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Shaping the new financial services marketplace series

Risk management in the age of structured products: Lessons learned for improving risk intelligence

Produced by the Deloitte Center for Banking Soultions

Shaping the New Financial Services Marketplace

A new financial services marketplace that's very different from the old is emerging from the credit crisis. The new market will be more transparent, simplified, standardized, and regulated with fewer intermediaries.

In this series, entitled *Shaping the New Financial Services Marketplace*, the Deloitte Center for Banking Solutions will examine the rules, regulations, and operating models that evolve as the industry sails uncharted waters. Specifically, these articles will focus on: strategies for success in the new marketplace, different types of global regulatory systems, the gap between financial innovation and risk management, the burden on compliance as change occurs, and steps for integrating compliance risk management.

In this report, we examine the recent experience with structured credit products to provide a perspective on lessons learned in risk management and how those lessons can be applied by financial institutions.

Foreword

As this paper goes to press, the challenges facing the global financial services industry continue to increase. The U.S. Federal government has taken unprecedented actions, including plans to buy up to $700 billion in mortgage related assets; other governments globally are stepping in with their own stabilization efforts; and major government-sponsored entities and financial institutions have been effectively nationalized.

The situation continues to evolve and financial markets are reacting strongly as takeovers, bailouts, and other major changes continue to take place at the industry's most venerable financial institutions. Also, credit, liquidity, and capital remain in short supply. The overriding message from this escalating credit and liquidity crisis is that no one is immune.

Why were so many companies so vulnerable? Could this have been prevented? Most importantly, how can financial institutions learn from this going forward?

The outward evidence of events is well known. While many speculate as to how events were allowed to mushroom into a crisis of global impact, recognition is growing within the financial services industry that many factors coalesced into a risk management perfect storm that included:

- The high degree of complexity inherent in structured credit products and corresponding valuation and risk measurement challenges;
- A drop in trading volumes and liquidity resulting in decreased pricing transparency; and
- The magnitude of aggregate exposures and their impact on capital.

This paper explores what happened and why, using the recent experience with structured credit products as an illustration to provide a perspective on lessons learned and how those lessons can be applied by financial institutions in their quest to become truly Risk Intelligent Enterprises™.

Sincerely,

Don Ogilvie
Independent Chairman
Deloitte Center for Banking Solutions

October 2008

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Introduction

While it is tempting to lay blame on the structured credit products[1] themselves, the causes of the current environment appear to be much more far-reaching. Key underlying issues in the recent credit crisis include: the prolonged maintenance of low short-term interest rates, a resulting housing price bubble and subsequent bust, modified approaches to underwriting and a reduced emphasis on traditional underwriting standards, high levels of leverage in many areas of the financial system, valuation and risk measurement analytics which did not fully keep pace with product complexity, and questions about risk management effectiveness.

We believe it is time to take a fresh look at the risk management capabilities of financial institutions and the processes in place to support financial risk management.

This is not the first time individual firms or the financial services industry has experienced a downturn that could be traced to such issues. It is the magnitude of the losses and the number of firms that seemingly did not fully understand their aggregate risk exposures that make this market collapse different. Given the enormity of losses to date, the global financial system surely does not want to see this happen again.

The financial system has not yet moved beyond the effects of this broad downturn. A Deloitte[2] survey of senior executives, including chief risk officers ("CROs"), of top global financial services companies conducted from December 2007 to April 2008 found that more than 91% of respondents believe that both the likelihood and the potential economic impact of systemic risk events have increased.[3] One-third of the executives do not look for improvement in the credit and liquidity crisis until 2009 or later.

The top four sources of systemic risk cited were:

- Increased use of leverage to finance investments (44%);
- Credit risk cycles and asset valuation bubbles (40%);
- The inability of markets and regulators to identify excessive aggregate risk (39%); and
- The increase in linkages and interconnectedness of markets produced by globalization (30%).

We believe it is time to take a fresh look at the risk management capabilities of financial institutions and the processes in place to support financial risk management.[4] It would appear that some firms lack a clearly stated risk philosophy or framework, risk appetite, relevant risk policies, and the necessary capabilities to support an accurate, aggregated, enterprise-wide understanding of the risks they face. Other financial institutions have effectively addressed these risk management issues. These firms view risk management not as a drag on strategy, but as an integral part of a strategic discussion where decision-makers look at risk and return collectively. Risk appetite is clearly stated and understood, with practices to put that expression of risk tolerances into action. Risk is part of the daily conversation and viewed from an enterprise-wide perspective. These are the firms where risk management not only has a seat at the table, but is also an active participant in all key business decisions. Now is the right time to undertake a fairly rigorous examination and begin implementing the kinds of organizational and process changes necessary to enable effective risk management. A change in the way risk management methodologies and processes are executed within many financial institutions is needed and will help companies move from a position of vulnerability to a place where risk management is executed more holistically and the company is not exposed to material unknown risks.

[1] "Structured credit products" are broadly defined here to refer to a spectrum of cash and/or synthetic credit derivative instruments used in the business of acquiring, distributing, and trading credit-sensitive assets for purposes such as value generation (e.g., cash collateralized debt obligations or "CDOs"), arbitrage (e.g., single-tranche synthetic CDOs for correlation trading), balance sheet management (e.g., synthetic CDOs for purposes of capital reduction), and credit intermediation (e.g., credit default swaps for buying/selling super senior risk with different counterparties).
[2] As referred to in this document, "Deloitte" means Deloitte & Touche LLP, a subsidiary of Deloitte LLP. Please see www.deloitte.com/US/about for a detailed description of the legal structure of Deloitte LLP and its subsidiaries.
[3] "Systemic Financial Risk, Surveying the Market," Deloitte Touche Tohmatsu, 2008.
[4] Risk management can be interpreted very broadly to include all risks that an organization confronts, including financial risks, such as market, credit, and liquidity risks, as well as broader risks such as compliance, operational, strategic, reputational, and legal, etc. Within the context of this paper, however, risk management refers primarily to the management of market, credit, liquidity, and operational risks relating to traded financial instruments.

Looking back

An abbreviated history of risk management in financial services

Regulatory guidance

Prior to the credit crunch, many risk management expectations and practices were driven primarily by regulatory guidance, as regulators have for some time focused on spurring financial institutions to improve their enterprise-wide risk management capabilities. One of the more significant banking regulatory programs has been to strengthen risk-based capital requirements and regulation through the banking industry's Basel Capital Accords. Basel I, released in 1988, was the first global banking capital standard and introduced elements of risk-based regulatory capital for credit risk in a consistent way for the first time on a worldwide basis. Over time, it became clear that these simplistic, risk-based approaches were inadequate in the context of financial engineering innovation and the creation of products like structured credit products. Basel I encouraged growth in securitization and other techniques to reduce capital charges through limitations identified in the original capital rules, and "arbitraging" Basel I became commonplace.

Basel I was amended in 1996 to include market risk; it allowed banks to use internal risk models for capital calculation for the first time based on Value at Risk ("VaR") methodologies, which rely on statistical techniques. Partially as a result of the Basel Market Risk Amendment, major global banks widely adopted VaR in the mid to late 1990s, and it became the industry standard approach for measuring market risk. But there are known limitations with VaR. Inherently, VaR is not a predictive tool — it cannot foretell catastrophe from so-called stress or tail events, as it is usually based on historical data, which creates an overly sanguine picture in prolonged boom periods.

Basel II[5] was the product of extensive discussions by members of the Basel Committee on Banking Supervision (the "Committee"); various consultative papers and proposals were released, culminating in the revised framework introduced in June 2004, which has itself been subsequently revised and amended. The fundamental objective of the Committee's work to revise the 1988 Accord has been to develop a framework that would further strengthen the soundness and stability of the international banking system while maintaining sufficient consistency to prevent capital adequacy regulation from becoming a significant source of competitive inequality among internationally active banks.[6]

Basel II introduced more sophisticated measurements for credit risk capital and also accommodated more complex products, such as securitized transactions. Because Basel II was subject to individual country regulator adoption timetables, it was not fully rolled out globally at the time of the credit crisis; Basel II was not in effect in the U.S., for example. Due to the U.S. system of bifurcated regulation of 1) banks and 2) investment banks and securities firms, the Securities and Exchange Commission ("SEC") introduced in 2004 its own capital adequacy rules specifically for large securities firms and investment banks; these are known as Consolidated Supervisory Entity ("CSE") rules[7] and are generally similar to those of Basel II.

[5]"International Convergence of Capital Measurement and Capital Standards A Revised Framework," Basel Committee on Banking Supervision, June 2004.
[6]"International Convergence of Capital Measurement and Capital Standards A Revised Framework, Comprehensive Version," Basel Committee on Banking Supervision, June 2006.
[7]"Alternative Net Capital Requirements for Broker-Dealers That Are Part of Consolidated Supervised Entities," Securities and Exchange Commission, final rule effective date August 20, 2004.

The European Union's Solvency II proposals have recently started to have a transformational effect on many insurance companies' risk and capital management processes. The effect of Solvency II on the insurance industry's risk management capabilities may be roughly akin to that of Basel II on the banking industry.

Risk measurement methodologies

Risk measurement methodologies for trading products were heavily focused on VaR, especially for market risks and related techniques for counterparty credit risks. Generally risks were measured using separate methodologies and "risk engines" for different types of risks, e.g., market risk or credit risk. Some risk measurement methodologies required simplifying factors in their risk estimation, rather than a full revaluation of the individual positions. Simplification, however, often tended to underestimate exposures, as specific risks resulting from unique product features may not have been captured.

Also, across any given firm, multiple risk management systems often operated independently, whether for different types of risk or for different trading desk units; this meant that those responsible for risk management had to manually cobble together an aggregated picture of enterprise risk. As a result, the risks for complex products were not always captured or fully estimated, and it was often not possible to get an overall view of the exposures they posed to the firm. Market and credit risk methodologies were siloed in many cases, using separate approaches, which limited the comparability of different risk exposures for the same business. The modeling of the underlying collateral of complex credit products, such as collateralized debt obligations or CDOs, often did not fully address factors like correlations in the underlying collateral, the impacts of a potential rise in defaults, or changes in expected recovery values. More than one institution assumed these risks were fully captured when, in fact, they were not. This problem did not begin with the advent of structured products. Historically, the quality of data and data processes available to some risk managers has tended to be imprecise and inconsistent, making aggregation difficult and undermining the credibility of resulting valuations and analysis. In some firms, the data challenges were exacerbated due to trading and operations technology infrastructure that did not provide a consolidated view of trades. This was due to limitations in the capture of all relevant trade information upon trade execution, as well as gaps in integration of the data that was captured.

Structured credit products themselves challenged the prevailing approach to risk management in many organizations — separate market risk and credit risk engines run by generally siloed risk management groups. Because many of these products were considered trading assets and held in the trading book, they were not subject to the fundamental credit analysis requirements of banking book assets. Due to the combination of fundamental credit analytic needs in a traded product subject to market risk, a much more integrated approach was required. Too often, it seemed, risk management responsibility for these products fell between the market and credit risk functions — this lack of coordination between the risk functions wasn't clear until it was too late and the losses became apparent.

Additionally, investment in risk management technology varied considerably, not only from firm to firm, but also within different risk management functions of the same company. As new products proliferated, the limitations of the technology infrastructure became more critical. New products were introduced more quickly than the technological systems required to evaluate them could be developed, making it difficult to capture all relevant risks.

Organization and governance

While many firms were proud of their risk management programs, in hindsight, risk management was not always a fully developed or well-integrated function within some financial institutions prior to the credit crunch. In some institutions, central governance over business lines was largely ceded to the business units, which tended to operate more autonomously. The businesses were focused on increasing revenues; investment in infrastructure and processes to measure and monitor risk exposure appear to have been given a lower priority. New product approvals may have been pushed through without sufficient understanding of the risks or required supporting infrastructure.

One should not overestimate the effect of an inordinate emphasis on short-term revenues to the detriment of risk management. Driven by pressure to maintain strong growth in quarterly revenues and the stock price, some firms found it understandably difficult to "get off the treadmill." Even as warning signs became more abundant and individual firms started reporting losses, many market participants were unable to alter their operating models.

Other considerations

There are a few other notable factors that contributed to the size and scope of the credit crisis.

First, there is a generally prevailing "agency problem" in major trading operations, whereby an asymmetry exists between risk and reward for traders. There are significant rewards and opportunities to the upside and limited risk to the downside, e.g., loss of employment at most, while a financial institution itself could be imperiled. As a result, the incentives of those actually taking and managing the risks (the traders) have not always been sufficiently aligned with those of shareholders and the institution itself.

One should not overestimate the potential impact of an inordinate emphasis on short-term revenues to the detriment of risk management.

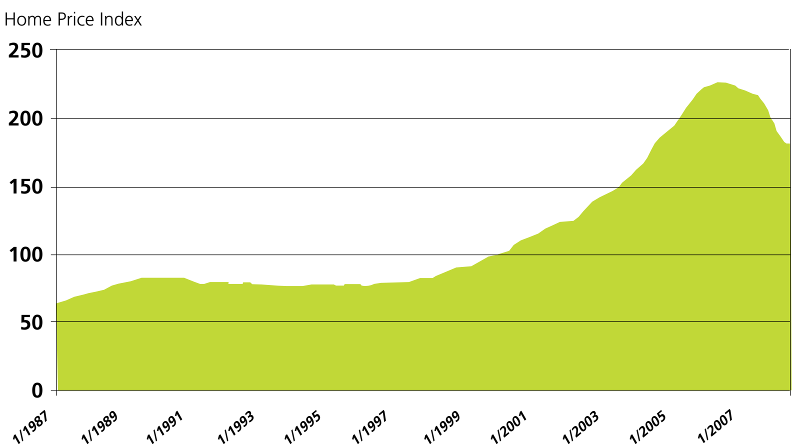
Second, focus on risk management capabilities in general tends to be cyclical and episodic. Attention to broader risk management areas usually increases after major negative events, and therefore, generally occurs on a lag basis. An example is the series of major risk events that followed one after the other during 2000 and 2001: the technology bust; the collapse of Enron, WorldCom, and Tyco; and 9/11. The corporate accounting fraud from some of these events turned the spotlight on accounting controls and corporate governance, culminating in the enactment of the Sarbanes-Oxley Act of 2002 in the U.S. But soon thereafter, a lengthy benign period and sustained boom began that lasted until recently. During these years, there tended to be much less focus on risk management than during periods of greater market uncertainty and volatility. This is not unexpected.

Third, many risk management agendas and budgets in recent years tended to be driven by the need to meet regulatory expectations set by such initiatives as Basel II, CSE, and Sarbanes-Oxley. While these are undoubtedly worthy efforts, they nonetheless had the effect of dominating the focus of many risk management resources…until the credit crisis became inescapable.

The credit crisis and structured credit products

Structured credit products are inherently complex to value when considering the modeling sophistication required to incorporate the correlation risk from thousands of underlying assets of differing quality. While, in general, this complexity created significant obstacles to fully comprehending risks, very specific developments in the structured credit products business contributed to the crisis that ensued.

S&P/Case-Shiller Home Price Index



Source: Standard & Poor's, Composite-10 CSXR; January 1987 - May 2008[8]

Analytical models dependent on historical data were often overwhelmed by the effect of rising home prices, which had been increasing in value for more than half a century, as shown by the S&P Case-Shiller Home Price Index and U.S. Census Bureau median home value data.

Expectation of a rising residential market — The prolonged period of home price appreciation and historically low delinquencies were a significant factor affecting the valuation and risk measurement estimation of structured credit products. Analytical models dependent on historical data were often overwhelmed by the effect of rising home prices, which had been increasing in value for more than half a century, as shown by the S&P Case-Shiller Home Price Index and U.S. Census Bureau median home value data. Prices finally started to decrease around March 2007, as early signs of the credit crunch emerged.

Revenue focus of management — Both product innovation and product complexity developed rapidly, driven in large part by the profitability of these products. There were sometimes few curbs in place, and a front office, empowered by success, could be subject to less oversight and prevail over risk management objections. As stated above, the technology to support risk analysis tended to lag new product development, limiting many financial institutions' ability to monitor and control their exposures for certain new products.

Easy funding and high yields — In general, there was an abundance of money available at very low rates to finance everything from the underlying mortgages to the structured product transactions themselves. Risk premiums (spreads over risk-free assets, such as treasuries) were at historic lows, evidence of the abundance of money and risk appetite chasing deals. Many investment grade CDOs offered debt returns that far exceeded yields on other investment grade alternatives. In 2006, the BBB-rated portions of CDOs yielded 7 to 9 percentage points above LIBOR or about a 13% annual return.[9]

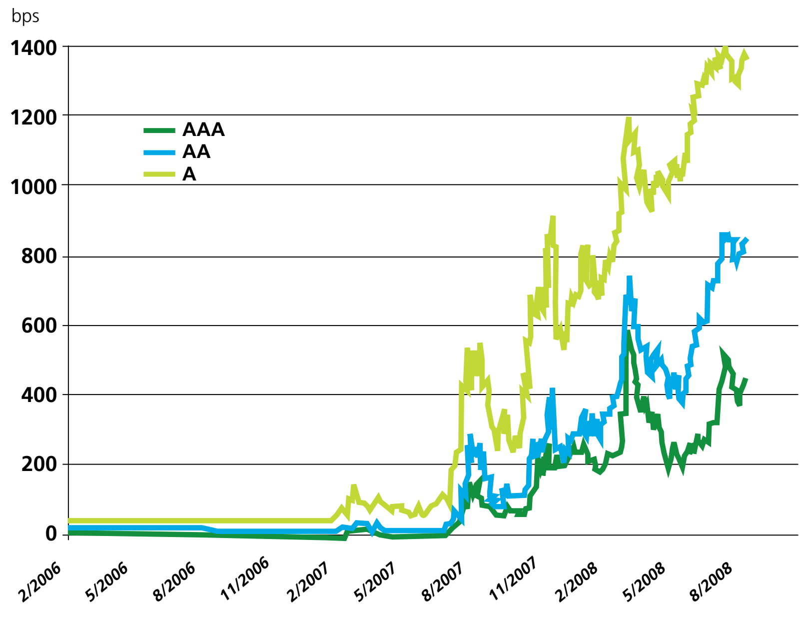
[8]The Case-Shiller composite-10 CSXR Home Price index measures the nominal value of the residential real estate market in the United States based on an aggregation of 10 major metropolitan areas.
[9]"The Rating Charade," David Evans and Richard Tomlinson, Bloomberg Markets, July 2007.

At the same time, changes in the approach to underwriting led to less emphasis on traditional underwriting standards for the mortgages, spurring growth in subprime and other nonstandard loans. These included 2/28 adjustable rate mortgages or ARMs, where the interest rate resets in two years, Alt-A or low-documentation loans that often did not require income verification, and even products that allowed borrowers to choose their payment amount (so-called "option ARM" or "pick-a-payment" products). More important, the combined loan-to-value ("LTV") ratio for many of the mortgages originated between 2005 and 2006 approached the 90s range, which provided a very thin equity margin of collateral on the underlying home loan.[11]

Within some financial institutions, low internal funding costs allowed "carry" strategies where no alpha was created. Also, there was a lack of consideration of certain risks in some firms' transfer pricing. As a result, large positions were built up to capture small spreads, further adding to leverage. These growing positions ultimately exposed firms to large concentrations of risk.

Securitization — There was a virtual explosion of securitization transactions whereby large volumes of complex securities backed by mortgages and other receivables were created. The securitization operating model allowed for the transfer of risk from the originator's or distributor's balance sheet to the end user investor with little risk "retained" by the originator in the process, except for those loans put back to originators through early payment defaults (EPDs). The securitization business model presumed deals were not to sit on the bank's balance sheet. Over time, the assumption proved incorrect, as firms increasingly had to retain unsellable tranches, and, ultimately, the warehoused collateral for entire deals in the pipeline had to be retained when deals were unable to be brought to market. As a result, firms ended up taking on substantial risks that were not anticipated in the original business model.

ABX 06-1 Implied Spreads



Source: Lehman Brothers/Markit Partners[10]

Additionally, securitized assets were spread across many investors of varying sophistication and geographic locations around the world. Investors' constant search for alpha drove some issuers to create increasingly more complex products with more and more esoteric features and, ultimately, with questionable underlying collateral. The buyers of these securities did not always fully understand or have the ability to independently value the transactions or measure the underlying risks, and, as a result, there was an overreliance on rating agencies. It was estimated that approximately half of the $412 billion of CDOs sold in the U.S. in 2006 contained subprime debt, and, on average, 45% of the contents of those CDOs consisted of securities backed by subprime home loans.[12]

[10]The ABX index, created by London-based Markit Group Ltd., measures the cost, or spread, of credit default swaps based on bonds secured by so-called subprime mortgages and home-equity loans.
[11]"Why We Are Still in the Early Innings of the Bursting of the Housing and Credit Bubbles," T2 Partners LLC, March 16, 2008.
[12]"The Rating Charade," David Evans and Richard Tomlinson, Bloomberg Markets, July 2007.

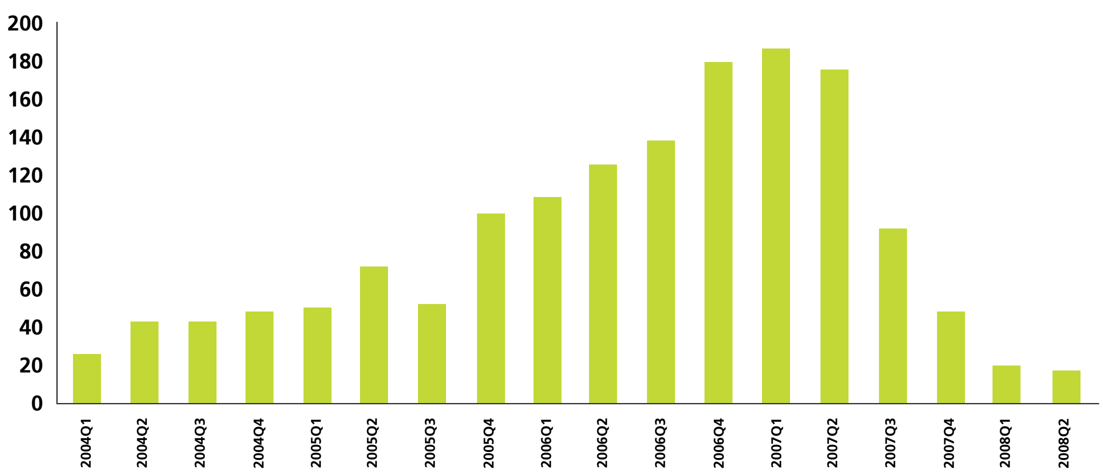
Valuation was often made inherently more challenging by the complexity of these products and a range of other factors, including, but not limited to, unreliable ratings and incomplete collateral assumptions and supporting analytics.

As a result, not only did the originating firms end up warehousing deals they hadn't intended to but investors who sought increasingly complex instruments providing high yields also experienced a concentration of real estate-related risk. The diversification of risk originally assumed from securitized assets did not protect them against a deep and widespread decline in real estate values nor from unexpected correlations and concentrations of risk.

Valuation — Trading positions, including structured credit products, depend on mark-to-market valuation. As the origination and trading of these products declined, so did the liquidity in the structured credit products markets. As a result, the valuation of structured credit products moved from transaction-based information to model-based efforts that relied on broader indices, creating less reliable valuations and greater pricing risk. Valuation was often made inherently more challenging by the complexity of these products and a range of other factors, including, but not limited to, unreliable ratings and incomplete collateral assumptions and supporting analytics.

Quarterly CDO Issuance

in $ Billions



Source: SIFMA, Global CDO Market Issuance Data; Total Issuance; first quarter 2004 - second quarter 2008.

The meltdown — a synopsis

The rapid evolution in the complexity of structured credit products was accompanied by a decrease in the quality of underlying collateral and by a broader capital markets credit liquidity freeze. The combination was too much, in many instances, for the evolving practices of and attitudes toward risk management. The credit meltdown, which continued as structured credit products losses became widely apparent, exposed previously hidden risk management weaknesses. Before this crisis is over, the aggregate industry write-downs are variously estimated to range from approximately $400 billion to $2 trillion. The lower end of the forecast has already been exceeded. Financial institutions have raised more than $300 billion of new capital in response at the time of this writing, with more capital undoubtedly needed. The wide range of estimates for the potential losses may reflect differences in opinion as to what losses are really attributable to the subprime mortgage crisis, but it is also further evidence of the continuing challenges of valuing the underlying financial instruments.

One of the most significant issues appears to have been incomplete views of a financial institution's full range of risks from these products:

- The methodologies used to value, measure, and monitor structured credit trading positions often did not adequately evaluate the underlying collateral, leading to underestimated risk exposures.

- Newer, complex products were often not built into the existing risk infrastructure and were being monitored on spreadsheets or via simplified risk approaches that did not take into account certain specific risks, such as the credit and prepayment risks of specific underlying loans.

- Approaches for related analytics in different areas, e.g., structuring models, front-office valuation models, market risk models, and counterparty risk models, could produce incompatible results, making it difficult to compare their analyses.

The exposure of limitations in some risk management practices brought into question the validity of industry models and highlighted a reliance on historical data that included the recent "cheap-money," "easy-credit," and "home-price-inflation" boom period; thus, the inherent risk of a typical structured credit product originated between 2004 and 2007 was frequently underestimated.

It was, however, the lack of trading liquidity that focused attention on dangerous concentrations and overexposure to risk. Without observable market prices, as discussed above, valuation of these instruments became challenged. As the size and scope of exposures were identified, financial institutions were forced to take unprecedented write-downs. The combination of these events raised the potential for systemic risk and a global financial system meltdown. This, in turn, led to unprecedented Federal Reserve actions to provide liquidity for nonbank financial institutions, such as investment banks for the first time and for certain mortgage-related and other assets, to relieve stress in funding markets and reduce systemic risk.

What can we learn from these events? What can we do differently? Where should financial institutions focus to improve their risk management effectiveness?

Lessons learned

With the benefit of 20/20 hindsight and awareness of regulators' guidance, our analysis suggests that the lessons fall generally into four areas:

1. Revamping governance, risk oversight, and risk management;
2. Integrating both risk and return into decision making;
3. Building capacity to understand and manage risk; and
4. Revisiting the need for improved transparency and disclosure.

From the lessons that follow come both prescriptive actions and food for thought.

Governance, risk oversight, and risk management

Issue: Risk oversight and direction

A key issue in the credit crisis relates to the role of senior management and the board. In some cases, it appears that senior management and the board were not adequately informed of the risks their firms faced in structured products and the aggregate risk contained on their balance sheets. This was not necessarily a failure of the risk management function, although there were cases where informational alerts weren't sufficiently forthcoming, but of the organization's management oversight and risk governance, and related management systems, policies, and procedures. In other cases, senior management and the board were given notification, but did not take timely action, perhaps due to limitations in relevant risk information or a belief that the potential risk was not as large as was subsequently demonstrated. Because risk management culture and approaches were not, in some cases, sufficiently embedded throughout the organization, risk and reward perspectives were not brought together in a way that would have allowed a more accurate, enterprise-wide understanding of the firm's risks. This lack of understanding across the organization of the true magnitude of its risks laid the groundwork for failure.

Second, some boards were not in a position to provide adequate risk oversight, due in large part to a lack of complete and timely information — "they didn't know what they didn't know." As a result, these boards were not asking questions related to the growing crisis until it was too late. Furthermore, there were board members who appear not to have been sufficiently risk literate, i.e., they lacked the understanding of the risks inherent in the products creating the firm's revenue. While their general acumen was not in question, they were not well versed in the specifics of risk management or in the new and complex area of structured products.

Third, risk appetite definitions as well as their enforcement and linkage to risk tolerances were a work in progress for the industry. Many financial institutions had a detailed set of limits on the trading floor, but there may not have been a clear, overall articulation or measurement of risk appetite and risk return. In addition, the linkage of the risk appetite statement to the actual tolerances and limits was sometimes imprecise.

Issue: CRO and risk management function

While the CRO position had been widely adopted, it remained the newest C-Suite position and, implicitly or explicitly, did not always have sufficient authority, especially relative to senior business management. Some of the original CROs were still building their organizations' risk capabilities at the time of the crisis. CROs tended to be primarily focused on monitoring, measuring, and reporting risk and were often not in a position to challenge or manage risks more proactively.

Inadequate communication between risk management and the business as well as powerful front-office influence added to the ultimate lack of authority of this position. A number of risk organizations structured themselves primarily by risk type, e.g., market risk, credit risk, etc., thus they did not act as true enterprise-wide risk management functions. While effective for tactical issues, this organization encouraged risk management departments to operate in silos, independent of one another, and was inadequate for larger events. This siloed risk organization structure contributed to the limited sharing of knowledge and data between risk management and the businesses.

Recommendation: A firm should have, in writing, a clear, detailed, board-approved risk management charter or framework that defines risk management roles and responsibilities, which is clearly communicated throughout the organization.

The charter should cover the key definitions of roles and responsibilities outlined below as well as other issues:

The board

- The board or board-designated risk management committee should provide oversight and guidance. This role should be reflected in the relevant committee charter as well as documented in related policies. While board committees are not responsible for managing risk, they do have responsibility for its oversight.
- The board should provide guidance and have access to risk management in order to understand its objectives and perspectives.

Senior management

- Overall responsibility for risk management belongs with the CEO. In many financial institutions, a CRO position has been established that provides leadership for and executes the organization's risk management plans.
- Senior management should establish and support a CRO position reporting to the CEO who is viewed as a true part of the C-Suite level executive management team.
- Senior management should ensure that a periodic meeting between the board and the CRO is routinely scheduled as a recurring board agenda item. These meetings between the CRO and board should be conducted as executive sessions, without management present and be conducted "off the record" in order to allow frank discussion.
- There should be a corporate risk management committee that takes an active role in reviewing the firm's risk profile. The committee should be held accountable for determining that policies and procedures are followed. It should include appropriate members from the C-Suite as well as management from the business lines and major risk management disciplines (market, credit, liquidity, operational risk, etc.).

There should be a corporate risk management committee that takes an active role in reviewing the firm's risk profile.

Risk management

- The CRO should have written veto power over transactions, counterparties, and other key risk-related decisions, including the ability to recommend cutting positions or hedging, with an appropriate escalation and resolution process (in writing) that includes the CEO and/or the risk management committee or executive committee, as appropriate.
- The CRO and central risk management function should be independent of the business units.
- The heads of the major risk disciplines should report to the management risk committee in order to provide a complete picture of the institution's risks.
- Risk management should focus primarily on risk management activities and not be drawn into unrelated areas. The risk management agenda should not be sidetracked by initiatives that should be managed elsewhere. While some risk management analyses may be viewed as value-added information by business units — and in many cases, this usage should be encouraged — the risk management team's responsibilities must be carefully managed to ensure that they are properly focused on their core mission, both from a segregation of duties perspective as well as from a resourcing perspective.
- Risk management organizational silos, such as the specific risk disciplines of market, credit, liquidity, and operational risk, should be broken down so that all risk areas operate in an integrated way to address the risks of businesses, and the company's overall risk management organization acts as a true enterprise-wide risk management function.

Business lines

The business units are responsible for taking and managing their risk. The risk management function should be a referee, using the risk appetite, tolerances, and limits as guidelines in monitoring, reporting, and measuring the firm's exposures. Conflicts are inevitable, but having clear statements of responsibility will reduce ambiguity and unwanted exposures.

- The business lines should work with risk management as trusted partners and active participants in business and strategy discussions.
- Regular reporting and communication procedures should be documented in policies and procedures to determine compliance. This includes appropriate discussion between risk management and the operating units, and between the front and back offices of the business lines. Ideally, everyone at all levels of the firm should understand his or her role and accountability for risk management in line with the organization's stated risk appetite and risk framework.

When different groups in the same firm perform functions, such as structuring, trading, or investing in securitized instruments, they should operate under an institutional code of conduct that will reduce or eliminate the potential for conflicts of interest.

Strengthening risk management is everyone's job. Financial institutions with strong risk management functions often use a "three lines of defense" strategy where business management, risk management, and the internal audit function reinforce overall attention to risk and control issues. Business units must take their own risk management role seriously and devote sufficient resources and management attention to make risk management effective.

Important questions every board member should ask

Oversight and reporting

- Are the risk oversight functions of the board committee with delegated risk oversight responsibility clearly defined in its charter?
- Are all relevant risk exposures appropriately aggregated into board and senior management risk reporting?
- Does the board understand the risk information it receives? Does the board understand what actions it should take in its oversight role if it receives adverse risk information?
- Does the board's risk committee have enough members with experience and understanding of risk management issues? Does their experience include multiple business cycles?
- Is there a defined and documented reporting line of the CRO to the CEO?

Roles and responsibilities

- Are the firm's policies and procedures clearly defined in writing? Do they include all major categories of risk, including risk governance and oversight as well as processes for managing each type of risk?
- Has the board reviewed and approved the risk appetite and key risk management policies? Does senior management review them on a periodic basis?
- Are the CRO and risk management supporting staff adequately compensated?
- Does the CRO have implicit or explicit authority to veto trades and drive risk reduction as necessary?
- Are the firm's traders open and communicative with risk management? Do they proactively bring risk managers into their discussions?
- Does risk management systematically provide training to develop competencies around risk management and through different business unit levels?

Processes

- Are risk and return part of strategic discussions?
- Is the new business and new product approval process documented?
- What mechanisms exist to monitor compliance with policies?
- What procedures exist to identify new or emerging risks that may impact the company, and how is their potential impact assessed?
- Does risk management periodically conduct stress tests to evaluate the firm's sensitivity to tail risks?
- Do board risk committees have regularly scheduled risk management review discussions?
- Does the board have regular communication with risk management, including:
  - In-person presentations and discussions with the CRO, including executive sessions without management present?
  - Regular reports showing key risks measured relative to their risk tolerances?

Building risk and return into the business practice

Issue: Placing risk and return in proper balance

Focused as they were on generating revenues, a number of financial institutions did not fully understand their exposures that generated the losses. It is time to build risk and return more effectively into the business practice.

The operating model used by some financial institutions drifted to one where the business evaluates (and is rewarded for) the return, while risk management evaluates the risk, primarily from a loss avoidance viewpoint. What we now see is that these financial institutions did not achieve an operating consensus regarding the appropriate balance between risk and return. Robust forums for discussion of risk issues among risk management, business, and senior management were not developed; nor were escalation procedures fully accepted and utilized to bring risk concerns to higher levels of the organization.

Recommendation: A risk management culture with decision-making based on risk and reward should be embedded throughout the organization, from the risk management group to corporate functions to business units.

There are specific steps financial institutions can take to embed risk management more fully in the company and to bring risk and return into better balance:

- Independent measurement and monitoring of risk-adjusted returns using calculation input from risk management.
- Periodic independent analysis of results against planned business strategy with senior management and the board.
- Joint discussions of the CRO and CFO with the board regarding risk and return, including a process to ensure these discussions take place.
- Revised incentive structures that base financial rewards on a risk-adjusted basis.
- Establishment of a CRO-led group with decision-making authority for new product approval, i.e., that cannot be overturned by the business unit developing the product; there should, however, be a higher-level formal escalation process which involves an authority such as the firm's risk management committee.

Both the relevant business units and the risk management function should continuously monitor new or emerging risks and escalate focus and attention on them within the firm as they arise.

Focused as they were on generating revenues, a number of financial institutions did not fully understand their exposures that generated the losses. It is time to build risk and return more effectively into the business practice.

As financial institutions use more integrated risk and reward analysis, the focus of individual businesses may change. At an industry level, it appears that changes to the entire securitization business model will be required to develop a more sustainable business model, although a discussion of such is beyond the scope of this paper.

Recommendation: Senior management — with board input and approval — should set the direction of the institution's risk appetite as part of its written risk framework.

Direction must come from the top. It is senior management's job, with input and approval from the board, to explicitly state how profit and risk will be balanced. The corporate risk appetite then should be translated into a detailed set of risk tolerances and limits at the business operating level. The business units need clear guidance from senior management, so that they understand the corporate risk appetite and how it translates to the operating level.

Integrating risk management into the business is an ongoing process. It's not about having a few checkpoints. It's about incorporating risk and reward into the decision-making process and allowing risk decisions to be reviewed by an independent risk management function. It's about embedding risk awareness in the day-to-day operation of the business.

Risk capability to identify, measure, monitor, and control risks

Issue: Valuation and risk measurement systems for complex products

It has been widely reported that a lack of sufficiently sophisticated analytical systems and a clear methodology for assessing liquidity risk contributed significantly to delays in management's response to the credit crunch. It now appears that valuation and measurement systems did not fully capture risk at the product level, impeding the formulation of a complete view of the financial institution's aggregate exposure. The limitations of some specific valuation and risk models used are worth noting:

- Some valuation and risk models were unable to "pierce" the security-level analysis of structured credit products, which meant they were not capable of analyzing the underlying collateral and, due to the lack of sufficient granularity, they were unable to capture the correlated risk associated with these components.
- Some valuation and risk models only used historical default experience and not current spread information; as a result, they were not sensitive to movements in related credit spreads. Some models also assumed a generally rising housing market and continued availability of cheap funding.
- Some risk models used simplifying assumptions that mapped complex instruments to general index type exposures. This had the effect of ignoring specific risks attributable to these products.
- Concentrations and correlations between different credit products, underlying collateral, counterparties, credit providers, and other factors were insufficiently modeled or analyzed.
- Liquidity risks were insufficiently modeled and considered in general; this was especially true with regard to contingent liquidity events.
- Stress tests and tail risks were often not incorporated sufficiently in some models. More importantly, stress tests lacked properly constructed action plans.
- Risks associated with monoline insurers and other guarantors were not sufficiently analyzed in some cases. Given that monoline insurers were exposed to subprime assets, their structured credit products insurance constituted a classic "wrong way exposure;" just when their insurance was needed most, it was ultimately not available due to the weakened condition of the monolines.
- Generally, agency ratings of the securities were highly relied upon, in some cases without significant internal analysis and validation.

It is also important to recognize that risks cannot be aggregated across the enterprise if data and analyses of different types of risk and from different businesses are incompatible. Systems that can't speak to one another, that use different types and formats of data and produce results that cannot be aggregated will not be able to do the job needed.

Recommendation: A firm should be able to value and robustly measure the risks associated with all transactions.

To do this, a firm should have a consistent set of models, data, and related systems for pricing and risk management that fully captures, to the extent practicable, all relevant drivers of value and risk.

It is also important to recognize that risks cannot be aggregated across the enterprise if data and analyses of different types of risk and from different businesses are incompatible.

These models should be developed to have applicability for the range of related risks for structured credit products, such as market, credit, and liquidity risk. The modeling framework should be flexible and extendable enough to incorporate new products as they are developed and to allow for new, meaningful, and timely analyses of risks as they emerge, looking into various correlation and concentration risks, for example. Valuation modeling should occur with sufficient frequency, generally daily. In addition, this entire model framework should be managed with a process for periodic review and independent validation, including review of key valuation assumptions. Where possible, profit-and-loss explanation processes should be developed to provide transparency and management information about the sources of profit (and loss) for the business. This will help identify drivers of risk and value inherent in the business and build a greater understanding of their importance.

Liquidity — Firms need to be looking more closely at liquidity, both individual product liquidity risk and the liquidity risk associated with their funding. Liquidity has often not been considered a core risk management function as there have been no regulatory capital requirements for liquidity. The importance of liquidity management is rising as it is now regarded as a critical risk management issue, not strictly as a treasury issue. Risk management and the treasurer's office should be working closely with each other to monitor liquidity risk. Contingent liquidity risks from products, off-balance-sheet structures, or other activities should be identified and captured in the liquidity risk systems as well as having mitigating action plans in place. Models should measure the liquidity of the business under stress scenarios, taking into account that liquidity exposure is different for every firm, depending upon its business.

Credit — Firms active in markets such as structured credit products should have the capability to perform their own credit risk and other analyses to reduce their reliance on external parties for key risk determinations.

The importance of liquidity management is rising as it is now regarded as a critical risk management issue, not strictly as a treasury issue. Risk management and the treasurer's office should be working closely with each other to monitor liquidity risk.

The determination of credit risk for counterparty or for a transaction is a significant management opinion that the firm should be capable of reaching on its own. Rating agency ratings should be considered as just one source of information, not as the sole source of information.

New products — Enhanced policies and procedures for new product approvals are necessary to determine that the new products can be properly valued, evaluated for risk, accounted for, and processed in the firm's systems. Given that a firm's existing technology is inherently challenged to capture new product risks, it makes sense to establish clear limits, including notional limits that mitigate the possibility of irreparable harm if things go wrong.

Overlooked exposures — Firms also should conduct rigorous analyses of products and business portfolios to expand their view of risk to accommodate exposures not previously captured, such as various contingent risks, correlation and concentration risks, wrong-way exposures, and contagion risk. All of these should be incorporated in stress scenarios and stress testing in order to build an accurate, holistic view of the firm's risk.

New and emerging risks — The institution should have a continuous process in place that assesses ongoing market, business, legislative, regulatory, political, and other conditions and identifies new and emerging risks that may impact its operations. Once such risks are identified, scenario analysis and planning techniques, along with other methodologies, should be used to assess the potential impact and identify relevant risk management and mitigation approaches.

Because credit, market, liquidity, and other risks are interrelated, they cannot be analyzed independently. They should be considered from a broader, enterprise-wide perspective. Limits should be developed and monitored in a way that the overall risk tolerance for products are represented in an integrated way.

Finally, the risk analytics alone are not enough. Management throughout the company — from risk management personnel to business unit and senior management — should understand the drivers of risk and value in different businesses and the implications of the results of the models. Thus, the application of well-grounded business judgment and common sense to the results of quantitative analysis is as important as the analysis itself. This understanding is necessary in order to incorporate the results of the models into the company's overall decision-making regarding risk and return.

The application of well-grounded business judgment and common sense to the results of quantitative analysis is as important as the analysis itself.

Recommendation: The firm should have consistent approaches to data, models, and processes.

If a financial institution hopes to compile an aggregated, enterprise view of its risk, its technology and data should be consistent across business units and across specific risk functions. Procedures to achieve data, model, and process consistency should be commonly understood and in use, including processes for the approval of new products, for legal and reputation risk review, and for overall valuation and risk measurement.

Recommendation: Greater investment in risk management infrastructure is essential.

Implied in the above discussion is the need for further investment in risk management infrastructure. Technology needs and the types of transactions and risks involved vary by financial institution. Large financial institutions may have systems for credit risk, for example, or to handle specific asset classes, but they may still lack the ability to get a broad view of risk across asset and risk classes; to link derivatives to underlying securities; to capture tail risk, for instance; or to look at market and credit risk using consistent methodologies.

There are implementation guidelines of general value to all financial institutions. First, all tools and analytics should be able to accommodate the analytical requirements of existing transacted products and those reasonably anticipated in the near future. That in and of itself is no minor issue. While off-the-shelf packages do exist, it is likely that customization by an in-house IT department will be required.

The technology should also be scalable and extendable in order to accommodate new products, new risks, and higher volumes. Most companies don't have enough capability for the business that may ultimately result from new products, which is understandable, given that a major technology investment doesn't make sense until the product is proven. But letting the business get too far out in front of risk management and its supporting infrastructure carries its own dangers, as we have seen. This is a bit of a "chicken-and-egg" proposition, but it can also be a ready excuse for not investing adequately during boom times.

The firm may need both to build a proprietary application or data warehouse and to enhance system integration. In the face of such a technologically daunting (and financially costly) proposition, it is easy to understand why companies have delayed making this investment. Only in light of recent events has it become evident how important it is to bring systems up to speed and to determine whether they are compatible with each other. It is difficult to overestimate the value of complete, compatible, consistent data.

Transparency and disclosure

Issue: Receiving or considering relevant risk-related information in decision making

Risk management infrastructure limitations, plus the complexity of structured credit products themselves, meant that essential risk-related information often did not reach the right levels or enter into key decisions regarding risk, at either the business or corporate level. Improved risk management processes, clarified responsibilities, consistent data, and better models will do much to rectify the situation.

Issue: Disclosure to both internal and external constituencies

Given the problems in internal communication regarding risk in some firms, it is not surprising that external disclosure was incomplete. This was compounded by the limited regulatory requirements in some areas, although in the U.S., the Financial Accounting Standards Board ("FASB") did have a FASB Staff Position[13] ("FSP") posted December 19, 2005, to improve disclosures about certain loan products that may give rise to a concentration of credit risk.

Recommendation: The firm should demonstrate clear intent to provide transparency and appropriate disclosure to all constituencies.

Internally, the following guidelines are recommended in structuring these efforts:

- The risk-related information relevant to key decisions, including current and potential exposures, stress scenario results, correlations, concentrations and contingent exposures and funding requirements, should be conveyed to senior management and authorized bodies like the management risk committee and board risk committee on a timely basis and in an understandable format.

- Senior management should actively monitor contingent exposures and have prepared action plans in place. Structured investment vehicles are a good example. While they may have been structured as off balance sheet, management should understand the circumstances under which they might be reconsolidated on balance sheet, as many were.

- Reporting should be customized for the audience — informative, transparent, and relevant to possible action, but drawn from standard source data.

- Standard risk management reports should be disseminated beyond the risk management function to reach front office and other appropriate managers, so there is consistency in risk exposure analysis.

- Board members and senior management should have the opportunity to participate in CRO-sponsored workshops covering the financial institution's exposures and the associated risk management approaches.

External constituencies, including shareholders, regulators, rating agencies, and counterparties, should receive relevant risk-related information, especially in times of stress. Regulatory bodies and rating agencies have made it clear that greater disclosure lies ahead, guided by more specific requirements, as the side bar on page 20, "What the regulators are saying," indicates.

In the meantime, some financial institutions have recognized that improved disclosure practices are not dependent on regulatory requirements. On April 11, 2008, the Senior Supervisors Group, a cooperative effort of leading regulatory authorities in several countries, issued a survey report on the disclosure practices of 20 large, internationally oriented financial firms. The survey identified a set of leading practices for financial disclosure.[14]

Clearly, financial institutions should be prepared to present information to regulators — to all constituencies, for that matter — in a way that is clear, easily understood, and at the appropriate level of detail for the audience.

[13] "Terms of Loan Products That May Give Rise to a Concentration of Credit Risk," Proposed FASB Staff Position (FSP) No. SOP 94-6-1.
[14] "Leading-Practice Disclosures for Selected Exposures," Senior Supervisors Group, April 11, 2008.

What the regulators are saying

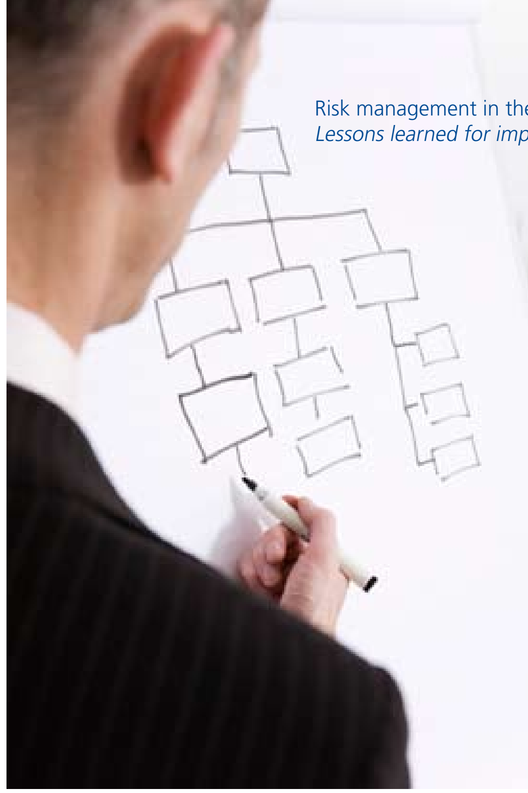
A number of regulatory and industry bodies, including the Basel Committee on Banking Supervision, the Senior Supervisors Group, the Institute of International Finance (IIF), and the Counterparty Risk Management Policy Group III have completed postmortem and "lessons learned" assessments and have suggested steps aimed at reducing the likelihood of similar crises happening in the future. A number of recommendations from multiple sources include the following:

- Improving the overall risk management process;
- Incorporating stress and scenario testing into the risk management and senior management dialogue;
- Strengthening liquidity risk management; and
- Improving transparency and disclosure.

These recommendations reinforce the lessons learned that are presented in this document. Additionally, there are a number of macro issues raised that require the attention of regulators, legislatures, and others. Efforts to broaden capabilities to monitor and address systemic risk will be called for; these may include changes to markets and their underlying infrastructure to reduce sources of risk. Significant changes to the U.S. regulatory oversight structure are likely, although this is most likely a longer-term initiative. Key oversight regulations like Basel II will likely be amended to incorporate lessons learned for structured credit products, including the addition to the regulatory framework of liquidity risk in a much more significant way. The nature of regulatory examinations will most likely change, regardless of the time it takes to adjust regulations, with increased focus on:

- Risk management oversight;
- Valuation models and processes and related controls;
- New product approval processes;
- Heightened credit risk management processes and practices; and
- An enterprise-wide view of liquidity management.

Conclusion



The world has become painfully aware that effective risk management is critical in a marketplace where complex financial products are increasingly commonplace. The commitment to risk management cannot be a passing one. It requires focused effort and significant resources during both boom and bust periods to create the proper infrastructure, and it may require a culture change on top of ongoing diligence to make it work.

Risk management is a process that requires direction and support from the highest levels of the organization, but everyone in the firm shares responsibility for it. The tone is set at the top by senior management and the board. The board must be sufficiently risk literate if it is to fulfill its responsibility for risk oversight. The board and senior management drive the firm's risk governance oversight and direction, and their views, expressed not only in written and spoken words, but also in actions, cascade down through the organization. How seriously risk management is taken at the top determines how seriously it is taken throughout the organization.

Senior management and the board need to provide clear guidance, which should be reflected in explicit policies and procedures. They should also communicate a clear expectation of compliance. The most sophisticated technology and detailed processes are useless if the results they produce are ignored or not taken seriously. Senior management should enforce stated risk policies and listen to risk management.

How seriously risk management is taken at the top determines how seriously it is taken throughout the organization.

Similarly, clear, fully disclosed, risk-related information should feed up from the business units to senior management and the board. Both the transparency and the range of perspectives of the information flowing up to senior management and the board depend on well-defined policies and procedures and on strong analytic capabilities with consistent methodologies unencumbered by individual risk silos. Reliable quantitative and qualitative information, seasoned by experience and common sense and delivered to decision makers in a timely fashion, is key to building a better-informed, more confident basis on which to review the corporation's risk appetite and adjust it to take best advantage of market conditions. Having this kind of information is what differentiates those "risk intelligent" financial institutions (see page 23) that use their understanding of possible outcomes strategically, both to seize opportunities and mitigate risks.

Summary of lessons learned

Governance & risk oversight	Balancing risk & reward	Building risk capability	Transparency & disclosure
• The board should clarify and formalize its risk management oversight role. • Senior management, with board input and approval, should set the direction and articulate the firm's risk appetite. • Roles and responsibilities should be articulated in written policies. • The CRO should have both implied and explicit authority and visibility for risk management. • Risk management should actively participate in business and strategy discussions. • The corporate risk committee should include C-Suite members and business leaders. • Risk management should be embedded in the front office and deal-approval committees. • Risk management should seek guidance from and have access to the board in order to understand their objectives and perspective. They should have guidance from the board in its oversight role. • The CRO should report to the CEO and board and should have regularly scheduled executive sessions with the board. • Risk management organizational silos, such as the specific risk disciplines, of market, credit, liquidity, and operational risk, should coordinate their measurement activities to address all the risks of businesses.	• Senior management, with board input and approval, should set the direction and articulate the firm's risk appetite. • Risk management should monitor, report, measure, and manage exposure against risk appetite. • The CRO and CFO should have a periodic joint dialogue with the board regarding risk and return. • Risk and reward must be embedded throughout the company. • The firm should have an independent measurement and monitoring of risk-adjusted returns. • Firms should have revised incentive structures that base financial rewards on a risk-adjusted basis. • There should be periodic independent analysis of results against planned business strategy with senior management and board. • There should be a CRO-led group with the decision authority for new product approval, and a formal escalation process which involves an authority, such as the firm's risk management committee.	• A firm should be able to capture, value, measure, aggregate, and monitor the risk associated with all its transactions. • Firms should have a single set of models, data, and related systems for pricing and risk that fully captures relevant drivers of value and risk. • Analytical systems should incorporate contingent and liquidity risk measures at a product level and institution funding level. • Firms should be able to appropriately stress test products and have properly constructed action plans. • Investment in technology infrastructure is needed in good times and bad. • Firms should have enhanced policies and procedures for new product approvals. • Firms should conduct rigorous analyses of products and business portfolios to expand their view of risk to accommodate exposures not previously captured. • Firms should have the capability to perform their own credit risk and other analyses to reduce their reliance on external parties for key risk determinations.	• Risk management should provide accurate, complete, and timely information to senior management, the board, and business units. • The firm should provide clear, easily understood, risk-related information to external audiences in an appropriate level of detail. • Senior management should actively monitor contingent exposures and be prepared to take action. • Standard risk management reports should be disseminated beyond the risk management function to reach front office and other appropriate managers so there is consistency in risk exposure analysis. • Board members and senior management should have the opportunity to participate in CRO-sponsored workshops covering the financial institution's exposures and the associated risk management approaches.

The Risk Intelligent Enterprise

Deloitte believes all companies should strive to be "Risk Intelligent Enterprises." This belief is predicated on the assertion that organizations that are most effective and efficient in managing risks to both existing assets and to future growth will, in the long run, outperform those that are less so. Without doubt, financial institutions are considerably more mature in their risk management views and practices than many other industries. However, we believe there is always room for improvement and recent events would appear to support that view. In our view, Risk Intelligent Enterprises adopt a balanced perspective of risk management, supported by the following fundamental principles:

1. A common definition of risk, which addresses both value preservation and value creation, is used consistently throughout the organization.
2. A common risk framework, supported by appropriate standards, is used throughout the organization to manage risks.
3. Key roles, responsibilities, and authority relating to risk management are clearly defined and delineated within the organization.
4. A common risk management infrastructure is used to support the business units and functions in the performance of their risk responsibilities.
5. Governing bodies (e.g., boards, audit committees, etc.) have appropriate transparency and visibility into the organization's risk management practices to discharge their responsibilities.
6. Executive management is charged with primary responsibility for designing, implementing, and maintaining an effective risk program.
7. Business units (departments, agencies, etc.) are responsible for the performance of their business and the management of risks they take within the risk framework established by executive management.
8. Certain functions (e.g., finance, legal, IT, HR, etc.) have a pervasive impact on the business and provide support to the business units as it relates to the organization's risk program.
9. Certain functions (e.g., internal audit, risk management, compliance, etc.) provide objective assurance as well as monitor and report on the effectiveness of an organization's risk program to governing bodies and executive management.

We believe there is always room for improvement and recent events would appear to support that view. In our view, Risk Intelligent Enterprises adopt a balanced perspective of risk management, supported by our principles.

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