

become more robust, with refined charges for the provision of liquidity, including contingent liquidity, and/or better alignment of incentives in business lines with established risk appetite.

Firms said they were increasing the scope of business activities covered in funds transfer pricing—including off-balance-sheet exposures—and applying funds transfer pricing more comprehensively across business lines and down to trading desk levels and beyond, where appropriate. Liquidity premiums have been added to certain activities to encourage stable funding. In addition, penalties have been assigned to discourage dependence on the parent or on short-term unsecured funds. Firms said they were working to integrate funds transfer pricing practices more fully into the overall liquidity risk management structure to ensure that established costs and incentives are having the desired effect and to avoid producing unintended arbitrage opportunities. Two firms were considering ways to charge businesses for stressed funding risk, as measured by their maximum cash outflow metrics.

Some treasurers transfer priced funds based on the expected holding period of the positions—irrespective of the position term or maturity. In many cases, the stated holding period was short term (trading) and the asset liquidity was unquestioned. As value and liquidity dissipated, the effective funding mismatch grew.

Firms found that increasing the cost of funds did not always work to control the balance sheet, as many trading desks and businesses had developed their own funding sources. For example, one firm found that upon receiving a higher cost of funds from corporate treasury, the prime brokerage unit would in turn offer clients a lower but attractive yield on deposits. In this case, prime brokerage would become a source of funding that would resell these funds to treasury—reducing the funds required from other sources. The prime brokerage funds, however, were extremely credit sensitive and departed from the firm at the first sign of distress. Some treasurers have introduced a bid/offer mechanism in transfer pricing in order to account for the likelihood that business units will source their own liquidity and arbitrage treasury.

Contingency Funding Plans

Most firms' contingency funding plans were, to some degree, inadequate for the events of the second half of 2008. Firms generally agreed on the need to enhance their plans, which had become overly focused on institution-specific events often typified by credit rating downgrades by the rating agencies.

A key lesson of the crisis, observed by firms and supervisors, was that complex corporate structures hindered effective contingency funding. Firms found that these

structures, which were often created to arbitrage tax and regulatory capital frameworks, also created significant constraints on the flow of funds across the firm between legal entities. Treasurers had often devised contingent funding plans on a consolidated basis and failed to recognize the constraints on funds flow created by legal complexity. In some cases, the complexity of the organizational structure prevented firms from readily accessing secondary sources of liquidity, such as central bank discount facilities. As a result, firms acknowledged the importance of a “bottom-up” approach to contingency planning, which includes the preparation of contingency funding plans at the individual legal entity level.

2. Risk Management Changes Associated with Prime Brokerage

- **Internal limits are being established on the use of rehypothecated client collateral and free credit balances.**
- **Firms are strengthening controls over client balance transfers.**
- **Dealers and clients are discussing the segregation of initial margins.**

Limits on Rehypothecation of Client Securities

Growing out of the LBIE experience, documentation and contractual rights were subsequently renegotiated with hedge fund clients. In particular, limits were imposed on rehypothecation rights and caps were agreed to in international prime broker agreements where previously none had existed. Such rehypothecation caps were typically set at levels to cover margin debits and collateral haircuts and to allow for operational friction. There was also a push by prime brokers to ensure that client service and operational expectations were aligned with contractual provisions contained in governing agreements. Some hedge funds arranged to transfer unencumbered securities that exceeded rehypothecation caps out of prime broker accounts and into custodian or triparty accounts. In response, some firms said they have developed their own bankruptcy remote or custody solutions to address client demands for asset protection. In other cases, firms have established tight internal limits on their own reliance on rehypothecated client collateral.

Enhanced Controls over Requests for Balance Transfers and Financing Commitments

During the period of crisis that followed Lehman's failure, the senior management of some firms said they became actively engaged in centrally monitoring and controlling firm-wide liquidity and the status of funding on a real-time basis. This

became especially important for firms with significant prime brokerage operations, where previously cash management had been conducted locally within the business unit. Because of the client service orientation of prime brokerage operations, client requests for immediate or real-time balance transfers were often met without consideration for the frictional impact on the liquidity profile of the business.

In addition to implementing new controls on outflows of funds, senior management imposed additional restrictions on accepting new transactions with funding implications. These restrictions placed a low or even zero limit on the amount of client financing that the sales force could commit to without explicit senior management approval.

Reduced Reliance on Free Credit Balances

Following the experiences associated with Bear Stearns—and with growing market awareness of the magnitude of free credit balance outflows experienced by Bear Stearns prior to its acquisition—prime brokers have taken steps to adjust their assumptions on stress outflows, including their assumptions of the impact of severe market events on the level of free credit balances. By fall 2008, firms were able to accommodate these outflows more effectively.

Returns provided to prime brokerage clients on free credit balances were repriced by international prime brokers when their value as a relatively inexpensive source of funding diminished. This reassessment of value has largely been driven by internal controls and new risk-based funds transfer pricing arrangements established by centralized corporate treasury functions. The repricing has reduced the level of returns that hedge funds achieve on free credit balances.

Before the crisis, firms recognized that free credit balances could be drawn down quickly. However, some firms were unprepared for the scale and immediacy of the outflows of client portfolios and cash balances following the Lehman Brothers default. Consequently, internal reporting and transfer pricing had to be adapted to take account of this new liquidity risk profile. The latter change was necessary in order to reduce reliance on this relatively unstable, noncore source of funding.

Most prime brokers are making adjustments to transfer pricing and management reporting arrangements. The adjustments are intended to ensure that tight controls are placed on the financing side of the business and that liquidity risk pertaining to the prime brokerage business is within limits so that such risk does not impair the firm's overall liquidity risk profile.

Segregation of Margin

A number of prime brokerage clients requested that independent amounts (initial margin) under the International Swaps and Derivatives Association's Credit Support Annex be held in segregated accounts. The purpose was to mitigate client exposure to a dealer's failure. Although some requests were met, overall the banks resisted these moves. Of note, there was a pricing implication associated with locking up initial margin, as these amounts are generally used for liquidity purposes, such as posting margin by the banks to clearing houses to cover exchange margining requirements. Many investment banks said the number of these requests declined as credit concerns eased. Still, as a result of the observed prime brokerage stresses in 2008, prime brokers started to provide hedge funds with more frequent (sometimes daily) and comprehensive management information presenting details and usage of all rehypothecated assets.

3. Risk Management Changes Associated with Securities Lending

- **Beneficial owners tightened reinvestment guidelines applied by agents and are becoming more discriminating in their choice of counterparties.**
- **Firms are strengthening controls over commingled accounts; additionally, there has been some migration of clients from commingled to separate accounts.**

Firms have responded to the new environment following September and October 2008 by undertaking formal and informal changes to risk management and control practices. Firms have focused most on improving collateral and CCR management and on strengthening liquidity in their reinvestment funds. In addition, according to some, there has been a significant shift to "intrinsic value" lending by beneficial owners that previously may have taken a "volume/securities finance" approach.¹³

Higher Standards for Acceptable Collateral

Beneficial owners and their agent lenders were establishing more conservative guidelines for their reinvestment programs. Outside of the United States, participants reported a move away from non-central-bank-eligible forms of collateral, such as equities and convertibles, and other asset classes generally perceived to hold greater credit and liquidity risk. Securities

¹³For an explanation of the intrinsic value and volume/securities finance approaches to securities lending, see footnote 8.

lacking transparency—for example, collateralized debt obligations and private-label mortgage-backed securities—were among the least desirable forms of collateral since September 2008.

Agents have engaged in more rigorous collateral reviews—for example, CUSIP-by-CUSIP assessments in some cases (despite the prohibitive expense that some see)—and in the establishment of a formal funding review of collateral in addition to a credit review.

Higher Liquidity Targets

Prior to the onset of financial stress, some cash reinvestment fund managers sought higher yields in a low-interest-rate environment by investing in somewhat riskier assets that were still considered safe. Many of these securities proved to be illiquid during the crisis. As a result, agent lenders sought to increase the overall liquidity in their cash reinvestment funds as conditions deteriorated.

Overnight liquidity ratios in cash reinvestment funds varied as of December 2008, but in some cases they ranged between 20 and 30 percent, compared with approximately 10 percent prior to the financial crisis. As of December 2008, improvements in such ratios were attributed to maturing assets, new reinvestment business, and, in certain cases, sponsor support, and less to successful asset sales. Going forward, some firms are targeting higher overnight liquidity ratios, in the range of 30 to 50 percent of the fund's asset value.

Greater Counterparty Focus

Beneficial owners and agent lenders were much more focused on counterparty risk and daylight exposures than they were before the crisis. Some agent lenders noted the importance of diversifying counterparties for the purposes of their own transactions.

Agent lenders said their existing credit concentration limits have generally not been faulted for significant losses in reinvestment funds. However, dramatic reductions in the size of firms' reinvestment books resulted in larger counterparty exposures exceeding issuer concentration limits in the aftermath of the crisis. As a result, fund managers were unable to purchase additional investments involving exposure to these counterparties.

Controls over Commingled Accounts

Agent lenders reported strengthened controls over commingled reinvestment funds because of risks that surfaced in 2008. Commingled funds tended to have higher targeted liquidity levels, for example, approximately 50 percent of total net assets at one firm with significant commingled accounts.

Some managers of cash collateral reinvestment funds also imposed controls to restrict or slow cash redemptions by permitting beneficial owners to redeem in cash only for ordinary course redemptions (that is, to pay back borrowers), and required beneficial owners to maintain then-current levels of lending or the beneficial owners would be completely redeemed out in-kind.

One practice among cash collateral reinvestment funds that sustained losses was to lock down the losses in a manner that ensured a fair distribution of losses across the full investor base while allowing shareholders to redeem a “vertical slice” of fund investments.¹⁴ In some instances, concerns about the effectiveness of these controls, including the timing or fairness of their application, have been the focus of lawsuits against agent lenders and have underscored the importance to firms of reviewing controls to protect themselves against legal and reputational risks.

4. Risk Management Changes Associated with Money Market Mutual Funds

- **Sponsored funds are revisiting the adequacy of their liquidity buffers to protect against extreme tail events; while such events were not typical before the crisis, several firms were incorporating into their contingency funding plans support for MMMFs and/or conducting some form of stress testing by the September–October 2008 period.**

Several sponsoring firms said they revised their assumptions about the reliability of funding from MMMFs in an extreme scenario. Several firms said they focused on the level of liquidity in their funds, and several sources improved their contingency planning. The MMMF crisis underscored the need for greater consideration of leading practices in investment management appropriate for funds with a stable net asset value (NAV).¹⁵ Events during the crisis also reinforced the importance of transparency to investors on the composition of portfolio holdings, particularly if firms are promising shareholders a stable NAV.

¹⁴ A vertical slice is the pro-rata portion of the fund's holdings received by an investor.

¹⁵ Under paragraph (c)(7)(ii) of SEC Rule 2a-7, the firm's board must adopt (and periodically review) written procedures requiring the fund to calculate the extent of any deviation between the fund's NAV, determined by reference to the amortized cost, and the market value of the portfolio “at such intervals as the board of directors determines appropriate and reasonable in light of current market conditions.” If the deviation exceeds 50 basis points, the board “shall promptly consider what action, if any” it should take. (Under Rule 2a-7(c)(1), a money market fund is able to rely on the amortized cost method of valuation only as long as the board believes it fairly reflects the market-based NAV.) The 50 basis point threshold is a trigger for when the board must get involved; it does not require the board to take any particular action.

Adequacy of Liquidity Buffers

One large sponsor noted that liquidity in its MMMFs tended to be approximately 10 percent of total net assets prior to the crisis and was subsequently raised to 25 to 35 percent. This move appeared consistent with the broader trend among funds to improve their liquidity profiles.

Contingency Planning

A few firms did incorporate fund support into their contingency funding plans (CFPs) before the crisis. Others had little or no reference to fund support in their CFPs prior to the September-October 2008 period. Regardless of prior approach, sponsoring firms did not anticipate the franchise and reputational risks associated with the run on MMMFs, and were generally unprepared for the extent of

liquidity demands on their business lines and on the consolidated firm.

Proposed Regulatory Reform

Several amendments to Rule 2a-7 and related rules governing money market funds are being considered in the United States. These changes are designed to enhance the resilience of funds to withstand short-term market turbulence and to provide greater protection for investors. The amendments would require funds to maintain a portion of their portfolios in instruments that can be readily converted into cash, to reduce exposure to long-term debt, and to limit investments to the highest quality securities. The modifications under consideration would also permit funds that have “broken the buck” to suspend redemptions to allow for the orderly liquidation of fund assets.

IV. SUPERVISORY EVALUATION OF SELF-ASSESSMENTS AND CRITICAL AREAS FOR CONTINUED FIRM IMPROVEMENTS

A. Background on Self-Assessment Exercise

- **Twenty firms were asked to benchmark their practices to industry standards.**

In November 2008, supervisors asked twenty major global financial firms to conduct self-assessments of their current risk management practices. Supervisors asked firms to benchmark their practices against the recommendations and observations of five industry and supervisory studies published in 2008.¹⁶ Taken together, these studies identified a wide range of 1) risk management control weaknesses that contributed considerably to reducing firms' financial resilience during the ongoing financial crisis and 2) risk management practices believed to have enhanced firms' abilities to withstand future market turbulence.

As instructed, the firms completed the self-assessments, presented the findings to their boards of directors, and submitted the self-assessments to their primary supervisors during the first quarter of 2009.¹⁷ Supervisors reviewed, aggregated, analyzed, and discussed the results. Senior Supervisors Group member agencies subsequently participated in interviews to discuss the lessons that firms learned from the crisis and the changes made to their risk management practices since the issuance of the first SSG report in March 2008. Notably, and commendably, a few firms had already conducted self-assessments against several of these industry reports prior to the supervisory request.

The observations in this report represent the collective view of the SSG. This collective view is based on the SSG's evaluation of the self-assessment submissions, bilateral supervisory discussions with the firms, and fifteen collective supervisory interviews conducted with a sample of the firms that completed the self-assessments.¹⁸

¹⁶ See footnote 1 for a list of the studies.

¹⁷ The SSG compiled the recommendations and observations of these reports in a suggested template. The recommendations and observations were organized by theme and clustered according to subthemes to create thirty-two assessment topics. For each assessment topic, firms were asked to review the list of recommendations and observations and indicate if the firm's practices were fully, partially, or not aligned with them. A copy of the template is included in the supplement to this report.

B. Overview of Results

- **Firms overall consider themselves well aligned with recommendations and observations, although to varying degrees across the set.**
- **Supervisors see more extensive gaps that still need to be closed.**

Supervisors found that many of the firms submitted thoughtful and substantive responses to the self-assessment exercise, but supervisors did not always agree with the firms' conclusions. Participating firms in aggregate were considerably more favorable in assessing their alignment with recommendations and observations than were their supervisors. Some of the differences arose because firms were giving themselves full credit for enhancements planned or only partially completed. While supervisors acknowledge some progress over the last twelve months since the crisis began, they see a clear need for broad-scale further remediation and believe that firms have to take significant additional action to institutionalize the recent changes that have been made. Supervisory views were generally more critical than those of the firms on the current state of board and senior management oversight, articulation of risk appetite, incentives, controls, and IT infrastructure. These issues are discussed in detail below.

1. Practices Assessed by Firms as Most Aligned with Recommendations

Firms rated their practices regarding governance and certain aspects of liquidity monitoring and planning as those that were most aligned with recommendations (Table 1). Notably, firms determined that they have made the most progress on governance and liquidity topics. These areas may have received the most attention because of the leading roles they played in earlier events. Many of the changes cited by firms represent "low-hanging fruit" that could be made quickly without substantial investments in new infrastructure.

¹⁸ It is important to note that the observations reported here are based on the firms' submissions. The supervisors did not validate these submissions and, at times, had views that differed from an individual firm's assertions. Some firms may have held themselves to a higher or lower standard than their peers in assessing the state of their controls. Nevertheless, the SSG members believe that, in aggregate, the relative order of alignment of firm practices with specific topics that emerged from the self-assessment exercise was broadly representative of the state of industry practice.

TABLE 1

Assessment Topics with Which Firms Consider Themselves Most Aligned*

Assessment Topic	Number of Firms			
	Fully Aligned	Partially Aligned	Not Aligned	NA/NR
Governance: Roles and responsibilities	20	0	0	0
Governance: Policies	20	0	0	0
Governance: Internal coordination and communication	20	0	0	0
Governance: Risk committee	19	1	0	0
Disclosure and transparency: Risk disclosure and transparency	16	3	0	1
Governance: Role of the chief risk officer	16	2	0	2
Liquidity risk: Monitoring and planning	18	2	0	0
Liquidity risk: Funding and reserve management	17	3	0	0

*Firms assessed their risk management practices as being fully aligned with (assigned a “3”), partially aligned with (“2”), not aligned with (“1”), or not applicable to (NA) the individual recommendations and observations underlying each assessment topic. NR indicates no response. Firms’ overall alignment with each assessment topic is based on an average of their alignment with the individual recommendations and observations. In total, the self-assessment template included 188 recommendations and observations and 32 assessment topics.

TABLE 2

Assessment Topics with Which Firms Consider Themselves Least Aligned*

Assessment Topic	Number of Firms			
	Fully Aligned	Partially Aligned	Not Aligned	NA/NR
Identification and measurement: Monitoring	6	12	1	1
Liquidity risk: Transfer pricing	7	13	0	0
Counterparty risk: Risk monitoring and mitigation	9	11	0	0
Counterparty risk: Close-out practices	7	13	0	0
Identification and measurement: Concentration risk	7	13	0	0
Stress testing: Scope of scenarios	7	13	0	0
Identification and measurement: New products	7	11	1	1
Stress testing: Governance	10	9	0	1

*Firms assessed their risk management practices as being fully aligned with (assigned a “3”), partially aligned with (“2”), not aligned with (“1”), or not applicable to (NA) the individual recommendations and observations underlying each assessment topic. NR indicates no response. Firms’ overall alignment with each assessment topic is based on an average of their alignment with the individual recommendations and observations. In total, the self-assessment template included 188 recommendations and observations and 32 assessment topics.

2. Practices Assessed by Firms as Least Aligned with Recommendations

Firms rated their practices associated with identification and measurement of risk, transfer pricing, counterparty monitoring, and stress testing as those that were least aligned with recommendations (Table 2). The supervisors agree with this assessment. Supervisors, however, view the challenges

associated with closing the gaps as more critical and difficult than do the firms, in aggregate, and note that resolution of each of these areas will likely require substantial investments in technological infrastructure. Failure to address these weaknesses will potentially undermine the effectiveness of practices viewed as aligned with the recommendations.

C. Areas for Continued Improvement

Ten critical areas of needed improvement that are broadly relevant across firms emerged from the self-assessment results and interviews. Supervisors believe that considerable work remains in these areas, encompassing governance, incentives, internal controls, and infrastructure. The absence of action in some critical areas, such as the alignment of incentives and infrastructure-related matters, should raise questions for boards of directors, senior managers, and supervisors about the effectiveness and sustainability of recent changes. Supervisors will critically evaluate the progress on these and other issues.

Firms have reported progress in their alignment with some industry standards related to areas explored below, such as those associated with corporate governance and with liquidity planning and monitoring. The SSG believes that some of the noted adjustments, such as modifications of reporting lines or expanded metrics in liquidity reports, may represent less time- and resource-intensive actions, or “low-hanging fruit.” Such changes must be ingrained in firm culture and must be validated by boards, senior management, auditors, and supervisors as to their effectiveness in bringing about desired results.

In key areas explored, supervisors remain unconvinced that firms are undertaking the full scope and depth of needed improvements, irrespective of the self-assessment results. Further, if left unaddressed, certain gaps could potentially undermine the effectiveness of progress already made. For example, the postponement of needed IT infrastructure investment may limit firms’ ability to bring about meaningful change in liquidity planning and monitoring, including the timeliness and comprehensiveness of MIS reports, and firms’ ability to develop a centralized, aggregated view of their liquidity needs. More broadly, weaknesses in risk capture and misaligned incentives have the potential to limit the effectiveness of oversight and controls, particularly those associated with recent enhancements to practices.

Closing some of the acknowledged gaps, particularly those associated with infrastructure, is a resource- and time-intensive process. Continued oversight by supervisors and concerted discipline and commitment by firms will be required to undertake the needed investments and adjustments to practices.

Some of the highlighted areas of greatest need, such as board and management oversight, articulation of risk appetite, and compensation practices, are potentially a result of the aforementioned imbalance between the stature and resources allocated to firms’ revenue-generating businesses and those afforded to the reporting and control functions. Other areas, such as risk aggregation and concentration identification,

stress testing, and credit and counterparty risk management, can also be attributed to the weak condition of many firms’ IT infrastructure. While considered central to sound firm governance and risk management, the areas of continued improvement addressed here are not exhaustive. Firms and supervisors have identified a broad range of remediation needs in addition to these areas, many of which are addressed in the SSG’s first report. Additionally, the relevance and priority of improvement needs noted below may differ across institutions.

1. Board Direction and Senior Management Oversight

- **Firms are generally undertaking adjustments to increase board and executive engagement and to strengthen the resources, stature, and authority of risk management; however, it is not yet clear whether these changes have contributed to stronger governance.**

Although firms reported that they had been operating for some time with a relatively high level of alignment with existing industry and supervisory expectations on governance, many have recently undertaken significant changes related to:

- increasing board and senior management engagement in risk management;
- improving risk reporting to the board and senior management;
- strengthening committee charters and the role of auditors and risk managers, including the chief risk officer’s membership on management committees; and
- incorporating finance into the risk management processes.

Many changes that firms have undertaken are organizational and appear to have been relatively easy to implement. Less clear is whether these organizational changes will—without further effort—improve future governance practices.

While firms reported alignment with recommendations on the need for boards of directors to have technical expertise sufficient to understand risk management issues, the assessments provided little supporting information. Only a few firms offered clear evidence of improvements in their board members’ financial or more specific banking business expertise, primarily noting recent appointments of new board members with such relevant knowledge. Several firms also discussed recent efforts to train board members to better understand complex risks through orientation, seminars,

individual tutorials, modules, or the engagement of third parties.

Firms said they grappled with increased expectations for boards of directors. Several firms acknowledged that the increased accountability and expectations of board members are inconsistent with the historical depth of their interaction with the firm. Because of the greater demands on people assuming this role, some firms are concerned that knowledgeable and competent executives may be deterred from becoming board members. Several firms also suggested that the expanded expectations of board members appear increasingly to overlap with responsibilities assigned to firm management.

Firms indicated that they are reviewing closely the processes by which chief executives, other senior officers, and the board of directors engage in risk management. Some firms are observing increased rigor and sophistication in the dialogue taking place at senior levels about risk management practices.

Virtually all firms have strengthened their risk management functions. Having gained a better understanding of the costs of failure, boards of directors and senior managers have given their risk management functions greater resources, independence, authority, and influence.

Organizational changes have focused on strengthening the chief risk officer position, with the introduction of more independent reporting lines, greater stature and authority on management and other committees, and, at a number of firms, direct involvement in business line compensation decisions. At most firms, risk management personnel assigned to business lines now formally report to the firm's chief risk officer and, in many cases, retain a weaker, "dotted-line" reporting responsibility with the business line executive. A few outlier firms, however, have yet to sever the joint reporting lines of risk management personnel to both the business line and the independent risk management function.

2. Articulating Risk Appetite

- **Supervisors see insufficient evidence of board involvement in setting and monitoring adherence to firms' risk appetite.**
- **Risk appetite statements are generally not sufficiently robust; such statements rarely reflect a suitably wide range of measures and lack actionable elements that clearly articulate firms' intended responses to losses of capital and breaches in limits.**

Most firms acknowledged some need for improvement in their procedures for setting and monitoring risk appetite. While

boards of directors reportedly approve risk appetites and strategies as articulated by management, most firms did not present much evidence of active board involvement in overseeing the setting or monitoring of the company's risk appetite or of board understanding of the firm's current risk position relative to its risk appetite. In several cases, firms admitted a disparity between the risks that the firm took and those that the board perceived it to be taking. Many firms indicated that they are in the process of revamping the way information is presented to their boards.

Firms said they were expanding the range of metrics for measuring risk appetite. Several firms that had previously calibrated limits to capital metrics were now focusing more on the level of quarterly earnings. Conversely, other firms were now paying more attention to "tail risks." These additional areas of focus, as well as the intense market interest in financial institutions' risk profiles since the onset of the crisis, underscore the need for firms to apply multiple measures of risk appetite, to develop a range of perspectives, and to consider a broad distribution of possible outcomes. These changes also suggest a need for firms to consider further what management actions are realistically feasible for restoring capital or reducing risk in adverse environments.

Many firms acknowledged that a conditional value-at-risk measure, using historical volatilities and correlations over a short period, does not generate the extreme outcomes necessary for the estimation and allocation of capital. Most firms are reviewing their use of economic capital risk measurement models in the wake of the crisis as well as expanding their use of these models. At least one firm said it has increased its internal charges on trading assets relative to the same position held on the banking book.

Supervisors view board direction as critical to sustaining a disciplined risk appetite for the firm when faced with market demands for increased risk taking. While the industry has not settled on a common way of expressing risk appetite, supervisors do see particular opportunities for needed improvement, which firms have undertaken to varying degrees:

- firms rarely compile for their boards and senior management relevant measures of risk (for example, based on economic capital or stress tests), a view of how risk levels compare with limits, the level of capital that the firm would need to maintain after sustaining a loss of the magnitude of the risk measure, and the actions that management could take to restore capital after sustaining a loss;

- few boards are willing to address risk appetite in a manner that not only clearly articulates individual risk limits but expresses the sum total of these limits as an overall risk appetite for the firm;
- firms' risk appetite statements often lack actionable elements that reflect their intended response to a range of possible events, such as a loss of capital or a breach of limits;
- few firms present their boards with a dynamic, or "flow," view of the capital account that details the sources of capital generation as well as the proposed uses of capital.

3. Compensation Practices

- **Most firms recognize that past compensation practices were driven by the need to attract and retain staff and were often not integrated within firms' control environments.**
- **Firms note the need to align better compensation with the risk appetite and are considering initial steps in this direction.**
- **Supervisors are concerned about the durability of proposed changes.**

Most firms recognized the need to improve incentive and compensation policies. Many indicated in self-assessments and subsequent interviews that they were working toward that goal. For example, one firm determined that there was a lack of corporate oversight of compensation plans. Upon review, the firm found that it had more than 150 different plans, and set a goal of substantially reducing this number. This firm's risk management function reviewed all of its compensation programs and found that incentives were in some cases misaligned, with no adequate deferral or claw-back arrangements. (The claw-back is an explicit statement by management that some portion of deferred compensation granted may be withdrawn prior to vesting, at the discretion of management.)

Firms undertaking these changes suggested that the incentives created by industry compensation practices were key contributors to the failure to ensure that the risk taken was properly controlled. In addition, they said compensation practices were inconsistent with the earning power and capital of the business and that competition to retain people led to some of this inconsistency.

Other firms, particularly a few that have fared comparatively well over the last two years, remained relatively comfortable with their compensation practices and saw little

need for change. These firms cited industry competition for talent as an obstacle to change. They believed that modifying compensation practices to be more conservative would lead to competitive disadvantages.

All firms, however, felt that compensation incentives needed to be reconsidered as part of the firm's control framework. Firms appeared to be exploring changes to all components of their compensation regimes: the accrual of bonus pools, allocation of pools to business units and individuals, and the form of compensation paid out, with a goal of better aligning practices with control objectives. Some frequently noted issues were:

- Historical compensation arrangements were generally not sensitive to risk and skewed incentives to maximize revenues. Firms generally acknowledged, and supervisors agreed, that compensation practices have been insensitive to the levels of risk taken to generate income and to costs associated with the long-term commitment of funds required to hold illiquid assets. Firms largely acknowledged that current compensation practices, or those in place prior to the crisis, created strong incentives to maximize revenues rather than risk-, capital-, and liquidity-adjusted earnings.
- Accrual of compensation pools historically did not reflect all appropriate costs. In many cases, industry practice previously defined the pool of funds available for distribution as incentive compensation in any year to be a simple percentage accrual of net revenues, excluding many expenses and the costs of liquidity and capital. Several firms indicated that aggregate incentive compensation pools will no longer represent a simple accrual of top-line revenues but instead will be a function of the bottom-line return on risk the firm achieves. Others indicated that they would now base the aggregate pool on profit and use net income, rather than net revenue, for accruals.
- Individual performance measurement schemes have often not reflected true economic profits, adjusted for known costs and uncertainty. At many firms, performance measurement schemes used to distribute the bonus pool did not incorporate the costs of the capital and liquidity employed in the generation of revenue. Moreover, revenues contributing to performance measurement schemes were often specifically constructed by management and, in some cases, excluded material risks to the firm. In other cases, future potential revenues whose realization

remained highly uncertain were incorporated into current-year performance income.

As a result, firms are considering changes to their practices:

- Recognizing these weaknesses, most firms that had not integrated performance measurement schemes with the costs of liquidity and capital were now implementing these practices. Firms said they were developing the transfer pricing mechanisms to ensure that internal performance measurement schemes included both the cost of capital employed in the generation of revenues and the cost of funds consistent with the liquidity of the positions funded. Liquidity surcharges based on the characteristics of positions funded were to be added to the transfer-priced cost of funds.
- Some firms found that performance evaluations lacked the input of control functions, a practice that the firms are now looking to change. The chief risk officer is now involved directly in business-line compensation decisions at a number of firms. Additionally, certain firms are now engaging risk or compliance personnel in compensation decisions at the sub-business level.
- Deferred compensation plans are being reviewed by firms with an eye toward longer vesting and distribution periods, although views on the effectiveness of deferred compensation measures varied. Some firms were exploring extending the length of the deferral beyond the conventional two-to-three-year period. One firm stated that executive compensation should have a deferral component that mimics the tail risk assumed by the firm. However, some firms felt that the deferred vesting and delivery of some portion of compensation in the form of restricted stock or stock options has had little impact on individual bankers and traders beyond motivating retention.
- Several firms have attempted to align compensation with longer term performance by implementing a claw-back provision in deferred compensation as a standard part of their compensation practices. Where claw-back provisions existed in the past, they were typically very limited, that is, to cases of material misstatement or illegal activities. Firms considering expanded use of claw-backs are working to develop standards for when a claw-back may be invoked.

4. Information Technology Infrastructure

- **The importance of a resilient IT environment with sufficient processing capacity in periods of stress is becoming increasingly evident.**

- **Firms are constrained in their ability to effectively aggregate and monitor exposures across counterparties, businesses, risk strands, and other dimensions because of ineffective information technology and supporting infrastructure.**

Many firms, in their self-assessment submissions and in subsequent discussions, said they are making considerable investments in risk management infrastructure. Many projects, however, are in the planning stages or in the infancy of execution, with significant work remaining.

One challenge to improving risk management systems has been poor integration resulting from multiple mergers and acquisitions. One firm suggested that acquisitions over the years have produced an environment in which static data are largely disaggregated. Another firm echoed this view, reporting that certain products and lines of business have not been included in data aggregation and analysis processes. A third firm reported that having two systems for the same business results in duplication of processes.

Another critical infrastructure concern during recent market events was the ability of firms to process record-high volumes of product transactions during periods of market stress. Transactions in equities, foreign exchange, government securities, and other instruments spiked sharply during the market disruption, taxing some firms' systems. Proactive firms are responding to this challenge by adding capacity to key system platforms to ensure that they can process volumes well in excess of previous peak levels.

5. Risk Aggregation and Concentration Identification

- **Self-assessment responses suggest that identification of risk concentrations is an area of weakness; firms are looking to automate identification of concentrations by counterparty, product, geography, and other classes.**

Data aggregation remained a central issue limiting firms' risk management capabilities, most notably in the management of CCR. Many firms lacked the ability to aggregate exposures, particularly gross and net exposures to institutional counterparties, in a matter of hours. This challenge includes the aggregation of exposures at the legal entity level. A number of firms also experienced difficulties integrating credit and market risks at the enterprise level and evaluating the two jointly in a consistent manner. Fragmented infrastructure and an overreliance on manual data compilation were among the factors impairing firms' ability in this regard. In addition, firms noted "off-line" trades that were not captured

in the main exposure model, but that represented a disproportionately large percentage of their overall measured CCR exposure. Excluding these “add-ons” diminishes the reliability of aggregate measures.

One firm noted that it had the ability to aggregate data to a *single* large counterparty within a day; however, during some periods in fall 2008, information was needed on a dozen or more counterparties that were of concern. Two-thirds of firms indicated that they were only partially aligned with regard to the capacity to estimate asset class concentrations and institutional counterparty exposures within hours.

Two-thirds of firms responded that they were only partially aligned with the recommendations that credit risks be viewed in aggregate, that consideration be given to the effects of correlations between exposures, and that counterparty risk consider the size and direction of positions a counterparty has with other firms. Many firms cited large-scale IT projects planned or under way to address these infrastructure and aggregation deficiencies. In the past, many such projects have fallen behind schedule because of inadequate investment and resources. In the current environment, these projects will require a significant dedication of funds, sponsorship, and commitment from the board and senior management during challenging economic times to ensure that technology platforms are constructed to handle unexpected spikes in volumes and to effectively produce aggregated data and appropriate management information for credit, liquidity, market, and other risk metrics.

6. Stress Testing

- **Firms report enhancements to and increased use of stress testing to convey risk to senior management and boards, although significant gaps remain in their ability to conduct firm-wide tests; credibility of extreme scenarios, despite recent events, remains an issue for some firms.**

Firms reported that they have been developing and implementing more robust stress-testing regimes and are placing a greater reliance on these tools. In contrast to the past, firms now report significant management “buy-in” to enhancements. According to the self-assessment results, most firms made some improvement in the frequency, flexibility, and number of scenarios and risk types in their stress testing as well as increased their senior management’s involvement in stress-testing programs.

Nevertheless, interviews confirm that most respondents still do not have regular, robust, firm-wide stress tests. Many

participants noted significant efforts under way to develop such tests. However, much of the progress to date appeared to be short-term and tactical in response to increased interest on the part of management and requests from firms’ boards to conduct specific scenarios, as opposed to progress that is strategic and forward-looking.

While more firms now perform stress tests based on hypothetical scenarios, many others still do not have the necessary infrastructure to allow them to develop easily and consider forward-looking scenarios, representing a significant weakness for the industry as a whole. Even when forward-looking stress tests are conducted, the process is resource-intensive, owing to infrastructure limitations. Reverse stress testing, a forward-looking approach advocated in CRMPGIII (p. 84),¹⁹ was reported to still be in its infancy; only two firms indicated that they run a reverse stress test designed to identify scenarios or risk factors that can cause a significant stress event for the firm or business line.

Firms repeatedly cited credibility as the primary criterion for stress and scenario analysis to influence management behavior, even after the events of September-October 2008. For this reason, the most common stress tests conducted have generally been those subjecting trading or credit accounts to extreme historic events. Still, some firms are relying increasingly on research and economic teams to forecast events that risk teams can then simulate.

7. Counterparty Risk Management

- **Flexibility in some firms’ CCR management systems proved particularly valuable; in contrast, the inability of other firms’ CCR systems to identify directional risk drivers limited these institutions’ responsiveness to sharp changes in exposures.**

The range of significant counterparty concerns during the financial crisis illustrates the value of flexible risk systems that permit firms to “drill down” and understand how their exposures would react as market conditions change. The flexibility and drill-down capabilities of models and systems facilitate a nuanced understanding of specific risk drivers within particular exposures. In addition to risk monitoring, these capabilities enable firms to more effectively determine desired changes to their hedging in response to changes in risk exposure. Of note, firms that had well-developed systems in place were able to hedge or flatten risk proactively and were able to react quickly to sharp changes in exposures.

¹⁹ See <<http://www.crmpolicygroup.org/docs/CRMPG-III.pdf>>.

Firms still focus on current and potential exposure as the primary measures of CCR but, because of the crisis, they have been investing more heavily in counterparty stress-testing capabilities. The integration of stress testing as a meaningful concentration management tool will continue to be a focus going forward. In addition, some firms are developing other measures of risk to complement potential exposure measures and stress testing, but these efforts are still nascent and in some cases informal. Many firms recognize that potential exposure and stress-testing measures are not designed to capture all forms of counterparty credit risk. In response, they place value on utilizing additional risk analysis, such as crowded trade analysis, wrong-way risk identification, jump-to-default loss estimations, and credit valuation adjustment sensitivities.

8. Valuation Practices and Loss Recognition

- **The loss of confidence among creditors, counterparties, and clients in firms' valuation practices for certain assets during the crisis contributed directly to the withdrawal of funding and other liquidity drains on firms in varying forms.**
- **Many firms are reviewing the oversight of their valuation function and working to increase the rigor of processes associated with, for example, enforcing uniform pricing across the firm, valuing models, and escalating valuation disputes; nonetheless, substantial work remains for firms to adhere to industry standards for valuation practices.**

From a risk management and governance perspective, the finance department plays an essential corporate control role in underpinning the effectiveness of valuation practices and robust loss recognition. Several firms expressed agreement that the finance department, and the areas responsible for carrying out key valuation processes, must be independent and maintain sufficient stature and influence in the firm. For example, several firms noted that if there is a difference in views between control and business personnel over a valuation in the absence of a clearly established, market-based price, escalation processes must be clear and the control function's view must ultimately prevail.

Based on the self-assessment results, most firms did have some mechanisms in place to enforce uniform pricing across legal entities and to decrease material valuation inconsistencies, yet some firms were uncertain that the same instrument held by different business units was marked at

the same price. Multiple systems and valuation models with differing pricing sources for the same product set were obstacles to achieving consistency, according to firms.

Some firms cited issues in ensuring that price-sensitivity analysis was performed consistently and formally across all financial instruments. Several firms acknowledged that they did not devote sufficient analytical resources to checking valuations and making adjustments during periods of low liquidity and to establishing a specialized financial control staff to perform fundamental analysis of underlying positions and to enforce discipline internally in marking their assets to their established prices.

One firm has increased the rigor of its profit-and-loss explanation process. Risk management must now explain the profit and loss to senior management, complementing the traditional controller's explanation. This firm stated that risk managers have a different perspective than that of controllers and can better tie profit and loss to risk positions.

Based on the interviews, firms gained a new appreciation for the importance of timely recognition of losses. A lesson learned by some firms was to maintain and adhere as much as possible to asset disposal schedules, even if at less desirable prices, in order to reduce the likelihood of much larger losses.

9. Operations and Market Infrastructure

- **Firms are making substantial progress standardizing practices, reducing backlogs of unconfirmed OTC derivatives positions, and improving collateral management techniques.**
- **Notwithstanding the significant efforts by firms to mitigate risk, work remains to improve key personnel's detailed knowledge of financial market utilities and communication with settlement infrastructure providers.**

Many firms expressed a better appreciation for the operations and risk-reduction benefits provided by the financial market utilities. In light of the importance of payment and settlement, chief risk officers and other key decision-makers were working to refresh their knowledge of utilities such that, when institutions are informed of time-sensitive issues, they have a baseline understanding of the systems in question. A few firms stated that front-office and risk management personnel lacked sufficiently detailed knowledge of the processes of financial market utilities and that the firms were working to establish awareness at the staff

and senior executive levels. Overall, firms cited the importance of effective communication between firms and settlement infrastructure providers.

In OTC derivatives, firms reported progress streamlining business processes toward the goal of same-day matching, adoption, and implementation of standard technology platforms as well as improving collateral management practices and reducing notional amounts of outstanding CDS transactions through portfolio compression.

On a positive note, as the SSG has previously reported, the processes around the resolution of Lehman's OTC derivatives book were far less disruptive than regulators and market participants had feared. Substantial industry efforts to standardize practices and reduce backlogs of unconfirmed positions appear to have significantly mitigated a substantial risk. Out of the approximately 900,000 Lehman OTC derivatives transactions, only a very few have been disputed to date, an indication that efforts to reduce unconfirmed trades have had a positive impact.

10. Liquidity Risk Management

- **As a result of lessons from the crisis, firms are making meaningful progress improving funding and liquidity risk management practices, but supervisors and some firms acknowledge that substantial work remains to align fully with industry standards.**

Almost all firms have sought to strengthen structures and processes to enhance firm-wide governance of liquidity. Firms have taken steps to improve the structure of their

treasury, liquidity risk management, and related functions, and to enhance liquidity reporting and other forms of communication for the entire firm. Funds transfer pricing processes and many aspects of contingency planning are being enhanced. It is important to note that no firm's contingency plan proved fully effective during the crisis. Among a range of issues, firms found that stress scenarios should overlay firm-specific shocks with systemic shocks. Firms also learned that complex corporate structures, by constraining the flow of funds between legal entities, hindered their ability to effectively manage firm-wide funding needs during the crisis. Section III provides an elaborate discussion of firms' reported enhancements to funding and liquidity risk management practices as a result of lessons from the crisis.

Some of the changes that firms have made are among the more easily achievable enhancements, such as organizational efforts to improve the coordination and interaction between the treasury function, the risk management function, and the business lines. The extent to which such changes are formalized into policies and procedures—and more important, ingrained into the corporate culture—will determine their sustainability and effectiveness. Other structural changes—such as improvements to firms' liquidity reports, collateral management practices, and funds transfer pricing—are more resource- and time-intensive. Concerted discipline and commitment on the part of boards of directors, senior management, and supervisors will be required to undertake the IT infrastructure investments needed to support these changes and to continue to improve the robustness of these liquidity risk management systems.

Appendix A

Self-Assessment: Firms' Reported Degree of Alignment with Recommendations and Observations of Industry and Supervisory Studies*

Assessment Topic	Number of Firms			
	Fully Aligned	Partially Aligned	Not Aligned	NA/NR
Governance				
Policies	20	0	0	0
Roles and responsibilities	20	0	0	0
Internal coordination and communication	20	0	0	0
Risk committee	19	1	0	0
Risk appetite	13	7	0	0
Incentives and compensation	14	4	0	2
Role of the chief risk officer	16	2	0	2
Resources	17	3	0	0
Identification and measurement				
Scope and procedures	10	10	0	0
Metrics	13	7	0	0
Monitoring	6	12	1	1
New products	7	11	1	1
Concentration risk	7	13	0	0
Counterparty risk				
Close-out practices	7	13	0	0
Risk monitoring and mitigation	9	11	0	0
Liquidity risk				
Funding and reserve management	17	3	0	0
Monitoring and planning	18	2	0	0
Transfer pricing	7	13	0	0
Market risk				
Valuations: Oversight, accountability, policies, and procedures	17	2	0	1
Valuations: Metrics and analysis	13	6	0	1
Trading patterns	12	4	0	4
Market infrastructure	10	7	0	3
Origination standards	15	3	0	2
Securitization and complex products				
Appropriate investors	12	4	0	4
Documentation	9	6	0	5
Risk management	12	7	0	1
Stress testing				
Scope of scenarios	7	13	0	0
Governance	10	9	0	1
Disclosure and transparency				
Prospectus disclosure	8	4	0	8
Standardization and increased transparency	11	5	0	4
Risk disclosure and transparency	16	3	0	1
Valuations disclosure and transparency	12	4	1	3

*Firms assessed their risk management practices as being fully aligned with (assigned a "3"), partially aligned with ("2"), not aligned with ("1"), or not applicable to (NA) the individual recommendations and observations underlying each assessment topic. NR indicates no response. Firms' overall alignment with each assessment topic is based on an average of their alignment with the individual recommendations and observations. In total, the self-assessment template included 188 recommendations and observations and 32 assessment topics. The results reported here are based on the firms' own assessments of their risk management practices. Some firms may have held themselves to a higher or lower standard than their peers in assessing the state of their controls.

Appendix B

Members of the Senior Supervisors Group

CANADA

Office of the Superintendent of Financial Institutions

Kent Andrews
Chris Elgar
Ted Price
Mark White

FRANCE

Banking Commission

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Patrick Montagner
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GERMANY

Federal Financial Supervisory Authority

Claudia Grund
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Yu Ozaki
Yasushi Shiina

SWITZERLAND

Financial Market Supervisory Authority

Tim Frech
Roland Goetschmann
Daniel Sigrist

UNITED KINGDOM

Financial Services Authority

Andy Murfin
Nicholas Newland
Simon Stockwell

UNITED STATES

Board of Governors of the Federal Reserve System

Mary Arnett
Jon D. Greenlee

Federal Reserve Bank of New York

Arthur G. Angulo
Brian L. Peters
William L. Rutledge (*Chairman*)
Marc R. Saidenberg

Office of the Comptroller of the Currency

Mike Brosnan
Kathy E. Dick
Kurt Wilhelm

Securities and Exchange Commission

Denise Landers
Michael A. Macchiaroli

Secretariat

Alexa Philo, Morgan Bushey, Brian Begalle, Jeanmarie Davis, Clinton Lively, and Jainaryan Sooklal, all of the Federal Reserve Bank of New York, and Kerri Corn of the Office of the Comptroller of the Currency

Glossary

Term	Definition*
2a-7 funds	2a-7 money market funds are U.S. open-end management investment companies that are registered under the Investment Company Act and regulated under Rule 2a-7 under the Act. Unlike other investment companies, 2a-7 funds are able to use the amortized cost method of valuing their portfolio securities rather than mark-to-market valuation, which allows them to maintain a stable net asset value, typically U.S. \$1.00 per share.
Asset-backed commercial paper	A short-term investment that encompasses the use of a special purpose vehicle or conduit; the conduit serves as the commercial paper issuer. The commercial paper is backed by physical assets such as homes, automobiles, or other physical property.
Bid-back request	An investor's request to a borrower to unwind a transaction earlier than contractually agreed upon.
Break-the-buck	A condition that occurs when a money market fund determines to discontinue the use of the amortized cost method of valuing its portfolio securities and to reprice the fund's shares below \$1.00 per share.
Claw-back	A provision in a law or contract that limits or reverses a payment or distribution for specified reasons.
Commingled funds	In securities lending, commingled funds refer to a pooling of cash collateral from multiple beneficial owners/lenders that is then used to purchase securities.
Contingency funding plan	A comprehensive plan that financial institutions have in place to maintain sufficient liquidity resources in a contingency scenario. Contingency funding plans typically include cash flow projections that estimate funding needs under adverse conditions, and should present courses of action for addressing unexpected short-, medium-, and long-term liquidity needs.
Credit default swap	An agreement between two parties in which the seller provides protection to the buyer against nonpayment of unsecured corporate or sovereign debt. The "protected" party pays an initial or ongoing scheduled fee in exchange for a guarantee that, if a bond/loan goes into default, the protection seller will provide compensation.
Credit valuation adjustment	The mark-to-market estimate of the counterparty credit risk from a firm's derivatives exposures.
CUSIP number	A number identifying all stocks and registered bonds, assigned by the Committee on Uniform Securities Identification Procedures (CUSIP). Brokers use a security's CUSIP number to obtain further information on the security; the number is also listed on trade confirmation tickets. The CUSIP system makes it easier to settle and clear trades. Foreign securities use a similar identification system: the CUSIP International Numbering System, or CINS.
Daylight exposure	Credit extended for a period of less than one day. In a credit transfer system with end-of-day final settlement, daylight credit in effect is extended by a receiving institution if it accepts and acts on a payment order even though it will not receive final funds until the end of the business day.
Free credit balance	The cash held by a broker in a customer's margin account that can be withdrawn by the customer at any time without restriction. This balance is calculated as the total remaining money in a margin account after margin requirements, short-sale proceeds, and special miscellaneous accounts are taken into consideration.
Funds transfer pricing	An internal cost-accounting system or methodology that transfers a cost-of-funds expense to profit centers that generate assets requiring funding and a funds credit to profit centers that provide funding.
Haircut	The percentage by which an asset's fair market value is reduced for the purpose of calculating lendable value/borrowing capacity.
Interbank deposit	Any deposit held by one bank for another bank. In most cases, the bank for which the deposit is held is known as the correspondent bank. The interbank deposit arrangement requires both banks to hold a "due to account" for the other.
Net asset value	An investment company's total assets minus its total liabilities.

*Based on publicly available and supervisory sources.

Glossary (Continued)

Term	Definition*
Novation	An agreement to replace one party to a contract with a new one. The novation transfers rights as well as duties and requires the consent of both the original and new parties.
OTC derivatives market	The over-the-counter, or OTC, market where derivatives transactions are executed directly between two parties through a telephone or computer network, without use of an exchange. A derivative is a financial contract (usually a bilateral contract) whose value is derived from another asset, index, event, or condition.
Portfolio compression	A market-wide exercise to reduce the gross notional outstanding and trade population by eliminating offsetting trade positions within the same product types and across multiple counterparties. Portfolio compression thus reduces the counterparty credit exposure and operational risk attached to superfluous outstanding trade positions that offer no additional economic benefits. Currently, credit and interest rate derivatives have regular cycles for portfolio compression.
Prime brokerage	A service offered by securities firms to hedge funds and other professional investors. Prime brokerage may include execution/clearance of transactions, margin financing, centralized custody, securities lending, and other administrative services such as risk reporting. The growth of the hedge fund sector over the last decade was supported by concurrent growth in the prime brokerage business of the investment banks that service these funds.
Rehypothecation	A practice in which a prime broker can take control, and in some jurisdictions legal title, over a client's assets, subject to an obligation to return the same or economically similar assets at a future time. By taking legal title over the assets, the prime broker is free to utilize the assets as it sees fit, including the sale of such assets or the pledging of them as security for amounts borrowed from counterparties. In practice, rehypothecation rights are used by prime brokers to obtain secured funding to finance margin loans provided to clients; however, such rights also enable prime brokers to cross-fund other positions on a portfolio basis in certain circumstances. The secured funding obtained through rehypothecation rights enables a prime brokerage business to be largely self-financing, as loans to clients are funded through rehypothecation of client assets.
Repurchase agreement	An agreement between a seller and a buyer of securities in which the seller agrees to repurchase the securities at an agreed-upon price, usually at a stated time.
Reverse stress test	A stress test in which the starting point of the analysis is an assumption that over a short period of time, an institution incurs a very large, multi-billion-dollar loss. The analysis then works backward to identify how such a loss could occur given actual positions and exposures prevailing when the stress test was conducted. If the assumed loss were truly large, it is highly likely that the possible sequence of events producing the loss would 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.
Same-day matching	A process that occurs when parties to an OTC derivatives trade obtain legal confirmation of the transaction on the same day the trade is executed, also known as "T+0 matching" or "same-day confirmation." Same-day matching continues to be an operational efficiency goal for the post-trade processing of OTC derivatives.
Triparty repo	In a triparty repo model, a custodian bank helps to administer a repo (repurchase) agreement between two parties. An investor places its money with a custodian bank, which in turn lends it to another institution; assets are then pledged as collateral for the loan. The triparty agent is responsible for administration of the transaction, including collateral allocation, marking to market, and substitution of collateral. Both the lender and borrower of cash enter into these transactions to avoid the administrative burden of bilateral repos.
Upgrade trade	For less liquid securities financed on behalf of hedge fund clients, prime brokers may enter into upgrade trades. In such a trade, the less liquid securities are exchanged with certain stock lenders for more liquid securities that are then monetized by the prime broker through repurchase arrangements.
Value-at-risk	A measure of expected loss over a given time interval under normal market conditions at a specified confidence level.

*Based on publicly available and supervisory sources.