

# Solvency II: Don't build a condo on Mars.

*Integrating risk models with business process and financial reporting is an essential foundation for a successful Solvency II implementation program, which requires careful consideration from an early stage.*

## Solvency II requirements

The three pillars of the Solvency II directive cover risk modeling (Pillar 1), integrating risk management into business process, often called enterprise risk management or ERM (Pillar 2) and risk reporting both to investors and regulators (Pillar 3).

Solvency II will prove to require substantial changes for many insurers. There are a myriad of tasks and projects to be established, managed and completed. Within all the work required, the actual choice of internal risk, or VaR, model might seem like a decision of secondary importance. Many consultants, service providers and IT vendors have produced a range of options from shrink wrapped, off the shelf, products to teams of experienced professionals that can create bespoke solutions and systems. Many will boast experience from Basel II, the equivalent of Solvency II for banks that was published in June 2004 and is currently being implemented around the world.

## The importance of model choice to business strategy

BRAVE Partners believes that the choice of model is one of the most critical elements in a successful and long term prosperous implementation of Solvency II. Many strategy consultants argue, correctly, that the modeling component of Solvency II must be inextricably connected to the management and reporting components. This is not just a requirement of the regulators, but a sound business choice to ensure that Solvency II does not become a pure reporting cost burden to an insurance company.

## Comprehensible inputs

The key to successful models is to ensure that all inputs and parameters have a clear interpretation in the everyday language used by the leaders of the business. During the height of the collateralized debt obligation (CDO) boom in the investment banking industry, one of the most popular pricing models was completely driven by a parameter that the quantitative teams called

*To see how flawed default time correlation is as a management concept, consider this real example. A credit trading desk had sold first to default protection on five names. The protection pays a fixed amount only once. This is when the first name in the list defaults. The names included both Marconi and Railtrack. As time progressed it became apparent that both Marconi and Railtrack would default. The trading desk needed to stem their losses and met to discuss strategy. The conclusion was to buy protection for the full pay out on the name they all thought would default first. Here where a real business decision was made, "default time correlation" was not a useful concept.*

“default time correlation”. The model itself was technically elegant in many ways, but this elegance arose from the use of a “default time correlation”. The issue that was largely overlooked was the fact that “default time correlation” is not a concept that was regularly discussed, or even understood by the business management. The CDO business ultimately failed spectacularly, taking a few banks down with it on the way. Some of the seeds to this destruction could have been sown when management and modeling disconnected.

## Connecting modeling with management

As businesses and products become more complex, modeling becomes an essential part of the management process. The beauty of Solvency I is in its simplicity, but yet that simplicity is also its greatest failing. The simple formula does not measure the risk accurately. As modeling efforts have grown, management has delegated responsibility to specialist teams and ultimately specialist departments. These specialists have necessarily been highly skilled mathematicians who have often been left to their own devices in terms of model specifications while management focus on strategic and operational issues for the core business. As time progressed the modeling had often become an end in itself, rather than a means to a business focused end for the organisation. This issue is the same one that arises in managing any highly specialist team within a business environment. It is often difficult to bridge the gap between specialist expertise and overall business objectives.

## Correlation is a flawed concept for event driven risks

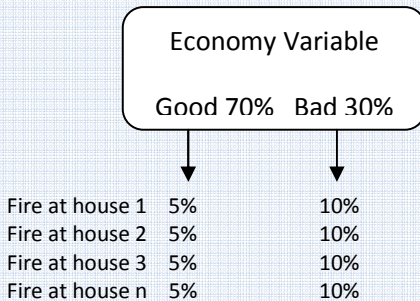
Within all the modeling and financial development that has occurred over the past ten years, there is an element of back to basics that has been lost. BRAVE Partners believes that the emerging winners in business will be those organizations who implement the values of the past in the technologies of the future. Mathematically speaking, correlation is a concept that is only fully defined for a Gaussian (often called Normal or Bell Curve) distribution. These distributions are smooth and symmetrical, making them highly different from the lumpy, one sided, event driven distributions, such as earthquakes, hurricanes and credit defaults. The ultimate reason that any concept of correlation does not make sense intuitively when talking about event losses, is ultimately because it also does not make sense mathematically either. A model for event losses that purely relies on correlation as an input has a lot of important detail defined by the technical model structure and not by the end user. It is no wonder that a disconnect arose between management and modelers.

*“Trading correlation is like buying a condo on Mars. I’m sure that I will be able to buy one in the future, but quite what it is and what it looks like is very unclear to me.”*

Senior ABS trader on the CDO market

## Good mathematics is intuitive

BRAVE Partners would suggest using a dependence style structure for event risk modeling. Managing Partner, Christopher Cloke-Browne, laid out the framework with colleagues many years ago in a technical paper that was published in RISK Magazine. Here events are seen to be dependent based on some common cause. In this framework the probability of an event is altered according to the state of the underlying cause. The example below will make this clearer.

**Dependency Structure**

Let's assume that economic hardship is a significant cause of arson, so that fire claims double from 5% of an insurer's portfolio in a good economy to 10% in a bad economy. In the framework promoted by BRAVE Partners, the model would have an underlying state which would be good with some probability and bad with some probability. Each insured house would then be assigned two probabilities of a fire loss, one of 5% when the economic variable is in the good state and one of 10% when the economic variable is in the bad state.

In this, framework correlation is only an observed characteristic of its output. The perception of correlation arises from the following dynamic. If a particular house, say house 1, has burned down in a model simulation, then it is more likely that the Economy Variable is

in the bad state as twice as many houses burn down in that state. If the Economy variable is in the bad state, then it is more likely that house 2 will burn down in the same model simulation as the probability of a fire is 10%, rather than 5%. The net result is that the results of simulations tend to fall into clusters with lots of events when the underlying variable increases the probability of occurrence and low numbers when the underlying variable decreases the probability of occurrences. In the observed output data this effect can be measured as a correlation, but it is a well defined dependence relation in the model that can be calibrated according to the management's view of the future direction of the markets and the business.

This framework has the best of both worlds. For the modelers there is a very smooth and beautiful mathematical construction, but for the managers there is an intuitive risk measurement framework that runs directly from their own discussions forecasts and decisions.

A more extensive summary of the issues and techniques can be found in a technical paper from RISK Magazine that Managing Partner, Christopher Cloke-Browne, co-authored.

## **BRAVE Partners experience**

Managing Partner, Christopher Cloke-Browne, has extensive experience in building sophisticated risk models that integrate seamlessly into the management processes of their users. These models include the PortfolioRisk+ model at CreditSuisse and the CreditHorizons model at Dresdner Kleinwort. In each case the model design achieved the goal of only relying on observable, comprehensible input parameters. The systems were used to advise a range of clients, including major European Banks and large Pension Funds in Denmark and the USA on business strategy. Many of the proposed strategies were implemented with highly successful results.

## **A role for a modeling or mathematics advisor**

BRAVE Partners would encourage all businesses that are assembling Solvency II teams and advisors to consider the need for a modeling advisor. The role of such a person would be to ensure that the risk modeling process that is ultimately selected and implemented is streamlined, fast and accurate, but

most importantly that the inputs, functioning and outputs of the model can be clearly and concisely presented to the board, regulators and investors. A modeling advisor would need to be introduced into the process at an early stage so that the Pillar 2 management structure and Pillar 3 reporting structures are clearly understood. The advisor would then ensure that the modeling inputs and outputs were clearly aligned and integrated with the management and reporting processes and that the model was detailed enough and fast enough to produce timely, useful output. This is perhaps the essential element in ensuring that Solvency II really does become an integrated part of an insurance business.

- *VaR models for Solvency II need to be integrated into the management (Pillar 2) and reporting (Pillar 3) processes from an early stage*
- *If modeling is an after- thought then it is likely that the model inputs and outputs will bear no resemblance to the discussions of the business leadership.*
  - *The cost of construction and operation will become a business overhead as the system will have no decision making value.*
  - *Business decision making and capital calculations will be disengaged.*
  - *The model might as well be a condo on Mars.*
- *BRAVE Partners Managing Partner, Christopher Cloke-Browne, has considerable experience in building risk and capital models for financial businesses and integrating these with business decision and reporting processes.*
- *A simple example of the dependence model described in this article is available to certified, signed up clients of BRAVE Partners.*
- *Contact BRAVE Partners LLP at:*

[enquiries@bravepartners.com](mailto:enquiries@bravepartners.com)

[www.bravepartners.com](http://www.bravepartners.com)