CHAPTER 2

STRUCTURED FINANCE: ISSUES OF VALUATION AND DISCLOSURE

This chapter focuses on two aspects of structured finance that have contributed fundamentally to the duration and depth of the crisis, namely, the valuation and disclosure of structured finance products. It concludes that the complexity of these products, coupled with weak disclosure, left the system exposed to a funding and confidence crisis. Looking forward, it is likely that structured finance will recover, but that the products will likely be more standardized and transparent to both investors and regulators.

The financial crisis that began in late July 2007 represented the first test of the new complex structured finance products, markets, and business models that have developed over the past decade.[1] The crisis has been both deep and protracted: one-month and three-month interbank interest rates remain elevated despite coordinated central bank operations and rate cuts; there is significant uncertainty about the valuations and disclosures of structured instruments; counterparty risk remains a concern; and the balance sheets of financial institutions have been weakened. As a result, important questions are being asked about whether structured finance products provided the intended benefits, the extent to which these products increased the risk of a crisis and exacerbated its consequences, and the need for both the official and private sectors to address systemic weaknesses.

The conclusion of this chapter is that, although structured finance can be beneficial by allowing risks to be diversified, some complex and multi-layered products added little economic value to the financial system. Further, they likely exacerbated the depth and duration of the crisis by adding uncertainty relating to their valuation as the underlying fundamentals deteriorated. The recovery of the structured market will likely entail more standardized products, at least for some time to come, and better disclosure both at origination and subsequently. To this end, policy measures should aim to strengthen design and market weaknesses and to close the regulatory gaps in structured finance, without impeding innovation.

This chapter first explores in some detail the implications for financial stability arising from the valuation and accounting practices for complex structured products both at origination and subsequently. In considering the difficulties of valuation, the chapter briefly discusses the associated role of credit rating agencies. It then examines, in relation to the crisis, the impact of fair value embedded in the two main accounting standards along with the related disclosure frameworks; and the role of off-balance-sheet entities, such as structured investment vehicles (SIVs) and conduits. The chapter argues that the relevant perimeter of risk consolidation and disclosure for banks is broader than their balance sheet when significant off-balance-sheet entities are present. The chapter also touches on the implications of Basel II implementation, before finishing with some key conclusions and a short discussion of structured finance going forward.

Note: This chapter was written by a team led by L. Effie Psalida and comprised of John Kiff, Jodi Scarlata, and Kenneth Sullivan. Yoon Sook Kim provided research support.

[1]Box 2.1 defines structured products and describes their function.

Valuation and Disclosure of Complex Structured Finance Products

One of the factors driving the need for coordinated central bank action to aid interbank liquidity needs in the second half of 2007 was banks' loss of confidence in the ability of their counterparties to meet their contractual obligations.[2] This was driven by fears of contagion from the rising level of defaults in subprime underlying instruments, many of which were incorporated in complex and difficult-to-value structured finance products. As a result, many investors withheld funding from complex structured products, even those with high-quality underlying assets. This compounded the internal worries of financial institutions about the valuation and financing of their own holdings of structured securitized products. The absence of liquid markets and the reliance on models for valuations meant that parties were unsure of the undisclosed losses on their own and others' balance sheets, as the interaction of credit and liquidity risk drove market valuations down to levels below theoretical assumptions.

The Role of Credit Ratings in the Valuation of Structured Finance Products

In the second half of 2007, the three main credit rating agencies were forced to make precipitous downgrades on a large number of structured finance products backed by U.S. subprime mortgages, on which default rates had risen abruptly relative to earlier assumptions. The downgraded securities included some rated AAA, which is the safest rating possible.

Credit ratings have been a key input for many investors in the valuation of structured credit products because they have been perceived to provide a common credit risk metric for all fixed-income instruments. In particular, when reliable price quotations were unavailable, the price of structured credit products often was inferred from prices and credit spreads of similarly rated comparable products for which quotations were available. For example, the price of AAA ABX subindices could be used to estimate the values of AAA-rated tranches of mortgage-backed securities (MBS), the price of BBB subindices could be used to value BBB-rated MBS tranches, and so on (IMF, 2007b, Box 1.1.). In this way, credit ratings came to play a key mapping role in the valuation of customized or illiquid structured credit products, a mapping that many investors now find unreliable.

Credit ratings are also important because many institutional investors are mandated to invest only in rated fixed-income instruments. In fact, successful structured credit issuance has largely depended on the ability to attain AAA credit ratings on large portions of these products (Box 2.2). Although it has long been known that, during credit downturns, structured credit ratings are more prone to severe downgrades than are ratings on traditional fixed-income securities (e.g., corporates and sovereigns), the benign performance of credit markets since the early part of this decade gave investors a false sense of security.

Although credit rating agencies insist that ratings measure only default risk, and not the likelihood or intensity of downgrades or mark-to-market losses, many investors were seemingly unaware of these warnings and disclaimers. However, in a welcome development, credit rating agencies have recently proposed the introduction of differentiated rating scales for structured credit products, possibly with qualifiers that indicate the amount of downgrade risk (Moody's, 2008; Standard & Poor's, 2008). Nevertheless, credit spreads on structured credit products tend to be wider than on similarly rated traditional fixed-income securities, indicating that markets are pricing in other types of risks, such as liquidity or market risks, in addition to just default risk (Box 2.3).

Furthermore, the spread widening that has occurred since mid-2007 suggests that market participants have come to view credit rating

[2]See Chapter 3 for a discussion on the provision of central bank liquidity.

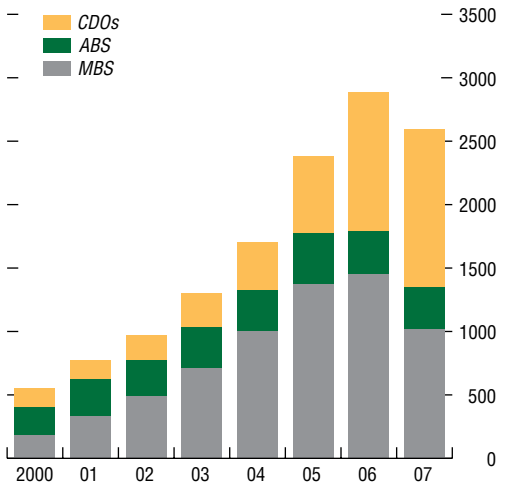
Box 2.1. Structured Finance: What Is It and How Did It Get So Large?

Structured finance can be beneficial, allowing risks to be spread across a larger group of investors, each of which can choose an element of the structured finance product that best fits its risk-return objectives. However, some complex, multi-layered structured finance products provide little additional economic value to the financial system and may not regain the popularity they garnered before the U.S. subprime mortgage crisis.

"Structured" finance normally entails aggregating multiple underlying risks (such as market and credit risks) by pooling instruments subject to those risks (e.g., bonds, loans, or mortgage-backed securities) and then dividing the resulting cash flows into "tranches," or slices paid to different holders. Payouts from the pool are paid to the holders of these tranches in a specific order, starting with the "senior" tranches (least risky) working down through various levels to the "equity" tranche (most risky). If some of the expected cash flows into the pool are not forthcoming (for instance, because some loans default), then, after a cash flow buffer is depleted, the equity tranche holders are the first to absorb payment shortfalls.[1] If payments into the pool are reduced further, the next set of tranche holders (the "mezzanine" tranche holders) do not receive full payment. Typically, the super senior tranches and the senior tranches at the top of the "capital structure" are constructed so that they qualify for AAA ratings from the credit rating agencies, meaning there should be a very low probability of not receiving their promised payments (see Box 2.2).

Until July 2007, when the financial crisis hit, the growth in structured credit finance products had been exponential. For example, issuance of selected structured credit products in the United States and Europe grew from $500 billion in 2000 to $2.6 trillion in 2007, while global issuance of collateralized debt obligations grew from about $150 billion in 2000 to about $1.2 trillion in 2007 (see figure).

European and U.S. Structured Credit Issuance
(In billions of U.S. dollars)



Sources: *Inside MBS & ABS*; JPMorgan Chase & Co.; and European Securitization Forum.
Note: CDOs = collateralized debt obligations; ABS = asset-backed securities, including auto, credit card, etc., and excluding MBS; and MBS = mortgage-backed securities, excluding U.S. agency MBS.

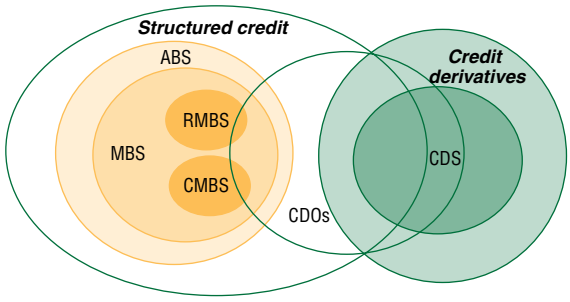
The motivations for creating structured finance products and for the rapid growth of issuance are several:[2]

- Pooling is meant to differentiate and diversify risks, and as a result of the tranched structuring, holders of the top tranches have a smaller chance of losing money than if they held a pro-rata portion of the pool's assets directly.
- Investors can choose among the tranches to reflect their own risk-return trade-offs, allowing different types of investors (e.g., insurance companies or hedge funds) to hold different parts of the capital structure of structured finance products.

Note: Laura Kodres prepared this box.

[1]Structured finance differs from securitization. While securitization diversifies risks by pooling instruments, the cash flows are not "tranched" and are instead provided to holders of securitized instruments on a pro rata basis.

[2]For further information, see Chapter 2 of the April 2006 GFSR (IMF, 2006); Box 1.1 of Chapter 1 of the April 2007 GFSR (IMF, 2007a); and Chapter 1 of the October 2007 GFSR (IMF, 2007b).



Note: ABS = asset-backed security; MBS = mortgage-backed security; RMBS = residential mortgage-backed security; CMBS = commercial mortgage-backed security; CDS = credit default swap; and CDOs = collateralized debt obligations. Not proportionally representative.

- In the period leading up to the crisis, benign financial market conditions encouraged investors to "search for yield" and raised demand for structured products, since they paid higher returns than many other similarly rated corporate or sovereign securities. Structured credit products were especially attractive to institutional investors seeking AAA-rated securities, where the pickup in yield appeared to bear no additional risks. In some cases, AA, A, and BBB rated tranches also paid more than similarly rated sovereign and corporate securities.
- Issuance of credit-risk-based structured finance products has been motivated by the desire of banks to manage regulatory capital more efficiently. Under Basel I, the transfer of credit risk through a structured finance product lowers capital charges to the bank. Under Basel II, these motivations are less pronounced, since Basel II is meant to better reflect underlying credit risks (see discussion in main text).
- Some financial institutions found that producing structured credit products allowed them to originate more underlying loans while not having to fund them directly, or bear the associated credit risk.
- Some issuers were motivated by the large fees they were able to charge given the strong demand.

As the peak of the credit cycle was reached, the underlying assets used to piece together some types of structured credit products were of increasingly lower quality. For instance, one-fifth of all U.S. mortgages originated in 2006 were of the subprime variety and many were included in structured finance products, since the tranching could raise the rating of some parts. As a result, new products dividing up the cash flows were devised in order to manufacture AAA securities (see Box 2.2).[3] The overconfidence about U.S. house prices and the expected liquidity of these instruments, even during times of stress, permitted the demand to continue even as the fundamentals underlying the pools deteriorated.

While some underlying portfolios are comprised of well-diversified, good-quality loans and securities, those backed by subprime U.S. mortgages and issued in the last few years have deteriorated rapidly. The universe of structured finance products is quite broad, but investor experiences with these newer complex securities have undermined confidence in many structured credit products, and new issuance in these markets is expected to be negligible for some time (see figure).[4] Many market participants do not expect the most complex products to reappear at all.

[3]These included some forms of collateralized debt obligations, where underlying debt instruments are placed in the pool to be tranched, and collateralized loan obligations, where leveraged loans are placed in the pool.

[4]Credit derivatives are also related to structured finance in that some structured credit products are backed by portfolios of credit default swaps. In addition, a market for credit derivatives based on portfolios of credit default swaps grew from about $1 trillion of outstanding contracts at end-2004 to $18 trillion at mid-2007, according to the Bank for International Settlements.

agencies as being slow to recognize the deterioration of some of the fundamental inputs to their rating methodologies. Indeed, since early 2007, credit rating agencies have been scrambling to anticipate and keep up with the rapid and material deterioration in the fundamental performance of subprime mortgages and the contagion to financial markets more broadly. (Box 2.4 demonstrates the rating dynamics of some simple collateralized debt obligation transactions.)

Accounting Frameworks

The accounting framework for disclosing valuations of structured finance products differs according to an institution's location. U.S. firms adopt that country's generally accepted accounting principles (U.S. GAAP) while European firms with listed securities use international financial reporting standards (IFRS).[3] Nonlisted European firms may use IFRS or their respective national guidelines, each of which may allow different valuation approaches. In the rest of the world, firms may use either national standards or IFRS (Table 2.1).

As most holders of structured finance products, including collateralized debt obligations (CDOs), wish to retain the ability to sell them before maturity, the majority adopt fair value for valuing these products.[4,5] Accounting frameworks require professional judgment in determining the mechanisms for fair value, including the use of unobservable inputs in cases of the absence of an active market for an instrument. Such judgment allows the possibility of different outcomes for similar situations, which in times of market uncertainty may compound the risk of illiquidity.

Since the assumptions underlying the accounting for structured products are framed for normal market conditions, the current period of stress is providing a significant test of the robustness of the accounting standards. It is important to note that the standard setters never intended any methodology for calculating fair value, including those classified as level three (U.S. GAAP), to provide any value other than an exit price.[6,7] The reclassification of assets under U.S. GAAP from one level to another reflects changes in the availability of market inputs for valuation. However, investors seem to have a perception contrary to what the standard setters intended because a firm risks a negative market reaction with a reclassification of assets from level two to three, as events during the turmoil indicated. (Figure 2.1 denotes the increase of assets in levels two and three in 2007 for selected large U.S. financial institutions). Market analysts may judge, correctly, that such a move reflects further illiquidity in the market or, incorrectly, that the firm's recategorization of fair value methodologies represents a deliberate overestimation of the value that the assets would generate in a sale.

It is understandable that in times of instability the absence of observable inputs to verify valuations exacerbates market uncertainty

[3]Annex 2.1 discusses the implications for structured products under the two standards.

[4]Fair value as defined in Financial Accounting Standards 157 is "…the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date" (see Annex 2.1 for more details).

[5]Both IFRS and U.S. GAAP contain provisions for the disclosure of fair value changes in the income statements or directly on the balance sheet to equity. An entity designates the reporting of fair value through income or directly to equity at the time of acquisition of the asset. Those assets classified as available for sale (both IFRS and U.S. GAAP) have fair value changes taken directly to equity. Entities must report all other fair value changes through profit and loss.

[6]U.S. GAAP require the classification of financial instruments into one of three levels depending on the basis for determining their fair value. Level one valuation uses observable market data while level three valuation uses material inputs that are not observable, requiring a "mark to model" approach (see Annex 2.1 for a detailed definition of the three classification levels).

[7]Classification of fair value methodologies as level one, two, or three is a different issue from their original classification as trading, available for sale, or held to maturity. If the entity classifies assets as trading or available for sale, it must report them at fair value.

Box 2.2. When Is a AAA not a AAA? (Part 1: The ABCs of MBSs and CDOs)

This box provides an introduction to the structural mechanics of subprime mortgage-backed securities (MBS) and structured-finance collateralized debt obligations (CDO). It shows that successful issuance depends on the ability to attain AAA credit ratings on large portions of these securities. This box and the subsequent two boxes explore the fragility of these AAA ratings, and, by implication, their valuations.

About 75 percent of recent U.S. subprime mortgage loan originations have been securitized. Of these, about 80 percent have been funded by AAA-rated MBS "senior" tranches, and about 2 percent by noninvestment grade (BB+ and lower) "junior" tranches (see figure). Most of this 2 percent was typically an unrated "equity" tranche created by overcollateralization—that is, the value of the loan pool exceeds the total principal amount of securities issued. The remaining 18 percent was funded by investment-grade "mezzanine" tranches (rated from AA+ to BBB–) that are "recycled" into structured-finance CDOs.

The risk transformation process relies on internal credit enhancements, including overcollateralization and subordination.[1] Subordination involves the sequential application of losses to the securities, starting with the equity tranche and moving up through the other junior tranches before being applied to the mezzanine and then the senior tranches. Only when a tranche is depleted are losses applied to the next tranche in the sequence. Under normal circumstances, the most senior tranches should be very secure against credit risk. For example, if subordination were the only credit enhancement, losses in the above-described structure would have to total 20 percent before the senior tranches would suffer losses.

Structured-finance CDOs also transfer risk by using similar credit enhancements to transform MBS tranches (and other structured-finance CDO tranches) into even more primarily investment-grade securities (see figure). High-grade, structured-finance CDOs resecuritize MBS tranches (subprime- and prime-backed) and other CDO tranches rated A– and above. Mezzanine structured-finance CDOs resecuritize BBB-rated MBS and CDO tranches. Over 90 percent of a typical high-grade, structured-finance CDO liability structure is comprised of AAA-rated senior tranches (of which all but about 5 percent is comprised of a "super-senior" tranche, which is the very last tranche to incur losses). Reflecting the higher risk of the underlying MBS tranches, the senior tranche of a typical mezzanine structured-finance CDO comprises just over 75 percent of the structure (of which about 60 percent is super-senior). Most of the A- and BBB-rated CDO tranches are recycled into CDO of CDO ("CDO-squared") securities, about 85 percent of which are comprised of AAA-rated senior and super-senior tranches.[2] These CDOs-squared and structured-finance CDOs were created almost solely to resecuritize MBS and CDO mezzanine tranches, for which there was not sufficient demand from investors. Therefore their value added in transferring risk is questionable.

Before the model's default probability and loss severity inputs were tested by the subprime crisis, it had been thought that a 20 percent enhancement amount (overcollateralization plus subordination) would make it virtually impossible to "break" a AAA-rated subprime MBS tranche. For example, it had been typical to assume that when a subprime mortgage foreclosed, about 65 percent of its outstanding balance could be recovered. Such a 35 to 50 percent loss-severity assumption implied that from 50 to 65 percent of the mortgages would have to default before losses would impact the MBS senior tranche. However, a more realistic loss-severity assumption for subprime mortgages might be as high as 70 percent, for which a 28 percent mortgage default rate would

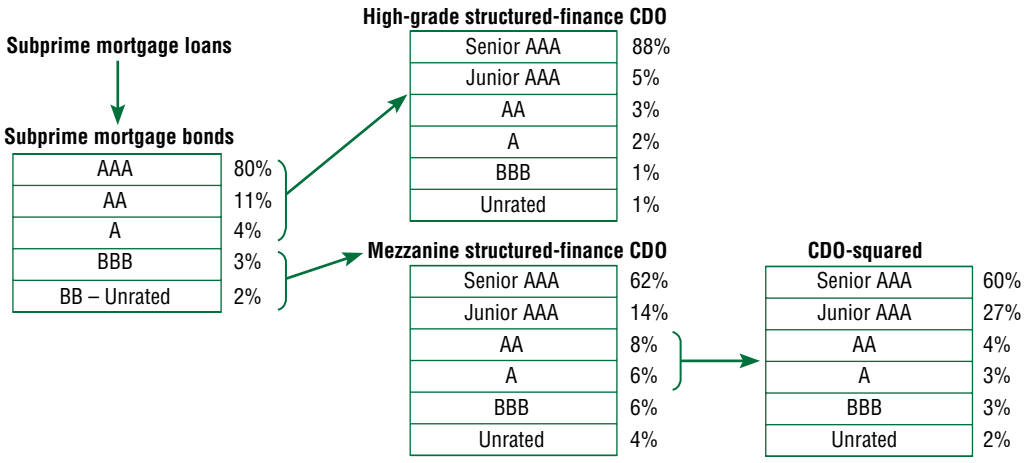
Note: John Kiff prepared this box.

[1]Other important MBS credit enhancements include excess spread, shifting interest, and performance triggers (see Ashcraft and Schuermann, 2007).

[2]CDO-squared products repackage tranches of other CDOs, whereas structured-finance CDOs are comprised of recycled CDOs, MBS, and asset-backed securities.

Box 2.2 ***(concluded)***

Matryoshka — Russian Doll: Multi-Layered Structured Credit Products



Source: IMF staff estimates.
Note: CDO = collateralized debt obligation.

compromise the senior tranche. This highly simplified analysis ignores the impact of other material credit enhancements, but it shows that the probability of MBS senior tranche defaults could be higher than the 0.05 percent or so default probabilities associated with AAA corporate securities (at a five-year maturity).

Structured-finance CDOs are even more fragile than noted above because they effectively leverage BBB- to AA-rated subprime MBS tranches. Not only are the default probabilities associated with these underlying securities likely to be higher than had been assumed when the CDOs were first rated, but if losses do exceed senior MBS tranche enhancement levels, the underlying BBB- to AA-rated tranches will experience 100 percent loss severities. Clearly, these potential risk scenarios are not consistent with maintaining a AAA rating at the top of the structure such as those associated with AAA corporate, where only five of 10,000 firms default.

and, therefore, market illiquidity. However, as the reclassification is often based on technical rather than substantive grounds, the market's reaction may reflect both a misunderstanding of how the relevant accounting standard (Financial Accounting Standards [FAS] 157) works and a broader misunderstanding of what fair value represents. The apparent negative response to level three reclassifications also included the market's generalized reaction against securitized products during the crisis.

Auditors' Recommendations on Fair Value Calculations

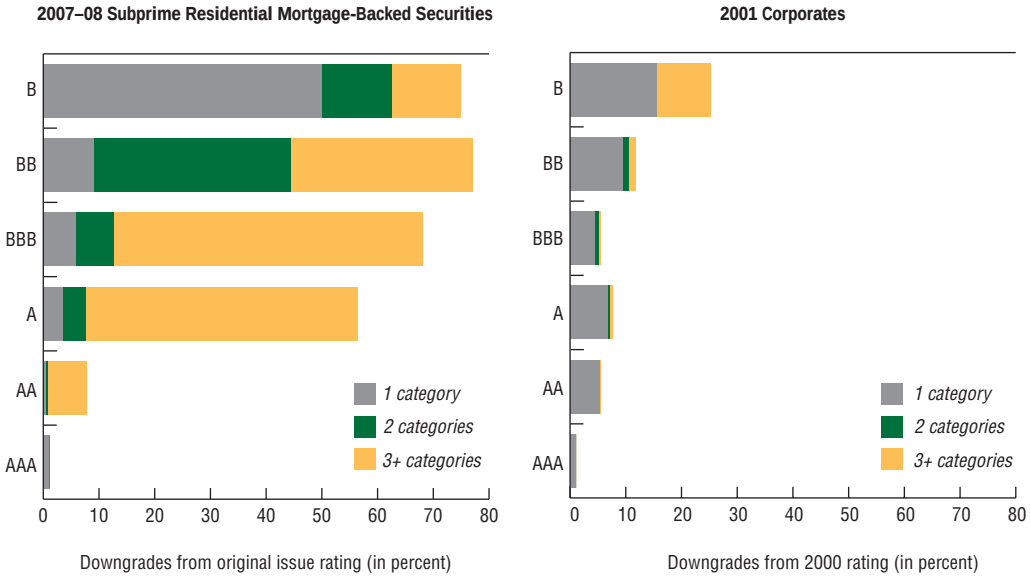
The absence of active markets for complex structured credit products and the observed sales at values below the theoretical value of their underlying cash flows have presented challenges to financial institutions as to the degree to which they could be considered "orderly sales" and hence depended on as a measure of fair value. The major audit firms have argued collectively

Box 2.3. When Is a AAA not a AAA? (Part 2: Actual versus Market-Implied Mortgage-Backed Security Ratings)

Most institutional investors require that their fixed-income holdings have a credit rating. Hence, credit rating agencies play a significant role in the marketing of structured credit products. However, recent market developments have raised questions as to whether investors performed their own due diligence and fully understood that the risk profile of structured credit products can be very different from that of similarly rated corporate or sovereign bonds.

Structured credit products are inherently likely to suffer more severe, multiple-notch downgrades than the typically smoother downgrade paths of corporate bonds (CGFS, 2005; IMF, 2006).[1] To illustrate this point, the first of the two figures above breaks down Standard & Poor's 2007 rating actions through February 25, 2008 on subprime residential mortgage-backed securities (RMBS) originated since 2005. It shows that of the RMBS rated BBB– to BBB+ at origination, about 6 percent were downgraded by one rating category (BB+ to BB–), 7 percent by two (B+ to B–), and 56 percent by more than two categories (CCC+ to D).[2] The second figure shows the same statistics (on the same severity scale) for corporate rating actions in 2001, the most recent year of significant corporate downgrades. The difference is striking: only 6 percent of all rating downgrades of BBB– to BBB+ rated corporates were by one or more categories (versus 68 percent for BBB– to BBB+ rated subprime RMBS in 2007–08). Although the AAA and AA RMBS downgrades appear

One-Year Cohort Rating Downgrades



Source: Standard & Poor's.

Note: John Kiff prepared this box.

[1]See Mason and Rosner (2007) for a more technical and critical appraisal of structured credit ratings.

[2]A more granular analysis (i.e., by rating notch) would have been preferred, but comparable corporate data were not available for 2001. Also, it would have been preferable to have rating changes from end-2006, although it is unlikely that many of the pre-2007 RMBS ratings would have changed much from origination to end-2006. In "normal" times, structured credit ratings are extremely stable.

Box 2.3 *(concluded)*

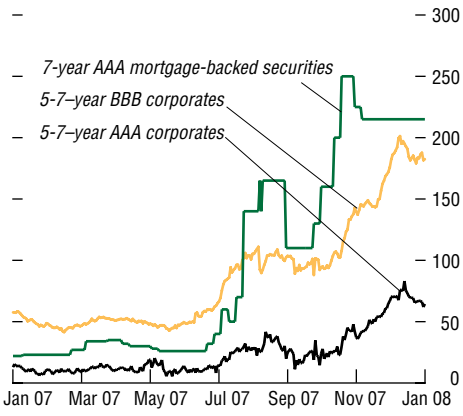
rather benign, on January 31, 2008, 47 percent of the AAA tranches of RMBS backed by 2006-originated mortgages rated by Standard & Poor's were on their negative "credit watch," as were 57 percent of AA+ tranches, 74 percent of AA tranches, and 80 percent of AA– tranches.

The multiple-notch downgrades and the severe valuation losses during the second half of 2007 and early 2008 also suggest that the credit rating agencies' key assumptions on the underlying subprime mortgage performance have been overly optimistic. It appears that the agencies underestimated the impact of the housing-cycle downturn on the speed with which subprime mortgage performance deteriorated and on the severity of potential losses. Even when delinquencies for 2006-vintage mortgages started to rise to alarming levels in early 2007, the credit rating agencies were slow to tighten their rating criteria, holding to the view that it was premature to extrapolate the impact of generally rising delinquencies to defaults on specific securities.[3]

More specifically, the joint effect of house price declines and high loan-to-value ratios seems to have been underestimated, and the risk assumptions for low- and no-documentation housing loans were too low. In addition, the likelihood of early delinquencies going into foreclosure seems to have been underestimated.

This underestimation became apparent in the waves of mortgage security credit rating downgrades that began in July 2007. Even more striking has been the gap between rating agency and market participant mortgage performance expectations. For example, credit spreads on AAA-rated U.S. RMBS have been priced at about the same level as BBB-rated corporate bonds since August 2007 (see figure).

Credit Spreads on AAA Mortgage-Backed Securities Versus AAA and BBB U.S. Corporate Bonds
(In basis points)



Source: JPMorgan Chase & Co.

[3]See Demyanyk and Van Hemert (2008) for an in-depth analysis of the characteristics and performance of recent vintage subprime mortgage originations.

that the presence of a price below theoretical valuation does not necessarily represent a distressed sale. In such cases, the auditors require firms to demonstrate why a sale price is not indicative of fair value before accepting a reclassification of an asset to level three.[8] For example, a sale in a thin market at a heavy discount by a liquidator may qualify as a distressed sale, while a similar sale by a solvent entity may not.

This approach aims to prevent "cherry picking" of valuation methods to manage losses. External auditors are likely to adopt a cautious approach to minimize the risks of material post-balance-sheet-date writedowns that would

[8]The major audit firms, comprising BDO International, Deloitte, Ernst & Young, Grant Thornton International, KPMG, and PricewaterhouseCoopers, met and prepared their joint approach, which they have issued through the Center for Audit Quality for U.S. GAAP and a similar paper for IFRS through the Global Public Policy Committee.

Box 2.4. When Is a AAA not a AAA? (Part 3: Collateralized Debt Obligation Rating Dynamics)

The three major international credit rating agencies use similar letter-grade scales (AAA to C, Aaa to C) to rank the relative default risk of all long-term, fixed-income securities, including structured credit products, despite the significantly more abrupt downgrade dynamics of those products discussed in Box 2.3.[1] This box uses the examples of some stylized structured credit products to demonstrate why such dynamics are inherent to these products and to the methodologies used to rate them.

The structured credit product-rating process starts with the construction of a probability distribution of the estimated losses on the structure's underlying risk. For mortgage-related securities, this is ultimately tied to estimates of foreclosure rates and loan-loss severities, driven by assumptions about fundamental factors such as house prices and interest rates. Structured credit ratings also depend importantly on assumptions regarding the correlation of defaults among the individual underlying risks. The first of the two figures in this box shows the cumulative probability distribution for a portfolio of 125 equally sized credits evaluated at three different correlation levels. It measures the probability that the number of defaults exceeds the level along the x axis, and shows that the higher the correlation, the more likely are multiple defaults.[2]

The probability distribution is then used to determine the credit enhancements and other embedded rules governing the distribution of gains and losses (see Box 2.2). For example, in the 125-credit example under the 5 percent correlation assumption, subordination that absorbs the losses associated with the first 40 defaults could get a AAA rating from Standard & Poor's. This is because, for AAA ratings, the target default probability is 0.06 percent and the probability of there being more than 40 defaults under the 5 percent correlation assumption is 0.06 percent. This is shown in the second figure, which zooms in on the lower right-hand corner of the first figure. Hence, the AAA "attachment" point is 16 percent of the underlying portfolio's notional value (40 defaults x 50 percent loss severity/125 credits).[3] The figure also shows that if the asset correlation were 15 percent, AAA subordination would have to increase from 16 to 25.6 percent (64 defaults). In fact, it shows that if the correlation were to jump from 5 to 15 percent, the originally rated AAA tranche should be downgraded to single-A or below (the probability of more than 40 defaults jumps from 0.06 percent to 1.88 percent, and the target default probabilities for A and BBB ratings are 0.46 and 2.32 percent, respectively). Increasing the loss severity from 50 to 70 percent (holding the correlation at 5 percent) would also downgrade the AAA tranche to single-A or below, and downgrading the underlying credits from BB to B could downgrade the AAA tranche rating to BB or below.[4] The principles used to determine Fitch's collateralized debt obligation ratings are very similar to those used above by Standard & Poor's in that they also target the tranche default probability. However, the process for determining Moody's ratings is somewhat more complex because they target expected loss and their targets are somewhat more stringent than

Note: John Kiff prepared this box.

[1]Standard & Poor's and Fitch Ratings use a letter-grade scale that starts at "AAA" for the least risky credits and goes down to "C" (via AA, A, BBB, BB, B, CCC and CC) for obligations that are very likely to default. Moody's uses a scale that goes from "Aaa" down to "C" (via Aa, A, Baa, Ba, B, Caa, and Ca).

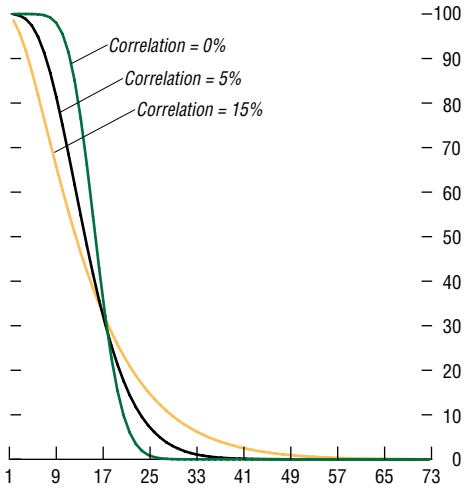
[2]All of the examples in this box are based on a portfolio of 125 identical five-year digital default swaps with a 50 percent loss-given-default referencing BB-rated corporate credits with a 10.42 percent default probability. A digital default swap is a credit default swap with a fixed recovery rate. For details on the Gaussian copula methodology used to construct the cumulative probability distribution, and the meaning of the asset correlation parameter, see Belsham, Vause, and Wells (2005, Box 2.2).

[3]The process is more complex when the loss severity is not fixed, but the principles are the same.

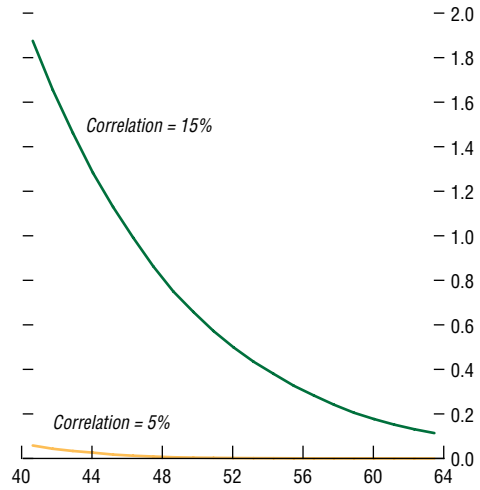
[4]When the underlying credits are downgraded from BB to B, the default probabilities increase from 10.42 to 24.46 percent, and the AAA tranche default probability rises from 0.06 to 16.16 percent, which is about halfway between the BB– and B+ default probability targets (14.6 and 18.57 percent).

Box 2.4 ***(concluded)***

Cumulative Loss Distribution
(125 credits, probability of default = 10.42%)
(In percent)



Cumulative Tail Loss Distribution
(125 credits, probability of default = 10.42%)
(In percent)



those of Standard & Poor's and Fitch (Fender and Kiff, 2005). Also, the expected loss-basis more accurately measures the risk associated with mezzanine tranches, which tend to have very high loss severities.

Default probabilities and expected losses are both flawed metrics for evaluating the default risk of portfolios of credit risk because neither appropriately accounts for correlation and diversification. For example, a risk-averse investor should prefer a portfolio of two of the above underlying credits to a portfolio consisting of just one of them, but an expected loss criterion would be indifferent between them, and the default probability criterion would prefer the single credit portfolio. More specifically, the expected loss associated with both portfolios is 5.21 percent, and the default probabilities are 19.75 percent for the two-credit portfolio and 10.42 percent for the single-credit portfolio. As the number of credits increases, the portfolio expected loss remains at 5.21 percent, but the default probability approaches 100 percent. Although credit rating agencies do not actually rate whole portfolios, a methodology that cannot appropriately rank the default risks of whole credit portfolios does not seem appropriate for ranking default risks of tranches of portfolios.

leave the auditor open to charges of negligence. Hence, the level of additional writedowns in the audited financial statements will likely reflect the convergence of the entity's valuation assumptions with those adopted by the auditors.

The adoption of the auditors' approach raises the risk of a negative bias in the valuations. Managers of firms may even be tempted to overstate the level of the current year writedowns in order to maximize the revaluation gains when the market recovers, thus increasing their future potential bonus pool. However, the risk of a negative valuation bias may be offset by the fact that audit liability is not defined by overvaluation of assets but rather by the appropriate exercise of professional judgment.

Table 2.1. Accounting for Securities Held as Financial Assets

Asset Classification	Measurement After Recognition	Treatment of Valuation Changes	Disclosures
IFRS			Disclosure as per national regulatory framework
Fair value through profit and loss	Fair value	Profit and loss	Fair value techniques and assumptions for each class asset
Available for sale		Equity	Where nonobservable inputs are used, the effect of using different reasonably possible alternative assumptions when the difference is significant
Held to maturity	Amortized cost	Impairment to profit and loss	Disclosure of fair value
U.S. GAAP			SEC mandates quarterly disclosures
Trading	Fair value	Profit and loss	Valuation techniques used to measure fair value and changes in techniques
Available for sale		Equity	Based on observability of pricing inputs, classification of assets into Levels 1, 2, or 3 (see Annex 2.1)
			For Level 3 assets, a reconciliation of reported value changes
Held to maturity	Amortized cost	Impairment to profit and loss	Disclosure of fair value

Note: IFRS = international financial reporting standards; U.S. GAAP = generally accepted accounting principles; SEC = Securities and Exchange Commission.

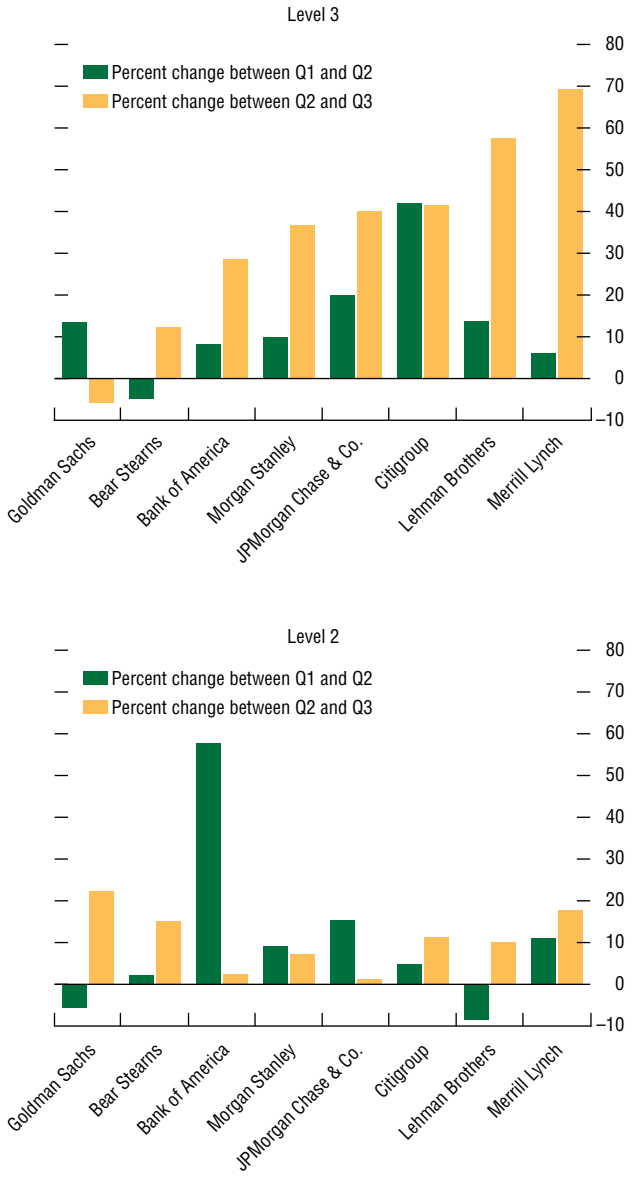
The Role of Fair Value During a Crisis

The abnormally tight market liquidity conditions during the crisis intensified discussions on the role of fair value in contributing to its severity (Shin, 2007). One argument suggests that fair value is compounding market instability by applying the valuations arising from sales in these abnormal market conditions across all fair-valued portfolios, regardless of the intention of holding them. While the need for liquidity drove values to discounts that were greater than the underlying cash flows would imply, the argument challenges the appropriateness of subjecting those portfolios to mark-to-market volatility where there is no intention or need to sell at the full amount of the liquidity induced discounts. This requirement to apply fair value without considering underlying conditions may be compounding instability by activating market-value triggers for liquidation in other portfolios.

Even if the markdown does not force a sale, it may trigger margin calls or additional collateral requirements that would further compound market illiquidity by reducing a firm's supply of assets available for further liquidity operations. Without opining on the merits of the argument, both IFRS and U.S. GAAP have a presumption of fair value for any financial asset that a financial institution is not committed to holding to maturity. Even for those firms able to value held-to-maturity assets at amortized cost on the balance sheet, both U.S. GAAP and IFRS require the disclosure of the assets' fair value elsewhere in the notes to the accounts, thus limiting the potentially stabilizing impact of amortized cost on the underlying economic value.

While many view fair value as the best indicator of asset value at the time of measurement, taken on its own it may not be the best measure for making long-term, value-maximizing decisions. This arises because fair value reflects a single, point-in-time exit value for the sum of all the risks the market assigns to the asset, including credit and liquidity risks. If the market overreacts in its assessment of any risk component, then fair value will reflect this. Hence, the heavy discounting during the crisis of any asset containing securitized instruments produced fair values much lower than their underlying expected future cash flows would imply, even

Figure 2.1. Selected U.S.-Based Financial Institutions: Change in Level 3 and 2 Assets
(Percent change; 2007:Q1–2007:Q3)



Source: Quarterly reports.
Note: Level 2 assets use a more illiquid market where prices are observable for similiar products, or for the same product but at different dates. Level 3 defines the absence of a material observable input used in the item's valuation.

allowing for the possible impairment of subprime elements.

Situations where firms use fair value levels to trigger decision rules, such as asset sales, may produce scenarios that both generate unnecessary realized losses for the individual firm and simultaneously contribute to a downward spiral of the asset price, thus compounding market illiquidity. It is therefore evident that the weaknesses arising from the use of fair value in a crisis need to be addressed. One possibility that should strengthen financial stability would be for financial institutions to define decision rules on the basis of fair value milestones that trigger a review of the elements, such as assumptions or special circumstances, underlying fair value. This would utilize the analysis produced by fair value in order to provide better information on a hold/sell decision, rather than trigger a compulsory sale, and would encourage firms to more carefully consider their expectations for future cash flows of their assets.

Disclosure of Structured Product Valuations

Apart from the requirements for annual financial statements, accounting standards do not specify the interim disclosure of financial asset valuations. Regulatory requirements may define interim reporting requirements, but in many cases it may be left to the discretion of the individual financial institutions. Within the United States, the Securities and Exchange Commission (SEC) requirement for quarterly disclosures provides a different framework than for European firms, whose regulatory disclosure requirements are less prescriptive.

In each firm, the professional judgment exercised by the chief financial officer in evaluating the degree to which a market price exists for each instrument may not necessarily conform with the firm's strategic considerations and underlying assumptions regarding the nature and duration of any downturn. This increases the scope for variability in the scale and timing of revaluation announcements. Within a range of entities holding similar instruments, different decisions

about the nature and duration of the downturn could lead to a variety of outcomes regarding the application of fair value techniques, both in terms of the timing of reporting losses and the scale of loss recognition. In the current crisis, the apparent piecemeal public release of revaluations—each of increasing gravity—contributed to growing concerns about the integrity of corporate balance sheets, thus compounding the uncertainty about counterparties and market illiquidity (Figure 2.2). If research confirms that inconsistency in the timing of the revaluation disclosures during the crisis materially contributed to its severity, a discussion among policymakers on the modalities of announcing repricing disclosures may be warranted.

Any such discussion promises to be contentious, as its objectives would be toward harmonizing disclosure patterns and timings at the expense of corporate strategic freedom in timing announcements. Within the framework of accounting standards, the discussion would need to recognize the principles-based foundation of IFRS and the desire to move U.S. GAAP toward a less prescriptive and more principles-based foundation. IFRS contain no prescriptive rulings regarding timeliness. Therefore, unless major changes to the approach of IFRS are envisaged, any rulings regarding the orderliness of valuation announcements would have to be prescribed through the market regulator rather than the standard setter. This issue indicates that there may be divergence between the information needs of investors, the desires of firms, and the stability of the financial system.

Both IFRS and U.S. GAAP require risk disclosures regarding financial instruments on the balance sheet. The focus of these disclosures is from the perspective of total-balance-sheet risk and so does not presume instrument-specific disclosures.[9] Thus, information about structured credit products is subsumed in the disclosure of other financial instruments, making it difficult to gauge exposure to potentially risky and volatile subsets of these products.

IFRS mandate quantitative and qualitative disclosures for credit, market, and liquidity (maturity) risks; how the firm manages these risks; and the balance sheet sensitivity to material changes in these risks. The standards require firms to disclose the methods and assumptions used in preparing the sensitivity analysis along with how and why these have changed from previous periods. U.S. GAAP require quantitative disclosures covering market risk from SEC registrants.[10]

While the U.S. GAAP disclosure requirements for financial asset valuations improve transparency, they retain an aggregate balance sheet perspective. The lack of instrument-specific information limits the ability of investors and analysts to understand a firm's full exposure to changes in the value of the underlying instruments. This can be an important issue where the instruments are complex and carry unique features not found in market-traded instruments. However, the development of Web-based financial reporting, as demonstrated by the SEC's adoption of the extendable business reporting language (XBRL), raises the prospect of future reports providing Web-based linkages to valuation information for individual instruments.

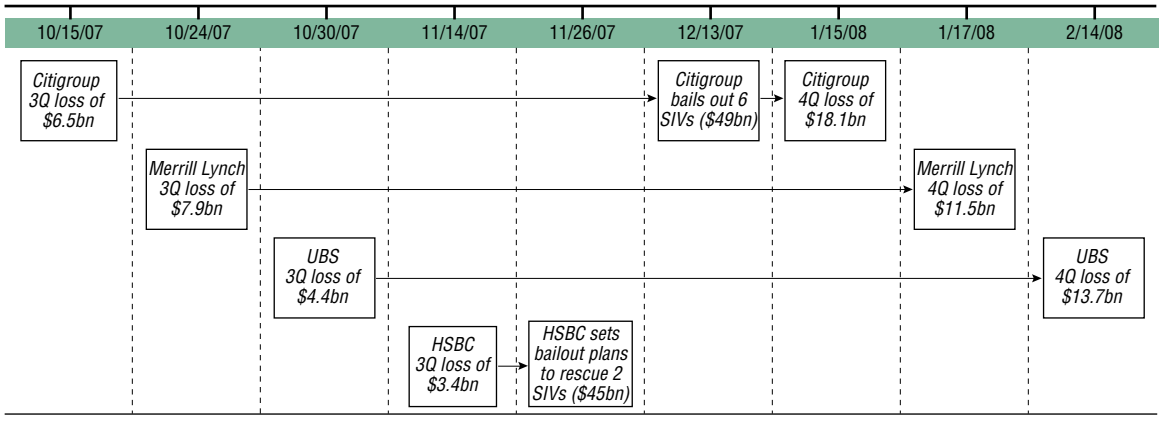
Disclosure Assumptions and Parameters When Marking to Model in the Absence of Market Prices

Investors and analysts require access to appropriate information before making any

[9]The qualitative disclosures consist, inter alia, of (1) the fair value of each class of financial asset and liability, along with information on the methods and significant assumptions employed in determining fair value; and (2) the terms and conditions of financial instruments, and qualitative information regarding the risks arising from the entity's holdings of financial instruments and management's approach to managing these risks.

[10]Presentation of these disclosures is outside of the financial statements, usually within the Management Discussion and Analysis disclosures (this is part of the Form 10-K filings with the SEC). In December 2007, the SEC sent a letter to registrants outlining the additional information regarding the characteristics of off-balance-sheet holdings and CDOs.

Figure 2.2. Writedowns of Selected Financial Institutions, October 15, 2007–February 14, 2008



Source: Bank press releases.
Note: SIV = structured investment vehicle.

investment decisions regarding complex structured finance products. Effective price discovery assumes proper diligence from investors and appropriate transparency by issuers. While regulation cannot universally enforce investor diligence, it can prescribe appropriate transparency.

The bespoke nature of structured finance products means that investors require substantive information for accurate valuation in both the primary and, when appropriate, the secondary market. At the point of origination of a product, this information needs to be timely, comprehensible, and sufficient. During the height of the demand for structured products (late 2005 and early 2006), issuers were able to employ short periods between the issue of the prospectus and opening for subscription. Investors, faced with these tight deadlines, made purchasing decisions on the strength of the credit rating without a full investigation of the underlying risks and volatilities. As instruments became more complex, the process of evaluating an offer became correspondingly more difficult and less transparent.

To re-establish issuance of structured finance products, structurers will need to take account of investors' likely demand for greater transparency, which should include longer lead times and more information regarding the sensitivity of key inputs. Difficulties could arise if the disclosure requirements were to include a firm's valuation model. Many are in-house models that firms have built to try to identify profitable pricing discrepancies in the market. As such, firms regard these models to be proprietary tools and will likely resist efforts to mandate disclosure of how they operate. This may not be a substantive barrier because one likely development from the crisis may be a move to a market convention on the presentation of valuation information relating to these instruments. So disclosure may be based on an agreed market convention and a universally accepted "vanilla" valuation model. Given that regulation should limit itself to situations of market imperfections, it is important that any regulatory initiative not frustrate these market initiatives.

Issuers should ensure that information regarding structured products and updates on underlying credit and valuation assumptions remain available to investors, though not necessarily free, throughout the duration of the instrument's life. Such disclosure would assume that investors have expertise in evaluating valuation models, and the larger institutional investors will maintain their own models. Other investors may use pricing advisory and valuation services.

However, the uniqueness and complexity of many of these products raises issues regarding their future disclosure framework. If an entity's balance sheet contains material portions of assets not priced from observable data, then prudent investors should expect to receive details of the valuation assumptions of the individual instruments. Reconciling this with the need to keep annual financial statements sufficiently concise to remain useful presents a challenge.

The Role of Off-Balance-Sheet Entities

The financial market crisis that started in late July 2007 revealed the vast expansion in off-balance-sheet entities (OBSEs) that had taken place since the mid-1990s, which was not transparent to many supervisors and regulators. Box 2.5 shows the basic features of these entities and discusses issues that arose given their structure.[11] OBSEs, such as SIVs and commercial paper conduits, are entities that allow financial institutions to transfer risk off their balance sheet and permit exposures to remain mostly undisclosed to regulators and investors; to improve the liquidity of loans through securitization; to generate fee income; and to achieve relief from regulatory capital requirements. In addition, during the relatively long period of excess liquidity and low interest rates, OBSEs were part of the process that extended credit access to borrowers to levels beyond what they would otherwise have been able to obtain. In the face of declining deposits, the securitization process has also provided banks an additional source of funding, often of short maturities to fund long-term assets. However, some of these positive features became less attractive to their owners as uncertainties about asset valuations rose and, subsequently, caused systemic disruptions in money markets.

[11]Off-balance-sheet entities is the term used throughout this chapter. More commonly found terms in the accounting and banking literature are "variable-interest entities" and "special-purpose entities." For the purposes of this chapter, the differences between SIVs and commercial paper conduits are not material.

Accounting methods under IFRS and U.S. GAAP as applied to OBSEs enabled off-balance-sheet treatment of sizable financial operations with limited transparency to investors and regulators. In general, OBSEs are structured such that no single institution holds the majority of the risks and rewards, thereby avoiding consolidation and appearance on a financial institution's balance sheet.[12] Slight variations in consolidation criteria exist between U.S. GAAP and IFRS. But in general, both use criteria that relate to the degree of control and the way risks and rewards are distributed, including liquidity support. Sponsoring financial institutions can ensure that these OBSEs are not consolidated by selling off the riskiest portions of the entities, thereby dispersing risk to multiple parties. The ability of financial institutions to avoid consolidation—making it difficult for investors and regulators to detect these financial activities—suggests that standard setters need to reconsider the grounds for consolidation to improve the understanding of underlying risks by all parties.

Both IFRS and U.S. GAAP require very few disclosures about unconsolidated OBSEs, so long as the originating bank does not carry the majority of risks or rewards from the OBSE. The SEC specifies a range of OBSE-related disclosures that it recommends firms make in their annual 10-K Management Discussion and Analysis disclosures. IFRS have nothing similar in place, but reflect these disclosures in their discussion paper on Management Commentary (IASB, 2005). This limited disclosure framework makes it difficult for investors to be aware of OBSE exposures until they crystallize. Hence, investors would benefit from more comprehensive regulatory requirements for disclosures about the scope and scale of exposures to OBSEs.

[12]Although financial institutions are required to disclose "the nature of the relationship between the parent and a subsidiary when the parent does not own, directly or indirectly through subsidiaries, more than half of the voting power" (International Accounting Standards 27.40) of the OBSEs, such information is often in a footnote in a firm's report.

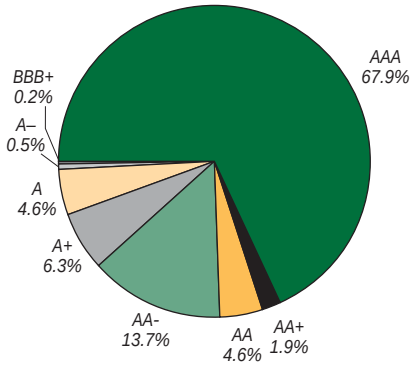
Box 2.5. Conduits, SIVs, and SIV-Lites

Commercial paper conduits, structured investment vehicles (SIVs), and SIV-lites are off-balance-sheet entities (OBSE) designed to transfer risk. Although commercial paper conduits and SIVs are closely related, their balance sheet structure differs (see figures and table). On the funding side, a typical SIV issues more varied and mostly longer-maturity notes. On the asset side, a SIV is typically comprised of more complex, tradable assets than are conduits. In addition, SIVs tend to be more leveraged than conduits.

SIV-lites, of which there were five at the peak of their popularity, share many of the characteristics of SIVs, but are less conservatively man-

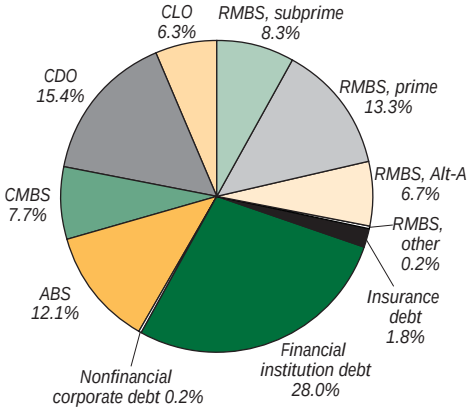
Note: Jodi Scarlata prepared this box.

Structured Investment Vehicle Portfolio by Ratings, October 2007



Source: Standard & Poor's.

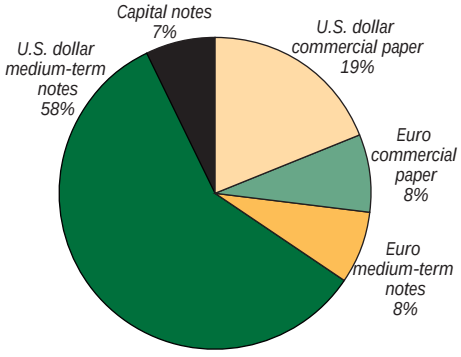
Structured Investment Vehicles by Type of Assets, October 2007



Source: Standard & Poor's.
Note: ABS = asset-backed security; CDO = collateralized debt obligation; CLO = collateralized loan obligation; CMBS = commercial mortgage-backed security; RMBS = residential mortgage-backed security.

Funding Profile of Structured Investment Vehicles Held by Banks and Nonbanks, October 2007

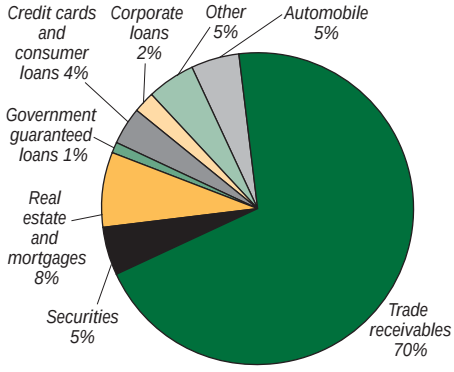
(Total liabilities: $367.8 billion)



Source: Fitch Ratings, November 2007.

Asset-Backed Commercial Paper Conduits by Traditional Assets, May 2007

(In percent of total)



Source: Moody's.

Features of Typical Conduits, SIVs, and SIV-Lites

	Conduit	SIV	SIV-Lite
Assets	• US$ ≈1,400 billion • Nontradable loans • Less risky • 47% Traditional assets • 53% Securities and derivatives	• US$ ≈ 400 billion • Assets are traded • Less risky • ≈ 28% Financial institutions' debt • ≈ 48% CMBS/RMBS/ABS • ≈ 22% CDOs/CLOs • ≈ 2% Other	• US$ ≈ 12 billion • Assets are traded • Risky • ≈ 96% U.S. RMBS • ≈ 4% CDOs
Liabilities	• 100% Commercial paper	• 27% ABCP • 66% Medium-term notes • 7% Capital notes	• Commercial paper • Medium-term notes
Credit enhancement	• Varied (sponsoring bank)	• Overcollateralization	
Liquidity facility	• Contractual 100% coverage	• Contractual < outstanding liabilities • ≈ 10 to 15 percent of senior debt	• Partial contractual credit line; subject to market value tests

Sources: Brunnermeier (2007); and IMF staff estimates.

Note: SIV = structured investment vehicle; RMBS = residential mortgage-backed security; CMBS = commercial mortgage-backed security; ABS = asset-backed security; CDO = collateralized debt obligation; CLO = collateralized loan obligation; ABCP = asset-backed commercial paper.

aged, structured with greater leverage, have less diverse asset portfolios, and are much smaller in size. Unlike the open-ended lifespan and ongoing business nature of SIVs and conduits, SIV-lites tend to be a one-off issuance vehicle with a finite lifespan. Unlike SIVs, SIV-lites had a substantially greater exposure to the U.S. subprime market.

Broadly, these entities borrow in the shorter term, including the commercial paper market, to purchase higher-yielding, longer-maturity debt, such as financial corporate bonds and asset-backed securities. SIV assets were traditionally comprised of loans and credit card receivables, while more recent SIV assets have focused increasingly on mortgage products and collateralized debt obligations, and now comprise just over half of the SIV's assets. Financial institutions that are originators and sponsors of OBSEs collect fees for establishing and running them. SIVs' profit, earned on the spread, is paid to the capital note holders and the investment manager. The capital note holders are also the "first loss investors" if any of the bonds default.

Liquidity Facilities and Credit Enhancements

SIVs and conduits are supported by mechanisms to both increase their attractiveness and provide a measure of insurance to the investor. Credit enhancements serve to protect investors from the risk that the entity will default on its obligations as well as unexpected events that reduce the value of the OBSE's assets. They are used to absorb initial losses on the assets held by the OBSE, to enable the commercial paper to receive a higher rating, and include collateralization, third-party loan guarantees, and credit insurance. Banks also provide liquidity backstops as a safeguard in case of funding shortages, ensuring that the commercial paper holders are repaid upon maturity. Bank-sponsored SIVs have often been structured with liquidity facilities of 364-day maturities to avoid regulatory capital charges, and are renewed annually.

SIV Tests

As became evident in the second half of 2007, rollover (liquidity) risk is the greatest threat to a SIV. This maturity mismatch risk is evaluated by testing the minimum amount of liquidity needed in a SIV under various circumstances. Specifically, net cumulative outflow tests evaluate if there is sufficient liquidity to cover the maximum net cash outflows over one year. The tests for peak outflows (including maturities

Box 2.5 *(concluded)*

of commercial paper and medium-term notes) conducted daily by the SIV manager are commonly 1- , 5- , 10- , and 15-day tests.

Other key risks are credit migration (including default), recovery, asset yield spreads, interest rate, and exchange rate (Standard & Poor's, 2006). Capital adequacy tests assess the appropriate level of available capital, specifically determining the amount of funds needed to pay debt holders in the event of asset default or a decline in market value. These tests use either matrix-based tests (e.g., asset-by-asset approach where the discounted market value must exceed the value of senior liabilities) or Monte Carlo–based tests (e.g., simulating the future performance of the portfolio and calculating the likelihood of losses) (Fitch Ratings, 2007b).

Issues

The maturity mismatch from using short-term liabilities to fund long-term assets would be more transparent if these positions were held on banks' balance sheets. In addition to this liquidity risk, SIVs face market risk if there is a decline in the value of the investments. Further, the asset-backed commercial paper issued by SIVs was purchased by money market mutual funds and U.S. state and local government investment funds, entities considered to have conservative portfolios by their investors. During the subprime crisis, the lack of transparency regarding SIVs compounded investors' uncertainty and resulted in banks struggling to either roll over or refinance the maturing debt through new commercial paper issuance or asset sales. Going forward, potential SIV investors will likely require funding liquidity lines with greater coverage of liabilities than the historically low levels. As the spread cost of providing such liquidity has increased, the spread between assets and liabilities for SIVs, a measure of profitability for structurers, will likely diminish. Consequently, the present format of SIVs is unlikely to continue in the future.

Implications of the Consolidation of Off-Balance-Sheet Entities

A sufficiently large reduction in the fair value of an OBSE's assets—as occurred in many cases during the second half of 2007—might find a sponsoring bank now absorbing more than half of the loss, thus triggering a requirement to bring the OBSE onto the balance sheet.[13] Consequently, the previously determined assets and liabilities of the OBSE might now have to be consolidated on the sponsoring bank's balance sheet and the exposures more clearly revealed. (See Box 2.6 for an illustrative example of a sponsor taking the underlying assets of its OBSEs on its balance sheet.)

The disclosure of the assets and liabilities of OBSEs through more frequent scrutiny or consolidation means that their relationship to the sponsoring financial institution may become more transparent. The 2007 white paper by the Center for Audit Quality on the consolidation of conduits stated that OBSEs should be re-evaluated regularly by sponsors of OBSEs to determine whether the initial conditions of the OBSE risk-reward structure had changed sufficiently to warrant consolidation.[14] Increased regularity in the monitoring and re-evaluation of OBSEs would provide greater transparency, especially as it relates to opportunities for consolidation measures, on-balance-sheet presence, and improved regulatory surveillance.

[13]Likewise, the need to provide liquidity support in the face of an escalation in the cost of funding, or a contraction in its supply, can produce a similar outcome. Other events that can make the sponsor absorb more than 50 percent include a sponsor taking additional interests in the vehicle, or a change in the initial contract and the subsequent re-evaluation of the initial assumptions for the OBSE (Center for Audit Quality, 2007).

[14]FIN46R (U.S. GAAP) also has this requirement, called a reconsideration event.

Box 2.6. Consolidation of Structured Investment Vehicles: An Illustrative Example of Issues That Arise

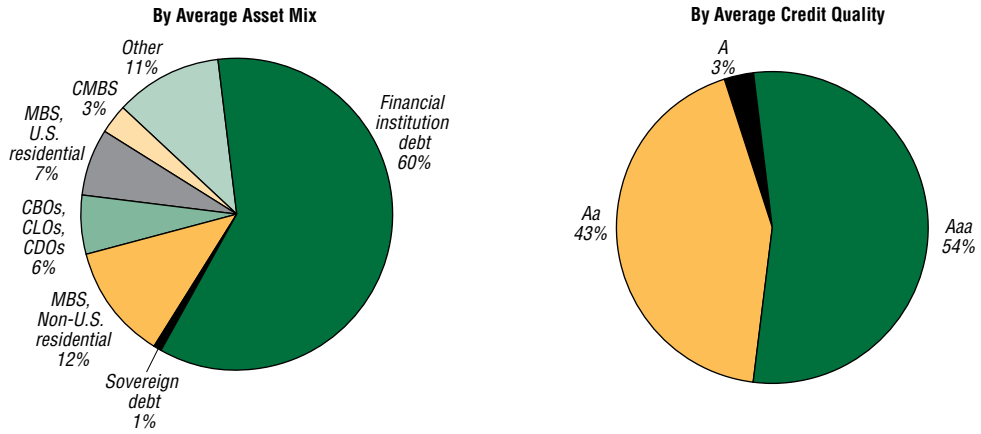
In the second half of 2007, uncertainty surfaced about the rules governing consolidation of off-balance-sheet entities. In one case, Citigroup announced its intention to bring its structured investment vehicles (SIVs) onto its balance sheet. Several other banks have also acquired their SIVs. This box outlines the issues involved in the Citigroup case as an example.

On December 13, 2007, Citigroup announced its intent to provide a support facility that would address the repayment of the senior debt in seven Citigroup-sponsored structured investment vehicles (see figure).[1] The intent was to support the ratings of the SIVs' outstanding senior debt, which faced potential downgrades by Standard & Poor's and Moody's, and to continue the orderly reduction of the SIVs' assets. As a result, the assets and liabilities of Citigroup's SIVs were taken on balance sheet and accounted for at fair value.

Note: Jodi Scarlata prepared this box.

[1]The seven Citigroup SIVs are Beta, Centauri, Dorada, Five, Sedna, Vetra, and Zela.

Profile of Citigroup's Structured Investment Vehicle Assets as of December 12, 2007



Source: Citigroup.

Note: CMBS = commercial mortgage-backed security; MBS = mortgage-backed security; CBO = collateralized bond obligation; CLO = collateralized loan obligation; CDO = collateralized debt obligation.

Increased disclosure achieved through consolidation or some form of parallel disclosures of an entity's unconsolidated and consolidated positions also means these entities have a direct impact on the institution's regulatory capital requirements, funding sources, and liquidity. For example, if a sponsoring bank provided support to the OBSE by purchasing its commercial paper such that the bank now holds the majority exposure to the OBSE, accounting rules for consolidation would force the OBSE onto the bank's balance sheet. Even if consolidation of the entire OBSE were not required, a supporting purchase of the OBSE commercial paper would now appear as an asset on the bank's balance sheet and result in a change in the financial ratios of the bank. Specifically, regulatory capital requirements would require applying the requisite Basel risk weights to these new assets, with a negative impact on the capital position of the bank. If the consolidation were sufficiently large or if purchased assets had deteriorated to the point where provisioning were necessary, this could impose further stress on the bank,

Box 2.6 *(concluded)*

Citigroup's operation raised a debate over the interpretation of rules governing off-balance-sheet entities (OBSEs) and what constitutes a "reconsideration event." According to the Financial Accounting Standards Board (2003), an entity's status as a variable interest entity and its primary beneficiary need to be re-evaluated based on certain events, including changes in the contractual arrangements governing these OBSEs, acquiring new assets, or a change in the value of the entities' assets or their risk (Center for Audit Quality, 2007).

Some argued that Citigroup needed to take these securities onto its balance sheet because, during the summer of 2007, it had purchased $25 billion in commercial paper issued by some of its SIVs that could no longer be rolled over. Combined with Citigroup's previous $18 billion exposure to those entities, Citigroup might be exposed to more than half the losses, which argued for consolidation of all $84 billion of the assets formerly held off balance sheet. Others disagreed, however, and asserted that there were no changes to Citigroup's contractual arrangements for the SIVs. It was argued that the obligation to provide backup arrangements was established when the vehicle was created, and therefore these actions were in keeping with the contractual arrangements for the vehicles.

Citigroup's final decision may have been prompted more as a result of its concern for its reputation rather than any conclusions drawn regarding compliance with consolidation standards. Nevertheless, the issue brought to the surface the uncertainty about the underlying parameters determining consolidation of complex OBSEs, parameters that should be clarified by regulators.

especially if it required the bank to replenish its capital or it reduced cash on hand, thereby constraining its lending ability.

Basel II and the Capital Treatment of Securitization

Some believe that had Basel II been in place in more countries, the current stressful episode could have been less severe.[15] Although there are elements in Basel II that would have reduced some of the pressures, it is difficult to conclude that the event could have been avoided.

Specifically, Basel II introduces enhanced guidance on the treatment by banks with regard to holding regulatory capital for OBSE exposures, and this should result in the increased transparency of bank exposures (Figure 2.3). For instance, based on certain conditions,[16] a bank must assess capital charges for its exposures to an OBSE (or in case of deterioration in the underlying assets, if the bank is forced to take these assets onto the balance sheet).

In addition, Pillar 3 of Basel II requires the disclosure of securitizations that includes, for example, qualitative discussions of the bank's securitization activities and the extent to which they transfer credit risk away from the bank, the accounting treatment for synthetic securitizations, and the separation of underlying assets held by OBSEs by type and quality of asset (Boemio, 2007). These regulatory requirements improve informational disclosures in a previously opaque and unregulated financial area. The supervisory review process of Pillar 2 supports these requirements and can serve to address existing issues or evolving ones, such as risks that might not be fully captured in the Pillar 1 process for capital requirements, such as credit concentration risk

[15]For those countries that have already introduced Basel II regulations or regulations comparable to Basel II, the impact of the regulatory changes discussed is lessened.

[16]Such conditions include the following: significant credit risk has not been transferred to a third party, the transferor maintains effective or indirect control over the transferred exposures, or the securities issued are obligations of the transferor (see paragraph 554 of Basel II).

Figure 2.3. Timelines for Implementation of Basel II Framework

	From End-2005	From End-2006	From End-2007	From End-2008
Foundation internal-ratings-based approach	Parallel calculation	95% capital floor	90% capital floor	80% capital floor
Advanced approaches for credit and/or operational risk	Parallel calculation or impact studies	Parallel calculation	90% capital floor	80% capital floor

Early Adopters

- Hong Kong SAR, January 1, 2007
- Japan, March 2007

European Union Implementation:

Effective January 1, 2008

U.S. Implementation:

Year	Transitional Arrangements
2008	Parallel run
2009	95% capital floor
2010	90% capital floor
2011	85% capital floor

Sources: Bank for International Settlements; and Board of Governors of the Federal Reserve System.
Note: The capital floors are limits on the amount of capital reduction allowed under Basel II during the transition between Basel I and Basel II. The amount of capital reduction is limited to a percentage of the existing Basel I calculation.

or business-cycle effects (BCBS, 2006, paragraphs 784–807). Nonetheless, the qualitative nature of Pillar 3 leaves sufficient flexibility so that certain weaknesses in the disclosure arrangements remain.

Under Basel II, banks that are originators of OBSEs will need to take into account their capital requirements when deciding on the best way to structure these OBSEs. In funding the entity, the originator can choose to issue commercial paper, medium-term notes, or lower-rated securitizations (that comprise the equity tranche). However, Basel II regulation imposes sequentially higher-risk weights on capital once the securitization is rated below investment grade or unrated. For originating banks holding equity tranche exposure, these low-rated or unrated assets may become very costly in terms of capital charges, particularly if they remain unhedged. For example, under the internal-ratings-based approach for long-term debt,[17] a bank holding an instrument rated BB faces risk weights of 425 percent. Yet, for the riskiest assets, the risk weight reaches 1,250 percent. Further, Basel II rules require that banks must prove that "significant credit risk" has been transferred to a third party in order to achieve capital relief through securitization. It is unlikely that the originating bank's on-balance-sheet holdings of the riskier equity tranche investments will meet these criteria.[18]

Likewise, as investors, banks under Basel II must hold capital against securitized instruments on their balance sheet. With charges of 650 percent for exposures rated BB–, the cost of holding below-investment-grade paper can be exorbitant. Investment-worthy assets and the associated reduced risk weights for investment-grade assets provide banks with a less costly alternative in terms of capital, thereby increasing the incentive to move away from low-grade instruments.

One question that arises under the disclosure and capital requirements of Basel II is whether originating banks will be discouraged from issuing below-investment-grade instruments. Although short and long maturities will likely still be issued by OBSEs, the funding structure of bank-originated OBSEs is likely to change, with an increased

[17]Most banks issuing in these markets would likely use the internal-ratings-based approach.

[18]Further, Basel II requirements for eligible liquidity facilities include an "asset quality test," as well as the requirement that, for facilities supporting externally rated securities, the securities must be externally rated investment grade at the time of funding.

issuance of higher-grade commercial paper and investment-grade securitizations relative to the period prior to Basel II adoption. Levels of leverage of these entities are likely to be lower than the current averages of about 14 times, as the riskiness of exposures will be accounted for more clearly in capital requirements.

Another consideration, which has a direct bearing on the general question about the "originate-to-distribute" business model underlying the interest in OBSEs, is whether banks in the future will retain part of the risk they originate. Will banks voluntarily take more of the OBSE's assets onto the balance sheet to provide greater assurance to investors as to the vehicle's quality? Or should banks be required to retain a stake in the performance of these assets, thus having the incentive to conduct better due diligence? In the latter case, one would need to consider the best choice as to who would prescribe and monitor such a requirement and the challenges of enforcing it, since financial institutions may find ways to circumvent it (e.g., by offsetting the risk with an off-balance-sheet derivatives hedge that may be difficult to observe).

While securitization is here to stay, the structure of bank-originated OBSEs as they exist today is likely to be altered, assuming banks will face the regulatory cost. In the short term, one can expect a move away from the complex highly structured products to simpler ones. However, products should emerge incorporating new elements, such as different asset classes, thicker tranches, or increased subordination in CDOs or other credit-tiered products—all methods to make these instruments less risky. The use of credit default swaps is likely to expand as Basel II encourages banks' hedging of risk exposures to lower risk weights on asset holdings.[19] Additionally, there are opportunities for the new products and entities to bring greater transparency to the risks on banks' balance sheets that will benefit both investors and regulators.

[19]While hedging credit risk through credit default swaps can be helpful, counterparty risk to those writing such swaps is still present.

In a macroeconomic context, it has been argued that the implementation of Basel II capital requirements could have a procyclical effect on the business cycle. Specifically, in an economic downturn, anticipated losses would require banks to increase their capital, putting further downward pressure on the provision of credit, thereby accentuating the downturn.[20] Moreover, as discussed in the section on fair value accounting, under certain circumstances, the application of fair value rules during periods of market weakness or turmoil can contribute to a downward spiral in asset prices and exacerbate financial instability. Therefore, policymakers need to be aware that, in a downturn, the combined application of fair value triggers and Basel II capital requirements could reinforce each other, thereby exacerbating economic weakness.

Liquidity Facilities and Credit Enhancements

In addition to the risks stemming from the assets of OBSEs, originating banks are also tied to these entities via the liquidity facilities and credit enhancements that support these entities.[21,22] Under Basel I, capital charges do not need to be applied to liquidity facilities with less than a one-year commitment, while they are required for those with longer terms. Effective September 2005, with a view to enhancing accountability, U.S. regulators required capital to be held against short-term liquidity facilities as well, although most European regulators did

[20] This depends on the type of rating models used by banks, e.g., where the credit rating is sensitive to economic conditions.

[21]Liquidity facilities are the assurance of a loan or guarantee of financial support to back up an off-balance-sheet entity. Banks provide SIVs with liquidity backstops averaging 10 to 15 percent of the face value of senior funding outstanding, while conduits typically provide 100 percent coverage of commercial paper liabilities.

[22]Credit enhancements are defined as a contractual arrangement in which the bank retains or assumes a securitization exposure, and in substance provides some degree of added protection to the parties to the transaction. Forms of credit enhancement include collateralization, third-party loan guarantees, and credit insurance. Overcollateralization is used heavily to support SIVs.

not introduce a similar requirement. For the most part, however, the implications for the originating banks of these supporting facilities were not fully realized until difficulties arose in early August 2007.

Basel II requires banks to hold more capital in line with the risk from their off-balance-sheet exposures. Banks are required to hold regulatory capital for both liquidity facilities and credit enhancements, improving visibility to investors and regulators. For 2007, this was expected to have the largest impact on European banks, which had not yet imposed capital charges on these liquidity facilities. Using the standards of Basel I, Fitch Ratings estimated that, under a worst-case scenario, if liquidity lines were to be fully drawn down, declines in the Tier 1 capital ratio of European banks would peak at 50 percent and for U.S. banks at almost 29 percent (Fitch Ratings, 2007a).

Based on the terms and conditions according to which liquidity facilities are subject to capital requirements under Basel II, their transparency could be enhanced, but they could also be structured to reduce capital charges. There are various criteria determining the appropriate credit conversion factor (CCF) for liquidity facilities and, hence, the overall risk weights for the associated capital charges.[23] The guidelines for liquidity lines entail significant differences in the magnitudes of the CCFs to be applied. With the adoption of Basel II, these contingent facilities are expected to undergo structural changes as originators revamp the liquidity lines to minimize the cost to regulatory capital.

Marketability, as well as investor demand for greater security, could encourage the size and format of backup liquidity lines for SIVs to approximate those of conduits, approaching or equaling 100 percent coverage, as well as incorporating more substantial credit enhancements. In addition, alternatives to the more frequently used third-party liquidity support include extendible commercial paper (i.e., a note whose maturity can be extended at the option of the user) and repurchase agreements.

Implications for Nonbank Financial Institutions

By their nature, nonbank financial institutions (NBFIs) are not directly affected by the new disclosure requirements for OBSEs under Basel II, yet they are subject to financial risks.[24] Thus, the direct or indirect relationships of NBFIs with other counterparties and their membership in financial groups, including banks, can trigger, or act as channels for, systemic events (Table 2.2).

The involvement of insurance companies in credit risk transfer products has been primarily as sellers of protection (Table 2.3 and Figure 2.4). Insurance companies are affected on the asset side of their balance sheets as investors in structured products. They can also be exposed via their holdings in hedge funds, which tend to invest in the riskier tranches of structured products and SIVs. More generally, insurance companies are exposed to the effects of increased market volatility and stress. In addition, it is also possible that there could be a particular effect for insurance companies that are part of financial conglomerates, as they might be called on to provide liquidity lines or support asset purchases for stressed entities.

In general, variations in the regulatory treatment of securitization among different types of financial institutions may provide an opportunity for regulatory arbitrage across financial sectors. Some securitization exposures are evaluated for regulatory purposes differently for insurance companies than for banks. Insurance companies—especially life insurers with their longer-term investment horizons—tend to hold more low-rated positions than do banks, a situation that may be accentuated if, under Basel II,

[23]To determine capital requirements for off-balance-sheet exposures, one must first apply a credit conversion factor to the exposure, and then risk weight the resulting credit equivalent amount (Basel II, paragraph 567).

[24]NBFIs include insurance companies, hedge funds, mortgage originators, pension funds, and mutual funds, and comprise a sizable portion of OBSE originators (about 28 percent as of November 2007 for SIVs only).

Table 2.2. U.S. Subprime Exposures and Losses

	Exposure[1]			Losses		
	2005	2006	2007[2]	2005	2006	2007[2]
	Total amount (in billions of U.S. dollars)					
Banks[3]	155.3	263.9	126.5	–8.8	–62.8	–28.8
Hedge funds	69.8	98.1	77.6	–6.7	–26.9	–20.4
Insurance companies	78.4	105.9	83.7	–1.6	–20.8	–15.1
Finance companies	24.6	30.2	23.8	–0.6	–4.8	–3.6
Mutual funds/pension funds	14.8	18.2	14.3	–0.4	–2.5	–1.9
Total	342.9	516.3	325.9	–18.1	–117.8	–69.8
	As a percent of total					
Banks[3]	45.3	51.1	38.8	48.6	53.3	41.3
Hedge funds	20.4	19.0	23.8	37.0	22.8	29.2
Insurance companies	22.9	20.5	25.7	8.8	17.7	21.6
Finance companies	7.2	5.8	7.3	3.3	4.1	5.2
Mutual funds/pension funds	4.3	3.5	4.4	2.2	2.1	2.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Goldman Sachs.
[1]Par amounts for securities and notional amounts for derivatives.
[2]As of November 2007.
[3]Including investment banks.

insurance companies face lower capital charges than banks for subinvestment-grade tranches (Figure 2.5).[25]

The spread of risk across the financial system is particularly relevant for monoline insurers compared with other insurance companies, as the impact of a potential rating downgrade of a major monoline insurer affects a much broader spectrum of players than the insurer alone. The exposure to monolines for banks and insurance companies also stems from direct holdings of monoline debt or equity, potential liabilities through reinsurance, and securities wrapped by monolines, where insurance companies are mostly exposed via holdings of monoline-wrapped securities (Barclays Capital, 2008). Most directly, the quality of the guarantee provided by the monoline insurer feeds through to the ratings on the securities and structured products supported by its guarantees (Figure 2.6).[26] At end-2006, monoline insurers supported $2.5 trillion of insured risk (securities at par value), including about $800 billion in structured finance obligations.[27]

What is key is the fact that a monoline not only provides an assessment of the creditworthiness of the issuer but also stands behind its assessment with financial support. A downgrade of a major monoline calls into question the quality of its assessment as well as the overall usefulness of such insurance. Further, the downgrade can have repercussions across financial sectors for those who hold monoline-guaranteed products. For example, banks holding such instruments would see a reduction in the value of the protection, thereby increasing the riskiness of the investment and the requisite regulatory capital charge that is applied (see Chapter 1). As a result, banks are exposed to either the underlying quality of the assets in the credit tranche or the counterparty risk of the monoline, whichever has the higher credit rating (Barclays Capital, 2008).

[25]However, if Solvency II on insurance regulation converges to Basel II, the opportunity for arbitrage would be reduced.

[26]The financial guarantee provided by an insurer provides an unconditional guaranteed payment of the principal and interest on the bonds that are guaranteed as they fall due. As a result, the quality of the bonds issued reflects the rating of the bond insurer, and the presence of a guarantee can reduce the amount of time invested by the buyer in researching the issuer. (See the Association of Financial Guaranty Insurers website at www.afgi.org.)

[27]See Chapter 1 for more details on monolines.

Table 2.3. Market Participants in Credit Derivatives, 2004 and 2006

(In percent of total)

	Protection Buyers		Protection Sellers	
	2004	2006	2004	2006
Banks	67	59	54	43
Hedge funds	16	28	15	31
Pension funds	3	2	4	4
Insurance	7	6	20	17
Corporations	3	2	2	1
Mutual funds	3	2	4	3
Other	1	1	1	1

Source: British Bankers' Association (2006).

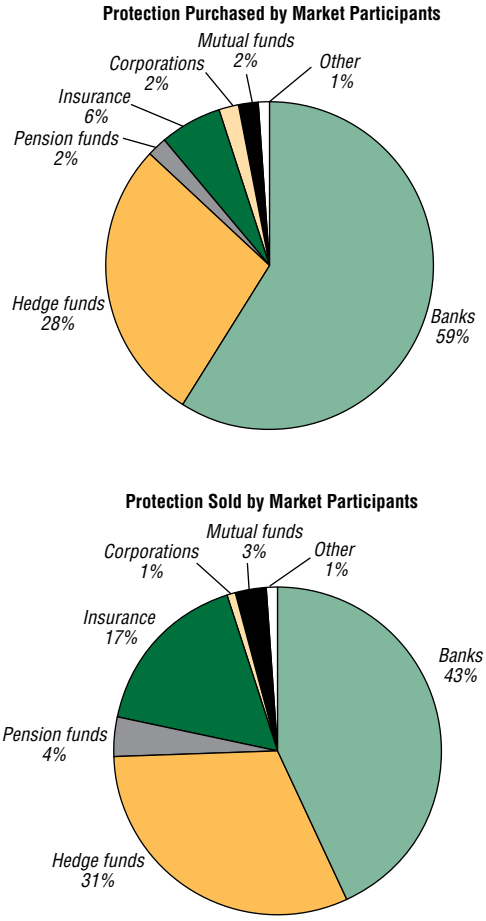
Hedge funds tend to hold the riskiest tranches of structured products. Discussions with market participants noted that 2006 saw an increase in the involvement of hedge funds in the CDO market. In the second half of 2007, while many hedge funds suffered from the subprime and ensuing broader crisis, some appeared to have gained from contrarian bets, while others bought assets at bargain prices when market liquidity dried up. As Basel II requirements provide the incentives for banks to gravitate toward high-grade assets, opportunities for hedge funds will likely increase for entering the riskier end of the structured market. In addition, there are opportunities for hedge funds to manage OBSEs on a fee income basis.

Calls continue for hedge fund disclosure, following up on the UK hedge fund industry initiative, which launched a working group backed by 14 of the largest UK hedge funds to develop a set of guidelines for the industry. But the recent turmoil appears to have strengthened the case of hedge funds in forestalling mandatory disclosure in any upcoming discussions with regulators as they provide needed liquidity and support for the affected markets. Looking forward, there needs to be a balance between disclosure that provides market and regulatory confidence, while not constraining hedge fund flexibility in contributing to the smooth functioning of the market.

More stringent regulatory and disclosure requirements in the banking sector could

Figure 2.4. Market Participants in Credit Derivatives, 2006

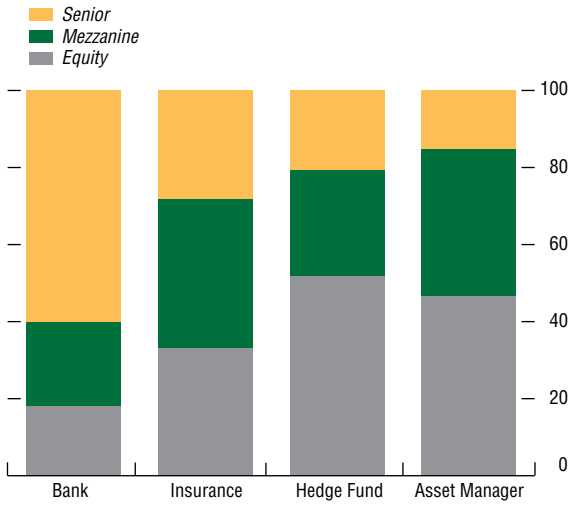
(In percent of total)



Source: British Bankers' Association (BBA) (2006).
Note: End-2006 estimates based on BBA's 2006 survey.

encourage a significant increase in NBFI involvement in OBSEs. Banks may look to hedge funds, insurance companies, or other financial institutions to provide liquidity facilities or credit enhancements, particularly to absorb first loss. If the equity tranche continues to be offered as part of OBSE operations, it is not likely to be done in its present form. Instead, the equity tranche might now be sold to NBFI investors under more lucrative terms to ensure a buffer to senior debt and the overall attractiveness of the entity to investors. This would entail "significant credit risk transfer" required of Basel II and eliminate charges to capital, albeit at the cost of impacting banks' profit margins by providing handsome returns on capital notes. Alternatively, these NBFIs may enter the market directly as originators of OBSEs themselves. For those NBFIs that remain outside the scope of regulatory oversight, assuming OBSE-related credit and liquidity risks may raise the issue of possible systemic effects down the road.

Figure 2.5. Structured Credit Products by Market Participants
(In percent)



Source: Citigroup.
Note: As of the first half of 2007.

Conclusions and Outlook

The financial crisis that began in late July 2007 has constituted an important test of complex structured finance products and provided insights into their implications for financial stability. The conclusion seems to be that the complexity of those products, coupled with weak disclosure, has left the system exposed to a serious funding and confidence crisis that threatens to continue for a significant period.

The key challenge going forward will be for these products and markets to adapt in ways that both preserve the benefits they bring in tranquil times while at the same time addressing the additional systemic risks they encouraged in their original form. In the latter regard, the ongoing crisis starkly illustrates two points. First, investors were in many cases too complacent about the risks that they were taking on and did not exercise appropriate due diligence, relying too heavily on rating agencies for assessing the risks to which they were exposed. Second, the perimeter of risk for financial institutions—that

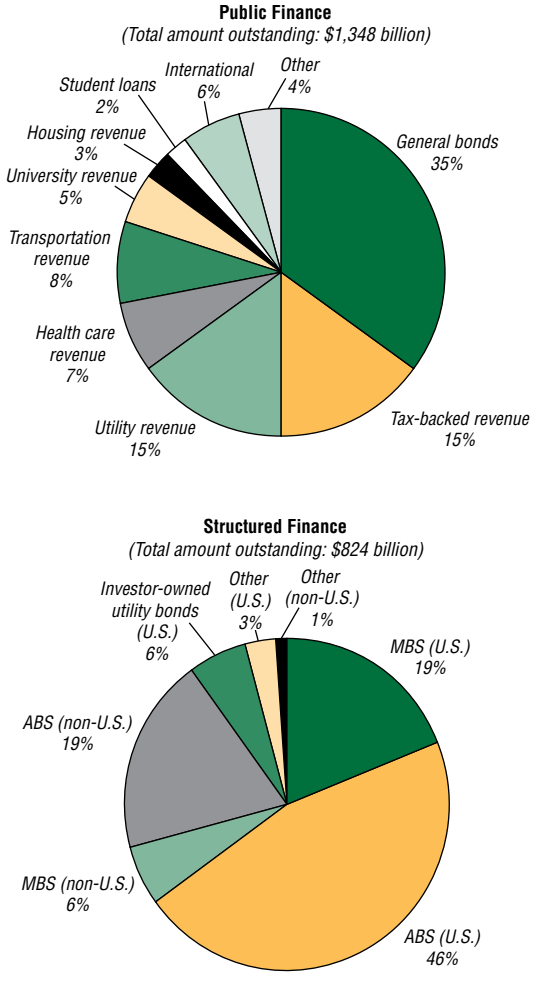
is, the risk assessment of all of an institution's activities, including its related entities—did not adequately take into account the size and opacity of institutions' exposures to SIVs, commercial paper conduits, and their related funding support. Effectively, market participants underestimated the credit risk in the underlying assets. This compounded the market liquidity risk inherent in these complex over-the-counter structured products.

In general, policy proposals relating to securitization should aim to strengthen the weaknesses and close the gaps in structured finance, without impeding market innovation. Overall, the policy proposals should focus on enhancing the underpinnings of the originate-to-distribute model, including strengthening underwriting standards and encouraging originators of structured finance products to improve disclosure of the underlying risks in the products in a timely and comprehensible manner. It would help if originators were to hold part of the risk of their originated loans, as then they might have greater incentive for due diligence and subsequent monitoring, though this may be difficult to implement in practice, particularly in the upswing of a credit cycle. Also important would be to encourage rating agencies to sharpen their methodologies to account for a wider range of risk factors, and to provide investors with more clarity as to the limitations of their ratings and the sensitivity of those ratings to the risk factors.

A number of the proposals would need to be implemented by the private sector, although official decision-making bodies could usefully provide encouragement in some cases:

- Most products could usefully be standardized at least to some extent. This should increase transparency as well as market participants' understanding of the risks, thus facilitating the development of liquid secondary markets. Although there will always likely be types of investors that will demand bespoke complex products, securitization trade associations and securities regulators could encourage that these be structured, at least partially, from standardized building blocks.

Figure 2.6. Financial Guaranty Industry Insured Portfolio Distribution, 2006
(Net par insured)



Source: Association of Financial Guaranty Insurers.
Note: MBS = mortgage-backed security; ABS = asset-backed security.

- Transparency regarding product characteristics at origination is needed. Timely, comprehensible, and sufficient information should be provided to investors at origination, including information on the underlying assets, the valuation assumptions used, and the sensitivity of those assumptions to changes (sensitivity analysis of assumptions regarding volatility, default and delinquency, and loss given default under various scenarios).
- Originators that retain risks and rewards in off-balance-sheet entities should disclose aggregate information on a timely and regular basis. Such disclosure about off-balance-sheet entities should cover key risk characteristics of the originator's exposure in terms of the quantity and sensitivity to credit, market, foreign exchange, and liquidity risks; and changes in risk exposure due to the quantitative and qualitative impact on the originator's balance sheet of changes in key risk factors. Where specific off-balance-sheet entities present material risks that diverge from the aggregate, separate disaggregated disclosures are warranted. Specifying these disclosures would require close cooperation between regulators and standard setters.
- In addition to using a differentiated scale for structured credit products, rating agencies should provide investors with more analytical information regarding potential rating volatility. Given that, by design, structured credit products can suffer more severe, multiple-notch downgrades relative to corporate or sovereign bonds, a differentiated rating scale would help make these differences more explicit. The additional analytic information, which could take the form of a score or index, would provide investors with a quantification of the increased downgrade risk.

Recommendations that lie mainly in the public domain include the following:

- Greater attention to applying fair value results needs to be addressed. As experience is gained from the crisis, some weaknesses in the implementation of fair value as a valuation mechanism could usefully be addressed. Research should investigate the degree to which decision-making rules based on fair value may compound a crisis, and identify strategies that could mitigate these adverse effects. Such strategies could involve defining decision rules on the basis of fair value milestones that trigger a review of the elements underlying fair value rather than compulsory sales. The results of such research should inform the decisions of securities and banking regulators as well as accountants and auditors, potentially requiring some fine-tuning of existing guidance.
- Further refinement and careful implementation of Basel II would substantially reduce current gaps. If properly specified and implemented, the emphasis of Basel II Pillar 3 on market monitoring, in particular by providing reliable and adequate information to investors and regulators, can be effective in closing the disclosure gaps of the Basel I framework. However, this chapter highlights that supervisors need to receive more rigorous guidance as to whether significant credit risk has been transferred to a third party before granting capital relief. As for applying the appropriate risk weights to contingent credit lines, Basel II guidance needs to be strengthened further. Some possibilities for regulatory arbitrage between banks and nonbank financial institutions may remain, however, as the same risk may be treated differently across regulatory regimes. Standard setters and supervisors need to be cognizant of unintended consequences across regulatory regimes, and to coordinate efforts, if needed, to resolve misuses.

The lessons learned from the turmoil are likely to shape structured finance decisively. Some of the changes may be short lived—simpler products and a more discerning investor base—and some may have more staying power, such as improved transparency and disclosure, and a better incentive structure for rating agencies. The innovation and flexibility associated with structured finance products and markets will likely guide the industry in the

post-stress period just as it drove it in its early expansion years. As such, it is important that any regulatory initiatives support rather than supplant market-driven responses to address the identified weaknesses. Such initiatives could involve (1) facilitating coordination between the different policy-making bodies, such as standard setters and regulators, in designing responses; (2) removing incentives for perverse outcomes, such as differential capital requirements on the basis of structure rather than risk; and (3) addressing systemic weaknesses identified in the crisis. It will be particularly important to address the incentives of various market participants in light of any existing or future regulation to ensure that they are aligned with a stronger, more resilient financial system.

Annex 2.1. The World According to GAAP

Note: Kenneth Sullivan prepared this annex.

The International Accounting Standards Board promulgates the IFRS and the Financial Accounting Standards Board promulgates the U.S. GAAP. IFRS applies to all European Union/European Economic Area companies with listed securities, while U.S. GAAP, combined with SEC regulations, governs all U.S. companies.[28] This annex will focus on accounting standards for valuing structured finance products and for the treatment of OBSEs. In both cases, the U.S. GAAP and IFRS treatments are substantially the same, but there are some subtle differences. The standards FAS 157 and IFRS 7, which elaborate the disclosures for financial instruments, are new to their respective frameworks and at the end of 2007 disclosures under these standards were only made by early adopters that included most major financial entities.

FAS 157 defines fair value as "…the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date."[29] FAS 157 recognizes fair value as an exit value from a sale, while currently IFRS is less prescriptive.

In determining fair value, both IFRS and U.S. GAAP prescribe a hierarchy of fair value methodologies starting with observable prices in active markets and moving to a mark-to-model in which some of the material inputs are unobservable. However, only FAS 157 requires disclosure of a formal three-level classification of all financial instruments in the financial statements. "Level-one" valuation requires observable prices for the same instrument in liquid markets. When observable prices are unavailable for the valuation date, "level-two" valuation allows the use of prices on nearby dates, or the use of arbitrage-type valuation models that use the observable prices of other financial instruments. For example, such a model might value a CDO tranche on the basis of credit spreads or implied correlations of similar CDO tranches. For instruments for which level-one and level-two valuations inputs are not available, "level three" allows the use of theoretical valuation models that use as inputs various relevant fundamental parameters. For example, an MBS valuation might be based on estimated or market-implied delinquency and foreclosure rates, and loss severities. This makes valuation of level-three assets highly dependent on, and sensitive to, the model's assumptions. FAS 157 requires disclosures of information concerning changes to the levels of and valuation methodologies for level-three assets. These include:

- A reconciliation of opening and closing balances with a disclosure of total gains and losses and where they are reported in earnings (income statement or other comprehensive income), along with all changes in stocks, including transfers in and out from other levels.
- For the annual statements, the disclosure of valuation techniques used to measure fair

[28]A number of countries rely on their respective national accounting standards, which may differ from both IFRS and U.S. GAAP. These are not considered in this chapter.

[29]FAS 157, paragraph 5, "Definition of Fair Value."

value and any changes in techniques in the period.

While IFRS require disclosure of valuation assumptions, they do not have a classification framework like FAS 157.

Neither U.S. GAAP nor IFRS prevent a firm from changing the method for calculating an asset's fair value over its life. Changes in market conditions may move assets from a level two to three classification, or vice versa, as firms assess the availability and integrity of market data with regard to the valuation of their assets.

While the market-to-model valuation technique accepts the use of unobservable inputs, it still requires the use of those valuation assumptions commonly used by "market participants" in determining an exit price for the instrument. This means using information regarding market participant assumptions that is reasonably available without undue effort and cost. In cases where an active market no longer operates, entities must take account of any information that provides evidence of fair value, whether it be liquidity premia or credit spreads. For example, if the liquidity spreads are deemed to be so extreme as to not represent an orderly transaction, entities may still gain measures of credit risk on their structured products through reference to the prices of similar instruments such as ABX indices to value MBS. This provides a means of estimating the appropriateness of an asset's valuation. While the index is imprecise, it may be a better measure of the underlying creditworthiness of an instrument, as it is less affected by the liquidity risks priced into traded instruments. As discussed in the body of the main text, the major audit firms have reached a general consensus for determining an "orderly transaction" under current market conditions.

IFRS and U.S. GAAP both require disclosures of risk management issues relating to financial instruments, but IFRS 7 requires more extensive disclosures relating to liquidity risks and sensitivity analysis. SEC regulations prescribe additional disclosures outside of U.S. GAAP as part of statutory periodic reporting, resulting in differences in the overall disclosure frameworks.

Both frameworks differ in their accounting for the treatment of securitization-related OBSEs such as asset-backed commercial paper conduits and SIVs. Both require balance sheet consolidation on the basis of control or if the sponsoring entity absorbs the majority of the expected risks and benefits, including provision of liquidity support. U.S. GAAP define control as more than 50 percent of rights, while IFRS have a test of effective control that can be less than 50 percent. U.S. GAAP describe variable interest entities, which are open-ended OBSEs, and qualifying special-purpose entities, which have a defined termination. IFRS define special-purpose entities. Each framework provides tests to determine the level of control or balance of risks and rewards that will trigger consolidation.

References

Ashcraft, Adam B., and Til Schuermann, 2007, "Understanding the Securitization of Subprime Mortgage Credit," FIC Working Paper No. 07-43 (Philadelphia: Wharton Financial Institutions Center). Available via the Internet: http://fic.wharton.upenn.edu/fic/papers/07/0743.pdf.

Barclays Capital, 2008, "Decoding the Fed and Monolines," *European Alpha Anticipator* (January 25). Available via the Internet: http://www.investmentnews.com/assets/docs/CI37618128.pdf.

Basel Committee on Banking Supervision (BCBS), 2006, "Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework—Comprehensive Version" (Basel: Bank for International Settlements, June). Available via the Internet: http://www.bis.org/publ/bcbs128.htm.

Belsham, Thomas, Nicholas Vause, and Simon Wells, 2005, "Credit Correlation: Interpretation and Risks," *Bank of England Financial Stability Report*, Vol. 19 (December), pp. 103–15.

Boemio, Tom, 2007, "Asset Backed Commercial Paper Conduits," presentation at the AIG-ILGC Joint Meeting of the Basel Committee on Banking Supervision, Washington, September.

British Bankers' Association, 2006, *Credit Derivatives Report 2006* (London).

Brunnermeier, Markus, 2007, "Deciphering the 2007 Liquidity Crunch," presentation at the Interna-

tional Monetary Fund's Monetary and Capital Markets Seminar Series, Washington, December.

Center for Audit Quality, 2007, "Consolidation of Commercial Paper Conduits," White Paper (Washington, October 3). Available via the Internet: http://www.aicpa.org/caq/download/WP_Consolidation_of_Commercial_Paper_Conduits.pdf.

Committee on the Global Financial System (CGFS), 2005, "The Role of Ratings in Structured Finance: Issues and Implications," CGFS Publication No. 23 (Basel: Bank for International Settlements, January). Available via the Internet: http://www.bis.org/publ/cgfs23.htm.

Demyanyk, Yuliya, and Otto Van Hemert, 2008, "Understanding the Subprime Mortgage Crisis," Supervisory Policy Analysis Working Paper No. 2007-05 (St. Louis: Federal Reserve Bank of St. Louis, February). Available via the Internet: http://ssrn.com/abstract=1020396.

Fender, Ingo, and John Kiff, 2005, "CDO Rating Methodology: Some Thoughts on Model Risk and Its Implications," *Journal of Credit Risk*, Vol. 1 (Summer), pp. 37–58.

Financial Accounting Standards Board, 2003, "FASB Interpretation No. 46, Consolidation of Variable Interest Entities" (FIN 46R) (Norwalk, Connecticut, December). Available via the Internet: http://www.pcfr.org/downloads/05_07_Meet_Materials/FIN_46R.pdf.

Fitch Ratings, 2007a, "Asset-Backed Commercial Paper & Global Banks Exposure—10 Key Questions" (New York, September 12).

———, 2007b, "Rating Performance of Structured Investment Vehicles (SIVs) in Times of Diminishing Liquidity for Assets and Liabilities" (New York, September 19).

International Accounting Standards Board (IASB), 2005, "Management Commentary," IASB Discussion Paper (London: International Accounting Standards Board, December).

International Monetary Fund (IMF), 2006, *Global Financial Stability Report*, World Economic and Financial Surveys (Washington, April).

———, 2007a, *Global Financial Stability Report*, World Economic and Financial Surveys (Washington, April).

———, 2007b, *Global Financial Stability Report*, World Economic and Financial Surveys (Washington, October).

Mason, Joseph R., and Joshua Rosner, 2007, "Where Did the Risk Go? How Misapplied Bond Ratings Cause Mortgage Backed Securities and Collateralized Debt Obligation Market Disruptions," paper presented at the Hudson Institute, Washington, May 3.

Moody's Investors Service, 2008, "Should Moody's Consider Differentiating Structured Finance and Corporate Ratings?" Moody's Global Credit Research Request for Comment (February 4).

Shin, Hyun Song, 2007, "Discussion of Assessing the Information Content of Mark-to-Market Accounting with Mixed Attributes: The Case of Cash Flow Hedges and Market Transparency and the Accounting Regime," *Journal of Accounting Research*, Vol. 45 (May), pp. 277–87.

Standard & Poor's, 2006, "As Structured Investment Vehicles Become More Popular, Risk Models Become More Sophisticated," *Ratings Direct*, October 11.

———, 2008, "S&P Announces New Actions to Enhance Independence, Strengthen the Ratings Process, and Increase Transparency to Better Serve Global Markets," Press Release, February 7.