

ENTERPRISE RISK MANAGEMENT

PREPARING ECONOMIC CAPITAL FOR DECISION MAKING

Economic capital is becoming increasingly important to decision making, helping to transform the way business is done, make companies nimbler and deliver better results.

By David Dullaway, Joe Lebens and Mark J. Scanlon

The use of economic capital (EC) is gaining momentum. It is at the heart of Solvency II in Europe. Banking and insurance regulators are adopting it in many countries. Rating agencies are accepting it as a measure for solvency and starting to take into account the EC models of individual companies when determining ratings. Most leading insurance firms have implemented EC in one form or another.

WHAT IS ECONOMIC CAPITAL?

Economic capital is a measure of risk that provides a realistic economic quantification of the amount of capital that a firm needs to hold to cover losses at a certain risk tolerance level. It combines analyses of the various risks to which the firm is exposed and is used by a growing number of multinationals and insurers as an important tool for risk-based decision making.

A well-implemented EC system can transform the way a business is run, providing a far better understanding of its risks, making it quicker in noticing and reacting appropriately to changing circumstances, leading to safer and more profitable results. This is particularly important in today's climate, where risks are more volatile than ever and where firms' available capital is shrinking and new capital is expensive.

There is a perception that the risk management practices of insurance and other financial industries, particularly banks, have not adequately accounted for the risks faced. However, it is not that ERM or EC has failed. Rather, both need some major improvements in execution.

ECONOMIC CAPITAL AS A RISK MANAGEMENT TOOL

For insurance companies, EC is useful because it captures, as scientifically as possible, the combined impact of the myriad risks, dependencies and complexities to which the organization is exposed. It presents the results as a single, understandable number.

At its most basic, EC tells managers how much capital the firm needs to have available to survive the worst scenarios or events consistent with their risk appetite, given the risks to which their business is exposed. It allows them to define these worst outcomes in a way that is most useful for managing the business, whether this is a 1-in-200-year event or the loss of an AA rating. It replaces traditional regulatory capital rules with an internally consistent, risk-sensitive calculation. This is especially helpful because regulatory rules may prescribe too much (or worse, too little) capital by not fully reflecting individual insurers' business structures and risk portfolios.

But the value of EC as a replacement for traditional regulatory capital requirements is not the primary benefit. Economic capital, and the associated measurement of assets and liabilities on an economic basis, should be at the heart of most decisions an insurance company makes. It should play a key role in management's decisions with respect to:

- which risks and products they wish to take on
- the prices they want to charge
- the types of hedging and risk management practices that should be carried out.

Additionally, EC is an important tool for assessing whether the company has performed well or badly, and for ensuring it remains solvent. The use of EC as a tool for risk management continues to increase in major markets around the world. Towers Perrin's 2008 Global ERM Survey found that, while EC is already used fairly widely in areas such as capital management and asset strategy, its use in these and other areas of decision making is set to increase dramatically in the near future. *Exhibit 1* summarizes the results of the survey with respect to the utilization of EC.

DESIGNING ECONOMIC CAPITAL TO SUPPORT DECISION MAKING

In order to benefit from the full potential of EC as a risk management tool, management needs a system that produces information that is relevant, reliable and timely. The characteristics and functionality of the system should be determined by the planned uses of EC. These business requirements should in turn drive the specification of the system's technical requirements. While this general approach may seem obvious, in practice, EC implementations often flow in the opposite direction, with systems being developed first, followed by consideration of possible uses.

Here we examine three uses for EC, each with different business requirements and, hence, different technical requirements. This analysis also shows how common implementation approaches are insufficient for many of the planned EC uses frequently cited by insurers today.



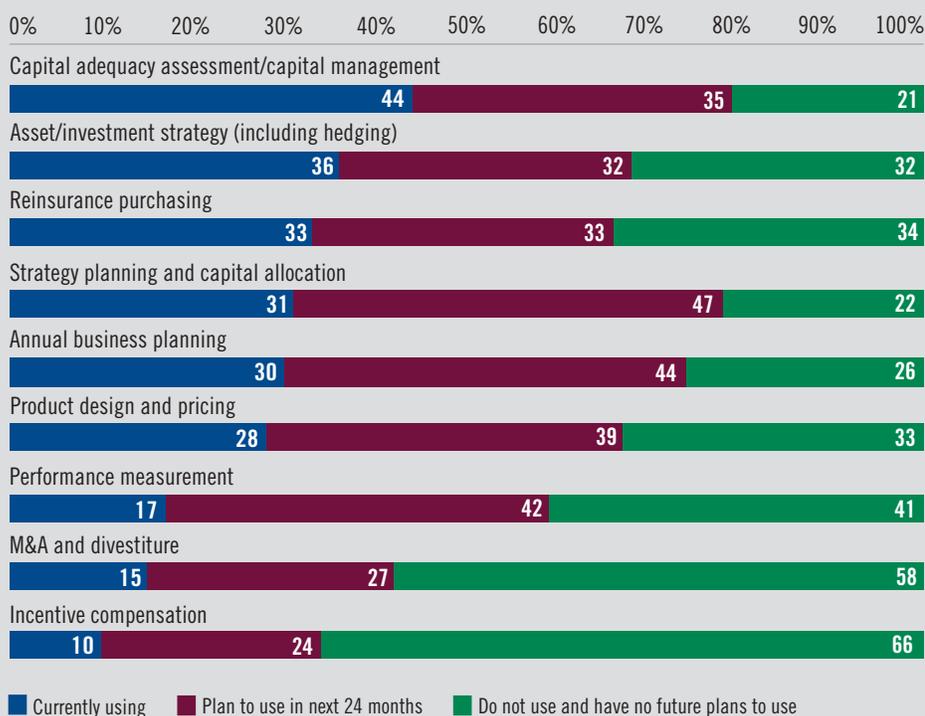
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EXHIBIT 1

Utilization of economic capital



Source: 2008 Towers Perrin Global ERM Survey

ASSESSING ENTERPRISE CAPITAL ADEQUACY

Assessing capital adequacy for regulatory and internal purposes is one of the primary areas in which many insurers expect to make initial use of EC. Compared to other areas of EC utilization, capital adequacy is more of a static measurement than part of an active risk management program. According to Towers Perrin's 2008 Global ERM Survey, 44% of insurers surveyed currently use EC for capital adequacy assessment, with another 35% planning to do so within the next two years.

To understand capital requirements at an enterprise level, insurers need to assess capital adequacy at multiple levels — for the organization as a whole, as well as on a stand-alone basis at business unit or legal entity levels. For this purpose alone, results are not required at a very detailed level, but the calculations need to include consideration of all meaningful risks in the insurer's risk portfolio, individually and in aggregate.

Fungibility Constraints

While conceptually, EC is independent of any specific regulatory reserving or capital requirements, in practice these requirements

act as fungibility constraints for the insurer, i.e., limits on transfer of cash and capital between different legal entities of the organization. Recently, the failure to capture fungibility constraints in assessing capital adequacy has caught some insurers unawares, in some cases with very significant implications as they realized too late that capital could not be moved as freely between entities as had been assumed in their modeling.

Speed of Calculation

For capital adequacy assessments to be useful, insurers need to be able to recalculate results quickly, i.e., in hours or days, not weeks or months. Knowing three months after the fact that there is a significant capital surplus or deficit severely limits management's ability to react effectively. This is especially important given the huge and rapid market movements since the onset of the global financial crisis.

From a regulatory perspective, continuous solvency monitoring is currently a requirement in the U.K., and a similar obligation is expected to be imposed under Solvency II for companies elsewhere in Europe and under the broader global standards being developed by the International Association of Insurance Supervisors.

To satisfy these business requirements, the EC framework needs to address some technical challenges.

Aggregation

The EC calculation needs to aggregate results at the detailed risk and/or product level in a way that adequately captures



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complex risk interrelationships. This is particularly challenging for many multiline insurers (writing life and P&C business), where detailed EC results from different parts of the organization are often calculated using different modeling approaches, and in some cases different definitions of economic capital.

In practice, correlation matrix approaches are widely used for aggregation. These calculate the EC required for each risk independently and combine the capital amounts together using a correlation matrix. While the use of a correlation matrix may provide useful results where the interrelationships between different risks and their impact on overall losses are relatively simple, this does not hold for more complex products and combinations of business lines and activities.

In particular, it implicitly assumes that losses are linear and separable, so that the aggregate loss from two risk factors moving simultaneously can be calculated as a linear combination of the losses from the two risks looked at individually. In reality, this is rarely the case, as many variable annuity (VA) writers have seen in recent times. The loss on a VA guaranteed minimum income benefit resulting from a drop in interest rates, a drop in equity values and increases in market volatility occurring simultaneously can be far greater than the sum of the impacts of the three moving independently.

Further, dealing with fungibility constraints adds to aggregation complexity and can increase model run times in the aggrega-

tion process. In practice, many insurers' current EC models lack the flexibility to allow for these easily.

PERFORMANCE MEASUREMENT

While EC is not currently used widely to measure performance, performance measurement is frequently cited by organizations as a driver for calculating economic capital. Solvency II and rating agencies require that EC models be embedded in management decision-making processes, including performance measurement, to be accepted for purposes of establishing required capital levels. According to Towers Perrin's 2008 Global ERM Survey, while only 17% of insurers surveyed currently use EC for performance measurement, another 42% plan to do so within the next two years.

As with determining capital adequacy, the calculation process must be updatable quickly so that the results can help management in its decision making. Also, performance measurement demands that the aggregation approach capture the complex risk relationships in a way that produces meaningful combined results for managers at each level of aggregation.

Capital Allocation

Performance measurement also requires an ability to allocate equitably the overall enterprise-required capital to the desired level of business granularity (e.g., business units, product lines) using a controlled and auditable process.

The ability to allocate capital equitably back down to the level at which performance is being measured requires that the performance measurement system recognize

and reflect the specific risk characteristics of each business segment being evaluated. Economic capital allows for this recognition in a quantitative manner and enables management to measure the performance of disparate business segments using a common measuring stick.

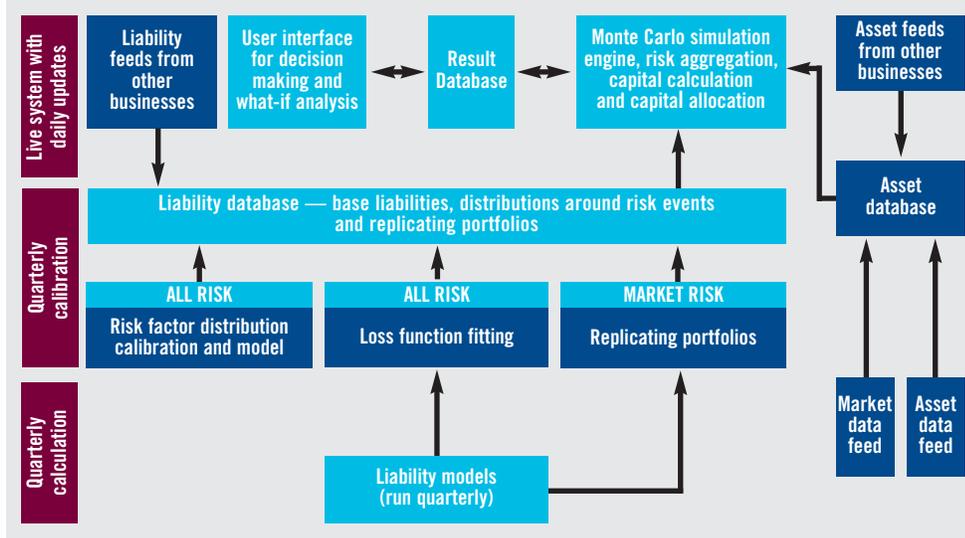
Management will be relying on the performance measurement system to support capital budgeting, for determining growth strategies and perhaps even to guide incentive compensation. The integrity of the measurement process is critical. The capital allocation process must have proper controls and auditability features that will instill confidence in the overall process.

Confidence also requires having in place the proper governance structure. Capital must be allocated to business units (or product levels, geographic regions, etc.) in a manner that reflects all of the contributing risk factors, such as market and insurance risk. The system must then be able to provide detailed analysis to understand the results, with an eye toward identifying the drivers of the results and approaches to improve the results.

RISK MANAGEMENT

Economic capital can also be used in key risk management processes, such as defining and monitoring investment or hedging and reinsurance strategies, but to do so imposes additional requirements. Nearly two-thirds of all respondents to Towers Perrin's 2008 Global ERM Survey indicated that they have used EC in their invested asset strategy (e.g., hedging, asset allocation) or plan to use it in the very near future. A similar percentage have used or

EXHIBIT 2 A leading-edge economic capital process



plan to use it in their reinsurance purchase decision making.

Where EC is used to help set risk limits — for example, as part of a hedging strategy — the calculations need to produce meaningful results at the level of detail at which the risk management action is being taken. This may be for one risk or a combination of a few risks at the product or business-unit level. Similarly, there is a need to measure the risk and calculate EC associated with the dimensions of the business segments being considered. Additionally, there may be a need to test various alternative risk strategies to determine the most efficient, or optimal, business decision.

ECONOMIC CAPITAL MISMATCHES WITH BUSINESS REQUIREMENTS

The results of the 2008 ERM Global Survey show that most insurers plan to use EC to support many areas of decision making, not just one or two. Economic capital systems need to be flexible enough to meet all of the associated business requirements.

Many insurers' current systems are ill equipped to meet these requirements. Measuring risk at the right level of detail, aggregating analyses at the right organizational levels and producing timely results are all significant implementation issues with which companies struggle. There has to be a better way to align the EC system with the various business requirements.

REALIGNING ERM

The firms that have the most success in addressing these challenges have adopted similar approaches. They have moved

away from approximations, such as correlation matrices, toward more detailed Monte Carlo modeling methodologies. In doing so, firms have made an explicit separation between how they model the distribution of risk factors (e.g., interest rates, mortality and catastrophe events) and how they model the impact of such risk realizations on their businesses. This allows them to address all of the issues.

To address the inherent consequence of an increased computational burden, firms have approximated the calculation of the impact of risk realizations on their business through the use of replicating portfolios, delta/gamma approximations and other techniques, calibrating these approximations to their underlying models on an annual or quarterly basis. *Exhibit 2* illustrates the methodology we have used to address these issues.

These approaches allow firms to model their risks, businesses and interactions much more accurately, while allowing for limitations in the fungibility of capital between business units or legal entities. They allow firms to:

- aggregate life and P&C business
- rapidly update their capital position

- carry out what-if and scenario tests
- report on multiple security levels
- allocate diversification benefits back to risks, businesses and products.

Significantly, in implementing these approaches, firms are able to leverage their existing models rather than having to start again.

EMBEDDING ECONOMIC CAPITAL

This change in approach does not stop with the analysis. The most successful firms are paying as much attention to the use of EC within the organization as to its calculation. They are considering what management information is required by whom, at what frequency and what actions will be taken based upon it. EC is a tool to help management run the businesses successfully. EC only becomes really useful when combined with the appropriate governance processes so that management can actually act upon it.

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