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Criteria:

Application Guide: Assessing Insurers' Economic Capital Models

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(Editor's Note: This article describes the process that Standard & Poor's Ratings Services intends to use to complete the initial phase of our review processes for economic capital models. For an outline of our criteria for the initial phase of our review processes for these models, see "Methodology: Assessing Insurers' Economic Capital Models," published on May 15, 2008, on RatingsDirect, the real-time, Web-based source for Standard & Poor's credit ratings, research, and risk analysis.)

Over the past several years, insurance companies have been developing internal economic capital models (ECMs) as a supplemental means of assessing their risk-based capital (RBC). Although RBC models have been in use for the past two decades, it has become increasingly clear that in addition to a factor-based RBC, companies often benefit from deeper exploration of their risks and the necessary capital to support them. An RBC approach might inefficiently capture the characteristics, expertise, and track record that could be unique to a firm. Ideally, an internal ECM model would enable a detailed and tailored understanding of a firm's risk portfolio and capital needs beyond what an RBC model alone could replicate.

Recognizing that these internal ECMs are having a significant role in both in strategic management and determining capital levels for insurers, Standard & Poor's now offers an evaluation that will incorporate information from these models into our ratings process.

The initial phase of the economic capital review process will primarily qualitatively assess a company's economic capital model without reference to any extensive quantitative testing. In subsequent years, we expect that these reviews will become increasingly quantitative as our confidence and knowledge of the company's ECMs improves.

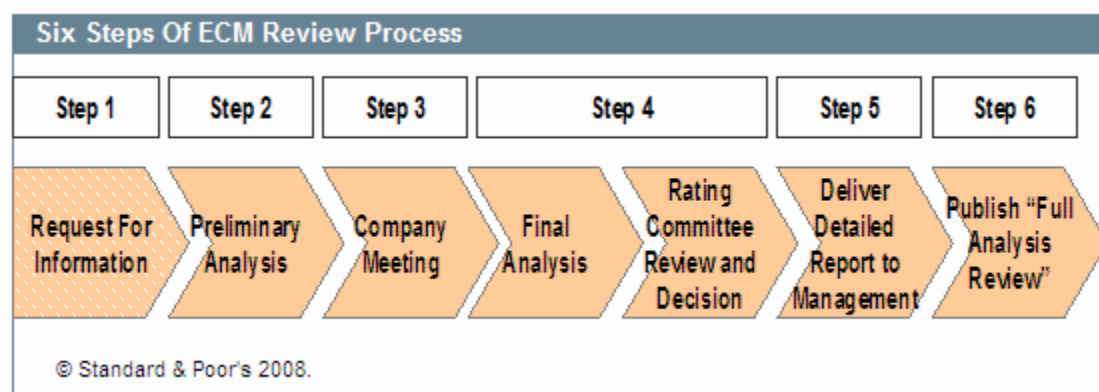
The ECM review will be available to companies that request it and satisfy a use test as described by the pre-conditions that are outlined in the accompanying article "Methodology: Assessing Insurers' Economic Capital Models," published on May 15, 2008, on RatingsDirect. These pre-conditions relate to the robustness of the ERM processes and the reliance of management on their capital model for major corporate decisions other than capital adequacy.

Evolution Of The ECM Review Process	
Date	Milestone
February 2007	Standard & Poor's published "Request For Comment: Economic Capital Review Process For Insurers" to start the process to determine guidelines for establishing criteria and procedures.
September 2007	"Economic Capital Review Process For Insurers: Criteria Update" published to follow up on a number of issues raised through the request for comment process.
May 2008	Standard & Poor's published the application guide and criteria update to describe the process and impact of the initial phase of the ECM reviews.

The Review Process

Our ECM review framework process has six steps. The initial four steps are an assessment to yield an ECM Review Report (Step Five) that summarizes our findings and opinion resulting from the review process as well as a commentary that will be incorporated into the full analyses on the insurers (Step Six), which are published on RatingsDirect.

The chart illustrates the process the review will go through.



The four assessment steps for the initial part of the review are:

- Step One: request for information (to include qualitative and quantitative items).
- Step Two: Preliminary analysis, using the information received.
- Step Three: Discussion of the information and the preliminary analysis by Standard & Poor's with the insurer's management. During this discussion, we will request additional information if needed.
- Step Four: Final analysis and rating committee decision.

Step Five will be the production of an ECM review report for the management of the reviewed company. This report will be confidential between Standard & Poor's and the company and will provide detailed justification of the rating committee decision regarding the credibility factor and any adjustments made to the capital adequacy assessment for the company. This report is provided to the company to comment only on factual errors in our review; we will finalize the rating decision at Step Four.

Step Six will be the publication of an updated full analysis article on the company on RatingsDirect. The update will include information from the ECM review report.

We will tailor this six-step process to each individual insurer being reviewed. The details of the process will be agreed up front between Standard & Poor's and the insurer, prior to the review's start.

As part of the review process, Standard & Poor's will collect a large amount of information from companies regarding the approaches and assumptions used by their ECM. We will store the key information from each ECM analysis (e.g., key assumptions and methodologies) in a database. This database will allow us to conduct peer reviews of model components and will ensure each company's results will be available for the next review of its

ECM (e.g., to ensure analytical consistency across reviews).

The following sections describe this process in greater detail.

Step One: Request for information

The core component of the review process will be a review of the company's own documentation. Therefore, at the start of the review process, each company must submit to Standard & Poor's a comprehensive pack of the required information for the review.

We will provide a request-for-information (RFI) form to companies, which will cover procedures and thought processes in the following nine broad areas:

- Model set-up.
- Model validation and control processes.
- Asset valuation.
- Liability valuation.
- Risk modeling.
- Assumptions setting.
- Diversification/aggregation.
- Risk-mitigation activities.
- Stress and scenario testing.
- Results of the model.

The Examples Of Model Documentation Materials section lists in detail specific information items requested for each of these areas. Upon response to our RFI, we will proceed to apply the ECM review framework described below to review the submitted information.

Step Two: Preliminary analytic review

The goal of the review is to assess an insurer's internal ECM model. To do so, we must become comfortable with the insurer's process.

To continue to the next steps of our review, we will require evidence that the insurer currently not only uses its internal economic capital models to determine capital adequacy but also that these models are integral components of that insurer's business planning, strategy and risk management, pricing, and decision-making processes.

Upon determining that the insurer rigorously employs the ECM model, an ECM specialist review team will use documents submitted to conduct the actual review of the insurer's economic capital model. We will then compare the results of this initial review with the results generated by our capital model as well as results generated by our reviews of other insurers' ECM.

A major element of this preliminary review will be to assess a company's internal validation processes for its ECM and to assure us that the output of its model is reliable. Our investigation will determine whether the company's validation process is sufficiently deep and broad. We would want to review the actual processes and see documentation that the processes were performed. This process is described in more detail later in this document.

Our processes will also incorporate an assessment of any recent external independent reviews of the company's ECM. These external reviews will be a useful component of our review process, but we will assess the level of

credence we give to the reviews and their results on a case-by-case basis. This process is described in more detail later in this document.

Step Three: Review meeting with the company

After the initial analytic review, Standard & Poor's ECM review team will meet with members of the insurance company's management team and modeling specialists to discuss the initial findings and investigate and clarify any areas of uncertainty. Standard & Poor's will issue an agenda, which will include a detailed list of the questions, prior to this meeting.

Where Standard & Poor's is using information provided from external independent reviews of ECM, we will request to discuss the findings with representatives of the firm that carried out the review. This phase of the process will also include detailed interviews with internal experts at the insurer regarding various aspects of the model or the modeling process.

Step Four: Final analytical review and rating committee decision by Standard & Poor's

In this part of the process, we will incorporate our findings from the previous steps to produce a detailed ECM review report that summarizes our analysis and findings. The ECM committee, which will include Standard & Poor's insurance analysts and ECM analysts, will review this report. This report will be provided to the company as described in Step Five.

In addition, the rating committee for that company will also consider the results of this review to decide how—if at all—this information will affect the ratings.

Step Five: ECM review report provided to the client

Once the ECM committee has approved the ECM review report, Standard & Poor's will then provide the final report to the reviewed insurer. The report will include a detailed description of our assessment of the models' positive and negative aspects, our conclusion on the models' credibility factor, and details of adjustments to capital requirements.

Step Six: Summary of findings made public

In the last step, we will incorporate a summary of the ECM review report into the reviewed insurer's full analysis, which will be published on RatingsDirect.

Examples Of Model Documentation Materials

At the start of the review process, we will provide an RFI form to companies. The RFI will request review samples of the detailed financial, actuarial, and systems documentation that support the model's ongoing maintenance and quality control. In general, much of the information requested should be available from an insurer's existing model documentation materials. Although most of the RFI will be common to all reviews, there will be items that specifically reflect the situation of the individual insurer.

In addition, the RFI will ask for any financial materials pertaining to an insurer's capital model that have been presented for regulatory review. For example, in the U.K., where the Financial Service Authority (FSA) has been reviewing internal capital models, we would ask to review any materials submitted to, and responses from, the FSA (subject to any confidentiality restrictions).

The items in the RFI list will most likely be refined over time as we complete a number of reviews with companies.

The key information items are initially likely to include:

Model set-up

- Description of modeling tools used to develop the company's ECM. This should include external as well as internally developed tools.
- The approach, the key decision-makers involved, and the decision-making process for setting assumptions, model parameters, and for approving methodology changes.
- Description of key risk measures produced by the model, why they are appropriate to the business, and how they are calibrated (where appropriate).

Model validation and control processes

- Describe process used to recommend, assess, and implement changes in the ECM when methodologies, data, assumptions, and parameters are updated.
- Where assumptions or approaches have changed, a full reconciliation to previous results should be provided. This should identify the impact of each change.
- Results of any reconciliation to other externally reported information (for example, accounting information).
- Data reconciliation to data used for accounting purposes.
- Where individual contract data is grouped for modeling processes, a description of checks made to ensure the accuracy of the grouping process.
- Other validation processes (see section on Model Validation at the end of this document).

Asset valuation

- Comprehensive descriptions of the framing assumptions, data, methodologies, and accounting paradigms used to value all assets.
- Reconciliation to existing accounting or regulatory valuation for asset values (i.e., a comparison of the economic view of the value of assets and the accounting or regulatory view of the value of assets).

Liability valuation

- Detailed description of the assumptions, data, and methodologies used to value all liabilities.
- Reconciliation to existing accounting and/or statutory valuation for liabilities.

Risk modeling

- A detailed description of the approach used to estimate liability risks in the model, i.e., methodologies used, assumptions set, and data required.
- A detailed description of the approach used to estimate asset risk in the insurer's model, i.e., methodologies used, assumptions set, and data required.
- Detailed descriptions of the approach used to estimate all other risks allowed for in the insurer's model (e.g., operational risk), i.e., methodologies used, assumptions set, and data required.
- Detailed description of any changes assumed on the part of management or policyholders within the model.

Diversification/aggregation

- Provide a detailed description of the interactions of risk drivers that could have a substantial impact on the model, including a description of the methodologies, assumptions, and data used.
- A breakdown of the impact of the various levels of diversification, e.g., between risk types, between operations (life assurance and nonlife assurance), and geographies.
- A description of the methods that the company has used to assess the ability of the group to move excess capital

from one entity/country to another in a time of stress (capital fungibility).

Risk-mitigation activities

- Description of how reinsurance structures are allowed for within the model (including the impact of delays in payment or disputes).
- Provide details of any other risk-mitigation activities allowed for within the model (e.g., hedging strategies or the use of insurance-linked securities).

Stress and scenario testing

- Provide details, including results of any additional stress and scenario tests not covered above. Describe the purpose of these tests and how the parameters for the tests were arrived at and agreed upon.

Results of the model

- Provide detailed reports from the model that are used by the insurer to validate its model's results.
- Provide copies of any final reports and presentation on results as submitted to the company's risk committee and to its board of directors.

ECM Review Framework

For these initial reviews, we anticipate focusing on six categories across each function or model. The application guide provides additional detail to the types of documents applicable for each of these categories.

Assumptions

This area of the review will cover both the process and governance to set assumptions as well as the actual assumptions themselves.

Methodology

This category focuses on whether an insurer can identify and quantify its risk exposures and whether it can incorporate the effects of various considerations, including diversification across risk categories and spot concentrations of correlated risks. We will consider the main approaches taken to generating the model. It will cover the approaches taken to estimate the diversification benefit and allow for any capital fungibility issues between entities or countries.

Data quality

The source and integrity of historical and market data used by the insurer in its ECM is important. This review will cover the quality of the data used for asset valuation and liability valuation as well as to set the model assumptions and parameters.

Process and execution

This category will review how the model is constructed and the ability of the model to produce the desired results. This will also consider the quality of the integration between data warehouses and risk engines, model results, and reporting tools.

Results

The quality of the results and of the reporting tools used will be considered here. The review will compare the results from the internal capital model with both our internal benchmarking database and our capital model results.

Testing and validation

This part of the review considers the quality of the company's approach to ensure that all the information going into the model is correct, that the individual algorithms within the model are appropriate, and that the resulting answers make sense. This review will also consider stress and scenario testing.

Assessing Insurer And Third-Party Assessment Validity

We want to make maximum possible use of the validation processes already done on the model and its results by the insurer or by an external third party. Standard & Poor's would want to view documentation of the validation processes that have been performed.

Here are possible ECM elements a company might want to provide as evidence of validation:

- Coverage. The model covers every risk and circumstance that should be covered. The model covers all material exposures and all risks that arise from these exposures. The model is complete.
- Input data. The data is complete, accurate, and timely. The model uses the data that it is supposed to be using.
- Assumptions. Assumptions are updated in a timely fashion. Assumptions have expected relationship to experience. Assumptions used are what is expected.
- Random scenarios. Random investment scenarios fit frequency and severity expectations for adverse scenarios. Random scenarios for insurance risks fit with frequency and severity expectations for adverse situations. Other tests are performed on variables of scenarios and other factors; i.e., interest rate inversions, serial correlation of equity returns, mean reversion tests, etc.
- Intermediate values, i.e., values secondary to the ultimate result, such as reserves, cash values, or amounts of coverage outstanding intermediate values produced in the model are as expected.
- Lowest level calculation check (i.e., of a single cell). Detailed checking of calculations done on a sampling basis for the most detailed elements calculated in the model.
- Static valuation. The model can reasonably reproduce a past-year result when the parameters are set to match the experience in that year and the starting values are based on the beginning of that year.
- Dynamic validation. When rolled forward, the model produces explainable gains and losses from simple changes in assumptions and starting conditions. Stress tests of major changes in assumptions produce explainable changes in results.
- Component tests. Tests that model results for major components of the insurer are explainable (companies, lines of business, and regions).
- Aggregate tests. Tests an insurer uses to ensure that aggregate results are explainable in total.

Third-Party ECM Reviews

Numerous factors should be considered when Standard & Poor's assesses the value that an independent review has to our review of a firm's ECM. As we gain more or less comfort with a third party's assessment, we will vary our acceptance of the findings of the assessment accordingly. However, a third party's assessment will not replace our analysis. We expect that such assessments will augment and, we hope, enrich our understanding of an insurer's ECM. Because we will not be relying on the third party's comprehensive opinion about the model, we will be treating the third-party review in the same manner as an internal review and will look for the same documentation. We would expect to have the same access to discussing the review with the third-party reviewer as with internal

insurer staff. We would expect to see the entire report prepared by the reviewer, not just an executive summary or excerpts. In addition, we will be considering the following questions:

Assessment process

There are several challenges when considering an outside party's assessment of an economic capital model. A key challenge is to understand the criteria applied by that outside party and how well aligned they are with any criteria that Standard & Poor's would apply.

Areas of consideration could include:

- The breadth, depth, and duration of the review.
- The methodology of the review.
- The validation process, including testing practices and vetting practices employed.
- The sampling process and the samples chosen.
- The documentation of these review processes that is provided.

Scoring

Comparing a favorable opinion by one reviewer for XYZ Insurer to a favorable opinion by a different reviewer for ABC Insurer might be difficult for us. The assessment scale might not facilitate this (e.g., seven rating categories used by one reviewer versus only three used by another). Moreover, what defines the scale of the review might not be comparable (benchmarking against industry best practice versus the validity of the practice itself).

Areas of consideration could include:

- The grading scale and definition.
- Benchmarks chosen.
- Comparisons to industry best practice.

Assessing reviewer qualifications

Competence and experience are key factors when reviewing an independent third party's assessment of an insurer's ECM. There are currently no generally accepted standards for reviewers as there are for reviewers of financial reports.

The composition of the team that did the review should be well aligned with the company and model being reviewed. Some firms could use different team structures depending on the characteristics (size, complexity, etc.) of the insurer being assessed.

Areas of consideration could include:

- The person(s) doing the review.
- The reviewers' experience, expertise, and qualifications.
- The selection process for the reviewer.

Other factors

The purpose of a third-party review should also be considered. One conducted to meet a regulatory requirement, or as part of the due diligence required if the insurer might be acquired, could differ in nature and scope from a voluntary review the insurer commissions.

The age of the review is also pertinent. Current information is more relevant for our purposes. However, an older review might be usable if there is clear delineation of the parts of that review that apply to parts of the model that have not changed since the time of the review.

Also, some reviews are conducted in sections over an extended period of time. One where different sections were reviewed at different times, and the final review document presented some time after the initial section was reviewed, could be cause for concern.

Recommendations

A third-party reviewer might have offered some recommendations or areas to improve and suggested ways to make those improvements. It is likely that such recommendations could provide insight into the strength of the model.

Areas of consideration could include:

- The recommendations made or weaknesses identified by the reviewer or an affirmative statement by the reviewer that no such recommendations were made.
- The impact of recommendations or improvements to the overall ECM assessment by the third party

These criteria represent the specific application of fundamental principles that define credit risk and ratings opinions. Their use is determined by the issuer-specific or issue-specific facts, as well as Standard & Poor's assessment of the credit and, if applicable, structural risks for a given issuer or issue rating. Methodology and assumptions change from time to time as a result of market and economic conditions, issue-specific or issuer-specific factors, or new empirical evidence that would affect our credit judgment.

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