Intermediary Internal Controls associated with Price Verification of Structured Finance Products and Regulatory Approaches to Liquidity Risk Management

Final Report

TECHNICAL COMMITTEE
OF THE
INTERNATIONAL ORGANIZATION OF SECURITIES COMMISSIONS

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Foreword

The Technical Committee of the International Organization of Securities Commissions (IOSCO) published a consultation report in July 2010 entitled: *Intermediary Internal Controls Associated with Price Verification of Structured Finance Products and Regulatory Approaches to Liquidity Risk Management*[1]. The comment period ended on 29 October 2010. The only entity to comment on the report was the International Capital Market Association (ICMA). Their letter, however, did not recommend any changes to the report. As a result, the IOSCO Technical Committee decided to publish the report as final with only technical edits.

[1] *Intermediary Internal Controls Associated with Price Verification of Structured Finance Products and Regulatory Approaches to Liquidity Risk Management* - Report of the Technical Committee of IOSCO, July 2010 available at http://www.iosco.org/library/pubdocs/pdf/IOSCOPD331.pdf

Chapter 1 Background and Purpose of the Project

In May 2008, the IOSCO Technical Committee (TC) published its *Report on the Subprime Crisis* (Subprime Report).[2] The TC noted in the Subprime Report that, among other things, many institutional investors and investment banking firms had inadequate risk modelling and internal controls in place to understand and address the risks they were assuming when buying many types of structured finance products. The TC further noted the work of the Senior Supervisors Group (SSG) in analyzing this issue.[3] As a result of its findings, the TC recommended that its Standing Committee on the Regulation of Market Intermediaries (TCSC3) "undertake a study of the internal control systems of financial firms, including asset managers, in different IOSCO jurisdictions and develop principles to address any concerns identified."

The Subprime Report also addressed the critical importance of balance sheet liquidity for financial institutions. It observed that firms that proved more resilient during the market turmoil also appear to have more effectively managed their contingent liquidity needs. In some cases, this led firms to forego investments and business lines related to the subprime market because of the contingent liquidity risk they potentially posed. By contrast, firms that experienced greater difficulties tended to not align their treasury functions with their risk management processes, or may have based their contingency funding plans on incomplete or inaccurate information or faulty valuation practices. Indeed, the TC concluded that many institutional investors and investment banking firms had inadequate balance sheet liquidity, even when adequately capitalized.

As a result, the Report recommended that TCSC3 also survey members on their experiences with regard to how firms they oversee managed liquidity risk, and with regard to current liquidity standards. This is intended to assist with and supplement the work currently being undertaken by the Basel Committee on Banking Supervision.

As part of its study of internal controls, TCSC3 conducted a survey of both firms and regulators. The primary purpose of the survey *to firms* was to obtain information from major intermediaries that held certain structured finance products (SFPs) (as defined below), in or around 2006, concerning their internal controls as they relate to marking-to-market the value of these assets. The purpose of the survey *to regulators* was to obtain information from them concerning applicable regulatory requirements and their views as to the causes of the failure of certain firms to mark-to-market accurately the value of certain SFPs. The focus of both surveys was on internal controls and policies in effect at firms, and pertinent regulations, in

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2 *Report on the Subprime Crisis* – Report of the Technical Committee of IOSCO, May 2008, available at: http://www.iosco.org/library/pubdocs/pdf/IOSCOPD273.pdf.

3 The SSG published a report in March 2008, entitled *Observations on Risk Management Practices during the Recent Market Turbulence*. It is available at: http://www.newyorkfed.org/newsevents/news/banking/2008/SSG_Risk_Mgt_doc_final.pdf.

Subsequently, on October 21, 2009, the SSG issued a second report that evaluates how weaknesses in risk management and internal controls contributed to industry distress during the financial crisis. The report—*Risk Management Lessons from the Global Banking Crisis of 2008*—reviews in detail the funding and liquidity issues central to the recent crisis and explores critical areas of risk management practice in need of improvement across the financial services industry. The report concludes that despite firms' recent progress in improving risk management practices, underlying weaknesses in governance, incentive structures, information technology infrastructure and internal controls require substantial work to address. The report is available at: http://www.newyorkfed.org/newsevents/news/banking/2009/SSG_report.pdf.

or around June 2006 (relevant period), i.e., prior to the financial crisis, and any changes made as a result of the crisis. The surveys also sought respondents' views concerning the viability of the traditional independent investment banking model[4] in light of the financial crisis that developed after 2006.

For purposes of both surveys, an SFP referred to financial instruments that meet the following three key features and can be issued through public offerings or private placements:

- They are based on pooling of assets usually sold to a special purpose vehicle (SPV). The assets can either be cash instruments or credit derivatives;

- There is a subsequent guarantee and/or credit or maturity tranching of liabilities which are backed by the asset pool[5]; and

- There is de-linking of the credit risk of the collateral asset pool from the stand alone special purpose vehicle (SPV).

Answers to the surveys were to be restricted to the following types of SFPs: agency[6] residential mortgage-backed securities (RMBS), prime RMBS, sub-prime RMBS[7], commercial mortgage-backed securities (CMBS), cash collateralized debt obligations (CDO)/collateralized bond obligations (CBOs), synthetic CDO/CBOs, cash collateralized loan obligations backed by small to medium size enterprises (SME CLOs), and asset-backed commercial paper.[8]

With regard to its examination of prudential regulatory requirements relating to firm liquidity, TCSC3 conducted a survey of the liquidity regimes applied by IOSCO members to securities firms. The survey included questions on the design of the regulatory framework for securities firms, and whether the financial crisis that occurred after 2006 has changed firms' and regulators' approaches to liquidity risk management and supervision.

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4 The term *independent investment banking model* refers to a business model used by financial firms that under normal circumstances do not have access to central bank funding support and are not dominated by a bank or a series of banks. These businesses generally earn money through underwriting and trading securities in the capital markets (such as the trading of derivatives, fixed income, foreign exchange, commodity, and equity securities), as well as offering strategic advisory services for mergers, acquisitions, divestiture or other financial services for clients.

5 This excludes covered bonds as their liabilities are not tranched.

6 Agency MBS are MBS issued by government-sponsored entities or GSEs such as Fannie Mae and Freddie Mac, or government agencies (Ginnie Mae) in the U.S. Loans eligible for GSE-issued MBS are also referred to as "conforming."

7 Including UK non-conforming RMBS.

8 There are, of course, additional types of SFPs, including credit card ABS, auto-loan ABS, student loan ABS, cash leveraged loan CLOs, and synthetic leveraged loan CLOs. However, in order to make this a more manageable project, it was decided to exclude them from the surveys.

Chapter 2 Internal Controls – Practices And Regulatory Requirements

A. Survey of Firms

A.1 Executive Summary

As part of our study, we conducted a survey of ten firms in North America, Europe and Asia. The responses we received to the survey evidenced that the majority of major intermediaries who responded failed to manage adequately the risks they were exposed to as a result of "warehousing" (holding) SFPs. In most cases, firms did not verify with sufficient rigor (or examine at all) the value of assets that underlie SFPs (e.g., residential mortgages and associated payment flows and defaults rates). Our study has made clear that firms cannot manage risks adequately simply by establishing a check-list of action items that may give the impression (at least on paper) that risks are being managed adequately, e.g., setting up "risk committees" and/or "control and audit" functions. Indeed, a couple of surveyed firms described detailed "steps" they had established to manage risk.

Adequate risk management stems from the development of a strong firm-wide risk management *culture* that informs all business decisions and is shared and supported by senior management. This includes the need for senior management to question not only failure, but also success. It also requires senior management to possess sufficient technical expertise to develop an informed view of the risks posed to the firm. If a firm succeeds in earning profits associated with a particular line of business that seem too good to be true, then it is incumbent upon senior management to examine the foundation of that success, just as rigorously as they might examine the causes of substantial losses. At the height of the housing bubble and the development of mortgage related SFPs, firms over-relied on the immediate liquidity of these instruments and/ or external pricing, without truly understanding the underlying assets and the associated risks, and the possibility that the products may become illiquid.

A.2 Discussion

(a) Early Development of Firm Capacity to Analyze and Understand Mortgage Related SFPs

As early as 2004, firm positions were growing in the residential mortgage space. At the time, there was reasonable liquidity in mortgage related products. With regard to the pricing of mortgages in 2004, there was no *live* or *consensus* trading, rather there were only matrix driven services.[9] The problem with matrices, however, is that in times of stress they will lag the market. Thus, when markets fall, it may not be possible for intermediaries holding these products to manage adequately their risks.

[9] Matrix pricing is analogous to comparison pricing. If there isn't activity trading in the specific security, you look at traded prices in similar securities. A typical matrix might have two dimensions: rating (or spread buckets, *i.e.*, a proxy for credit quality) and maturity (buckets). The basic presumption is that these are the dominant drivers of variation in prices across instruments. There is, therefore, an expectation that the variation of prices *within* a rating-maturity cell (combination) will be much smaller than the differences across or between cells.

Some firms[10] observed, as early as 2004, episodes in the SFP market that raised risk management concerns, for example, cases where "excess" in their mortgage related SFP pools could sometimes not be sold (distributed), and cases where prices for significant portions of their inventory could not be verified. These firms determined to take steps to better understand the underlying mortgages, and to improve in general their analytical capability with regard to the price verification of mortgage related products, thus minimizing losses in the SFP space during the financial crisis. In particular, they were not satisfied with relying upon the existing liquidity of these products at one point in time, or with blindly accepting pricing data from the market, but rather investigated further the assets underlying these products and the potential longer term decrease in liquidity.

The price verification processes developed by such firms revealed a subtle softness in the marketplace, i.e., price verification became more challenging in some instances (even though the markets in general remained quite liquid). The pricing of mortgage-backed products appeared to be "idiosyncratic," in contrast to "other products" for which there was "good consensus."

Firms which undertook such analyses assigned personnel with insight on how to price this inventory, including (1) broad knowledge over mortgages; and (2) a comprehensive understanding of relevant collateral, structuring aspects, underwriting, price verification, and risk management as a whole.

These firms sought to formulate a "view" based upon substantial research. Some of the core concepts developed included:

- Developing the ability to understand what the marketplace was "telling us," e.g.; understanding market depth and the meaning of transaction prices;

- Running cash analytics through tools such as INTEX[11] and Bloomberg, in order to understand price observed price volatility, with an emphasis on seeking to understand price sensitivities for particular products;

- Understanding underlying data, such as trying to understand actual collateral

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[10] The phrase "some firms," "these firms" or "firms" as used in this discussion section may refer to one or more surveyed firms.

[11] Intex Solutions, Inc. is a provider of structured fixed-income cash-flow models and related analytical software. Its clients include many financial institutions including major investment banks, regional broker dealers, issuers and investment managers. Intex provides a library of RMBS, ABS, CMBS and CDO deal models, created and maintained for the generation of cash-flow projections and price/yield analytics. Intex supports deals issued in North America, Europe, Australia, Japan and other regions of the globe. Since 1990, Intex has modelled over 20,000 individual deals, and creates ongoing updates for each deal each month or quarter using investor reports and, when available, loan- or asset-level information obtained directly from trustees, servicers and issuers. Intex's software solutions include INTEX*net*™ for convenient web-based analysis, INTEX*desktop*™ for those desiring a PC-based solution, the INTEX Subroutines™ API for developers seeking to build proprietary applications, and INTEX DealMaker™ for investment banks and others who need to structure new deals. All Intex software applications have at their core the ability to calculate future principal and interest cash-flows based on user-specified stress scenarios applied to interest, prepayment, default, recovery and delinquency rates. Intex's cash-flow projection tools have also been integrated into many specialized third-party applications targeted to specific vertical markets and industry segments.

performance;

- Development of an understanding of what attributes lead to prepayment;
- Looking at price of capital structure; and
- Understanding and predicting the probability of repayment default.

By contrast other firms conceded that, until 2007, they generally did not look at the value of the mortgages underlying SFPs (see discussion below under *Typical Price Verification Practices at the Majority of Surveyed Firms*). A few of these firms stated that, only in 2007, did they even begin to look at the default pipeline (*e.g.*, INTEX) and/or to look at remittance reports. As to CDOs, they eventually developed an intrinsic cash flow model that looked at macro and loan level analysis. Similarly, one Asian firm stated that it was not until December 2006 that its risk management unit and controller implemented joint Residential Conduits IPV / Valuation processes.

(b) Firm Structure: Reporting to (and involvement of) Senior Management

The firms surveyed reflected a diversity of business lines and entities involved in the relevant SFP business, including the control functions related to the understanding of particular business lines underlying an SFP (e.g., commercial real estate market for CMBS). A few firms stressed the importance of senior management involvement in the price verification process. These firms stressed the importance of encouraging broad participation in decision making, with a deal approval process requiring input from a large number of groups. This was an important part of these firms' *culture*. For example, larger deals went through these firms' "firm wide" committees, while smaller deals went through the specific committees. These committees would review actual securitizations and also mandates for CDOs. There were also stress limits.

One productive practice was face-to-face meetings between senior management and price verification teams, as part of obtaining senior management's explicit agreement on price verification results. These discussions were serious, comprehensive and technical, requiring senior staff to be fluent in the technical aspects of risk management. At some firms, written minutes were kept of these discussions, thus documenting price verification decisions. Senior management was thus held accountable for the price verification decisions they made (and the assumptions therein).

In contrast, one firm stated that it had no centralized portfolio management and risk controlling of the ABS investments. Other firms indicated that they would only rarely elevate the decision making for any deal to very senior management (e.g., the CFO). In fact, one firm reported that it did not have, during the relevant period, a centralized reporting of the overall summary of limit excesses (The firm now has an escalation process). As a result of the absence of centralized reporting, approved and unapproved excesses may not have been discussed at a higher level. Another firm stated that "business units" were always responsible for staying within their risk limits. If limits are breached, they would "be escalated for review." A bank confessed that it didn't have an overall strategy for the group. One firm confessed that during the relevant period it did not have "adequate key reports with regard to price verification processes." The firm conducted a reassessment only in 2007,

after the markets for toxic assets became more and more illiquid. Another firm confessed that it did not, during the Relevant Period, focus on highly rated ABS business on the risk side. Thus they could not, during the relevant period, identify any key reports with regard to price verification processes.[12] Finally, one firm stated that, "since the prices obtained were market quotes, no further price verification was done."

(c) Typical Price Verification Practices at the Majority of Surveyed Firms

At one firm, with regard to cash processes, traders typically priced on a daily basis; the finance department produced a daily report with, and without, vendor's marks. Any large discrepancies were reviewed on a weekly basis. A report would subsequently be created that would compare that date's valuations against two weeks prior and two weeks after, looking at the same CUSIP[13] or "like" CUSIP. The firm used spreads from new issue deals, and those spreads from the most recent sale, and compared them against the firm's traders' marks. If still not comfortable with the verification, the matter would go to risk management for review, e.g., such as looking at underlying collateral. *The firm conceded, however, that during the relevant period, it was a "very uncommon occurrence" for underlying collateral to be examined.* Finally, the "operations" system produced a file, done by CUSIP, which showed ratings and third party pricing. Results of these different steps would be taken to trading management and reviewed on a monthly basis. In general, there were very few positions that the firm placed into the "unverified" category, probably because, at the time, there was a liquid market for most of these SFPs.

With regard to *synthetics* at this firm, most of the SFP deals were primarily sub-prime CDS (AAA rated) used to build hybrid and synthetic CDOs. There was a mark review process in place driven by generic credit spreads from other deals and some trades (they would compare a trader's spread against the generic market spread). The market and finance risk groups were involved in this process. The firm did not conduct a CUSIP level analysis; instead, they conducted a "like kind" analysis, including looking at the ratings of similar products. Today, the firm would not just look at spreads. Spread information provided by dealers is not optimal because of different cash flow assumptions. This was a weakness in the data made available by Markit Group Limited (Markit) at the time because Markit would release consensus pricing based upon dealer input (and there were certainly different cash flow assumptions). The firm first used a more reliable pricing approach in December 2007, e.g., by using risk duration (calculating predicted loss for a given CUSIP).

Another firm stated that "all positions at the firm needed to be marked to market" and viewed this essentially as adequate risk management. Models and matrices were "sometimes" used for pricing. Desk heads were responsible for timely and accurate valuations. One factor that was considered in verifying prices included the degree to which a bid or offer price may not have been achieved. This firm was also an example of an intermediary that established impressive sounding *steps* to manage risk. These steps, however, did not prevent the firm from suffering large financial losses related to SFPs.

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[12] Such an assessment was started for the first time in mid-2007, when the sub-prime crisis escalated and the markets for toxic securities became essentially illiquid.

[13] CUSIP stands for the *Committee on Uniform Securities Identification Procedures*. Formed in 1962, this committee developed a system (implemented in 1967) that identifies securities, specifically U.S. and Canadian registered stocks, and U.S. government and municipal bonds.

For example, the firm developed FAS 157[14] hierarchy buckets. This means that, on the first level, prices were verified using external prices, if available. On a secondary level, they sought to verify model inputs, where pricing was done by models (e.g., for interest rate swaps). They also had an alternative procedures classification, e.g., where they sought to verify a bond price by looking for historical trends. Finally, there were a group of assets in "level 3," which sat in an unverified bucket (i.e., unverified by outside data) and all other assets that were not in level one or level two. These latter assets were rated as to risk (in other words, there might be "low risk" CDOs because there was some observable trade information). Nonetheless, limited reporting was done with regard to price verification.

Other firms were quite blunt about their limited SFP price verification. One group stated simply that it used "valuation techniques" to establish the fair value of instruments where prices, quoted in active markets, were not available. Valuation techniques used for financial instruments include modeling techniques, the use of indicative quotes for proxy instruments, quotes from less recent and less regular transactions and broker quotes. Moreover, as long as the financial markets were liquid and a sharp decline of asset prices had not yet occurred, they felt that there was "no reason to invest resources in developing sophisticated pricing models."

Other firms did not seek to verify in-house SFP pricing, and relied wholly on third party sources. Moreover, the vast majority of surveyed firms, by their own admission, relied heavily on external ratings of the rating agencies in general. Firms with more sound risk management practices did not rely heavily on the ratings for price verification, and used them for very limited purposes.[15]

Internal auditing systems were also inadequate at a number of the survey firms. A majority indicated that they had an audit system, which of course would look at SFPs. There was not, however, a special SFP business audit system. One firm even admitted that an audit of SFP holdings commenced in March 2007 received an unsatisfactory rating. As the audit proceeded, the SFP market began to "unravel," and so the scope of audit was expanded to seek more detail regarding the liquidity and treasury risk management and the warehouse building process. Not surprisingly, the primary problems appeared in the firm's SFP warehouse build-up process.

Another firm noted that, during 2006, it had different auditing approaches depending on the nature of the firm's business. What differentiated the audit function adopted by this firm included the management structure and the nature of risks involved. Each such auditing function would develop a risk appraisal profile or RAP. The medium RAP divided into medium high and medium low. High risk businesses were audited every 12 months, low risk

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[14] On November 15, 2007, FAS 157, or the fair-value measurement standard - took effect. The rule required most financial companies to come up with market prices for hard-to-value securities. Most of the of the major firms, however adopted FAS 157 early, meaning they started following it from either the start of 2007 or, in the case of most brokers, since December 2006.

[15] For example, the ratings might have been used to classify assets (seeking "like kinds" of assets for price verification purposes), particularly for synthetics. At such firms, third party ratings were more likely to be used for cash products, but only when there was no external price or trading information. In such cases, they would look at spreads for existing issues by rating bucket, and then take 4-6 deals and apply them to a grid that the desk would use to price their sub-prime bonds and then see how close that was to the price of the new issue.

every 48 months. Audit reports were written that assessed the strengths and weaknesses in controls. Controls received a satisfactory, "needs important improvements" or unsatisfactory grade. Every business that earned an unsatisfactory grade was re-audited within 12 months. RMBS was considered a "medium risk" (2 year cycle), but changed to the high risk category in September 2008. Interestingly, another surveyed firm placed RMBS and CMBS into the "high risk" audit category for the fiscal years 2004 – 2007. Audits for such high risk products were performed on an 18-month cycle.

(d) Hedging Strategies

Prior to mid 2007, the primary hedging was in the secondary market; and some larger firms hedged with single names. One firm said flatly that "selling" was the best hedge, although derivative products did exist with which firms could hedge in indices and single name forms. There was less hedging available with regard to ALT-A mortgages, but more in the subprime area. In the sub-prime area, one firm used single names of "like" bonds (i.e., bonds with similar characteristics). Also on sub-prime, they used the ABX index[16] as a hedge. Another firm sought to avoid lower tranches; regarding super senior tranches, they used swaps and customized hedge instruments to manage risk. One firm surveyed confessed that, apart from hedging interest rate risk, it had no portfolio risk management related to credit spread risk, basis risk, etc., of SFPs until the emergence of the subprime crisis.

Notwithstanding the existing hedging options, one firm's risk management philosophy was that rather than being "long and wrong" its "culture" was simply not to keep a "long" portfolio for an extended period of time. In stark contrast this philosophy, however, another firm conceded that even into late 2007, it had never liquidated a CDO warehouse, thus exposing the firm to massive losses during the financial crisis. It had thought (incorrectly) that it could hedge in theory during the Relevant Period to bring their notional exposures to zero.

(e) Developments of Concern

In 2005, if you originated a mortgage, you needed to wait for the issuance to come out; you could not *go short*.[17] Beginning in 2006, however, investors could take either long or short positions without expending a lot of capital; and then they did not even have to wait for a product to be originated, as they could now create synthetics. It appears that the development of these *synthetics* may have played a significant role in the lowering of underwriting standards, since demand for these products (and their securitization) was so high.

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[16] The ABX Index, created by Markit, is a series of credit-default swaps based on 20 bonds that consist of subprime mortgages. ABX contracts are commonly used by investors to speculate on or to hedge against the risk that the underling mortgage securities are not repaid as expected. The ABX swaps offer protection if the securities are not repaid as expected, in return for regular insurance-like premiums. A decline in the ABX Index signifies investor sentiment that subprime mortgage holders will suffer increased financial losses from those investments. Likewise, an increase in the ABX Index signifies investor sentiment looking for subprime mortgage holdings to perform better as investments.

[17] *Going short* or *short selling* is the practice of selling assets, usually securities, that have been borrowed from a third party (usually a broker) with the intention of buying identical assets back at a later date (and at a hoped for lower price) to return to the lender.

In 2006, the ABX index and single name CDS market were issued. The index was a good original indicator to see swings, along with deteriorating underwriting standards. Beginning in 2006, one surveyed firm began to observe higher volume in the ABX index. There was generally price stability but, at end of 2006, the firm observed some volatility. Nonetheless, there was substantial transparency. People could hedge risk and they could also go short. Liquidity peaked in this period; and there was very robust volume on the ABX Index.

The firm became further concerned during the 2006 period with regard to the performance of deals and certain developments from the underwriting perspective, e.g., early payment defaults, more defaults coupled with the lowering of credit standards, originators going out of business, a reduction in flow in refinance capital and price volatility in the ABX index. Also, some major hedge funds became very short on the ABX Index. This was of particular concern to the firm as it was net long on residential mortgage SFPs. Moreover, the firm observed some very large *profit and loss* swings on these positions, which was not normal. This analysis was facilitated by the work of the firm's SFP price verification team. In contrast, most surveyed firms simply observed the liquidity of the SFP market in mid-2006, and took no steps to analyze and/or decrease SFP positions.

(f) Observations and Prudent Actions taken prior to the Financial Crisis to Decrease Risk and Limit SFP related Losses

By the fourth quarter of 2006, some firms decided to decrease exposure (positions) even though the *economic residuals*[18] were being priced higher. Indeed, CDOs were still in high demand. Thus, there were opportunities to reduce index positions and go short.

A key component of some firms' decision to go short in residential based SFPs was the realization that there was no reliable consensus service for single name credit default swaps (CDS). In some cases, firms reviewed the pricing for large groups of mortgage-related CDSs in order to have a meaningful understanding of the associated risks. In order to do this, they needed to "price verify" thousands of names. They did so by:

- Incorporating collateral disputes into price verification;

- Surveying entire single name portfolio (checking all delinquencies, e.g., how many have missed how many payments). One means of doing so is to develop information from INTEX[19]; and

[18] In this context, the term *economic residual* should be understood as the difference of the *book* value of underlying loans that a firm purchases, and the amount received by the firm from investors once those mortgages were pooled and securitized (and the securities sold to the investors). For example, if a firm purchases mortgage loans with a face value of $100, the firm would sell mortgage related securities (as the result of the securitization of those loans) with a value of no more than $95. In theory then the firm would retain an *economic residual* of $5 or 5%, which it considered the minimum necessary. Accurate price verification is a key to whether or not this "economic residual" has value to the firm. If the loan prices can be deemed "verified," then it is much more likely that the economic residual retained ("warehoused") by the firm would have value. As the business grew, return on residual became a key consideration.

[19] This data was available to all firms. There is only a one month lag in the INTEX data.

- Developing a tool that enabled it to put all single names on a graph comparing to trading prices and consensus pricing. This permitted the firm to identify the "outliers."

As a result of this work, at least one firm became concerned as to whether it would be able to sell the CDOs; they therefore shut down CDO deals beginning in 2007, sold collateral that they had warehoused, and took losses.

Some firms' concerns were heightened when the Tranched ABX[20] came out on 14 February 2007, and shed light on the weaknesses in certain segments of the marketplace. In particular, once the Tranched ABX came out, there was a rapid deterioration in the market place. This made it clear that there was a problem with re-financings. Spreads widened to over 1000 points in some cases. Some firms began to observe collateral disputes in February 2007. As these disputes developed, a consensus pricing service became necessary because it became more uncertain as to whether the single names should be priced, or what the spread should be. These firms went to sources such as Markit and Fitch, and themselves agreed to participate (i.e., contribute firm trading data to these services in order to obtain *consensus* pricing data. Firms which engaged in *actual trades*, and which compared such trades to the consensus pricing, were able to discern flaws in consensus pricing as compared to actual trades. They could thus draw conclusions concerning the quality of the input data submitted to sources such as to Markit and Fitch from other firms.

It was observed that some firms, "instead of hitting the brakes, hit the gas pedal and did more deals." More successful firms noted the importance of a "risk management culture" as the key to survival, including the belief in fair value and marking assets to market. Successful firms understood the characteristics of the "whole loan" and the value of the "economic residual." They observed that, when the real estate market was at its peak, the goal of a firm was not to second-guess whether prices were "too high," but rather to ask whether prices were clearing. Accordingly, successful firms reduced their inventory of assets with unverified prices.

(g) Changes Made at Firms Post-Financial Crisis

At one firm, procedures have changed with regard to finance strategies, with a focus in part on price verification policies, governance and consolidated reporting. They have developed a standard set of metrics that all units (personnel) doing price verification need to meet. They now seek to have consolidated reporting at the "line of business" level and above, and to have regular meetings between finance and risk management (the implication being that they did not do this during the relevant time period).

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[20] On February 14, 2007, CDS IndexCo LLC (CDS IndexCo), a consortium of 16 investment banks licensed as market makers in the ABX, CDX and CMBX indices, and Markit launched Tranched ABX (TABX), standardized tranches of the ABX indices, the synthetic asset backed benchmark indices referencing U.S. sub-prime residential mortgages. TABX provides investors with a universe of tradable instruments and opened up a range of new trading strategies to suit individual risk appetites. For the first time, investors were able to hedge or gain leveraged exposure to the BBB and BBB- tranches of the ABX indices through a transparent, multi-dealer product. TABX enables investors to gain or hedge a specifically tranched exposure to ABX.HE, a synthetic ABS index, which referenced U.S. sub-prime residential mortgages. TABX allows the market to target a precise risk profile within the ABS portfolio and express a view by going long or short, much like the CDX and iTraxx tranches.

The firm has also sought to formalize communication better, and to formalize escalation and governance processes. The firm began to hire (apparently, late in 2007) a more centralized "robust" team to focus exclusively on price verification, in particular, to look not just at bids and offers, but also to look at the underlying assets. Again, very little, if any, analysis of assets underlying SFPs was done in mid-2006.

In addition, the firm now has fully consolidated reports across the entire SFP market; any problems are raised more efficiently to senior management, including reports of collateral disputes. They now bring together all senior partners with heads of all key groups so that big issues can be discussed in that forum to provide a more comprehensive picture of overall risk profiles.

Another firm undertook efforts to improve controls, stress testing and independent risk management. It also changed its price verification process. The new focus on risk has been on providing periodic updates to senior management on risk concentrations, financial markets participants, and other systemic risk issues. The approach now is more forward looking, and with a historical perspective. They seek to obtain a more objective view by focusing more on shock and stress scenarios. This approach is designed to enable the firm to assess economic risk across the company.

They now stress positions in both the trading and banking books. These stress tests allow the company to evaluate what steps should be taken to reduce exposures. Monitoring and aggregating risks are "key drivers" for assessing potential economic losses. The firm attempts to assess the impact of extreme events on the firm. The firm appointed a new chief risk officer in 2008, and has brought in additional new people to enhance their risk management capabilities. These persons mostly replaced earlier staff. They did not in most instances create new positions.

In summary, the firm believes that there is now more comprehensive and more frequent reporting to senior management. Senior management is now provided with an increased amount of risk metrics, including potential extreme downsides. Presently, there is more emphasis on developing hypotheses about the future, in contrast to what was done in 2006. There has also been a merger of the groups within risk.

Further, at this same firm in 2006, SFP inventory (warehouse content) was small, but inventory reached much higher levels as liquidity left the market. So they "adapted" to the change in market conditions. The key changes that they have implemented include:

- Greater use of pricing services;
- Deriving information regarding margin differences and analyzing it;
- Undertaking a review of pricing methodology;
- Updating their price verification policy;
- Conducting a special review of "level three" inventory;
- Improving practices and procedures; and

- As part of reasonableness checks, looking at default probabilities to determine whether prices are reasonable.

Two surveyed firms completely changed their strategy and also their policies and practices concerning SFP. The general strategy is to cut down the risky proprietary trading and to concentrate on customer based business, i.e., to essentially change the firms' business model. One firm installed a new segment Portfolio Restructuring Unit (PRU) that deals only with the unwinding of the firm's past credit replacement business and other non customer-related businesses in the next three to four years. PRU has a separate risk management structure and reports directly into the management board.

Beginning in December 2006, another firm's risk management unit and controller implemented joint Residential Conduits valuation procedures. These valuation procedures were performed monthly on a rotational basis for selected Residential Conduit products (e.g., Fixed Rate Alt-A, ARMs Alt-A, FHA / VA, Second Liens, Sub-Prime and Residual Tranches), with all products covered at least quarterly. This included review and/or benchmarking inputs and assumptions (e.g., deal structure, subordination levels, tranche spreads, prepayment speeds, default inputs and models, severity inputs, spreads and coupons and yield curves). Perhaps as a result, this firm exited, in 2007, both the RMBS and CMBS businesses. Moreover, much of the remaining inventory positions have been sold-off or marked down.

A surveyed investment management firm has taken steps to improve upon its ability to assess the risks associated with SFP investments. Steps include:

- Appointment of a trustee responsible for obtaining securities prices to assist in valuing existing inventory;

- Establishment of a secondary "pricing source" to obtain independent quotes on the SFPs as a check on the trustee prices;

- Prohibiting fund managers' involvement in pricing decisions;

- Holding regular meetings of a Risk Management Committee, with attendees from local Risk Management, Global Risk Management, Compliance, the Chief Investment Officer and Chief Operational Officer. As part of its normal business, the Committee reviews unquoted and/or illiquid securities;

- Establishment of a detailed *pricing policy* (Policy). The Policy defines the valuation principles and pricing sources for different asset classes to ensure fair value of securities including SFPs are obtained. The Risk Management team, being independent of the investment team, is responsible for updating and maintaining the Policy; and

- Establishment of a Pricing and Valuation Committee (Pricing Committee), consisting of the Head of Risk Management, the Head of Compliance as well as the Chief Investment Officer. When requested, the Pricing Committee will convene and will review the pricing sources for an instrument and form an independent view as to the

fair value of illiquid or unquoted securities. Terms of reference of the Pricing Committee are also included in the Policy. The Policy also outlines the monitoring procedure on stale price securities.

A.3 Observations on best practices by Firms

Our study, although limited to a survey of 10 firms in North America, Europe and Asia, has led us to conclude that the majority of these firms did not have in place adequate SFP price verification processes and related internal controls during the Relevant Period. Indeed, the survey of regulators (described below) revealed that, as a result of monitoring and examination programs, it became clear that one of the failings of firms in the past was their possible overreliance on external ratings in both price verification and overall management of their liquidity risk profile, and insufficient attention on position concentrations and size. There were also a number of weaknesses in risk management and internal controls processes that were identified in the examination process (such as documentation and supervisory control weaknesses regarding sales practices that could have created firm liability).

The survey to firms revealed, however, that firms can have effective SFP verification *if* they possess a sophisticated and firm wide risk management *culture* that permeates the actions of the entire firm, including the most senior management. Such a firm may not only avoid substantial losses during a financial crisis (such as the recent one associated with SFPs), but there may even be opportunities for such a firm to earn substantial income from shorting certain positions as a result of a sophisticated risk management and price verification team. Recognizing the challenges in articulating the roadmap to the development of such a risk management culture, our study has led us to the conclusion that the following are key components of such a culture, which should be adopted by major intermediaries with regard to their dealing in any complex financial product, including SFPs. These steps include:

- Developing an in-house expertise to facilitate a comprehensive understanding of SFPs and their underlying assets, and any other complex product. This would also include the establishment of an internal pricing model expertise, including the ability to both develop and test models. The firm should also have a high degree of confidence in the accuracy of the model input data;

- The establishment of a senior management team, including as appropriate the Chief Financial Officer and/or Chief Regulatory Officer, who are sufficiently knowledgeable about any complex financial products with which the firm deals, including SFPs, in order to be capable of, and does in fact:

    - Question the risk management function concerning long term risks posed to the firm by SFPs and other complex financial product lines, *particularly* when they are providing the firm with out-sized short term profits. Senior management should be prepared to question the long term risk to the firm posed by these products just as they might question continued dealing in products that have led to losses;

    - Participate in a comprehensive and meaningful discussion of SFP related risks and the technical aspects of SFPs, including the level of risk that the firm is

prepared to accept with regard to decisions to deal in (and warehouse) any complex financial products, including SFPs;

- Invite to such discussions knowledgeable risk management personnel who might hold contrary views with regard to the firm's continued dealing in SFPs and/or other complex financial products even when those views, if implemented, could lead to lower short term profits or even losses to the firm. Those views should be considered with an eye to towards the long term financial health of the firm and its capacity to survive a severe financial crisis; and

- Establish a firm culture where the development of informed contrarian and diverse views regarding risks posed to the firm by dealing in SFPs and other complex financial products is both encouraged and rewarded.

- Development of a formal reporting system and escalation process to senior management by the risk management function regarding the activities of SFP business lines and associated risks. This should include centralized reporting of the overall summary of limit excesses; and

- Recognizing and understanding the limits of both hedging done to limit the risks posed to a firm by SFPs and of the value of third party ratings of SFPs.

B. Survey of Regulators

B.1 Regulatory Standards Imposed on Firms with regard to Marking-to-Market the Value of SFPs.

(a) During the Relevant Period

In 2006, most jurisdictions did not have specific price verification standards for SFPs. Instead, they imposed general prudential requirements upon firms, such as minimum capital standards, and also required that the value of SFPs be marked-to-market on a daily basis.[21] For example, in the U.S., under the Net Capital Rule, any SFP that cannot be valued readily is given a 100% haircut, i.e., it cannot be counted towards the required capital of the firm.

In Japan, capital requirements were stipulated under the Securities and Exchange law (SEL) and related cabinet office ordinances during the relevant period. Securities companies, when calculating their net capital regulation ratio, were required to calculate an amount equivalent to the risk that may arise from changes in the prices of the securities they hold. In particular, a securities firm was required to calculate daily an amount reflective of both the market and counterparty risk.[22]

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[21] One exception was the Consolidated Supervised Entities (CSEs) regulated by the U.S. Securities and Exchange Commission. CSEs were permitted to mark on a weekly or monthly basis for illiquid products.

[22] See Article 52 of the SEL and Article 4, paragraph 4, of a cabinet office ordinance concerning regulation of the net capital of securities companies.

French regulation[23] required that all trading book positions be subject to "prudent valuation rules." When a market price was not available, or, on an exceptional basis for certain convertible products (when the market price does not reflect the intrinsic value of the position), the firm was required to use an alternative method of valuation, provided that the method was sufficiently prudent and had been communicated in advance to the Commission Bancaire.

Some jurisdictions also imposed requirements that certain intermediaries establish, document, and maintain a system of internal risk management controls to assist them in managing the risks associated with their business activities, including market, credit, leverage, liquidity, legal, and operational risks.[24] For example, securities intermediaries in Hong Kong are subject to GAAP rules in the valuation of structured financial products and are required to create adequate internal controls and risk management under the "Management, Supervision and Internal Control Guidelines." In the UK, with regards to firms' internal controls in relation to valuations, there are general control requirements on marking-to-market and marking-to-model for BIPRU[25] firms, which flow from the FSA's implementation of the European Capital Requirements Directive (CRD).[26]

Finally, certain auditing rules may also have impacted the price verification procedures within a firm. For example, in the U.S., every broker-dealer must file annually with the SEC an audited financial statement (Exchange Act 17a-5(d)). SEC rules in effect during the Relevant Period required (and continue to require) that the annual audit disclose any

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23 See article 6.1 of Regulation 95-02 of 21 July 1995 modified www.banque-france.fr/gb/supervi/telechar/regle_bafi/Regulation_95_02.pdf.

24 In the U.S., pursuant to the Securities Exchange Act of 1934 (Exchange Act) Section 15c3-4(d) (3), this requirement applied to any broker-dealer that is also registered as an OTC derivatives dealer. OTC derivatives dealers are a special class of broker-dealers that are exempt from certain broker-dealer requirements, including membership in a self-regulatory organization (§240.15b9–2), regular broker-dealer margin rules (§240.36a1–1), and application of the Securities Investor Protection Act of 1970 (§240.36a1–2). OTC derivative dealers are subject to special requirements, including limitations on the scope of their securities activities (§240.15a–1), specified internal risk management control systems (§240.15c3–4), recordkeeping obligations (§240.17a–3(a) (10)), and reporting responsibilities (§240.17a–12). They are also subject to alternative net capital treatment (§240.15c3–1(a) (5)). CSEs were also subject to the internal risk management control requirements set forth in Exchange Act Section 15c3-4(d)(3), pursuant to Exchange Act Section 15c3-1e(a)(1)(viii)(C).

The French regulatory framework (Regulation n°97-02) required credit institutions and investment firms to have in place an adequate internal control system relating to oversight, risk-appetite, adequacy of systems, and audit suitable to the firm's scale and complexity.

Mexico placed requirements on the Board of Directors to approve and set the high-level aims and objectives of firms, including risk appetite, as well as reporting lines into senior management. Firms are required to have systems and controls in place to manage risk and monitor positions, exposure limits, and valuation models, and to establish a special administrative unit in charge of market surveillance that should measure and assess the risks from operations. The unit is also required to provide a daily verified report of the risks undertaken to the general management and the Board of Directors.

25 Banks, building societies and investment firms.

26 The CRD was implemented as of January 1, 2007; but it did not change materially pre-existing requirements. Pre-CRD rules required that a firm must establish and maintain systems and controls sufficient to produce prudent and reliable valuation estimates, and must have independent price verification. Internal and external audit functions would have provided an additional layer of control.

inadequate price verification controls that have or could reasonably be expected to result in a material financial loss to the firm.

(b) After the Relevant Period

In general, regulatory requirements have not changed materially since 2006.[27] However, European respondents noted some amendments resulting from Basel II and the Capital Requirements Directive (CRD).[28] In France, article 305 of Order of 20 February 2007[29] requires that firms establish systems and controls that document valuation procedures, including the reporting lines for the relevant department leading the valuation process. That department is required to be independent of other operating units. Further, where marking to market is not possible, firms are required to mark their positions or their portfolios to model before applying capital requirements for the trading book. This included a periodic verification of the accuracy and independence of the market prices and data used by the model. Where independent pricing sources were not available or pricing sources were subjective, firms are required to take prudent measures such as valuation adjustments. Firms are also required to consider the need for establishing reserves for less liquid positions and are required to review their adequacy on an ongoing basis. In addition, Regulation n°97-02 was amended in January 2009 with a view to enhancing internal control procedures and, in particular to improve the flow of information, better control of operational risk (including fraud-prevention), and ensure that remuneration policies are consistent with their risk management objectives.

The UK FSA, in response to the CRD, put in place new rules for marking to model. In particular, when the model used is developed by the firm, that model must be:

- Based on appropriate assumptions that have been assessed and challenged by suitably qualified parties independent of the development process;

- Independently tested, including validation of the mathematics, assumptions, and software implementation; and

- Generally developed or approved independently of the front office.

In addition, in accordance with the UK rules implementing the CRD, a firm must:

- Ensure that its senior management is aware of the positions which are subject to mark-to-model and understand the materiality of the uncertainty this creates in the reporting of the performance of the business of the firm and the risks to which it is subject;

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27 Canada, Hong Kong, Singapore, Spain, UK FSA and U.S. SEC.

28 In the UK, new requirements were also introduced into the rulebook from 1 January 2007 as part of the implementation of the CRD. This supplemented broadly equivalent rules that existed during the relevant period, and which required "prudent and reliable valuation estimates" and "independent price verification."

29 www.banque-france.fr/gb/supervi/telechar/regle_bafi/20070220_order_arr_11_09_08.pdf.

- Source market inputs in line with market prices so far as possible and assess the appropriateness of the market inputs for the position being valued and the parameters of the model on a frequent basis;

- Use generally accepted valuation methodologies for particular products where these are available;

- Establish formal change control procedures, hold a secure copy of the model, and periodically use that model to check valuations;
- Ensure that its risk management functions are aware of the weaknesses of the models used and how best to reflect those in the valuation output; and

- Periodically review the model to determine the accuracy of its performance.

Finally, with regard to regulations in the United States, the survey results indicated that the financial crisis introduced several challenges for accountancy practices. Prior to 2008, external prices (or observable inputs used in valuation models) for certain asset categories were more readily available and observable. Therefore, estimating fair value for certain SFPs simply required identification and use of observable pricing information for identical or similar assets. However, beginning in 2008, liquidity in certain markets significantly decreased, or in some cases, those markets completely froze. As a result, external pricing information was not available or observable; and if it was available, it was not necessarily reliable given that trading was sporadic and not in close proximity to the measurement date.

The reduction in market liquidity for certain SFPs significantly increased the amount of work and judgment required by financial statement preparers to estimate the fair value. Specifically, preparers needed to determine if observable pricing information reflected fair value as defined by FAS 157, or if observable transactions were the result of *fire sales* or distressed transactions. However, determining if a transaction is orderly or forced is a difficult task and requires significant judgment. To address the concerns of marketplace participants, the FASB issued FSP FAS 157-4 in April 2009, which provided additional guidance on how to estimate fair value in markets that have become illiquid and identifying transactions that are not orderly. FAS 157 established a single definition of fair value and established a framework for measuring fair value.

The principals underpinning the definition of fair value under FAS 157 include:

- Fair value is based on an exit price from a hypothetical exchange transaction;

- The exit price assumes that the asset (or liability) is exchanged in an orderly transaction between market participants; it is not a price from a distressed sale or forced transaction;

- Fair value measurement assumes that the asset (or liability) is sold (or transferred) in its principal market, or in absence of a principal market, the most advantageous market;

- Fair value is determined based on assumptions that market participants would use in pricing the asset or liability; and

- Fair value measurement techniques should maximize observable inputs and minimize unobservable inputs.

B,2 Examination and Inspection Programs

To the degree that regulators had inspection or examination programs during the Relevant Period, these programs have changed little since that time. Nonetheless, some issues have become more important in reviews and supervision including controls on structured products and product due diligence and approvals. Checks on internal controls, risk awareness promotion, along with the publication of formal guidance have become more common.

With regard to registered broker-dealers in the United States, prior to the year 2006, the SEC's Office of Compliance Inspections and Examinations (OCIE) examination program included a review of the new product approval process during its examinations of large broker-dealers that focused on internal controls and risk management. Key aspects of the review may include, but may not be limited to, a broker-dealer's process for identifying new products, process for approving new products via committees and senior management prior to trading by firm personnel, the integration of the new product into the firm's risk management systems after approval, capturing of the new product on the firm's books and records, the firm's independent controls for valuing or pricing the product, and the firm's monitoring of the new product after approval including its ability to manage associated risks.

Since 2006, OCIE's internal controls based examinations of broker-dealers have continued to focus on the new product process and areas noted above, but also consider specific guidance set forth in the 2006 *Interagency Statement on Sound Practices Concerning Elevated Risk Complex Structured Finance Activities*.[30]

Specifically, coverage of new products on internal controls based examinations includes a review of the broker-dealers' procedures and controls for approving complex structured finance transactions.

OCIE has an internal controls examination cycle goal for the largest broker-dealers in the industry based on customer accounts, assets, and equity as reported in periodic filings to the Commission. The goal is to examine certain of the largest broker-dealers on a three year cycle and examine certain other large broker-dealers on a four year cycle.

In the period 2004-05, when US investment banks applied to become consolidated Supervised Entities (CSEs), the SEC staff conducted a comprehensive review and examination of the firm as part of the application process. A core component of this review was for the SEC staff to review the firm's overall risk management approach on a consolidated basis and to test the implementation of the control procedures at various affiliates within the organization. This included how a firm verified pricing, and the internal controls surrounding that process. These examinations were conducted primarily by OCIE, using audit procedures and resulting in a comprehensive examination report and deficiency letter sent to the firm requesting them to address weaknesses and deficiencies. After the application period, OCIE continued to conduct comprehensive risk management

[30] Available at: http://www.sec.gov/rules/policy/2006/34-53773.pdf.

examinations of the CSE firms on a cyclical basis; and the SEC's monitoring office, the Division of Trading and Markets (DTM), continued to monitor the firms on an ongoing basis. In March of 2007, the inspection responsibility was transferred from OCIE to DTM; no additional examinations were conducted as the SEC relied on the regular monitoring through meetings and discussions.

As the CSE program ended in 2008, the SEC's examination office today focuses primarily on the risk management/internal control functions of, and the various regulatory requirements established for, registered broker-dealers, including those that are affiliated with former CSE holding companies, continuing to conduct risk management and internal controls examinations of the largest broker-dealers on a cyclical basis.

Japan also had, during the relevant period, a comprehensive inspection program. It covered both the legal compliance (operational risk) aspects and financial risk management system, and sought to assess the "risk awareness" of both directors and managers.

The remaining surveyed regulators took a variety of approaches in seeking to understand the nature of the risks posed to firms through their dealings in SFPs after the relevant period. For example:

- The Canadian national self-regulatory organization, the Investment Industry Regulatory Organization of Canada (IIROC),[31] interviewed member firms and other industry participants with regard to SFPs. IIROC staff also conducted a compliance sweep of relevant firms designed to determine what product due diligence controls and processes were in place and how they were applied to third-party ABCP;

- In 2007, the Commission Bancaire adjusted its schedule of investigations over the course of the year (the emphasis was initially placed on the implementation of prudential filters for calculating capital following the introduction of the International Financial Reporting Standards to analyse the initial effects of the summer's banking crisis (VaR and monoline insurers). Numerous inspections of major banking groups[32] were carried out in 2008. The inspections focused on activities or institutions deemed to present specific risks requiring on-site checks further to monitoring by the documentary audit unit of the General Secretariat of the Commission Bancaire. The emphasis was placed on the valuation of complex products, liquidity management, risks linked to monoline insurers and Value at Risk (VaR) models for measuring market risk. The Commission Bancaire also changed the schedule of investigations during the year to begin inspecting market activities at large banking groups;

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31 The IIROC is the national self-regulatory organization which oversees all investment dealers and trading activity on debt and equity marketplaces in Canada. Created in 2008 through the consolidation of the Investment Dealers Association of Canada and Market Regulation Services Inc., IIROC sets high quality regulatory and investment industry standards, protects investors and strengthens market integrity while maintaining efficient and competitive capital markets. IIROC carries out its regulatory responsibilities through setting and enforcing rules regarding the proficiency, business and financial conduct of dealer firms and their registered employees and through setting and enforcing market integrity rules regarding trading activity on Canadian equity marketplaces.

32 In France, the most significant investment firms are subsidiaries of banking groups. In addition, according to French regulation, investment firms are included in the prudential perimeter of a banking group.

- In 2006, the German Bundesanstalt für Finanzdienstleistungsaufsicht (Bafin) conducted audits [based on the general supervisory framework.] Several audits of financial intermediaries were undertaken that used internal market risk models according to the Solvency Regulation (§ 313 et seq. Solvency Regulation) and focused on credit products and adequate price verification data (including, *inter alia*, marking of credit spreads). Additional audits were scheduled in 2008 and 2009, in order to examine pricing methods and controls for structured products.

B.3 Significant Weaknesses Identified at the Firms with regard to their SFP Related Internal Controls during the relevant period and Regulatory Responses

The survey results revealed that, from the perspective of supervisors, the key failings of firms included:

- a possible overreliance on external ratings in both price verification and overall management of their liquidity risk profile; and

- Insufficient attention paid to concentration and size of positions.

There were also a number of weaknesses in risk management internal controls processes that were identified in the examination process (such as documentation and supervisory control weaknesses regarding sales practices that could have created firm liability). Generally, there appears to have been a focus by firms on general market risk, to the exclusion of other risks, including reputational and liquidity risk. In addition, there was insufficient analysis of maximum exposure arrangements.

Other weaknesses identified included:

- The failure of firms and/ or their representatives to conduct independent due diligence with respect to the attributes or risks of third-party ABCP;[33]

- Structured products in the banking book were (for internal management purposes) not fully evaluated with actual market data and were not reported adequately internally. For example, risks associated with outdated price sources were not raised clearly to the attention of senior management;[34]

- The failure to analyze or quantify the risks associated with valuation models and procedures that could not be tested adequately. Some special pricing models for spread risks were not analysed and not validated by financial intermediaries. Correlation risk was also not sufficiently monitored. Moreover, intermediaries relied inappropriately for valuation on third-party information without implementing quality checks on that information – even if that information came from non-independent parties (e.g., sponsors of the structured positions);[35] and

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33 Canada.

34 Germany.

35 Germany.

- Originating firms may, in some instances, have conducted unequal levels of credit due diligence on assets depending on whether they intended to retain the risks on their own balance sheet or transfer them to a SPV. In particular, CDO assets that are specifically originated or purchased (and temporarily warehoused) to be sold to an SPV may have undergone a less rigorous credit underwriting process when compared to credits that the originator intends to retain.[36]

In general, supervisors communicated weaknesses in writing to all firms, as well as tailored individual input to firms via letter, phone and on-site feedback. In most instances, firms were requested to address and correct any deficiencies.

For example, in 2007 and 2008, several French institutions were instructed to strengthen the resources assigned to permanent and periodic controls and to provide more effective follow-up of action taken on recommendations issued in connection with internal and external audits.

There were also requests to strengthen accounting controls, extend and formalise procedures, improve control arrangements for outsourced activities, and/ or to improve the implementation procedures for assessment of new product compliance and to centralise that information.

The French *Commission Bancaire* sent firms a post-inspection letter regarding their holding of SFPs. It was supplemented with a technical appendix setting out remarks and recommendations for corrective action by the institution, plus a strict timetable for making these adjustments. The specific changes/enhancements required included:

a) Institutions should devote sufficient resources, both in terms of quality and quantity, to model approval and review, independent price verification and stress testing, as well as to internal control units. Consistent and rigorous valuation practices should be applied throughout a banking group;

b) On a regular basis, institutions should assess the need to develop back-up valuation models for complex or potentially illiquid instruments;

c) Institutions should enhance their risk management practices, notably as regards the incorporation of all appropriate risk factors in valuation practices;

d) Institutions should enhance their policies and procedures as regards the initial classification of financial instruments into an accounting category, being mindful of the strict reclassification rules that exist in IAS 39. Notably, accounting classification should not be used with the view to achieving a particular capital treatment if this is disconnected from the business intent of the institution;

e) Institutions should apply the same valuation processes and diligence when valuing financial instruments irrespective of the accounting categories that they have been allocated to or whether the fair values are purely used for disclosure;

[36] UK.

f) Institutions should apply sound criteria for investment and business decisions and to diligently analyse the related underlying risks and characteristics of a transaction prior to engaging in it. In the absence of appropriate information that would allow the valuation of the position in times of stress, it is expected that institutions will refrain from engaging in the transaction; and

g) Institutions should pay due attention to both net and gross exposures in managing their risks and to adequately take into account correlation and concentration risks when 'hedging' exposures.

B.4 Recommendations to Regulators for the Enhancement of Firm Internal Controls

In 2006, most jurisdictions did not have specific price verification standards for SFPs. Instead, they imposed general prudential requirements upon firms, such as minimum capital standards, and also required that the value of SFPs be marked-to-market on a daily basis. These requirements have not changed substantially.

There remain substantial challenges to any supervisor dictating any particular price verification procedure or related internal control, as the appropriate controls will depend in great part on the unique characteristics of the firm, including size, business model and the nature of the SFPs with which the firm deals. Thus, there remain two key regulatory tools that supervisors and/or self-regulatory organizations (SROs) may have the authority to use in order to help discourage or prevent excessive risk taking by firms and to promote robust internal SFP price verification processes and related internal controls. These include:

- Robust capital standards that seek to ensure that all material risks are adequately addressed; and

- Restricting a firm from engaging in a particular line of business where the firm falls below certain capital levels or where the firm violates other material requirements imposed by the regulator.[37]

- In addition, on an ongoing basis, we recommend that supervisors and/or SROs enhance their oversight of firm internal controls by:

- Closely monitoring the firms' liquidity position;

- Assessing the concentration of positions and the building up of concentration, particularly in the context of a limited history of liquidity of a particular asset class;

- With regard to valuation practices, inspecting to see if there is a reasonable valuation system in place. Supervisors should seek to ensure that firms are appropriately marking assets to market; and

[37] See, e.g., FINRA Rule 4120 -- Regulatory Notification and Business Curtailment, available at: http://finra.complinet.com/en/display/display_main.html?rbid=2403&element_id=8770. In particular, Rule 4120(c) (3) (D) authorizes FINRA to require a "reduction of business," which could include "reducing the size or modifying the composition of its inventory and reducing or ceasing market making."

- Developing a robust inspection program to implement the above, and particularly to determine whether the firm as a whole, and senior managers in particular, are appreciating the risks posed to their firm by these products.

C. Viability of the Independent Investment Banking Model

Surveyed regulators generally expressed the view that the independent investment banking model remains viable for firms that have robust risk management and internal control systems in place, and which hold sufficient long term debt that provides the liquidity necessary to withstand an extreme crisis and an irrational market (e.g., where counterparties refuse to lend against high quality collateral). In fact, Canadian regulators noted that in 2009, 177 of the 211 investment dealers regulated in Canada were independent of bank holding companies. All IIROC regulated firms are subject to their general prudential standards and, while all members were impacted by the global credit crisis, none of these firms became insolvent during the crisis. The view was also expressed that independent firms contribute to the diversity of business models within the industry, lead to greater competition and offer alternatives to the bank-owned financial service company model.

Where an investment bank firm relies excessively on short term funding to meet liquidity needs, however, no matter how good its risk management and internal controls, it may not be capable of surviving a crisis event where markets no longer functional rationally. For such a firm, the investment bank model may be unsustainable in the presence of a crisis of confidence by secured and unsecured lenders. In other words, it may not be able to survive a "run on the bank" without access to central bank funding support. Of course, this principle would equally apply to other financial institutions, including deposit taking banks.

The crisis faced by both independent investment banks and deposit taking institutions highlights in general the need to consider the issues relating to the problem posed by “too big to fail” institutions for the stability of the financial sector. Some suggestions to address this problem included:

- Development of strengthened capital and liquidity requirements for *systemically important* entities (in the wake of the G20 request);

- Strengthening more generally the prudential requirements relating to the *trading* activities for all financial institutions;

- Stricter supervision of proprietary (own-account) trading. From this standpoint, financial institutions should reinforce their internal controls and, more generally, their procedures for risk management. The ongoing work of both national governments and international bodies on the compensation schemes of traders constitutes one of the most important responses to this issue as they aim at limiting excessive risk taking in the short run by financial institutions; and

- Establishment of a credible mechanism for the resolution of failed institutions, particularly for those firms active on a cross-border basis.

Chapter 3 Liquidity Requirements

1. Executive Summary

TCSC3 undertook a prudential survey on how jurisdictions' liquidity regimes applied to securities firms. The survey comprised questions on the design of the regulatory framework for securities firms, and whether the crisis has changed firms' and regulators' approaches to liquidity risk management and supervision.

Eleven IOSCO jurisdictions responded to the December 2008 survey. Responses to the survey evidenced that there were many common features in jurisdictions' regulatory treatment of securities firms before 2006. They also show that a number of jurisdictions observed a number of areas where the regulatory approach could be improved as a result of the crisis. Indeed, the vast majority of respondents were in the process of, or were planning to update their approach to liquidity risk at securities firms as a result of lessons learnt during the recent crisis.

2. Discussion

(a) Pre-crisis approach to liquidity risk regulation

Jurisdictions generally had a number of common features in their pre-crisis approach to regulating liquidity risk at securities firms. The majority of jurisdictions' liquidity regimes were based on the Basel principles for liquidity risk regulation, and applied to all securities firms regardless of relative size or business model complexity within the jurisdiction. Most jurisdictions favoured a prescriptive approach to regulating liquidity risk before the crisis, which included restrictions on balance sheet size, and/ or stipulating the size and composition of firms' holdings of liquid assets. Generally, prescriptive parameters were applied to firms on a solo rather than a group basis.

The primary objective for surveyed regulators' liquidity regimes was to prevent firm failure. The responses identified a number of other objectives, such as ensuring orderly wind-down in the event of severe liquidity stresses, protecting clearing houses and preventing mismatch between firms' assets and liabilities. The treatment of securities firms between jurisdictions was highly standardised in relation to regulatory reporting. During the relevant period, regulators collected quantitative information from firms to inform their regulatory approach to these firms. Quantitative analysis by regulators usually focussed upon the financial reports on a firm's balance sheet including analysis of liquidity and solvency ratios.

(b) Sources of liquidity risks at securities firms

Most surveyed regulators were of the view that asset-backed securities such as asset-backed commercial paper (ABCP) presented the greatest source of liquidity risk and stresses in securities firms during the 18 months from mid-2008. Other areas identified as causing significant liquidity stress included risks in trading book proprietary positions, unsecured bond borrowing, corporate debt, options, structured products and counterparty risk.

(c) Issues that arose during the crisis

The survey sought to identify any issues in jurisdictions' approaches to securities firms' liquidity risk management and supervision highlighted by the crisis. A key area of concern for surveyed regulators was that of asset and liability valuation, particularly during stressed conditions. Respondents found that generally, security price discovery during the crisis was easier for exchange-traded securities only, and if the security belonged to an asset class with a deep, liquid secondary market. Security valuation was hindered if there were weak price discovery mechanisms in the secondary market, or if the price discovery mechanisms were based on fundamentally inaccurate methods (as noted in Chapter 2 of this paper). In addition, market opacity and a lack of market depth also caused problems in this area, during the relevant period.

(d) Valuation methods at firms

Jurisdictions did not observe any significant changes in valuation methods during the period from mid-2007 to December 2008; however, some expected that adjustments would be made by rating firms, as well as in the approaches of price providers. A small number of surveyed regulators considered that their firms were using inappropriate risk valuation methods. The majority of surveyed regulators highlighted the complexity firms encountered when trying to value securities during periods of severe market illiquidity, noting that often, alternative valuation methods that may have been appropriate were not prepared in advance of the crisis. In accordance with the findings in Chapter 2 of this paper, regulators also believed that firms were overly-reliant on information from rating agencies and price providers.

Only two jurisdictions noted that valuation methods changed after the relevant period. For one jurisdiction, the most important was a shift from mark-to-market to mark-to-model for instruments. They also noted an increasing use of "judgment" and critical analysis in the valuation process, and closer cooperation with auditors to develop guidance for the auditing of fair values.

The second jurisdiction commented that changes in firms' approach to valuing the illiquidity and spread volatility aspects of their pricing has been significant in the way they responded to the crisis. Most firms were placing less reliance on external ratings of instruments and firms, particularly for structured products and securitized products. In this jurisdiction, firms began incorporating alternative pricing approaches, including the use of Credit Default Spreads observed in the OTC markets. Additionally, the jurisdiction observed more reliance on third party pricing vendors for pricing illiquid assets. Firms have examined their models, and subjected themselves to more rigorous stress testing.

The survey elicited how well firms assessed the appropriateness of haircut sizes before the relevant period. A number of jurisdictions observed that their securities firms had to change haircut sizes during the crisis because risks of securities such as ABCP were not assessed appropriately. Consequently, the margin rate for firms' ABCP holdings were not adjusted appropriately before the domestic market for these instruments froze. One jurisdiction noted that although some securities firms assessed the appropriate size of haircuts well, others were unprepared for the lack of liquidity and the ensuing increased size of haircuts required. During the relevant period it was found that generally, firm Value at Risk (VaR) models did not work well. Moreover, firms under severe stress did not anticipate that repo funding, including that collateralised with government and government agency financial instruments,

could dry up. For one respondent, the setting of haircuts in the repo market is not common practice, so little attention was paid to haircuts before the current crisis.

(e) Intra-group and cross-border issues

Surveyed regulators described their experience of intra-group and cross-border management of liquidity at securities firms, including:

a) The rapid transfer of liquidity from securities firms;

b) Home-host supervisor collaboration;

c) The reliability of intra-group sources of liquidity; and

d) The FX market's pivotal role in the crisis.

It was observed that a negative aspect of intra-group and cross-border liquidity management is the ability of groups to rapidly transfer liquidity from a securities firm to, for example, a bank, leaving the securities firm in a weakened financial position. A jurisdiction considered that the avoidance of incremental credit and market risks within a financial group could be a benefit of firm-wide consolidated liquidity management.

In the role of host supervisor, a jurisdiction said that they maintained active communication, and close cooperation with home supervisors during crises in groups that spanned jurisdictional borders. A specific example of this was when a foreign parent company had to provide additional funding to a subsidiary in the host supervisor's jurisdiction. The respondent did not observe any complications in their approach to effectively managing liquidity risks during stress as a result of differences in national regulatory regimes.

Some respondent regulators observed that there were clear differences in how effectively cross-border firms could be regulated. One said that in their experience, this depended on whether intra-group funding was managed in a centralised or decentralised way. They believed that centralised approaches hindered the ability to gauge the impact of deteriorating funding environments in the home jurisdiction on other entities in the group. Another respondent commented that it did not generally consider intra-group sources of liquidity as reliable, aside from that provided by the parent company.

Another observation was that most financial institutions and groups were not fully prepared for deterioration in the foreign exchange swap market, highlighting this and enhanced foreign currency liquidity risk as a key area for firms and regulators to consider going forward.

(f) Existing regulatory regime

Jurisdictions considered that the quantitative aspects of their liquidity regimes were most effective during the relevant period. These included risked based capital requirements that were viewed to be particularly effective during periods of high volatility, and when equity prices fell significantly. Early warning mechanisms were also highlighted as an effective way of detecting potential financial difficulties early. Consequently, there were no surprises for sudden member defaults. Many jurisdictions said that their liquidity risk ratios worked well, as firms were often required to hold a buffer of liquid assets to protect against liquidity

shocks. It was noted that generally, information provided in regulatory returns was not directly useful to the *day to day* monitoring of the liquidity crisis, as supervisors felt that the complex methodologies implemented made them difficult to interpret. However, ad-hoc data requests during the crisis supplemented supervisors work to resolve issues.

One specific respondent stated that it was beneficial, to have captured funding methods and features, risk factors and changes in funding structure in detail prior to the financial crisis through the daily monitoring of funding position.

Surveyed regulators were asked about the strengths and weaknesses of their current liquidity regime in terms of achieving its objectives. For one respondent, a key strength of their regime is the use of detailed daily monitoring to capture the funding situation of financial institutions in a timely manner. They also discussed the benefits that resulted from close cooperation between them and the central bank when deciding on approaches to dealing with the crisis. Other strengths related to preventive measures and increased regulatory activity, including intensified stress tests to assess the financial exposure that brokers could withstand in adverse market conditions. Jurisdictions believed that although the new approach is significantly more resource intensive, they believed that it better enables them to gauge the risk of liquidity stresses in licensed firms that are not subsidiaries of regional or global financial institutions.

One regulator identified a weakness in their liquidity regime, which was that it did not take into account the specific risks that firms were taking on. Other regulators noted weaknesses relating to information periodicity, valuation and rating activities, supervisory procedures, and market discipline measures.

(g) Intra-group and cross-border liquidity risk management

The survey evidenced that jurisdictions used different approaches to dealing with intra-group and cross-border liquidity risk management at larger securities firms. The crisis showed regulators that securities firms could be particularly vulnerable to intra-group liquidity drains, and complications in accessing the FX markets. Jurisdictions that had more positive experiences in dealing with these larger group structures promoted approaches where there was close collaboration between home and host supervisor, as well as a good dialogue between regulator and central bank.

3. Current updates to liquidity risk supervision at securities firms

Jurisdictions indicated that they were either in the process of updating their approach to regulating and supervising liquidity risk management at securities firms, or had the intention of doing so in the short to medium term. This was as a result of lessons learned during the crisis. The survey identified a number of key risks that could make securities firms more susceptible to liquidity stresses. The most common risks identified related to:

a) Complexities in asset price discovery;

b) Concentration risk – a lack of asset diversity;

c) Mismatches between asset and liability maturity; and

d) Over-reliance on short-term, unsecured wholesale funding.

A range of approaches to reducing the probability and impact of liquidity risk were identified in the survey results. Generally, regulators control firms' behaviour by placing limits on areas that could give rise to liquidity risks, such as daily funding liquidity risks, asset and funding concentrations, and a requirement that firms hold a buffer of liquid assets against their liquidity risk.

A number of jurisdictions were changing liquidity requirements, to improve liquidity risk management and supervision for these firms in their jurisdiction. One approach was described as being aligned to the Basel, CEBS and IIF overarching principle for the sound management of liquidity risk. Other regulators were planning to update the quantitative aspects of their liquidity regime for credit institutions, incorporating lessons learnt from the current crisis, and BCBS and CEBS standards for liquidity. Alternative responses included increasing capital requirements for certain credit institutions, the introduction of liquidity charges to supplement haircuts, changing the core liquidity requirements for certain institutions and updating the listing requirements for structured products.

4. Recommendations

(a) Securities valuation

Although not all IOSCO members responded to the survey, the survey results imply that jurisdictions encountered a number of similar issues during the crisis. Generally, the greatest source of liquidity risk was attributed to securities and the accuracy of their valuation. Indeed, this is a key area that jurisdictions are working to improve in their updated liquidity regimes. The promotion of consistent good practices and guidelines in this area could help to ensure that the new methods developed are sufficiently robust to remain effective during future crises.

The survey responses implied that investment firms that hold illiquid assets are more susceptible to experiencing the liquidity stresses encountered during the recent crisis. The most resilient of these firms will be the ones that can quickly shrink their balance sheet without having to resort to accepting fire-sale prices for their assets. This may not, however, be feasible for some securities firms. It may be appropriate to require these firms to keep a buffer of highly liquid assets to offset the liquidity risks inherent in their balance sheet.

(b) Increased supervision of liquidity risk

As is the case with most jurisdictions, we recommend that regulators take steps to increase supervisory attention paid to liquidity risks at securities firms. This includes increased scrutiny of liquidity risks at firms and greater dialogue between firm and regulator, collecting easy to interpret information, and re-designing quantitative elements that worked less well during the crisis. Consistency in the new approaches on a cross-border basis could benefit the global financial markets, both from the perspective of facilitating more effective regulatory approaches, and less complex compliance for firms.