

# ISSUES IN BRIEF

UK LIFE INSURANCE

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EVEN BEFORE THE RECENT BUDGET, PENSION PROVISION AND WAYS IN WHICH PROVIDERS MIGHT NEED TO ADAPT TO MEET THE NEEDS OF THEIR CUSTOMERS WAS DESTINED TO BE ONE OF THE HOT TOPICS OF 2014; NOW IT SEEMS CERTAIN TO BE A MAJOR ISSUE AS WE MOVE TOWARDS IMPLEMENTATION OF THE NEW RULES GOVERNING THE USE OF PENSION SAVINGS IN APRIL 2015. THE THIRD ARTICLE IN THIS EDITION OF ISSUES IN BRIEF LOOKS AT HOW THE INCREASED FLEXIBILITY MAY BE USED IN PRACTICE, BY ANALYSING INTERNATIONAL MARKETS WITH SIMILAR CHARACTERISTICS.

ANOTHER POPULAR CURRENT TOPIC COVERED IN THIS ISSUE IS PREDICTIVE ANALYTICS. WE EXPLAIN THE TWO MOST COMMON CATEGORIES OF PREDICTIVE ANALYTIC MODELS AND ILLUSTRATE HOW THEY CAN BE USED TO HELP INSURANCE COMPANIES TO TAILOR THEIR SERVICING TO MEET CUSTOMER NEEDS MORE APPROPRIATELY.

**NICK DUMBRECK**  
PRINCIPAL AND  
CONSULTING  
ACTUARY



Regulatory and financial reporting developments are still coming thick and fast. We look at the likely combined impact on European insurers' use of derivatives from Basel III and EMIR, based on the results of three Milliman surveys. Basel III also features in the article which follows; this explains the background to the Basel regulations and how their evolution has led to concerns about their overall effectiveness. As the likelihood that Solvency II will finally come into force in 2016 increases, we highlight a few important similarities and differences between Basel III and Solvency II, and discuss whether any lessons can be drawn from the experience of the Basel regulations.

We also consider the key business implications of the latest Exposure Draft of IFRS 4, which is intended to replace the current accounting standard for insurance contracts in 2018. The article provides a summary of the building blocks of insurance liabilities under the Exposure Draft rules.

We begin this edition with an article which discusses the re-emerging trend of VIF monetisation among insurers as a part of their liquidity, risk and capital management and as a potential way of reducing balance sheet volatility. The article analyses the potential benefits and structures of such transactions as well as the current appetite amongst potential counterparties.

I hope you will find something of interest to you in our Summer 2014 *Issues in Brief*.  
—Nick Dumbreck

# VIF MONETISATION: A RE-EMERGING TREND



In the past 18 months, the European life insurance industry has seen increased activity in 'value of in-force (VIF) monetisation' transactions. In this short article we explore recent market activity and the potential benefits that can be achieved from this solution.

## RECENT MARKET ACTIVITY

Recent publicised activity in Europe has focused on the Spanish and Portuguese bancassurance sector, driven by pressures from the banking crisis in those markets. Since 2012, the completed publicised transactions are:

- July 2012: Santander/Deutsche Bank/Abbey Life (€490 million, 100% quota-share)
- November 2012: CaixaBank/Berkshire Hathaway (€600 million, 100% quota-share)
- March 2013: BBVA/SCOR (€630 million, 90% quota-share)
- June 2013: Banco Espirito Santo (BES)/NewRe<sup>1</sup> (40 bps increase to BES's core tier 1 ratio, 100% quota-share)

We also note that several non-publicised deals have also occurred recently in the UK market, and activity is also apparent in other European markets.

Milliman has been at the forefront of recent developments on European VIF monetisation deals, acting as advisor to BES and BBVA on the monetisations of their risk portfolios in Portugal and Spain respectively. Milliman also advised a number

of investors on the other transactions listed above, as well as a number of non-publicised and non-completed deals.

## POTENTIAL BENEFITS AND DRIVERS

While VIF monetisation clearly has benefits during times of financial stress, there are several reasons why VIF monetisation might be attractive in more normal circumstances, including:

- Liquidity enhancement
- Risk transfer
- Potential capital release under Solvency I and Solvency II, either via risk transfer or via recognition of assets which are not otherwise recognised under the regulation
- Reduced volatility of Solvency II or ICA capital position

As the industry moves towards more transparent, risk-based and economic solvency and reporting regimes, insurers are increasingly encouraged to understand their risk profiles and manage their business around that. VIF monetisation in its various forms can be considered part of the toolkit for life insurers to employ as part of a holistic framework for liquidity, risk and capital management. Depending on market conditions and specific circumstances, this can be an attractive alternative to other forms of financing, such as debt, equity or hybrid capital, as well as bring additional potential benefits around risk and capital optimisation.

Through a good understanding of the risk and value drivers, and by adopting a more efficient capital and liquidity structure, strategic opportunities potentially open up. For example, it could provide greater capacity for new business or M&A opportunities.

Depending on its underlying source, VIF can be an inherently volatile asset. Under Solvency II, VIF is categorised as core tier 1 capital. During the development of the Solvency II framework, however, there was significant industry debate around the quality of that capital and its volatility, particularly during periods of market stress. By implementing a VIF monetisation structure, the quality of the VIF can be improved and VIF monetisation can therefore be considered as a form of 'VIF hedging' - partial or full - bringing increased certainty to the value of an uncertain asset.

**'VIF MONETISATION'**  
 REFERS TO THE BROAD  
 MECHANISM BY WHICH AN  
 INSURER CAN TAKE UP-  
 FRONT CREDIT FOR THE  
 VALUE OF IN-FORCE (VIF)  
 OF A PARTICULAR LIFE  
 INSURANCE PORTFOLIO.  
 THIS CREDIT REPRESENTS  
 AN EXCHANGE OF  
 EXPECTED FUTURE  
 PROFITS FOR AN UP-FRONT  
 AMOUNT OF CAPITAL.

<sup>1</sup> New Re is part of the Munich Re group.

Solvency uplift might be possible for certain portfolios under Solvency II if contract boundary restrictions apply to the insurer, particularly if the transaction can be structured in such a way that they do not apply to the reinsurer/counterparty. This would essentially recognise the residual economic value that is not included in the base technical provisions for certain types of contract under Solvency II.

## COUNTERPARTY APPETITE

Any transaction requires at least two willing parties. There is significant interest from the various possible counterparties to a VIF monetisation transaction, including reinsurers, investment banks and private equity firms.

There is a possibility for a third-party insurer to act as the reinsurer/counterparty on such deals. This potentially offers asset-liability management benefits to that third party, via the acquisition of a long-term insurance-related asset to back its own long-term insurance liabilities.

## STRUCTURING THE TRANSACTION

The specific structures used in these transactions can be as simple or complex as the situation requires and will be tailored to the needs of all the parties involved. There are a number of broad structuring options available for a VIF monetisation deal, including:

- Contingent loan
- Financial reinsurance
- Quota-share reinsurance
- Insurance-linked securitisation (ILS)

These broad categories can overlap to some extent and the structure can vary significantly within these categories, depending on the specific circumstances.

The preferred arrangement for the recent deals in Spain and Portugal was a quota-share reinsurance structure with up-front commission. However, each of the transactions differed significantly in terms of objectives, structure and counterparties.

## UNDERSTANDING THE OBJECTIVES AND IMPLICATIONS

Understanding the objectives of all parties to the transaction is critical to the design of the structure and a successful outcome. Areas of focus for all parties include financial reporting implications, generation of profit and/or capital, transfer of risks and rewards, liquidity and/or tax implications.

It is essential to seek the regulator's view at an early stage in the process to ensure that the desired balance sheet or capital objectives are feasible under the proposed structure and current regulation. It is also important to understand the auditor's opinion on the accounting implications of the deal. Scenario testing and volatility analysis are key steps to ensure the robustness of a proposed structure and to avoid certain unintended consequences.

## DEFINING THE PORTFOLIO AND CASH FLOWS

A natural prerequisite to a successful VIF monetisation is that a sufficiently large amount of VIF is available to be structured into a deal. Beyond this, the possibilities are relatively broad. As an early step in a transaction process, insurers might perform an assessment of their portfolios to identify which are strong candidates to meet the objectives of the transaction.

Deal sizes vary and different types of counterparties will have appetites for different deal sizes. The nature and risk profile of the portfolio also influence the attractiveness of the deal because counterparty appetite for different risk types can vary.

Cash transfers between the issuer and the counterparty may not necessarily be the actual profit stream emerging from the defined portfolio. In general, the contract terms and conditions should objectively define the cash flows transferred, so that they can be verified independently and reconciled back to audited accounts and administration systems. The definition of the cash transfers must also produce the intended transfer of risk and rewards under the transaction.

## UNDERSTANDING THE RISKS

Parties to the transaction will be exposed to a number of risks and these will depend on the specific circumstances. A thorough due diligence process should be undertaken to fully understand the risk implications of the proposed structure. All risks should either be appropriately mitigated via the structure or be allowed for in the deal pricing.

The underlying risks associated with the defined portfolio, such as mortality, persistency or market-related risks, will be a feature of any deal to some extent. Other transaction-related risks will also arise, such as counterparty, legal or country-related risks. The various risks can potentially be separated and shared among multiple counterparties.

Collateral arrangements can play an important role in reducing counterparty risk and protecting policyholders. A wide range of options is available for structuring these arrangements, and it is important to understand their impact, as they can significantly influence the deal economics.

## CONCLUSIONS

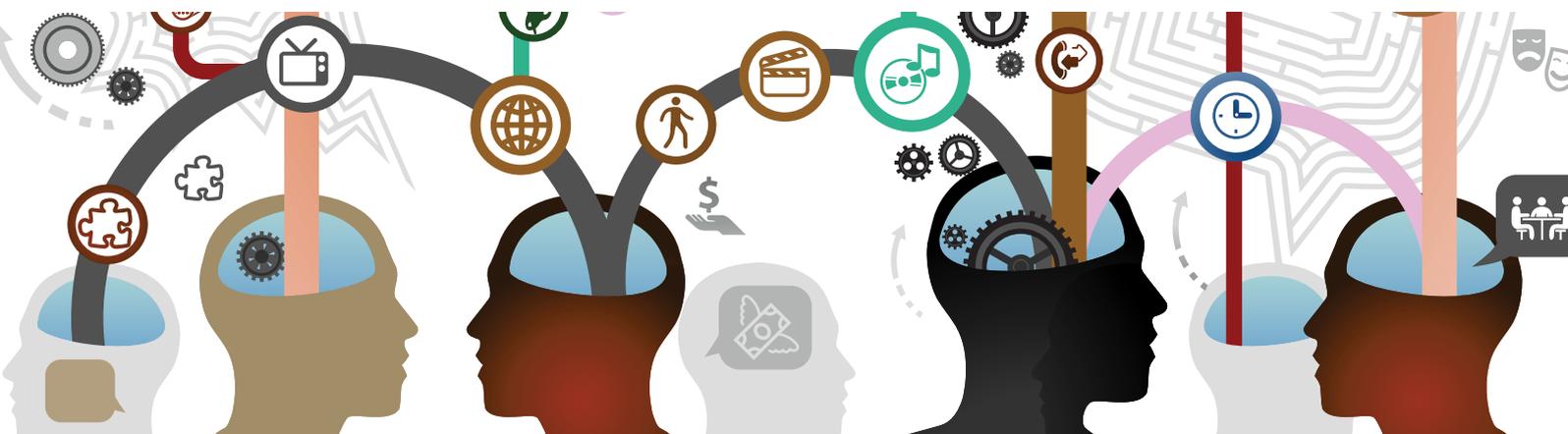
VIF monetisation solutions offer life insurers a number of possible benefits and might be considered as part of a holistic framework for liquidity, risk and capital management. At the same time, counterparty appetite is strong, paving the way for future transaction activity in this area.

A number of alternative structures are available to consider, and it will be important to design the structure around the key objectives to ensure a successful outcome.

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# PREDICTIVE ANALYTICS ADDS VALUE FOR LIFE INSURERS



**P**redictive analytics describes the analysis of current and historical data to identify relationships which are 'predictive' about an outcome of interest. In recent years, predictive analytics techniques have been rapidly revolutionising the way people use information to understand the world at large.

Initially used in data-rich areas, such as credit scoring and online retailing, the methods have gradually evolved and moved into wider areas such as supply chain optimisation, patient diagnostics and risk management. A major attraction of predictive analytics is its 24/7/365 nature, meaning that it can be watching and predicting continuously in real time; for applications like patient safety this can literally be a matter of life or death.

It is a popular misconception that large amounts of data are needed in order to make use of predictive analytics, as this is not the case for all applications. However, it is true that sometimes the amount of information that has to be studied is vast, so achieving high-frequency analysis is extremely challenging; traditional search algorithms would simply take too long to produce results and there is no time to pre-organise the data anyway. Recent advances, under the heading of 'Big Data', mean that such data can now be examined and analysed efficiently and effectively.

In the insurance industry it has so far been the property and casualty sector that has been exploring predictive modelling techniques, primarily as a way to improve pricing and renewal activity. This has particularly been the case in motor and household insurances, where the short-term nature of the business lends itself to providing substantial learning data for such techniques. However, a number of advances in predictive analytics methods and the inevitable infrastructure cost reduction that has occurred as cloud computing services mature mean that life insurance companies have started to reap the benefits of predictive analytics for their businesses.

In this article we introduce some ways in which predictive analytics can add value for life insurers. In particular we illustrate how embedding these methods within a robust understanding of how outcomes occur can lead to better longer-term forecasts as well as short-term predictions.

## PREDICTIVE MODELLING

Consider a typical life insurance task: trying to predict lapses. This drives actuarial assumptions for pricing and reserving and also forms the basis of servicing activity.

Traditional statistical analysis of past experience might suggest that policy type, duration and the value of guarantees are the key drivers of lapse rates. The inevitable paucity of data at some durations means that assumptions end up being something of an educated guess about the 'average' behaviour of each grouping. However, the company also has a wealth of other data that may be indicative of a policyholder's propensity to lapse, including policy data (e.g. sales channel, historical returns, policy size), policyholder data (e.g. age, postcode, occupation) and economic data (e.g. interest, inflation and unemployment rates). This data, however, is unlikely to have been organised to provide information about lapses.

Predictive analytics is not a single formula or method. It is about finding the 'best' method for using observable information to make a good prediction of the outcome you are interested in. The company will therefore analyse historical information about the policyholder and the factors influencing their decision to lapse and look for the best rule for mapping some subset of these factors to actual lapse experience. The model itself can take one of many forms, but will generally fall into one of two categories: regression models and models employing machine learning techniques.

By combining 'unstructured' data with your typical lapse data the resulting predictive model will tend to be more accurate in assessing a particular policyholder's propensity to lapse than the traditional statistical methods. With this information, the company can make better estimates of emerging lapse experience and can start to refine its servicing strategies accordingly. However, beyond simply telling us that someone is at risk of lapsing, predictive analytics can help us to model customer responses to different servicing strategies.

This can help companies to tailor their servicing to meet customer needs more appropriately. In particular, some policyholders might prefer to receive basic communication only and will react negatively to higher levels of engagement. Others might appreciate the attention, saving a potential lapse. Others might simply do what they like, regardless of contact from the company. Significant reductions in cost and improvements in servicing satisfaction can be achieved by knowing in advance how your customers are likely to react (see example in sidebar).

## BEYOND PREDICTIONS

Machine learning (whereby the model reacts to new data to try and improve its predictive accuracy) can be extremely helpful in alerting us to the fact that something has 'changed', but it takes some time to be sure that this is a 'new normal'. Some of the leading predictive analytic techniques used in association with behaviours utilise advanced signal processing and machine learning techniques (e.g. Featurespace's ARIC™ engine) which can find these paradigm shifts very efficiently. If, in addition to knowing something has changed, we also know why it has changed, then we can be better prepared to act.

## PREDICTING POLICYHOLDER BEHAVIOUR

Consider a policyholder population whose responses to additional servicing contact (i.e. contact beyond the basic levels of 'good' service) were as summarised in Figure 1. The propensity of each group to lapse is summarised in Figure 2. If we can more accurately identify which policyholders respond in which way, we can adjust the servicing strategy to focus additional attention on those who appreciate it.

Even if you could only accurately predict 10% of the population of each group, you would improve lapses by 1% and reduce contact cost by 23%.

If you could predict 75%, you would almost halve lapses and reduce contact costs by two-thirds.

FIGURE 1: POLICYHOLDER RESPONSE

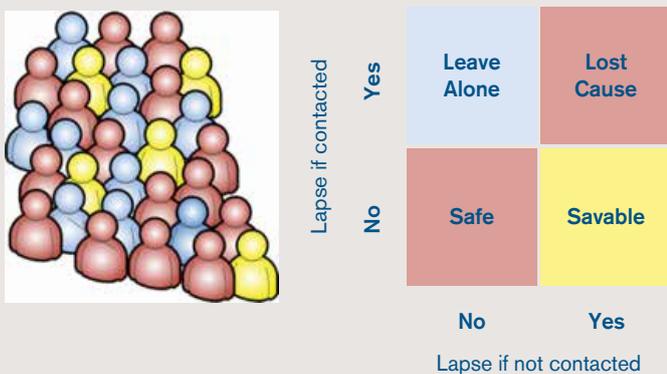


FIGURE 2: LAPSE RATES

Influence	Lapse if contact	Lapse if no contact
Negative	30%	7.5%
Neutral	5%	5%
Positive	1%	5%

We must also be careful in applying these powerful new insights over anything but the immediate term. Complex and adaptive behaviours tend to be highly non-linear, and small errors in describing initial conditions can quickly grow to make results rather dubious. We also have to remember that whilst predictive models react quickly to new information, they can only see what is in the data - i.e. they can flag the emergence of a new behaviour or trend but they cannot anticipate it ahead of any clues appearing in the data.

## THE LONGER TERM AND INSIGHTS

In order to make longer-term forecasts and to explain 'why' outcomes are what they are, we need to form a view about the underlying drivers of the situation we are studying. In the case of policyholder behaviour, for example, we know that the subtleties and influences which cause someone to lapse are far too complex and numerous to study directly. However, the complexity sciences, being concerned with understanding how relationships between constituent parts give rise to the collective behaviours, offer a practical way forward.

If predictive analytics makes it possible to organise the insights of what we can 'see', then other complexity sciences offer a way to harness and organise what we 'know'. Combining the two provides a powerful insight into what is happening, why and what is possible/probable.

Having a good knowledge of what is about to happen can be rigorously used in forecasting models to conditionally determine which set of futures now seems probable. Updating this continuously provides useful planning information by reducing the uncertainty we have about our initial conditions. Returning to the policyholder behaviour example, if a regulatory change was expected and it was thought that this could have a range of impacts upon lapse dynamics, then getting early sight of which was beginning to emerge would enable proactive, rather than reactive, resourcing and servicing strategies to be deployed and appropriate adjustments to be made to pricing and reserving.

## OTHER USES IN LIFE INSURANCE

So, being able to improve motor insurance pricing and household insurance pricing is of great benefit. And fraud and complex medical situations can now be predicted with impressive degrees of accuracy. But now we have a way to link prediction, forecast and explanation. This opens a wide range of applications in business and especially in life insurance, which concerns itself with the longer term as well as the 'now'.

Within the life sector there are many areas where assumptions are being made about how 'someone' behaves - policyholders, investors, suppliers, staff, etc. The latest generation of predictive analytics enables us to reduce the uncertainties we have about what is immediately happening. Combining this with a structured understanding of how causal interactions determine outcomes offers the potential for substantial improvements in areas such as underwriting, servicing, treasury management, marketing and risk management. These methods are integral to achieving resilience and delivering sustained value.

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# A COMPLICATED RETIREMENT

**R**etirement just got more complicated. The changes introduced in the Budget mean that, from April 2015, it will no longer be effectively compulsory to convert a pension pot to an annuity at retirement. This will have a significant impact on all aspects of our industry, and everyone is trying to understand what the impact will be and how to react.

In the March 2014 Budget it was announced that the government will “introduce the most fundamental reform to the way people access their pensions in almost a century by abolishing the effective requirement to buy an annuity”. Post-April 2015, at the point of retirement, anyone with a defined contribution (DC) pension will be able to either:

- Leave some or all of the money in the pension
- Take some or all of the money out (25% tax-free lump-sum and the rest taxed at marginal income tax rates)

Once an individual takes any money out of their pension, they can do what they like with it. They can buy an annuity, buy a Lamborghini or spend, save or invest it in any way they choose. And that is the big unknown: What will people do with their money when they retire?

In order to understand what people might do, once they no longer have to annuitise, it is useful to look to other markets.

## AUSTRALIA

We can start by looking at Australia, as it has been widely cited in the press in relation to the impact of the Budget on the UK annuity market.

The first point to make is that Australia has never had compulsion in terms of retirees buying annuities. However, prior to September 2004, annuities were incentivised by legislation that meant they were excluded from the asset means test used to determine levels of state pension. With incentivisation, a little over 30% bought an annuity. In the year after incentivisation was discontinued, this dropped to approximately 10% and it is currently estimated in the region of 4% to 6.5%.

Challenger is the largest retail annuity supplier in the Australian market, holding a market share of approximately 80%. In the 2H13 market data released, Challenger reported that, of the \$1.46 billion in retail annuity sales, \$1.19 billion (82%) were fixed-term annuities.

Amongst the majority who do not buy an annuity, ‘Allocation Pensions’ are popular (accounting for around 80% of the retirement income stream). Allocation Pensions allow retirees to invest their super funds (i.e. pension pots) in an investment portfolio pending their risk preference and decision on how much to withdraw annually (subject to minimum statutory limits).

As there was never compulsion in Australia, the Australian experience provides the lower end of the spectrum in terms of what will happen in the UK.

## SWITZERLAND

Switzerland has also been cited in the press in terms of understanding the impact of the budget on the size of the UK annuities market. It provides the other end of the spectrum, as approximately 75% to 80% of individuals take an annuity at retirement, despite an absence of compulsion.

However, there are significant differences between the UK and Swiss markets. In the Swiss market:

- Employer pensions are compulsory and quite differently structured. Employer pension schemes have to be offered with rates of return on the accumulation phase of the pension, which are set by the Federal Council and are then valid for all savings in the accumulation phase, and guaranteed conversion rates on the annuity that are defined by parliament. These conversion rates are overly generous, as they do not reflect the low interest rates and increased longevity, so it is a very rational choice to opt for annuitisation.
- Typically, individuals opt for an annuity from the pension scheme where they have accumulated their pension pot.

- There is always a spouse’s pension attached to the main contract, and this is quite generous compared to the UK.
- The Swiss are fiscally very conservative and, due to the mandatory occupational pension scheme, generally better off than counterparts in the UK, so they may have less need for up-front cash at retirement. In addition, interest rates are very low and adequate investment alternatives hardly exist.
- Approximately 80% of the Swiss population rent a property through their lifetime. Individuals therefore require a continuation of income through retirement in order to pay their rent.
- For those who do buy, there is no requirement to repay a mortgage by retirement age. In fact, most mortgages have minimal capital repayments (being largely interest-only) so this encourages individuals to take a regular income to offset ongoing mortgage repayments through retirement. Interest on mortgages is also tax deductible.

All the factors above create a market which provides significantly more encouragement to individuals to annuitise than the UK market will be post-April 2015.

## IRELAND

Closer to home, the Irish market may offer a slightly better comparator.

Annuities were compulsory in Ireland before 1999. A change was introduced in the Finance Act of 1999 which excluded certain types of pension savers from compulsory annuitisation (essentially the self-employed and proprietary directors). This change was subsequently extended to all DC members. In summary, and subject to certain conditions, a pension pot can now be invested in an ‘Approved Retirement Fund’ (ARF) to be drawn down as and when the individuals wish. One important condition is that a minimum guaranteed income test applies in order to have full flexibility in terms of drawing down the ARF. If this test is not met, there are restrictions on how much can be drawn down before age 75.

At retirement, almost everyone takes the tax-free lump sum. In recent years, more than half of the remaining DC retirement fund balances have been invested in an ARF. Our analysis shows that approximately 20% to 25% of money at retirement goes to buying an individual annuity. It will be interesting to see how this develops as the Irish post-retirement market matures.

Of those who do buy an annuity, it is almost invariably a whole of life annuity, generally with a five-year guaranteed period and a spouse's reversion. Term annuities are not permitted and enhanced annuities are not a feature of the market.

It should be noted that any remaining balance in the ARF can be passed on as an inheritance (and there can be some tax planning advantages in this regard, depending on who the beneficiary will be).

Key differences between the UK and Irish market are that, in the Irish market:

- ARFs were introduced to receive money from pension pots when an annuity was not desired.
- There are some conditions and restrictions that apply to ARFs.
- Term and enhanced annuities are not a feature of the market.
- There is an inheritance advantage of ARFs over annuities.

## IMPLICATIONS FOR THE UK

International comparisons are useful. However, the UK market has peculiarities that need to be acknowledged, such as:

- A long history of annuitisation.
- The annuity market is sophisticated in terms of products offered (for example, enhanced annuities).
- A professional and regulated advice channel dominates.

- The guarantee, also in the Budget, that, from April 2015, everyone who retires with a DC pension will be offered 'free and impartial face-to-face guidance on their choices at the point of retirement!'

The UK specific factors above tend to support an argument that any drop in the UK annuity market will be somewhat cushioned.

It seems very likely, given the different market factors, that the UK individual annuity market will drop by considerably more than the Swiss market following the removal of effective compulsion. There is also a reasonable likelihood that the individual annuity market will hold up more than the Irish market, post removal of compulsion. Our assessment is that the individual annuity market in the UK will drop to approximately 30% of its current level.

Incidentally, if the UK individual annuity market decreases significantly, there is likely to be a negative impact on the supply side of the equity release market (as, to some extent, equity release has been sold in order to generate matching assets for annuities). Ironically, the demand side of the equity release market may be boosted, as people may be more likely to run out of money during their retirement.

If individuals in the UK move away from buying annuities, the next question is what they will do with their pension pots.

In the Budget, the government promoted savings and investments. The government:

- Enabled National Savings and Investments (NS&I) to launch a choice of fixed-rate savings bonds in January 2015 for people aged 65 or over
- Increased the premium bond limit
- Increased the ISA limit
- Introduced the NISA
- Increased tax relief on particular investments

Some of these measures—the first four above—seem targeted to appeal to those likely to take the cash, instead of annuitising.

Although it is clear that the Australian market is very different from the UK, it is interesting to see what the 96% of individuals who do not buy an annuity do with their money.

Research by Challenger identified the most popular uses for the lump sum at retirement were:

- Pay off mortgage/pay for home improvements/buy a home (32%)
- Invest money or put it in a bank account (27%)
- Keep it in the pension scheme (21%)
- Buy or pay off a car (19%)
- Pay for a holiday (14%)
- Clear other debts (12%)

(Source: Challenger, 2012)

This may prove to be the route of many individuals in the UK, post-April 2015: take the cash, pay off debt, set yourself up for retirement, and invest what's left (either by leaving it in the pension or via other products).

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To discuss any of the themes in this article, please contact Colette Dunn at [colette.dunn@milliman.com](mailto:colette.dunn@milliman.com) or Chris Lewis at [chris.lewis@milliman.com](mailto:chris.lewis@milliman.com).

# IMPLICATIONS OF THE IFRS 2013 EXPOSURE DRAFT

The 2013 Exposure Draft (ED) is the latest development in the International Accounting Standards Board's (IASB) long-running project on accounting for insurance contracts. The ED is intended to replace the current standard, IFRS 4: Insurance Contracts. The consultation period closed at the end of October 2013, and the IASB has published the responses received. The IASB is currently in the process of reviewing the responses, and has proposed a number of tentative changes to the standard based on its re-deliberations to date.

## BACKGROUND

In general, the IASB appears to have listened to prior feedback on the 2010 ED, and in some respects the revised proposals are an improvement on the earlier proposals. However, the detailed proposals remain complex and changes will be far-reaching. Considerable effort will be needed to implement the proposals. There are wider implications which will affect pricing, financial reporting, systems and investor communication.

Furthermore, important differences to Solvency II exist. The responses the IASB have received reflect the complexity of the proposals and the likely high cost of implementation.

Mandatory adoption of the proposals will be three years after the issue of the final standard, recognising the complexity of implementation. Under the proposed timetable, the final standard could be issued in 2015, and so mandatory adoption could be as early as year-end 2018.

The proposals are of interest to companies currently reporting under both IFRS and UK GAAP. The Financial Reporting Council is considering a range of options around the longer-term future of UK GAAP, one of which is to adopt the ED.

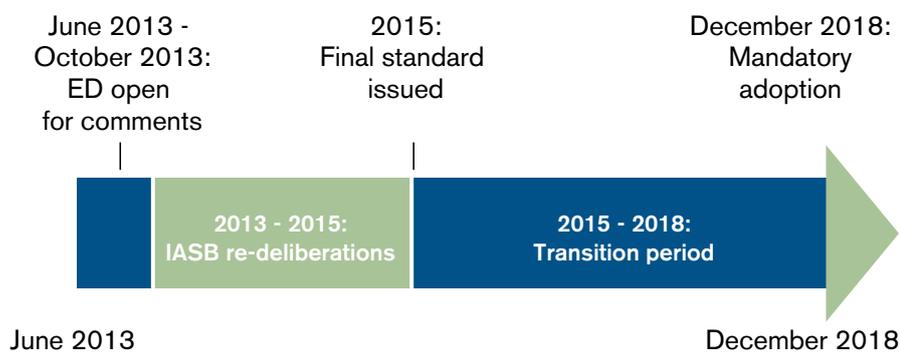
In this article we present some of the high-level implications and summarise the liability measurement approach.

## KEY BUSINESS IMPLICATIONS OF THE 2013 ED FOR UK INSURERS

Some of the key business implications include:

- Significant cost implications associated with both developing the necessary systems and in managing and updating the data needed to perform the calculations. A specific area of complexity highlighted in the responses is the need to split cash flows into different components, which is not present in current IFRS insurance reporting.
- Explaining results under the new presentation to investors and analysts, especially given that the accounts prepared under the ED will be fundamentally different to those produced under the current standard. For example, revenue will no longer be based on premium written but on an actuarial calculation, and locked-in discount rates will be used to determine liability values used in preparing the Profit and Loss (P&L).
- Under the ED, accounting mismatches may have arisen: The movement in some asset values due to changes in interest rate curves would be recognised in P&L but the associated movement in liability would not be recognised (due to locking in of discount rates for liability values in P&L). The IASB has made the tentative decision early in 2014 to make this approach optional, and so the impact of movement in discount rates on liabilities may be recognised in P&L. This tentative decision is likely to be welcomed by UK insurers.
- Volatility in the P&L statement, as a result of the 'mirroring approach'.<sup>1</sup> For example, for a proprietary company that has with-profits business, all of the movement in the fair value of the shareholder's interest in the estate may need to flow through to P&L.
- Deciding on appropriate metrics to manage the business and be used in decision making, as significant differences remain when compared to embedded value and Solvency II.

FIGURE 1: LATEST TIMELINE



<sup>1</sup> The mirroring approach applies to participating contracts. Where the payment to a policyholder varies directly with an underlying asset, insurers are required to measure the fulfilment cash flows, which vary with the asset on the same basis as the underlying asset.

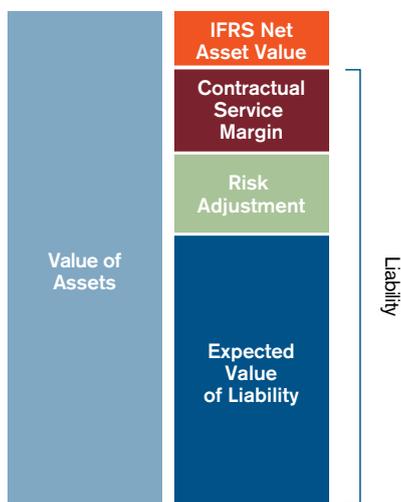
## SUMMARY OF BUILDING BLOCK APPROACH TO LIABILITY MEASUREMENT

Under the ED, a current measurement framework is proposed for long-term business, which maximises the use of market observable inputs, and updated estimates and assumptions at each reporting date. This approach is intended to reflect the time value and uncertainty of the liability.

In particular, a building block approach is proposed that reflects time value and uncertainty, consisting of:

- Expected value of liability (EVL) – The unbiased present value of future fulfilment cash flows discounted at current yield curve, including allowance for time value of guarantees and options
- Risk adjustment – An adjustment to reflect the uncertainty as to the amount and timing of the future cash flows
- Contractual service margin (CSM) – A liability set up to eliminate any gain at policy inception

FIGURE 2: IFRS ASSETS AND LIABILITIES – BUILDING BLOCKS<sup>2</sup>



A bottom-up or top-down approach can be used to determine the discount rates for the expected value of liability calculation.

The discount rates should also reflect the illiquidity of the liabilities and so may include an illiquidity premium. A key difference between the proposed Solvency II and IFRS approaches is that there is no prescribed methodology to determine the illiquidity premium under IFRS, and only broad principles are set out.

Estimates of future cash flows underpin the EVL calculation. These calculations may be stochastic Monte Carlo simulations, although deterministic modelling is allowed provided it is sufficiently accurate. It is unclear how the assessment of accuracy of deterministic methods should be performed.

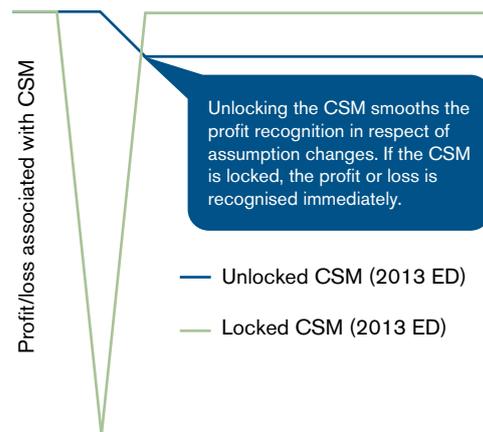
The contract boundary of the cash flows is similar to the proposed definition under Solvency II and focuses on where the insurer has the right to reassess the premium so that it fully reflects the risks.

The risk adjustment can be calculated under any one of a number of specified approaches, in contrast to Solvency II and the 2010 ED, which both specify the calculation approach.<sup>3</sup> However, insurers must disclose the confidence level associated with the risk adjustment to assist comparability. The calculation of a confidence interval is potentially onerous, since a full calculation requires multi-year stochastic modelling.

The CSM is effectively a liability set up to limit profits at issue to zero and to recognise these over the lifetime of the contract. On subsequent measurement, the CSM is calculated using a prescribed roll forward calculation from its initial value. This roll forward is a material driver in the P&L statement. If estimates of future cash flows underpinning the EVL change, the CSM is unlocked to reflect the revised cash flows. This unlocking potentially achieves smoothing of Profit and Loss related to future assumption changes.

Figure 3 illustrates the impact of unlocking the CSM in a simple worked example compared with not unlocking, (the proposal in the 2010 ED).

FIGURE 3 : IMPACT ON P&L OF UNLOCKING THE CSM



In this example, the estimated future cash flows are revised to be more onerous in Year 3. If the CSM is unlocked, as proposed, the profit follows the blue line in the above figure and the loss is smoothed over the future lifetime of the contract. There is no loss at Year 3, but subsequent profits in later years are lower. If it is not unlocked, profit follows the green line and the full loss associated with the assumption change is immediately recognised at Year 3, and the original profit level is maintained going forward.

## CONCLUSION

The 2013 ED is a significant stepping stone in the IASB's insurance contracts project. However, the responses to the consultation highlight a number of areas where insurers have concerns, although—encouragingly—some of these concerns have been addressed by the IASB's tentative decisions to date. The remaining re-deliberations in 2014, en route to a final standard, will be of interest to a large number of insurers.

If you have any questions or require any further information please contact Emma McWilliam at [emma.mcwilliam@milliman.com](mailto:emma.mcwilliam@milliman.com) or Matt Cocke at [matthew.cocke@milliman.com](mailto:matthew.cocke@milliman.com).

<sup>2</sup> Not to scale.

<sup>3</sup> The 2010 ED gives the option of using a cost-of-capital, confidence level or conditional tail value-at-risk approach to calculating the risk margin. Solvency II specifies a cost-of-capital approach for the risk margin.

# LOOK BEFORE YOU LEAP: THE POTENTIAL IMPACT OF EMERGING REGULATORY STANDARDS



It is likely that at some time in your life you would have heard the phrase 'look before you leap'. In essence it warns us to think carefully about what we are going to do before we do it. Perhaps obvious, it is clear that this important idiom is too often forgotten. History is littered with instances where pausing to consider the consequences would have yielded considerable benefits.

After the impact of the global financial crisis, the upcoming changes to both the insurance and banking industry have the potential to bring about many positive outcomes. However, there is also the risk of great cost in both time and money and that the new regimes are no better, or create their own issues, compared with the previous ones. As such, now would be a good time for all participants in both industries to 'look before they leap'.

Over the last two years, key industry stakeholders have raised concerns regarding the potential behaviour of companies under both sets of revised regulations including:

- The prevalence of internal models and manipulation of companies' capital requirements to get the 'right answer'
- The over-reliance on complex models
- How well Basel III has addressed the shortcomings of Basel II

In response to these various questions and concerns, and in conjunction with Iain Allan (visiting Professor, Cass Business School and former Group Director, Strategy at RBS), we will be shortly publishing a paper that highlights some important similarities and differences between the Basel regulations and Solvency II. The paper will identify some on-going weaknesses of the Basel regulations and also discusses whether Solvency II might suffer from these same weaknesses. In addition, we take a high-level view of both the Basel III and Solvency II regulations and consider how they may impact company culture and behaviours. Some highlights of the paper are discussed below.

## THE BASEL REGULATIONS

The Basel regulations have evolved over time in response to the various financial crises and perceived weaknesses. The Basel Capital Accord (Basel I) first came into force in 1988 covering only credit risk. In 1996, due to shortcomings in the initial accord, an amendment was made to the regulations to also cover the calculation of market risk capital and permit banks to use their own internal models in the assessment. Due to changing risks and business practices carried out by banks, and to overcome some of the distortions caused by the lack of granularity in Basel I, the Basel II regulations were published in 2004. After some further amendments, Basel II came into force in 2008, right in the middle of the global financial crisis and the

failure of banks such as Lehman Brothers. Basel III regulations were published in 2010, though some amendments were made to the existing regulations in the short term in response to the crisis (so-called Basel 2.5). Basel III will be implemented in stages between 2011 and 2019.

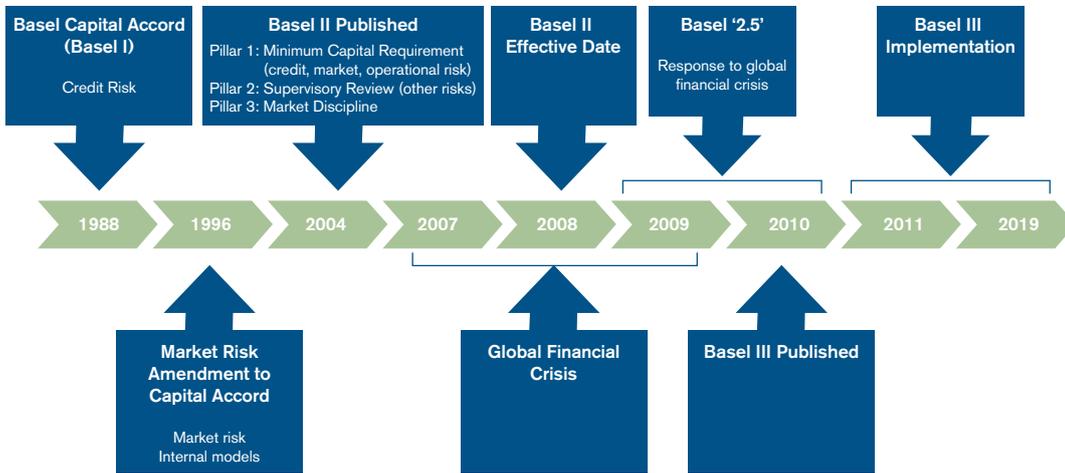
As a result of this evolution over the last 25 years:

- The Basel regulations have become increasingly complex
- The assessment of capital has become segmented, with some risks falling under Pillar 1 while others are considered under Pillar 2

There have been serious concerns regarding the overall effectiveness of the Basel regulations, such as:

- A culture of 'tick-box compliance' rather than professional judgement within the banking industry
- The difficulty in gaining a true understanding of the aggregate risk profile of banks
- Regulator-issued capital add-ons becoming "the norm" in the industry
- The resulting disclosures being of limited use to outside stakeholders, including the ability to perform meaningful comparisons between firms

FIGURE 1: BRIEF HISTORY OF THE BASEL REGULATIONS



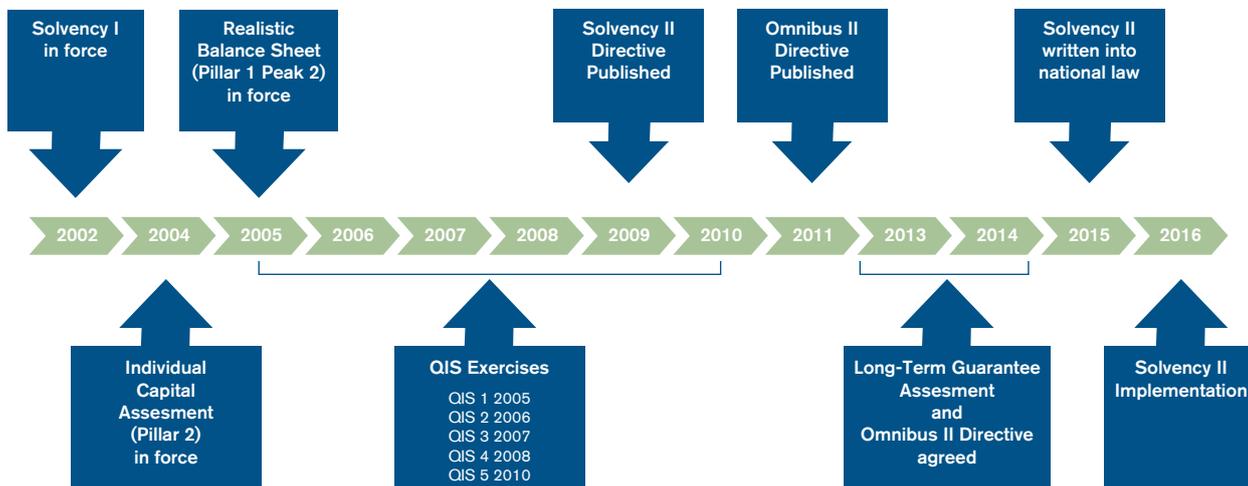
We suggest that, taking a steer from Solvency II, there may be call to address the balance between the three pillars under the Basel regulations in order to remove some of the strain on Pillar 1. In addition, simple and standardised models, alongside internal models, may be suitable to aid comparison between banks and limit the potential for manipulating capital requirements going forward.

These concepts are not too dissimilar to the thinking behind the Solvency II standard formula and the PRA's Early Warning Indicators. We acknowledge that some steps have been taken within the banking industry in the recent paper, published in October by the Bank of England, which makes proposals for a quantitative, forward-looking basis for concurrent stress testing of the UK banking system.<sup>1</sup>

**SOLVENCY II**

Solvency II has suffered many delays over the course of its implementation. Companies have had to carry out a number of quantitative exercises and there have been lengthy debates over the final form of the regulations, especially regarding long-term guarantees. However, with the recent agreement over the Omnibus II Directive, the implementation of Solvency II is once again on the horizon. While on the whole

FIGURE 2: BRIEF HISTORY OF INSURANCE SOLVENCY REGULATIONS AFFECTING THE UK



<sup>1</sup> A framework for stress testing the UK banking system, October 2013.

we consider the Solvency II regulations to be a positive development, we examine the possible pitfalls and unintended consequences in light of what we have all witnessed in the banking industry. Some points of note in the paper include:

- Consideration of the potential for a gradual weakening in companies' capital assessment assumptions without any change in their underlying risk exposures. This possibility should not be ignored though some actions have already been put forward in an attempt to discourage these practices (such as the previously mentioned Early Warning Indicators).
- The sheer extent of the Solvency II regulations may also cause issues, and the regulator should be alert to the possibility of a drift to 'tick-box compliance' over time. For example, around areas such as satisfying the test and standards required for internal model approval.
- It will be interesting to see how insurance companies communicate the results of their complex models to the various stakeholders as part of the disclosure requirements of Pillar 3.

## CONCLUSIONS

The Solvency II directive provides for a promising framework that addresses a lot of issues with the current regulations for European insurers, but there are areas that might lead to unintended or adverse consequences. That being said, we believe that the banking industry should consider whether the developments made under Solvency II could help to create a more robust and useful set of regulations going forward.

Furthermore, ahead of the implementation of Solvency II, we would encourage regulators to reflect upon the events that have occurred in the banking sector and monitor the implementation and emerging best practices so that the regulations continue to meet the needs of all stakeholders.

By stopping to take a look at past problems and possible future unintended consequences, we can ensure that both industries take a confident step forward and not a leap of faith.

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For a full copy of the paper please contact Fred Vosvenieks at [fred.vosvenieks@milliman.com](mailto:fred.vosvenieks@milliman.com) or Stuart Reynolds at [stuart.reynolds@milliman.com](mailto:stuart.reynolds@milliman.com).

# REGULATORY UPDATES: MORE TO THINK ABOUT THAN OMNIBUS II



**W**ith a deal reached on Omnibus II and the light at the end of the tunnel now looking noticeably brighter, Solvency II has been once more grabbing the regulatory headlines. However, we shouldn't forget two other significant pieces of regulation that have made somewhat speedier progress and are also likely to have far reaching impact on the European insurance industry.

**Basel III** implemented in the European Union through the CRD IV package. These new rules for raising the quantity and quality of bank capital took effect from 1 January 2014,<sup>1</sup> with a transitional period provided, so that banks need to be fully compliant by 2019. Whilst not directly impacting on insurers, they are likely to have a noticeable indirect impact through the heightened cost of transacting with banks in the capital and derivatives markets. At the same time, they may also present some potential new investment opportunities to insurers, as banks move away from some types of business that look far less attractive under a Basel III lens.

**EMIR's** most recent key implementation milestone happened on 12 February 2014, when the reporting requirements came into force for all derivative asset classes.<sup>2</sup> Mandatory central clearing is also expected to go live later in the year for the first raft of qualifying over-the-counter (OTC) derivatives.

Milliman surveyed opinion amongst insurers to establish market views regarding the likely combined impact of all this regulatory change in the capital and derivatives markets.

**EMIR is the main regulatory vehicle through which the EU delivers on G20 commitments made in September 2009, to achieve mandatory clearing and reporting of OTC derivatives. These measures aim to reduce risk and increase transparency in the derivatives markets, to address some of the key concerns raised during the global financial crisis.**

**Basel III is a new regulatory framework for banks that aims to address many of the shortcomings that led to the global financial crisis. It primarily has the following objectives:**

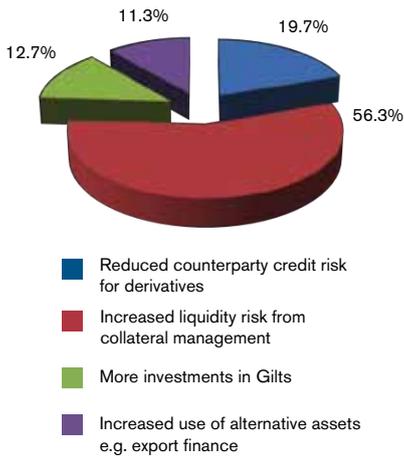
- **To raise the quality, consistency, and level of banks' capital bases**
- **To reduce the pro-cyclicality and systemic risks within the financial system**
- **To strengthen the risk coverage of the regulatory capital held by banks**
- **To introduce new minimum liquidity standards**
- **To cap the overall balance sheet leverage of banks**

<sup>1</sup> European Union press release (July 16, 2013). Legislation on capital requirements for the banking sector to enter into force. Retrieved from [http://europa.eu/rapid/press-release\\_MEX-13-0716\\_en.htm?locale=en](http://europa.eu/rapid/press-release_MEX-13-0716_en.htm?locale=en).

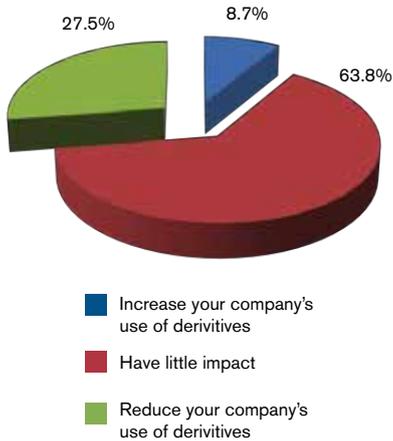
<sup>2</sup> European Securities and Markets Authority. European Market Infrastructure Regulation (EMIR). Retrieved from <http://www.esma.europa.eu/page/European-Market-Infrastructure-Regulation-EMIR>.

**MILLIMAN CLIENT FORUM (APRIL 2013) – UK AUDIENCE**

**A) WHAT ARE THE MOST SIGNIFICANT IMPLICATIONS OF BASEL III AND EMIR?**



**B) WHAT WILL BE THE LIKELY IMPACT OF BASEL III AND EMIR ON YOUR USAGE OF DERIVATIVES?**



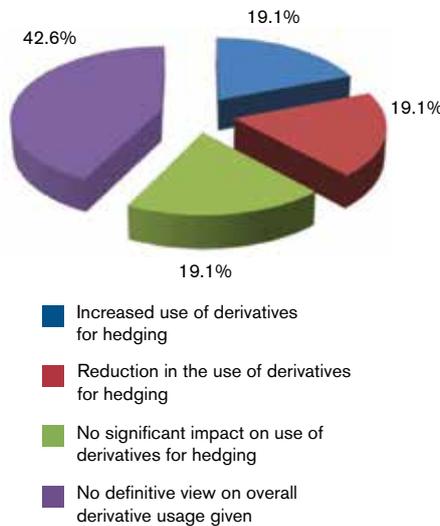
**UK ACTUARIAL LIFE CONVENTION SESSION (NOVEMBER 2013) – MAINLY UK AUDIENCE**

The questions from the April Milliman Client Forum were posed again to this audience consisting of around 50 actuaries working for banks and insurers. The results were broadly similar though generally more negative regarding the outcomes, in particular:

- A majority of the audience felt that the greatest implication of the regulation would be increased liquidity risk from the changes to collateralisation requirements; no one viewed reduced counterparty risk as the key outcome.
- A higher proportion of the audience foresaw a reduction in derivatives use as a result of the changes.

**MILLIMAN DERIVATIVES USAGE SURVEY<sup>3</sup> (DECEMBER 2013) – GLOBAL SURVEY OF OVER 60 INSURANCE COMPANIES**

**WHAT DO YOU SEE AS A KEY IMPACT OF THE CENTRALISED COUNTERPARTY CLEARING REGULATIONS FOR YOUR COMPANY?**



*(There were a number of potential multiple responses to this question relating to investment and collateral management. We highlight above just the responses relating to the level of overall derivative usage).*

The global survey results show a fairly even split between those thinking that these regulations will increase, reduce or have little impact on derivative usage. The uncertainty, which can be read from the fact that most were unwilling to give a definitive answer, is striking. Certainly, the interactions between these regulatory

changes, in particular in a Solvency II world in Europe, are complex and not fully clear cut. We have recently undertaken a research study to examine the likely impacts for a typical UK life insurer in more detail. To give a flavour of this, we talk through one of the key issues as follows.

**KNOCK-ON IMPACTS OF CENTRAL CLEARING**

The cornerstone of EMIR is the central clearing obligation, which mandates that specified classes of OTC derivatives, for qualifying counterparties, are centrally cleared with an approved central counterparty. At outset, it is expected that only interest rate swaps and credit default swaps will be covered, but the range of qualifying derivatives seems likely to be extended over time. Whilst the benefit of reduced counterparty risk within the financial system that this brings about is certainly a big positive, there are some countervailing impacts that introduce new systemic risks.

One of the key adverse impacts from this new regulation is the heightening of liquidity risk within the financial system. This arises from the need to post an increasing level of collateral on a more frequent basis to meet the central clearing margin requirements, and an increasing amount of this is in pure cash form to meet variation margin requirements. There is also systemic concentration risk, with a few approved central counterparties now intended to mitigate counterparty risk through their margining mechanisms.

**Impact on the balance sheet:** When collateral is posted, under current typical market practice, the insurer retains the economic interest in the assets pledged and there should be no direct impact on the market value balance sheet in isolation. Indirectly, however, the systemic need for more collateral-worthy assets may push up market prices.

However, there are also some significant impacts on investment strategy and solvency capital to consider. First, to meet variation margin requirements of centrally cleared derivatives, increased cash reserves will be required to provide the liquidity

<sup>3</sup> We intend to publish a report on this global derivatives usage survey; for a copy, please contact Neil Dissanayake.

to meet any margin calls. Actual cash requirements will be highly dependent on the notional amount and composition of the derivatives portfolio, and we illustrate what this could look like for a typical insurer in a range of scenarios in our research report.<sup>4</sup> An implication of this is that swap-based duration hedging is likely to be less economic due to the dilution of overall yield arising from the increased cash holdings.

There is less stringency over the types of assets required to meet new initial margin requirements on cleared derivatives, and existing bond holdings can be used to collateralise these, albeit subject to haircuts. But what impact does this have on solvency capital requirements?

**Impact on capital (matching adjustment):** For many insurers, it is already clear that the matching adjustment is likely to be highly

material to their solvency positions and also to the volatility of that position over time. There is a question mark over the continued eligibility of assets pledged as collateral for initial margin requirements to contribute towards the matching adjustment. Eligibility of collateral assets to be included in the matching adjustment calculation feels like a finely balanced argument that hinges on the perceived likelihood of a liquidity-driven default upsetting the insurer's matching position compared with other factors which could drive the abandonment of a buy-and-hold investment strategy.

**Impact on capital (encumbrance):** Current market practice is to post collateral under an arrangement called title transfer which means that, whilst the economic interest in the collateral assets remains with the party posting collateral, the legal ownership of the assets passes to the party receiving it.

The assets pledged as collateral are thus no longer available to meet other claims on the insurer.

Based on the provisions of the long-term guarantee assessment (LTGA), our view is that these assets may well be deemed encumbered and thus ineligible to count as Tier 1 capital and may instead be classified as Tier 2 capital. The diagram below illustrates the possible implication of this. In this example, an insurer can initially cover its solvency capital requirement (SCR) comfortably with Tier 1 capital, though it has some Tier 2 arising from initial margin posted on its centrally cleared derivatives position.

Over time, markets move against the derivatives positions so asset values fall, but the insurer is closely hedged so the fall is matched by a fall in liability value and capital resources are unchanged. However, additional collateral posted to cover margin calls may increase encumbrance and the proportion of capital classified as Tier 2; this could possibly reach the point where the constraints upon the quality of capital eligible to back the SCR start to become a concern.

## CONCLUSION

In conclusion, the combined impact of these new regulations, in the context of an already complex Solvency II framework, will mean that insurers have to contend with an additional layer of complexity in their asset-liability, investment and capital management of their business. In our full research report, we talk through some of these complex issues in more depth, as well as illustrate what these impacts could potentially look like for a typical insurer. Importantly, we go on further to discuss what the potential responses may be in terms of changes to existing practices, as well as potential changes to product offerings altogether.

To discuss any of the themes in this article, please contact Neil Dissanayake at [neil.dissanayake@milliman.com](mailto:neil.dissanayake@milliman.com), Matthew Cocke at [matthew.cocke@milliman.com](mailto:matthew.cocke@milliman.com) or Russell Ward at [russell.ward@milliman.com](mailto:russell.ward@milliman.com).

FIGURE 1: ELIGIBILITY OF ASSETS IN MATCHING ADJUSTMENT CALCULATION

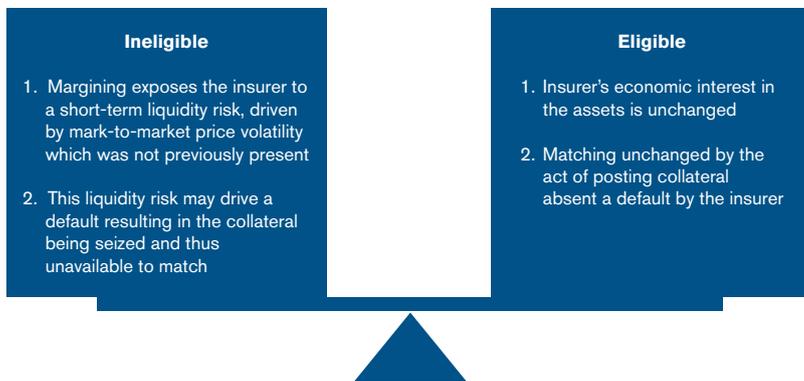
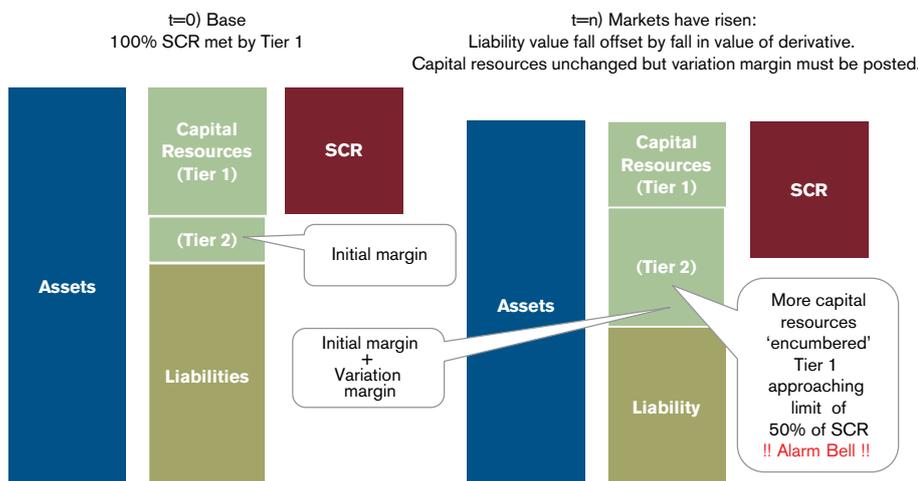


FIGURE 2: POSSIBILITY OF ASSET ENCUMBRANCE



<sup>4</sup> For a full copy of the report, please contact Russell Ward, Neil Dissanayake or Matthew Cocke.

# THOUGHT LEADERSHIP

MILLIMAN OFFERS UNBIASED, EXPERT ADVICE BASED ON FIRST-HAND EXPERIENCE IN MARKETS AROUND THE WORLD. OUR INSIGHT INTO INDUSTRY ISSUES SUCH AS THOSE DETAILED BELOW CAN HELP YOU NAVIGATE TODAY'S SHIFTING BUSINESS ENVIRONMENT AND FIND PRACTICAL, IMPLEMENTABLE SOLUTIONS.



## EIOPA PROPOSAL FOR GUIDELINES ON THE PREPARATION FOR SOLVENCY II

John McKenzie, William Coatesworth,  
15 October 2013

On 27 September 2013, the European Insurance and Occupational Pensions Authority (EIOPA) published its final guidelines for the preparation of Solvency II, which set out EIOPA's proposal for the phased introduction of specific aspects of the Solvency II requirements, some of which are due to be put in place by 1 January 2014. This paper summarises the content of the guidelines and discusses what they mean for firms impacted by the regulations.

Read the full article: <http://tinyurl.com/lz8soh8>



## OVERNIGHT TRADING STRATEGIES

Neil Dissanayake, Victor Huang,  
07 February 2014

Milliman's global Financial Risk Management practice offers 24-hour trading coverage and execution to its global hedge outsourcing clients via trading desks in Sydney, London and Chicago. However, as with typical industry practice for variable annuity (VA) and equity-indexed annuity (EIA) hedging programs, real-time trading generally takes place only during the cash-market hours of the respective risks. This study examines the impact and potential benefits of expanding futures-based real-time risk management to hours where the respective cash markets are closed but the futures markets remain open.

For a full copy of this article please contact Neil Dissanayake at [neil.dissanayake@milliman.com](mailto:neil.dissanayake@milliman.com).



## INSURANCE MERGERS AND ACQUISITIONS: GLOBAL REACH, LOCAL KNOWLEDGE

Milliman has successfully completed hundreds of M&A due diligence assignments and understands the unique challenges associated with mergers and acquisitions. In this video, Milliman consultants discuss the evolutionary changes and cross border challenges in insurance M&As.

See the video at: <http://tinyurl.com/qa95v74>



## ORSA: AN INTERNATIONAL REQUIREMENT

Eamonn Phelan, Padraic O'Malley,  
04 December 2013

The Own Risk and Solvency Assessment (ORSA) is quickly becoming a global regulatory requirement for insurance undertakings, and it is one of the key elements of enterprise risk management (ERM). This paper compares and contrasts the International Association of Insurance Supervisors ORSA requirements with the requirements applying in Europe (through Solvency II), in the United States and in Australia. It also examines common challenges facing insurers when embedding an ORSA into their organisation.

Read the full article: <http://tinyurl.com/n4zmtbh>



## OPTIMISING LIFE REINSURANCE STRATEGY UNDER RISK-BASED CAPITAL MEASURES

Christopher Lewis, Jillian Wood, Sandra Haas,  
Scott Mitchell, Tatyana Egoshina,  
10 February 2014

The recent introduction of new economic- and risk-based reporting and solvency frameworks is encouraging life insurers to focus much more than previously on risk, value and capital management of their portfolios. As life insurers adapt their business models to modern risk management frameworks, reinsurers must also adapt their offerings to meet the evolving needs of their life insurance clients. This report explores the possible impact of risk-based economic frameworks on a life insurer's reinsurance strategy.

Read the full article summary: <http://tinyurl.com/loqv589>



## THE ERM JOURNEY

In this short film, Milliman consultants discuss enterprise risk management and explain how techniques for analysing organisational structures and processes can increase resilience and allow a business to better understand and respond to risk.

See the video at: <http://tinyurl.com/qa95v74>

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DATE	ORGANISER	EVENT
3 July 2014	Staple Inn Actuarial Society	Risk Factor Portfolio Construction Presentation
September 2014	Milliman	Milliman Forum/Milliman Technical Forum
9 - 11 November 2014	Institute and Faculty of Actuaries	Life Conference and Exhibition 2014

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