# Pushing the boundaries of credit analysis

Counterparty default risk has been identified as one of the core components of the Solvency Capital Requirements under Solvency II. But the treatment of this credit risk depends on ratings from external credit rating agencies. **Prof Duan Jin-Chuan** and **Dr Oliver Chen** from the **Risk Management Institute** at the **National University of Singapore** propose an alternative to traditional credit ratings which has applications for insurers' economic capital decisions.


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Insurance companies face credit risk on a number of fronts. While the treatment of credit risk in their asset portfolio is common to any portfolio manager, a special case for insurance companies is the risk of a reinsurance contract not being honoured due to the default of the reinsurer.

Within Solvency II, the credit risk associated with each counterparty is encapsulated by two quantities that need to be estimated: the probability of default (PD) of the counterparty and the loss given default (LGD). For entities that are rated by an external credit rating agency (CRA), the PD used is a direct translation from the rating. For example, a firm that is rated as AAA is assigned a 0.002% PD, one that is rated as AA is assigned 0.01%, all the way to a 30.41% PD for CCC and lower rated firms.

However, CRAs have been much criticised in the past few years. There is an inherent conflict of interest when entities pay to be rated by CRAs. For example, this has been shown to lead to rating shopping where issuers shop around for the CRA that will give the highest rating. Critics have also pointed to the timeliness with which CRAs react to changes in credit conditions.

In short, ratings by CRAs lack granularity to differentiate obligors and are short of objectivity and timeliness expected of a high-quality risk sorting measure.

## A constructive response

Of course, these criticisms of CRAs are not confined to the insurance arena, with public outcry cresting in the aftermath of the 2008-2009 financial crisis. The Risk Management Institute (RMI) at the National University of Singapore took on a Credit Research Initiative (CRI) as a constructive response to these critics of CRAs. This initiative is to establish a public good alternative to the provision of credit ratings, and to push the boundaries of knowledge in credit risk in general.

The central component of the CRI is an operational PD estimation system that is providing daily updates for exchange listed firms around the globe. The major economies of Asia-Pacific, North America and Western Europe are included, and expansion to economies in Latin America and Eastern Europe is currently being tested. Any user can gain free access at www.rmi.nus.edu.sg/cri to a limited list of 2,200 companies within the current coverage of 30 economies, as well as aggregate default forecasts at the economy and industry levels. In addition, users with credible professional qualifications can request access to the entire set of nearly 50,000 firms, including historical results for firms that have been delisted.

Since the CRI does not accept fees from the firms whose PDs are published or from users for the PD data, there are no conflicts of interest. Also, as a non-profit initiative, complete transparency into the PD estimation system can be given by a detailed technical report.

As a research initiative, the PD estimation system will undergo evolutionary changes as improvements are researched and developed. Ideas for methodological improvements are globally sourced in a 'selective Wikipedia' approach to research. The extensive database that serves as the basis for the CRI has been opened up to researchers from around the world who choose to take part in this undertaking. Any promising research results that they find will be independently validated by an internal RMI team and implemented in the system.

**Figure 1: Thai Reinsurance in 2011**

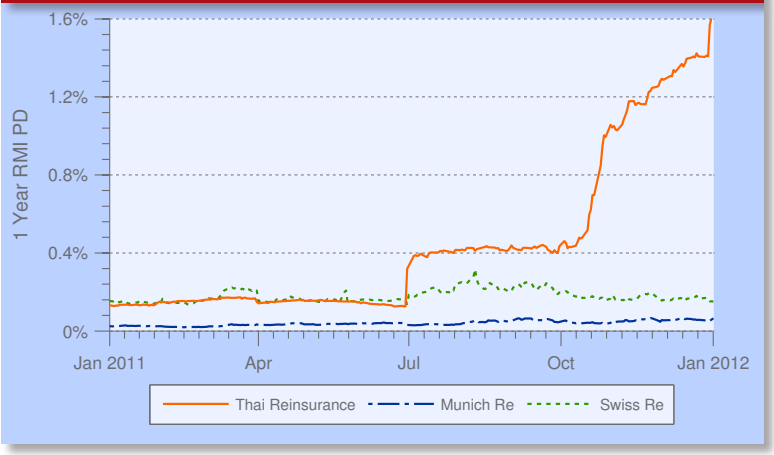


**Figure 2: Trenwick Group default**


## Underlying model

The current PD estimation system uses a mixture of quantities from financial statements along with more timely stock market information. This ensures that default forecasts encompass up-to-date market information and changes to credit quality are immediately captured.

The underlying model is specified using data from all exchange listed firms, and is not specifically targeted towards a particular industry. Nevertheless, a high level of accuracy is achieved in all industries. This is possible by using broadly applicable financial quantities. Firm specific variables that are used include measures of: profitability, liquidity, volatility adjusted leverage, relative size, idiosyncratic risk and growth potential. Besides the firm specific variables, macro-economic variables are also used as indicators of monetary conditions and the overall stock market direction.

Two examples relevant to the insurance industry are provided to demonstrate the relevance of the current PD estimation system.

## Post-catastrophe changes in credit quality

The devastating floods in Thailand started in late July of last year and the flood waters only started subsiding by the end of the year. Swiss Re has estimated that the total insured losses will reach US$8-11 billion. A local reinsurance company, Thai Reinsurance, has not yet been able to estimate its losses from the floods. However, its stock price started a steep dive in October 2011.

While it is apparent that the market is pricing in a higher credit risk for Thai Reinsurance, its credit ratings did not reflect the significantly higher credit risk. Its Standard & Poor's rating was only downgraded on 7 December, from A- to BBB+. The increase in credit risk was captured by the CRI system as reflected in the one-year PD in Figure 1. From July to early October, the PD stayed at a level near 40bps. Starting in mid-October, the PD increased by four times to around 160bps by the end of 2011. The graph also includes the PD for Swiss Re and Munich Re as points of comparison. Note that there was a jump in PD for Thai Reinsurance from the range of 10-20bps to 40bps in July, which was due to a leverage increase reflected in a newly released financial statement.

## Predicting an actual default

Trenwick Group, a Bermuda based reinsurance firm that defaulted on a senior note on 1 April, 2003, is our second example. Its financial difficulties started in 2001 and were exacerbated by the 9/11 terrorist attacks. Figure 2 shows that shortly after markets re-opened after the event, Trenwick's PD shot up to over 10%, providing an early warning a year and a half in advance of what turned out to be its eventual default.

Then in October 2002, A.M. Best downgraded the financial strength rating of various subsidiaries of Trenwick Group from A- (excellent) to B+ (very good). This downgrade caused a breach of a covenant for a letter of credit facility that left Trenwick under-collateralized and led to a collapse in its stock price. The PD reacted by reaching a level of over 70% before it was delisted from the NYSE in late March. Not surprisingly, Trenwick subsequently defaulted.

## Management implications

The two examples given here show that stock market information can be effectively incorporated in assessing credit risk. A purely quantitative default prediction model such as the CRI system can be utilised in large-scale applications. The timely updates of credit quality without needing to wait for a new financial statement or ratings action from an external CRA is a big advantage. The precise PD from the CRI allows much finer granularity than the coarse bucketing that a letter rating imposes. Averaging letter grades of different obligors obviously makes little sense, but PDs can be meaningfully aggregated. The CRI system models the joint dynamics of obligors over time, which lends itself to predicting individual defaults as well as naturally forming a bottom-up approach to the description of any credit portfolio's default behavior.

There are numerous possible managerial usages of the CRI PD estimation system. An example of an application for insurance companies is to use the CRI PD estimation system rather than ratings from CRAs to determine economic capital levels. It can also be used to study the credit risk profiles of insurance syndicates and help to manage reinsurance counterparty risk exposure.