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The gods strike back

Feb 11th 2010
From The Economist print edition

Financial risk got ahead of the world's ability to manage it. Matthew Valencia (interviewed here) asks if it can be tamed again

Illustration by Tim Marrs

"THE revolutionary idea that defines the boundary between modern times and the past is the mastery of risk: the notion that the future is more than a whim of the gods and that men and women are not passive before nature." So wrote Peter Bernstein in his seminal history of risk, "Against the Gods", published in 1996. And so it seemed, to all but a few Cassandras, for much of the decade that followed. Finance enjoyed a golden period, with low interest rates, low volatility and high returns. Risk seemed to have been reduced to a permanently lower level.

This purported new paradigm hinged, in large part, on three closely linked developments: the huge growth of derivatives; the decomposition and distribution of credit risk through securitisation; and the formidable combination of mathematics and computing power in risk management that had its roots in academic work of the mid-20th century. It blossomed in the 1990s at firms such as Bankers Trust and JPMorgan, which developed "value-at-risk" (VAR), a way for banks to calculate how much they could expect to lose when things got really rough.

Suddenly it seemed possible for any financial risk to be measured to five decimal places, and for expected returns to be adjusted accordingly. Banks hired hordes of PhD-wielding "quants" to fine-tune ever more complex risk models. The belief took hold that, even as profits were being boosted by larger balance sheets and greater leverage (borrowing), risk was being capped by a technological shift.

There was something self-serving about this. The more that risk could be calibrated, the greater the opportunity to turn debt into securities that could be sold or held in trading books, with lower capital charges than regular loans. Regulators accepted this, arguing that the "great moderation" had subdued macroeconomic dangers and that securitisation had chopped up individual firms' risks into manageable lumps. This faith in the new, technology-driven order was reflected in the Basel 2 bank-capital rules, which relied heavily on the banks' internal models.

There were bumps along the way, such as the near-collapse of Long-Term Capital Management (LTCM), a hedge fund, and the dotcom bust, but each time markets recovered relatively quickly. Banks grew cocky. But

that sense of security was destroyed by the meltdown of 2007-09, which as much as anything was a crisis of modern metrics-based risk management. The idea that markets can be left to police themselves turned out to be the world's most expensive mistake, requiring $15 trillion in capital injections and other forms of support. "It has cost a lot to learn how little we really knew," says a senior central banker. Another lesson was that managing risk is as much about judgment as about numbers. Trying ever harder to capture risk in mathematical formulae can be counterproductive if such a degree of accuracy is intrinsically unattainable.

For now, the hubris of spurious precision has given way to humility. It turns out that in financial markets "black swans", or extreme events, occur much more often than the usual probability models suggest. Worse, finance is becoming more fragile: these days blow-ups are twice as frequent as they were before the first world war, according to Barry Eichengreen of the University of California at Berkeley and Michael Bordo of Rutgers University. Benoit Mandelbrot, the father of fractal theory and a pioneer in the study of market swings, argues that finance is prone to a "wild" randomness not usually seen in nature. In markets, "rare big changes can be more significant than the sum of many small changes," he says. If financial markets followed the normal bell-shaped distribution curve, in which meltdowns are very rare, the stockmarket crash of 1987, the interest-rate turmoil of 1992 and the 2008 crash would each be expected only once in the lifetime of the universe.

This is changing the way many financial firms think about risk, says Greg Case, chief executive of Aon, an insurance broker. Before the crisis they were looking at things like pandemics, cyber-security and terrorism as possible causes of black swans. Now they are turning to risks from within the system, and how they can become amplified in combination.

Cheap as chips, and just as bad for you

It would, though, be simplistic to blame the crisis solely, or even mainly, on sloppy risk managers or wild-eyed quants. Cheap money led to the wholesale underpricing of risk; America ran negative real interest rates in 2002-05, even though consumer-price inflation was quiescent. Plenty of economists disagree with the recent assertion by Ben Bernanke, chairman of the Federal Reserve, that the crisis had more to do with lax regulation of mortgage products than loose monetary policy.

Equally damaging were policies to promote home ownership in America using Fannie Mae and Freddie Mac, the country's two mortgage giants. They led the duo to binge on securities backed by shoddily underwritten loans.

In the absence of strict limits, higher leverage followed naturally from low interest rates. The debt of America's financial firms ballooned relative to the overall economy (see chart 1). At the peak of the madness, the median large bank had borrowings of 37 times its equity, meaning it could be wiped out by a loss of just 2-3% of its assets. Borrowed money allowed investors to fake "alpha", or above-market returns, says Benn Steil of the Council on Foreign Relations.

The agony was compounded by the proliferation of short-term debt to support illiquid long-term assets, much of it issued beneath the regulatory radar in highly leveraged "shadow" banks, such as structured investment vehicles. When markets froze, sponsoring entities, usually banks, felt morally obliged to absorb their losses. "Reputation risk was shown to have a very real financial price," says Doug Roeder of the Office of the Comptroller of the Currency, an American regulator.

Everywhere you looked, moreover, incentives were misaligned. Firms deemed "too big to fail" nestled under implicit guarantees. Sensitivity to risk was dulled by the "Greenspan put", a belief that America's Federal Reserve would ride to the rescue with lower rates and liquidity support if needed. Scrutiny of borrowers was delegated to rating agencies, who were paid by the debt-issuers. Some products were so complex, and the chains from borrower to end-investor so long, that thorough due diligence was impossible. A proper understanding of a typical collateralised debt obligation (CDO), a structured bundle of debt securities, would have required reading 30,000 pages of documentation.

Fees for securitisers were paid largely upfront, increasing the temptation to originate, flog and forget. The problems with bankers' pay went much wider, meaning that it was much better to be an employee than a shareholder (or, eventually, a taxpayer picking up the bail-out tab). The role of top executives' pay has been overblown. Top brass at Lehman Brothers and American International Group (AIG) suffered massive losses when share prices tumbled. A recent study found that banks where chief executives had more of their wealth tied up in the firm performed worse, not better, than those with apparently less strong incentives. One explanation is that they took risks they thought were in shareholders' best interests, but were proved wrong. Motives lower down the chain were more suspect. It was too easy for traders to cash in on short-term gains and skirt responsibility for any time-bombs they had set ticking.

Asymmetries wreaked havoc in the vast over-the-counter derivatives market, too, where even large dealing firms lacked the information to determine the consequences of others failing. Losses on contracts linked to Lehman turned out to be modest, but nobody knew that when it collapsed in September 2008, causing panic. Likewise, it was hard to gauge the exposures to "tail" risks built up by sellers of swaps on CDOs such as AIG and bond insurers. These were essentially put options, with limited upside and a low but real probability of catastrophic losses.

Another factor in the build-up of excessive risk was what Andy Haldane, head of financial stability at the Bank of England, has described as "disaster myopia". Like drivers who slow down after seeing a crash but soon speed up again, investors exercise greater caution after a disaster, but these days it takes less than a decade to make them reckless again. Not having seen a debt-market crash since 1998, investors piled into ever riskier securities in 2003-07 to maintain yield at a time of low interest rates. Risk-management models reinforced this myopia by relying too heavily on recent data samples with a narrow distribution of outcomes, especially in subprime mortgages.

A further hazard was summed up by the assertion in 2007 by Chuck Prince, then Citigroup's boss, that "as long as the music is playing, you've got to get up and dance." Performance is usually judged relative to rivals or to an industry benchmark, encouraging banks to mimic each other's risk-taking, even if in the long run it benefits no one. In mortgages, bad lenders drove out good ones, keeping up with aggressive competitors for fear of losing market share. A few held back, but it was not easy: when JPMorgan sacrificed five percentage points of return on equity in the short run, it was lambasted by shareholders who wanted it to "catch up" with zippier-looking rivals.

An overarching worry is that the complexity of today's global financial network makes occasional catastrophic failure inevitable. For example, the market for credit derivatives galloped far ahead of its supporting infrastructure. Only now are serious moves being made to push these contracts through central clearing-houses which ensure that trades are properly collateralised and guarantee their completion if one party defaults.

Network overload

The push to allocate capital ever more efficiently over the past 20 years created what Till Guldimann, the father of VAR and vice-chairman of SunGard, a technology firm, calls "capitalism on steroids". Banks got to depend on the modelling of prices in esoteric markets to gauge risks and became adept at gaming the rules. As a result, capital was not being spread around as efficiently as everyone believed.

Big banks had also grown increasingly interdependent through the boom in derivatives, computer-driven equities trading and so on. Another bond was cross-ownership: at the start of the crisis, financial firms held big dollops of each other's common and hybrid equity. Such tight coupling of components increases the danger of "non-linear" outcomes, where a small change has a big impact. "Financial markets are not only vulnerable to black swans but have become the perfect breeding ground for them," says Mr Guldimann. In such a network a firm's troubles can have an exaggerated effect on the perceived riskiness of its trading partners. When Lehman's credit-default spreads rose to distressed levels, AIG's jumped by twice what would have been expected on its own, according to the International Monetary Fund.

Mr Haldane has suggested that these knife-edge dynamics were caused not only by complexity but also—paradoxically—by homogeneity. Banks, insurers, hedge funds and others bought smorgasbords of debt securities to try to reduce risk through diversification, but the ingredients were similar: leveraged loans,

American mortgages and the like. From the individual firm's perspective this looked sensible. But for the system as a whole it put everyone's eggs in the same few baskets, as reflected in their returns (see chart 2).

Efforts are now under way to deal with these risks. The Financial Stability Board, an international group of regulators, is trying to co-ordinate global reforms in areas such as capital, liquidity and mechanisms for rescuing or dismantling troubled banks. Its biggest challenge will be to make the system more resilient to the failure of giants. There are deep divisions over how to set about this, with some favouring tougher capital requirements, others break-ups, still others—including America—a combination of remedies.

In January President Barack Obama shocked big banks by proposing a tax on their liabilities and a plan to cap their size, ban "proprietary" trading and limit their involvement in hedge funds and private equity. The proposals still need congressional approval. They were seen as energising the debate about how to tackle dangerously large firms, though the reaction in Europe was mixed.

Regulators are also inching towards a more "systemic" approach to risk. The old supervisory framework assumed that if the 100 largest banks were individually safe, then the system was too. But the crisis showed that even well-managed firms, acting prudently in a downturn, can undermine the strength of all.

The banks themselves will have to find a middle ground in risk management, somewhere between gut feeling and number fetishism. Much of the progress made in quantitative finance was real enough, but a firm that does not understand the flaws in its models is destined for trouble. This special report will argue that rules will have to be both tightened and better enforced to avoid future crises—but that all the reforms in the world will never guarantee total safety.

Economist.com SPECIAL REPORTS

Number-crunchers crunched

Feb 11th 2010
From The Economist print edition

The uses and abuses of mathematical models

IT PUT noses out of joint, but it changed markets for good. In the mid-1970s a few progressive occupants of Chicago's options pits started trading with the aid of sheets of theoretical prices derived from a model and sold by an economist called Fisher Black. Rivals, used to relying on their wits, were unimpressed. One model-based trader complained of having his papers snatched away and being told to "trade like a man". But the strings of numbers caught on, and soon derivatives exchanges hailed the Black-Scholes model, which used share and bond prices to calculate the value of derivatives, for helping to legitimise a market that had been derided as a gambling den.

Thanks to Black-Scholes, options pricing no longer had to rely on educated guesses. Derivatives trading got a huge boost and quants poured into the industry. By 2005 they accounted for 5% of all finance jobs, against 1.2% in 1980, says Thomas Philippon of New York University—and probably a much higher proportion of pay. By 2007 finance was attracting a quarter of all graduates from the California Institute of Technology.

These eggheads are now in the dock, along with their probabilistic models. In America a congressional panel is investigating the models' role in the crash. *Wired*, a publication that can hardly be accused of technophobia, has described default-probability models as "the formula that killed Wall Street". Long-standing critics of risk-modelling, such as Nassim Nicholas Taleb, author of "The Black Swan", and Paul Wilmott, a mathematician turned financial educator, are now hailed as seers. Models "increased risk exposure instead of limiting it", says Mr Taleb. "They can be worse than nothing, the equivalent of a dangerous operation on a patient who would stand a better chance if left untreated."

Not all models were useless. Those for interest rates and foreign exchange performed roughly as they were meant to. However, in debt markets they failed abjectly to take account of low-probability but high-impact events such as the gut-wrenching fall in house prices.

The models went particularly awry when clusters of mortgage-backed securities were further packaged into collateralised debt obligations (CDOs). In traditional products such as corporate debt, rating agencies employ basic credit analysis and judgment. CDOs were so complex that they had to be assessed using specially designed models, which had various faults. Each CDO is a unique mix of assets, but the assumptions about future defaults and mortgage rates were not closely tailored to that mix, nor did they factor in the tendency of assets to move together in a crisis.

The problem was exacerbated by the credit raters' incentive to accommodate the issuers who paid them. Most financial firms happily relied on the models, even though the expected return on AAA-rated tranches was suspiciously high for such apparently safe securities. At some banks, risk managers who questioned the rating agencies' models were given short shrift. Moody's and Standard & Poor's were assumed to know best. For people paid according to that year's revenue, this was understandable. "A lifetime of wealth was only one model away," sneers an American regulator.

Moreover, heavy use of models may have changed the markets they were supposed to map, thus undermining the validity of their own predictions, says Donald MacKenzie, an economic sociologist at the University of Edinburgh. This feedback process is known as counter-performativity and had been noted before, for instance with Black-Scholes. With CDOs the models' popularity boosted demand, which lowered the quality of the asset-backed securities that formed the pools' raw material and widened the gap between expected and actual defaults (see chart 3).

Never mind the quality 3

CDOs of subprime-mortgage-backed securities
Issued in 2005-07, %

	Estimated 3-year default rate	Actual default rate
AAA	0.001	0.10
AA+	0.01	1.68
AA	0.04	8.16
AA-	0.05	12.03
A+	0.06	20.96
A	0.09	29.21
A-	0.12	36.65
BBB+	0.34	48.73
BBB	0.49	56.10
BBB-	0.88	66.67

Source: Donald MacKenzie, University of Edinburgh

A related problem was the similarity of risk models. Banks thought they were diversified, only to find that many others held comparable positions, based on similar models that had been built to comply with the Basel 2 standards, and everyone was trying to unwind the same positions at the same time. The breakdown of the models, which had been the only basis for pricing the more exotic types of security, turned risk into full-blown uncertainty (and thus extreme volatility).

For some, the crisis has shattered faith in the precision of models and their inputs. They failed Keynes's test that it is better to be roughly right than exactly wrong. One number coming under renewed scrutiny is "value-at-risk" (VAR), used by banks to measure the risk of loss in a portfolio of financial assets, and by regulators to calculate banks' capital buffers. Invented by eggheads at JPMorgan in the late 1980s, VAR has grown steadily in popularity. It is the subject of more than 200 books. What makes it so appealing is that its complex formulae distil the range of potential daily profits or losses into a single dollar figure.

Only so far with VAR

Frustratingly, banks introduce their own quirks into VAR calculations, making comparison difficult. For example, Morgan Stanley's VAR for the first quarter of 2009 by its own reckoning was $115m, but using Goldman Sachs's method it would have been $158m. The bigger problem, though, is that VAR works only for liquid securities over short periods in "normal" markets, and it does not cover catastrophic outcomes. If you have $30m of two-week 1% VAR, for instance, that means there is a 99% chance that you will not lose more than that amount over the next fortnight. But there may be a huge and unacknowledged threat lurking in that 1% tail.

So chief executives would be foolish to rely solely, or even primarily, on VAR to manage risk. Yet many managers and boards continue to pay close attention to it without fully understanding the caveats—the equivalent of someone who cannot swim feeling confident of crossing a river having been told that it is, on average, four feet deep, says Jaidev Iyer of the Global Association of Risk Professionals.

Regulators are encouraging banks to look beyond VAR. One way is to use CoVAR (Conditional VAR), a measure that aims to capture spillover effects in troubled markets, such as losses due to the distress of others. This greatly increases some banks' value at risk. Banks are developing their own enhancements. Morgan Stanley, for instance, uses "stress" VAR, which factors in very tight liquidity constraints.

Like its peers, Morgan Stanley is also reviewing its stress testing, which is used to consider extreme situations. The worst scenario envisaged by the firm turned out to be less than half as bad as what actually happened in the markets. JPMorgan Chase's debt-market stress tests foresaw a 40% increase in corporate spreads, but high-yield spreads in 2007-09 increased many times over. Others fell similarly short. Most banks' tests were based on historical crises, but this assumes that the future will be similar to the past. "A repeat of any specific market event, such as 1987 or 1998, is unlikely to be the way that a future crisis will unfold," says Ken deRegt, Morgan Stanley's chief risk officer.

Faced with either random (and therefore not very believable) scenarios or simplistic models that neglect

fat-tail risks, many find themselves in a "no-man's-land" between the two, says Andrew Freeman of Deloitte (and formerly a journalist at *The Economist*). Nevertheless, he views scenario planning as a useful tool. A firm that had thought about, say, the mutation of default risk into liquidity risk would have had a head start over its competitors in 2008, even if it had not predicted precisely how this would happen.

To some, stress testing will always seem maddeningly fuzzy. "It has so far been seen as the acupuncture-and-herbal-remedies corner of risk management, though perceptions are changing," says Riccardo Rebonato of Royal Bank of Scotland, who is writing a book on the subject. It is not meant to be a predictive tool but a means of considering possible outcomes to allow firms to react more nimbly to unexpected developments, he argues. Hedge funds are better at this than banks. Some had thought about the possibility of a large broker-dealer going bust. At least one, AQR, had asked its lawyers to grill the fund's prime brokers about the fate of its assets in the event of their demise.

Some of the blame lies with bank regulators, who were just as blind to the dangers ahead as the firms they oversaw. Sometimes even more so: after the rescue of Bear Stearns in March 2008 but before Lehman's collapse, Morgan Stanley was reportedly told by supervisors at the Federal Reserve that its doomsday scenario was too bearish.

The regulators have since become tougher. In America, for instance, banks have been told to run stress tests with scenarios that include a huge leap in interest rates. A supervisors' report last October fingered some banks for "window-dressing" their tests. Officials are now asking for "reverse" stress testing, in which a firm imagines it has failed and works backwards to determine which vulnerabilities caused the hypothetical collapse. Britain has made this mandatory. Bankers are divided over its usefulness.

Slicing the Emmental

These changes point towards greater use of judgment and less reliance on numbers in future. But it would be unfair to tar all models with the same brush. The CDO fiasco was an egregious and relatively rare case of an instrument getting way ahead of the ability to map it mathematically. Models were "an accessory to the crime, not the perpetrator", says Michael Mauboussin of Legg Mason, a money manager.

As for VAR, it may be hopeless at signalling rare severe losses, but the process by which it is produced adds enormously to the understanding of everyday risk, which can be just as deadly as tail risk, says Aaron Brown, a risk manager at AQR. Craig Broderick, chief risk officer at Goldman Sachs, sees it as one of several measures which, although of limited use individually, together can provide a helpful picture. Like a slice of Swiss cheese, each number has holes, but put several of them together and you get something solid.

Modelling is not going away; indeed, number-crunchers who are devising new ways to protect investors from outlying fat-tail risks are gaining influence. Pimco, for instance, offers fat-tail hedging programmes for mutual-fund clients, using cocktails of options and other instruments. These are built on specific risk factors rather than on the broader and increasingly fluid division of assets between equities, currencies, commodities and so on. The relationships between asset classes "have become less stable", says Mohamed El-Erian, Pimco's chief executive. "Asset-class diversification remains desirable but is not sufficient."

Illustration by Tim Marrs

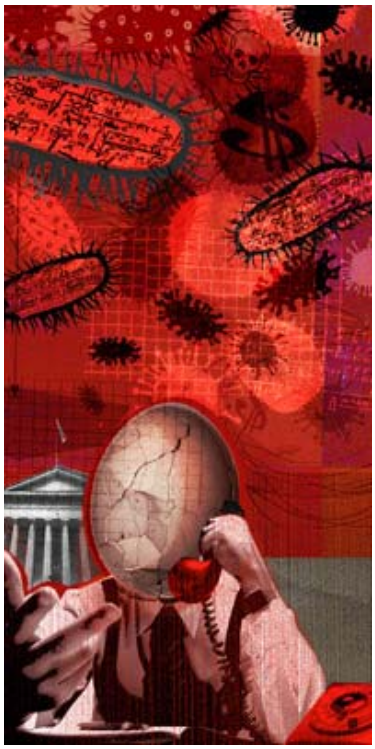
Not surprisingly, more investors are now willing to give up some upside for the promise of protection against catastrophic losses. Pimco's clients are paying up to 1% of the value of managed assets for the hedging—even though, as the recent crisis showed, there is a risk that insurers will not be able to pay out. Lisa Goldberg of MSCI Barra reports keen interest in the analytics firm's extreme-risk model from hedge funds, investment banks and pension plans.

In some areas the need may be for more computing power, not less. Financial firms already spend more than any other industry on information technology (IT): some $500 billion in 2009, according to Gartner, a consultancy. Yet the quality of information filtering through to senior managers is often inadequate.

A report by bank supervisors last October pointed to poor risk "aggregation": many large banks simply do not have the systems to present an up-to-date picture of their firm-wide links to borrowers and trading partners. Two-thirds of the banks surveyed said they were only "partially" able (in other words, unable) to aggregate their credit risks. The Federal Reserve, leading stress tests on American banks last spring, was shocked to find that some of them needed days to calculate their exposure to derivatives counterparties.

To be fair, totting up counterparty risk is not easy. For each trading partner the calculations can involve many different types of contract and hundreds of legal

entities. But banks will have to learn fast: under new international proposals, they will for the first time face capital charges on the creditworthiness of swap counterparties.



The banks with the most dysfunctional systems are generally those, such as Citigroup, that have been through multiple marriages and ended up with dozens of “legacy” systems that cannot easily communicate with each other. That may explain why some Citi units continued to pile into subprime mortgages even as others pulled back.

In the depths of the crisis some banks were unaware that different business units were marking the same assets at different prices. The industry is working to sort this out. Banks are coming under pressure to appoint chief data officers who can police the integrity of the numbers, separate from chief information officers who concentrate on system design and output.

Some worry that the good work will be cast aside. As markets recover, the biggest temptation will be to abandon or scale back IT projects, allowing product development to get ahead of the supporting technology infrastructure, just as it did in the last boom.

The way forward is not to reject high-tech finance but to be honest about its limitations, says Emanuel Derman, a professor at New York’s Columbia University and a former quant at Goldman Sachs. Models should be seen as metaphors that can enlighten but do not describe the world perfectly. Messrs Derman and Wilmott have drawn up a modeller’s Hippocratic oath which pledges, among other things: “I will remember that I didn’t make the world, and it doesn’t satisfy my equations,” and “I will never sacrifice reality for elegance without explaining why I have done so.” Often the problem is not complex finance but the people who practise it, says Mr Wilmott. Because of their love of puzzles, quants lean towards technically brilliant rather than sensible solutions and tend to over-engineer: “You may need a plumber but you get a professor of fluid dynamics.”

One way to deal with that problem is to self-insure. JPMorgan Chase holds $3 billion of “model-uncertainty reserves” to cover mishaps caused by quants who have been too clever by half. If you can make provisions for bad loans, why not bad maths too?

Economist.com **SPECIAL REPORTS**

Cinderella's moment

Feb 11th 2010
From The Economist print edition

Risk managers to the fore

Illustration by Tim Marrs

IN A speech delivered to a banking-industry conference in Geneva in December 2006, Madelyn Antoncic issued a warning and then offered some reassurance. With volatility low, corporate credit spreads growing ever tighter and markets all but ignoring bad news, there was, she said, “a seemingly overwhelming sense of complacency”. Nevertheless, she insisted that the firm she served as chief risk officer, Lehman Brothers, was well placed to ride out any turbulence, thanks to a keen awareness of emerging threats and a rock-solid analytical framework.

Behind the scenes, all was not well. Ms Antoncic, a respected risk manager with an economics PhD, had expressed unease at the firm’s heavy exposure to commercial property and was being sidelined, bit by bit, by the firm’s autocratic boss, Dick Fuld. Less than two months after her speech she was pushed aside.

Lehman’s story ended particularly badly, but this sort of lapse in risk governance was alarmingly common during the boom. So much for the notion, generally accepted back then, that the quality of banks’ risk regimes had, like car components, converged around a high standard. “The variance turned out to be shocking,” says Jamie Dimon, chief executive of JPMorgan Chase.

The banks that fared better, including his own, relied largely on giving their risk-managing roundheads equal status with the risk-taking cavaliers. That was not easy. In happy times, when risk seems low, power shifts from risk managers to traders. Sales-driven cultures are the natural order of things on Wall Street and in the City. Discouraging transactions was frowned upon, especially at firms trying to push their way up capital-markets league tables. Risk managers who said no put themselves on a collision course with the business head and often the chief executive too.

At some large banks that subsequently suffered big losses, such as HBOS and Royal Bank of Scotland (RBS), credit committees, which vetted requests for big loans, could be formed on an ad hoc basis from a pool of eligible members. If the committee’s chairman, typically a business-line head, encountered resistance from a risk manager or other sceptic, he could adjourn the meeting, then reconstitute the committee a week or two

later with a more pliable membership that would approve the loan.

Another common trick was for a business line to keep quiet about a proposal on which it had been working for weeks until a couple of hours before the meeting to approve it, so the risk team had no time to lodge convincing objections. Exasperated roundheads would occasionally resort to pleading with regulators for help. In the years before the crash the Basel Committee of bank supervisors reportedly received several requests from risk managers to scrutinise excessive risk-taking at their institutions that they felt powerless to stop.

Many banks' failings exposed the triumph of form over substance. In recent years it had become popular to appoint a chief risk officer to signal that the issue was receiving attention. But according to Leo Grepin of McKinsey, "it was sometimes a case of management telling him, 'you tick the boxes on risk, and we'll worry about generating revenue'."

Since 2007 banks have been scrambling to convince markets and regulators that they will continue to take risk seriously once memories of the crisis fade. Some are involving risk officers in talks about new products and strategic moves. At HSBC, for instance, they have had a bigger role in vetting acquisitions since the bank's American retail-banking subsidiary, bought in 2003, suffered heavy subprime-mortgage losses. "Everyone should now see that the risk team needs to be just as involved on the returns side as on the risk side," says Maureen Miskovic, chief risk officer at State Street, an American bank.

Glamming up

Ms Miskovic is one of an emerging breed of more powerful risk officers. They are seen as being on a par with the chief financial officer, get a say in decisions on pay and have the ear of the board, whose agreement is increasingly needed to remove them. Some report directly to a board committee as well as—or occasionally instead of—to the chief executive.

For many, the biggest task is to dismantle cumbersome "silos", says Ken Chalk of America's Risk Management Association. Risks were often stuffed into convenient but misleading pigeonholes. Banks were slow to refine their approach, even as growing market complexity led some of the risks to become interchangeable.

Take the growth of traded credit products, such as asset-backed securities and CDOs made up of them. Credit-risk departments thought of them as market risk, because they sat in the trading book. Market-risk teams saw them as credit instruments, since the underlying assets were loans. This buck-passing proved particularly costly at UBS, which lost SFr36 billion ($34 billion) on CDOs. Many banks are now combining their market- and credit-risk groups, as HSBC did last year.

For all the new-found authority of risk managers, it can still be hard to attract talent to their ranks. The job is said to have the risk profile of a short option position with unlimited downside and limited upside—something every good risk manager should avoid. Moreover, it lacks glamour. Persuading a trader to move to risk can be "like asking a trapeze artist to retrain as an accountant", says Barrie Wilkinson of Oliver Wyman, a consultancy.

A question of culture

Besides, there is more to establishing a solid risk culture than empowering risk officers. Culture is a slippery concept, but it matters. "Whatever causes the next crisis, it will be different, so you need something that can deal with the unexpected. That's culture," says Colm Kelleher of Morgan Stanley. One necessary ingredient is a tradition of asking and repeating questions until a clear answer emerges, suggests Clayton Rose, a banker who now teaches at Harvard Business School.

The tone is set at the top, for better or worse. At the best-run banks senior figures spend as much time fretting over risks as they do salivating at opportunities (see article). By contrast, Lehman's Mr Fuld talked of "protecting mother" but was drawn to the glister of leveraged deals. Stan O'Neal, who presided over giant losses at Merrill Lynch, was more empire-builder than risk manager. But imperial bosses and sound risk cultures sometimes go together, as at JPMorgan and Banco Santander.

A soft-touch boss can be more dangerous than a domineering one. Under Chuck Prince, who famously learned only in September 2007 that Citigroup was sitting on $43 billion of toxic assets, the lunatics were able to take over the asylum. Astonishingly, the head of risk reported not to Mr Prince or the board, but to a newly hired executive with a background in corporate-governance law, not cutting-edge finance.

Another lesson is that boards matter too. Directors' lack of engagement or expertise played a big part in some of the worst slip-ups, including Citi's. The "sociology" of big banks' boards also had something to do with it, says Ingo Walter of New York's Stern School of Business: as the members bonded, dissidents felt pressure to

toe the line.

Too few boards defined the parameters of risk oversight. In a survey last year Deloitte found that only seven of 30 large banks had done so in any detail. Everyone agrees that boards have a critical role to play in determining risk appetite, but a recent report by a group of global regulators found that many were reluctant to do this.

Boards could also make a better job of policing how (or even whether) banks adjust for risk in allocating capital internally. Before the crisis some boards barely thought about this, naively assuming that procedures for it were well honed. A former Lehman board member professes himself “astonished”, in retrospect, at how some of the risks in the company’s property investments were brushed aside when assessing expected returns. The survivors are still struggling to create the sort of joined-up approach to risk adjustment that is common at large hedge funds, admits one Wall Street executive.

Board games

Robert Pozen, head of MFS Investment Management, an American asset manager, thinks bank boards would be more effective with fewer but more committed members. Cutting their size to 4-8, rather than the 10-18 typical now, would foster more personal responsibility. More financial-services expertise would help too. After the passage of the Sarbanes-Oxley act in 2002 banks hired more independent directors, many of whom lacked relevant experience. The former spymaster on Citi’s board and the theatrical impresario on Lehman’s may have been happy to ask questions, but were they the right ones?

Under regulatory pressure, banks such as Citi and Bank of America have hired more directors with strong financial-services backgrounds. Mr Pozen suggests assembling a small cadre of financially fluent “super-directors” who would meet more often—say, two or three days a month rather than an average of six days a year, as now—and may serve on only one other board to ensure they take the job seriously.

That sounds sensible, but the case for another suggested reform—creating independent risk committees at board level—is less clear. At some banks risk issues are handled perfectly well by the audit committee or the full board. Nor is there a clear link between the frequency of risk-related meetings and a bank’s performance. At Spain’s Santander the relevant committee met 102 times in 2008. Those of other banks that emerged relatively unscathed, such as JPMorgan and Credit Suisse, convened much less often.

Moreover, some of the most important risk-related decisions of the next few years will come from another corner: the compensation committee. It is not just investment bankers and top executives whose pay structures need to be rethought. In the past, risk managers’ pay was commonly determined or heavily influenced by the managers of the trading desks they oversaw, or their bonus linked to the desks’ performance, says Richard Apostolik, who heads the Global Association of Risk Professionals (GARP). Boards need to eliminate such conflicts of interest.

Meanwhile risk teams are being beefed up. Morgan Stanley, for instance, is increasing its complement to 450, nearly double the number it had in 2008. The GARP saw a 70% increase in risk-manager certifications last year. Risk is the busiest area for financial recruiters, says Tim Holt of Heidrick & Struggles, a firm of headhunters. When boards are looking for a new chief executive, they increasingly want someone who has been head of risk as well as chief financial officer, which used to be the standard requirement, reckons Mike Woodrow of Risk Talent Associates, another headhunting firm.

The big question is whether this interest in controlling risk will fizzle out as economies recover. Experience suggests that it will. Bankers say this time is different—but they always do.

Economist.com SPECIAL REPORTS

A matter of principle

Feb 11th 2010
From The Economist print edition

Why some banks did much better than others

JPMORGAN CHASE managed to avoid big losses largely thanks to the tone set by its boss, Jamie Dimon. A voracious reader of internal reports, he understands financial arcana and subjects staff to detailed questioning. PowerPoint presentations are discouraged, informal discussions of what is wrong, or could go wrong, encouraged. These "soft" principles are supplemented by a hard-headed approach to the allocation of capital. Though the bank suffered painful losses in leveraged loans, it was not tripped up by CDOs or structured investment vehicles (SIVs), even though it had been instrumental in developing both products. Nor was it heavily exposed to AIG, an insurance giant that got into trouble.

This was not because it saw disaster coming, says Bill Winters, former co-head of the firm's investment bank, but because it stuck by two basic principles: don't hold too much of anything, and only keep what you are sure will generate a decent risk-adjusted return. The bank jettisoned an SIV and $60 billion of CDO-related risks because it saw them as too dicey, at a time when others were still keen to snap them up. It also closed 60 credit lines for other SIVs and corporate clients when it realised that these could be simultaneously drawn down if the bank's credit rating were cut. And it took a conservative view of risk-mitigation. Hedging through bond insurers, whose finances grew shaky as the crisis spread, was calculated twice: once assuming the hedge would hold, and again assuming it was worthless.

Goldman Sachs's risk management stood out too—unlike the public-relations skills it subsequently displayed. Steered by its chief financial officer, David Viniar, the firm's traders began reducing their exposure to mortgage securities months before subprime defaults began to explode. More willing than rivals to take risks, Goldman is also quicker to hedge them. In late 2006 it spent up to $150m—one-eighth of that quarter's operating profit—hedging exposure to AIG.

The firm promotes senior traders to risk positions, making clear that such moves are a potential stepping stone to the top. Traders are encouraged to nurture the risk manager in them: Gary Cohn, the firm's president, rose to the top largely because of his skill at hedging "tail" risks. Crucially, Goldman generally does not fire its risk managers after a crisis, allowing them to learn from the experience. Yet despite everything, it still needed government help to survive.

By contrast, UBS's risk culture was awful. Its investment bank was free to bet with subsidised funds, since transfers from the private bank were deeply underpriced. It confused itself by presenting risk in a "net and forget" format. Trading desks would estimate the maximum possible loss on risky assets, hedge it and then record the net risk as minimal, inadvertently concealing huge tail risks in the gross exposure. And it moved its best traders to a hedge fund, leaving the B-team to manage the bank's positions.

Publicly humbled by a frank report on its failings, the bank has made a raft of changes. Risk controllers have been handed more power. Oswald Grübel, the chief executive, has said that if his newish risk chief, Philip Lofts, rejects a transaction he will never overrule him. If the two disagree, Mr Lofts must inform the board, which no longer delegates risk issues to a trio of long-time UBS employees. A new, independent risk committee is bristling with risk experts. Whether all this amounts to a "new paradigm", as Mr Lofts claims, remains to be seen.