

Potential impact of Solvency II on equity derivatives markets

Solvency II is a major regulatory theme for financial markets through 2011 and beyond. It will not only have an impact on insurance companies, but may also have wider repercussions across financial markets. This article provides a summary of the Royal Bank of Scotland's latest report focusing on the potential implications of Solvency II for the equity derivatives markets

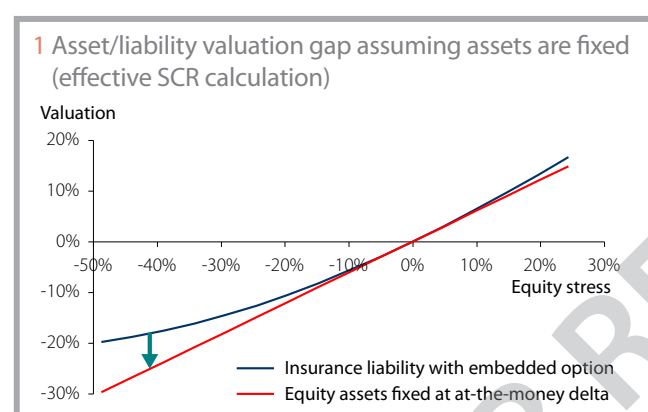
Solvency II (European Union insurance company regulations) is a major regulatory theme for financial markets through 2011 and beyond. Under Solvency II, insurers will be forced to hold sufficient capital, as measured by the Solvency Capital Requirement (SCR), to remain solvent during periods of market and insurance stress. Consequently, there is increased linkage between capital requirements (and cost of capital) and the price of risk embedded in market assets. Combined with the extensive size of insurers' asset holdings, any alteration in their operating environment has the potential to alter not only the behaviour of those institutions directly involved but also wider asset pricing and market structure. This is particularly true for equity derivatives prices, which are highly sensitive to supply/demand balance. For this reason, we believe it is useful for all investors – not just those in the insurance industry – to understand Solvency II and its implications.

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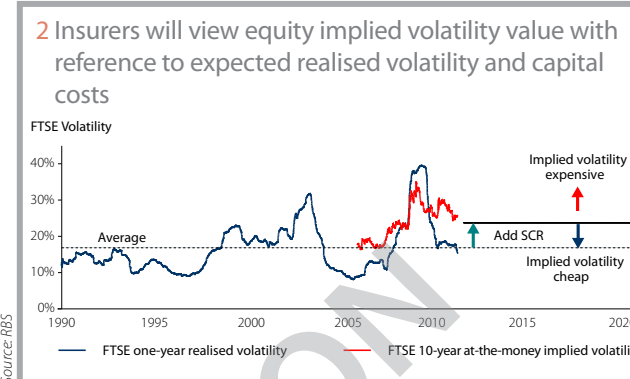
In our view, the most important general conclusion comes from the underlying spirit of the Solvency II framework, which aims to match insurance capital requirements with the economic risks that the companies are undertaking. Since insurers generally sell some form of optionality (or guarantee) to their end-clients, there should be greater structural interest from insurance companies in hedging with market-based long optionality products. Furthermore, Solvency II is being implemented coincidentally with Basel III and at a time when there is increased regulatory scrutiny of buyers of risk, which further adds to the upwards pressure on the cost of options.

Many insurers write long-dated guaranteed investment policies and attempt to replicate these guarantees using some form of active investment strategy. However, such management actions are given no credit in the current standard model of Solvency II as stress is applied instantaneously rather than assuming it happens over a period of time (despite the fact that the stress is designed to replicate the worst annual change in the market). This has important implications for actively managed replication/investment strategies.

Figure 1 illustrates a simple example of how a long-dated option and an asset hedge varies as the price of the underlying is stressed.



There is a significant mismatch between an option and the equivalent 'delta' position in the underlying for large changes in the price of that underlying. This is because the underlying valuation changes linearly with price, whereas the option value moves in a convex way. If the two positions are stressed instantaneously, the insurer faces a significant SCR contribution (the green arrow in figure 1). In reality, to replicate the option, the asset composition in the replicating portfolio will be varied dependent on the level of the underlying, reducing exposure to the underlying as its price falls. Since insurers receive no credit for their management actions, they may choose to 'outsource' the replication through buying similar maturity and strike options to their liabilities. Before making this choice, they must assess the relative merits of replicating their liabilities via different strategies, effectively deciding how they replicate the option contracts they have sold to their end-clients. If the company wishes to take no explicit investment risk on the underlying, it has two choices: 1) self replicate and pay a replication cost (due to *ex ante* slippage) plus capital SCR charge (due to instantaneous convexity mismatch of liability and assets); or 2) buy the option and pay an option premium plus default SCR charge (due to the reinsurance being with another counterparty). Therefore, an insurer should consider re-insuring the policy risk if



the market premium is considered too cheap and so the market price should rise (and vice versa). Ultimately, equilibrium should be reached when both strategy costs are equal. Hence, insurers will view the fair value of implied volatility with a combination of their view of future realised volatility, which is an important base, and the potential capital charges included for undertaking the self-replicating strategy (see figure 2). Thus, Solvency II creates a strong link between the typical implied-realised volatility spread to that of the cost of insurance capital and will mean that a positive spread is now effectively enforced by regulatory requirements. However, we believe this demand will not be unlimited and will be dependent on market prices. In our view, induced flows will only help drive the surface to an equilibrium point where options are no longer cheap vis-à-vis the capital charge of self-replication. This demand bias should mean that implied volatility should continue to be structurally fair to expensive, rather than cheap to fair.

Solvency II does not preclude equity investing, but it does encourage tactical asset allocation. However, some insurers may consider it necessary to strategically hold equities to hedge potentially 'real' liabilities or against long-dated policies. A primary consideration for any strategy will be the return on capital employed, with the market SCR sub-modules assigning the capital requirement for any investment. Solvency II makes no differentiation between stocks (either using characterisation by sector, beta or other metrics) and also has a counter-cyclical adjustment varying with capital cost rising/falling as the equity market rallies/falls, both of which could influence the underlying equity market in the future. At any time the optimal investment strategy, equity or equity with derivatives overlay, will also vary depending on the market conditions. Shorter-dated options can appear better 'capital hedges' than longer-dated options but, under Solvency II, these shorter-dated hedges will have to be implemented on a rolling basis, which has previously proven to be sub-optimal. Long-dated options will obviously be more expensive (at least in absolute terms), but can help reduce 'capital volatility' as they better match long-dated liabilities. Hence, we believe that insurers may look specifically at one- to two-year hedges, which balance the extra convexity advantage of shorter-dated hedges with the need to have the cheapest strategy in place over an annual horizon. This is likely to mean that implied volatility term structures should remain structurally steep going forward. Insurers have also come to realise that short-dated collars kill the equity risk premium, so we do not necessarily see a sharp increase in the demand for skew, apart for long-dated out-of-the-money puts, as insurers may look to hedge pre-existing policies.

Solvency II concerns more generic equity exposures and therefore encourages buying protection through equity index options, and so is likely to help maintain the structural richness of

implied correlation. For dividends, the impact is tricky to assess, as insurers may implement different hedging strategies, each having a different influence on dividends. Implied dividend positions are not technically stressed in the standard model of Solvency II, and so insurers may turn to dividend swaps as an alternative investment. Nonetheless, under Pillar II of the framework, insurers will have to report these types of investments and the regulator may consider stressing them as if they were equity investments.

What may be ultimately more important for the implied volatility markets comes from the secondary implications of Solvency II. Because of the additional capital charges, there could be a trend of traditional insurance policies being replaced by products with greater discretion or more market-orientated products, which are easier to hedge explicitly, and therefore more cheaply, for insurers.

The main issue is that the risk applied to equities in the SCR is based on a one-in-200-year statistical event and does not take into account the time-varying risk outlook of any asset class. The equity stress applied in the SCR calculation remains fixed through time. In this case there could be an incentive to consider more optimally risk-budgeted strategies, where the level of risk being taken is effectively known a priori. For example, buying volatility control underlyings either via delta (which fixes absolute risk) or calls (which fixes absolute downside) could be more capital-efficient. Volatility control is particularly attractive for equity investing in our opinion because it takes advantage of the negative spot/volatility correlation.

Conclusions

This article has highlighted how Solvency II has the potential to influence all areas of the equity derivatives market – implied volatility, skew, dividends, correlation and investment strategies. For some areas, the biases seem relatively clear, while for other areas the outcome is likely to depend on investor reaction. Furthermore, the overall impact will be dependent on outstanding policies, investment strategies and the divergence between pre-existing national regulations and the final rules of Solvency II.

The Royal Bank of Scotland (RBS) has a long tradition of working with insurers on their hedging and investment requirements across a whole spectrum of assets and solution complexity. RBS also has award-winning teams dedicated to providing general and bespoke specific product and asset/liability management advice, providing regular updates and innovative solutions for the ever-changing regulatory environment.

Further reading

Stephen Einchcomb, *Solvency II: Assessing its impact on the equity derivatives market*, RBS Report, May 2011
Solvency II – Capitalising on market distortions, RBS sponsored statement, Risk, September 2011
Solvency II and rates, RBS Report, February 2010
EIOPA report on the fifth Quantitative Impact Study (QIS5) for Solvency II, March 2011
Controlling volatility to reduce uncertainty, RBS sponsored statement, Risk, September 2010