Defining the Internal Model for Risk & Capital Management under the Solvency II Directive

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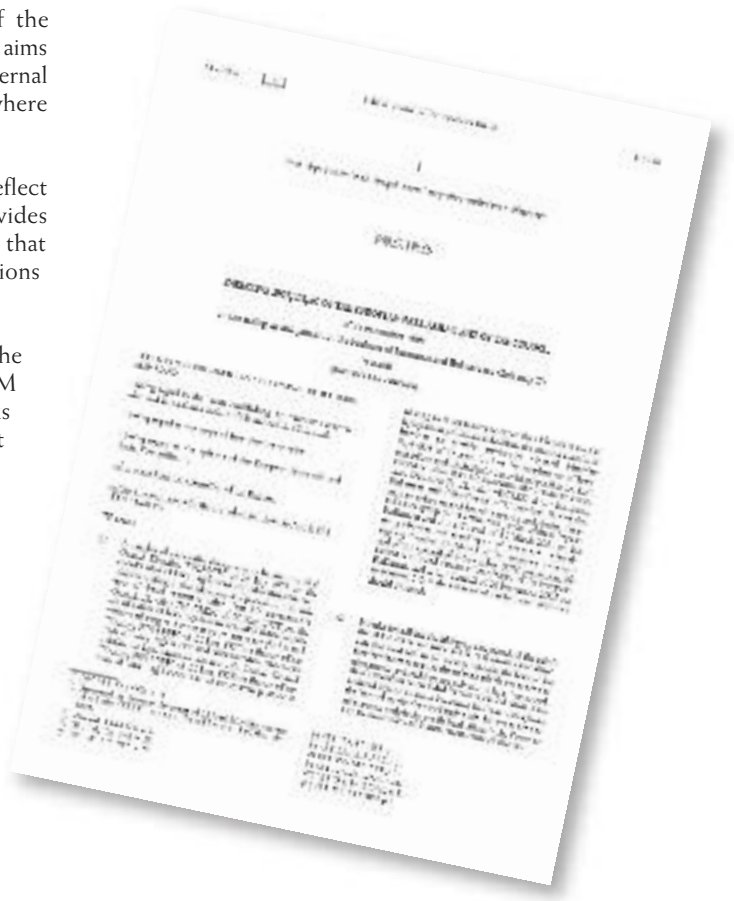
In this article, the authors explain the challenges in defining the risk and capital internal model.

The Internal Model is a key component of the Solvency II regime. The Solvency II Directive aims to allow a full Risk and Capital-related Internal Model (IM) approach to be used where requirements are met and approval has been granted.



Authorised insurers are allowed to tailor their IM to reflect the broad range and scale of risks they face and provides them with an opportunity to build models that systematically assess the existing risks and interactions between risks in their own firms.

It also provides an important foundation for the Enterprise Risk Management system. Specifically, the IM is an essential vehicle to measure and monitor risks across the company, enhance risk management capability and ultimately determine capital requirements.

Solvency II vs. Basel II (and Basel III)

Defining and developing an Internal Model is a specific explicit requirement of the Solvency II Directive (applicable to specified insurance entities in the European Union).

Basel II and III, for banking/deposit-taking organisations, with its international focus, have similar objectives to Solvency II but take a different approach. In banking, Basel II Accord

allows the creation of the advanced IM based on the specific risk type, including credit risk (Foundation-Internal Ratings Based and Advanced- Internal Ratings Based), market risk (Internal Rating Based) and operational risk (Advanced Measurement Approach). Basel III maintains the same approach.

There are both similarities and differences in the risk universe between insurance and banking. While insurers have credit, market, liquidity (considered small by some) and operational risks like banks they also have other insurance specific risks (many say that "risk" is the "business" of Insurers).

There are three keys risks in Solvency II that are unique for Insurers. First, Underwriting Risk, which is the risk that claims are higher than expected; this can be caused by external or internal factors. The second is Actuarial Risk, which is the risk that actuarial assumptions are wrong (mainly Life related or longer term policies). Finally there is Claims Risk, which is the risk that claims are mismanaged.

From a modeling perspective, therefore, the most significant difference between Basel II and Solvency II is the treatment of full internal models. Pillar 1 of Basel II effectively only allows a full internal model approach for market risk and operational risk. In the field of operational risk for Basel II, firms can choose the Advanced Measurement Approach (AMA) backed up by a sophisticated internal model (including scenario and loss distribution approaches). For credit risk, which tends to be the largest component of a bank's capital requirement, companies are only allowed to use internal models to determine the parameters (probability of default, loss given default and exposure at default) to feed into a supervisory prescribed model.

Solvency II allows a full and comprehensive internal model approach. This reflects the broad range and scale of risks faced by different insurers and allows them the opportunity to build a models that better reflect the existing risks and risk interactions n their own business environment as well as risk mitigation resulting from the risk management techniques used (including diversification).

Under Solvency II, the Internal Model covers all quantifiable material risks including Insurance, Market, Liquidity, Credit and Operational. The risks modelled will be those relevant to the applicable legal entities and lines of business. The above approach ensures that the Solvency Capital Requirement (SCR) will be calculated using the Internal Model for all significant risks within the organisation. Under the Solvency II Directive, the SCR represents the level of capital required by an Insurer, covering all material risks, which will cover the risk of 'ruin' occurring on a 1 in 200 year period basis. It therefore represents a buffer against unexpected loss and acts as an 'early warning' indicator for the supervisor.

Solvency II permits firms to apply for approval to use full or partial internal models for the calculation of their regulatory capital requirements, as an alternative to using the standard formula. The internal modelling activity is required to be integrated into the risk management activity of the firm. To meet Solvency II requirements, firms will need to continue the refinement of their internal model and to integrate their IM into their risk and capital management frameworks.

Firms intending to seek approval for their internal model will require demonstrating the compliance with several mandated tests and requirements, including use, statistical quality, data, documentation, calibration and profit and loss attribution. In addition, activities such as sensitivity, stress and scenario testing will also need to be evidenced.

Similar to banking's Basel II accord, the Solvency II Accord's advanced models are used for the key insurance risks as well as other risks (such as Credit Risk, Market Risk, Operational risk, etc.), institutions must ensure that the models they are using are sufficiently integrated into their risk management systems that are conceptually sound and operating with integrity.

Solvency II - Pillar I - Demonstrating adequate financial resources

Solvency II provides for two different solvency-related requirements: The SCR (Solvency Capital Requirement) and the MCR (Minimum Capital

Requirement). The SCR represents the required capital for regulatory solvency, and is calibrated to give protection against a 1 in 200 years chance loss event that basic own funds will remain positive. The MCR represents the level below which capital resources must not fall in order not to lose the regulatory authorisation to write new business.

The SCR may be calculated either by using a standard formula or an approved internal model. All firms will need to be familiar with the standard formula for calculating the SCR. The MCR is calculated using simplified calculations based on technical provisions and amount of annual premiums.

A robust Internal Model may be used, subject to regulatory pre-approval, to replace the Solvency II Pillar I standard formula capital calculations.

In addition to this, insurers need to demonstrate the quality of their financial resources to meet the SCR and MCR. These resources are known as the "own funds" or "excess of assets over liabilities" on the Solvency II balance sheet.

Internal Model and its role

There is a strong and negatively correlated relationship between Risk and Capital capital assessment process reviews the firm's entire risk profile as a prerequisite to determining capital requirements. Therefore, capital assessments are important in risk management. There are three key capital-related steps in the risk management process: (i) cataloguing and assessment of the firm's risks, (ii) review of how the firm addresses those risks, (iii) calculation of how much current and future capital is necessary to cover those risks through the IM. This last point incorporates the concepts of capital planning and capital adequacy in Capital Management.

The risk and capital framework, that includes the IM, need to be incorporated into the business processes. The Risk/Capital framework should provide details for capital structure, allocation and reporting, as well as assisting with the investment strategy and supporting Management in decision-making.

The IM is important in supporting strategic initiatives, including:

- Decisions on risk-taking and sustainable profitable performance.
- Determination and measurement of the effectiveness of risk mitigation approaches.
- Determination, validation and assessment of the Risk Appetite, supporting underwriting excellence, strong controls and tight financial management.

A firm's Internal Model needs to be integrated within its overall risk management and decision-making activities. Most importantly, it should be routinely used to quantify risks and assess a firm's economic capital.

The Solvency II Directive does not define specifically the internal model required to be used. The IM for the firm is designed by the organisation itself.

Insurance firms are required to design their IM which is defined as an integral part of the company risk management system developed to analyse the overall risk position, to quantify risks and to determine the economic capital required to meet those risks based on its specific risk profile.

Solvency II permits firms to apply for approval to use their full or partial internal models (where parts of the SCR calculation make use of the standardised formula) for the calculation of their regulatory SCR capital requirements, as an alternative to applying the results of the standard formula.

The internal modelling activity is required to be integrated into the risk management activity of the firm which is in turn is integrated into the risk and capital management framework. Approval to use an internal model will require the Company to demonstrate compliance with several mandated tests and requirements, including, statistical quality, data, documentation, calibration and profit and loss attribution. Activities such as sensitivity, stress and scenario testing will also need to be evidenced.

In addition, the Company will need to demonstrate that it meets the requirements of the use test, such that the IM is widely employed in and plays an important role in the managing of the business. Demonstrating compliance with this test is a key prerequisite for model approval. The Internal Model becomes a key part of the risk and capital assessment process (ORSA) and model's outputs influence a number of key business functions.

The overall structure of the Internal Model (in particular the outputs) is constantly evolves driven by the changing demands of the business requirements in a continual feedback loop.

How to manage the Enterprise Risk Management (ERM) cycle using the IM

The ERM Risk Framework is the overarching environment that incorporates the risk & capital IM and associated processes for the identification, assessment, measurement, managing, monitoring and reporting of risks.

At the heart of an Enterprise Risk Management (ERM) system is the Internal Model.

As per Illustration 1, the IM is a representation of the risk and capital management processes which support management of the business. The IM assists management in defining the overall risk profile of the business and in calculating the capital requirements of the current operations and plans as well as making decisions that take into account the risk and capital implications of those decisions.

The IM is a key part of the risk and capital assessment process, and model outputs influence a number of key business functions. The Internal Model must have the right capabilities

and granularity to meet the business needs (for users: decision-making on performance assessments, pricing, etc.).

The scope of the IM must be wide enough to properly capture the business and risk profiles of the businesses of the applicable entities. Given the importance of the Internal Models to the running of the businesses, there will be constant internal pressure for model refinement and improvement of accuracy of capital calculation

The reporting/disclosures element is the processes and procedures employed to identify, assess, monitor, manage, and report the short and long term risks a firm faces or may face, and to determine the own funds necessary to ensure that overall capital needs are met at all times.

The Internal Model is a key tool of Risk Management which quantifies the risk profile to determine the required economic and regulatory capital. The Internal Model covers all quantifiable material risks. The Internal Model is the collection of the required Inputs, Capital Calculation engine, generated Outputs and related documentation. The calculation engine is the mathematical-based system which is used for the quantification of capital requirements for the risk categories specified.

The Capital Calculation engine is the Capital Modelling software used. It is the model used to generate capital-based outputs. The technical kernel is the mathematical-based capital calculation engine which is used for the quantification of capital requirements according to risk categories.

Assumptions are of two types: (i) made throughout the Internal Model where there is little or no internal or external data available for Internal Model input and key assumptions are made using expert judgment and (ii) other required assumptions as applicable. External models are defined as the use of third party models to feed the capital calculation engine.

The Internal Model Governance processes ensure the adequacy and effectiveness of the Internal Model. Internal Model Governance ensures that the information from the model is delivered on time, complete and accurate, and also acts as a point of request for ad-hoc uses.

Risk monitoring and reporting on business performance is important. Output from the Internal Capital Model provides outputs and analytics for the use of risk-adjusted performance measures to report and evaluate performance on the firm's activities. As well, Internal Risk Monitoring (through MI) includes monitoring and reporting on sources of risk to their respective Management teams as well as Senior Management.
Regarding Corporate Governance, the Internal/Capital Model's outputs are used to assess and analyse for key decision-making in order to influence and shape business decisions, opportunities and planning (within the applicable risk appetite).

The Internal Model Governance processes ensure the adequacy and effectiveness of the Internal Model. It covers requisite policies and controls. Provides information and feedback loops with the senior executives, Board Risk Committee and Board.

Use Test

The Use Test requires the insurer to demonstrate that there is sufficient discipline in its Internal Model development and application such that it is 'widely used in and plays an important role in' the management of the firm. Through this, supervisors can be sure that an internal model is appropriate to the business, if it is widely used and plays an important role in how the firm measures and manages risk in its business.

The Use Test demonstrates that the internal model is widely used and plays an important role in the firm's system of governance and in particular, its risk management system, decision-making processes and the Reporting/Disclosures system. Other tests, for example those which are specified by Solvency II, include statistical and data quality standards and Validation standards.

The use test requires the Company to demonstrate that there is sufficient discipline in its Internal Capital Model development and application such that it is widely used and plays an important role in the management of the firm. Through this, regulators can be sure that the Internal Capital Model is appropriate to the business. Demonstrating compliance with this test is an essential condition of Internal Capital Model approval. The use test supports the assertion that the Internal Capital Model is established and retained (i.e., embedded) as part of firm's normal operation and into its everyday use.

Solvency II requires the firm to demonstrate that the Internal Model is widely used in its system of governance and in particular, its Risk Management system, business decision-making processes and the Own Risk and Solvency Assessment (ORSA).

IM Validation

In developing models in-house, a series of validation standards must be designed and utilized to ensure the firm meets the regulatory requirements.

Validation is a defined review process that ensures the overall appropriateness, accuracy and effectiveness of the design and operation of the IM and its governance, and that it continues to reflect the risk profile of the firm, demonstrating that the appropriate risk and capital processes are in place.

The IM Validation (for Risk and Capital Management) requires testing to ensure that the measures of the quantification of risks, such as rating systems, parameters or operational risk metrics, are accurately calibrated and are consistent with a bank's policies and procedures.

Other Matters

There needs to be processes in place to ensure that the IM is continuously refined and improved, where relevant and required, to reflect changes to the nature, scale, scope and

complexity of the business covering all key risks and lines of business.

There is also a need to ensure that the performance of the Internal Model is efficient and effective based on the IM's design and operation. In addition, there needs to be a process in place to ensure on-going compliance with the requirements of the Internal Model's regulatory approval.

Documentation is integral to the integrity of the Internal Model and Internal Model Governance. A critical component is the standards for the required supporting documentation. The documentation standards include the following key requirements: clarity, completeness, accuracy, proportionality and an audit trail. The documentation will need to be sufficient and appropriate for a "knowledgeable independent third party" to understand same.

Where applicable there is a need to identify and document any significant drawbacks and weaknesses in the IM.

Conclusion

The "Risk Model" is the firm's representation of the risk management processes to support management of the business, including articulation of the overall risk profile of the business and to calculate the capital requirements.

The Internal Model is developed by the financial institution to determine the capital requirement on the basis of the company-specific risk profile.

The Risk Model is the overarching environment that incorporates the risk & capital model and associated processes for the identification, assessment, measurement, managing, monitoring and reporting of risks.

During the recent financial crisis many firms had insufficient risk management in place. In addition, the risk management and capital models had significant deficiencies. For examples, they often had poor input data, were incorrectly designed, had flawed assumptions and bore no resemblance to the real world.

It reminds us of a not so old saying by the late Aaron Levenstein of New York's Baruch College that models (including risk and capital models) are like bikinis – what they reveal is suggestive, but what they conceal is vital.

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Illustration 1 – Example Design of an IM of the Risk and Capital Management processes