatory coupons or encumbrances (guarantees or other charges).
- **Breach of SCR is a trigger for non-payment of coupons or withdrawal of redemption on tier 1 capital.** A key point to emphasise is that this proposes setting an automatic limit resulting in the non-payment of coupons on hybrid tier 1 capital and withdrawal of the ability to redeem, namely the breach of the SCR. Otherwise hybrid tier 1 must have a minimum duration of 10 years (callable at the discretion of the insurer).
- **Tier 2 is less strict** by fully allowing shorter duration hybrid capital (five years), or other capital instruments such as preference shares that do not have the conversion features. Tier 2 hybrid capital must also be able to absorb losses to some degree and be subordinated on wind-up. Also, like tier 1, the option to redeem the capital must be at the discretion of the insurance company. However, unlike tier 1, coupons only have to be deferred (rather than removed) on breach of the SCR or at

the option of the company, although subsequent payment of these coupons is subject to the approval of regulatory authorities.

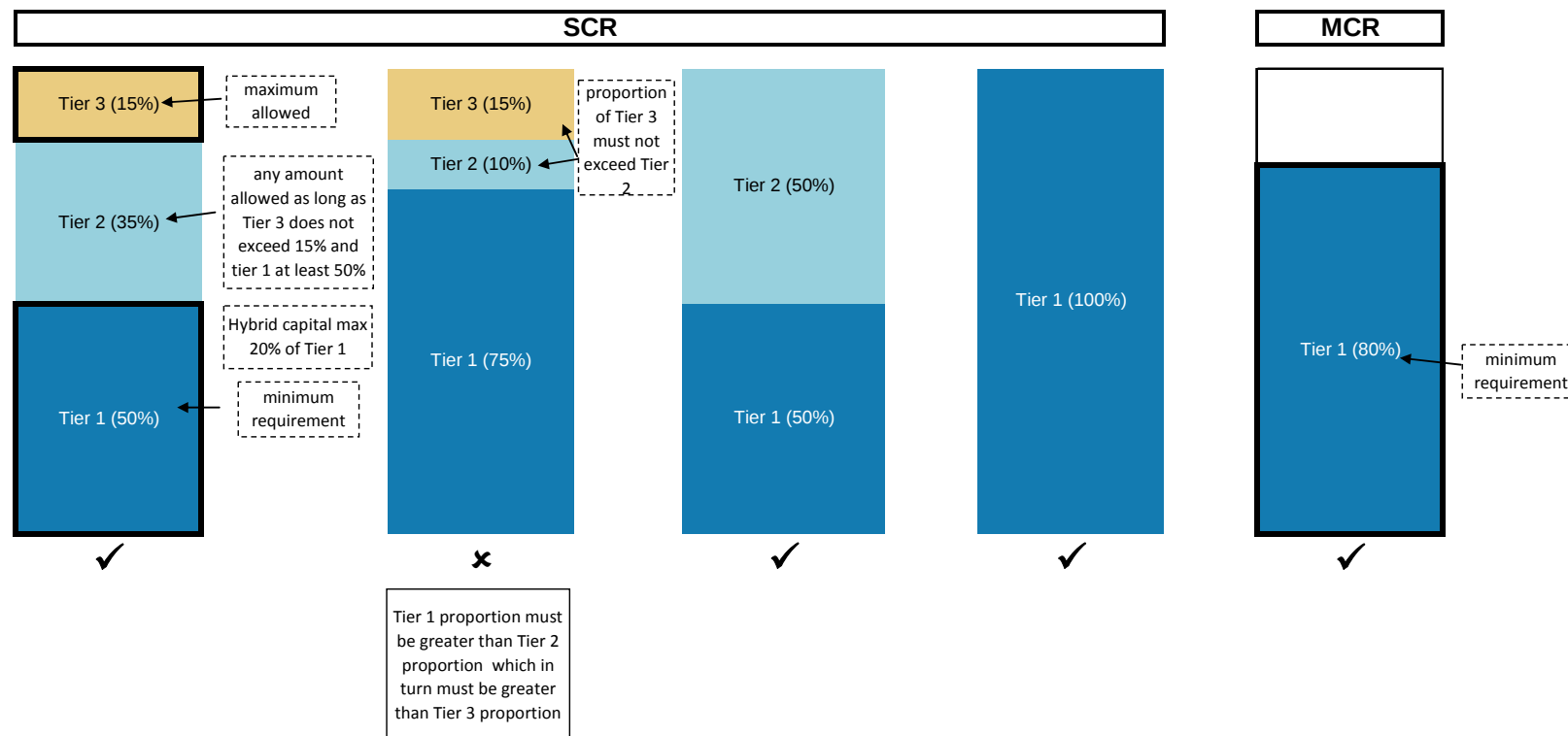
- **Tier 3 encompasses other forms of capital.**

These may include, for example, other debt instruments that do not display the characteristics of tier 1 or tier 2 capital. However, this tier must still possess some of the features required for tier 1 and tier 2, but to a lesser degree. Tier 3 must show some degree of subordination on wind-up, should be free from encumbrances, and is also subject to restrictions on redemption or coupon payments on breach of the SCR. The minimum maturity of tier 3 capital is three years.

- **Tier 1 hybrid capital may not contain incentives to redeem**, e.g. there cannot be any step-ups of coupons if perpetual or long-dated capital is not called early. This is not the case with tier 2 capital, where 'moderate incentives' to redeem may be included. There are no restrictions for tier 3 hybrid capital.

Exhibit 119

Combinations of tier 1, tier 2 and tier 3 capital that may or may not be used to meet the SCR and MCR under Solvency 2 proposals. See text for an explanation. In the examples below, the combination where tier 2 capital is less than tier 3 is not permitted.



Source: Morgan Stanley Research, Oliver Wyman

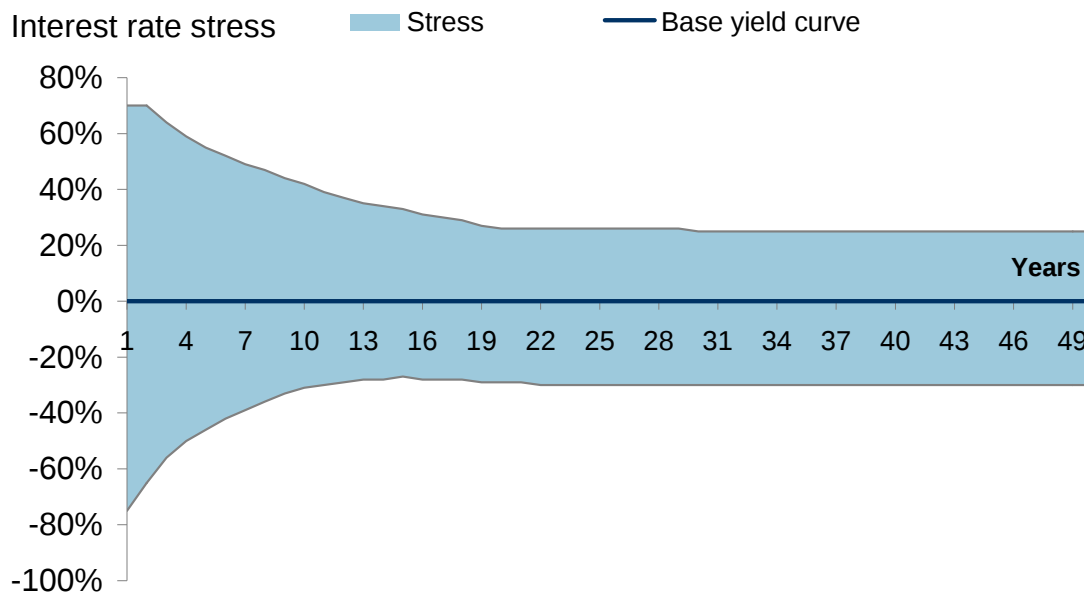
Exhibit 120

Market risk SCR factors – from QIS4 to QIS5

Risk Area	QIS4 specification	CEIOPS advice for QIS5	Final QIS5 specification
Equity	32% for global equities 45% of other equities (e.g. alternatives)	45% for global equities 55% of other equities (e.g. alternatives) Symmetric adjustment mechanism of +/- 10% to reduce procyclicality Additional volatility stress test combined with equity stress test, based on +50% or -15% change in implied vol.	39% for global equities 49% of other equities (e.g. alternatives) 22% for strategic participations Symmetric adjustment mechanism of +/- 10% to reduce procyclicality (9% reduction in QIS5) Volatility stress test removed.
Interest rate	Stress test based on increase and reduction in interest rates - specified by duration	Small changes to stress tests. Introduction of interest rate volatility stress test to be carried out in conjunction - +12% of -3% change in implied interest volatilities.	Increase in stress tests compared to QIS4. Interest rate volatility stress test removed.
Spread	Corporate bond and structured credit stress tests, dependent on duration and rating. Structured credit stress tests more onerous. Credit derivatives worst of 300bps widening or 75bps reduction in spreads.	Higher corporate and structured credit factors. Credit derivatives worst of 600bps widening or 75bps reduction in spreads. Real estate structured credit charge based on secured and unsecured exposure.	Structured credit stress tests involve looking through to underlying assets. Approach to corporate credit stresses as before. Credit derivatives widening now dependent on rating, reduction in spreads still tested at 75bps.
Illiquidity Premium	No illiquidity premium stress test	No illiquidity premium stress test	Illiquidity premium stress test introduced of 65% fall in value of illiquidity premium. No stress test on widening of illiquidity premium - this is assumed to be taken into account in spread risk capital stress tests.
Property	20% to all properties	25% to all properties	25% to all properties
Currency	Max of + / - 20% change in currency exchange rates	Max of + / - 25% change in currency exchange rates, with lower stresses to currencies within ERM	Max of + / - 25% change in currency exchange rates, with lower stresses to currencies within ERM
Concentration	Formula based on exposure and ratings of assets	Reduced thresholds for assets rated above A from 5% to 3%. Threshold reduced to 1.5% for other rated / unrated assets.	Reduced thresholds for assets rated above A from 5% to 3%. Threshold reduced to 1.5% for other rated / unrated assets.

Source: Morgan Stanley Research, Oliver Wyman

Exhibit 121

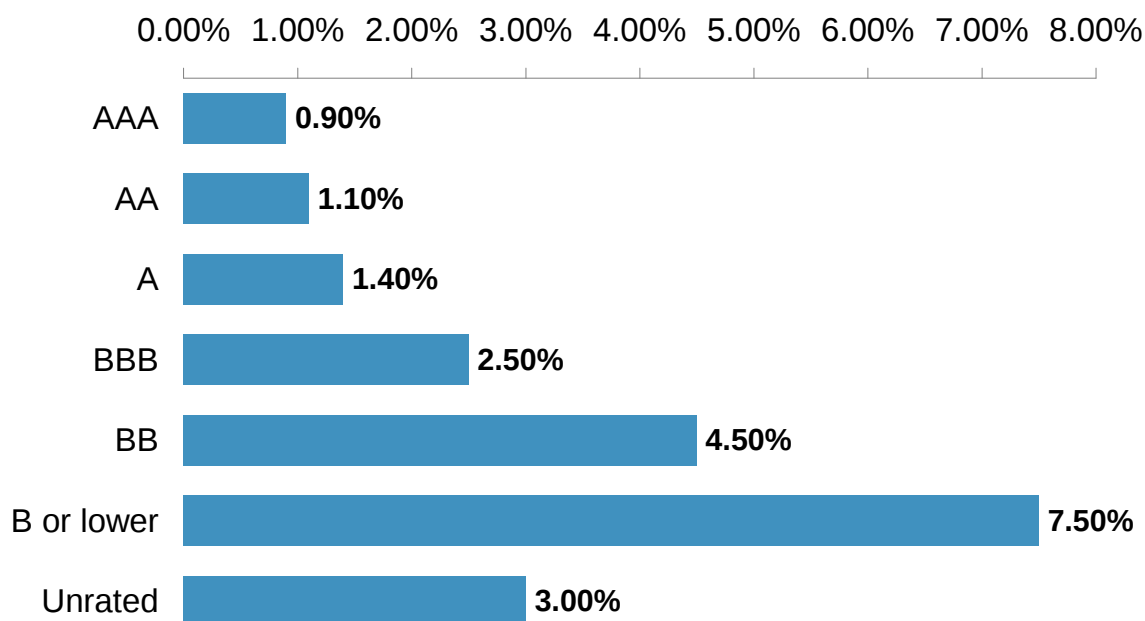
Interest rate stress test as a percentage of base yield curve

Source: Morgan Stanley Research, Oliver Wyman

Exhibit 122

Corporate bond stress tests by rating, which are multiplied by duration (subject to caps and floors)

Corporate credit risk charges x duration



Source: Morgan Stanley Research, Oliver Wyman

Exhibit 123

Life underwriting SCR – from QIS4 to QIS5

Risk Area	QIS4 specification	CEIOPS advice for QIS5	Final QIS5 specification
Mortality	10% increase in mortality	15% increase in mortality	15% increase in mortality
Longevity	25% reduction in mortality	25% reduction in mortality	20% reduction in mortality
Expenses	10% increase in expenses and additional 1% per year expense inflation. Policies with adjustable charges can assume 75% of additional expenses recovered after 2 years due to increase in charges.	10% increase in expenses and additional 1% per year expense inflation. No explicit adjustment for policies where charges can be increased.	10% increase in expenses and additional 1% per year expense inflation. No explicit adjustment for policies where charges can be increased.
Lapse	Worst of + / - 50% in lapse rates. Mass lapse event assuming 30% of policies lapse.	Worst of + / - 50% in lapse rates. Mass lapse event assuming 30% of retail policies lapse, but 70% for non-retail. Must take into account scenarios of adverse policyholder behaviour in take up of options in policies compared to assumptions.	Worst of + / - 50% in lapse rates. Mass lapse event assuming 30% of retail policies lapse, but 70% for non-retail. Must take into account scenarios of adverse policyholder behaviour in take up of options in policies compared to assumptions.
Disability & Morbidity	35% higher disability in year 1, followed by +25% in following years	50% higher disability in year 1, followed by +25% in following years. 20% decrease in recovery rates.	35% higher disability in year 1, followed by +25% in following years. 20% decrease in recovery rates.
Revision risk	3% increase in annuity payouts exposed to revision risk	3% increase in annuity payouts exposed to revision risk	3% increase in annuity payouts exposed to revision risk
Catastrophe	Increase of 1.5 per mille in next year's mortality	Increase of 1.5 per mille in next year's mortality	Increase of 1.5 per mille in next year's mortality

Source: Morgan Stanley Research, Oliver Wyman

Exhibit 124

Non-life underwriting SCR – from QIS4 to QIS5

Business Area	QIS4		CEIOPS advice for QIS5		Final QIS5	
	Premium risk	Reserve risk	Premium risk	Reserve risk	Premium risk	Reserve risk
Motor vehicle liability (%)	9.0	12.0	11.5	9.5	10.0	9.5
Motor other (%)	9.0	12.0	8.5	12.5	7.0	10.0
MAT (%)	12.5	10.0	23.0	17.5	17.0	14.0
Fire and other (%)	10.0	10.0	15.0	12.0	10.0	11.0
TPL (%)	12.5	15.0	17.0	16.0	15.0	11.0
Credit & suretyship (%)	15.0	15.0	28.0	25.0	21.5	19.0
Legal expenses (%)	5.0	10.0	8.0	9.0	6.5	9.0
Assistance (%)	7.5	10.0	5.0	12.5	5.0	11.0
Miscellaneous (%)	11.0	10.0	15.5	20.0	13.0	15.0
NPL Property (%)	15.0	15.0	20.0	25.0	17.5	20.0
NPL Casualty (%)	15.0	15.0	16.5	25.0	16.0	20.0
NPL MAT (%)	15.0	15.0	18.5	25.0	17.0	20.0
Average (%)	11.4	12.4	15.5	17.4	13.0	14.1

Source: Morgan Stanley Research, Oliver Wyman

Exhibit 125

Examples of important SCR correlation matrices between different risk categories

Non-life correlations	Motor Vehicle Liabilities	Motor , Other Classes	Marine, Aviation and Transport	Fire and Other Damages	Third-party Liability	Credit and Suretyship	Legal expenses	Assistance	Miscellaneous Non-life Insurance	NP Reins Property	NP Reins Casualty	NP Reins MAT
Motor Vehicle Liabilities	100%	50%	50%	25%	50%	25%	50%	25%	50%	25%	25%	25%
Motor , Other Classes	50%	100%	25%	25%	25%	25%	50%	50%	50%	25%	25%	25%
Marine, Aviation and Transport	50%	25%	100%	25%	25%	25%	25%	50%	50%	25%	25%	50%
Fire and Other Damages	25%	25%	25%	100%	25%	25%	25%	50%	50%	50%	25%	50%
Third-party Liability	50%	25%	25%	25%	100%	50%	50%	25%	50%	25%	50%	25%
Credit and Suretyship	25%	25%	25%	25%	50%	100%	50%	25%	50%	25%	50%	25%
Legal expenses	50%	50%	25%	25%	50%	50%	100%	25%	50%	25%	50%	25%
Assistance	25%	50%	50%	50%	25%	25%	25%	100%	50%	50%	25%	25%
Miscellaneous Non-life Insurance	50%	50%	50%	50%	50%	50%	50%	50%	100%	25%	25%	50%
NP Reins Property	25%	25%	25%	50%	25%	25%	25%	50%	25%	100%	25%	25%
NP Reins Casualty	25%	25%	25%	25%	50%	50%	50%	25%	25%	25%	100%	25%
NP Reins MAT	25%	25%	50%	50%	25%	25%	25%	25%	50%	25%	25%	100%

Life correlations	Mortality	Longevity	Disability / Morbidity	Expenses	Revision	Lapse
Mortality	100%	-25%	25%	25%	0%	0%
Longevity	-25%	100%	0%	25%	25%	25%
Disability / Morbidity	25%	0%	100%	50%	0%	0%
Expenses	25%	25%	50%	100%	50%	50%
Revision	0%	25%	0%	50%	100%	0%
Lapse	0%	25%	0%	50%	0%	100%

Market risk correlations	Interest Rates	Equities	Property	Spread	Currency	Conc	Illiquidity
Interest Rates	100%	50%	50%	50%	25%	0%	0%
Equities	50%	100%	75%	75%	25%	0%	0%
Property	50%	75%	100%	50%	25%	0%	0%
Spread	50%	75%	50%	100%	25%	0%	-50%
Currency	25%	25%	25%	25%	100%	0%	0%
Concentration	0%	0%	0%	0%	0%	100%	0%
Illiquidity	0%	0%	0%	-50%	0%	0%	100%

Cross risk correlations	Market	Default	Life	Health	Non-life
Market	100%	25%	25%	25%	25%
Default	25%	100%	25%	25%	50%
Life	25%	25%	100%	25%	0%
Health	25%	25%	25%	100%	0%
Non-life	25%	50%	0%	0%	100%

Source: Morgan Stanley Research, Oliver Wyman

THIS PAGE HAS BEEN LEFT BLANK
INTENTIONALLY

Disclosure Section

Morgan Stanley & Co. International plc, authorized and regulated by Financial Services Authority, disseminates in the UK research that it has prepared, and approves solely for the purposes of section 21 of the Financial Services and Markets Act 2000, research which has been prepared by any of its affiliates. Morgan Stanley also approves any statements by Oliver Wyman in this report solely for the purposes of section 21 of the Financial Services and Markets Act 2000. As used in this disclosure section, Morgan Stanley includes RMB Morgan Stanley (Proprietary) Limited, Morgan Stanley & Co International plc and its affiliates.

For important disclosures, stock price charts and equity rating histories regarding companies that are the subject of this report, please see the Morgan Stanley Research Disclosure Website at www.morganstanley.com/researchdisclosures, or contact your investment representative or Morgan Stanley Research at 1585 Broadway, (Attention: Research Management), New York, NY, 10036 USA.

Analyst Certification

The following analysts hereby certify that their views about the companies and their securities discussed in this report are accurately expressed and that they have not received and will not receive direct or indirect compensation in exchange for expressing specific recommendations or views in this report: Jon Hocking, Farooq Hanif.

Unless otherwise stated, the individuals listed on the cover page of this report are research analysts.

Global Research Conflict Management Policy

Morgan Stanley Research has been published in accordance with our conflict management policy, which is available at www.morganstanley.com/institutional/research/conflictolicies.

Important US Regulatory Disclosures on Subject Companies

The equity research analysts or strategists principally responsible for the preparation of Morgan Stanley Research have received compensation based upon various factors, including quality of research, investor client feedback, stock picking, competitive factors, firm revenues and overall investment banking revenues.

Morgan Stanley and its affiliates do business that relates to companies/instruments covered in Morgan Stanley Research, including market making, providing liquidity and specialized trading, risk arbitrage and other proprietary trading, fund management, commercial banking, extension of credit, investment services and investment banking. Morgan Stanley sells to and buys from customers the securities/instruments of companies covered in Morgan Stanley Research on a principal basis. Morgan Stanley may have a position in the debt of the Company or instruments discussed in this report.

Certain disclosures listed above are also for compliance with applicable regulations in non-US jurisdictions.

STOCK RATINGS

Morgan Stanley uses a relative rating system using terms such as Overweight, Equal-weight, Not-Rated or Underweight (see definitions below). Morgan Stanley does not assign ratings of Buy, Hold or Sell to the stocks we cover. Overweight, Equal-weight, Not-Rated and Underweight are not the equivalent of buy, hold and sell. Investors should carefully read the definitions of all ratings used in Morgan Stanley Research. In addition, since Morgan Stanley Research contains more complete information concerning the analyst's views, investors should carefully read Morgan Stanley Research, in its entirety, and not infer the contents from the rating alone. In any case, ratings (or research) should not be used or relied upon as investment advice. An investor's decision to buy or sell a stock should depend on individual circumstances (such as the investor's existing holdings) and other considerations.

Global Stock Ratings Distribution

(as of August 31, 2010)

For disclosure purposes only (in accordance with NASD and NYSE requirements), we include the category headings of Buy, Hold, and Sell alongside our ratings of Overweight, Equal-weight, Not-Rated and Underweight. Morgan Stanley does not assign ratings of Buy, Hold or Sell to the stocks we cover. Overweight, Equal-weight, Not-Rated and Underweight are not the equivalent of buy, hold, and sell but represent recommended relative weightings (see definitions below). To satisfy regulatory requirements, we correspond Overweight, our most positive stock rating, with a buy recommendation; we correspond Equal-weight and Not-Rated to hold and Underweight to sell recommendations, respectively.

Stock Rating Category	Coverage Universe		Investment Banking Clients (IBC)		
	Count	% of Total	Count	% of Total IBC	% of Rating Category
Overweight/Buy	1082	42%	381	43%	35%
Equal-weight/Hold	1145	44%	402	46%	35%
Not-Rated/Hold	13	0%	4	0%	31%
Underweight/Sell	364	14%	91	10%	25%
Total	2,604		878		

Data include common stock and ADRs currently assigned ratings. An investor's decision to buy or sell a stock should depend on individual circumstances (such as the investor's existing holdings) and other considerations. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the last 12 months.

Analyst Stock Ratings

Overweight (O). The stock's total return is expected to exceed the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Equal-weight (E). The stock's total return is expected to be in line with the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Not-Rated (NR). Currently the analyst does not have adequate conviction about the stock's total return relative to the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Underweight (U). The stock's total return is expected to be below the average total return of the analyst's industry (or industry team's) coverage universe, on a risk-adjusted basis, over the next 12-18 months.

Unless otherwise specified, the time frame for price targets included in Morgan Stanley Research is 12 to 18 months.

Analyst Industry Views

Attractive (A): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be attractive vs. the relevant broad market benchmark, as indicated below.

In-Line (I): The analyst expects the performance of his or her industry coverage universe over the next 12-18 months to be in line with the relevant broad market benchmark, as indicated below.

Cautious (C): The analyst views the performance of his or her industry coverage universe over the next 12-18 months with caution vs. the relevant broad market benchmark, as indicated below.

September 22, 2010

European Insurance: Solvency 2

Benchmarks for each region are as follows: North America - S&P 500; Latin America - relevant MSCI country index or MSCI Latin America Index; Europe - MSCI Europe; Japan - TOPIX; Asia - relevant MSCI country index.

Important Disclosures for Morgan Stanley Smith Barney LLC Customers

Citi Investment Research & Analysis (CIRA) research reports may be available about the companies or topics that are the subject of Morgan Stanley Research. Ask your Financial Advisor or use Research Center to view any available CIRA research reports in addition to Morgan Stanley research reports.

Important disclosures regarding the relationship between the companies that are the subject of Morgan Stanley Research and Morgan Stanley Smith Barney LLC, Morgan Stanley and Citigroup Global Markets Inc. or any of their affiliates, are available on the Morgan Stanley Smith Barney disclosure website at www.morganstanleysmithbarney.com/researchdisclosures.

For Morgan Stanley and Citigroup Global Markets, Inc. specific disclosures, you may refer to www.morganstanley.com/researchdisclosures and https://www.citigroupgeo.com/geopublic/Disclosures/index_a.html.

Each Morgan Stanley Equity Research report is reviewed and approved on behalf of Morgan Stanley Smith Barney LLC. This review and approval is conducted by the same person who reviews the Equity Research report on behalf of Morgan Stanley. This could create a conflict of interest.

Other Important Disclosures

Morgan Stanley & Co. International PLC and its affiliates have a significant financial interest in the debt securities of 3i, Deutsche Boerse, F&C Asset Management, Invesco, Man Group.

Morgan Stanley produces an equity research product called a "Tactical Idea." Views contained in a "Tactical Idea" on a particular stock may be contrary to the recommendations or views expressed in research on the same stock. This may be the result of differing time horizons, methodologies, market events, or other factors. For all research available on a particular stock, please contact your sales representative or go to Client Link at www.morganstanley.com.

Morgan Stanley Research does not provide individually tailored investment advice. Morgan Stanley Research has been prepared without regard to the individual financial circumstances and objectives of persons who receive it. Morgan Stanley recommends that investors independently evaluate particular investments and strategies, and encourages investors to seek the advice of a financial adviser. The appropriateness of a particular investment or strategy will depend on an investor's individual circumstances and objectives. The securities, instruments, or strategies discussed in Morgan Stanley Research may not be suitable for all investors, and certain investors may not be eligible to purchase or participate in some or all of them.

The fixed income research analysts or strategists principally responsible for the preparation of Morgan Stanley Research have received compensation based upon various factors, including quality, accuracy and value of research, firm profitability or revenues (which include fixed income trading and capital markets profitability or revenues), client feedback and competitive factors. Fixed Income Research analysts' or strategists' compensation is not linked to investment banking or capital markets transactions performed by Morgan Stanley or the profitability or revenues of particular trading desks.

Morgan Stanley Research is not an offer to buy or sell or the solicitation of an offer to buy or sell any security/instrument or to participate in any particular trading strategy. The "Important US Regulatory Disclosures on Subject Companies" section in Morgan Stanley Research lists all companies mentioned where Morgan Stanley owns 1% or more of a class of common equity securities of the companies. For all other companies mentioned in Morgan Stanley Research, Morgan Stanley may have an investment of less than 1% in securities/instruments or derivatives of securities/instruments of companies and may trade them in ways different from those discussed in Morgan Stanley Research. Employees of Morgan Stanley not involved in the preparation of Morgan Stanley Research may have investments in securities/instruments or derivatives of securities/instruments of companies mentioned and may trade them in ways different from those discussed in Morgan Stanley Research. Derivatives may be issued by Morgan Stanley or associated persons.

With the exception of information regarding Morgan Stanley, Morgan Stanley Research is based on public information. Morgan Stanley makes every effort to use reliable, comprehensive information, but we make no representation that it is accurate or complete. We have no obligation to tell you when opinions or information in Morgan Stanley Research change apart from when we intend to discontinue equity research coverage of a subject company. Facts and views presented in Morgan Stanley Research have not been reviewed by, and may not reflect information known to, professionals in other Morgan Stanley business areas, including investment banking personnel.

Morgan Stanley Research personnel may participate in company events such as site visits and are generally prohibited from accepting payment by the company of associated expenses unless pre-approved by authorized members of Research management.

The value of and income from your investments may vary because of changes in interest rates, foreign exchange rates, default rates, prepayment rates, securities/instruments prices, market indexes, operational or financial conditions of companies or other factors. There may be time limitations on the exercise of options or other rights in securities/instruments transactions. Past performance is not necessarily a guide to future performance. Estimates of future performance are based on assumptions that may not be realized. If provided, and unless otherwise stated, the closing price on the cover page is that of the primary exchange for the subject company's securities/instruments.

Morgan Stanley may make investment decisions or take proprietary positions that are inconsistent with the recommendations or views in this report.

To our readers in Taiwan: Information on securities/instruments that trade in Taiwan is distributed by Morgan Stanley Taiwan Limited ("MSTL"). Such information is for your reference only. Information on any securities/instruments issued by a company owned by the government of or incorporated in the PRC and listed in on the Stock Exchange of Hong Kong ("SEHK"), namely the H-shares, including the component company stocks of the Stock Exchange of Hong Kong ("SEHK")'s Hang Seng China Enterprise Index; or any securities/instruments issued by a company that is 30% or more directly- or indirectly-owned by the government of or a company incorporated in the PRC and traded on an exchange in Hong Kong or Macau, namely SEHK's Red Chip shares, including the component company of the SEHK's China-affiliated Corp Index is distributed only to Taiwan Securities Investment Trust Enterprises ("SITE"). The reader should independently evaluate the investment risks and is solely responsible for their investment decisions. Morgan Stanley Research may not be distributed to the public media or quoted or used by the public media without the express written consent of Morgan Stanley. Information on securities/instruments that do not trade in Taiwan is for informational purposes only and is not to be construed as a recommendation or a solicitation to trade in such securities/instruments. MSTL may not execute transactions for clients in these securities/instruments.

To our readers in Hong Kong: Information is distributed in Hong Kong by and on behalf of, and is attributable to, Morgan Stanley Asia Limited as part of its regulated activities in Hong Kong. If you have any queries concerning Morgan Stanley Research, please contact our Hong Kong sales representatives.

Morgan Stanley Research is disseminated in Japan by Morgan Stanley MUFG Securities Co., Ltd.; in Hong Kong by Morgan Stanley Asia Limited (which accepts responsibility for its contents); in Singapore by Morgan Stanley Asia (Singapore) Pte. (Registration number 199206298Z) and/or Morgan Stanley Asia (Singapore) Securities Pte Ltd (Registration number 200008434H), regulated by the Monetary Authority of Singapore, which accepts responsibility for its contents; in Australia to "wholesale clients" within the meaning of the Australian Corporations Act by Morgan Stanley Australia Limited A.B.N. 67 003 734 576, holder of Australian financial services license No. 233742, which accepts responsibility for its contents; in Australia to "wholesale clients" and "retail clients" within the meaning of the Australian Corporations Act by Morgan Stanley Smith Barney Australia Pty Ltd (A.B.N. 19 009 145 555, holder of Australian financial services license No. 240813, which accepts responsibility for its contents); in Korea by Morgan Stanley & Co International plc, Seoul Branch; in India by Morgan Stanley India Company Private Limited; in Canada by Morgan Stanley Canada Limited, which has approved of, and has agreed to take responsibility for, the contents of Morgan Stanley Research in Canada; in Germany by Morgan Stanley Bank AG, Frankfurt am Main and Morgan Stanley Private Wealth Management Limited, Niederlassung Deutschland, regulated by Bundesanstalt fuer Finanzdienstleistungsaufsicht (BaFin); in Spain by Morgan Stanley, S.V., S.A., a Morgan Stanley group company, which is supervised by the Spanish Securities Markets Commission (CNMV) and states that Morgan Stanley Research has been written and distributed in accordance with the rules of conduct applicable to financial research as established under Spanish regulations; in the United States by Morgan Stanley & Co. Incorporated, which accepts responsibility for its contents. Morgan Stanley & Co. International plc, authorized and regulated by the Financial Services Authority, disseminates in the UK research that it has prepared, and approves solely for the purposes of section 21 of the

September 22, 2010

European Insurance: Solvency 2

Financial Services and Markets Act 2000, research which has been prepared by any of its affiliates. Morgan Stanley Private Wealth Management Limited, authorized and regulated by the Financial Services Authority, also disseminates Morgan Stanley Research in the UK. Private U.K. investors should obtain the advice of their Morgan Stanley & Co. International plc or Morgan Stanley Private Wealth Management representative about the investments concerned. RMB Morgan Stanley (Proprietary) Limited is a member of the JSE Limited and regulated by the Financial Services Board in South Africa. RMB Morgan Stanley (Proprietary) Limited is a joint venture owned equally by Morgan Stanley International Holdings Inc. and RMB Investment Advisory (Proprietary) Limited, which is wholly owned by FirstRand Limited.

The information in Morgan Stanley Research is being communicated by Morgan Stanley & Co. International plc (DIFC Branch), regulated by the Dubai Financial Services Authority (the DFSA), and is directed at Professional Clients only, as defined by the DFSA. The financial products or financial services to which this research relates will only be made available to a customer who we are satisfied meets the regulatory criteria to be a Professional Client.

The information in Morgan Stanley Research is being communicated by Morgan Stanley & Co. International plc (QFC Branch), regulated by the Qatar Financial Centre Regulatory Authority (the QFCRA), and is directed at business customers and market counterparties only and is not intended for Retail Customers as defined by the QFCRA.

As required by the Capital Markets Board of Turkey, investment information, comments and recommendations stated here, are not within the scope of investment advisory activity. Investment advisory service is provided in accordance with a contract of engagement on investment advisory concluded between brokerage houses, portfolio management companies, non-deposit banks and clients. Comments and recommendations stated here rely on the individual opinions of the ones providing these comments and recommendations. These opinions may not fit to your financial status, risk and return preferences. For this reason, to make an investment decision by relying solely to this information stated here may not bring about outcomes that fit your expectations.

The trademarks and service marks contained in Morgan Stanley Research are the property of their respective owners. Third-party data providers make no warranties or representations of any kind relating to the accuracy, completeness, or timeliness of the data they provide and shall not have liability for any damages of any kind relating to such data. The Global Industry Classification Standard ("GICS") was developed by and is the exclusive property of MSCI and S&P.

Morgan Stanley Research, or any portion thereof may not be reprinted, sold or redistributed without the written consent of Morgan Stanley.

Morgan Stanley Research is disseminated and available primarily electronically, and, in some cases, in printed form.

Additional information on recommended securities/instruments is available on request.

Other Important Disclosures from Oliver Wyman

Copyright © 2010 Oliver Wyman. All rights reserved. This report may not be reproduced or redistributed, in whole or in part, without the written permission of Oliver Wyman and Oliver Wyman accepts no liability whatsoever for the actions of third parties in this respect.

This report is not a substitute for tailored professional advice on how a specific financial institution should execute its strategy. This report is not investment advice and should not be relied on for such advice or as a substitute for consultation with professional accountants, tax, legal or financial advisers. Oliver Wyman has made every effort to use reliable, up-to-date and comprehensive information and analysis, but all information is provided without warranty of any kind, express or implied. Oliver Wyman disclaims any responsibility to update the information or conclusions in this report. Oliver Wyman accepts no liability for any loss arising from any action taken or refrained from as a result of information contained in this report or any reports or sources of information referred to herein, or for any consequential, special or similar damages even if advised of the possibility of such damages.

This report may not be sold without the written consent of Oliver Wyman.

Oliver Wyman employees are subject to a policy containing restrictions on account trading.

The Oliver Wyman employees that contributed to this report are neither FSA nor FINRA registered.

Oliver Wyman are subject to contractual obligations with Morgan Stanley in producing this report. Oliver Wyman employees are also subject to Oliver Wyman conduct of business terms and standards.

Oliver Wyman is not authorised nor regulated by the FSA. As a consultancy firm it may have business relationships with companies mentioned in this report and as such may receive fees for executing this business.

Please refer to www.oliverwyman.com for further details.

The Americas
1585 Broadway
New York, NY 10036-8293
United States
Tel: +1 (1)212 761 4000

Europe
20 Bank Street, Canary Wharf
London E14 4AD
United Kingdom
Tel: +44 (0)20 7425 8000

Japan
4-20-3 Ebisu, Shibuya-ku
Tokyo 150-6008
Japan
Tel: +81 (0)3 5424 5000

Asia/Pacific
1 Austin Road West
Kowloon
Hong Kong
Tel: +852 2848 5200

EMEA	North America	Asia Pacific
	1166 Avenue of the Americas	
55 Baker Street	29 th Floor	8 Cross Street, #24-01
London W1U 8EW	New York, NY 10036	048424
United Kingdom	United States	Singapore