

SECTION IV: RISK MONITORING AND RISK MANAGEMENT

A. Introduction

As is now widely recognized, the events leading up to the credit market crisis and the crisis itself have demonstrated shortcomings in risk monitoring and risk management across many institutions and classes of institutions. To some extent, these shortcomings reflect the fact that virtually all risk management tools are unable to model/present the most severe forms of financial shocks in a fashion that is credible to senior management. In addition, these shortcomings reflect “technical” limitations associated with risk management tools, including the fact that most quantitative models are, to some extent, backward-looking. That is to say, they are in essence a disciplined framework for the analysis of historic data and, as such, they implicitly assume that the future will look like the past. As another example of technical limitations, many hedges are far less than perfect, giving rise to basis risk; for example, when historic correlations, or default rates, or other parameters move materially away from modeled outcomes, which on occasion has resulted in substantial write downs or losses. Finally, and perhaps most importantly, there have been shortcomings regarding the full appreciation of the tight linkages and interdependencies between capital adequacy and liquidity – both market liquidity and funding liquidity.

While these and other shortcomings in risk monitoring and risk management can, with the benefit of hindsight, be explained, there is a larger and more profound issue at work in this context. That is, despite all of the complexities of risk management, the essence of risk monitoring and risk management is quite straightforward. Specifically, risk monitoring and management reduces to the basics of getting the right information, at the right time, to the right people, such that those people can make the most informed judgments possible.

Looked at in that light, several things stand out. Risk management assumes that risk monitoring is effective and that critical information flowing into and out of risk monitoring processes can be distilled and compiled in a coherent and timely manner and made available, not only to the risk managers, but to key business leaders across the institution and to top management. Only when this logical sequence of conditions is present and is supported by a rigorous but flexible framework of corporate governance will there be

reasonable prospects that business judgments can better anticipate and respond to contagion and systemic events. This is the fundamental reason why the Policy Group has placed so much emphasis on the core precepts outlined in Section I.

This same philosophy has also shaped the content of this section with its emphasis on (1) corporate governance, (2) enhanced tools and techniques in risk monitoring and management, (3) the use of the “maximum liquidity outflow” technique to substantially upgrade liquidity management, and (4) the linking together of the conceptual frameworks for analysis of capital adequacy, leverage and liquidity. Indeed, to the extent that capital adequacy and rigorous stress testing of liquidity are viewed as a single discipline, concerns about leverage and leverage ratios will be substantially mitigated.

B. Governance Background and Recommendations

The Policy Group has identified corporate governance as a core precept for large integrated financial intermediaries. Because effective risk monitoring and risk management are so tightly linked to sound corporate governance, this part of Section IV includes discusses and makes recommendations regarding corporate governance. These recommendations are designed to reinforce Core Precept I relating to corporate governance in Section I. The recommendations discussed below cover the following aspects of governance:

- (1) structure;
- (2) internal communication; and
- (3) the roles of committees.

1. Structure

Large integrated financial intermediaries by definition take risk. The goal of risk management is not to eliminate that risk, but to manage it effectively to provide the stakeholders of the institution with long-term returns commensurate with the risk. Risk management – in the broadest possible meaning of that term – must be deeply rooted in

the culture of individual institutions. However, culture is easy to recognize but hard to define. Thus, to a large extent, the practice of sound corporate governance must rely, in part, on the organizational structure of the firm.

Good governance begins with the Chief Executive Officer (CEO). The message that the CEO conveys to the firm's employees about the importance of corporate governance as it applies to the firm's risk taking and the way in which that risk taking is discussed with the board sets the tone for the overall corporate governance process.

Effective corporate governance is realized when the many facets of an organization work closely together to properly identify, monitor, price and mitigate (or intentionally accept on an unmitigated basis) all of the risks inherent in the business model of the organization, including financial, operational and reputational risk. Success depends importantly on the highest levels of the organization having information that is clear, timely and actionable.

To create the link between corporate governance and risk management, some firms use the concept of "three lines of defense". In this model, the business unit is the first line of defense and is accountable for identifying, assessing, taking and mitigating the risks of its business. The second line of defense includes the business support functions, such as risk management, legal, compliance, human resources, finance, operations, and technology. Each of these groups independently and collectively works closely with the business units to ensure that the business has appropriately identified, measured, priced, and managed the risk in the business. It is expected that the business support functions will work closely in helping to shape strategy, implementing company policies and procedures, and collecting information across the business units to create company-wide views of risk. The third line of defense includes the audit function that independently tests the efficacy of the processes created by senior business leaders and top management and the judgments made by these officials.

There is a widespread consensus about the need for a strong, independent risk management function. This is usually achieved by having a role, such as Chief Risk Officer (CRO), with a strong reporting relationship that reinforces the importance of the function. However, the reporting relationship is not sufficient by itself. The CEO and board of directors need to ensure that the individual performing the CRO role is a clear

and visible member of the firm's top management team and is able to independently influence risk taking, risk appetite, and risk mitigation. The members of the risk management organization should have shared responsibility for approving new business, products, and transactions along with the business line. The risk management team must work closely with other independent support and control functions, such as controllers, operations and internal audit, to ensure seamless control of risk taking and mitigation across the family of control functions.

The CRO function must have human and infrastructure resources available to it commensurate with the level of sophistication of the institution. As businesses are started or continue to develop, senior management needs to ensure that the business support functions are staffed with individuals capable of understanding the business's risk as it evolves and relating it to other risks within the institution. Consideration needs to be given to rotating business leaders into business support functions in order to deepen their understanding of risk and to provide additional experience and expertise to the support functions. Information systems and processes must allow for a robust and timely assessment of the risks of the firm.

Recommendations

- IV-1a.* The Policy Group recommends that risk management and other critical control functions be positioned within all large integrated financial intermediaries in a way that ensures that their actions and decisions are appropriately independent of the income producing business units and includes joint approval of key products and transactions. This would generally mean having a CRO with a direct line of responsibility to the CEO and having the CEO and the board take a highly active role in ensuring that the culture of the organization as a whole recognizes and embraces the independence of its critical control functions. Even without the direct reporting, the CRO should have a clear line of communication to the board.

- IV-1b.* The Policy Group further recommends that institutions ensure that their risk management functions are staffed appropriately for both the upside

and the downside and are able to understand and properly size risks in tranquil markets as well as during periods of market stress. The risk management functions must also have the capacity to function effectively in periods of spikes in processing volumes and under various disaster recovery scenarios.

2. Communication

While far from being universally true, much of the writings from the events of the last 12 months have focused on the inability of firms to see the totality of the risk they faced. This problem was the result of several causes, including: (1) inadequate risk aggregation systems, (2) systems or processes that did not pull together all exposures because they were viewed as outside the scope of the firm's risk, (3) siloed business or risk management units, and (4) simply a lack of understanding.

As described above, the creation of a specific governance structure will not, by itself, solve these problems. Firms which were able to work across their organizations with common language and measures of risk had a greater chance of success during times of market stress.

All personnel in risk taking and risk mitigation business units must understand all aspects of risk – strategic, credit, market, liquidity and operational risk. During the credit market crisis, credit risks became market risks, which then became liquidity risks in very short order. Officials across the organization need to understand those connections and the potential for contagion, just as they must understand the implications of those connections for risk appetite even though there is no single metric that will measure the risk of contagion or express that appetite.

In the complex world of large integrated financial intermediaries, there are a myriad of risks and measures of those risks. It is the responsibility of risk management to distill that information into a very understandable and concise format. Risk transparency is not measured by the quantity of information considered in committees, but by the ease of understanding of that information by someone who is not experienced in that field. This is

true of information presented to all committees within the company, including information submitted to senior management and, when appropriate, to the board of directors.

Recommendations

- IV-2a.* The Policy Group recommends that all large integrated financial intermediaries evaluate the manner in which information relating to risk taking, risk monitoring, and risk management is shared with senior management and the board of directors and make necessary improvements to ensure that such information flows are timely, understandable, and properly presented. As a part of this effort, senior management should actively encourage ongoing discussion with board members in order to improve the quality, coverage and utility of information made available to the board. Each institution should evaluate how effective its information flows are as they relate to the intersection of credit, market, operational and liquidity risk.
- IV-2b.* The Policy Group recommends that each institution ensure that the risk tolerance of the firm is established or approved by the highest levels of management and shared with the board. The Policy Group further recommends that each institution ensure that periodic exercises aimed at estimation of risk tolerance should be shared with the highest levels of management, the board of directors and the institution's primary supervisor in line with Core Precept III, as discussed on pages 11, 12.
- IV-2c.* The Policy Group further recommends that large integrated financial intermediaries ensure that their treasury and risk management functions work with each other and with business units to manage balance sheet size and composition in a manner that ensures that the established risk tolerance is consistent with funding capabilities and ongoing efforts to manage liquidity risk.
- IV-2d.* The Policy Group further recommends that each institution review its internal systems of both formal and informal communication across

business units and control functions to ensure that such communication systems encourage the prompt and coherent flow of risk-related information within and across business units and, as needed, the prompt escalation of quality information to top management.

3. The Roles of Committees

All large integrated financial intermediaries must, as a practical matter, rely on a number of senior level institution-wide committees to facilitate communication, coordination, and, in some instances, collective or consensus-based decision-making. While the names and mandates of such institution-wide committees will vary from one institution to another, the subject matter covered by these committees is fairly common and typically includes areas such as (1) financial risk management including funding and liquidity, (2) large commitments of the firm's own capital, (3) operational and reputational risk, (4) business practices, and (5) new product approvals. Recognizing the vital roles of these committees as an integral part of governance arrangements at large integrated financial intermediaries, the Policy Group believes that there are opportunities to strengthen the functioning of the committee structure. Specifically:

- IV-3a.* The Policy Group recommends that, when schedules permit, the CEO and the second ranking officers of all large integrated financial intermediaries should frequently attend and participate in meetings of risk management-related committees.

- IV-3b.* The Policy Group further recommends that the highest levels of management periodically review the functioning of the committee structure to ensure, among other things, that such committees are appropriately chaired and staffed and there is an appropriate overlap of key business leaders, support leaders, and enterprise executives across committees to help foster firm-wide cooperation and communication.

- IV-3c.* The Policy Group further recommends that for certain classes of firm-wide committees, such as those responsible for the approval of new products – especially new products having high financial, operational or

reputational risks – the committee oversight process should include a systematic post-approval review process. This post-approval review process would assess the extent to which new products have, in commercial terms, performed as expected. Equally important, the process would assess whether the risk characteristics of the new product have been consistent with expectations, including the burden of the new products on technology and operating systems. Further, it is particularly appropriate to review at the earliest opportunity outsized profitability and market share gains to ensure that this does not reflect a problem with the original pricing or risk assessment of the product.

C. Risk Measurement and Monitoring and Recommendations

CRMPG I and CRMPG II incorporated a number of recommendations that were broadly grouped into “Transparency and Counterparty Risk Assessment” (CRPMG I), “Internal Risk Measurement, Management and Reporting” (CRMPG I) and “Risk Management and Risk-Related Disclosure Practices” (CRMPG II) sections. As a result of significant individual firm and broader industry attention and investment, substantial progress has been made in fulfilling a preponderance of these initial recommendations. However, as a result of a more complex business environment and other factors, including an increasing variety of structures giving rise to basis and liquidity risk, required standards for risk management have increased substantially.

One component of these standards, without which effective risk management is not possible, is the accurate measurement and monitoring of credit and market risks. Building on the recommendations of the CRMPG I and II Reports, the following reflects additional or updated recommendations, which are essential, in the current environment, to the measurement and monitoring of these risks.

1. Investment in the Risk Management Process

Recent events have highlighted limitations and weaknesses in the risk management processes and infrastructures of many large integrated financial intermediaries and their clients. In some cases, reliance on other “smart” players to vet trades has been

considered sufficient to allow other firms to do “copy cat” trades. In other cases, excessive reliance on rating agencies without an independent and detailed analysis of the rating agencies’ rating criteria has led to complacency in building large positions of highly-rated but complex and illiquid financial instruments. In yet other cases, risk management teams have engaged in sophisticated theoretical modeling with limited connection to practical risk-taking activity. As a result, these teams’ relevance and efficacy have been limited.

These and other causes contributed to risk management systems and processes that were inadequate for the task of managing risk in the volatile, stressed environment of the credit market crisis.

Recommendations

Large integrated financial intermediaries need to make serious and sustained investment in their risk management teams and infrastructures. This activity must be at the core of the risk taking process. Large integrated financial intermediaries who choose not to make such investments, or who cannot afford to develop a comprehensive, sophisticated knowledge of the products in which they propose to trade, would be prudent to refrain from significant involvement in these areas.

Building these risk capabilities is not inexpensive. Nor can they be assembled “just in time” for large incremental market positions or new initiatives. Firms must make significant and sustained commitments during both tumultuous and quiet markets. Moreover, risk management infrastructure cannot be quickly discarded if the product or industry sector is no longer an area of opportunity; it must remain in place as long as the risk positions remain in place.

IV-4a. The Policy Group recommends that sustained investment in risk management systems and processes, and the careful calibration of such investment to business opportunities being pursued, be a key area of focus for a firm’s senior management team.

IV-4b. The Policy Group further recommends that each firm’s CRO commission a periodic review and assessment of the firm’s investments

in risk management for presentation to its senior management and the audit committee of its board.

2. Stability of Credit Terms

Credit terms, including initial and variation margin for derivatives, haircuts for margin loans, and similar terms have been a key means by which large integrated financial intermediaries compete for client business. During benign market periods, it is not uncommon for credit terms to be negotiated down to levels that could expose large integrated financial intermediaries to material risk (relative to the credit of the counterparty) in the event of a counterparty default. Conversely, when market conditions deteriorate, large integrated financial intermediaries are often inclined to tighten credit terms to levels providing greater resilience against credit issues.

As the events that create stress in one counterparty may also impact others, the combined impact of multiple counterparties simultaneously coming under stress can undermine the stability of the financial system by setting off rounds of cascading liquidations and accelerating price declines.

While incentives for pro-cyclical credit loosening and credit tightening actions are readily understandable, the effect of these actions is to increase financial stress on a counterparty when that counterparty – and sometimes the entire financial system – is most vulnerable. Consequences include straining systemic liquidity, requiring the sales of positions on an immediate or other accelerated basis, and potential promulgation of adverse rumors.

Large integrated financial intermediaries and other market participants can also adversely affect counterparties through other means, including: (1) requesting (or not accepting when requested) assignments or novations of trades, (2) requesting that a counterparty close out derivatives transactions (especially those that are in-the-money to the counterparty and thus require the return of collateral), and (3) withdrawing funding lines. These decisions can have the same effects as tightening credit terms, not only in terms of draws on liquidity, but also on the ability of the counterparty to maintain its desired portfolio composition.

The effect of these actions can both increase the stress on individual counterparties, as well as increase the risk of systemic disruption.

Recommendations

Large integrated financial intermediaries and their clients must mutually recognize the value of stable credit terms and work together to create sustainable arrangements. Such credit terms should be analyzed to estimate their adequacy during stress periods. Those that are likely to prove inadequate should be identified so the parties can consider strengthening them. The term and haircuts of a financing should be sized to the anticipated time required for an orderly liquidation during periods of market stress, while at the same time incorporating the uncollateralized credit quality of the counterparty. For example, a large integrated financial intermediary would have less onerous terms and haircuts than a small, standalone fund. Large integrated financial intermediaries and their clients should be aware of the consequences of requesting and setting credit terms that are not resilient to changing market conditions, and clients should prepare contingency plans to deal with adverse developments in credit terms.

- IV-5a.* The Policy Group recommends that all market participants implement a paradigm shift in credit terms, establishing arrangements that create more stable trading relationships, are less pro-cyclical, and thus reduce systemic risk.

- IV-5b.* The Policy Group further recommends that each firm's senior management commission a periodic review of credit terms extended over a cycle, together with an assessment of the stability of such terms, for discussion with the firm's senior management.

3. Credit Risk Systems – Exposure Aggregation Capabilities

To manage risk effectively, large integrated financial intermediaries must have the capability to monitor risk comprehensively. However, the range of large integrated financial intermediaries and client products, markets and businesses, together with the volumes and varieties of trades, and the disparate risk metrics applicable to these

products, makes this difficult. Further complicating the compilation of accurate exposure information is the variety of collateral and other limit- and trade-specific terms used, and the multitude of contract forms that are used to document trades and their associated credit terms.

Large integrated financial intermediaries need to maximize their ability to take appropriate actions to deal with counterparties before, during, and after the time the counterparty experiences problems. To do this, it is essential that large integrated financial intermediaries have the ability to rapidly compile aggregated counterparty information. This information should incorporate exposures across all related legal entities, on a global basis, with adjustments to reflect the effect of enforceable netting and collateral arrangements.

Recommendations

- IV-6a.* The Policy Group recommends that large integrated financial intermediaries ensure that their credit systems are adequate to compile detailed exposures to each of their institutional counterparties on an end-of-day basis by the opening of business the subsequent morning. In addition, the Policy Group recommends that large integrated financial intermediaries ensure their credit systems are capable of compiling, on an *ad hoc* basis and within a matter of hours, detailed and accurate estimates of market and credit risk exposure data across all counterparties and the risk parameters set out below. Within a slightly longer time frame this information should be expandable to include: (1) the directionality of the portfolio and of individual trades; (2) the incorporation of additional risk types, including contingent exposures and second and third order exposures (for example, SIVs, ABS, *etc.*); and (3) such other information as would be required to optimally manage risk exposures to a troubled counterparty. Large integrated financial intermediaries should be able to use exposure aggregation data both prospectively to avoid undue concentrations and, if necessary, in real time to react to unanticipated counterparty credit events.

- IV-6b.* To demonstrate their compliance with the aforementioned standards, the Policy Group recommends that firms conduct periodic exercises for both individual and multiple institutional counterparties, and, to the extent that deficiencies are observed, develop remediation plans as a matter of urgency.

4. Portfolio Metrics

Consistent with the recommendations of CRMPG I and II, market participants have expanded the range of risk metrics they use to include a range of stress tests, scenario analyses and other measures that are useful in revealing portfolio risk characteristics. However, in many cases during the recent market disruption, these risk metrics were not effective in capturing the totality of risks that were actually incurred. Deficiencies included: (1) insufficiently extreme modeling of adverse price moves; (2) unanticipated deterioration in liquidity (which stretched out closeout periods); (3) unfavorable position correlations; and (4) the incomplete capture of contingent risks.

Risk reports may also be materially affected by the incorporation of underlying assumptions that are not fully apparent to users, but which can have a profound effect on calculated exposures. Examples include underlying assumptions about: (1) the effectiveness of market and credit hedges; (2) collateral valuations; (3) collateral enforceability; (4) trade valuations; and (5) prepayment, default, delinquency, and severity.

Despite the range of available metrics, public disclosure has remained focused on VaR and on current exposure as the major measures of market and credit risk, respectively. This has contributed to the market's lack of understanding of the size and nature of risks being taken by large integrated financial intermediaries and other market participants.

Recommendations

- IV-7a.* The Policy Group recommends that large integrated financial intermediaries' risk analytics incorporate sufficient granularity to reveal less obvious risks that can occur infrequently but that may potentially

have a significant impact (for example, basis risks between single name underliers and index hedges). However, risk management professionals and senior management must recognize the limitations of mathematical models, and that the tendency to overly formalize arcane aspects of an analysis can often detract from an understanding of the bigger picture implications of the total risk position. Incremental analytical detail must not be allowed to overwhelm users of the data. The salient risk points must be drawn out and made apparent, especially to senior management. Adequate time and attention by senior management must also be allotted to socializing the implications of the risk data.

- IV-7b.* The Policy Group recommends that large integrated financial intermediaries ensure that assumptions underlying portfolio analyses are clearly articulated and are subject to frequent, comprehensive review. Alternative measures should be presented to demonstrate the sensitivity of the calculated metrics to changes in underlying assumptions.
- IV-7c.* The Policy Group recommends that credit risks be viewed in aggregate across exposures, giving full consideration to the effects of correlations between exposures. Further, counterparty credit risks, including correlations and directionality, should be evaluated based not only on positions within a large integrated financial intermediary, but also considering available data regarding the size and direction of positions the counterparty has at other firms.
- IV-7d.* The Policy Group further recommends that large integrated financial intermediaries work to supplement VaR as the dominant risk measure of market risk and current exposure as the dominant risk measure for credit risk, both for public reporting and for risk discussion purposes. Supplemental measures should include statistical information intended to display the most likely ways a large integrated financial intermediary

or a managed portfolio could sustain significant losses, as well as an indication of the potential size of those losses.

5. Stress Tests

Considerable emphasis has recently been given by risk practitioners, regulators, internal and external auditors, and other constituents to the practice of using stress tests as an essential metric in measuring risk. As conventionally performed, financial institutions select one or multiple stress scenarios and then evaluate their portfolio against the stresses incorporated in the selected scenario(s). They then draw conclusions based on the resulting loss levels relative to the capital, earnings capacity, or other determinants of the ability of the institution to incur such losses, as well as the returns expected and other such considerations.

One limitation of this approach is that it has, as a starting point, assumptions about the underlying markets and other parameters. To the extent that users of stress tests consider these assumptions to be unrealistic, too onerous, not strenuous enough, incorporating unlikely correlations or having similar issues which detract from their credibility, the stress tests can be dismissed by the target audience and its informational content thereby lost.

Additional ways of running and analyzing the data from stress tests may be useful. One approach which might draw out additional information would include the use of so-called "reverse stress tests". The starting point in the analysis would be an assumption that over a short period of time an institution incurs a very large multi-billion dollar loss. The analysis would then work backward to identify how such a loss could occur given actual positions and exposures prevailing when the stress test is conducted. If the assumed loss were truly large, it is highly likely that the possible sequence of events producing such a loss would have to entail elements of contagion or systemic forces. Thus, the reverse stress test is likely to require institutions to address issues that are not normally captured in stress tests. Done properly, the conduct of such a reverse stress test would be a very challenging exercise, requiring the engagement of senior personnel from both the income-producing and the control functions in a context in which the results of such exercises

would be shared with senior management. Finally, the use of reverse stress tests would be very much in keeping with Core Precept III, as discussed in Section I.

Recommendations

- IV-8a.* The Policy Group recommends that firms think creatively about how stress tests can be conducted to maximize their value to the firm including the idea of a reverse stress test where the emphasis is on the contagion that could cause a significant stress event to the firm.

- IV-8b.* The Policy Group further recommends that firms incorporate the expanded suite of stress tests into a formalized production schedule, against which trends and developments in key risk factors and exposure amounts can be tracked.

6. Risk Metrics and Liquidity Parameters

Among parameters incorporated into risk metrics in particular and risk management in general, current and prospective position liquidity is arguably the least developed. This is not because the importance of liquidity is not recognized. For example, CRMPG II specifically recommended that greater attention be focused on identifying and mitigating crowded trades. However, despite best intentions, little progress has been made in systematically or broadly capturing liquidity information. This is due in part to its volatility and lack of transparency.

Recent experience has demonstrated that the range of trades and entire markets that can become illiquid is very broad, and that illiquidity events can occur rapidly and with little warning. For example, recently, markets saw illiquidity in the “usual suspects” of popular but crowded trades and bespoke trades with limited numbers of potential counterparties. But, previously unrecognized product deficiencies were also revealed as there was rapid loss of liquidity in the commercial paper, asset-backed commercial paper, and municipal and student loan auction rate markets.

As a result, risk analytics and metrics that are based on “normal market” price volatility, unwind periods and other parameters can materially understate the risks inherent in trades or portfolios during periods of illiquidity. This is the case regardless of whether such illiquidity occurs as a result of crowded trades, market technical factors or other causes.

The use of “normal market” risk analytics and metrics permits (and perhaps even encourages) the development and use of structures that appear to be low risk but that in fact have unrevealed tail risk during periods of systemic stress (for example, SIVs and quantitative strategies-oriented hedge funds).

In addition to resulting in the potential understatement of the amount of risk being taken by a large integrated financial intermediary to its counterparties, the absence of liquidity information also has the potential to obscure the large integrated financial intermediary’s understanding of its counterparties’ credit quality. From a risk of loss perspective this is a toxic combination.

Recommendations

- IV-9a.* The Policy Group recommends that large integrated financial intermediaries adjust quantitative measures of potential credit risk with margined counterparties to take into account exceptionally large positions, as well as position concentrations in less liquid instruments. The adjustment should anticipate potentially protracted unwind periods and the risk of price gapping during unwinds.

- IV-9b.* The Policy Group further recommends that consideration be given to collecting higher initial margin and higher haircuts from counterparties with outsized positions relative to market liquidity. Large integrated financial intermediaries should also evaluate the need to adjust internal pricing for large positions.

Additional transparency in fixed income markets and their trade flows should be encouraged to permit market participants to better understand market activity. Initiatives like TRACE reporting of transactions and prices on a timely basis will improve

understanding of the markets and permit participants to better manage their risks. In aggregate, this will reduce systemic risk.

Industry groups and regulators need to support and sponsor additional academic and applied research on developing analytics for measuring, and procedures for disseminating, information on illiquid trades of all forms.

7. Pricing of Trades

Over the past year, one of the more public indications of market turmoil was the prevalence of significant valuation disputes. Mortgages, leveraged finance, and structured credit generally were among the markets where pricing disagreements were frequent and often substantial. This led to protracted periods of wide bid-ask spreads, and lack of consistent (or even non-existent) price information. This was true even among products and trade structures that had historically evidenced substantial trading volumes and strong price discovery.

In addition to differences in valuation methodologies, causes of pricing discrepancies included a lack of adequate infrastructure by some industry participants. As a result, some large integrated financial intermediaries were not able to analyze positions on a timely or comprehensive basis.

Among other consequences, there was a rise in levels of collateral disputes to magnitudes that contributed materially to systemic risk and that compromised risk management effectiveness. This increase also imposed additional burdens on stressed counterparties, for whom non-payment of collateral was sometimes construed as an indication of financial distress.

Recommendations

IV-10a. The Policy Group recommends that large integrated financial intermediaries ensure that they employ robust, consistent pricing policies and procedures, incorporating disciplined price verification for both proprietary and counterparty risk trades. Special attention should

be given to bespoke trades, structured products, illiquid products, and other difficult to price assets. A robust monitoring process should be employed to track stale prices and elevate unresolved issues.

IV-10b. The Policy Group further recommends that firms and industry groups promote standardized and strengthened dispute resolution mechanisms and encourage the application of higher levels of resources to position pricing. Firms should also promote enhanced understanding of the need for cooperative behavior among firms (for example, when requested to provide indicative bids).

IV-10c. The Policy Group further recommends that increased emphasis be given to using, wherever possible, transparent and liquid instruments rather than bespoke products. To incentivize this conduct, large integrated financial intermediaries should consider imposing internal charges against the P & L of hard to value and illiquid transactions, or other methods, such as higher capital charges, higher haircuts to collateralized borrowers, and the imposition of limits on allowed trade volumes. The recommendations incorporated in the section on High-Risk Complex Financial Instruments regarding documents and disclosure are of particular relevance to bespoke products.

8. Consistency of Position Prices Across Applications

The challenges associated with pricing illiquid and highly structured positions are compounded by the multiple outlets through which such prices are used inside and outside of a large integrated financial intermediary. Firm books and records, customer statements, collateral calls, and regulatory filings are but some of the applications for these valuations.

Many large integrated financial intermediaries acknowledge providing, externally, or using internally, different valuations for identical underlying products. This can lead to legal, reputational, regulatory and other potential issues, which can lead to financial and non-pecuniary losses. It can also lead to inaccurate information being used for internal and

external decision making. Finally, it contributes to, and may be indicative of, a lack of discipline and financial control within a firm.

Recommendations

IV-11a. The Policy Group recommends that large integrated financial intermediaries ensure, in the absence of exceptional circumstances, that when the same instrument is held by different business units, such instrument is marked at the same price in each unit. Large integrated financial intermediaries should restrict those personnel and groups that are authorized to provide marks to internal and external audiences. Any differentials in pricing across applications or units should be carefully considered and the rationale for such differences should be fully documented. Notwithstanding the above, it is recognized that for large integrated financial intermediaries, there are communication walls that are designed to fulfill regulatory requirements for the restriction of information flows. In these instances, it is understood that legitimate differences in pricing may occur.

9. Incentive Structures – Impact on Risk (including Systemic Risk)

Large integrated financial intermediaries and other market participants manage their businesses within a complex framework of rules, norms, and practices established by regulators, auditors, legal departments, equity and debt investors, and a variety of other constituents.

Large integrated financial intermediaries typically attempt to optimize performance subject to liquidity, rating agency, regulatory capital, accounting, and other parameters. This can encourage behavior which, when taken across an industry as a whole, can prove highly pro-cyclical. This is particularly the case given industry participants' tendency to mirror each other's trading strategies, and their requirement to unwind positions on a simultaneous basis during periods of market stress.

Recommendations

- IV-12a.* The Policy Group recommends that large integrated financial intermediaries ensure that a review of the systemic risk implications of incentives and consequent remedial actions is an integral component of each firm's risk management practices. Regulators should encourage this proactive review and assessment on a regular periodic basis. Regulators should identify practices that have the potential to destabilize markets during periods of stress and communicate their concerns aggressively.
- IV-12b.* The Policy Group further recommends that, when considering new trade structures, strategies, or other opportunities, systemic risk implications be evaluated by the senior management of large integrated financial intermediaries. Trades or structures which materially add to systemic risk should be subject to particular scrutiny.

D. Liquidity Background and Recommendations

The recent market dislocation has demonstrated the critical need for individual firms to adopt liquidity practices that are appropriate for the scope of their businesses, their geographic footprint, and their risk profile. Maintenance of a strong liquidity position, combined with effective risk management and monitoring practices, is essential to the financial condition of individual firms and, more broadly, the health of the financial system.

As demonstrated by the recent events surrounding Bear Stearns, few institutions can withstand extreme funding and liquidity dislocations involving both secured and unsecured financing sources. At a minimum, these events demonstrated several threats to firms that have become more prevalent over the preceding ten years: (1) the unwillingness of counterparties to provide funding, even against certain high quality assets, in a time of severe stress; (2) the rapid loss of funding from prime brokerage clients; and (3) dislocations related to CDS. Although it is not possible to anticipate the precise evolution of financial markets and innovation over the next ten years, our recommendations reflect the belief that new vulnerabilities will undoubtedly appear.

The immediate instinct, after the extreme liquidity dislocation experienced recently, is to mandate a prescriptive, target-based approach to liquidity management. While convenient, that approach will wholly miss the mark of what will be effective. The Policy Group believes that liquidity should be monitored by supervisors in the context of the Basel II, Pillar II process *via* an evaluation of a firm's liquidity risk management processes and models, as well as the assessment of a broad set of liquidity metrics. Firms' liquidity needs, strategies, and processes vary widely for entirely legitimate business reasons. Therefore, to effectively supervise liquidity is to recognize the unique product and geographic nature of different firms and the related set of factors that make for a well-functioning liquidity program.

In that context, the role of an effective liquidity manager is to identify a firm's full set of potential liquidity fault lines, to build a nuanced understanding of the dynamic behavior of different liquidity levers in stress events, and to develop a thoughtful set of expectations around outcomes and survival periods under these stress events. These activities, of course, must incorporate any regulatory or jurisdictional restrictions on the use of liquidity for a firm's different legal entities and reflect the sometimes very complex structure of legal entities comprising large integrated financial intermediaries.

A number of recent efforts, including the draft Basel Committee on Banking Supervision, "Principles for Sound Liquidity Risk Management and Supervision," provide broad-based views on effective liquidity management in the context of the credit market crisis. CRMPG III objectives in this area are not to present a comprehensive policy view of effective liquidity management, but rather to highlight the most critical lessons from the recent dislocation and make related recommendations.

1. Maximum Liquidity Outflow (MLO) Stress Testing

Over the past nine to twelve months, unprecedented market disruptions have combined with a deterioration of the financial condition of firms to place significant pressure on the funding of individual firms, as well as on the system as a whole. These events, and the resulting funding pressures, have exposed weaknesses in firms' approaches to stress testing and the connection between these stress tests and "business as usual" liquidity management. Many firms had sound approaches to idiosyncratic and systemic funding

liquidity disruptions but did not forecast the likely overlap of these events and their related maximum liquidity outflows in any given period of time. In addition, many firms' stress testing and contingency planning were designed with relatively short survival horizons under the assumption that a crisis would be of moderate duration and that within this timeframe confidence in the institution and the system would be restored.

Recommendations

IV-13a. The Policy Group recommends that all large integrated financial intermediaries should, on a regular basis, conduct liquidity stress tests to measure their MLO. Stress tests should be based on scenarios that consider how normal sources of liquidity, both secured and unsecured, could be disrupted for the firm, the markets, or both. The stress test scenarios should focus on potential liquidity outflows, taking into account a firm's particular vulnerabilities.

IV-13b. The Policy Group further recommends that, in addition, at a minimum, firms monitor their MLO within the first 30 days and for additional intervals within this timeframe (for example, overnight, one week, two weeks). The MLO is defined as the net loss of liquidity under the firm's most severe scenario from the time of the calculation for the tenors prescribed.

IV-13c. The Policy Group recommends that stress scenarios, both for purposes of stress testing and calculation of MLO, should:

- Include both firm-specific and systemic events and their overlapping nature.
- Consider extreme shocks as well as progressive events.
- Take into account implicit as well as explicit risks and potential damage of a firm's actions to its franchise.

- Review the potential for loss of key sources of secured and unsecured funding, including deposits, commercial paper, and other short- and long-term debt. Firms should also consider the impact of funding illiquidity on asset-backed commercial paper conduits and on the ability to securitize pools of assets.
- Analyze the potential outflows related to customer activity, including prime brokerage.
- Examine the impact of on- and off-balance sheet exposures including the potential outflows related to derivative transactions, liquidity commitments, and special purpose vehicles.
- Consider the impact of intra-day liquidity exposures, including the heightened interest of counterparties to accelerate trades and settlements in times of stress and other time-related mismatches in the flow of funds.
- Consider other large cash payments including salaries, taxes and lease payments.
- As with all liquidity practices, evaluate the impact on both individual legal entities, as well as the consolidated firm.
- Consider the availability of central bank facilities. Generally speaking, extraordinary central bank facilities, such as the Federal Reserve System's Primary Dealer Credit Facility, should not be considered an element of an effective liquidity plan.

These stress tests, and their results, would be internally classified, confidential documents that would be shared with senior management, boards of directors, and primary supervisors on a periodic basis. The

information provided by the stress tests should be used to identify funding gaps and assess where gaps are incompatible with the firm's risk appetite. Since the stress test information provided to supervisors would be confidential supervisory information, it would and should be protected from public disclosure.

2. Availability of Unencumbered Highly-Liquid Reserves

Recent events have demonstrated that firms may experience a rapid reduction in the availability of both unsecured and secured funding. This experience requires a reexamination of the types of assets that would be available for incremental funding in a liquidity event. Pools of lower quality unencumbered assets may not provide incremental funding if the firm cannot convert assets into same day liquidity through sale, repo, or pledge to a central bank. Further, recent experience has indicated that firms may lose secured funding from lower quality assets that are currently providing liquidity.

Recommendations

IV-14. The Policy Group recommends that all large integrated financial intermediaries maintain, on an ongoing basis, an unencumbered liquidity reserve of cash and the highest grade and most liquid securities. The liquidity reserve should be sized in relation to the firm's stress tests and MLO and should explicitly reflect the firm's liquidity risk tolerance and desired survival periods.

3. Structural, Long-Term Liquidity

Long-term, structural liquidity shortfalls translate, over time, into short-term funding needs or vulnerabilities. This is particularly the case under more prolonged periods of dislocation. A comprehensive view of a firm's liquidity requires utilizing measures to address both the short-term and long-term liquidity position of the firm. To enable an effective liquidity program, there is a need to regularly assess the structural, longer-term liquidity position of the firm.

Recommendations

IV-15. The Policy Group recommends that all large integrated financial intermediaries maintain long-term structural liquidity in excess of their illiquid assets. In making this assessment, large integrated financial intermediaries should analyze the term structure of their long-term liabilities and the long-term stable portion of their deposits (where applicable), as well as equity capital. Illiquid assets should include those assets that cannot be converted to cash within a specified horizon and potential growth of those assets, as well as the haircuts necessary to convert generally liquid assets to cash through sale, securitization, or secured financing.

The baseline assessment of whether a large integrated financial intermediary has long-term structural liquidity in excess of its illiquid assets should reflect current business conditions. However, the amount of this excess (“the cushion”) should reflect an evaluation of the assets and liabilities under stressed conditions. This cushion should be replenished with structured long-term liabilities, with tenors appropriate to market conditions, business strategy, and existing debt maturities.

4. A More Encompassing Approach to Liquidity Management

Strategic planning and new product development processes have not consistently taken into account their initial and ongoing impact on liquidity. In addition, firms systematically have not fully incorporated into their liquidity planning the full extent of on- and off-balance sheet obligations, including non-contractual, reputational and franchise related exposures. In particular, the growth and nature of off-balance sheet liquidity exposures have not been consistently factored into liquidity plans, subjected to adequate stress tests, priced in a manner commensurate with their expected risks, or consistently factored into risk capital models. The incorporation of these risks into the broader thinking of liquidity managers has often been gradual and in some instances lagged market events.

Recommendations

IV-16. The Policy Group recommends that a firm's liquidity plan and any stress tests mentioned above include, in all instances, the full set of on- and off-balance sheet obligations. In addition, they must reflect a clear view of how the firm will address non-contractual obligations that have significant franchise implications. While some non-contractual obligations may not lend themselves to incorporation into the core stress scenarios, an evaluation of how such exposures will play out in different market environments should be an overlay to the core stress scenarios. In addition, a clear assessment of how practices in relevant markets (for example, SIVs and auction rate securities) will affect an individual firm's conduct should be directly factored into liquidity planning. The above liquidity exposures should be fully priced under the firm's transfer pricing policies (see Recommendation V-17).

5. Comprehensive Funds Transfer Pricing

One of the foundations for business performance evaluation and the management of a firm's balance sheet is a comprehensive funds transfer pricing mechanism that assigns the cost of funding to businesses that make use of it and credits the benefits of funding to businesses that generate it. Many of today's issues around liquidity and funding at individual firms can be traced back to a failure to adequately price for both on- and off-balance sheet funding exposures.

Recommendations

IV-17. The Policy Group recommends that all large integrated financial intermediaries incorporate appropriate pricing-based incentives for the full spectrum of their funding activities. This includes a funds transfer pricing policy that assigns the cost of funding to businesses that use funding and credits the benefits of funding to businesses that provide it. This must encompass both on- and off-balance sheet activities (for example, contingent funding), as well as potential funding needs related to actions that might be taken to preserve the institution's reputation.

The funds transfer pricing process should be informed by stress testing efforts that identify potential vulnerabilities and assign the related costs to the businesses that create them. The methodology should provide direct economic incentives factoring in the related liquidity value of assets and behavioral patterns of liabilities. The costs and benefits identified should be assigned to specific businesses and, under all circumstances, used in evaluating the businesses' performance.

6. Integration of Liquidity Risk Management into a Firm-Wide Risk Management Approach

Recent market events and the resulting stress on individual financial institutions and on the system, more broadly, exposed shortfalls in the communication processes between risk disciplines within firms and between the risk functions and the respective business managers. Regardless of a firm's formal organizational structure, communication processes often fell short of that necessary to ensure identification and mitigation of the comprehensive set of risks faced by firms. The President's Working Group on Financial Markets' March 6, 2008 "Policy Statement on Financial Market Developments" appropriately notes that firms that suffered extensive losses exhibited "inadequate communications among senior management, business lines and risk management functions". Further, the Financial Stability Forum, in its April 2008 report, "Enhancing Market and Institutional Resilience," observes that firms did not adequately address the links between funding, market, liquidity, and credit risk. Failure to link these disciplines in a seamless way contributed to liquidity blind spots within firms, resulted in inadequate evaluation of liquidity buffers and contributed to dislocations in the money markets.

Recommendations

- IV-18.* The Policy Group recommends that to manage, monitor, and control funding liquidity risk, treasury officials in particular need to be included in an enterprise-wide risk management process with appropriate channels of communication. The evaluation of the interconnected elements of these risks requires seamless communication across all risk disciplines, as well as between risk management functions,

treasury and the underlying businesses. All integrated financial services firms should hold regularly scheduled meetings of an oversight committee represented by the above disciplines to monitor the firm's liquidity positions.

7. Capital and Liquidity Planning

As part of the liquidity planning process, firms regularly collect information (for example, levels, rates, maturities) about the entirety of the balance sheet. This information allows them to manage the inherent interest rate risk and to evaluate any maturity mismatches that may exist. At the same time, capital planning information related to asset levels and sensitivities is critical for effective liquidity planning. The events of the past year have made it clear that the liquidity and capital planning processes need to be more coordinated.

Recommendations

- IV-19.* The Policy Group recommends that firms explicitly coordinate across their liquidity and capital planning processes and, at a minimum, ensure that critical information flows between the two processes. Executive management must have the capacity to evaluate and incorporate the highly integrated nature of the two disciplines into its planning activities.

E. Capital Adequacy and Recommendations

Strong levels of capitalization are essential to ensuring confidence in financial institutions. The turmoil in credit and money markets over the last year has reemphasized this. Firms that have experienced substantial losses in connection with subprime, leveraged loan, or other write-downs have found it imperative to replenish their capital bases. Failing to do so risked a further erosion of confidence in these firms as going concerns by investors, counterparties, customers, and supervisors. The capital raising completed over the last year – in the hundreds of billions of dollars – has helped strengthen firms' abilities to absorb future potential losses and repositioned them to invest in more attractive business segments as opportunities present themselves. Reflecting upon the issue of capital

adequacy in the context of the recent market stresses, two important considerations emerge:

First, while strong capital levels are critical to future financial performance, they alone do not ensure a financial institution can or will remain a going concern. Both Bear Stearns and Northern Rock appeared to have reasonable levels of capitalization as measured by their respective regulatory regimes. However, neither firm was able to maintain the necessary liquidity to fund their operations on a continuing basis, resulting in their effective insolvency. Therefore, it is evident that capital management and liquidity management are complementary disciplines that must be addressed together.

Second, the adequacy of capital is best determined by employing robust measures of the economic risks of the assets the capital is funding. Accounting measures of capital leverage and blunt risk-based measures such as Basel I provide potentially misleading signals about capital adequacy – particularly in periods of market stress – because they do not properly recognize material risk factors applicable to underlying assets (including their liquidity characteristics) or the structural features of business activity, such as dynamic collateral requirements. This consideration underscores the Policy Group’s belief that the risk-sensitive regime in Basel II is preferable to both Basel I and leverage ratio measures.

Recommendations

IV-20a. The Policy Group re-affirms its recommendation that for large integrated banks and investment banks, Basel II should remain the primary capital standard that such institutions, their primary supervisors, and the marketplace generally look to in making judgments about capital adequacy.

IV-20b. The Policy Group recommends, at least for the present, that the existing Basel II standards for minimum capital and well-capitalized institutions be maintained. In taking that position, the Policy Group recognizes that the experience of the credit market crisis provides a

sobering reminder to individual institutions, their senior management and their supervisors that future judgments about capital adequacy should be more sensitive to downside risks than perhaps has been the case in the past.

IV-20c. The Policy Group further recommends that supervisory judgments about capital adequacy for all large integrated banks and investment banks give primary weight to case-by-case evaluations based on the range of criteria contained in Basel II, Pillar II, and, when necessary, such judgments should be promptly shared with individual institutions.

IV-20d. The Policy Group strongly recommends that every reasonable effort be made by the international community of supervisory authorities to (1) seek to stabilize, at least for a reasonable period of time, the methodology associated with Basel II, (2) move toward a common implementation date across major jurisdictions, and (3) insure a competitive and supervisory level playing field in the application of Basel II across classes of institutions and across national boundaries.

F. Leverage

The Policy Group is strongly of the view that leverage ratios are a seriously flawed measure of capital adequacy, except in highly unusual circumstances. The limitations that are inherent to leverage ratios were spelled out in the CRMPG I Report in 1999 and repeated in the CRMPG II Report in 2005.

As set out in detail in Appendix A of the CRMPG I Report, traditional measures of leverage, such as total on-balance sheet assets to equity, are misleading because they inadequately capture the relationship between the real risk of loss and the capital available to absorb it. A gross on-balance sheet leverage measure (1) does not take into account the potential variability in the value of off-balance sheet assets, (2) does not capture the risk dynamics of assets with embedded leverage, (3) does not give credit for hedging (including when matched book assets are perfectly hedged with offsetting liabilities), and (4) most importantly, fails to distinguish between assets with the same

balance sheet value but widely differing risk. All balance sheet measures of leverage share a critical flaw in that a firm that appears to have relatively low leverage can nonetheless be taking substantial risks, while a firm that looks relatively highly leveraged may well be taking little risk. Viewed in isolation without greater understanding of the risk characteristics of portfolio assets, balance sheet measures of leverage can send false signals about a firm's financial and risk condition. Appendix A to the CRMPG I Report explored these flaws and offered progressively more sophisticated measures of leverage to address them. In the end, CRMPG I concluded there is no single right measure of leverage. The challenge for financial institutions is to ensure that there is deep understanding and management of how asset liquidity and funding liquidity interact dynamically for a given portfolio of assets and sources of financing, including capital.

Notwithstanding the Policy Group's view as to the shortcomings of leverage ratios, the Policy Group does recognize that (1) in some circumstances they can provide useful information and (2) in the aftermath of the credit market crisis they cannot be dismissed out of hand.

Recommendations

- IV-21a.* The Policy Group recommends that where the use of leverage ratios is compulsory, supervisors monitor such leverage ratios using the Basel II, Pillar II techniques and intervene regarding the adequacy of such leverage ratios only on a case-by-case basis.

- IV-21b.* The Policy Group recommends that efforts be directed at either (1) framing more meaningful leverage ratios where they exist or (2) phasing out their use and implementing alternative risk measures that more effectively fulfill their intended objectives.

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