

# AFTER THE CRISIS: *Re-engineering Risk Management?*

Thoughts from market experts including senior fellows and members of the board of directors of International Association of Financial Engineers (IAFE)

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## An IAFE survey in cooperation with SunGard Adaptiv

The recent financial crisis exposed many flaws in the business procedures and incentive models within the global financial sector. After more than 20 months of analysis, debate, bail out plans, and crisis talks; local, global, internal, and public scrutiny have left us speculating whether the financial sector will ever regain its reputation. Meanwhile proposals for global regulation from nation states (particularly the US and UK), international entities (such as the EU, BIS, G20, IMF), and private institutions (such as ISDA and IOSCO), are forcing institutions to look into every aspect of their risk management functions. This paper gathers the thoughts and opinions of senior fellows and members of the board of directors of the International Association of Financial Engineers (IAFE) who talk openly about the issues surrounding the stability of the financial engineering community and what needs to be done to control the complexity of financial risk management.

Following the crisis, risk management has resumed its Jekyll and Hyde character. Questions about the inadequacy of historical approaches to risk management have been tempered by a need to improve risk management practices in the face of industry jarring volatility. So to gather the pulse of the industry, and perhaps suggest critical trends and directions for the discipline we call financial risk management, we approached our elite team of experts – the senior fellows and board of directors of IAFE and past winners of our coveted Financial Engineer of the Year award. The experts we surveyed included:

### Board Members

- Steve Allen – Practitioner
- Tanya Beder – Practitioner
- Giovanni Beliossi – Practitioner
- Stephen Figlewski – Academic
- Richard Lindsey – Practitioner and Former Academic
- Leslie Rahl – Practitioner
- David Rowe – Practitioner
- Andrew Weisman – Practitioner

### FEOY Winners

- 1999 John Hull – Academic
- 2000 Emanuel Derman – Practitioner and Academic
- 2001 Andrew Lo – Practitioner and Academic
- 2003 Darrell Duffie – Academic
- 2005 Phelim Boyle – Academic
- 2007 Jack Treynor – Practitioner
- 2008 Robert Litterman – Practitioner
- 2009 Richard Roll – Practitioner and Academic

### WAS FINANCIAL ENGINEERING TO BLAME?

The charge that the complexity of financially engineered products overwhelmed the ability of the system to cope with risk is often made in the press and media. However, our panel of experts is skeptical and point to less systemic causes. For example, Weisman noted that rather than complexity per se the problem was the sensitivity of pricing to specific assumptions:

*“While certain instruments required the use/support of relatively complex pricing models in order to arrive at defensible pricing, it is well known that subtle changes to input assumptions in such models can frequently bring about radical price changes. Additionally it is well understood that securities with poorly developed secondary markets can have greatly varying prices depending on short-lived supply/demand considerations.” [Weisman].*

On a related note, the systems’ and managements’ inability to deal with magnitude of losses in a short time period was viewed as a major problem by several. The views of Stephen Figlewski were typical:

*“I don’t think the biggest problem was complexity. I think it was that there was a lot more risk than people expected. The system’s inability to cope with losses of the magnitude that hit it was the problem. Firms took bigger hits than they thought were possible and lost their*

capital. With greatly reduced capital compounded by the need to reduce leverage, there was no way to deal even with products as simple as overnight repo loans. [Figlewski]

Echoing this theme, Hull also argues that complexity was not the problem:

*"The vast majority of the OTC derivatives that trade are relatively straightforward and are either (a) entered into by an end user with a derivatives dealer to manage the end user's exposure or (b) entered into by a derivatives dealer with another market participant to manage the dealer's exposure arising from its trading with end users." [Hull]*

Not surprisingly in consequence, many of our commentators felt that kneejerk regulatory responses limiting the use of even more complex derivatives may only be damaging. Consider Hull again:

*"It would be a mistake to imagine that regulating OTC markets will somehow automatically prevent similar crises in the future. The crisis was caused by a mixture of macroeconomic events, government policies, the relaxation of mortgage lending standards in the US, and a failure of regulation." [Hull]*

In general our commentators were in favour of specific, well thought out technical improvements. For example, most of our risk panel supported moving standardized OTC transactions towards central clearing parties (CCPs) even though doubting that it would be a panacea. Some of our commentators noted that complexity was always conditional on the ability of our systems and processes to handle it, and that too often, different parts of the system had not developed at the same speed as the front office, and that management ultimately had to take responsibility. For example, Tanya Beder noted:

*"The infrastructure, supervisory oversight and governance within firms lagged the market (without excuse on the part of firms themselves, regulators should be allowed some lag due to staffing and resource constraints). In my opinion it is the responsibility of senior management and boards to ensure that firms engage in activities that are in accord with their abilities, capabilities and infrastructure." [Beder]*

One of our commentators Leslie Rahl, argued that complexity should be viewed explicitly as a risk that should be addressed in their risk calculations, and furthermore that:

*"Complexity should be avoided unless strictly necessary and regulators should have a skeptical view toward complexity" [Rahl].*

When asked if the appropriate regulatory response is to control or limit complexity, most of our experts argued for additional risk controls and regulatory capital, even in some cases explicitly incorporating "complexity" and "liquidity" into risk measures. Leslie Rahl talked about embedding "complexity" in Basel capital calculations and encouraging others to explicitly gross up VaR and other risk metrics to account for "complexity" [Rahl]. Most however looked on better pricing and improved risk controls as the best answer to the issue of complexity. For example, Andrew Weisman talked about the need for "mandated pricing and risk controls that are based on informed judgments that take into account the known liquidity characteristics and pricing variability of securities involved" [Weisman].

One area of regulation that was generally seen as much needed was a restriction on unscrupulous sales of complex structures to retail consumers. Consider the thoughts of Stephen Figlewski, who argued for "stronger consumer protection to make it harder for unscrupulous operators to sell snake oil to the truly naive would be good" [Figlewski].

What was consistently clear, was that "complexity can in no sense be **"outlawed"** [Figlewski] and that we had to move forward with organizational and technological change rather than move backwards. Tanya Beder put it clearly:

*"I think it is impossible to put the financial engineering genie back in the bottle. I believe this would cost more to economies than 'upping' the requirements for firms who engage in complex products and the penalties for firms whose management claims they did not understand what was going on in the firm below them. Regulators should demand more from the senior management and boards. An open question in my mind is the degree to which financial firms with government guarantees (e.g.*

*deposit insurance or pension scheme guarantees) should be allowed to engage in substantial risk taking (perhaps measured by risk-weighted capital)."* [Beder]

When asked whether the complexity of major financial organizations significantly affects systemic risk, most of our correspondents agreed but argued that appropriately trained and incentivized senior executives were the primary defense rather than additional restrictions or capital charges. For example, Weisman noted:

*"Senior executives of large complex financial institutions, involved in risk-taking through the use of complex securities should be required to have the necessary training to evaluate the primary risks assumed by the firms they purport to manage. In my experience the most significant risks assumed by large financial institutions were relatively easy to identify. However, lax corporate governance and poor incentive structures encouraged behavior that, while rational on a personal basis, was not rational at the corporate level."* [Weisman]

Similarly Tanya Beder noted that systemic risk was much influenced *"to the degree that the senior management and/or the board is not (nor seen to be) on top of what is going on in their organizations."* [Beder]

Most of our respondents did believe that addressing the *"too big to be allowed to fail"* problem was an urgent priority, although many suggested the problem needed to be recast in terms other than size. For example Weisman noted that *"the size and complexity of financial institutions was not the issue. Small, non-complex organizations trading in illiquid securities probably blew up in the same proportion as larger complex organizations"*. He went on: *"Too big to fail is a problem. Too connected to fail is an even bigger problem."* [Weisman]

Another common theme of our experts' comments was the need to establish an efficient resolution regime. For example, Weisman noted that *"a streamlined bankruptcy process is a good idea"* and that *"paying into a fund to facilitate such bankruptcies is a good idea as well"* [Weisman]. But as Rahl warned, *"if we make it easier for large organizations to fail, they will fail more frequently"* [Rahl] and thus a well defined resolution regime could never be sufficient.

## MARK TO MARKET

A common whipping boy of the crisis was the use of mark-to-market (MTM) accounting. Although cognizant of the difficulties, none of our respondents wanted a move away from MTM pricing. Many of our experts noted adjustments that can be used to improve naïve MTM approaches. As Allen noted – *"Mark-to-market is always appropriate, but that doesn't mean just utilizing the last quoted price without regard to size. Mark-to-market requires judgment based on liquidity considerations."* [Allen].

Putting it graphically, Weisman said: *"There are three things you never want to see being made: sausage, law, and a month-end NAV. Pricing should not be a point forecast but rather it should include a measure of dispersion."* [Weisman] Despite the criticisms, John Hull believed that *"accountants have got it more or less right with FAS 157 and IAS 39. They should not have bowed to political pressure in 2008-2009 and allowed exceptions to their rules. They are also right when they say that regulation is a separate activity from accounting and does not need to be based on the same rules."* [Hull]

In abnormal markets or in the area of OTC derivatives, the discussion of MTM was particularly sensitive. For example, Beder noted that *"in over-heated markets (e.g. CDOs in 2002-2005) where too-high prices are paid and in distressed markets where only fire sales are taking place, marking to independent, third-party models may better approximate fair value."* [Beder] John Hull went further arguing that the description of OTC markets as *"dark markets"* lacking transparency does not hold up under close examination.

*"On-line services such as Bloomberg and Reuters have done an excellent job in disseminating dealer prices to the market. It is true that the quote given by a dealer for, say, a ten-year interest rate swap may depend to a small extent on the size of the trade, the credit quality of the counterparty, and other transactions that are outstanding with the counterparty. But there are good reasons for this. The price quoted for a highly structured product may vary quite widely from dealer to dealer, but this is also to be expected and not something that regulators should be concerned about."* [Hull]

The discussion of MTM of OTC derivatives led naturally to whether some form of enhanced transparency (about product, price, volume, or exposure) might enhance the system's ability to cope with the risks of new products. Most of our respondents agreed that it would. Identifying exposures was key, noted Leslie Rahl but repeatedly our panel argued that increased transparency would be particularly effective when combined with a move from OTC to exchange traded derivatives [Allen] and in the context of appropriately trained executives, sound corporate governance, and appropriate incentive structures [Weisman].

That said, transparency is not a panacea. Beder noted that when the ratings agencies introduced volatility ratings to enhance investors' ability after the disasters with financially engineered products in the early to mid 1990s, different risks not measured by this enhanced transparency evolved. Richard Roll was concerned that poorly conceived government edicts in this area might actually make the problem worse.

When asked whether supervisors need significantly expanded, detailed (non-public) information in electronic form and the ability (expertise and computing power) to analyze systemic risks, most of our panellists agreed it would be somewhat helpful. Consider the views of Weisman:

*"Regulators should have access to such data from large financial institutions involved in certain forms of investment banking activity that are known to trigger excessive risk taking – most notably structuring mortgage-backed securities." [Weisman]*

There were doubts however of the data infrastructure available to regulators to do this effectively as Tanya Beder pointed out:

*"Identifiers should be in place for market participants. This can be done in a way that does not jeopardize confidentiality or breed front-running. However, supervisory systems, data warehousing capacity and IT staff will require a huge step up to be able to do anything with these data. It's a sad reality. At the Board of Mathematics and their Applications at the National Academies we have had presentations by major*

*departments of the government where data storage is shown with a photo of hard copy files in a warehouse and the chief data mining tool is a photo of a highlighter pen. This does not mean that I think we should give up; these departments must be given the requisite resources. But it will take major focus from a task force that includes front office spec writing to make a plan that gets anywhere." [Beder]*

## MITIGATING CRISIS

No matter what the investment in regulations, systems, few of our respondents were confident of complete success in preventing or even significantly mitigating future financial crises. The best we can do is to further improve our techniques and understanding. For example, risk management could do a better job in the future of diagnosing, and potentially capping, potential catastrophic losses by going beyond traditional VaR, which they noted is often "misused when it is calculated from the wrong probability distribution" [Roll], and incorporating more stress tests. John Hull put this plainly:

*"Clearly stress testing has a key role to play in risk management. The problem with VaR is that it acted as a substitute for senior managers within a bank using their experience and judgement to form a view on what could go wrong. VaR and stressed VaR are useful calculations, but they should be the beginning not the end of the process a bank goes through in understanding its risks. The technique of reverse stress testing needs refining, but has the potential to be useful to the committee of senior management that is charged with the task of identifying the scenarios used in stress testing." [Hull]*

But there was consensus that models (and improved models and techniques) can only represent partial solutions and, in the end, common sense combined with an enhanced risk culture will be the final determinant as to whether risk models are used appropriately by front line managers and executives. Bridging the cultures of the quant and the executive were noted by several experts as important steps, said Litterman.

*"There is a significant gap in most organizations between the level of quantitative insight of senior*

*managers and the board and that of quants and product structuring staff.” [Litterman]*

Weisman went further arguing that *“senior management should probably include competent technically-adept persons”*. [Weisman] But underlying all these issues was the problem of risk culture. Some banks take risks more seriously than others as John Hull pointed out:

*“The fundamental problem in risk management is one of risk culture. In the current environment most banks take risk management very seriously and the CRO meets frequently with the CEO. In a few years time the pendulum may swing back so that traders have more influence. How does one maintain a consistent fairly conservative risk culture within a bank? This is the \$64,000 question.” [Hull]*

In the end, Figlewski noted that improving a risk culture could only happen when institutions realize that *“Not losing \$1 million is just as valuable to a firm as making \$1 million”* thus elevating the role, recognition and appreciation of risk managers.

Nor were board members of corporations left exonerated. Some of our experts regarded the lack of quantitative expertise as a primary problem at the level of the board rather than senior executives per se, for example Hull noted that banks should take steps to ensure that these skills are also well represented in their board members. *“Board members need to know the right questions to ask and to be in a position to evaluate and follow up on the answers. Only then does it make sense for the board to provide the sort of oversight that regulators require.” [Hull]*

Clearly our respondents felt the board need to take much more active responsibility with respect to risk management. Tanya Beder believed boards should be more accountable. *“To say we had no idea is unacceptable unless it was a major NEW type of fraud that escaped numerous checks and balances.” [Beder]* And indeed Weisman argued that *“board members should be selected to provide insight and guidance to senior executives. They should be chosen to ensure a broad skill set as a collective entity. They should verify that the risk and pricing protocols of the firm are appropriate and enforced”*. [Weisman]

## SO WHAT OF THE FUTURE?

All of our respondents acknowledged the importance of a global approach and global institutions (or at least carefully coordinated national actions) to deal with systemic risk. Harmonization of national policies, to avoid regulatory arbitrage was needed, but few were confident that the path would be an easy one. When asked for the single most important policy/regulatory approach which could mitigate future systemic risk episodes, our experts made a variety of recommendations:

### 1. Predefined Government and Regulatory Responses

Weisman noted that regulators and government officials should be held to more stringent conflict of interest standards than they are currently. *“Note the AIG bailout orchestrated by a former CEO of Goldman, with a newly appointed President of AIG that was a Goldman Board Member, who then determined that a full payout on Goldman CDS was appropriate; doesn’t inspire confidence... Second, properly trained regulatory staff, access to data, and the authority to demand explanations with the ability to communicate to the markets when financial institutions are assuming outsized risks. Greater transparency with a market mechanism is the path.” [Weisman]*

### 2. Enhanced Capital Requirements

Capital constraints continue to be seen as essential regulatory tools particularly when adjusted to incorporate stress scenarios [Allen] and pro-cyclicality [Beder].

### 3. Too-Big-To-Fail

It seems size although an imperfect measure of risk, it really does matter. Litterman noted that *“regulators need to address the TBTF issue. Creditors of systemically important firms are, in effect, guaranteed by the government. This incentivizes the firm to take too much risk” [Litterman]*. Dealing with such huge institutions means giving a formal regulatory body the power and authority to worry about systemic risk and to take strong enough action to deal with it, said Figlewski. *“Leaving the bailout to Congress and an ad hoc bunch of Fed, Treasury, FDIC, SEC, and other institutions did not work well.” [Figlewski]*

#### 4. Improved Corporate Governance and Risk Management in Financial Institutions

Our panel was united in its view of the need for better risk management and governance. For example, Tanya Beder proposed: fixing the compensation systems that encourage risk taking with payouts on the upside and simply being fired on the downside after pocketing huge sums. And further she suggested encouraging standard setters and regulators alike to implement multiple measures and promote their collective value. *"Managers, boards, regulators and other overseers should be well-trained in the strengths and weaknesses of the various measures rather than having other individuals in their organizations who have these skills."* [Beder]

#### 5. Accounting Standards

None of our panellists advocated wholesale retreat from MTM, but most wanted some flexibility in the way it was applied in practice. Take Tanya Beder's views for example on the need to promote a more flexible approach to defining fair value. *"None of the single measures are the best choice across super-heated, normal and distressed market conditions. Promote more supervisory activity, and provide the necessary tools to the supervisors [both analytic and monetary] to keep up with the firms they supervise."* [Beder]

## CONCLUSIONS

The clearest conclusion to be drawn from the above discussion is that the financial crisis was far too complex to be reduced to a single cause or even a handful of factors. Similarly it would be a gross oversimplification to assume that a mere handful of remedies will be able to solve the current problems in the market or to prevent future problems. Technical improvements around MTM, centralized counterparties and capital requirements all

offer partial solutions but we cannot turn back the clock and the easy simplistic answers that appeal to politicians and their constituents are unlikely to prevent the next crisis.

Complexity is clearly an issue that must be addressed, whether at the level of the transaction, the institution, or the market as a whole. Mechanisms to limit the systemic risk embedded in these complex systems are necessary but there is no simple answer. What is clear though, is that 'complexity' should not be outlawed but carefully considered by regulators and, more importantly, by the boards of institutions – all of which need to greatly improve their understanding of modern financial products and contemporary risk management concepts. This need for education among senior management was seen as a more pressing priority than breaking up large institutions as a result of the too-big-to-fail edict, an edict which fails to take into account other factors, suggesting that too-connected-to-fail is the more critical concept.

The complexity of the market is underlined by the fact that there was a lack of consensus on some issues, such as establishing a streamlined bankruptcy process for all institutions. Nevertheless there was a clear consensus among the respondents on a series of corporate governance and oversight measures that need to be implemented in order to instill a more effective role for risk managers and to limit the fallout of negative events that will inevitably occur in the future.

These measures include the following:

- Incorporating non-normal probability distributions
- Using stress tests
- Improved risk culture
- Greater quantitative expertise at board level
- Harmonised global regulation as relates to accounting standards, enhanced capital requirements and corporate governance

### **About IAFE**

The IAFE is a not-for-profit, professional society dedicated to fostering the profession of quantitative finance by providing platforms to discuss cutting-edge and pivotal issues in the field. Founded in 1992, the IAFE is composed of individual academics and practitioners from banks, broker dealers, hedge funds, pension funds, asset managers, technology firms, regulators, accounting, consulting and law firms, and universities across the globe.

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