



SOCIETY OF ACTUARIES

Article from:

Risk Management

March 2009 – Issue 15

Solvency II Primer

By Judy Wong

INTRODUCTION

THE MOVEMENT towards fair value accounting and market consistent valuation of assets and insurance liabilities has led to global efforts to revise the current insurance solvency regulation. Solvency II, a new solvency regulation initiated in the European Union, determines capital requirements using a fair value approach as opposed to the formula-driven Risk Based Capital framework that is currently adopted in the U.S. European insurers are required to be in full compliance with Solvency II by 2012. Regulators around the world including the United States are also closely reviewing the Solvency II regime in terms of incorporating elements of it into their own local regulations.

This article serves as a Solvency II primer by first introducing the Solvency II framework and then identifying several implementation issues that are still being resolved. Finally, it provides a discussion on how the credit crisis in 2008 could affect the framework as it continually evolves.

SOLVENCY II FRAMEWORK

Solvency II is based on the concept of fair value of liability and market consistent valuation. It is a dynamic approach of looking at the balance sheet where two points in time are considered: the current balance sheet and the balance sheet at the end of the year. It requires companies to have enough capital to withstand adverse changes to the Fair Value of Liabilities (FVL) over one year at the 99.5th percentile confidence level. The FVL is the sum of two components: the Best Estimate Liability (BEL) and the Market Value Margin (MVM). Figure 1 illustrates the Solvency II balance sheet at the valuation date (Time 0) and one year forward (Time 1).

BEST ESTIMATE LIABILITY

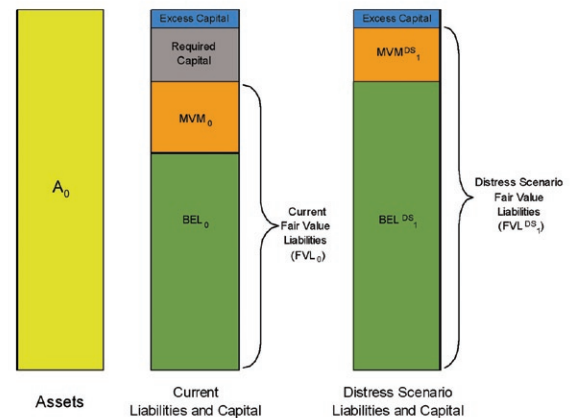
The Best Estimate Liability is the unbiased estimate of the present value of expected future cash flows. In other words, the cash flows are valued using best estimate assumptions with no explicit margins incorporated.

FOOTNOTES:

¹ Ernst & Young, 2007. *Report on Market Value Margins for Insurance Liabilities in Financial Reporting and Solvency Applications.*

FIGURE 1

The Solvency II Balance Sheet¹



*Distress scenario is the 99.5th percentile worst case scenario

MARKET VALUE MARGIN

Since insurance cash flows are not deterministic, simply considering the BEL to be the fair value of liability will underestimate the liability value. The BEL is the outstanding liability on average only. There is the risk that actual experience will be more adverse than expected, or that a catastrophic event could happen, causing the actual outstanding cash flows to be much larger than expected. As a result, there needs to be an additional “risk margin” component built on top of the BEL. This value is referred to as the MVM. The MVM can be interpreted as the cost of putting up capital to assume the risk of experience adversely deviating from best estimate assumptions. Note that the MVM only covers non-hedgeable insurance risks such as mortality and policyholder behavior risks. Hedgeable financial risks such as equity and interest rate risks are not captured in the MVM since these risks can be completely hedged through market transactions.

“Regulators around the world including the U.S. are closely reviewing the Solvency II regime in terms of incorporating elements of it into their own local regulations.”

There are various methods to derive the MVM. Solvency II prescribes that the MVM be calculated using the cost of capital approach as described below:

- 1) Determine the capital base needed to support the liability on the valuation date.
- 2) Project the capital base each year forward until the liability is expected to be paid off.
- 3) For each year, multiply the capital base by the cost of capital rate and take the present value of the product.
- 4) Take the sum of the present values for all years from Step 3 to arrive at the MVM.

SOLVENCY CAPITAL REQUIREMENT

Figure 1 shows that the distress scenario FVL is the sum of BEL^{DS}_1 and MVM^{DS}_1 , i.e., the estimated BEL and MVM at the end of one year following a distress event at the 99.5th percentile determined through simulation. The required capital is the difference between the distress scenario FVL and the current FVL. It can also be expressed as the sum of the changes in the BEL and MVM:

$$\begin{aligned}
 &\text{Required capital} \\
 &= FVL^{DS}_1 - FVL_0 \\
 &= (BEL^{DS}_1 + MVM^{DS}_1) - (BEL_0 + MVM_0) \\
 &= (BEL^{DS}_1 - BEL_0) + (MVM^{DS}_1 - MVM_0) \\
 &= (\text{change in BEL}) + (\text{change in MVM})
 \end{aligned}$$

The change in MVM is difficult to quantify. It is more straightforward to calculate MVM^{DS}_1 directly rather than separately calculating MVM_0 and the change in MVM. The remaining component of the required capital, i.e., the change in BEL, is defined as the Solvency Capital Requirement (SCR) under Solvency II. It is easy to see from this definition that the SCR is a value-at-risk measure at the 99.5th percentile over a one-year time horizon.

ISSUES

While Solvency II aims to provide a risk-sensitive framework of capital adequacy and move away from the traditional formulaic approach of quantifying capital requirements, there are several implementation issues that are still subject to ongoing discussions.

CALIBRATION OF THE MVM

The Market Value Margin measures a market consistent price to compensate companies for providing capital to assume risks. In order to be market consistent, the components of the MVM, specifically the cost of capital rate, need to be calibrated properly. At the time of writing, the cost of capital rate is prescribed by the Solvency II task force to be a fixed six percent over the risk-free rate. It is questionable whether this is truly the market consistent cost to raise capital and whether the cost should be kept constant regardless of current market conditions. Furthermore, the cost of capital methodology implicitly assumes that companies will always be able to raise capital in the market. The credit turmoil in 2008 provides ample evidence to show that when the market is under stress, not only will the cost of capital skyrocket, but raising capital could be infeasible at these elevated rates. Given the uncertainty around the true cost of capital rate, it would be prudent to conduct thorough stress testing of the MVM to ensure it adequately captures the risk margin even in stressed situations.

USE OF INTERNAL MODELS

Solvency II promotes the use of internal capital models by allowing companies to use their own models to determine the BEL, SCR and MVM, provided the models meet several standards. While the use of internal models may induce companies to take a more rigorous approach in measuring their risk exposure, the sub-prime crisis has brought about a lot of attention and skepticism on the use of sophisticated models. Some argue that market-consistent liability valuations are mark-to-model rather than mark-to-market concepts. Since insurance liabilities have no observable market price, calibrating the capital models becomes a very challenging task. The move away from formula-driven solvency rules will require regulators to possess both superior risk modeling knowledge and common sense, so they can decipher the black-box nature of capital models and at the same time rationally assess whether model results truly make sense.



Judy Wong, FSA, MAAA, is AVP and assistant actuary at New York Life Insurance Co. in New York, NY. She can be reached at judy_wong@newyorklife.com.

CONTINUED ON PAGE 44

Solvency II Primer | from Page 43

This will require the investment in additional resources for model review and validation by insurance regulators in many jurisdictions.

LESSONS FROM BASEL II AND THE CREDIT CRISIS

Basel II, the fair-value based solvency regulation for banks, came into effect in the United States in the beginning of 2008. The Solvency II framework is similar to Basel II in many regards. Examining how Basel II has unfolded in the midst of the credit crisis may offer insights into shaping the future of Solvency II.

SYSTEMIC RISK

In an effort to reign in the economic slump in 2008, governments around the world injected billions of capital into banks and insurance companies. While this promotes liquidity and solvency, it introduces uncertainty into the financial system as there are now subjective decisions being made by the governments to boost the capital of some otherwise would-be insolvent companies. It becomes difficult to gauge just how much risk remains in a company after a government bailout. The credit crisis sparked discussions around the need to allocate capital for systemic risk, i.e., the risk of a total collapse of the financial system. Research is currently underway to determine how systemic risk should best be captured under the Basel II framework. The results of such research could be applicable to Solvency II as it currently does not require companies to put up capital for systemic risk.

PRO-CYCLICALITY

Both Solvency II and Basel II are susceptible to pro-cyclicality as they are market-consistent approaches that prescribe capital requirements sensitive to the risk profile

of companies. In a good economy, the market value of assets is high and adequate to maintain healthy capital ratios. When the economy weakens, asset values fall and capital levels decrease. If the market value of assets decreases enough so that capital levels dip below minimum requirements, companies could be forced to sell risky assets that are capital intensive to lower their capital requirements. The increase of securities for sale in the market further depresses asset values, exacerbating the downturn. Regulators are working to come up with solutions to address pro-cyclicality. One proposed approach under Solvency II suggests mandating periodic stress testing of cyclical effects on capital positions to detect any potential capital shortfall. In cases where future capital inadequacy is deemed possible, regulators can prescribe a capital add-on to the SCR to “prepare for rainy days.” This method of over-collateralization of risks was also used to enhance the credit ratings of sub-prime bonds. In the case of these bonds, over-collateralization has proved inadequate. Capital add-ons need to be clearly defined and frequently reviewed to make them truly useful.

CONCLUSION

Solvency II takes on a new approach to regulate capital requirements by quantifying risk on a market consistent basis. One of its stated purposes is to provide incentives for companies to develop good risk management practices. While Solvency II is a big step forward from the traditional formulaic-based solvency approach, its use of mark-to-market valuations increases instability when markets are volatile. Policymakers and the insurance sector will need to continue to work together to resolve outstanding technical issues on the implementation of the Solvency II framework, at the same time learning from the recent experiences of banks and other financial institutions in the credit crisis. ♦