

A consistent framework for integrating assets and liabilities

If companies are to manage their economic capital effectively, they must value their assets and liabilities consistently, writes Dr Andrew Aziz of Algorithmics

INSURANCE COMPANIES are increasingly showing a desire to manage their capital, and hence the underlying risk components of their business, in a coherent and consistent manner. But this means bringing together two very different disciplines that traditionally have not been very closely linked. There are several possible approaches to doing this but, ultimately, it means bringing assets and liabilities into the same valuation framework.

Insurance regulation is moving in the direction of requiring companies to assess their risks in a more market-based way, while competitive pressure is pushing companies to take the same approach in calculating and managing their economic capital. It looks likely that insurance regulation and best practice will converge, just as it has done in banking, making it essential that companies change the way they look at risk on an enterprise basis. Simply matching expected asset returns with expected liability payoffs, while ignoring risk and correlations, will no longer be sufficient.

In separate silos

The problem is that, until now, the two sides of the business – assets and liabilities – have operated as more or less separate silos. Each side has had its own methodologies, own systems and own practices. The actuarial discipline of pricing and managing insurance products has a long and successful history, as has asset management. However, while the liability side has remained in its own specialised world, the asset side – through its common link with other financial institutions – has become immersed in modern approaches to market risk, adopting

models that calculate the fair value of assets and how this fair value can change over time.

Insurance companies are realising that, in order to allocate and manage economic capital more effectively, they need to bring liabilities into a similar framework, so that both sides of the business are valued consistently and, equally importantly, so that assets can be strategically allocated against the company's liabilities.

Even at the desk level, fund managers today are increasingly expected to take responsibility for tracking asset returns to the company's liability profile. It is no coincidence that liability-driven investments are arguably one of the hottest investment products currently offered in the market.

Bottom-up approach

So how can this be achieved? One approach is to tackle the problem head on and start pricing liabilities using the same fair-value approach used for pricing assets. This is already happening with insurance products that are linked to the capital markets, such as variable annuities, segregated funds, unit and equity-linked insurance – products whose valuation is dependent on the levels of exchange-traded indices.

However, this market-consistent pricing becomes increasingly difficult the further you move away from these blended products, particularly as you move from life to non-life products – where there is still an enormous gap between how insurance products are priced today – and the application of fair-value approaches. A market-consistent approach to the pricing of all liabilities an insurance company might possess would require a new generation of methodologies and systems, and this is not going to happen overnight.

Fortunately, there are alternatives. Where an insurance company knows that it will be some time before its liability systems can undertake fair-value pricing across the board, there is an alternative bottom-up approach that involves integrating existing asset and liability systems within a common risk architecture.

Under this approach, market consistency is achieved through the use of a single set of scenario paths as inputs for all asset and liability simulation engines and the use of a single aggregation engine for



consolidating the resultant scenario-dependent projections. Although it may only be the assets that are actually fair-value priced, using a single set of scenarios will ensure that correlations between asset and liability payoffs are captured appropriately through time. For this to work, the risk architecture must be both robust and scalable enough to address the entire enterprise, and open and extensible enough to accommodate the co-existence of many heterogeneous simulation engines – developed internally or purchased from external vendors.



Dr Andrew Aziz

Top-down approach

An alternative to the bottom-up approach is to go top-down and use a replicating portfolio methodology. The idea here is to create a proxy portfolio consisting of standard capital market products, which will then replicate the scenario-dependent payoffs generated by the company's existing liability systems. As this replicating portfolio is composed of capital markets products then, through proxy, the valuation of liabilities is consistent with the valuation of the asset side of the balance sheet.

Insurance companies are just beginning to experiment with this approach and, for the moment, creating proxy portfolios is very much a blend of art and science. Optimisation technologies are essential tools in this process, but there is still much trial and error in developing portfolios that are robust in their replication of the underlying liabilities.

So what is the best level at which to optimise? Traditional tools for the financial markets optimise by defining objective functions and constraints with respect to distributional statistics – standard deviation and tracking error or, more recently, tail measures such as value-at-risk or expected shortfall. But, in the insurance world, value distributions are unlikely to conform to simple distributional assumptions such as normality or even to more sophisticated assumptions that attempt to capture skewness and kurtosis.

Therefore, it is better to go to a different level of detail and optimise on a scenario basis rather than at the level of a descriptor of the scenario distribution. So, if you have 1,000 scenarios, then the objective

function would be to minimise the sum of the norms representing the differences between the proxy portfolio and the liability portfolio across all scenarios. This is a much more robust way of ensuring a true distributional fit than just focusing on an imperfect statistic.

Decision-support tools

Many insurance companies have invested heavily in traditional systems for pricing liabilities, and are unlikely to replace these in the short term. In many ways, these systems continue to serve them well, enabling practical pricing of liabilities for their current business activities. But, increasingly, companies

are recognising the need for decision-support tools that will help them allocate assets more efficiently to meet those liabilities – assets that have been priced using an entirely different approach.

The challenge is how to achieve this in the short term, through approaches that can co-exist with existing systems, even though, in the longer term, utilising a fair-value pricing approach for all liabilities makes the most sense. It is here that the trend towards securitising insurance products is helpful. Just as in the credit market – where the securitisation of credit in the form of traded credit derivatives has facilitated fair-value pricing – the securitisation of insurance products will make it much easier to bring assets and liabilities together in a common valuation framework. ■

Dr Andrew Aziz is managing director, risk solutions, at Algorithmics. Algorithmics is the world's leading provider of enterprise risk management solutions, and possesses patents in portfolio optimisation and replication.

Contact

Andrew Aziz
 Managing director, risk solutions
 E. algoinsurance@algorithmics.com

www.algorithmics.com