

Editorial

'It is vain to speak of cures, or think of remedies, until such times as we have considered the causes . . . He is happy that can perform this aright' wrote Robert Burton almost five centuries ago.¹ Few, I think, would disagree. Indeed, when it comes to financial crises, the desire to find the appropriate cures and remedies has probably never been more strongly felt than in these subprime-infested times.

During the last decade, financial institutions have devoted very large resources to the study of financial risk in an attempt to find cures and remedies. Their findings have both inspired and been informed by the largest-scale regulatory and risk-management upheaval of a generation (the Basel II project). Yet, despite a capital investment certainly in the billions of dollars, despite the millions of man-hours in modelling, coding and data scrubbing, and despite the thousands of symposia, articles and round tables, recent financial events seem to indicate that our ability to deal with financial risk has not improved. On the contrary: the spillovers from the subprime crisis are beginning to infect not only arcane areas of finance (such as structured investment vehicles, conduits and monoline insurers), but the 'real economy'. When healthy companies face increasing borrowing costs, when financially sound households see the cost of new mortgages rise, and when banks become reluctant to extend new credit, it is far more than bankers' bonuses that suffer. It is Main Street that feels the pain.

How can that be? How can so many

resources, so many bright minds, such a concerted regulatory effort have produced so little in terms of effective management of financial risk?

There is, of course, no way of telling what would have worked for certain. Nonetheless, one can be reasonably sure which of the tools deployed for the task never had any chance of working. Unfortunately, the risk-management safeguards that have failed to work so miserably in recent months have become the cornerstone for much of the quantitative management of risk as well as the regulators' tool of choice to calculate banks' capital. So, what is the problem?

Quantitative financial risk management became emboldened in the early years of this century by the relative successes it appeared to reap in the area of market risk — the risk, that is, that arises from trading activities. There were, sure enough, many critics of this school of thought, but it is fair to say that, in the specific area where it was first designed and applied, statistical risk management appeared, and to some extent proved, promising. The buzzword was 'value at risk' (or VaR, for the *cognoscenti*): roughly speaking, the daily or weekly monetary loss that an institution should, statistically speaking, not exceed more frequently than, say, once a month, or a year.

By luck or by design, this risk management tool was first introduced in the one area of financial risk-taking where it has a sporting chance of success: trading risk. In this market, transactions

occur frequently (giving rise to that abundance of data which constitutes a statistician's paradise); positions can, in theory, be turned around quickly (making the horizon of a few days appropriate); and the market 'social context' (introduction of new products, rules, regimes, etc) does not change so rapidly as to make the plentiful data collected in the last year or so statistically irrelevant. In short, one can reasonably hope that, when it comes to trading risk, the future will look like the past.

Unfortunately, these early successes (or the early promise, depending on the point of view) encouraged practitioners and regulators to 'do more of the same' in areas of financial risk control where none of the statistical conditions outlined above really applied. If asking about daily losses that occur, on average, once a month makes sense, what can be wrong in enquiring about *monthly* losses that can occur once in a few years? And if this makes sense, why not ask about *yearly* losses that should occur only once a century? Why stop there? What about once in a thousand years? The misguided belief took hold that, with enough data, patience and ingenuity, all these superficially similar questions could be answered in a meaningful way. So, in an unprecedented risk-inflationary spiral, the financial community quickly began asking with a straight face statistical questions about financial losses that, literally, should have occurred only once since Homer wrote the *Odyssey*. And financial institutions and regulators did more than ask questions — they began to believe that they could set aside sufficient capital to withstand once-in-many-thousand-year perfect storms by interrogating their statistical models.

Given the problem at hand, the statistical absurdity of such questions is readily recognised by professional statisticians, physicists and mathematicians. But it is certainly also apparent to 'softer' scientists, such as economists, policy makers and central bankers. In Alan Greenspan's words, for instance:

'[p]olicymakers often have to act ... even though [they] may not fully understand the full range of possible outcomes, *let alone each possible outcome's likelihood*. As a result ... policymakers have needed to reach to broader, though less mathematically precise, hypotheses about how the world works.'²

More strongly and unambiguously, Brad deLong, Professor of Economics at UC Berkley and Research Associated of the NBER, recently made the following comments on my book *Plight of the Fortune Tellers*, in which I expand on the ideas presented here:

'... how foolish we academics are in thinking that there are things that go without saying: a great deal of the very large value of the book comes in saying things that, when I would say that in academic seminars, would be followed by someone saying: '*But of course, that goes without saying*' ... the 99.9 per cent value at risk for a weekly return distribution cannot be determined ...'³

Unfortunately, despite being commonplace among scientists and economists, this statistical impossibility is not recognised as such just by those who are in charge of the stability of the financial system, ie the regulators and the risk management community. In this

close-knitted circle, this collective madness has created a sort of 'plausibility by repetition' and obliterated common sense in questioning methodological absurdities. In an article recently published in a risk management journal,⁴ for instance, neither the authors nor the referee found anything strange in the claim that, to estimate the likelihood of a *once-in-two-thousand-years event*, a length of data of 'five years [is] relevant for the economic circumstance over the next year'. As this article was written towards the end of 2006, the data at the authors' disposal failed to include not only the Black Death, the Napoleonic Wars and the fall of the Roman Empire, 'but even the US economic recession of 1991, arguably the only meaningful economic recession of the last twenty years!'⁵

The saddest irony is that, even if these impossibly high probabilities could be reliably estimated, there is no evidence to support the claim that they would be of any use in reaching decisions. On the contrary, all available experimental evidence shows that human beings *can* be surprisingly good at dealing with everyday, 'medium-sized' probabilities,⁶ but that they fail miserably when confronted with extremely low probabilities.⁷ After all, if you hear on the radio that there is a 40 per cent chance of rain, this may plausibly influence your decision as to whether or not to carry an umbrella to work. But did you choose the means of transportation for your last holiday on the basis of the mortality rate associated with planes, trains and cars? The current risk management obsession with science fiction probabilities is therefore not only methodologically misguided, it also runs against the cognitive grain of how real

human beings, as opposed to stylised utility maximisers, actually make decisions when faced with uncertainty. And risk management, as people seem to forget more and more frequently these days, is not about calculating percentiles (the higher, the better). It is about making decisions.

If all of this were just a technical squabble among statisticians, risk managers and regulators, it would be of little relevance to society at large. Unfortunately, the impact of this tilting at windmills is becoming painfully apparent in concrete aspects of financial reality. The rating agencies, for instance, only a year or so ago bestowed their highest (AAA) blessing of safety to the super-senior CDO tranches created from subprime mortgages originated in 2006 and early 2007. If a naïve statistical interpretation is assigned to a rating such as AAA, it would indicate that losses so large as to endanger interest or principal would occur once every many thousand years. Yet, in an unprecedented volte-face, only a few months later the same bonds were downgraded by the agencies, sometimes by a staggering number of notches. To give an idea of the scale of this failure in prediction, at the beginning of October 2007, Moody's Interactive Website contained 4,303 downgraded bonds going back to 1990. On a single day, 11th October, 2007, Moody was forced to downgrade 2,507 of those bonds. In other words, more bonds were downgraded in one day than in the preceding 17 years!⁸ *The Economist*⁹ suggests that this abysmal failure is partly due to the fact that the rating agencies have moved from the mixture of quantitative and qualitative criteria that they have used for decades for rating corporates, to making

exclusive use of statistical techniques for supposedly extremely rare events.

What has happened to the rating agencies is, of course, but one example. Most of the financial institutions that have devoted such large resources to estimating their hypothetical once-in-many-thousand-year losses have failed just as miserably at seeing what was coming their way. (Those who have fared better, by the way, have relied on more old-fashioned criteria such as avoidance of excessive concentration, irrespective of what a statistical model might suggest.) As market fears about the magnitude of these 'impossible' losses have grown, and as financial instruments directly or indirectly linked to subprime mortgages have been peppered all over the financial system, investors have become distrustful of anything vaguely related to the area of mortgage fallout. Trading in many of these instruments has ground to a halt, liquidity has all but disappeared, and the banks' appetite for taking new assets (commercial loans, 'good' mortgages, various forms of financing, etc) on their already uncomfortably bloated balance sheets has dwindled. This is not a healthy state of affairs for the 'real' economy.

Finding a single culprit for something as complex as the current financial impasse is clearly inappropriate. Still, if regulators and the banking industry seriously thought that sophisticated quantitative techniques, scores of PhD researchers and arrays of super-computers could make the statistically-unattainable quantifiable, and that this would help the financial community in reaching sound risk management decisions, at the very least a lot of time

and effort would have been wasted. If this line of analysis is pursued, we will get no closer to the real causes of the current (and, no doubt, future) 'impossible' events. Robert Burton would not be happy.

Riccardo Rebonato
Global Head of Market Risk and
Global Head of Quantitative
Research, RBS; Visiting Lecturer,
Oxford University; and
Adjunct Professor, Tanaka Business School,
Imperial College London

References

- 1 Burton, R. (1621) 'The Anatomy of Melancholy'.
- 2 Greenspan, A. quoted in Frydman, R. and Goldberg, M. D. (2007) 'Imperfect Knowledge Economics', Princeton University Press, Princeton, NJ, p. 3.
- 3 deLong, B. (2007) 'A few thoughts on "The Plight of the Fortune Tellers"', available at: <http://delong.typepad.com/sdj/2007/11/a-few-thoughts-.html> (accessed 8th December, 2007).
- 4 As this is not an *ad personam* attack, for once I prefer to hide the exact attribution.
- 5 See Rebonato, R. (2007) 'Plight of the Fortune Tellers', Princeton University Press, Princeton, NJ.
- 6 For example, see the fascinating paper by Griffiths, T. L. and Tenenbaum, J. B. (2005) 'Optimal prediction in everyday cognition', *Psychological Science*, Vol. 17, No. 9, pp. 763–773.
- 7 For example, see Sunstein, C. (2005) 'Laws of Fear', Cambridge University Press, Cambridge.
- 8 Source: UBS Research (2007) ABS CDO collateral downgrades 2007, 12th October, internally produced by UBS, New York for clients and investors.
- 9 *The Economist*, 23rd October, 2007, p. 98.

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