

MILLIMAN RESEARCH REPORT

# 2015 Embedded Value Results: Europe

Generating Value

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## Executive summary

### BACKGROUND

- Developed economies saw another year of challenging economic conditions in 2015. Interest rates continued on a downward trend across many economies at the start of 2015, albeit with some recovery by the end of the year. This was generally accompanied by poor and variable growth in equity markets.
- In May 2016, an amendment was issued to the European Insurance CFO Forum Market Consistent Embedded Value Principles<sup>®</sup> (the MCEV Principles<sup>1</sup>). This amendment permits, but does not require, the use of the projection methods and assumptions for market-consistent solvency regimes (e.g., Solvency II) in future embedded value (EV) reporting. Prior to this amendment, the CFO Forum announced additional guidance for embedded value reporting in October 2015, which stated that it did not view an allowance for Solvency II, and its associated consequences, to be required when complying with the MCEV or European Embedded Value Principles (EEV Principles) reporting principles for reporting periods ending prior to 30 June 2016. As such, the embedded value metrics reported by firms in respect of year-end 2015 will not necessarily have taken Solvency II methodologies and consequences into account.
- Based on our review of 23 companies, around 30% continue to use the EEV Principles rather than the MCEV Principles. However, there is still a trend towards reporting on a market-consistent basis such that over 95% now use some form of market-consistent valuation in their embedded value reporting, based on our sample of companies. One company moved to a balance sheet approach and fully aligned its methodology with Solvency II for its embedded value calculations in 2015.

### EV RESULTS

- There has been a noticeable reduction in firms reporting on an embedded value basis in 2015, compared with 2014. Eight members of the CFO Forum did not report a 2015 EV result and eight firms included in our 2014 survey (Hannover Re, Mapfre, Munich Re, Standard Life, Delta Lloyd, Mediolanum, PZU, and Storebrand) had not published a 2015 EV result at the time of writing.
- The current CFO Forum members (that disclosed their embedded values at the end of 2015) reported a combined embedded value of GBP 248 billion (EUR 337 billion<sup>2</sup>) at the end of 2015, compared with GBP 228 billion (EUR 294 billion<sup>3</sup>) at the end of 2014. The majority of companies included in this study experienced an increase, of varying degrees, in their group embedded values compared with 2014. Two companies saw a decrease in the group embedded values.
- Of the current CFO Forum members, Allianz, AXA, and Prudential reported the three largest group embedded values. The top performers (by percentage increase) were Aviva, Generali, and SCOR.

### NEW BUSINESS RESULTS

- Overall, results for new business were fairly positive for the majority of companies in our sample. The total value of new business (VNB) written by the current CFO Forum members (that disclosed their values of new business at the end of 2015) was GBP 9.7 billion (EUR 13.2 billion) in 2015, compared with GBP 10.3 billion (EUR 13.2 billion) in 2014.

### EV METHODOLOGY HOT TOPICS

- The framework used by companies that disclosed embedded value in 2015 has generally remained static, with the overwhelming majority of companies (some 95%) applying some form of market-consistent valuation. Allianz moved to a balance sheet approach and fully aligned its methodology with Solvency II for its embedded value.
- Three key areas in embedded value methodology retain their place on the podium of hot topics. They are: (1) the construction of the risk discount rate (RDR), (2) the allowance for cost of capital (CoC), including the cost of residual non-hedgeable risks (CRNHR), and (3) recognising the time value of options and guarantees (TVOG).

1 Copyright© Stichting CFO Forum Foundation 2008.

2 Sterling to Euro exchange rate as at 31 December 2015.

3 Sterling to Euro exchange rate as at 31 December 2014.

### Construction of the risk discount rate

- All companies included in our study used a bottom-up approach to determine the RDR, with the exception of Legal & General, which used a top-down approach.
- Around 70% of companies in our study use only swaps as the underlying basis for the risk-free yield curve, with the remainder using government bonds. There are a number of companies that use government bonds for business based in countries without a deep and liquid swap market.
- A number of companies make an adjustment to the risk-free rate for credit risk, and over 2015 there has been a continued move towards alignment with Solvency II—a large number of companies in 2015 have applied a credit risk adjustment (CRA) in line with the technical information published by the European Insurance and Occupational Pensions Authority (EIOPA) on 13 January 2016.
- As expected, companies have continued to align their embedded value methodologies with Solvency II during 2015. Four companies used the volatility adjustment (VA) with their discount rates in 2015, in addition to the five companies which already applied a VA in 2014. Given that the benefits of using a liquidity premium (LP) are generally larger than those of a VA adjustment, this move is likely to have had an impact on results—two companies disclosed an effect of around a 4% reduction on their embedded value results due to abandoning a liquidity premium in favour of a VA.
- No companies in our sample disclosed the use of a matching adjustment (MA) as an adjustment to the discount rate.
- At year-end 2015, liquidity premiums applied were generally slightly higher than those applied in 2014 but remained in the region of 30 to 110 basis points (bps). VAs applied last year differed from the ones published by EIOPA, potentially because EIOPA curves were published quite late, whilst VAs applied in 2015 were generally in line with the curves published by EIOPA.
- Sensitivities to the liquidity premium or VA were, again, generally reported as a 10 bps addition to the liquidity premium/VA, or the removal of the liquidity premium/VA, where applied.
- Around 60% of the companies in our sample disclosed that they were using extrapolation techniques. Of those disclosing their extrapolation methodologies, the Solvency II approach again was most prevalent, with most of the companies aligning their parameters with the final Solvency II guidelines.

### Cost of capital/cost of residual non-hedgeable risks

- For MCEV companies that disclosed their equivalent cost-of-capital charges for residual non-hedgeable risks, there have been some changes in the CoC rate applied since 2014, largely in response to the implementation of Solvency II. Two companies increased their rates to 6% to align with the CoC rate used for the Risk Margin under Solvency II. One company, however, reduced the charge from 4.0% at the end of 2014 to 3.2% at the end of 2015.

### Time value of options and guarantees

- In general, market-consistent approaches were used to value options and guarantees. In addition, implied volatilities for interest rates and equities were based on year-end data; companies generally used at least 1,000 economic scenarios in their stochastic models.
- A handful of companies disclosed allowances for dynamic policyholder behaviour in certain economic scenarios in 2015. This number was reduced from those that disclosed modelling of dynamic policyholder behaviour at the end of 2014.

**DISCLOSURES**

- Changes were expected to the level of disclosures during 2015, given the implementation of Solvency II as at 1 January 2016. As a result, a number of companies completely dropped their embedded value disclosures and those companies continuing to report embedded value generally did not change their levels of disclosure, but included some additional discussion on their allowances for Solvency II.
- Updated EEV and MCEV Principles and Guidance published by the CFO Forum in May 2016 may bring significant changes to companies' disclosures at mid-year 2016 and year-end 2016.

**OTHER MEASURES OF VALUE**

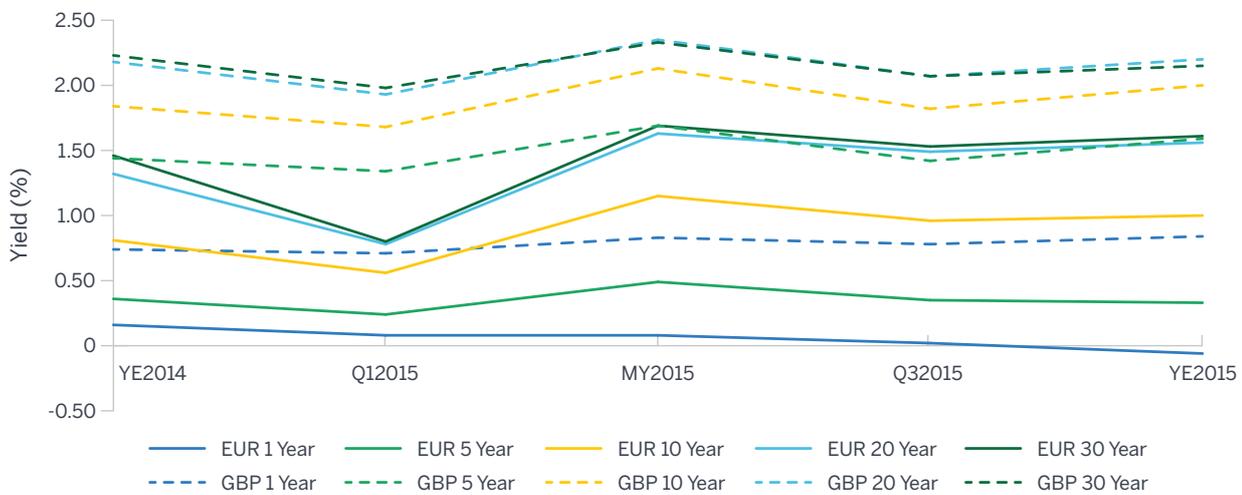
- Individual insurance companies' market capitalisations have generally diverged further from their embedded values, although across our sample the average market capitalisation as a percentage of total embedded value has decreased from 105% at the end of 2014 to 101% at the end of 2015.
- The year 2015 was key for financial and solvency reporting, with the implementation of Solvency II as at 1 January 2016. Although an allowance for Solvency II was not required when complying with the MCEV or EEV reporting principles as at 31 December 2015, we anticipate that the updated EEV and MCEV Principles and Guidance published by the CFO Forum in May 2016 will lead to reduced divergence between embedded value and Solvency II reporting measures in future. With this in mind, companies are likely to face a number of challenging years in terms of adapting to new reporting requirements.
- Given the different intended purposes of embedded value and Solvency II reporting, it remains to be seen whether convergence will occur in practice. The requirements of the key stakeholders and how important they view the reporting information to be to the management of their business will also drive the level of convergence seen. Companies may continue to align their embedded value methodologies with Solvency II. On the other hand, the existence of features of Solvency II that are not market-consistent, such as the VA, MA, and transitional measures which may (if used) last for 16 years, might distort Solvency II results, retaining the need for a more market-consistent reporting metric.

## Introduction

The year 2015 was another one with challenging market conditions—interest rates decreased in the first half of the year, and remained low despite some recovery during the second half of 2015 (see Figure 1). This was accompanied by poor and variable growth in equity markets (see Figure 2). The FTSE 100 and FTSE All-Share indices ended lower at the end of the year compared with the start, whilst the CAC 40 and DAX Index grew over the year.

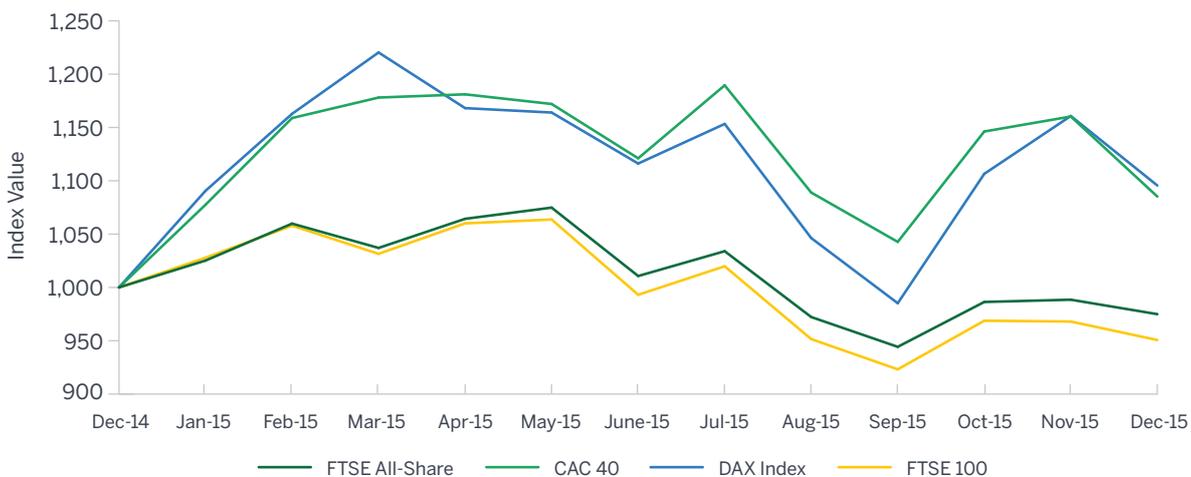
The persistent low interest rates environment and increased volatility continue to negatively impact companies’ operations and results. Despite these continually challenging conditions many companies have been able to sustain their operating returns. For example, many companies commented that, in order to be able to maintain levels of VNB, they implemented management actions with respect to product design and/or steered new business written towards a more profitable business mix.

**FIGURE 1: RECENT TRENDS IN GBP AND EUR SWAP RATES**



Source: Bloomberg

**FIGURE 2: RECENT EQUITY MARKET PERFORMANCE**



Source: Bloomberg

Indices above are the gross total return indices and have been rebased to 1,000 as at 31 December 2014

The comparison between market capitalisation and embedded value slightly worsened, with the average market capitalisation as a percentage of total embedded value decreasing from 105% at the end of 2014 to 101% at the end of 2015 (see Figure 13). Overall equity market growth remained low in 2015 and the initial growth witnessed at the start of the year had largely tailed off by the end of the year.

In May 2016, the European Insurance CFO Forum issued an amendment to the MCEV and EEV Principles. This amendment permits, but does not require, the use of the projection methods and assumptions for market-consistent solvency regimes (e.g., Solvency II) in future embedded value reporting. This will allow firms to align the assumptions used between the reporting measures, if they wish to do so. Whilst this does not compel companies to align the assumptions, we anticipate that this will lead to reduced divergence between embedded value and Solvency II reporting measures in future.

Prior to this amendment, the CFO Forum announced additional guidance for embedded value reporting in October 2015, which stated that it did not view an allowance for Solvency II, and its associated consequences, to be required when complying with the MCEV or EEV reporting principles for reporting periods ending prior to 30 June 2016. As such, the embedded value metrics reported by firms in respect of year-end 2015 will not necessarily have taken Solvency II methodologies and consequences into account.

Following these announcements, and continuing the trend seen since 2014, a number of firms have continued to align their embedded value methodologies with Solvency II. This is particularly noted in the reference rates used, where some firms have transitioned to the Solvency II risk-free yield curves, or have adopted the VA or MA. Firms were also seen to adopt the yield curve extrapolation and convergence methodology specified within the Delegated Acts, with the parameters set out in the technical information published by EIOPA relating to risk-free rate term structures on 13 January 2016.

In this publication, we focus on embedded value results as at year-end 2015. In addition to providing an overview of the methodologies companies used and commenting on any developments, we have covered a range of current *hot topics* that companies may wish to consider when developing and enhancing their embedded value approaches in the future. They include:

- Developments in the embedded value methodology after Solvency II implementation
- Determining the RDR
- Calculating the CoC
- Assessing the CRNHR
- Evaluating the TVOG
- Disclosures in embedded value reporting
- Other measures of value (market capitalisation, IFRS, and Solvency II)

Appendix 1 on page 22 covers a high-level overview of some of the key components of an embedded value calculation.

## Embedded value approaches

In May 2016, the CFO Forum issued revised MCEV and EEV Principles and Guidance, updated for the Solvency II regime which came into force on 1 January 2016. The CFO Forum noted that there are similarities between the methodology and assumptions used to determine the Solvency II balance sheet and those employed under embedded value reporting, and that alignment of methodology and assumptions between Solvency II and MCEV and EEV may be beneficial for companies that report under one of these approaches. The CFO Forum amended both EEV and MCEV Principles in areas where the embedded value reporting differed from Solvency II.

The changes to MCEV Principles include:

- Principle 1 G1.5 has been added, which states that where Solvency II is adopted for solvency reporting, certain components of the MCEV methodology may be aligned to Solvency II methodology and assumptions, as described in Principles 3, 5, 6, 8, 10, 11, 14, and 16. Alignment of MCEV to Solvency II methodology and assumptions in other areas is permitted, provided that the nature of such alignment is disclosed.
- Principle 3 now allows the value of in-force (VIF) to be implicitly included within other components of the MCEV, when a balance sheet presentation is adopted for MCEV and MCEV methodology is aligned with Solvency II.
- Principle 5 now allows companies to align the Required Capital to the Solvency Capital Requirement under Solvency II.
- Contract boundaries has been one of the areas where there has been a difference in definitions. Principles 6 and 10 were amended to permit the alignment of the definition of contract boundaries with Solvency II.
- If the Risk Margin includes sufficient allowance for the frictional costs of required capital, then no further allowance for frictional costs of required capital is needed (Principle 8).
- Principle 14 has been amended and now allows the use of the Solvency II risk-free rate term structure, CRA, MA, and VA.
- Further changes include the potential for alignment of expense and taxation methodology with Solvency II (Principle 11) and the potential for allowing surplus funds allocated to participating business to be treated as a component of free surplus and required capital rather than VIF (Principle 16).

Overall, these changes allow companies to fully align the methodology and presentation of results between Solvency II and MCEV, and use Solvency II Own Funds as the MCEV measure.

The most significant change has been with regard to disclosures, where the previous disclosures are no longer compulsory but serve as an example of what can be disclosed. The new advice suggests that significantly less information may be disclosed. As a minimum, the updated MCEV Principles require the following disclosures:

- Assumptions, methodology, and key judgements underlying the MCEV results presented
- Sensitivities to key assumptions
- An explanation of results compared to the prior period
- Any areas of noncompliance with the MCEV Principles and Guidance

Similar changes have been made to the EEV Principles and Guidance, to allow methodologies to be aligned between EEV and Solvency II for companies reporting under EEV Principles. The following EEV Principles have been amended:

- Principle 3 allows an implicit inclusion of present value of future shareholder cash flows from in-force covered business (PVIF) in other components when the EV methodology is aligned to Solvency II (methodology and assumptions) and a balance sheet presentation is adopted for EV.
- Principle 5 allows an alignment of the Required Capital with Solvency II capital requirements and requires no further allowance for cost of required capital if Solvency II is adopted for solvency reporting, and the Solvency II Risk Margin contains sufficient allowance for the cost of holding the required capital.
- The basic risk-free interest rate term structure, CRA, MA, and VA as calibrated and applied in Solvency II is now a possible application of Principle 10 and associated Guidance.
- Principles 6 and 8 allow an alignment of contract boundaries definitions between Solvency II and EEV.
- Principle 9 has been amended to allow expenses and taxation methodologies to be aligned with Solvency II.
- Principle 11 allows for surplus funds allocated to participating business to be treated as a component of free surplus and required capital rather than VIF.

Similarly to MCEV Principles, requirements for disclosures have been reduced significantly.

The breakdown of the number of companies from our sample of 23 using EEV, market-consistent EEV<sup>4</sup>, and MCEV Principles is shown in Figure 3. In addition, some companies follow equally valid approaches that do not entirely conform to either the MCEV or EEV Principles and they are captured under 'Other'. For example, Swiss Re reports under a basis known as its Economic Value Management framework.

Some companies, included in last year's analysis, did not disclose embedded value results for 2015 year-end at the time of writing, namely Hannover Re, Mapfre, Munich Re, Standard Life, Delta Lloyd, Mediolanum, PZU, and Storebrand. Standard Life explained in its annual report that it no longer reports an embedded value because it is no longer solely an insurance company, and more than one accounting convention may detract from clarity of reporting. Legal & General stated in its annual report that from 2016 the group will no longer be reporting EEV information, given that the Solvency II reporting framework incorporates a best estimate of cash flows in relation to insurance assets and liabilities and consequently has replaced EEV reporting in the management information used internally to measure and monitor capital resources.

Overall, the framework used by companies that disclosed embedded value in 2015 has remained generally static; although Allianz moved to a balance sheet approach and fully aligned its methodology with Solvency II.

**FIGURE 3: EMBEDDED VALUE REPORTING PRINCIPLES**

EV REPORTING PRINCIPLES	2014			2015		
	CFO FORUM MEMBERS	OTHER COMPANIES	TOTAL	CFO FORUM MEMBERS	OTHER COMPANIES	TOTAL
EEV	1	1	2	1	0	1
Market-Consistent EEV	5	5	10	3	3	6
MCEV	9	8	17	6	6	12
Solvency II Based	0	1	1	1	1	2
Other	2	0	2	2	0	2
<b>Total</b>	<b>17</b>	<b>15</b>	<b>32</b>	<b>13</b>	<b>10</b>	<b>23</b>

Notes:

1. Number of companies based on a sample of 23 in 2015. Eight companies did not disclose their Embedded Value results (Hannover Re, Mapfre, Munich Re, Standard Life, Delta Lloyd, Mediolanum, PZU, Storebrand), Friends Life is now part of Aviva.
2. Swiss Re does not report explicitly under either EEV or MCEV principles but under a framework called Economic Value Management.
3. Prudential uses a market consistent approach for shareholder-backed annuities and EEV Principles for the rest of the business.

As noted above, the CFO Forum in October 2015 announced additional guidance for embedded value reporting. In this additional guidance, the CFO Forum permits, but does not require, an allowance for Solvency II and its associated consequences when complying with the MCEV Principles, or the EEV Principles, for reporting periods ending before 30 June 2016. Companies responded differently to this additional guidance, with some choosing not to reflect the Solvency II requirements (but noting that it may have a significant impact), some choosing to further align their bases with Solvency II and/or reflecting the Solvency II capital requirements, and some fully replacing their embedded value reporting with Solvency II.

<sup>4</sup> The term 'market-consistent EEV' describes a company reporting in compliance with the EEV Principles but on a market-consistent basis.

Figure 4 outlines companies' approaches to reflecting the impact of Solvency II at 2015 year-end.

**FIGURE 4: HOW SOLVENCY II IS REFLECTED IN EMBEDDED VALUE REPORTING YEAR-END 2015**

COMPANY	HOW SOLVENCY II IS REFLECTED IN EMBEDDED VALUE REPORTING (YEAR-END 2015)
<b>CFO FORUM MEMBERS</b>	
Ageas	Reference term structure is in line with valuation parameters set by EIOPA (except HKD)
Allianz	Full alignment with Solvency II
Aviva	No allowance
AXA	Transitioned to Solvency II capital requirements at the 2015 year-end, liquidity premia were replaced by VA
CNP	No allowance, additional sensitivity disclosed on the required capital in line with Solvency II requirements
Generali	Changes include definition of reference rates and required capital – required capital is based on Solvency II for European Economic Area (EEA) companies and local regulatory capital for non-EEA companies
Legal & General	No allowance
Prudential	No allowance
SCOR	No allowance
Talanx	Adoption of CoC rate of 6%
ZIG	No allowance
<b>OTHER COMPANIES</b>	
Achmea	Conversion with Solvency II, except CoC rate and contract boundaries
Baloise	Aligned methodology of the reference yield curves with Solvency II, including use of VA
Chesnara	No allowance
Old Mutual	No allowance
Phoenix	No allowance
Royal London	No allowance
St James's Place	No allowance
Uniq	The required capital is defined as the solvency required capital less subordinated debt and VIF under the Solvency II regime
Vienna	The required capital is defined as the solvency required capital less subordinated debt and VIF under the Solvency II regime

## Embedded value results

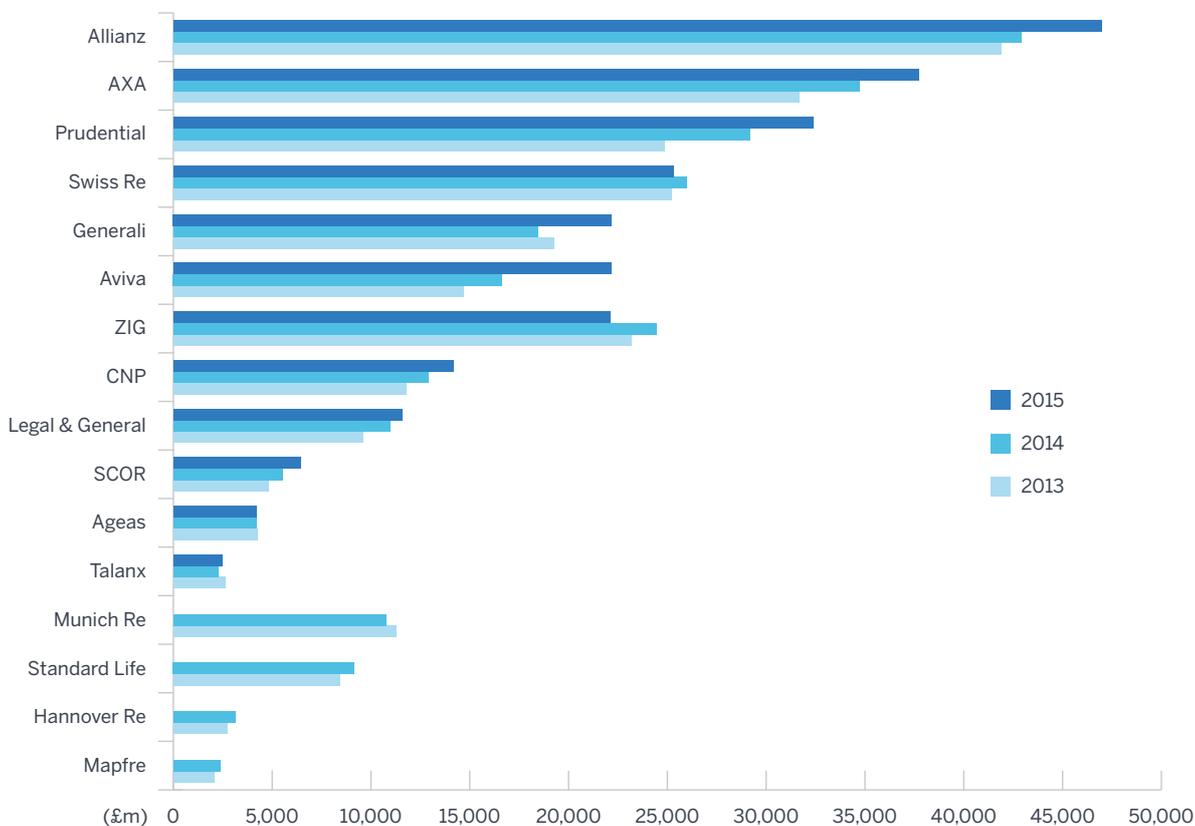
### EMBEDDED VALUE

In 2015, many developed economies experienced mixed economic growth. Generally, this resulted in variable equity market performance across different European geographies, increasing volatilities, and narrowing credit spreads. However, many companies responded to this by implementing management actions around product design and/or steering new business written towards a more profitable business mix. Overall, the economic climate was similar to that experienced by insurers in 2014.

The current CFO Forum members (that disclosed their embedded values at the end of 2015) had a combined embedded value of GBP 248 billion (EUR 337 billion) at the end of 2015, compared with GBP 228 billion (EUR 294 billion) at the end of 2014. Figure 5 shows the embedded value results of current CFO Forum members at the last three year-ends.

The majority of companies included in this study experienced an increase, of varying degrees, in their group embedded values compared with 2014. Two companies saw a decrease in the group embedded values.

**FIGURE 5: PUBLISHED EMBEDDED VALUE RESULTS OF CFO FORUM MEMBERS AT YEAR-END 2013, 2014 AND 2015**



1. Ageas' embedded value is the total of 'life' and 'non-life & other insurance'.

2. Munich Re, Standard Life, Hannover Re and Mapfre did not disclose any embedded value results in 2015.

3. Past years' EV results are converted to GBP using end year 2015 exchange rate to exclude the effect of exchange rate in comparison.

The embedded values considered in Figure 5 include both covered and non-covered business. Allianz, AXA, and Prudential take the top three positions in terms of the largest combined business embedded values. During 2015, the top performers based on percentage increases in embedded value were Aviva, Generali, and SCOR.

- Aviva's embedded value increase of 33% mainly reflects the profit for the year and the Friends Life acquisition.
- The main drivers of Generali's 20% increase in embedded value were a combination of an increase in the EU reference rates and a reduction of government bond spreads, together with a strong savings business performance in the Latin and Asia areas, higher volumes of unit-linked business written in Italy, Germany, and France, and the expansion of protection business in all geographical areas.

- SCOR experienced positive economic and experience variances as well as an improved value of new business, which drove a 16% increase in embedded value. More specifically, the market value gain on investments together with favourable currency movements had a positive impact on economic variances, which served to increase the company's embedded value. In addition, active in-force management had a positive impact on the experience variance, thereby increasing the embedded value.

Two companies—Swiss Re and ZIG—experienced a decrease in their embedded values<sup>5</sup>, whereas Ageas's embedded value stayed broadly the same.

- Swiss Re's positive Economic Value Management (EVM) performance has been offset by unfavourable investment performance in a challenging market and a loss in Admin Re<sup>®</sup> driven by the Guardian transaction.
- Similarly, ZIG also experienced negative economic variances, which drove a fall in the embedded value. Most of the company's results dropped as a result of unfavourable currency movements and dividend payments. In addition, embedded value for Italy's business decreased because of a lower new business value, resulting from the use of a reduced interest rate, whilst Ireland's results were further reduced due to a change in expenses assumptions.
- Ageas's total return was positively impacted by the effect of spread narrowing. However, the increase in interest rate volatilities in the financial markets has negatively impacted the total return. Therefore, Ageas's embedded value results in 2015 had a small 0.5% increase compared with 2014 year-end's results.

#### VALUE OF NEW BUSINESS

Some companies noted that their improved values of new business mainly stemmed from management actions around the repricing and redesigning of products, following years of challenging economic conditions. Overall, results for new business were fairly positive for the majority of companies in our sample. The total value of new business (VNB) written by the current CFO Forum members (that disclosed their values of new business at the end of 2015) was GBP 9.7 billion (EUR 13.2 billion) in 2015, compared with GBP 10.3 billion (EUR 13.2 billion) in 2014.

Figure 6 shows the values of new business over the last three years for the CFO Forum members (who disclosed their new business results). Prudential, AXA, and Allianz took the top three positions in terms of VNB in 2015. The top performer, based on percentage increase in the VNB, was Talanx, which saw a significant increase in VNB in 2015 compared with 2014, primarily driven by an increase in new business volumes from reinsurance business, a more favourable outlook on interest rates, and a revised business mix to increase profitability in the ongoing low-interest environment.

Underlying the VNB results, the average new business margin<sup>6</sup> for the CFO Forum members decreased slightly to 3.3% in 2015 from 3.6% in 2014<sup>7</sup>. There was approximately a 5% increase in new business volumes over 2015.

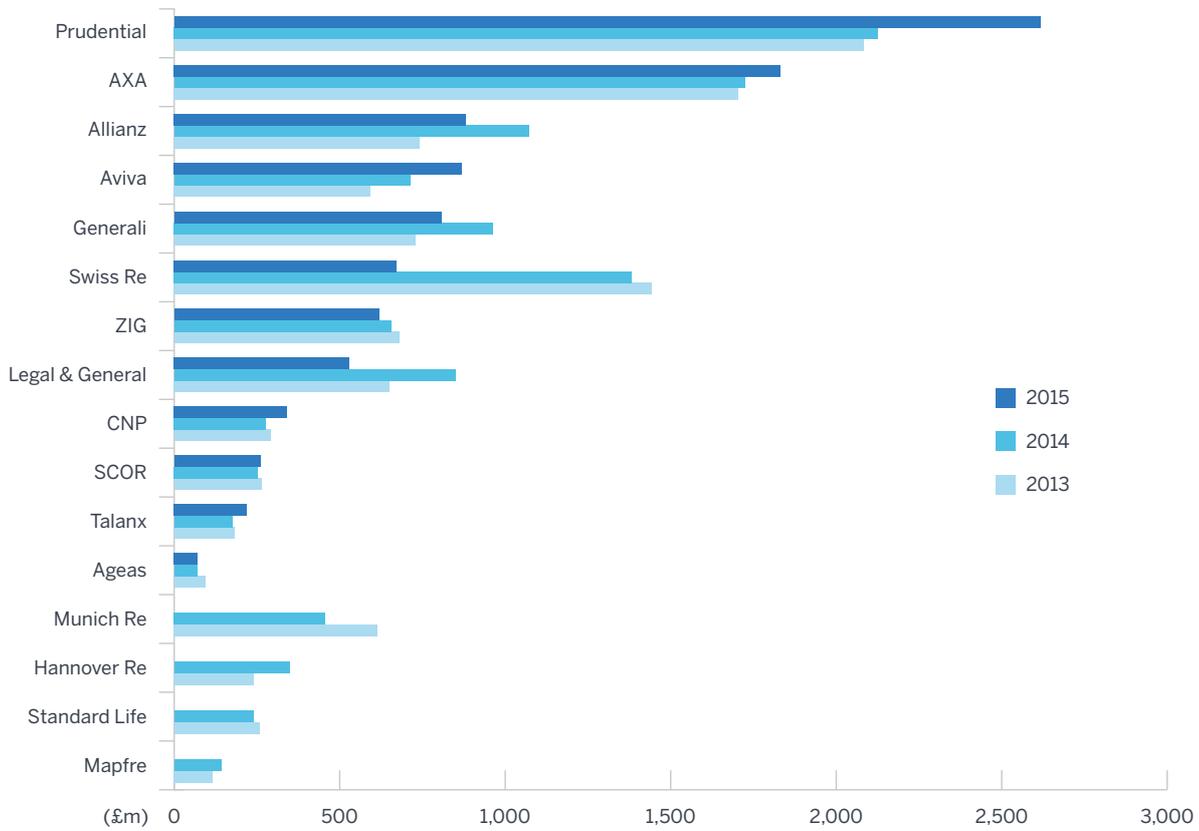
Companies in the CFO Forum (that disclosed their VNBs) experienced a mixture of movements in their VNBs. Prudential, Aviva, CNP, and Talanx saw their VNBs increase by more than 20%, whilst Swiss Re and Legal & General saw their VNBs drop by more than 30%. More than half of the CFO Forum members that disclosed their EV results increased their new business volumes, but also more than half saw the decrease of new business margins.

<sup>5</sup> Swiss Re uses a framework called Economic Value Management.

<sup>6</sup> Throughout this report, 'new business margin' is defined as the ratio of VNB to the present value of new business premiums.

<sup>7</sup> This includes companies disclosing their results in 2015 only.

**FIGURE 6: PUBLISHED VALUE OF NEW BUSINESS BY CFO FORUM MEMBERS AT YEAR-END 2013, 2014 AND 2015**



1. Swiss Re VNB only includes the value from its underwriting activities.  
 2. Talanx has a 50% holding in Hannover Re. The VNB for Talanx includes this participation in Hannover Re.  
 3. Past years' EV results are converted to GBP using end year 2015 exchange rate to exclude the effect of exchange rate in comparison.

## Methodology hot topics

Based on our analysis of companies' embedded value methodologies, evolving practices, and emerging market trends, including conversion of EV methodology to Solvency II methodology, we see three key *hot topic* areas: (1) the construction of the RDR, (2) how to allow for the CoC, including the CRNHR, and (3) recognising the TVOG. We consider each of these in detail below.

### Risk discount rate

The risk discount rate (RDR) is one of the key assumptions required for a company's embedded value calculation (under either MCEV or EEV), as it is used to discount the projected cash flows.

In determining the RDR, companies consider a number of key areas, such as:

- Whether to construct the RDR using a *bottom-up* or a *top-down* approach. To comply with the MCEV Principles, a *bottom-up* approach is required.
- The underlying basis for the RDR—typically, swap rates or the return on government-issued debt. Furthermore, consistency with Solvency II risk-free interest rates has become a conscious decision for those firms aligning their embedded value methodologies to Solvency II.
- Allowing for the inclusion of a liquidity premium (also referred to as a MA under Solvency II) or VA.
- Extrapolating for longer durations where reliable data in the asset market may not exist.

Companies may adopt a number of different approaches to address these areas, which in some cases will be dependent on whether they are reporting under the EEV or MCEV Principles as well as on how closely they wish to align with Solvency II requirements. An overview of the approaches used to determine the RDRs by companies as at year-end 2015 is provided in Figure 7. Each of these areas is expanded in further detail in the subsequent sections.

### Construction of risk discount rate

Legal & General continues to be the only company in our study to use a top-down approach to construct the RDR. Figure 7 sets out the approach to construction of the RDR by firms included in our study.

### Basis for risk-free rate

Based on our study, over 60% of companies reporting under the EEV Principles use swap rates as a starting point for the reference rate. The majority of companies reporting under MCEV Principles also use swap rates, with two exceptions—Phoenix continued to use government bonds as the basis for its reference rate and Old Mutual switched to using government bonds in 2015.

Companies that opted to use swap rates as the basis for their reference rates also needed to decide which swap rates to use. In the recent past, industry practice has seemed to suggest swaps based on interbank lending rates, such as the London Interbank Offered Rate (LIBOR) in the UK for sterling-based cash flows. As the underlying rate (e.g., LIBOR) contains some level of compensation for the credit risk associated with lending money to a bank, even for a short duration, an adjustment is sometimes made to the resulting interest rate curve. Ageas and SCOR continued to apply a reduction to the swap rate—this year five more companies aligned their methodologies in this respect with Solvency II (AXA, CNP, Generali, SCOR, and Baloise). Overall the majority of companies reporting under MCEV Principles applied the CRA in line with the technical information published by EIOPA relating to risk-free interest rate term structures on 13 January 2016.

### Allowance for liquidity premium

As expected, there has been a continued trend of companies moving away from the Solvency II Quantitative Impact Study 5 (QIS 5) methodology and liquidity premium in favour of aligning their adjustments to risk-free rates under Solvency II. Four companies (AXA, CNP, Generali, and Baloise) used VA as an adjustment to their discount rates, which is in addition to the five companies (Ageas, Allianz, Talanz, Achmea, and Storebrand<sup>8</sup>), which applied a VA in 2014. This move is likely to have affected results, given that the benefits of using a liquidity premium are generally larger than those of a VA adjustment. In particular, Generali and AXA have disclosed an impact on their embedded value results of around a 4% reduction due to abandoning liquidity premium in favour of a VA. No companies in our sample disclosed the use of a MA as an adjustment to the discount rate. Allianz was the only company to use it in 2014 for its pension business in Spain, but it used VA for this business in 2015 instead. The move away from liquidity premium and wider use of VA in 2015 reflects the implementation of Solvency II as at 1 January 2016.

8 Storebrand had not disclosed embedded value results for 2015 year-end at the time of writing.

**FIGURE 7: OVERVIEW OF RISK DISCOUNT RATE CONSTRUCTION**

COMPANY	PRINCIPLES	RISK DISCOUNT RATE METHODOLOGY	UNDERLYING BASIS FOR RISK DISCOUNT RATE	OTHER ADJUSTMENTS	EXTRAPOLATION OF RISK-FREE CURVE	DIFFERENCE FROM SII SPECIFICATIONS FOR EXTRAPOLATION
<b>CFO FORUM MEMBERS</b>						
Ageas	EEV (MC)	Bottom up	Swaps, CRA <sup>2</sup>	VA <sup>4</sup> for EUR, USD and HKD	Yes, SII <sup>7</sup>	Parameters as per SII
Allianz	Solvency II Based	Bottom up	Swaps, CRA	VA	Yes, SII	Parameters as per SII
Aviva	MCEV	Bottom up	Swaps	Liquidity Premium, QIS 5	Yes, other <sup>8</sup>	Parameters as per SII
AXA	EEV (MC)	Bottom up	Swaps, CRA	VA	Yes, SII	Parameters as per SII except for Hong Kong where the convergence period is 40 years
CNP	MCEV	Bottom up	Swaps, CRA	VA	Yes, SII	Parameters as per SII
Generali	MCEV	Bottom up	Swaps, CRA	VA	Yes, SII	Parameters as per SII
Legal & General	EEV	Top down	Gov. Bonds	Not disclosed <sup>5</sup>	Not disclosed	
Lloyds Banking Group	EEV (MC)	Bottom up	Swaps, deduction for credit risk	Liquidity Premium, method not disclosed	Not disclosed	
Prudential	EEV (MC)	Bottom up	Swaps (Annuities) <sup>3</sup> Gov. Bonds (Other)	Liquidity Premium, method not disclosed	Not disclosed	
SCOR	MCEV	Bottom up	Swaps, CRA	Not disclosed	Yes, SII	Parameters as per SII
Swiss Re	Other <sup>1</sup>	Bottom up	Gov. Bonds	No	Not disclosed	
Talanx	MCEV	Bottom up	Swaps, CRA	VA	Yes, SII	Parameters as per SII except for Poland (PLN) where the LLP is 15 years and the convergence period is 40 years
ZIG	MCEV	Bottom up	Swaps	Liquidity Premium, QIS 5 <sup>6</sup>	Not disclosed	
<b>OTHER COMPANIES</b>						
Achmea	Solvency II Based	Bottom up	Swaps, CRA	VA	Yes, SII	Parameters as per SII
Baloise	MCEV	Bottom up	Swaps, CRA	VA	Yes, SII	Parameters as per SII except for CHF where a LLP of 15 years is used
Chesnara	EEV (MC)	Bottom up	Swaps	No	Not disclosed	
Old Mutual	MCEV	Bottom up	Gov. Bonds	Liquidity Premium, method not disclosed	Yes, not disclosed	
Phoenix	MCEV	Bottom up	Gov. Bonds, +10 bps	Liquidity Premium, method not disclosed	Yes, not disclosed	
Royal London	EEV (MC)	Bottom up	Gov. Bonds	Not disclosed	Not disclosed	
St James's Place	EEV (MC)	Bottom up	Gov. Bonds	Not disclosed	Not disclosed	
Swiss Life	MCEV	Bottom up	Swaps	Liquidity Premium, QIS 5	Yes, QIS 5 <sup>9</sup>	
Uniqqa	MCEV	Bottom up	Swaps, CRA	Liquidity Premium, method not disclosed	Yes, SII	Parameters as per SII
Vienna	MCEV	Bottom up	Swaps	Liquidity Premium, method not disclosed	Yes, SII	Parameters as per SII

1. Swiss Re uses an Economic Value Management framework.

2. Credit Risk Adjustment is applied in line with the EIOPA published technical information from 13 January 2016.

3. Prudential uses swaps for its UK shareholder-backed annuity business.

4. Volatility adjustment in line with the EIOPA published technical information from 13 January 2016.

5. An allowance for a liquidity premium can be regarded to be implicit within the spread over the risk-free rate for certain assets.

6. QIS 5 methodology to deriving Liquidity Premium is to take 50% of (corporate spread over swaps less 40 bps) if greater than zero.

7. Smith-Wilson approach using Solvency II parameters.

8. Nelson-Siegel extrapolation methodology.

9. Smith-Wilson approach using QIS 5 parameters.

Last year there was an expectation that more companies would adopt the use of MA for their embedded value reporting once they received MA approvals. Instead, companies preferred to apply a VA this year, which is potentially due to the use of MA being computationally more intensive along with time pressurised reporting deadlines.

The changes in approaches to adjustments to risk-free rate and values of these adjustments are shown in Figure 8, for those companies for which the use and value of these adjustments were explicitly disclosed.

**FIGURE 8: SUMMARY OF RISK DISCOUNT RATE ADJUSTMENTS AND SENSITIVITIES AS AT YEAR-END 2014 AND 2015**

COMPANY	UNDERLYING BASIS FOR RISK DISCOUNT RATE	OTHER ADJUSTMENTS	VALUE AT 2014 (BPS)	VALUE AT 2015 (BPS)	SENSITIVITY
<b>CFO FORUM MEMBERS</b>					
Ageas	Swaps	VA for EUR, USD and HKD	19 (Euro, VA) 47 (US, VA) 36 (HKD, VA)	22 (Euro, VA) 81 (US, VA) 64 (HKD, VA)	No VA VA + 10 bps
Allianz	Swaps	VA	13 (Euro including Greece, VA) 28 (Switzerland, VA) 50 (US, VA) 4 (Czech Republic, VA) 28 Hungary, VA) 18 (Poland, VA) 17 (Thailand, VA)	22 (Euro excluding Greece, VA) 55 (Greece, VA) 9 (Switzerland, VA) 78 (US, VA) 8 (Czech Republic, VA) 19 (Hungary, VA) 8 (Poland, VA)	UFR by -200 bps
Aviva	Swaps	LP	109 (UK Immediate Annuity) 82 (UK Deferred Annuity) 19 (France, Ireland, Spain - annuity) 15 (France, Spain, Italy - participating business)	114 (UK Immediate Annuity) <sup>1</sup> 86 (UK Deferred Annuity) <sup>2</sup> 38 (France, Ireland, Spain - annuity) 29 (France, Spain, Italy - participating business)	LP + 10 bps
AXA	Swaps	VA	20 (Euro, LP) 61 (US, LP) 53 (UK, LP) 0 (Switzerland, LP)	22 (Euro, VA) 78 (US, VA) 31 (UK, VA) 3 (Japan, VA) 9 (Switzerland, VA) 78 (Hong Kong, VA)	No VA VA + 10 bps
CNP	Swaps	VA	24 (Euro, LP)	22 (Euro, VA)	No VA VA + 10 bps
Generali	Swaps	VA	61 (UK, LP) 19 (Euro, LP) 0 (Switzerland, LP) 7 (Czech Republic, LP)	31 (UK, VA) 22 (Euro, VA) 9 (Switzerland, VA) 6 (Czech Republic, VA)	No VA VA + 10 bps
Lloyds Banking Group	Swaps	LP (Annuities), method not disclosed	120 (UK Annuities)	85 -144 (UK Annuities)	LP + 10 bps
Prudential	Swaps (Annuities) Gov. Bonds (Other)	LP, method not disclosed	UK Annuities 85 (Existing business) 79 (New business)	UK Annuities 116 (Existing business) New business, not disclosed	LP + 10 bps
Talanx	Swaps Gilts (PLN)	VA	14 (EUR, primary business) 8 (PLN, primary business)	22 (EUR, primary business) 0 (PLN, primary business)	Not disclosed
ZIG	Swaps	LP, QIS 5	62 (US) 52 (UK) 17 (Euro) 0 (Swiss)	87 (US) 61 (UK) 40 (Euro) 5 (Swiss)	No LP
<b>OTHER COMPANIES</b>					
Achmea	Swaps	VA	Not disclosed	Not disclosed	Not Disclosed
Baloise	Swaps	VA	18 (Euro, LP) 0 (Switzerland, LP)	22 (Euro, VA) 9 (Switzerland, VA) 78 (US, VA)	LP + 10 bps
Old Mutual	Gov. Bonds (South Africa) Swaps (Other)	LP, method not disclosed	OMLAC (SA) 55 (Immediate Annuities) 50 (Fixed bond)	OMLAC (SA) 60 (Immediate Annuities) 60 (Fixed bond)	Not disclosed
Phoenix	Gov. Bonds	LP, method not disclosed	46 (UK)	52 (UK)	Not disclosed

**FIGURE 8: SUMMARY OF RISK DISCOUNT RATE ADJUSTMENTS AND SENSITIVITIES AS AT YEAR-END 2014 AND 2015 (CONTINUED)**

COMPANY	UNDERLYING BASIS FOR RISK DISCOUNT RATE	OTHER ADJUSTMENTS	VALUE AT 2014 (BPS)	VALUE AT 2015 (BPS)	SENSITIVITY
Swiss Life	Swaps	LP, QIS 5	69 (UK)	83 (UK)	Not Disclosed
			24 (Euro)	38 (Euro)	
			63 (US)	84 (US)	
			20 (Switzerland)	24 (Switzerland)	
			25 (Canada)	48 (Canada)	
Uniq	Swaps	LP	34 (EUR)	34 (EUR)	No LP
			12 (CZK)	9 (CZK)	
			12 (HUF)	29 (HUF)	
			12 (PLN)	12 (PLN)	
			0 (RUB)	0 (RUB)	
Vienna	Swaps	LP	9 (Euro)	22 (Euro)	No LP
			2-16 (Other)	1-19 (Other)	

Notes: OMLAC (SA) is Old Mutual Life Assurance Company South Africa.

1. In addition to UK annuity business (UKA), immediate annuities have also been sold in the UK life and pensions business (UKLAP) and Friends UK. At YE15, the liquidity premium for Friends UK policies is 77 bps for existing business and 90 bps for new business, and for UKLAP policies is 76 bps (YE14: 61 bps).
2. In addition to UK annuity business (UKA), deferred annuities and participating business eligible for a liquidity premium have been sold in the Aviva UK life and pensions business (UKLAP) and Friends UK. The liquidity premium for UKLAP policies at YE15 is 57 bps (YE14: 46 bps). The approach to estimating the liquidity premium in the UKLAP business was revised during 2014 to be consistent with the approach taken for these products in other businesses. The liquidity premium in Friends UK at FY15 is 58 bps for existing business; volumes of new business sold are not material.

At year-end 2015, liquidity premiums applied were generally slightly higher than those applied in 2014 and remained in the region of 30 to 110 bps. VAs applied in 2014 differed from the ones published by EIOPA, potentially because EIOPA curves were published quite late, whilst VAs applied in 2015 were generally in line with the curves published by EIOPA.

Recognising the sensitivity of the results to the liquidity premium or VA, a number of companies also disclosed embedded value sensitivities to the size of those adjustments. These sensitivities were generally based on a 10 bps increase to the liquidity premium/VA or the removal of the liquidity premium/VA.

### Yield curve extrapolation

Figure 7 above shows that, at year-end 2015, as was the case at year-end 2014, of the companies disclosing their extrapolation methodologies, the Solvency II approach was most prevalent, with most of the companies aligning their parameters—including ultimate forward rate (UFR), last liquid point (LLP), and convergence period—with those specified under the Solvency II regulation.

Suitable values for key inputs into the chosen extrapolation method, such as the LLP, the UFR, and the period over which convergence to the UFR is achieved, can vary over time. As such, companies should ensure that these values reflect their views on the long-term rates before using them in their embedded value reporting. The change in extrapolation approach may produce a significant impact on embedded value results. For example, Allianz disclosed a sensitivity to a reduction of the UFR by 200 bps and reported a decrease in the MCEV of 13.7%.

### Cost of capital

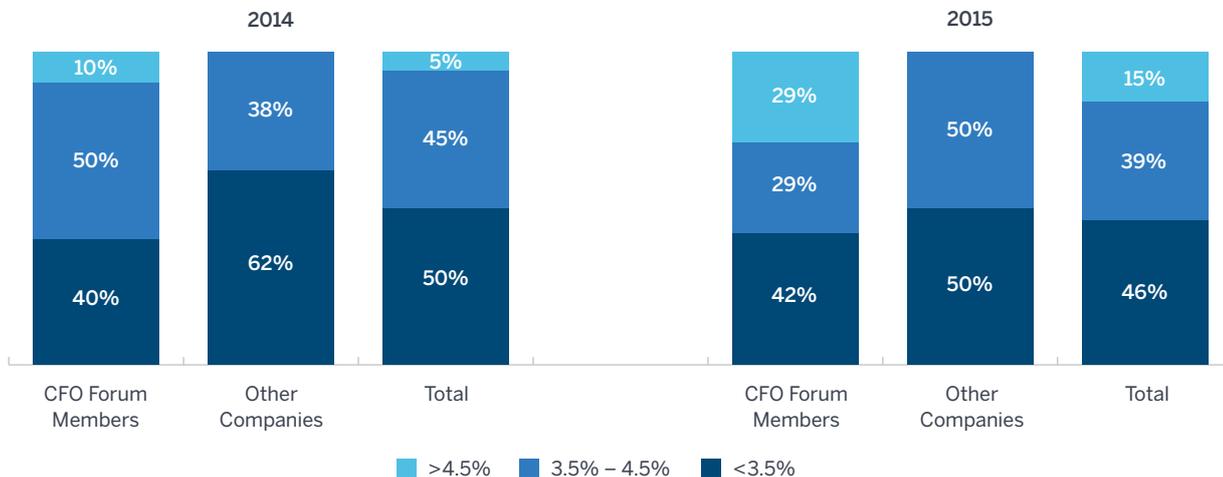
The majority of companies reporting a market-consistent embedded value calculate the cost-of-capital (CoC) using the frictional cost approach, which is the approach required under MCEV Principles. However, the definition of required capital differs between companies. As at year-end 2015, almost all companies disclosed that they set their required capital by reference to local regulatory requirements, with the vast majority of them also taking into consideration the results from an internal capital model. Some companies used Solvency II capital requirements as their regulatory capital. In addition, of those that disclosed the basis of their required capital, approximately a third of the companies stated that they considered the level of capital also needed to achieve a certain target credit rating.

### Cost of residual non-hedgeable risks

The majority of companies continue to use approximate methods to project the residual non-hedgeable risks-based-capital, for example by running off the initial capital derived over the projection term in line with certain drivers. The drivers reported by companies generally include reserves, premiums, and sums at risk. The choice of drivers has generally remained stable.

Figure 9 shows the range of the equivalent average CoC charges based on the companies included in our analysis reporting under MCEV Principles, split by CFO Forum members and other companies. There have been some changes in the CoC rate applied, with Allianz and Talanx increasing their rates to 6% to align with the CoC rate used for the Risk Margin under Solvency II, CNP increasing its rate by 0.2%, and SCOR reducing its rates by 0.8%.

**FIGURE 9: EQUIVALENT AVERAGE COST-OF-CAPITAL CHARGE FOR NON-HEDGEABLE RISKS AT YEAR-END 2014 AND 2015**



A lower charge does not necessarily imply a weaker assumption or lower overall CRNHR. Instead, it may capture the different extents to which companies allow for non-hedgeable risks in their present values of future profits (PVFPs) and TVOGs, diversification, and varying business models and strategies, as well as in the general differences among the wider embedded value methodologies adopted by companies. The equivalent average cost-of-capital charges differ across companies. At the lower end of the spectrum, one company made no allowance for the CRNHR, while the highest observed in our analysis was 6% per annum. The company which made no allowance stated that the CRNHR was not applicable because of the insurer's particular business model: the insurer has a closed book with no new business, uses significant outsourcing, and the insurer states that it has succeeded in closing out significant legacy risks. This insurer discloses a CRNHR as a sensitivity to the main results.

The CRNHR has similarities to the Risk Margin under Solvency II. A key difference between the Risk Margin and the CRNHR is that the Risk Margin covers all business and not just long-term business, whereas the CRNHR will be in respect of long-term business only. As such, the Risk Margin will have explicit allowance for diversification between covered and non-covered business, which is different from the MCEV Principles.

The Delegated Acts require a cost-of-capital charge of 6% and, whilst not directly comparable, our analysis indicates this is potentially higher than the charge companies are currently considering in their MCEV reporting.

Some companies identified particular concerns with the CRNHR approach, citing that, according to the MCEV Principles, no allowance for further risk management actions is anticipated or reflected and that this was not representative of the company's future risk profile. Consequently, providing sensitivities will help companies to demonstrate to observers the future potential impact of their risk management profiles and plans.

Companies continue, in the main, to allow for diversification in line with the MCEV Principles, which state that diversification should not be allowed for between hedgeable and non-hedgeable risks or between covered and non-covered business in the CRNHR. In 2015, ZIG changed its approach and chose to no longer recognise diversification benefits between covered and non-covered business.

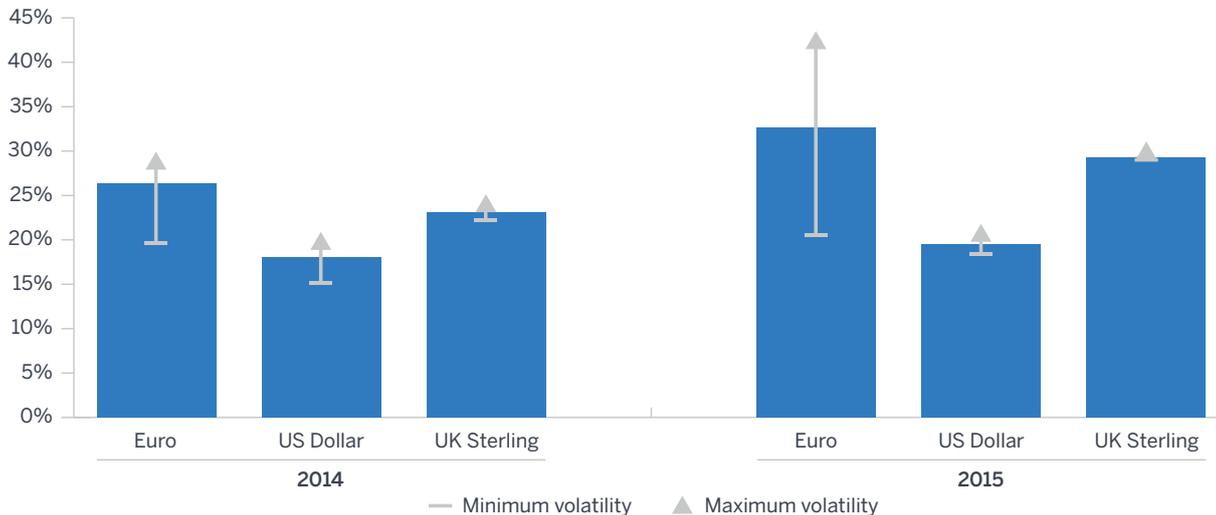
This may be an area where Solvency II and embedded value approaches continue to differ.

#### Time value of options and guarantees

The majority of companies continued to base volatility assumptions for property on historical analysis and expert opinion in the absence of meaningful option prices from which implied volatility could be accurately derived.

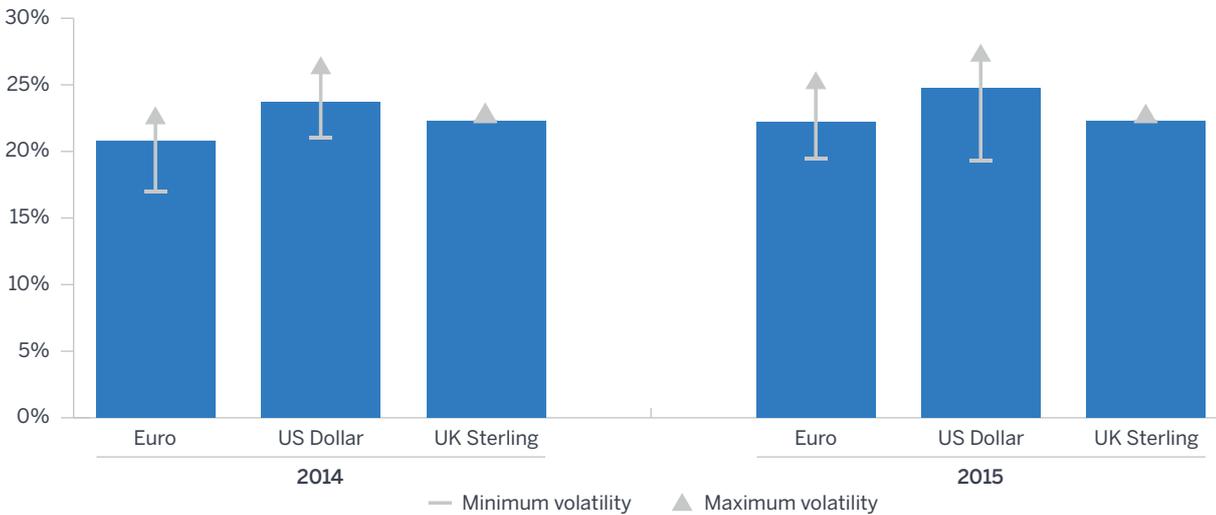
Figures 10 and 11 show the average, the highest, and the lowest implied volatility levels used by companies complying with the MCEV Principles (where the volatility from swaptions shows the volatility of risk-free rates, and equity option volatility shows the volatility used for equity). Furthermore, the majority of companies continued to base asset correlations on historical market relationships. The MCEV guidance in this area requires companies to check correlations against external sources for reasonableness which was, in part, in anticipation of future sources of correlation information becoming available.

**FIGURE 10: SWAPTION IMPLIED VOLATILITIES - AVERAGE, HIGHEST AND LOWEST FOR MCEV COMPANIES**



\* Swaption-implied volatilities are based on 20-year swap length, 20-year option term.

**FIGURE 11: EQUITY IMPLIED VOLATILITIES - AVERAGE, HIGHEST AND LOWEST FOR MCEV COMPANIES**



\*\* Equities based on 10-year options.

As can be seen in Figures 10 and 11, equity-implied volatility across the different regions remained broadly at the same level as last year, with euro and U.S. dollar volatilities slightly increased. The range of volatilities for the U.S. dollar was wider than at this time last year.

Euro, U.S. dollar, and UK sterling interest rate volatility increased over 2015, continuing the trend of 2014. There is a wider range of interest rate volatilities disclosed for the euro. This is to be expected, as the swaptions used to derive these volatilities will depend on the country of issue, regardless of the currency.

Dynamic policyholder behaviour is included in many companies' assessments of TVOG. In particular, a number of companies recognise the impact of dynamic policyholder behaviour under certain economic scenarios. For example, if the guarantees attaching to certain product types (e.g., guaranteed annuity options) were projected to become in-the-money under certain scenarios it could result in higher take-up rates of the option and, possibly, an increase in the best-estimate assumption for the level of persistency.

Figure 12 shows that, of those companies that disclosed the number of scenarios used, the majority applied 1,000 economic scenarios on a market-consistent basis. This is the area where there potentially could have been some development as companies completed their preparations for Solvency II. However, there was no increase in the number of scenarios used in 2015 compared with 2014.

**FIGURE 12: TIME VALUE OF OPTIONS AND GUARANTEES: NUMBER OF SCENARIOS AND POLICYHOLDER BEHAVIOUR**

COMPANY	OPTIONS AND GUARANTEES	SCENARIOS	USE OF DYNAMIC POLICYHOLDER BEHAVIOUR
<b>CFO FORUM MEMBERS</b>			
Ageas	Market-consistent	1,000	Not Disclosed
Allianz	Market-consistent	1,000 (5,000 in Germany)	Yes
Aviva	Market-consistent	At least 1,000	Yes
AXA	Market-consistent	At least 1,000	Yes
CNP	Market-consistent	1,000	Yes
Generali	Market-consistent	1,000	Yes
Hannover Re	Not Disclosed*	Not Disclosed*	Not Disclosed*
Legal & General	Real world	Not Disclosed	Not Disclosed
Lloyds Banking Group	Market-consistent	Not Disclosed	Not Disclosed
Mapfre	Not Disclosed*	Not Disclosed*	Not Disclosed*
Munich Re	Not Disclosed*	Not Disclosed*	Not Disclosed*
Prudential	Both	Not Disclosed	Yes
SCOR	Market-consistent	Not Disclosed	Not Disclosed
Standard Life			
Swiss Re	Market-consistent	Not Disclosed	Not Disclosed
Talanx	Market-consistent	4,000 in domestic primary insurance (1,000 in international and reinsurance business)	Yes
ZIG	Market-consistent	1,000	Yes
<b>OTHER COMPANIES</b>			
Achmea	Not Disclosed	Not Disclosed	Not Disclosed
Baloise	Market-consistent	1,000-5,000	Yes
Chesnara	Market-consistent**	Not Disclosed	Not Disclosed
Mediolanum	Not Disclosed*	Not Disclosed*	Not Disclosed*
Old Mutual	Market-consistent	Not Disclosed	Yes
Phoenix	Market-consistent	Not Disclosed	Yes
PZU	Not Disclosed*	Not Disclosed*	Not Disclosed*
Resolution (Friends)	Not Disclosed*	Not Disclosed*	Not Disclosed*
Royal London	Market-consistent	Not Disclosed	Not Disclosed
St James's Place	Not Disclosed ***	N/A	N/A
Storebrand	Not Disclosed*	Not Disclosed*	Not Disclosed*
Swiss Life	Market-consistent	2,000	Yes
Uniqa	Market-consistent	At least 1,000	No
Vienna	Not Disclosed	Not Disclosed	Yes

\* Company did not disclose embedded value results in 2015.

\*\* Market-consistent with approximations.

\*\*\* St James's Place does not offer products that carry any significant financial guarantees or options.

## Disclosures

Disclosures is an area where changes had been expected during 2015 given the implementation of Solvency II, as at 1 January 2016, resulting in companies continuing to align their methodologies and reflecting these changes in their disclosures.

A number of companies have completely dropped their embedded value disclosures, which may be due to key stakeholders no longer considering embedded value as important to the management of their businesses or may be due to the similarities between MCEV reporting and the Solvency II regime. We expect that additional companies will scale back or even stop their current levels of embedded value disclosures for year-end 2016.

Those companies continuing to report embedded value generally did not change their level of disclosures, with some additional discussion on their allowances for Solvency II.

Updated EEV and MCEV Principles and Guidance published by the CFO Forum in May 2016 may bring significant changes to companies' disclosures at mid-year 2016 and year-end 2016. The prescribed format of disclosure and sensitivities is no longer compulsory, which may lead to a significant reduction in the information companies will disclose on the embedded value methodology and results going forward.

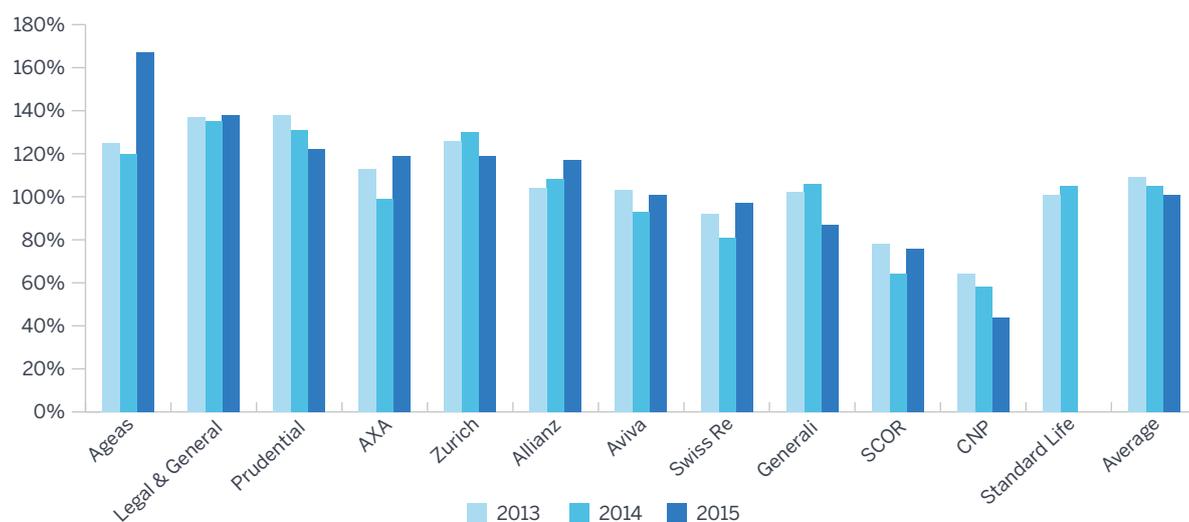
## Other measures of value

In this final section, we discuss how the results from embedded values compare and contrast with other metrics used by parties such as investors or market analysts. In particular, we consider first how embedded value compares to market capitalisation and then how developments in both Solvency II and IFRS reporting may impact embedded value reporting going forward.

### MARKET CAPITALISATION

The acid test of embedded value has always been how much the market believes the result. One simplistic way of measuring this is to compare a company's market capitalisation to its embedded value at a given point in time. However, discrepancies in the embedded value and the market capitalisation can be due to a number of reasons whose impact may not always be entirely clear. For example, no allowance is made within a company's embedded value calculation for future new business sales or for intangible assets such as the loyalty of a customer base, which may be factors investors consider and hence should be reflected within the market capitalisation. This may suggest that, as long as these items are thought to create value, market capitalisation should exceed the reported embedded value. Another reason for discrepancies may be timing differences between the availability of embedded value and market data.

**FIGURE 13: MARKET CAPITALISATION AS A PERCENTAGE OF EMBEDDED VALUE AS AT 31 DECEMBER 2013, 2014 AND 2015**



#### Notes

1. Excludes Lloyds Banking Group, Hannover Re, Talanx, Mapfre and Munich Re. A comparison of their embedded values to market capitalisation has not been included because their embedded values do not contain all the business within the group.
2. Market capitalisation has been sourced from Bloomberg for the last trading day of 2015, 2014 and 2013, except for SCOR whose market capitalisation has been sourced from its annual report.
3. Ageas embedded value is the total of 'life' and 'non-life & other insurance'.
4. Standard Life did not disclose its MCEV value in 2015.

Figure 13 on page 19 shows the market capitalisation as a percentage of the embedded value for current CFO Forum members as at 31 December 2013 to 31 December 2015.

The average ratio of the market capitalisation to the embedded value decreased over the last year, potentially indicating lower market confidence. Overall, the individual ratios moved further away from 100% than in previous years, with only two companies in the range of 90% to 110% and an overall range of 44% to 167%. Ageas's ratio moved significantly with its market capitalisation, increasing by about 45% over 2015 while the embedded value did not move much over that period.

## SOLVENCY II

Solvency II came into force on 1 January 2016. A key area of focus for life insurers are the long-term guarantee measures:

- Matching adjustment (MA)
- Volatility adjustment (VA)
- Risk-free discount rates

The MA is applied as an increase to the Solvency II discount rate and aims to reduce artificial volatility created by spread movements in portfolios where assets are held to maturity. The MA is specified as the spread on eligible assets over and above a 'Fundamental Spread' the latter aiming to capture the element of the overall spread that can be attributed to default risk. Since 31 December 2014, Fundamental Spreads have been published monthly by EIOPA. The use of the MA is subject to regulatory approval.

The MA has the following features:

- The Fundamental Spread is floored at 35% of the long-term average spread for corporate bonds and 30% of the long-term average spread for government bonds.
- The calibration of the Fundamental Spread has been more prudent than many in the industry expected, and so the benefit of the MA has been lower than expected.
- The MA can only be applied where the cash flows provided by the assets are fixed and contain no issuer options. However, assets with 'make-whole' clauses, under which the borrower must make an additional payment on early redemption in order to indemnify the lender for the loss of future income, are now in scope. In the UK, the Prudential Regulation Authority (PRA) has allowed callable bonds within MA portfolios if the assumed cash flows are coupons up to the first redemption date, no coupons subsequently, and principal repaid at the latest possible redemption date. Because this cash flow pattern is very unlikely to be realised, it is unclear to us if it is a suitable assumption for managing asset liability matching.
- Lower-rated assets may be held within the MA portfolio, although the benefit that can be taken for assets rated below BBB cannot exceed that of assets of similar grades.

A key requirement of the MA application is that the MA portfolio must be ring-fenced from the rest of the business, with, for standard formula companies, a resulting loss of diversification benefit in the Solvency Capital Requirement (SCR) calculation. If there is suitable justification, internal model companies may allow for some diversification between the MA portfolio and other business.

The VA's purpose is to dampen the impact of short-term market volatility on portfolios other than those subject to the MA and is specified as an increase to the Solvency II discount rate. Unlike the MA, the VA is not determined based on the actual holdings of an insurer. Instead, EIOPA calculates the VA based on reference portfolios representing typical asset mixes by currency and country. In the UK, a specific area of industry feedback has been the reference portfolio used—it contains a material proportion of equity investments, which lowers the level of the VA. The VA is calculated as 65% of the risk-adjusted spread on each reference portfolio, with additional allowance made when excess spreads in a particular country are significant. In some territories, use of the VA is at the insurer's discretion, whereas in others it is subject to regulatory approval.

Based on our study, the majority of companies reporting under market-consistent measures aligned their risk-free curves with Solvency II, including extrapolation methodology and parameters and the use of credit risk adjustment. The use of VA is now more prevalent than liquidity premium in 2015 compared with 2014, particularly by the CFO Forum members. No companies in our study used MA as a risk-free curve adjustment. A significant proportion of companies reported sensitivities with respect to VA, and Allianz disclosed a sensitivity to a risk-free curve where the UFR has been reduced by 2%.

The introduction of Solvency II also includes a number of transitional measures which allow companies to move to full implementation over a period of time. The purpose of these measures is to soften the impact of the new regulation and to allow the effect on the insurers' balance sheets to be brought forward gradually. The main measures include:

- **Equity Transitional Measure:** This allows a phase-in of the effect of the equity stress factor (on equities in the portfolio at 31 December 2015). The use of this measure does not require regulatory approval.
- **Transitional Measure on Risk-Free Interest Rates:** This allows companies a transitional period to move from the interest rate structure in force under Solvency I to that required by Solvency II; regulatory approval is required for the use of this measure.
- **Transitional Measure on Technical Provisions:** This allows companies to apply a transitional deduction to their technical provisions. The deduction is 100% of the difference between Solvency II and Solvency I technical provisions at 1 January 2016, which then reduces linearly to 0% by 1 January 2032. This measure requires approval by the regulator.

Throughout 2013, 2014, and 2015, EIOPA has published guidelines and standards which aim to ensure regulators and firms take active steps towards implementing certain key elements of Solvency II in a consistent and convergent way. Firms have therefore been establishing processes to provide Solvency II balance sheet reporting during 2015.

Companies and users of companies' accounts would ideally prefer Solvency II and embedded value reporting to converge as far as possible so that common assumptions and calculations can be used. However, it remains to be seen how achievable this will be, given that the two methodologies are intended for different purposes and will ultimately depend on whether stakeholders and market analysts find that Solvency II numbers meet their requirements for understanding the value of firms' businesses.

Companies may continue to align their embedded value methodologies with Solvency II. On the other hand, the existence of features of Solvency II that are not market-consistent, such as the VA, MA, and transitional measures which may (if used) last for 16 years, might distort Solvency II results, retaining the need for a more market-consistent reporting metric.

## **IFRS DEVELOPMENTS**

The preparation of accounts on an IFRS basis gives rise to a different interpretation and timing of profit and loss compared with the embedded value bases. This is fundamentally due to IFRS focusing on a current view of assets and liabilities together with current profit generation compared with embedded value, which also makes allowance for future earnings and the shareholder value created. Reconciliation of these different measures helps to reveal different features of firms' underlying performances. Consequently, companies reconcile their embedded value shareholder net worth to IFRS net asset values. It is also worth noting that assets under embedded value are at market value whereas, under current IFRS reporting requirements, assets can be held at market value or amortised cost.

The IFRS 4 Phase II project aims at further standardising international accounting requirements for insurance contracts. The publication (in June 2013) of an Exposure Draft on reporting for insurance contracts by the International Accounting Standards Board (IASB) was a significant milestone towards this goal. The IASB has been considering the feedback on the Exposure Draft and has made a number of tentative decisions and amendments to its proposals. The feedback received and subsequent decisions made have been summarised in the paper published by IASB in August 2016.

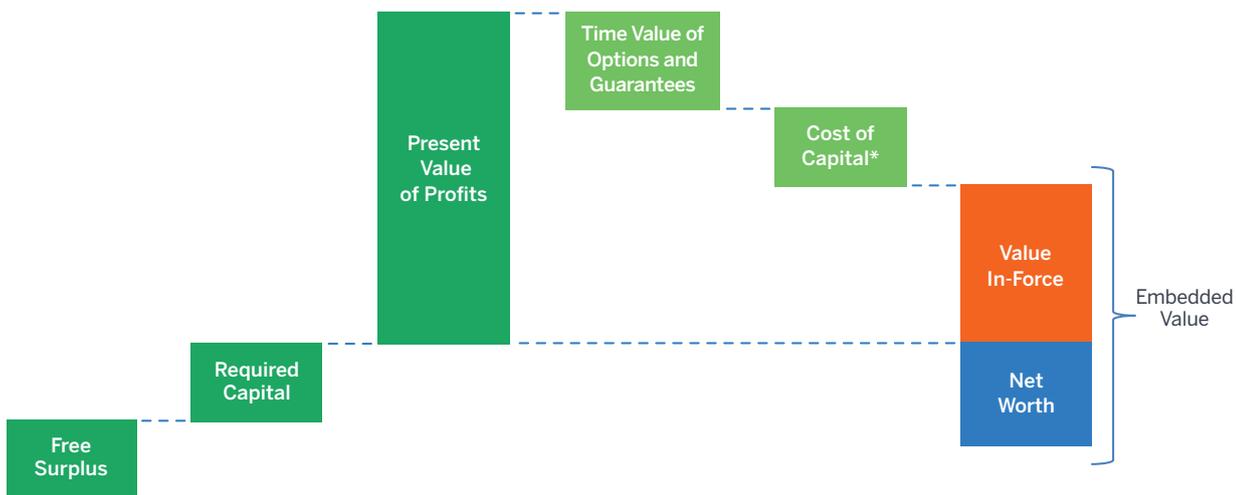
A sticking point has been participating contracts—the proposals in the Exposure Draft were not well-received by the European insurance industry, and the IASB responded with the tentative decision that the mirroring approach proposed in the Exposure Draft should not be permitted or required.

In light of this, the timetable for the final standard has potentially been delayed—the earliest possible date for the final standard is late 2016 or early 2017. Mandatory implementation is likely to be three years after the publication of the standard.

## Appendix 1: Overview of embedded value methodology

The embedded value of a company is intended to be a measure of the value of the shareholders' interests in the business. Over time, various principles and guidance have been issued by industry bodies to achieve consistency in the way embedded values are calculated among companies and reporting periods. Two of the main sets of guidance currently used by companies are the EEV Principles and the MCEV Principles. A brief outline of the methodologies under these two sets of principles, including key terminology, is described below and illustrated in Figure 14.

**FIGURE 14: SUMMARY COMPONENTS OF EMBEDDED VALUE**



\* Under the MCEV Principles, the CoC is split into frictional costs and the CRNHR. Companies using the EEV Principles may also choose to adopt this approach.

Under both the MCEV and EEV approaches, the embedded value is calculated as the sum of the *net worth* and *value of in-force* (VIF) of the covered business, which, according to Principle 2 of both the EEV and the MCEV Principles, is defined as contracts regarded by local supervisors as being long-term life insurance business.

The covered business may also include short-term life insurance business, long-term accident or health insurance business, or group risk business. Under MCEV Principles, companies may disclose the group market-consistent embedded value (Group MCEV), which is a measure of the consolidated value of shareholders' interests in the total business of the company. The Group MCEV includes the unadjusted IFRS net asset value of the non-covered business (all business not classified as covered).

The *net worth* is equal to the *required capital* plus *free surplus* where:

- **Required capital** is the market value of assets, attributed to the business over and above that required to back the liabilities for the business and whose distribution to shareholders is restricted. The level of required capital may be set by reference to regulatory capital requirements, levels of capital requirements that achieve a target credit rating, internal model capital requirements, or a combination of them.
- **Free surplus** is the market value of any assets allocated to, but not required to support, the in-force business at the effective date of the embedded value calculation.

The VIF is equal to the *present value of future profits* (PVFP) less the *time value of options and guarantees* (TVOG) less the *cost of capital* (CoC) where:

- **Present value of future profits** is the present value of the net of tax shareholder cash flows from both the in-force business and the assets backing the associated liabilities. The PVFP includes an allowance for the intrinsic value of financial options and guarantees but not cash flows arising from projected future new business. The economic assumptions used to calculate the PVFP can differ under EEV Principles and MCEV Principles. Under EEV, the PVFP may be calculated using real-world investment return assumptions and a discount rate that includes a margin for risks not captured elsewhere in the calculation. Under MCEV, the PVFP is typically calculated using a *certainty-equivalent* approach, whereby assets are assumed to earn a return based on a risk-free curve and all cash flows are discounted using the same risk-free curve, though other approaches are possible.

- **Time value of options and guarantees** is the additional value of financial options and guarantees above the intrinsic value already allowed for in the calculation of the PVFP. This is typically calculated using stochastic techniques.
- **Cost of capital** is a deduction from the PVFP in respect of the additional costs from investing in assets backing the required capital via an insurance company rather than directly. Under EEV, the CoC is the difference between the required capital held at the effective date of the embedded value calculation and the present value of the projected releases of the required capital. Whereas under MCEV, the CoC is split into two independent components: the frictional costs of capital and the cost of residual non-hedgeable risks.
  - **Frictional costs of capital** reflect items such as the taxation and investment costs that arise on the assets backing the required capital.
  - **Cost of residual non-hedgeable risks** reflects the expected CoC related to non-hedgeable risks that can have an asymmetric impact on shareholder value (to the extent that these risks have not already been reflected in the PVFP or TVOG). They can include both financial and nonfinancial risks.

### CONSTRUCTION OF THE RISK DISCOUNT RATE

Companies can construct their RDRs using either a top-down or a bottom-up approach under EEV Principles. However, in practice, the bottom-up approach has become an industry standard.

The top-down approach considers the risks a company is exposed to as a whole in order to derive a Risk Margin that applies to all future cash flows. This may be achieved, for example, by considering the company's *weighted average cost of capital*. By comparison, a bottom-up approach considers the risks to which each cash flow (or group of cash flows) is exposed, to determine a risk margin that is specific to each cash flow. Under MCEV, a bottom-up approach is required, whereas under EEV, companies can choose to use either a top-down or bottom-up approach.

MCEV Principle 13 states that: '*VIF should be discounted using discount rates consistent with those that would be used to value such cash flows in the capital markets.*' To illustrate, equities are generally expected to yield returns above a risk-free asset to compensate for the additional risk inherent in equities. As such, under a market-consistent basis, in order to value equity cash flows, a RDR that reflects the additional risk should be used. This logic equally applies to liability cash flows by valuing them consistently with traded assets that exhibit the same (or similar) characteristics. Therefore, where cash flows are fixed or vary linearly with market movements, companies can adopt the certainty-equivalent approach (i.e., assets are assumed to earn a rate based on a risk-free curve and all cash flows are discounted using the same risk-free curve) to achieve the same result. However, where companies use illiquid assets to match their liabilities, this can be reflected in the RDR. The certainty-equivalent approach may also be adopted by firms reporting under the EEV Principles.

#### Basis for risk-free rate

To begin the construction of a suitable RDR curve, companies will typically identify returns on assets in the market that are a proxy to the *risk-free* rate. The MCEV Principles term this proxy the *reference rate*. In practice, the starting point for the reference rate is either government bonds or interest-rate swaps, based on interbank lending rates. However, in reality, no assets exist that are completely risk-free, as even bonds issued by the most secure government will carry some residual level of risk.

#### Allowance for liquidity premium

Typically, the additional return on an asset (such as a corporate bond) over the risk-free yield is considered to be made up of three key components, which compensate for: (1) the expected cost of defaults of the issuer including recovery, (2) the uncertainty surrounding the unexpected cost of defaults, and (3) other risks predominantly thought to be in respect of the illiquidity of the asset, particularly in adverse conditions, known as the liquidity premium. Consequently, companies that closely match their asset and liability positions to mitigate spread risk may consider it appropriate to make an allowance for the latter part of the additional yield they expect to receive in the form of a liquidity premium adjustment. Final Solvency II text allows use of the MA and VA to the risk-free rate to reduce short-term market volatility.

### Yield curve extrapolation

In order to calculate the VIF component, some companies require a risk-free curve that extends to very long durations, reflecting both current market conditions and long-term economic views. This may pose a challenge where available market data is of a shorter duration than the projected cash flows. Even where data is available for very long swap contracts or sovereign bonds, as the case may be, the market may not be sufficiently deep or liquid for such data to be reliable. Therefore, to obtain suitable rates at such long durations, companies may extrapolate the risk-free yield curve from the LLP to some long-term equilibrium rate (sometimes referred to as the UFR). Extrapolating the risk-free curve from the LLP may help to reduce the impact on the VIF calculation of volatility that is due to demand and supply imbalances for the long durations in the asset market.

There are a number of extrapolation methods available to companies, such as:

- Assuming that a flat rate continues beyond a certain point
- Assuming a margin over government bond yields at longer durations
- Using the Smith-Wilson technique (consistent with Solvency II)
- Using the Nelson-Siegel method, which fits a model to the observed yield curve

### Cost of capital

CoC is typically reflected as a deduction from the PVFP to reflect the fact that assets backing the required capital are held within an insurance company rather than directly and, therefore, cannot be distributed to shareholders immediately. Additional costs may arise from investing in assets via an insurance company, such as additional taxation, investment expenses, or the fact that investors do not have direct control over their capital (known as *agency costs*). CoC may also arise in respect of non-hedgeable risks, which are covered separately in the next section.

Under Principle 8 of the MCEV Principles, *‘an allowance should be made for the frictional costs of required capital for covered business. The allowance is independent of the allowance for non-hedgeable risks.’*<sup>9</sup>

Companies reporting under MCEV Principles typically allow for the frictional costs of capital within the investment income on assets backing the required capital by:

- Projecting investment returns using the reference rate net of tax and investment management expenses
- Discounting using the reference rate gross of tax and investment management expenses

Companies may also adopt such an approach under the EEV Principles, especially if they use a market-consistent basis. Alternatively, the CoC may be calculated based on the difference between the *real-world* investment return assumptions and the RDR.

### Cost of residual non-hedgeable risks

Generally, non-financial risks such as mortality, longevity, morbidity, persistency, expenses, operational, and tax risks are regarded as non-hedgeable. By comparison, the majority of financial risks are generally considered to be hedgeable. However, there are still some financial risks that fall under the banner of non-hedgeable. These financial non-hedgeable risks often arise from uncertainty in setting best-estimate assumptions, which can arise from a lack of deep and liquid market information. To illustrate, companies may employ extrapolation techniques to determine appropriate risk-free rates to apply at longer durations, and the impact associated with this uncertainty should be captured in the CRNHR, if not already allowed for in the PVFP or TVOG. Companies that do not recognise the impact of this uncertainty may potentially underestimate the CRNHR.

Principle 9 of the MCEV Principles states: *‘An allowance should be made for the cost of non-hedgeable risks not already allowed for in the TVOG or the PVFP. This allowance should include the impact of non-hedgeable non-financial risks and non-hedgeable financial risks. An appropriate method of determining the allowance for the CRNHR should be applied and sufficient disclosures provided to enable a comparison to a CoC methodology.’*

9 This Principle has been amended in May 2016 and now states that where Solvency II is adopted for solvency reporting, and the Solvency II Risk Margin contains sufficient allowance for the frictional costs of required capital, no further allowance for frictional costs of required capital is required.

When assessing the CRNHR, companies usually consider the following:

- The cost of non-hedgeable risks where they have not already been allowed for in the PVFP or TVOGs
- The asymmetry<sup>10</sup> of risks and the effect it has on shareholder value
- The cost associated with the uncertainty in setting best-estimate assumptions

Under MCEV Principles, regardless of how companies allow for their CRNHRs, the equivalent average CoC charge should be presented. The residual capital derived in respect of the residual non-hedgeable risks should be based on a company's internal economic capital model. The cost-of-capital charge represents the excess return or risk premium that investors might reasonably expect on capital exposed to such residual risks.

Each company may, however, determine the most appropriate level of internal capital over its self-determined future time horizons as appropriate for each one's business model and strategy. For example, selecting a higher confidence level in the capital calculation for the CRNHR may be in line with maintaining a target company credit rating. However, companies are required to express this as the equivalent average CoC charge based on the capital required on a 99.5% confidence interval over a one-year time horizon.

### Time value of options and guarantees

The impact of financial options and guarantees can be split into two components. The first is the effect on the PVFP with respect to the intrinsic value of such financial options and guarantees. The second is the time value of financial options and guarantees. The TVOG is the difference between the central PVFP capturing the intrinsic impact and the average of the PVFPs over a range of scenarios obtained by stochastic calculations.

The TVOG corresponds to the asymmetry in the impact over a range of scenarios on the distributable earnings to shareholders. For example, in the case of participating contracts, profits are shared between shareholders and policyholders. Losses, however, are only shared up to a certain point, after which shareholders bear all the subsequent losses. This can be further exacerbated by the actions of policyholders (dynamic policyholder behaviour).

The features of products that generally give rise to an assessment of TVOG can include interest rate guarantees on traditional products, profit-sharing features such as bonuses or levels of credited rates, guaranteed benefits on unit-linked products, and guaranteed annuity options.

Companies are required to assess the TVOG using stochastic techniques. Closed-form solutions can also be used where they lead to sufficiently accurate results but may not be suitable in valuing certain guarantees. The stochastic models must be appropriately calibrated and internally consistent with the rest of the modelling methodologies and approaches. Management actions can be allowed for which can include actions regarding the credited rate to policies, bonus rates, charges to asset shares, and investment strategies. These management actions can be reflected provided they have passed through the company's normal governance and approval processes, are consistent with the operating environment, and take into account the market reaction to discretion.

Principle 7 of both the EEV and MCEV Principles requires firms to make an appropriate allowance for the potential impacts on shareholder values from financial options and guarantees. In carrying out this assessment, an important element is the calibration of companies' stochastic models to the implied volatility from appropriate financial market instruments.

10 A risk where equal and opposite movements upwards and downwards result in financial outcomes that are not of equal magnitude.



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