

*"THERE IS NEVER (OR HARDLY EVER)  
A SINGLE ANSWER."*

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INVESTMENT AND RISK

## > LESSONS FROM RECENT EVENTS

Colin Wilson looks at how traditional risk modelling fared in the recent extreme economic conditions, and draws three key lessons for the future.

The words 'risk modelling' immediately evoke thoughts of complex mathematics. Fear not - this article takes a look at a set of principles, using the analytical technique of common sense.




### FINANCIAL INSTITUTIONS ...

Risk modelling has been applied to financial institutions for years. Banks, Insurance Companies and Pension Funds have many differences, but they have one thing in common – each has assets and liabilities. Those assets and liabilities might have different characteristics, but they are all intrinsically uncertain. Banks don't know when depositors will want their money back, whether borrowers will default, whether collateral is secure, or what future interest rates will be. Insurance Companies and Pension Funds cannot be certain about future demographic trends, economic indicators such as inflation, or investment returns.

These uncertainties make such institutions prime candidates for risk modelling. The results from the models help formulate strategic thinking, by highlighting the uncertain influences likely to do most damage, and by testing the effectiveness of possible protective actions. Rather than dwell on the mathematical detail, important though it is, think of risk modelling as a black box. Feed your assumptions into the black box, and out comes a range of possible outcomes, each with a probability attached to it.

### ... AND THE WEATHER

Note that there is never (or hardly ever) a single answer. It is rather like a long range weather forecast for the next 5 days. Feed in readings from weather stations at several locations in a given area, and out comes a forecast for a single location within the area, along the lines of:

Sunshine		Broken cloud		Showers	
<b>80% chance</b>		<b>10% chance</b>		<b>10% chance</b>	

Nothing is presented as a certainty, but there are three possibilities, some more likely than others. Unavoidably, interpretation of the results and deciding on the best plan for the future requires judgement. Sun block might be a better bet than an umbrella! In summary, the forecast is vital, but it's not the whole picture.

### BACK TO FINANCIAL INSTITUTIONS...

In financial risk modelling, the black box is much the same. Data is collected over many years from several sources. There are many possible outcomes, each with a percentage probability. Most of the data often shows a clear trend, and it is easy to be confident about the relative risks of commonplace outcomes. It is a lot harder to attach probabilities to extreme outcomes. A weather forecast for the middle of the weather stations will be more reliable than one for the edge where there is less data. Or we may be in a part of the world where hurricanes are so rare that we cannot deduce the conditions that are likely to lead to one in the future.

*" HAVING NO PLAN IS NO GOOD."*

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## THE ONE IN 200 YEAR EVENT

"The shortcoming recently revealed in financial risk modelling is that discernible trends were identified only from normal times, albeit in some cases from sources with a lot of available and reliable data. But those trends were extrapolated to gauge the likelihood of extreme events, with hardly any supporting data.

In particular, assumptions were made about the likelihood of combinations of different events: eg. snow and gales. The trouble is that recent conditions were so extreme, that even the basic assumptions in the black box became invalid. They were fine in normal conditions, because everyone had analysed many years of relative normality, albeit with occasional ups and downs. But recent events were far from normal. In short, what was considered a 0.5% chance - the "one in 200 year event" - actually happened. No-one had statistical data collated under such extreme conditions, and so the risk models became unreliable.

### Key lessons

What can we learn from this?

#### Key lesson 1

Risk models designed to work in normal conditions cannot be relied upon in more extreme conditions.

#### Key lesson 2

A one in 200 year event is not the same as "it will never happen".

#### Key lesson 3

If a one in 200 year event has massive detrimental impact, then completely ignoring it can lead to big trouble. First, you need to structure things to minimise the impact. Then, if a potentially catastrophic one in 200 year event does happen, you need some sort of plan to respond. Having no plan is no good.

If Key lesson number 3 sounds pedantic and impractical, then take a few moments of quiet reflection about air travel – first, all the safety features and checks to minimise the risk of a problem, then what happens at the start of a plane journey. *"In the unlikely event of an emergency ..... [one in a million(?) chance] ....your life jacket is under your seat, oxygen masks will descend from above, and the exits are being pointed out to you now"*. This is the plan. Even though an emergency is extremely unlikely, it is so important that everyone knows the essentials of the plan that the captain personally asks everyone to pay attention. Risk management without an equation in sight.

## DIFFERENT LANGUAGE, SAME MESSAGE

In our more familiar actuarial territory of Financial Institutions, we might have to resort to language like Value at Risk and confidence limits. (These are statistical expressions which describe the chance that a random variable will lie in a given range. For example, there is a 95 per cent confidence that the temperature will be less than 35°C today.) Handling the mathematics is a core competence for actuaries. But rest assured that we will never forget the importance of the underlying principles and the three key lessons.

*"THE ONE IN 200 YEAR EVENT ACTUALLY HAPPENED"*