THE SOCIETY OF ACTUARIES IN IRELAND

Submission on the Central Bank of Ireland's Discussion Paper on Economic-Scenario Generators and Market Consistency

June 2011

1 Introduction

1.1 The Society of Actuaries in Ireland is the professional body representing the actuarial profession in Ireland. Many of our members hold responsible roles within, or as advisers to, financial-services firms. They act as board members, Appointed Actuaries (with statutory responsibilities), Signing Actuaries (also with statutory responsibilities), and senior managers carrying a range of responsibilities including financial and risk management.

1.2 In addition, the Society is an active member of the Groupe Consultatif Actuariel Européen and is fully engaged in the Groupe's ongoing work on governance systems and prudential regulatory standards, especially in relation to the development of Solvency II.

1.3 The Society welcomes the opportunity to participate in this Central Bank of Ireland ('Central Bank') discussion paper on economic-scenario generators and market consistency.

1.4 We provide general comments in Section 2, followed, in Section 3, by answers to specific questions posed in the discussion paper.

2 General Comments

2.1 We recognize the difficulties involved with the complex area of calibrating market-consistent (MC) economic-scenario generators (ESGs) in the absence of deep & liquid markets, and we welcome the Central Bank's initiation of a discussion on this topic.

Fair-Value Measurement

2.2 We believe that the ultimate purpose of the discussion is to support actuaries, regulators, and the insurance industry in the valuation of technical provisions for options and guarantees. In this, the primary focus should remain on the output of the valuation, such that the methodology and assumptions, in aggregate, lead to appropriate measurement, while noting that the routes to achieving this may well contain significant differences.

2.3 A particular case in point, which will arise throughout the discussion, is the considerations of risk margins—that is, the price for bearing the uncertainty inherent in the liability cash flows. In this, we advocate a general requirement for clarity and disclosure of methodology to ensure that it is transparent to all stakeholders how risk margins have been allowed for in the valuation.

2.4 Because this issue is neither new nor particular to the European insurance market, these valuation issues have been addressed substantively elsewhere, for example, in fair-value accounting literature and research. A particular example of this is the work of the American Academy of Actuaries (AAA) in providing policy and guidance notes to its membership in the context of Financial Accounting Standard (FAS) 157 (how to apply fair-value accounting in the context of US GAAP[1]).

Limitations and Applications of MC ESGs

2.5 Please note that our comments in this submission are solely concerned with ESGs used for MC valuation (MC ESGs), rather than those used for generating shocks. In particular, the primary, meaningful purpose of an MC ESG is to produce scenarios over which asset and liabilities are aggregated & averaged in order to generate MC measures of assets and liabilities; quantiles and other statistics of either the MC ESG output itself, or the valuation of liabilities thereon, are of limited value.

2.6 We note that the scope of the discussion paper includes all business with material investment guarantees, although particular mention is made of variable annuities. We agree that the issues associated with calibrating MC ESGs apply to all undertakings with investment-guarantee business and not just to variable-annuity writers.

2.7 We note that the discussion paper covers the calculation of MC technical provisions under Solvency II. We caution readers that, were recommendations emanating from the paper to be applied under the current solvency regime, care would need to be taken when integrating them with the non-MC aspects of the current regime; in particular, care would be needed so as to

[1] In February 2009, a working party of the AAA produced a public policy practice note, http://www.actuary.org/pdf/life/fas157_0209.pdf, that addresses a range of issues pertinent to the discussion herein.

ensure that an appropriate allowance for prudence is made, one that is neither excessively high nor excessively low.

2.8 In general, we are dealing with measurement of liabilities that are "unobservable", in accounting parlance, which measurement requires valuation using models. These inputs themselves may include material, unobservable parameters, whether financial or otherwise. This mark-to-model environment is familiar to actuaries; however, the challenge lies, in part, in the integration of insurance methodologies & heritage with market-based valuations that rely heavily on replication methodologies and frameworks that are based on replication.

2.9 This convergence of insurance and market-based pricing requires considerable application of expert judgment so as to ensure that the approach neither duplicates nor omits key elements of the valuation. Thus, it is essential that the purpose and the requirements of the valuation be unambiguous to all participating in the valuation. Furthermore, it is important that, where key judgments have been made by experts, they be transparent and readily understood by those using the valuation output. For example, it should be expressly stated how all the margins referred to in questions 8 & 9 of the Central Bank's discussion paper (illiquidity premium, repo cost, etc.) have been allowed for, whether, say, by calibrating to market prices that already incorporate these margins or by explicitly modelling each of the margins.

ESG for the Purpose of Interpolation

2.10 If the liabilities to be valued are similar to instruments traded in deep & liquid markets, then the calibration of an MC ESG is straightforward. Where the liabilities to be replicated lie within the region of the data used for calibration but are not precisely observable, then we are using the ESG for interpolation purposes. For example, if the available set of calibration instruments includes data points with moneyness of some instruments greater than that of the liability and moneyness of others less, and terms of some instruments longer than the liability and terms of others shorter; in this case, the MC ESG facilitates the interpolation of market data for the purpose of evaluating the required liability prices. When the MC ESG is being used as an interpolation engine, the selection of the set of instruments to calibrate to is of primary importance rather than the probability distributions assumed in the model underlying the ESG. And the selection of data points for calibration is likely to influence differences between valuations more than the models themselves. Thus, two different models calibrated to the same set of instruments will likely produce very similar liability values, if the liability is similar to the set of calibration instruments; but the same model could easily produce very different liability values if calibrated to different sets of instruments.

ESG for the Purpose of Extrapolation

2.11 In the absence of a deep & liquid market for the calibration of the model, the ESG is used as an extrapolation engine; and while the set of calibration instruments is still relevant, the model underlying the ESG assumes much more importance. In addressing these challenges, we recognize that the primary focus needs to be on the approach in aggregate rather than on elements of the assessment. Thus, where a holistic approach is used in setting the valuation, a similarly holistic view needs to be applied to the assessment of the valuation.

2.12 To support such valuation and assessment, each undertaking should be able to "show its work" when calibrating to markets that are not deep & liquid and for extrapolating the projection beyond the region of the data. Thus, there is an unambiguous onus on the undertaking to demonstrate that its approach is reasonable and self-consistent.

2.13 By way of illustrating the diversity of routes to achieving reasonable outputs, we introduce a range of approaches that we believe may currently be in use. The differences among these approaches primarily depend on whether risk margins are required to be explicit or implicit components within the valuations. Examples of approaches are in the following four paragraphs.

Implicit Margins

2.14 An example of extrapolating prices from deep & liquid markets is to extend the implied-volatility surface of short-term equity options that are close to the money out to longer terms and strikes that are further from the money. The method of extrapolation could be a traditional actuarial method, such as linear interpolation or splines, or it could be a financial-markets method, such as using a stochastic-volatility model or a fat-tailed distribution. This approach makes certain assumptions as to the continuation of expectations contained within the observable information, including an expectation of a continuation of future market costs of risk.

2.15 This approach may be extended or expanded by either introducing observed partial information or applying expert judgment in the valuation through consideration of OTC derivatives. These instruments may capture the additional cost of risk margins required to externalize risks and may introduce relevant information as to the liquidity or otherwise of the markets for components of risk embedded within guarantees and options sold.

2.16 The process of calibrating to OTC prices is similar to calibrating to prices from a deep & liquid exchange, although it is not always as reliable, especially if the prices are requested only when the undertaking needs to calibrate an ESG and are never traded at. Reliability improves if the prices are provided as part of a daily collateralization process on actual instruments held by the undertaking; and reliability improves further if transactions are executed at the prices. Even if calibrating to OTC prices is not very reliable, doing so occasionally can provide a useful check on some of the other methods, especially if there are OTC prices at strikes or durations closer to those of the liability than exist in deep & liquid exchanges.

Explicit Margins

2.17 Approaches that are reliant on historical statistical information—for example, insurance pricing methodologies—require significant extensions to replicate MC prices. In particular, such processes will need to directly address issues such as the statistical properties of real-world returns, explicit allowances for transaction costs & risk margins, and the interactions among all of the parameters, noting the non-linearity and interdependency of the components.

Coherent Allowance for Margins

2.18 Explicitly allowing for illiquidity margins (question 8) and other margins (question 9) is obviously very important when modelling all components of prices. But if prices are extrapolated from deep & liquid markets, then these elements will also be implicitly extrapolated. In this case, the undertaking needs to assess whether future market states are likely to reflect states currently implied by the markets. If, for example, markets are viewed as being extremely liquid, this may lead to relatively low risk & illiquidity premiums in option prices (that is, in implied volatility), which situation may lead to relatively flat, and low, implied-volatility surfaces. A more regular market structure may imply an upward sloping curve reflecting the increased lifetime cost of capital and uncertainty for longer-term options. Thus, the calibration process itself will require expert input to assess, not only the data being used, but also the condition of the underlying market.

2.19 When deciding which of the above approaches to use—or, indeed, whether to use some other approach—undertakings should bear in mind our answer to question 2 of the Central Bank's discussion paper and in particular, the recognition that there will be trade-offs between cost and complexity that will need to be set in the context of modelling an amount that is inherently uncertain. When trying to strike the right balance between these issues and the accuracy produced by each approach, undertakings should take account of materiality; and the materiality considerations should not be just of the size of the liability, but should also include the proportion of the liability that cannot be priced by reference to instruments traded in deep & liquid markets—whether exchange-traded or OTC—as well as the difference between using a simple model and using a complex one. That is, a small guarantee or a short-term simple guarantee or a guarantee with the same approximate value no matter what model is used could be valued using a simple ESG, while a large, long-term, complicated guarantee would probably require a more sophisticated ESG.

Solvency II

2.20 Under Solvency II, the calculation of technical provisions and the splitting of them into best-estimate liabilities and risk margins for any liabilities without guarantees or options are relatively straightforward. However, for options and guarantees, it is less clear, and level 2 guidance is still required to determine where risk margins will lie. Given the points that we make in this section and the next, it is important that any margins are not over- or under-counted. For example, if the risk margin makes allowance for a non-hedgeable economic risk that has already been included in the ESG, then the requirement to hold additional risk margins for market risk on top of the best-estimate liability would be excessive. Conversely, a valuation that does not recognize the costs of replication within the calibration or directly in the valuation would arguably lead to a valuation that, absent a risk margin, would not meet the requirement of an exit value.

2.21 Finally, it is worth considering the issues of illiquidity premiums and technical provisions, which are clearly important and material. In particular, it is critical to appreciate that the arguments supporting the inclusion of illiquidity premiums in respect of long-term liabilities are not necessarily valid in the case of liability valuations based on replication strategies. In particular, the continuous rebalancing of such market positions is diametrically opposed to the buy-and-hold premise that supports the inclusion of illiquidity premiums in the risk-free rates.

That said, where the aim of the illiquidity premium is to reduce market cyclicality, there is an argument for including such allowances in other parameters such as implied volatility. Thus, consideration of guarantees and options in the context of Solvency II requires specific consideration of the way in which the technical provisions are produced.

3 Responses to Questions

In this section, we respond to the specific questions posed in the Central Bank's discussion paper.

3.1 Term structure of volatility and implied-volatility skew

ESG models using a relatively simple Black-Scholes model for equity returns may be able to reliably replicate option prices for at-the-money options, but this model does not reliably replicate the full volatility surface. The model may overstate prices of in-the-money options (with a strike price above 100%) and underestimate the prices of out-of-the-money options.

Some undertakings, in calibrating their ESGs to their individual portfolios, will identify the average moneyness of their liabilities and calibrate the ESG on that basis. However, it must be noted that such approaches may not be sufficient for all portfolios, if the equity option price is a convex function of moneyness.

More sophisticated models may be necessary to better capture the variation in the market volatility surface and therefore price a wider range of equity options more accurately. These models may capture market features such as equity-volatility clustering (periods of high market volatility following each other), jumps in volatility, or the so-called volatility smile for interest rates.

Question 1
As companies prepare for Solvency II, when should undertakings consider the use of more sophisticated models that capture the features identified above?

Undertakings should always consider whether their models adequately capture the material aspects of their liabilities; so, the short answer to this question is 'immediately'. As for when undertakings should use more sophisticated models, that depends on the nature of the liabilities and the current models, as well as the complications that the adoption of new models would cause, which are addressed in the next sub-section.

The more complicated a guarantee or option is, the more likely that a simple model will not value it accurately. The presence of path-dependent guarantees (for example, ratchets), complex fund structures (for example, volatility-controlled funds or multi-asset funds), and complex pay-offs all make the need for a sophisticated model more pressing. However, it should be borne in mind that MC ESGs are used to calculate average values rather than tail values, and there is generally less of a difference between the average values two models produce than there is between the tail values that they produce. Therefore, if the current, simpler model produces market values that are reasonably close to what a more sophisticated model would produce, or if the guarantee or option to be valued is not very material, then the simple model can be justified.

Question 2
Does the adoption of such models introduce other complications? If so, what are they and what approaches can be used to address these?

There is a necessary trade-off between complexity and fitness for use. In particular, where the primary aim is to generate valuation metrics, then simplified models are perhaps reasonable and the inclusion of increased complexity may primarily be directed towards addressing a wider set of needs of a risk-management nature.

In terms of the issues raised by more complex models, the following is a non-exhaustive list:

- Expertise required

  More complicated models require more expertise to build, run, and understand them than simpler models. If this expertise is rare or unavailable, it can often be safer to build a model that may not capture all aspects of a liability but that everyone understands.

- Board understanding

  Related to the above point is the need for the board and senior management to understand how the model works and what drives the outputs. Complex models may be beyond the understanding of all but the most highly technical of experts.

- Spurious accuracy

  Ultimately, models are abstract representations of a real world dynamic, which dynamic is often complicated. While the natural response to a complicated reality is to build a complicated model of it, this does not necessarily result in a better model. Where there are complex pay-outs, non-traded underlying funds, or uncertain demographics over long time horizons, the model might well be calibrated very complicatedly, but with very little demonstrable or supportable evidence. Thus refinements and enhancements to models need to be considered taking into account both the materiality of the improvement created and the reliability of the refinement.

- More information from the same market

  Model calibration is itself an estimation process; therefore, introducing new information requirements to be extracted from perhaps an unchanged data set may introduce limitations. For example, if undertakings are hard-pressed to recover reliable estimates of implied volatility from a thin market in options, then it will be clearly even more difficult to extract reliable information supporting higher moments such as volatility of volatility.

- New information from new markets

  Where new data is to be introduced—such as OTC variance-swap markets for pricing volatility—there will be issues concerning market liquidity, which may further reduce the reliability of such estimates. Thus, there will remain a requirement for expert judgment.

- Proportionality

  Related to the point on spurious accuracy above, there is a general requirement to understand the degree of estimation error that currently exists in valuations and to understand the compensating measures that have been put in place. In particular, where risks are hard to value, undertakings will need to understand their risk appetite and risk mitigation for such liabilities. In this, the main prudential & governance concern would be to ensure that an

undertaking is not too highly leveraged against a "model" measure of risk and that an appropriate set of capital and governance requirements are in place outside of, and in addition to, the valuation.

- Run times

  Introducing more parameters into a model can, depending on its significance, materially increase the number of scenarios to be evaluated so as to achieve price convergence. This will lead to longer run times, and if the time available to produce results is not sufficiently flexible, then simplifications to other parts of the model—for example, compression of model points—will be required. Thus, there is again a proportionality argument for determining whether introducing a new variable will improve overall valuation confidence if it leads to other simplifications in modelling.

3.2 Though-the-cycle or point-in-time valuations

It was observed in the 2008 crisis that market implied volatilities spiked to very high levels. Would this mean that, in order to be market consistent, the options in insurance contracts have to be valued in a manner that reflects these rates? Alternatively, can a "through the cycle" approach be used where the range of scenarios assumed will reflect an "average" position?

While this does avoid exacerbating pro-cyclicality in terms of capital requirements' fluctuating with the state of the market, it would however be knowingly suppressing an actual point-in-time value in favour of what might happen in a typical/ average year. This is particularly true of market volatility but could equally apply to other factors.

Question 3
Can "through the cycle" calibrations ever be regarded as market consistent?

Policy objectives that seek to reduce market pro-cyclicality through the introduction of dampeners or the stabilization of certain parameters away from being MC all have their merits, but they are by definition contrary to MC. Therefore, the short answer to this question is 'no'. However, unless all the parameters of an ESG are observable, some of them will have to be estimated, and "through the cycle" methods may be appropriate, in particular in estimating future market states where no reliable market exists for the liabilities.

Thus, care must be taken when inferring long-term ESG parameters from current market prices. As an example, during the crisis of 2008 and into 2009, there was an overall increase in the level of fear and uncertainty combined with a reduced capacity of industry players (whether banks or hedge funds) to assume risk; thus, there were major changes in the cost and availability of options. Calibrating to such market prices for volatility would thus include elements of both expectation & illiquidity, and extrapolation of such prices by definition projects a continuation of such expectations & illiquidity in markets. If this calibration were used to estimate the cost of a dynamic replicating strategy using such instruments, the undertaking should make itself aware of the impact of heightened option prices.

Question 4
If so, under what circumstances and with what caveats?

If a "through the cycle" approach is used, the undertaking should consider an underpin of a "cost of fulfilment", through the cycle, noting that a cost of fulfilment in terms of market replication will by definition require some consideration of the long-term cost of hedging. And where expert judgment is applied, a clear statement is required about current market liquidity and assumptions as to future market liquidity.

3.3 Long-term volatility assumptions

The assumption for long-term volatility is a key determinant in the level of technical provisions for investment-guarantee business. It is not clear to the Central Bank that there is a general market consensus on the methodology for the determination of the volatility assumption for long-term guarantees.

The methods currently adopted by industry participants range from the use of a relatively simplistic constant-volatility assumption based on historical information, to market implied volatility or to the use of more sophisticated models, such as GARCH. In the case of the GARCH model, the implied volatility at the last liquid data point is extrapolated to a long-term ultimate rate. Methods may assume mean reversion to a long-run average rate derived from historical data or auto-reversion or no term structure.

Question 5
How should changes in volatility be modelled?

Term structure of volatility is a key component of pricing long-term guarantees; however, to fully understand its significance in a particular case, it is important for undertakings to consider the sensitivities of market value to volatility assumptions in future periods. Having established the sensitivity of liabilities to future levels of volatility, undertakings can better appreciate what portion of liabilities are sensitive to valuations that are either more or less observable and reliable.

In terms of understanding the importance of factors such as 'volatility of volatility', 'autoregression', and 'heteroskedasticity', undertakings should understand how these statistical properties manifest themselves before setting about considering how best to model such features. Thus, undertakings need to consider how these features affect the likelihood and size of pay-outs or hedging profits & losses.

Once an undertaking understands the impact of the assumptions about future volatility, it should keep the following in mind:

- Short-term volatility

  Calibration of implied volatility to short-term options will recover near-term expectations of asset-price uncertainty & liquidity. As such, this information is an important indicator of near-term replication costs for guarantees, so regard would need to be had of such information.

- Long-term volatility

  Evidence supports a hypothesis for mean reversion, as does the requirement that, to avoid ever expanding volatility, some level of mean reversion in the variability of asset prices is a reasonable assumption. However, what we are seeking is not a statistical measurement of asset-price processes but a mechanism to recover prices of options and guarantees. To the extent that such prices include risk margins and frictional costs, it is reasonable to consider that historical measures of volatility, without allowance for (duration-dependent) costs, will understate long-term option prices. Thus, in the presence of a fixed statistical assessment of volatility, throughout the term structure, one would expect that the resulting implied-volatility curve, when adjusted for margins, will be upward sloping.

- Mean reversion

  Having established prices that set the overall level of volatility through long-term and short-term pricing points, there is the challenge of interpolating a full term structure between these points. The slope of the curve, while important, is perhaps of secondary concern to setting the overall level, but its significance will need to be considered in the context of the liability profile of the overall portfolio.

Thus, discussion about the term structure of volatility needs to address calibration to the liquid market together with a framework or ideology for setting long-term volatilities and then, as a final step, to consider the process for putting in place an appropriate shape.

3.4 Short-term volatility assumptions

From the perspective of the insurance undertaking, one can view the long term as simply being a series of short terms. This approach to analysing the long-term volatility positions on insurers' balance sheets would suggest that it is the volatility implied by short-term option prices—and its volatility—that is more relevant to insurers than placing reliance on mean reversion, or other relationships over the long term, particularly where this tends to reduce the apparent cost of provision of long-term investment guarantees.

Question 6
Does this mean that only short-term volatility is important?

No. As mentioned under question 5, the discussion is concerned with the value of technical provisions that are sensitive to the occurrence of returns over a number of periods; thus, understanding the sensitivity of liabilities to volatility at different future points is important.

In many ways, modelling of the volatility term structure is akin to modelling of interest rates wherein models with two or more factors include both near-term and long-term input factors.

Question 7
Does this mean that very short term (e.g., daily) fluctuations need modelling?

Not necessarily. We come back to considerations of materiality and the adequacy of a model with longer time steps. That is, how likely is the price of a liability to vary if the time step is shortened? In

this, the concern or question is whether the liability is undervalued because of an inability to capture intra-period noise that is not modelled appropriately by the aggregate change projected to apply to the longer time step. A particular case that may require additional, specific attention is the treatment of liabilities that are close to the money and close to maturity; such liabilities will be extremely sensitive to movements in the underlying asset and, thus, may require additional attention.

3.5 Benchmarking of pricing methodologies to the options market

The options market, which is used as a reference point for volatility parameters when valuing liabilities, is relatively deep and liquid for terms of up to 5 years. Options for terms in excess of this are thinly traded and incorporate substantial illiquidity premiums into the price, as the capital markets command an increasing premium with term to assume long-term volatility risk. During periods of market stress, market liquidity may dry up completely, even at short durations.

In addition to the calibration of the ESG, the market is also directly relevant to undertakings where it forms part of a more balanced strategy to risk mitigation as opposed to full reliance on either a reinsurance or dynamic-hedging solution.

Question 8
How should the illiquidity margins embedded in the market for option prices be reflected in the valuation of investment guarantees?

Current Solvency II thinking, as exemplified by QIS5, considered a reduction in the liability value in order to account for the illiquidity of insurers' liabilities. However, in the context of options and guarantees, insurers suffer an additional replicating cost as a result of illiquidity in the asset markets. This is a genuine cost and should not be removed from the liability valuation. Removal would be relying on a "buy and hold" type strategy, which is at odds with the Solvency II approach to valuation, whereby the value of technical provisions is determined by the cost of transferring liabilities to a third party.

This is further underlined by the fact that significant guarantee exposures may introduce the need for active risk management through hedging, for example. Therefore, the illiquid policyholder liabilities are transformed into liquid obligations in effect.

Illiquidity margins can be built into the ESG through an adjustment to the volatility parameter, an adjustment to the risk-free rate, or both. For example, if an insurance liability can be replicated using a static portfolio of options, then the illiquidity premiums will already be built into the prices of those options and, therefore, any ESG calibrated to them. On the other hand, if an insurance liability can be replicated using a dynamic hedging strategy, then adjusting the risk-free rate for the bid-ask spread—which is lower the better liquidity is—and the frequency of trading will allow the illiquidity premium to be incorporated into the liability's value. The adjustment should generally result in the allowance for illiquidity being higher for longer durations than it is for shorter durations.

Please note that any other adjustments - for example, for mean-reverting volatility (question 5) or for rebalancing costs (question 9) - could result in the allowance for longer durations being higher or lower than the allowance for shorter durations.

3.6 Allowance for non-hedgeable market risks and trading costs

Benchmarking the volatility parameters used in the options market at long durations and the assumptions used by insurance companies in valuing a portfolio of options and guarantees reveals a disconnect in the approaches adopted by the two market participants. Part of this difference can be explained by the inclusion of a margin for non-hedgeable market risks and trading costs by participants in the options market.

The margin for trading costs needs to take into consideration a variety of (interlinking) factors:

- *use of hedge instruments with poorer liquidity and the implications for bid-offer spreads (total return or price indices for example);*
- *interaction of the above on frequency of rebalancing and resulting hedge error in normal and dislocated markets;*
- *liquidity of the underlying and resulting implications for repo cost; and*
- *recognition of the credit risk embedded in interest rates.*

Question 9
How should other margins be reflected in ESGs?

Some of these issues were discussed in the answers to previous questions above, in particular, the general alternatives of implicit or explicit allowances to recover MC prices.

Where there is a consideration of what the allowances will be—for example, in considering long-term, unobservable parameters—some regard would need to be had of the nature of the cost and how it is best allowed for. For example, costs that occur on the rebalancing of a hedge instrument will be a function of volatility, so allowances within the volatility parameter appear appropriate. And costs that relate to the treasury costs of either borrowing stocks for shorting purposes or posting collateral are all margins that manifest themselves through the rate of accumulating or discounting, so allowance should be made in the risk-free rate. That is, the location of margins needs to have regard to nature of the margins in question.

As noted earlier, extrapolation from markets implicitly makes allowance for any additional margins built in by the market participants. This implicit allowance should be analysed for reasonability, and care should be taken to avoid double-counting the margins.

4 Queries

We should be delighted to assist if clarification or elaboration is required on any of the points made in this submission. Please direct any queries to Ms Yvonne Lynch, Director of Professional Affairs, at the contact details at the bottom of this page.

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