

CRO Forum Feedback to Fitch on June 2006 Exposure Drafts:

- (1) Assessment of Insurers' In-House Economic Capital Models; &
- (2) Insurance Capital Assessment Methodology and Model (PRISM)

The Chief Risk Officer Forum



Münchener Rück
Munich Re Group



Summary of CRO Forum Feedback

The CRO Forum highly appreciates Fitch's bold and innovative step in the evolution of the assessment of an insurer's capital adequacy. We strongly support Fitch's directional move in explicitly reflecting sound economic principles. The CRO Forum is also very pleased that Fitch strongly supports company internal models for measuring capital adequacy (subject to admissibility requirements) including explicit reflection of diversification and risk mitigation.

Although we are broadly supportive of Fitch's bold steps as outlined in these publications, we believe that greater differentiation in approaches to companies with appropriate internal models is needed. Specifically, we do not support the use of PRISM to measure the capital adequacy nor to "benchmark results" of companies with internal models. Although we understand Fitch's desire to benchmark PRISM, we feel that it is better to focus benchmarking on those companies that do not have internal models or those that tend to rely more on asset adequacy tests prescribed by regulators.

The main reason for our position is that CRO Forum company internal models are not cash flow testing models. This means that the basis of measurement of value and capital adequacy is fundamentally different. In addition, an internal model (as Fitch notes) will be much more precise to the specific circumstances of the insurer. We feel that the amount of effort to benchmark, calibrate and reconcile internal models to PRISM will be enormous for both Fitch and the insurer. Resources on both sides would be much more effectively employed discussing the results and implications of company internal models on the day-to-day operations of the insurer.

In the remainder of this note we highlight the key features of Fitch's framework that we have general agreement with and those areas where we have concerns. Please note that our feedback is only based on the executive summary document. At this time we do not have plans to comment on the more detailed Technical Document that accompanied the above exposure drafts.

Again, we want to express our appreciation for the extraordinary effort expended by Fitch in reaching this stage in such a short period of time. We would be happy to spend some time with Fitch in person to discuss this important topic further.

Assessment of Insurers' In-House Economic Capital Models and Insurance Capital Assessment Methodology and Model (PRISM) – Exposure Drafts

Our comments on these Exposure Drafts are divided into the key elements of the framework that we believe represent a significant improvement on the past regime of rating agency capital adequacy assessment criteria generally and the key elements of the new framework that we consider ought to be looked at more closely by Fitch.

Elements we fully support:

(1) *Internal models as the “Trojan Horse” of Risk Management*

The CRO Forum believes that used properly, an internal model not only forms the basis for risk *measurement* but rather can also act as the central pillar for risk *management*. Indeed many of the CROs in the CRO Forum champion the cause of internal models not so much for their mathematical purity but rather because it is recognized that the discipline of embedding such a model in an organization can act as the Trojan horse of risk management for effecting necessary changes in the organization - all the way from management information systems to capture data that feeds these models to the Board of Management's risk governance framework.

Nevertheless, we fully support Fitch's desire to only admit the results of internal models where it is satisfied as to the extent to which the model satisfies a “use test” and the extent to which it has a proven track record with appropriate testing and controls. We also support the list of questions in Appendix 2 as the CRO Forum companies consider these questions to be highly relevant to the task of arriving at the best possible representation of an insurer's risk based capital adequacy. Likewise we consider the linkage of capital requirements to adequately documented management actions that are capable of being monitored and measured to ensure application is a sound principle to be embraced, particularly for primary life business with discretionary benefit features.

(2) *Fitch's balanced approach to diversification.*

The CRO Forum considers Fitch's approach to diversification to be very much in line with its detailed study issued in June 2005 titled “A framework for incorporating diversification in the solvency assessment of insurers”. In this study we also highlighted the importance of respecting fungibility of capital constraints and distinguished between the different elements of diversification as well as the “operational risks” associated with businesses trying to diversify into fields where they have no expertise.

In addition, the CRO Forum would like to note that the key issue in respect of reflecting diversification benefits is that concentration of risk is bad for the insurance industry and consumers. It is the main contributor to insurer impairments, especially in times of major stress. Not reflecting diversification benefits may actually encourage companies to have more concentrated business models.

(3) *Fitch's balanced approach to the treatment of management actions*

The CRO Forum considers Fitch's approach to the treatment of management actions within capital models to be fair and reasonable. We also consider that it should be linked to evidence of practical application and demonstrable acceptance by senior management (e.g. Board resolution, documented bonus policy, policyholder or sales force communications etc).

Elements that we recommend are looked at more closely are:

(1) *Weight given to internal models, PRISM and Regulatory Capital Requirements*

We consider the proposed "weighting" scheme between an insurer's in-house model and the results produced by PRISM (proposed to be used as a benchmark) to be problematic from four main perspectives:

- a. The basis of measurement of market consistent internal models is fundamentally different from an accrual based cash flow testing model. Market consistent internal models also take into account the lifetime of the business and associated risks but measure value and capital adequacy consistent with financial economic principles. Cash flow testing models rely much more heavily on historic information and views of the future.
- b. The difference between the minimum regulatory solvency capital requirements (SCR) and the insurer's available capital may be a feature of the business model or a feature of the "formulaic" approach adopted by the regulator for determining these requirements or both. As the SCR can be relatively blunt as a measure of risk (especially when determined using a factor based approach), this may distort these weightings.
- c. There is no fundamental reason to expect that a blended weight of PRISM's results and the in-house model results produce a closer approximation to the best risk based capital adequacy representation for that insurer. In fact, it can be expected that an appropriate internal model achieves a greater granularity in the assessment of risk. As a result, the CRO Forum strongly prefers an "admissibility" (i.e. in or out) approach to in-house models to manage the moral hazard risk referred to by Fitch. In other words, if insurers/reinsurers meet these admissibility requirements, then Fitch ought to use the results of that model. If the insurer fails to meet these requirements, Fitch ought to use PRISM or PRISM with analyst adjustments. We consider this to be the preferred framework for incentivising insurers to meet Fitch's admissibility requirements.¹
- d. We have some concern that benchmarking an internal model with PRISM, may result in dampening the incentives that should be provided to companies to develop an internal model and use that as a basis for integrated risk management (i.e. not just risk measurement).

¹ As is already mentioned in the Bibliography section of Fitch's Exposure Draft, the CRO Forum commissioned an independent report on what could be a reasonable set of admissibility criteria. (Refer CRO Forum Report of June 2005 titled "Principles for Regulatory Admissibility of Internal Models"). We would encourage Fitch to use these, or preferably feedback to the CRO Forum any improvements on these criteria, so that all companies can ensure they meet the greater of Fitch's requirements and requirements likely to be adopted by regulators under the European Solvency II initiative. The CRO Forum would very much prefer to have one set of admissibility criteria that all member companies should "strive for".

(2) ***Use of Country-Specific and Segment-Specific Data for Liability Parameterisation***

Whilst we agree with the general approach of Fitch under PRISM of making risk based capital requirements far more responsive to portfolio characteristics, the CRO Forum has found that there can exist incredibly significant remaining differences within countries and even within segments within a country. Accordingly, we question whether the costs/benefits of attempting to reconcile insurers' in house models against PRISM will yield any real fruit for the insurers that have an internal model. Whilst the benefits to Fitch in refining its model for companies that do not have an in-house model are clear, we do not consider it fair or reasonable that CRO Forum companies (all of whom have an internal model) should be the main parties that assist with this development. We also think that it would take enormous resources on the part of Fitch to reconcile PRISM to internal market consistent models.

(3) ***Translating from VaR to TailVar***

We understand that Fitch will be releasing an exposure draft on this topic in 3Q'06, but wanted to give Fitch some preliminary thoughts on the topic. Firstly, an academic paper issued in 2005 "rehabilitates VaR as a measure of risk by showing its sub-additivity in the tail region of a distribution."² The CRO Forum does not advocate one measure over another, but notes that criticisms of VaR are often oversimplified especially when used in the context of the determination of risk capital requirements. Secondly the CRO Forum would caution Fitch on a "one size fits all" translation from VaR to TailVar. It can be readily demonstrated for example that the translation for a proportional property reinsurance portfolio with net of account Nat cat protection is very different to the translation necessary for a non-proportional property reinsurance portfolio. Finally, academic studies have shown that the number of simulations required for reaching acceptable stability in model results is generally far greater in TailVar frameworks relative to VaR frameworks.

(4) ***Measurement of Available Capital***

We understand that Fitch will be releasing an exposure draft on this topic in 3Q'06, but wanted to stress that in some segments the task of measuring required risk capital cannot really be separated from the task of measuring available capital. One example is life or long-term health business where the risk capital requirements are often set using a "downside embedded value" framework. For example, in this framework, available capital must also make adjustments to the accounting capital to reflect differences (positive or negative) between the DAC asset taken credit for in the accounts and the measure of the economic value of the business (e.g. using the EEV or MCEV framework).³

² The CRO Forum is grateful to the German Regulator, BaFIN (refer paper by Stahl and Bongers titled "Economic Capital Use Test" of March 2006 for drawing our attention to this paper). The relevant academic paper is titled "Sub-additivity re-examined: the case for Value-at-Risk Working paper, 2005" by Danielsson, J., Jorgensen, B. N., Sarma, M. and C. De Vries.

³ EEV refers to the European Embedded Value principles of the CFO Forum whilst MCEV represents the Market Consistent Embedded Value, a subset of an EEV measurement framework.

(5) *Promoting Transparency Between Rating Agency and Insurer*

The CRO Forum considers it impractical and inefficient for CRO Forum companies to simply provide rating agencies a copy of their internal models. The key obstacles include explaining the enormous contextual features of some of the models e.g. different components are often built and run across a firm's different operations and in addition there are significant IT issues that would need to be resolved. In particular, the proprietary components of models cannot be simply "handed over" (e.g. the B&H ESG component of the model or the RMS Nat cat modelling component of the model or indeed any "in-house" proprietary approaches to risk modelling that have been developed by CRO Forum companies). We therefore have a strong preference to promoting transparency by a combination of one or more of the following alternative approaches:

- Independent certification from an external advisor or indeed under the Solvency II framework from the "lead" regulator who will have conducted their own examination/certification that the modelling and control environment is sufficient for the business undertaken⁴
- Documentation of the model
- Sensitivity tests from the model for key model parameters
- Interviews with CROs and /or their capital modelling staff
- Reconciliations of changes in the economic capital position and public disclosures⁵

(6) *Allowance for Underwriting Cycle*

Care is required in assessing the extent to which the underwriting cycle is a specific feature of the internal model. Insurers can adopt a variety of approaches for doing this and the CRO Forum does not advocate one approach over another. The approaches depend heavily on the period used to parameterize the cycle factors (e.g. how is the US Casualty period of 1997-2001 incorporated), the extent to which current expectations of the cycle are incorporated, the extent to which the insurer adopts a "flexing of capital" approach (i.e. increasing capital during soft markets to reflect deteriorating terms and conditions and vice versa in hard markets) vs. a "through the cycle" capital determination approach, the extent to which cycle effects are decomposed into "adverse loss development" components and other premium insufficiency components, or modelled jointly, and offcourse to the extent that the operational risk capital loadings already include some allowance for the cycle. In short the CRO Forum believes it is over simplistic to assume that a model with an explicit allowance for the cycle is superior to one without!

⁴ It should be noted that this is not a "distant future" development but a reality today under many regulatory regimes. For example, BaFin in Germany has already commenced preparing for such a process with some of the German insurers/reinsurers (see for example the paper titled "Economic Capital Use Test" by O. Bongers and G. Stahl, Bundesanstalt für Finanzdienstleistungsaufsicht (BaFin), of March 2006). Further, the FSA has since 2004 implemented the so called ICAS framework under a Pillar II styled approach and the FOPI in Switzerland is reviewing internal models for use in the Swiss Solvency Test.

⁵ The CRO Forum has established a Working Group with a remit to promote risk based disclosure standards/requirements (including those related to economic capital models) under the proposed Pillar III branch of the Solvency II framework.

(7) *Use of Market Consistent versus Realistic Calibrations of an Economic Scenario Generator*

The CRO Forum believes that the appropriate calibration for an ESG must depend on the application. There are many technical papers on this subject (e.g. see Babbel) but briefly, for the purposes of technical pricing or determination of the “market value” (i.e. arm’s length trade value) of liabilities, a market consistent calibration is necessary. For estimating capital requirements, both market consistent and best estimate calibrations have a role to play.

(8) *Use of Stress Scenarios*

The CRO Forum cautions about using stress scenarios in an additive fashion. To the extent that a stress scenario is designed to cover “gaps in quantitative approaches” to risk modelling, then only the excess capital required over and above the allowance in the risk model needs to be considered for “capital add on” purposes. Even here, care is required as often we see stakeholders adding such standalone numbers to diversified numbers, which is an applies to oranges exercise.

(9) *Use of Default Probabilities to Assign Ratings*

The attached discussion paper (Appendix A) on “Economic Capital Models and Implied Ratings” provides a brief summary of some of the pitfalls that should be avoided when using historical default probabilities directly for establishing a link to a rating.

(10) *Capital for Model and Parameter Risk*

The CRO Forum considers it necessary to define more precisely what is meant by parameter and model risk. We have attempted a definition of the former in our “Admissibility” paper of June 2005 and for example, for mortality risk, we recommended that one admissibility criteria would be the requirement to specifically capitalize for parameter risk in the way it is defined. We consider that “model risk” is best mitigated by the use of the stress scenario framework that Fitch also recommends (see comment above). By definition, capital required for “model risk” cannot be held “within a model” and we would consider the wording in this section of the Exposure Draft needs to be refined so that it is made clear that Fitch supports “stressing model parameters” and holding capital on top of that produced by the base risk model if necessary, or equivalently demonstrating capital adequacy before and after stress scenarios.

In the area of Nat Cat for example, the CRO Forum notes that Fitch has decided to use within PRISM the AIR Nat cat modelling tool of CATRADER. Some of the world’s leading reinsurers who have in-house geoscientists have conducted extensive proprietary research on the relative performance of such models for different perils, geographies, portfolios and treaty structures. The simple mathematical range of answers from these models can indeed be staggering and it would not be appropriate to simply add the difference between Fitch’s chosen licensed solution and that used by the insurer/reinsurer.

We consider this process needs to be necessarily guided by geo-scientific expertise and is not a pure mathematical exercise. Fitch also needs to recognize that for some perils there is diverging opinion in the scientific community on how best to represent these risks. The CRO Forum's Emerging Risks Initiative position paper on climate change issued recently highlights this important point⁶.

(11) *Time Horizon*

The time horizon of 30 years adopted for PRISM needs to be treated carefully. A paper by consulting firm Barrie & Hibbert⁷ shows that there is a trade off between choosing a long time horizon (where portfolio characteristics far out from the valuation date can be brought into consideration in a more satisfactory way) and choosing a short time horizon (based on funding changes in market-consistent liability values over a one year time horizon). Indeed, market consistent liability valuations already take into account the lifetime of the business and associated risks. The paper also shows that the traditional actuarial approach to risk modelling (i.e. choosing a long time horizon) comes at a cost – that of lower confidence in the calibration of parameters that far out into the future. The CRO Forum does not advocate one time horizon over another but rather believes that it should be appropriate to the business model and also the period of time over which management can deploy risk management strategies that can significantly impact the risk profile of the firm. Often running a model on more than one time horizon provides useful insight that is important for shaping enduring risk management or risk mitigation strategies.

(12) *Managing the Different Stakeholder Views of Capital*

A pure economic assessment of capital requirements is often insufficient for understanding the true impact of risk management strategies. CROs are often challenged with the task of having to develop strategies that balance the economic, regulatory and rating agency views of capital adequacy.

(13) *Diverse Modelling Frameworks*

CROs that have had an internal model in place for some time have often found that the simplifying assumptions associated with some methods and tools (e.g. the Mack method used for estimating the risk of adverse loss reserve development which is also used in PRISM) need to be constantly reviewed over time for their continued suitability to the portfolio. The CRO Forum believes that such review processes and “continuous feedback” loops can be just as important as the initial tools used for estimating risk based capital adequacy.

(14) *Peer Review of EY's Work*

It would be helpful for gaining acceptance and credibility of PRISM from insurers that do not have internal models for Fitch to consider asking another consultant to review the technical work of Fitch and indeed to install a process whereby this work is continuously reviewed and monitored over time (e.g. for advances in modelling developments, incorporation of new research, etc). We consider this to be a far more effective way of ensuring high quality output than one whereby the model is fed with more and more data from companies that have internal models.

⁶ Refer paper titled “Climate Change & Tropical Cyclones in the North Atlantic, Caribbean and Gulf of Mexico”, a Position Paper published by the CRO Emerging Risks Initiative (which includes all CRO Forum member companies) dated May 2006.

⁷ Titled „Calculating the market risk component of the ICA - A discussion of alternative approaches and their relative merits“ by Turnbull & McCulloch, March 2005

(15) *Data Requirements of PRISM*

As mentioned above, we consider it is preferable to provide a regime that incentivises companies to use internal models to determine capital adequacy. In cases where PRISM will be used to determine capital adequacy we want to stress that in our opinion, the model should not be biased in a way that favours those companies providing more and more data for PRISM. Providing information along the data structure required for PRISM might not be the best way for companies to structure their management information systems (which may have been built to meet the requirements of other internal applications).

Appendix A

Economic Capital Models and Implied Ratings

Economic Capital Models (“ECMs”) are a hot topic of discussion within the insurance industry lately. There is a lot of activity from both company’s (internal ECMs) and regulators (overhauling regulatory frameworks). Of course, one of the key objectives of these ECMs is to determine the amount of capital that is needed to support the business. What is the target level of confidence?

There are many variations of models but the growing standard appears to be 1-year VAR models where the capital requirement is set to maintain a certain level of confidence that the company will be economically solvent at the end of one year. For company internal models, the target is set in order to maintain a certain claims paying rating from rating agencies such as S&P, Moody’s and Fitch. For regulatory models, regulators tend to set the confidence level at least in part considering what the implied financial strength ratings would be at that level. For regulatory models, this target confidence level essentially sets a minimum claims paying rating that companies should have to remain a going concern.

How do companies and regulators link likelihood of economic insolvency in one year to implied ratings?

The usual answer is that they use historical default studies from the rating agencies. Below are the annual default probability tables and mean recovery rates from S&P⁸ and Moody’s⁹:

<u>Table 1: 1-year Default rates</u>			<u>Table 2: Mean Recovery</u>		
	S&P	Moody's		S&P	Moody's
AAA	0.00%	0.00%	Bank debt	77.5%	
AA	0.01%	0.00%	Senior secured bonds	62.0%	57.4%
A	0.04%	0.02%	Senior unsecured bonds	42.6%	44.9%
BBB	0.27%	0.16%	Senior subordinated bonds	30.3%	39.1%
BB	1.12%	1.16%	Subordinated bonds	29.2%	32.0%
B	5.38%	6.03%	Junior subordinated bonds	19.1%	28.9%
CCC/C	27.02%	23.12%			

The most common approach is to read the probability of defaulting from either S&P or Moody’s in Table 1 to establish the level of confidence needed in their ECM to support the company’s target claims paying rating. For example, using the S&P data, a company that targets an AA credit rating would ascertain the probability of a company defaulting in one year to be 0.01%. This means that an AA company would default once in every 10,000 years or said differently, 1 in every 10,000 companies rated AA would default by the end of the year. Translating this to capital requirements within their ECM would target setting capital at the 99.99 percentile. If the Moody’s default probabilities were used, the confidence level is ... well let’s just say higher.

Regulators have often been targeting a confidence level of 99.5 percentile. In setting this level, they use a table similar to Table 1 to infer this supports a BBB rating.

⁸ Source: Annual 2005 Global Corporate Default Study And Rating Transitions
⁹ Source: Default And Recovery Rates Of Corporate Bond Issuers, 1920 - 2004

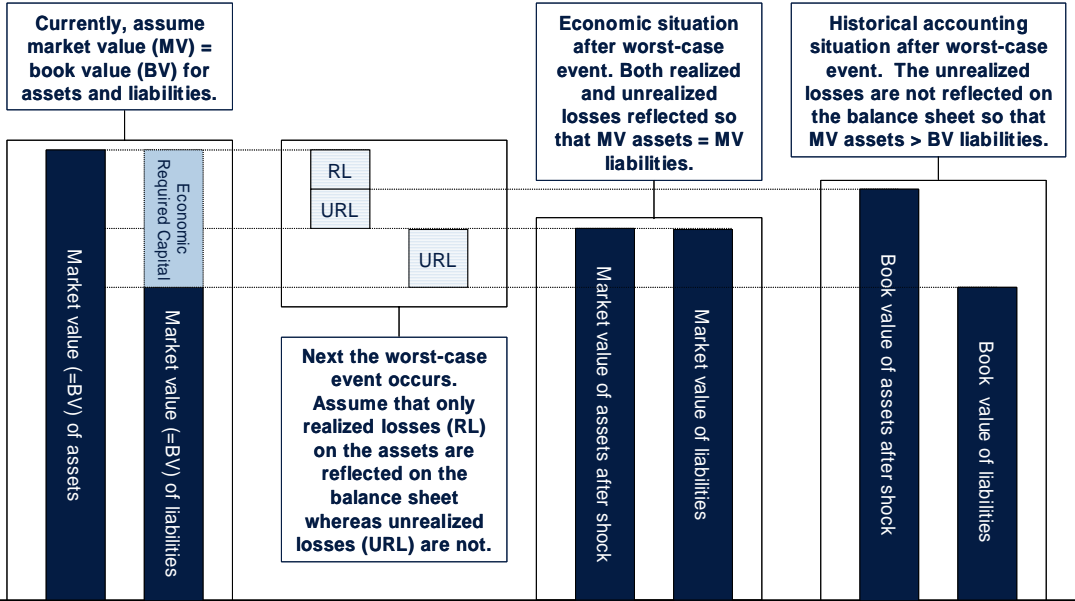
Using this approach to arrive at a link between target confidence levels in ECMs and implied claims paying ratings makes sense at first glance. It is unclear where this methodology started but it is likely within the banking and consulting industry where ECMs first developed. However this approach has startling shortcomings and we believe significantly over estimates the targeted confidence level under an economic solvency model that should be needed for a targeted claims paying rating.

What is wrong with this approach?

The main problem with this approach is in the definition of insolvency itself. Rating agency historical default statistics do not reflect economic insolvency; they typically reflect a collection of approaches such as book value (statutory accounting) and cash flow or financing shortfalls resulting in declaration of insolvency. Management action and typically slow recognition of economic loss in financial reporting combine to produce a lower incidence of default, which creates an artificially high standard under an economic capital model. Management of the companies or the company’s regulator (for industries that are regulated) declare insolvency or file for bankruptcy only after considering and acting upon all possible actions to avoid it. The decision to declare insolvency is not based on an economic assessment.

Under an economic framework, after a worst-case event has occurred, the market value of assets is still enough to support the market value of liabilities. The intent is that the business can be transferred to a third party at zero cost. This concept is illustrated below.

After a worst-case event, the realized and unrealized losses on the assets reduce the market value of assets while the realized and unrealized losses on the liabilities increase the market



value of liabilities. In the above illustration, the company would be on the breach of economic insolvency whereas on a book value basis, the picture would be much more positive. Since the historical default loss data of rating agencies spans many years, it also spans several accounting regimes – including amortized cost accounting. Amortized cost accounting would have allowed the situation to deteriorate further past the worst-case event before the book value of assets would be less than the book value of liabilities. After declaration of default, the assets and liabilities would be liquidated. It is this liquidation that would force the recognition of the unrealized losses that are imbedded in the business. This

helps to explain why recovery rates after declared default are well below 100% in Table 2. This supports that historical default loss data from rating agencies is not directly applicable to an economic solvency framework, as under historical accounting, an economic insolvency threshold would most often have been breached considerably sooner.

We also know that there are many companies and almost entire industries in some countries that have been technically economically insolvent at some point in the past ... just as some are still technically insolvent on an economic basis today. Most of these companies have not in the past and will not in the future actually default. Investors are still willing to support these companies because a belief in management’s ability to improve the situation. The point is that economic insolvency occurs at a significantly higher rate than what is represented in the actual declared insolvency situations measured by the rating agencies.

Some additional support for an alternative to this direct use of the historical probability of default approach can be seen from S&P’s Financial Product Company ratings methodology. This ratings process is used for the financial product portions of some insurance companies in the USA. Under this approach, S&P had established a link to the claims paying ratings of insurance companies to the modeling results under the Financial Products Company model. This model methodology is much closer to a company’s internal ECM than the standard risk-based capital models used by rating agencies and regulators. The link S&P have published in the Financial Product Company ratings methodology is¹⁰:

Targeted Statistical Level of Confidence for Rating Categories			
Rating Category	Target (%)	Implied Standard Deviation Movement	Assessment
AAA	99.9	3.00	Extremely strong
AA	99.5	2.57	Very strong
A	98.4	2.14	Strong
BBB	95.7	1.71	Good
Statistical level of confidence is based on assumed normal distribution			

Although many factors enter the rating process of a company, capital adequacy plays a key role. From this table, we can see that that AA rating would call for a confidence level of 99.5%.

¹⁰ Source: “New Insurance Capital Model Embraces Trends in Risk Management”, by Bob Roseman, January 7, 2002

Conclusions?

It is not our intent to describe a complete objective process for the link between confidence levels in ECMs to claims paying ratings. However there are sound arguments against using the historical default probabilities directly for establishing this link. This article is intended to promote awareness on this issue as many companies and regulators continue to follow the same logic. Declared insolvency does not occur at the same frequency of economic insolvency. Requiring an artificially higher standard for economic insolvency could raise capital requirements in the market and prices of insurance products. If the rating agencies were to use the same approach, the industry would not even enjoy the benefits the higher confidence level should afford them – higher ratings.