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Chief Risk Officer Forum Principles for Regulatory Admissibility of Internal Models

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The Chief Risk Officer (CRO) Forum, comprising risk officers of the major European insurance companies and financial conglomerates, was formed to address key risk issues. It is a technical group focused on developing and promoting industry best practices in risk management. The membership is made up of the following companies: AEGON NV, Allianz AG, Aviva PLC, AXA Group, Converium, Fortis, Generali, ING Group, Munich RE, Prudential PLC, Swiss Re, Winterthur and Zurich Financial Services. In the November 2005, Issue No. 6 of *Risk Management*, the June 2005 CRO Forum study, "A Framework for Incorporating Diversification in the Solvency Assessment of Insurers" was presented. This article summarizes the other CRO Forum study published at that time.

Introduction

The CRO Forum has undertaken a study to benchmark internal models, so as to discuss the admissibility of these models for regulatory purposes in the context of Solvency II. In internal models the true risk profile and solvency position of a company is reflected and therefore the use of internal models provides a real incentive for improved risk measurement and risk management. The study presents the results of the benchmarking of internal models and also presents a proposed set of principles that could be used by regulators for validating and admitting internal models for regulatory capital purposes.

Inventory of Risk Measurement Frameworks Used by CRO Forum Members

The CRO Forum established a benchmarking team consisting of Damir Filipovic and Daniel Rost of the University of Munich, with Mercer Oliver Wyman for supplementary support. A detailed questionnaire, set up by the benchmarking team, was completed by all participants and three regulatory agencies. The survey outcomes were discussed with the risk management departments of all 13-member companies. There were also responses from BPV (Switzerland), DNB (Netherlands) and BaFin (Germany).

Overview of the Results of the Benchmarking Study

The most important and interesting conclusion is that the approaches used by the participants in the benchmark study are highly similar. In some cases there are differences, often driven by differences in the type of business.

With respect to the framework definition, most of the participants (69 percent) use a VAR approach with a one-year time horizon, and more than 75 percent follow an economic approach. The vast majority (85 percent) only use, at maximum, one year of new business. Only a few (15 percent) use the IAA (A Global Framework for Insurer Solvency Assessment) advised TailVaR as the risk measure due to the complexity of this measure. With respect to the confidence levels, all participants use a confidence level above 99.5 percent (99.6 percent to 99.99 percent). For solvency purposes a regulatory consensus appears to be converging to 99.5 percent.

Overall, the modeling methodologies used are in line with those recommended in the IAA Solvency Framework paper. The important issue is that ALL risk should be measured in a consistent way. All participants model and measure market risk and credit risk. Most participants (more than 75 percent) also model credit risk for reinsurers. As expected the quantitative measurement of operational risk is still in its infancy.

The interesting conclusions on the framework implementation are that most (69 percent) have a detailed documentation system, but that only about half (54 percent) have a formalized sign-off procedure. Also it seems that, although critical for gaining senior management commitment, links to management compensation are still in their infancy.

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Overview of the Resulting Principles Defined by the Chief Risk Officer Forum

Principle Risk Modeling Framework

- Internal models need to be based on the adverse movement in the Economic Value of the difference between the Assets and Liabilities, calibrated to an annualized 99.5 percent probability of solvency.
- Modeling approaches based on longer time horizons or alternative risk measures (e.g., TailVaR) are permissible, provided the calibration approach used can be shown to be consistent with an annualized 0.5 percent probability of economic insolvency
- One year's new business should be explicitly modeling, based on assumptions that are consistent with business plans, where this has a material impact on the risk profile of the group
- Assets that are not likely to be available in the event of insolvency (for example, profits from future new business, the component of deferred tax assets arising from losses carried forward), should not be included as available capital in the internal model
- Best estimate liability cash flows should be discounted at swap rates, as they are typically the most liquid, complete and reliable risk-free rates available. This is more conservative than using a truly economic discount rate that would include an allowance for the credit spread of the insurer itself (or of the counterparty to whom the liabilities would be transferred in the event of insolvency)

Principle Modeling Market Risk

All sources of market risk need to be modeling probabilistically with inter-factor dependencies explicitly modeling.

- Choice of modeling approach (simulation-based or analytical) and granularity of modeling needs to be proportionate to the risks/businesses being modeling. For example:
- *Interest rates* — Cash flow matching taken account of by modeling of the whole yield curve

- *FX mismatch risk* — Currency mismatches between assets and liabilities/supporting capital explicitly modeling
- *Equity risk* — Equity risk modeling based on analysis of the relevant market index where concentration in individual sectors/individual stocks differs from the index, such concentrations should be explicitly modeling
- *Real estate risk* — Real estate risk modeling based on analysis of the relevant property market index, or reasonable proxies if such an index is unavailable—where concentration in individual sectors/individual stocks differs from the index, such concentrations should be explicitly modeling
- *Derivatives/market risk mitigation* — Explicit modeling through simulation/scenarios, with counter-party credit risk also being measured.
- *Embedded options and guarantees explicitly modeling through simulation modeling:*
 - Management actions (e.g., bonus rates on participating business, dynamic asset allocation policies), where material, should be explicitly and realistically modeling, with modeling management actions codified as policy and disclosed to the supervisor
 - Policyholder behavior, where material, should be explicitly and dynamically modeling, with key assumptions (which could be either expert-opinion based or empirically based) being disclosed to the supervisor
- *Parameterization of volatility and dependencies between market risk factors should be derived from an appropriate and reliably time series of market data, and should be estimated accounting for tail dependencies (e.g., understressed conditions)*

Principle Modeling Credit Risk

- All sources of credit risk need to be modeled, or demonstrated to be insignificant.
 - Investments
 - Reinsurance/derivative counterparty failure
 - Credit insurance
 - Trade creditors, debtors
- All different manifestations of credit risk should be modeling
 - Default risk
 - Migration risk
 - Spread risk

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People have trouble incorporating a priori probabilities, which can be the most important factor with qualitative information in estimating probabilities.

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- Credit insurance should be modeling using methodologies that reflect the specific exposure characteristics and risk mitigation options inherent in the business
- If credit exposures can be accurately represented by external credit indices (e.g., Euro 'A' corporate bond index) and credit concentrations are not material relative to the relevant index, then default risk, migration risk and spread risk can be modeling on integrated basis through direct modeling of the index (e.g., through an Economic Scenario Generator)
- Reinsurance/risk transfer
 - Proportional reinsurance can be modeling consistently with the approach used for modeling the gross losses
 - For additional credit to be given for non-proportional reinsurance scenario or probabilistic approaches must be used
 - Capital must be held to cover the risk of counterparty failure, taking into account possible dependencies between the size of gross losses occurring and counterparty failure

If representative credit indices are not available, or credit concentrations are material, then default and migration risk need to be modeling explicitly in a manner aligned with the principles of Basel II.

Principle Modeling Insurance Risks

- For life/health insurance mortality, morbidity and persistency risk should all be measured, ensuring that parameter, process and calamity risks are all covered by the modeling
- For non-life insurance the risk associated with current year underwriting (premium risk) and prior years' underwriting (reserve risk) should both be measured (either in an integrated model, or separately), again ensuring that parameter, process and calamity/catastrophe risks are all covered by the modeling
- For both life/health and non-life insurance process, catastrophe/calamity and parameter risk should be measured using either scenario or probabilistic approaches
 - Process (or volatility) risk, the risk associated with the anticipated year-to-year volatility in insurance result, should be measured probabilistically, supported by scenario analysis where appropriate
 - Separate estimation of calamity/catastrophe risk should be carried out using scenarios/probability distributions based on scientific analysis and expert opinion
 - Parameter risk – if significant, level and trend risk should be measured separately based on a combination of scientific analysis, expert opinion and analysis of historical experience

Principle Modeling Operational risk

- Operational risk needs to be explicitly accounted for under Pillar 1, in a manner aligned with the principles of the Basel II approach

Reaction to the Study

Regulators and other interested parties were appreciative and complimentary toward the study. Solvency II is moving ahead in 2006 with internal models as a core foundation in the framework. Work is now underway by the Committee European Assurance (CEA), the European Insurers Association, and also with the help of the CRO Forum, on the development of a recommended standard model for insurers. Solvency II regulations are expected to be drafted by 2007 for an expected introduction by 2010, creating a modern financial regulatory insurance system for Europe. ♦

More detailed information can be found in the June 10, 2005 CRO-forum paper: "Principles for Regulatory Admissibility of Internal Models." Copies can be obtained at the secretariat, CRO Forum: Giselle.Lim.gisellelim@kpmg.com

Further information:

Risk Management, Issue No. 6, November 2005: "Chief Risk Officer Forum: A framework for incorporating diversifications in solvency Assessment of insurers."

"Solvency Assessment Models Compared," CEA and Mercer Oliver Wyman, March 2005

IAA: "A Global Framework for Insurer Solvency Assessment" 2004