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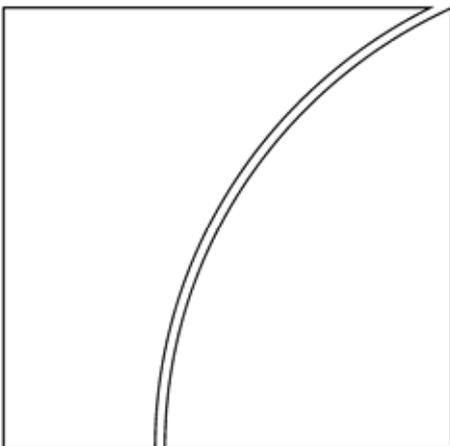
### Ratings in structured finance: what went wrong and what can be done to address shortcomings?

Report submitted by a Study Group established by the Committee  
on the Global Financial System

This Study Group was chaired by Nigel Jenkinson of the Bank of  
England

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## Preface

The role of credit ratings in structured finance is a topic of long-standing interest to the Committee on the Global Financial System (CGFS). In particular, in January 2005, the Committee published a Working Group report entitled “The role of ratings in structured finance: issues and implications”. Key risks highlighted in that CGFS report materialised during the credit market turmoil.

Against the backdrop of the turmoil in the markets for structured credit products, the CGFS in September 2007 discussed the use of credit ratings in structured finance (SF). Following this discussion and a request by the Financial Stability Forum (FSF) to update the 2005 report, the CGFS organised a workshop with market participants and credit rating agencies (CRAs) at the Bank of England in October 2007. At its November 2007 meeting, the CGFS asked a Study Group, chaired by Nigel Jenkinson (Bank of England), to investigate further specific issues related to the use of credit ratings in SF markets.

This report draws on the lessons that have been learnt during the credit turmoil on vulnerabilities of ratings of SF products, and provides a number of recommendations to address weaknesses that were identified. A draft consultative report prepared by the Study Group was discussed by CGFS members at its March 2008 meeting, and subsequently this was sent for comments to investors, industry associations and CRAs. This consultative report also informed the April 2008 FSF report to the G7 Finance Ministers and central bank Governors.

The current public version of the report incorporates a summary of the feedback received during the consultation process. A number of initiatives to enhance the information provided on SF ratings are already under way. In the light of these initiatives, the CGFS will follow up with CRAs and investors on the recommendations made in the report.

Donald L Kohn

Chairman, Committee on the Global Financial System  
Vice Chairman, Board of Governors of the Federal Reserve System



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## Executive summary

During the second half of 2007, the deterioration in the performance of subprime loans in the United States resulted in a sharp repricing of asset-backed securities (ABS), undermining investors' and regulators' confidence in the ratings of existing structured finance (SF) products backed by subprime mortgages (including collateralised debt obligations (CDOs) of subprime-backed ABS) and, to a lesser degree, those backed by other assets. The frequency and magnitude of rating revisions on SF products, particularly multi-notch rating downgrades, were much greater than for corporate securities in 2007.

These developments also revealed an overdependence on ratings as well as other weaknesses in investors' risk management. One lesson from the recent market turmoil is that investors' risk management and stress-testing systems need to be revised to take better account of the key differences in risk characteristics between SF and traditional corporate debt securities. Further, given the important role of ratings in the investment and risk management processes, and in regulation, the turmoil has also raised questions about the effectiveness of credit rating agencies' (CRAs') assessments of risks in rating complex financial products.

To address these weaknesses in SF ratings, a number of initiatives are already under way to improve the information content of and to explore the usefulness of complementary risk measures for SF ratings. This report documents the main findings of a Study Group established by the CGFS to investigate ways to improve the credibility of ratings of SF products, while also highlighting the inevitable uncertainties attached to them.

In doing so, the report highlights the risk factors that are likely to have contributed to the poor rating performance of SF products backed by US subprime mortgages (Section 2). These include CRAs underestimating the severity of the housing market downturn, model risk aggravated by limited historical data, and CRAs underestimating the originator risk factor. Section 3 summarises industry views on the recent performance of ratings in SF markets. Although investors were critical of CRAs for the technical failings and inadequate resources, the need for CRAs to repair their reputation was seen as a powerful force for improvements. Indeed, investors noted that the CRAs' recent shortcomings in risk evaluation had also been shared by many market participants.

Drawing on these inputs, the report sets out four lessons (Section 4): credit rating information should support, not replace, investor due diligence; CRAs should enhance the information underlying SF ratings; better information on the key risk factors of SF ratings is needed; and CRAs should take system-wide risk into account. Based on these lessons, Section 5 offers a number of specific recommendations to address weaknesses and improve investor confidence in the rating of SF products:

1. Investment fund trustees and managers should review their internal procedures and guidelines concerning how ratings information on SF products is used in their investment mandates and decisions.
2. Rating reports should be presented in a way that facilitates comparisons of risk within and across classes of different SF products.
3. Rating agencies should provide clearer information on the frequency of rating updates.
4. More user-friendly access to CRA SF models and their documentation should be provided. Rating models made available by CRAs should facilitate "what-if?" analysis or stress tests by users on key model parameters.
5. CRAs should document the sensitivity of SF tranche ratings to changes in their central assumptions regarding default rates, recovery rates and correlations.

6. CRAs should clearly and regularly disclose to investors their economic assumptions underlying the rating of SF products.
7. Where only limited historical data on underlying asset pools are available, this should be clearly disclosed as a source of model risk, as should any adjustments made to mitigate this risk.
8. CRAs should monitor more intensively the performance of the various agents involved in the securitisation process (from origination to sale and subsequent servicing and administration).
9. CRAs should periodically consider the wider systemic implications of a rapid growth of similar instruments or vehicles, or of new business undertaken by existing vehicles, for the continued robustness of their original ratings criteria.
10. CRAs should consider how to incorporate additional information on the risk properties of SF products into the rating framework.

The feedback received from investors, industry associations and CRAs during the consultation process was generally supportive of these recommendations. There was a general recognition that ratings should be used to support, but not to replace, investors' due diligence. While recognising the importance of historical data, the CRAs noted the possibility of structural breaks as a factor limiting their usefulness, and highlighted the fact that forward-looking analysis played a major role in the ratings decision. With respect to the question of how the rating risk of SF products can be better captured or differentiated from that of plain vanilla credit instruments, one view expressed by some institutional investors and CRAs was that alternative rating scales for SF products may be costly and could create confusion among users of rating information. At the same time, the provision of more information and of additional indicators that capture rating risk was supported by both investors and the CRAs themselves. CRAs indicated that they are exploring several indicators intended to convey additional dimensions to rating risk.

## 1. Introduction

The problems in SF markets that emerged in mid-2007 have revealed weaknesses in risk management. Given the important role of ratings in the investment and risk management processes, and in regulation, the turmoil has also raised questions about the effectiveness of CRAs' assessment of risks in rating complex financial products. This report focuses on the use of rating information on SF products by different investor groups, including the "hard-wiring" of ratings in structured investment vehicles (SIVs) and the role of monolines in providing credit enhancements to SF product ratings, and discusses opportunities to broaden the scope, information content and reliability of SF ratings.<sup>1</sup>

The Study Group report draws on information gathered from the London workshop, bilateral interviews with users of CRA ratings conducted by a number of central banks, and research undertaken by members of the Study Group. Although it was not practicable to conduct a comprehensive and fully representative survey of users, suggesting that the evidence should be treated with some caution, the exercise nevertheless provided insights into the use of ratings in SF markets. The report also incorporates feedback received from investors, industry associations and CRAs.

One lesson from the recent market turmoil is that investors' risk management and stress-testing systems need to be updated to account better for the key differences in risk characteristics between structured finance and traditional corporate debt securities. A number of initiatives are already under way to improve the information content and to explore the usefulness of complementary risk measures for SF ratings by CRAs, in consultation with investors.<sup>2</sup> The report supports these efforts by proposing four ways in which CRAs should improve the information on SF products:

- First, by enhancing the clarity and accessibility of existing rating information and documentation on SF products.
- Second, by improving the information available to investors on the key risk factors that drive SF ratings, in particular on model risk and the sensitivity of ratings to assumptions about macroeconomic and sectoral developments.
- Third, through periodic provision of information on the robustness of a CRA's ratings criteria for classes of SF instruments to changes in system-wide market developments.
- Fourth, by expanding the ratings framework for SF products to include information on the risk properties of individual issues and their rated tranches.

The report is structured as follows. Section 2 discusses causes of the large rating changes during the turmoil. Specific mechanisms through which ratings have affected the functioning of the financial system are discussed in boxes on monolines and SIVs. Section 3 provides a summary of industry views on how SF ratings are used in investment decisions, the main investor criticisms of CRA approaches, and views on the usefulness of complementary rating

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<sup>1</sup> While questions have been raised on the management of potential conflicts of interest within CRAs, current initiatives by IOSCO and CESR are looking into these issues. See IOSCO, "The role of credit rating agencies in structured finance markets", *Final Report*, May 2008, and CESR, "The role of credit rating agencies in structured finance", May 2008.

<sup>2</sup> See, for example: "Survey results on differentiating structured finance from corporate ratings", *Special Comment*, Moody's Investors Service, March 2008; "Introducing assumption volatility scores and loss sensitivities for structured finance securities", *Moody's Global Credit Policy*, May 2008; and "Request for comment: should an identifier be added to Standard & Poor's structured finance ratings?", Standard & Poor's, May 2008.

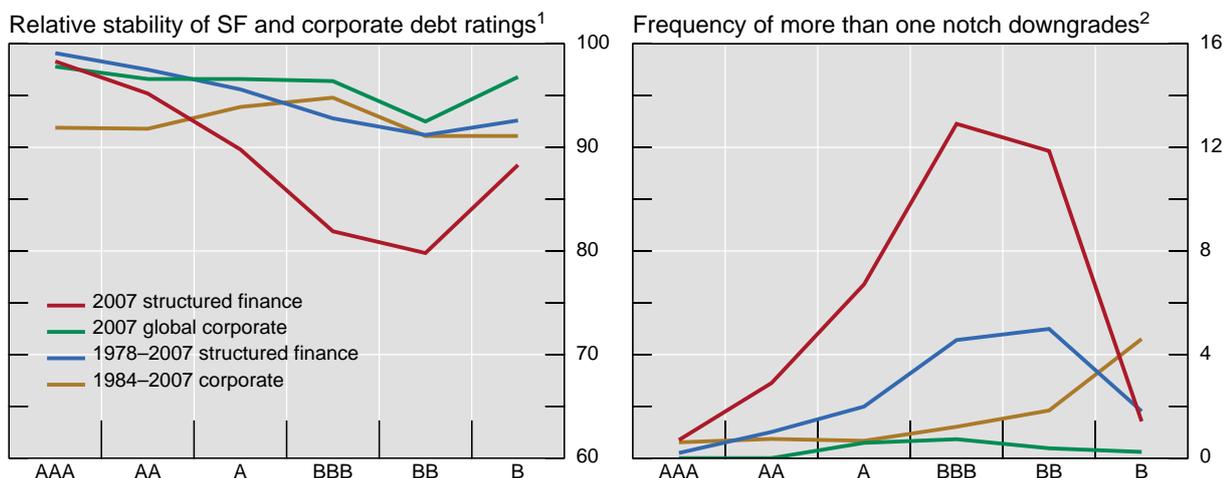
quality indicators for SF products. Section 4 draws some lessons, and Section 5 offers recommendations as to how the rating information on SF products could be improved. Section 6 summarises the private sector feedback on the recommendations, and Section 7 concludes.

## 2. Issues associated with rating SF transactions

During the second half of 2007, the deterioration in the performance of subprime loans in the United States resulted in a broad repricing of asset-backed securities (ABS) and collateralised debt obligations (CDOs), many of which were backed by subprime mortgages, and in a loss of confidence in SF products more generally. The ongoing repricing undercut investors' confidence in the ratings of existing SF products backed by subprime mortgages and, to a lesser degree, those backed by other assets. Indeed, rating revisions and frequency of multi-notch rating downgrades on SF products far exceeded those on corporate securities in 2007 (Graph 1).

Graph 1

### Rating migration characteristics of corporate and SF securities



<sup>1</sup> The percentage of ratings at the beginning of the period that are not subject to a downgrade during the year. <sup>2</sup> The percentage of ratings subject to a more than one notch downgrade during the year.

Source: S&P.

This section highlights the factors that are likely to have contributed to the poor rating performance of the US subprime mortgages included in pools of residential mortgage-backed securities (RMBS), and consequently those of SF products backed by them (see Annex 1 for a detailed discussion). In particular, the underlying risks associated with those mortgages were obscured, and the impact of resulting losses was amplified, through the re-securitisation of subprime RMBS in the form of CDOs of ABS. The complexity and underlying leverage of these instruments may not have been apparent to many investors who placed undue reliance on the ratings. The impact of the poor rating performance of SF products on other players whose business models are hard-wired to the credit ratings of SF instruments is discussed in Boxes 1 and 2.

### 2.1 CRAs underestimated the severity of the housing market downturn

The accuracy of SF credit ratings depends crucially on the precision of the CRAs' economic forecast. The pooling of assets reduces idiosyncratic risk, but increases exposure to systematic risk. Hence, losses in a mortgage pool are driven by changes in economic

conditions, and especially in house prices. In contrast, a corporate credit rating relies on the CRAs' assessment of the likelihood that a firm will default during neutral economic conditions (ie full employment at the national and industry level). If one were to fix the level of economic activity – for example at full employment and zero home price appreciation (HPA) – the level of losses in the RMBS pool is determined and, according to the model, the probability of default is either zero or one. It follows that the credit rating on an RMBS tranche is the agency's assessment that economic conditions will deteriorate to the point where losses on the underlying mortgage pool exceed the tranche's credit enhancement. However, the failure of CRAs to spot early enough a deterioration in underwriting standards (see Section 2.3) led to a significant underestimation of both the level and the correlation of defaults. As a result, it does not appear that the agencies fully anticipated the severity of the housing market downturn.

The observed performance of subprime loans, and the SF products including or referencing RMBS, is due in part to the occurrence of what was widely viewed by market participants as a low-probability economic event. In particular, a number of economists published academic studies documenting that much of the increase in home prices in 2000–03 could be explained by lower long-term interest rates and improvements in quality.<sup>3</sup> Historically, real estate markets in the United States were thought of as being local, and there had not been a nationwide decline in home prices since the 1930s.

Economic projections remain an important factor in subprime RMBS surveillance, and the CRAs have changed their outlook for the housing market dramatically over the last year. Broadly speaking, whereas in January 2007 they expected zero nationwide HPA during the housing market downturn, by July they had revised their expectation to price in declines of about 10% and by January 2008 to falls of 20%.

## 2.2 Limited historical data added to rating model risk

RMBS ratings rely more heavily on quantitative models while corporate debt ratings are more dependent on analyst judgment but a long historical record. In particular, corporate credit ratings require the separation of a firm's long-run condition and competitiveness from the business cycle, the evaluation of whether or not an industry downturn is cyclical or permanent, and an assessment about whether or not a firm could actually survive a prolonged transitory downturn. In contrast, RMBS credit ratings rely crucially on the ability of the rating agency to predict how the level of losses for a particular loan pool will respond to a number of different economic scenarios. Errors in the CRAs' model of the relationship between losses and economic conditions create an additional source of uncertainty in the performance of RMBS credit ratings.<sup>4</sup>

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<sup>3</sup> J McCarthy and R Peach, "Are home prices the next bubble?", *Economic Policy Review*, vol 10, no 3, December 2004; C Himmelberg, C Mayer and T Sinai, "Assessing high house prices: bubbles, fundamentals, and misperceptions", *Federal Reserve Bank of New York Staff Report No 218*, 2005.

<sup>4</sup> There is evidence that the relatively worse performance of the most recent vintages of subprime loans cannot be completely explained by economic conditions, suggesting the existence of model error. See, for example, Y Demyanyk and LO Van Hemert, "Understanding the subprime mortgage crisis", 2007, <http://ssrn.com/abstract=1020396>.

Box 1

**Monoline insurers<sup>5</sup>**

Monoline bond insurers' traditional business has been the provision of financial guarantees on municipal bonds. During the 1990s, they began to offer credit enhancements ("wraps"), in the form of credit derivatives to SF products (see Annex 2 for a discussion of financial guarantors' role in SF). For structures that are relatively complicated or opaque, certification of credit quality by a third-party guarantor is potentially useful to investors.

The major monolines have generally enjoyed AAA guarantee ratings, which is arguably essential to their competitive viability. Since the guarantee rating serves as a lower bound for the rating of any insured instrument, and the main investors in wrapped instruments are seeking assets of very high credit quality, a downgrade would eliminate most, if not all, the value of any wrap and thus threaten the business model of the monoline insurers. Downgrades could also trigger disruptions in the markets for municipal securities and structures, including variable rate demand obligations (VRDOs) and tender-option bonds (TOBs), as well as some asset-backed commercial paper conduits. Because of the liquidity support that banks supply to some of these structures, banks could potentially be required to bring a sizeable volume of assets, especially municipal securities, onto their books.

The sharp widening of subprime mortgage spreads beginning in mid-2007 and rising defaults have resulted in large charges against monolines' income and shareholders' equity as a consequence of their exposure to this market segment through wraps of SF tranches.<sup>6</sup> This led to a number of monoline bond insurers being downgraded by CRAs. These events highlighted the linkages between the ratings of a monoline and the rating of the SF products it has wrapped, as well as their common vulnerability to any CRA misjudgements in assessing the quality of the ABS collateral underlying subprime-backed SF products.

The lack of comprehensive historical data is likely to have added to model risk during the current turmoil. Historical data on US subprime loans are largely confined to a relatively benign economic environment, with very little data on periods of significant declines in house prices.<sup>7</sup> Given the importance of refinancing to the performance of subprime loans, and the inherent non-linearities in the payoff of the refinancing option, this could be an important source of model error as the limited historical data will provide inadequate information on the underlying risks. Fitch has recently noted that the increased "willingness of borrowers to simply walk away from mortgage debt has contributed to extraordinary levels of early default".<sup>8</sup> The lack of historical data arguably added to difficulties in correctly assessing correlations, and the degree of diversification achieved through a pooling of subprime loans. In particular, the assumption that geographical diversification exists turned out to be incorrect.

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<sup>5</sup> See CGFS report on "The role of ratings in structured finance", 2005, for a discussion of the financial stability risks associated with a monoline downgrade.

<sup>6</sup> For example, the book value of group-level shareholders' equity in Ambac fell by nearly 60% and that of MBIA by about 44% in the last quarter of 2007. This decline is not reflected, however, in the insurance companies' statutory claims-paying resources which are measured inclusive of loss reserves and impairment losses on credit derivatives.

<sup>7</sup> The shortcomings resulting from limited data history do not, however, imply a generally superior prediction power of models using long time series, as the performance and characteristics of underlying assets may not be static.

<sup>8</sup> Fitch, 31 January 2008, as quoted in <http://calculatedrisk.blogspot.com/2008/02/fitch-concerned-about-borrowers-walking.html>.

## Box 2

### Structured investment vehicles

Since August 2007, SIVs – entities with senior-subordinated structured liabilities investing in a range of assets of somewhat longer duration, and thereby generating income primarily from a maturity mismatch – have suffered from a seizing-up of the asset-backed commercial paper (ABCP) market, which was partly generated by investor uncertainty regarding the degree of SIV exposure to assets backed by US subprime mortgages. The inability of SIVs to roll over or issue new ABCP forced them to draw down their liquidity lines with banks and notwithstanding this also to liquidate assets. The value of assets under management by SIVs fell from \$400 billion in June 2007 to \$200 billion by mid-December 2007.

The business model and operations of SIVs are also highly dependent on CRA rating requirements and provide another example of “hard-wiring” (see Annex 3 for details). The funding problems faced by SIVs appear to be linked to the criteria imposed by CRAs in rating debt instruments issued by these vehicles. Changes in the market value of SIVs’ assets can lead to certain tests (liquidity and capital adequacy) being violated. These tests, which are intended to protect the interest of senior creditors, can lead to a pause in growth or a deleveraging through a run-off of assets and the repayment of senior creditors. However, recent events have shown that, when applied to a number of SIVs at the same time, these intended protections can create a downward spiral of asset price falls generating further rounds of deleveraging and asset sales that depress prices further still.

The recent experience of SIVs calls into question the ultimate viability of their business model. One view is that SIVs will not be able to survive in their current form and must transform themselves into non-structured vehicles such as ABCP conduits or into CDOs with less dependence on short-term funding and so exposure to rollover risk. A more sanguine view is that with lower leverage, enhanced liquidity backstops and asset-level transparency, the SIV model can survive. That said, even if this business model remains viable, it may be desirable to limit or proscribe the inclusion of structured finance assets in SIV portfolios, owing to both the implicit leverage and the valuation problems with these assets.

### 2.3 CRAs underestimated the originator risk factor

While there is typically diversification across borrowers within a mortgage pool, there is not similar diversification across originators, issuers or servicers. This leaves SF investors vulnerable to correlated risk, introducing additional risk factors which need to be addressed. In the case of RMBS, the performance of mortgage loans depends in part on the state of refinancing conditions. The level of interest rates, credit spreads, and the general level of underwriting standards each have important effects on the performance of mortgage loans.

Since all of the loans in a pool are serviced by the same firm, and are originated by at most a few firms, there is correlated risk across the loans related to servicer and/or originator quality. The CRAs have noted that servicer quality has a dramatic impact on the loss distribution, and publish servicer quality ratings in order to minimise this source of uncertainty.<sup>9</sup> However, the CRAs do not deal with differences in originator quality with the same amount of analytical rigour.

The July 2007 subprime RMBS downgrades were concentrated in the issues of four firms, suggesting that there were important unobserved differences in underwriting standards across originators. Some weakly capitalised originators may have taken advantage of transparent rating agency criteria, enabling borrowers to misrepresent occupancy, income,

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<sup>9</sup> Moody’s estimates that a servicer can increase or decrease the level of losses by 10%.

down payment source and/or property appraisals. A recent report by Fitch observes that, for a significant fraction of early payment defaults, there were clear signs of fraud in the loan files that were ignored in the underwriting process.<sup>10</sup> To deal with this problem, Moody's changed its surveillance criteria in October 2007, splitting originators into three tiers, with loss expectations increasing significantly from the highest to the lowest tier.

### **3. Industry views on the recent performance of rating agencies in SF markets**

This section draws on views expressed by market participants during the London workshop and bilateral interviews conducted by a number of central banks with actual or potential non-bank users of CRA ratings.<sup>11</sup>

Overall, the importance of SF in the investment portfolios of our contacts varied greatly, as did apparent reliance on CRA ratings. Although it would be unrealistic to expect investors who had relied solely or extensively on CRA assessments to reveal themselves, some contacts hinted that they had suffered losses on structured debt and some were critical of the performance of the CRAs. However, while the CRAs were criticised for technical failings and inadequate resources, the need to repair their reputation was seen as a powerful force for improvements in their practices.<sup>12</sup> Participants at the London workshop as well as those interviewed during bilateral meetings were generally reluctant to blame the CRAs for not foreseeing the wider implications of the subprime crisis, often noting that the CRAs' recent shortcomings in risk evaluation were widely shared among market participants.

#### **3.1 Use of ratings as a tool for framing mandates and allocating investments is widespread**

As a tool for framing mandates for summarising risk appetite and for investment allocation, and as a device for addressing potential principal agent problems between owners of assets (or their trustees) and investment managers, the use of a ratings structure appears to be universal.<sup>13</sup> As a summary measure of credit quality, ratings are also important in the choice of market indices against which a manager's performance is judged. Some investors said they appreciated that a AAA rating of an SF security differed from that of a corporate or sovereign bond because of some very different risk characteristics arising from greater exposure to systematic risk factors. However, it is unclear from our limited sample whether this view is widely held.

Investors were asked how soon they would be required to sell or reduce their exposure to a security that had been downgraded according to their mandate. While reaction times would

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<sup>10</sup> Fitch, "The impact of poor underwriting practices and fraud in subprime RMBS performance," *US Residential Mortgage Special Report*, 28 November 2007.

<sup>11</sup> Bilateral interviews with investors in SF products were conducted by the Bank of England, Bank of France, Federal Reserve Bank of New York and the Riksbank.

<sup>12</sup> In February, Moody's reported a drop of 40% in its revenue from structured finance in the last quarter of 2007 and warned of an overall fall in earnings in 2008.

<sup>13</sup> A recent survey by Cantor et al shows that the use of credit ratings information is widespread among both plan sponsors and fund managers. See R Cantor, O ap Gwilym and S Thomas, "The use of credit ratings in investment management in the US and Europe", *The Journal of Fixed Income*, Fall 2007, pp 13–26.

depend on the size of the downgrade, some managers said they were given some leeway in order to avoid bunching sales into a falling market.

### **3.2 Amongst investment managers, CRA ratings tend to be a starting point in deciding to invest in a structured finance security**

All investment managers interviewed stated that CRA ratings were not the decisive factor in choosing an investment in a structured security. However, a CRA rating was important in initially narrowing the field of choice in order to meet a given investment objective. The potential securities meeting a given minimum CRA rating would then be subject to further analysis.

From the perspective of issuers, a credit rating was not seen as essential in selling SF products to some investors (with superior credit risk assessment capability) such as large hedge funds or pension fund managers. The issuance of SF products tends to be linked to perceived investor risk appetite and internal hedging decisions, and much is privately placed without a rating. However, ratings remained an important requirement in marketing SF products to a broader investor base.

In choosing an SF security, some investors said they would distinguish securitisations which were part of an issuer's well established funding strategy from more opportunistic arbitrage deals. They would then model and stress cash flows and subject the legal documentation to close scrutiny. Whether an issuer showed a commitment to the deal through a retained equity interest was also cited as an important criterion, although the originator's ability subsequently to offset this risk through hedging was seen to limit its usefulness.

### **3.3 Investment managers' technical criticisms of the CRAs**

CRAs were criticised for their over-reliance on geographical dispersion as a way of reducing concentration risk. This had led to the underestimation of the risk of correlated defaults because it ignored commonly applied lending standards within pools, and attached too little weight to common vulnerabilities, such as to interest rates and house prices. Some said that the agencies appeared to have been slow in recognising a common slide in mortgage underwriting standards in the United States.

There was a more general criticism that the CRAs had failed to devote sufficient resources to monitoring the post-issuance performance of deals, and had placed excessive reliance in their methodologies on historical data that were not strictly applicable (eg applying the experience of home equity lending in the 1990s to subprime). It was contended that some structures that were highly sensitive to market risk, for example constant proportion debt obligations (CPDOs), had been insufficiently stress-tested and that the rating of SIVs had failed to take account of growing asset concentrations and the system-wide risk from fire sales by several SIVs simultaneously.

Despite these criticisms, contacts conceded that market participants generally had also been late to appreciate the deterioration in credit quality, or the likelihood that subprime problems would be the catalyst for such widespread illiquidity.

### **3.4 Awareness of the limitations of ratings and the business pressures on CRAs seemed generally high**

Contacts generally seemed well aware of the potential conflicts of interest in the "issuer pays" ratings model, but none could see any practical alternative to it, although it was acknowledged that it may provide insufficient incentives for effective post-deal monitoring. It was felt that the use of ratings in regulatory frameworks had underpinned the CRAs' status and revenues and warranted further review. There was a range of views on whether these

factors had affected the quality of ratings. CRA interaction with originators or CDO sponsors was not generally viewed as “advice”, as distinct from a clarification of the CRAs’ minimum criteria for a particular rating.

Nevertheless, some contacts felt that in order to earn the higher fees from more complex deals, CRAs appeared on occasions to have compromised their standards. The ratings of CPDOs and BBB tranche subprime resecuritisations were cited as examples in which the CRAs had overreached themselves in order to capture fees, raising concerns about the alignment of incentives and possible conflicts of interest. But there were mixed views as to whether competition would raise standards or result in a “race to the bottom”.

The CRAs were widely criticised for failing to keep pace with demand for SF products and there was a feeling that this had led to corner-cutting and a lowering of standards, particularly in post-issuance monitoring and in the failure to adjust the ratings of extant securities following changes in CRA models or their assumptions. Given the high margins the CRAs had obtained in recent years, contacts pointed to their culpability. Nevertheless, there was also some sympathy amongst contacts for the difficulties the CRAs faced. They frequently lost staff to the investment banks (the training in credit assessment provided by the agencies is valued by prospective employers elsewhere in the financial sector) so experience levels were perceived to have fallen.

There was a widely held view that the reputation of the CRAs, and in particular the “gold standard” AAA, had been seriously devalued by recent events (and far more so than by the Asian crisis in 1997). Nevertheless, most contacts believed that the agencies were taking measures to redeem their position – albeit belatedly. Contacts were silent on the need for regulation,<sup>14</sup> but were supportive of investor-driven improvements in the type and clarity of the information the CRAs provided.

It is recognised that improvements in the rating process for SF securities, including more effective post-deal monitoring, are not costless. Higher fees charged to issuers could aggravate the potential conflict of interest that arises from the “issuer pays” model, emphasising the need for CRAs to have effective and transparent processes to handle these.

### **3.5 Views on alternative and complementary rating criteria for structured products**

Participants in the London workshop discussed alternative forms of information, such as rating volatility, that rating agencies could provide to improve investors’ risk assessment of SF products, and indeed of rated products more broadly.<sup>15</sup> While many felt that such measures could enhance investor understanding of the risks in SF instruments, others questioned whether investors with limited risk management support would fully appreciate their significance. However, there was broad agreement among workshop participants on supporting proposals for new measures of the sensitivity of SF product ratings to certain risk factors.

Several investors subscribed to the view that rating agencies need to be more transparent on the macroeconomic assumptions underlying their rating assessments and how their ratings are likely to change under alternative macro scenarios. There was a view that the rating stability analyses published by rating agencies were too backward-looking, and that a more

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<sup>14</sup> Initiatives on this issue are being taken by IOSCO and CESR.

<sup>15</sup> Indicators such as rating volatility are likely to provide useful information on the rating risk of other rated products, and hence, need not be restricted only to SF products.

forward-looking analysis might be useful. Nonetheless, it was stressed that this information needed to be more effectively conveyed to be useful.

Participants also discussed the usefulness of introducing alternative rating scales for SF products so as to differentiate them from other market segments. Views on this differed. A number felt that alternative rating scales would be useful, particularly as their introduction would force fund managers and trustees to revise overly simplistic investment mandates. Others observed that some investors would inevitably resort to remapping alternative rating scales to more traditional ratings, either for risk assessment or for price discovery purposes. One rating agency remarked that a separate rating scale it had introduced for banks is being monitored by a narrow investor base, but is seldom used by investment management and risk management professionals.

## 4. Lessons

### 4.1 Credit rating information should support, not replace, investor due diligence

Recent events have shown that many investors failed to incorporate adequately the risk characteristics of SF securities into their portfolio allocation and risk management systems. Several factors probably contributed to this failure, including a “search for yield” in an environment where credit spreads were being progressively squeezed, combined with a lack of experience with, and understanding of, the risk characteristics of structured credit products.

That said, credit ratings on SF products have played an important role in portfolio allocation and risk management processes. Some investors whose investment mandates and asset preferences are significantly governed by minimum external rating requirements have been attracted to highly rated SF securities. In part, this has happened because such securities, given their apparently well diversified collateral and perceived low default risk, appeared to offer better value than highly rated corporate or sovereign bonds, or non-structured, pass-through securitisations. Investors with relatively long holding periods were also attracted by high spreads, which they may have assessed as reflecting liquidity rather than credit risk given the high CRA ratings attached to the securities. And many investors have probably read far more into ratings than the CRAs have ever claimed for them.

It is also important to emphasise that the dominant investor in recent vintages of subprime RMBS has been ABS CDOs (Box 3). While many relatively sophisticated investors (eg issuing banks and financial guarantors who retained the super-senior tranche) are unlikely to have relied on CRAs to assess the risk of CDO *tranches*, they appear, nonetheless, to have relied on them to assess the risk of the underlying RMBS *collateral*.<sup>16</sup> To this end, the necessary changes in risk management are not limited to relatively unsophisticated investors learning how to manage new risks; they also include relatively sophisticated risk managers.

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<sup>16</sup> A major issuer suggested that the only investors to rely excessively on ABS CDO credit ratings were those who purchased the funded AAA tranche. It was alleged that these tranches were purchased largely by non-US institutions. Mezzanine tranches were typically placed in CDO-squared transactions while equity tranches were held by hedge funds.

### Box 3

#### Growth of ABS CDOs

Until 1997, the vast majority of subprime RMBS used bond insurance as credit enhancement. The bond insurers' willingness to say no was an important check on the riskiness of loans that originators could make. In mid-1997, issuers started to use subordination as a source of credit enhancement, targeting sophisticated real estate investors. From 1997 to 2003, half of deals used bond insurance and the other half used subordination as credit enhancement.

However, starting in 2004, structured finance assets became the dominant asset in arbitrage CDOs. The surging demand for these assets helped push spreads down, so much so that the bond insurers and real estate investors were priced out of the market. A recent note by Adelson and Jacob (2008) argues that this was the key event that changed the market fundamentally.<sup>17</sup> CDOs were willing to accept loans that traditional investors would not have accepted, and originators began originating riskier loans. This permitted more aggressive underwriting of subprime RMBS pools, as these investors were not conducting due diligence on originators to the same extent as the traditional investors in these pools.

There is additional support for these points in the recent stress test of the financial guarantors completed by Standard & Poor's.<sup>18</sup> In particular, the CRAs' loss projections on ABS bonds wrapped by each monoline were strikingly lower than on ABS bonds underlying ABS CDO transactions. These differences point to the monolines' ability to avoid direct exposures to transactions with aggressive underwriting. That said, these firms did end up with large super-senior exposures to high-grade ABS CDOs which were secured by highly rated but weakly underwritten RMBS collateral. One can see a similar pattern in the exposures of banks which issue ABS CDOs. While these institutions typically had very little exposure to weakly underwritten RMBS, they ended up with significant exposure through retained super-senior tranches of ABS CDOs. This pattern suggests weaknesses in the risk management of complex trading book positions like hybrid ABS CDOs, which relied excessively on the CRAs' view of the underlying collateral.

The responsibility of investors for risk assessment and stress testing of any investment product must be strengthened going forward. In particular, trustees of investment funds and investment managers should review their internal procedures and guidelines concerning how ratings information on SF products is used in their investment mandates and decisions. At the same time, rating information is likely to remain a key input to asset allocation and risk management processes. Moreover, credit ratings also serve as an input for determining banks' regulatory capital under the Basel II framework, as well in other areas of non-bank financial regulation. In fact, many of the investors with exposures to structured finance securities have been supervised institutions, and some of the largest losses have been sustained by firms active in the design and marketing of these structures.

Against this background, we expect the CRAs to continue to play an important role by conveying rating information in a way that supports risk analysis and investor due diligence. It is apparent from the responses of the CRAs to recent criticism that they recognise that more should have been done to alert users to the limitations of their rating models and their own scrutiny of the quality of underlying asset pools, as well as the sensitivity of their ratings to any divergence from the key central assumptions upon which their analysis rested. Against this backdrop, while it is important for public authorities to identify clearly areas where improvement is needed and to suggest alternatives as to how such improvement could be achieved, the group believes that it is the responsibility of CRAs and users of

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<sup>17</sup> M Adelson and D Jacob, "The sub-prime problem: causes and lessons", 8 January 2008, [http://www.adelsonandjacob.com/pubs/Sub-prime\\_Problem-Causes\\_&\\_Lessons.pdf](http://www.adelsonandjacob.com/pubs/Sub-prime_Problem-Causes_&_Lessons.pdf).

<sup>18</sup> Standard & Poor's, "Detailed results of subprime stress test of financial guarantors", 25 February 2008.

ratings to collaborate on developing specific solutions. The consultation processes initiated by various CRAs and industry organisations serve this purpose.

#### **4.2 CRAs should enhance the information underlying SF ratings**

CRAs do already provide a large amount of information on SF products. Currently CRAs provide a view on an SF transaction, in the form of a “pre-sale” report which includes indicative tranche ratings. The models on which their ratings are based are available to investors, along with defaults and transition studies. Once a deal has been completed, CRAs process information from the trustee report in standardised format (like other private vendors) and show the remaining level of the credit enhancement. However, such post-deal monitoring, including the processing of trustee reports, has not always been timely.

Information provided by CRAs should be presented in a way that facilitates comparisons of risk within and across classes of different SF products. For instance, standardisation of pre-sale and post-sale performance reports would support monitoring. This would apply particularly to resecuritisation products, where relatively little performance information is currently provided. Information should be provided on the timing and completion of post-issuance reviews by CRAs, and whether an existing rating has been reassessed in the light of changes to modelling assumptions. Finally, more user-friendly access to CRA SF models and their documentation should be provided.

The Group recognises that responsibility for improving the transparency of SF markets does not, of course, rest solely with the CRAs. At present, the initial information provided by issuers is often regulated, as it supports the sale of the products. Public data on collateral pool asset performance are very fragmented among a large number of commercial data vendors who specialise in different asset classes, and none is able to provide market-wide data. Competitiveness concerns are usually the reason put forward by sponsors to explain these shortcomings. However, in the changed market conditions this reticence may disappear.

#### **4.3 Better information on key risk factors of SF ratings is needed**

The massive rating downgrades in 2007 dramatically illustrated the risk properties of SF instruments that arise from the tranching of claims against an underlying portfolio of collateral assets. These differences manifest themselves in the stability characteristics of ratings. Over a long period and at an aggregate level, highly rated SF securities have shown greater ratings stability than corporate bonds. This long-run historical experience is reflected in the lower risk to highly rated SF securities of a single-notch downgrade, but this disguises the higher risk of multi-notch downgrades that can follow a more pessimistic reappraisal of the prospective performance of the underlying collateral. Usually this risk will be small, but where projected losses on the pool are subject to a significant adverse and correlated change, sharp downgrades can ensue (Graph 1).

CRAs should provide more information about their assumptions on the key risk factors that influence ratings of SF securities. These include:

- *Model risk.* CRAs should document the sensitivity of SF tranche ratings to changes in their central assumptions regarding default rates, recovery rates and correlations. Limitations to the historical data on underlying pools, for instance if they cover only a short time period, apply only to similar rather than identical contracts, or where the characteristics of underlying assets have changed significantly, should be clearly disclosed as a risk to the rating, as should any adjustment made to mitigate this risk. CRAs should give greater emphasis to stress tests by providing such analysis in their publications or by facilitating “what if?” scenario analysis by users.

- *Macroeconomic forecast error.* CRAs should clearly and regularly disclose to investors their economic assumptions underlying the rating of SF products, and document how they expect each rated tranche of a structured finance transaction to perform under different economic scenarios. CRAs should document the type of scenario that would lead to a severe impairment of a tranche. Related to the above, CRAs could indicate the extent to which ratings based on historical default experience have been modified by their assumptions about the macroeconomic outlook.
- *Other risk factors.* The rating agencies should take effective steps to ensure that information from issuers and originators is trustworthy, and monitor more intensively the performance of the various agents in the securitisation process. One key practical proposal would be that the agencies should rate mortgage originators, as they do servicers. The rating would focus on reducing uncertainty created by the originator risk factor. Hence, it might look at factors such as underwriting standards rather than the originator's debt.

#### **4.4 CRAs should take system-wide risk into account**

CRAs should periodically consider the wider systemic implications of a rapid growth of similar instruments or vehicles, or of new business undertaken by existing vehicles, for the continued robustness of their original ratings criteria. Such growth may lead to a concentration of market and other risks that may not have been anticipated at the time the CRA's minimum requirements were formulated. As illustrated by the recent experience of SIVs, the consequences of exposure to a common shock can be amplified when several vehicles sharing common ratings rules are simultaneously affected. This is particularly the case when market-based triggers are incorporated in the rating.

Such a review, perhaps conducted on an annual basis (and made available to investors), may lead to a tightening of ratings criteria and possibly to downgrades if existing structures are unable to adapt quickly. Moreover, anticipatory adjustments, if carried out in calmer times, are likely to be less disruptive to financial markets.

Among other issues, this raises the question of the potential system-wide implications of rating structured products and vehicles, whose ratings themselves are sensitive to market value changes and/or to the ratings of their collateral assets. Similar effects may arise from ratings being embedded in financial regulation. The CGFS is considering investigating the potential system-wide implications of such "hard-wiring" of ratings as follow-up work to this report.

#### **4.5 SF ratings should more clearly be differentiated from single-name credit ratings**

Considering ways to distinguish clearly between the rating information on structured and other securities appears important for certain groups of investors. In the course of rating SF instruments, CRAs collect and process large amounts of information, much of which might be useful to investors who devote substantial resources to risk assessment and management. These users may well communicate with CRAs on their own initiative to solicit additional information. However, ratings are extensively used, and will continue to be used, as rough standalone measures of overall credit risk by a number of participants: investors who have limited access to analytical resources; private "principals" (such as pension fund trustees) that wish to provide straightforward and easily verifiable risk guidelines to managers to whom they have delegated investment decisions; and public regulators.

Several options are available for incorporating different risk characteristics into the ratings framework, which can be broadly classified under one-, two- or multi-dimensional measures

of risk (Table 1). For example, lower ratings can be assigned to structures with high model uncertainty, a practice referred to as notching, than might otherwise be warranted by the central (but highly uncertain) estimates of key parameters such as correlation, default probabilities and recovery rates. Alternatively, different loss characteristics of SF instruments could also be conveyed using a separate rating scale.

Table 1  
**Options for differentiating SF and single-name borrower ratings<sup>1</sup>**

	Example	Concept	Analytical requirements
<b>One-dimensional measures</b>			
Notching	SF product is rated A instead of AAA	Applying lower rating to capture greater tail risk or model risk	High. Estimate of full loss distribution required
Separate rating scale	1,2,3 instead of AAA, AA, A	Information on unexpected losses of SF is embedded in new rating scale <sup>2</sup>	High. <sup>2</sup> Estimate of full loss distribution required. Subject to model risk, short data history etc
Fixed asset class suffix	AAA.sf instead of AAA	Suffix added to existing rating indicates different loss characteristics of asset class	Relatively low. Need to identify SF asset class
<b>Two-dimensional measures</b>			
Simple risk suffix	AAA.h, AAA.c, AAA.nr instead of AAA	Suffix indicates whether risk of downgrade of SF instrument is higher (h) or comparable (c) to single-name products, or whether risk cannot be rated (nr), in the case of new instruments with high model uncertainty	Medium. Requires understanding of broad risk categories
Ordinal risk suffix	AAA.v1, AAA.v2, etc	Information on unexpected loss (volatility) or measure of tail risk (eg on multi-notch transitions)	High. Estimate of full loss distribution required. Subject to model risk, short data history etc
Rating confidence suffix (could be combined with risk suffix or shown separately)	AAA.c1, AAA.c2, etc	Information on uncertainty resulting from model risk (including parameter uncertainty, confidence about quality of input information, etc)	Medium to high, depending on granularity of confidence suffix
<b>Multidimensional measures</b>	AAA.v1.c1.q1, AAA.v2.c3.q1, etc	Information on a number of risk measures, such as, volatility, rating confidence, and quality of input parameters in the model	High. Estimate of full loss distribution required

<sup>1</sup> Simplified exposition.

<sup>2</sup> Assumes that the separate rating scale would incorporate information on the credit loss distribution of SF instruments, say unexpected loss, in addition to the information contained in the existing rating when calibrating the SF rating scale. Otherwise, the separate rating scale would just be a change in nomenclature, and essentially not different from an asset class suffix.

Table 2

**Effectiveness of SF rating risk indicators in meeting different objectives<sup>1</sup>**

	<b>Would indicator trigger a review of investment mandates?</b>	<b>Would indicator clearly convey information on rating risk?</b>	<b>Would indicator reduce risk-taking by uninformed investors?</b>	<b>Would indicator allow comparison of rating risk across SF instruments?</b>
<b>One-dimensional measures</b>				
Notching	Unlikely	No	Investors should be discouraged by lower spreads for stated rating	Not explicitly
Separate rating scale	Yes. Investors would be forced to re-write mandates	No. No distinction between rating and risk	Perhaps. Investors might map SF scale into old scale. But changes in investment guidelines might affect risk-taking	Yes, at least implicitly <sup>2</sup>
Fixed asset class suffix	Perhaps. Investors might ignore suffix	No. Only general indication that asset class is different	Perhaps	No. Risk differences across SF assets would not be captured
<b>Two-dimensional measures</b>				
Simple risk suffix	More likely than for asset class suffix as investors will be alerted to risk levels	Yes, in broad relative terms	More likely, depending on adjustments made to investment guidelines	Only in a relatively simplistic way
Ordinal risk suffix	More likely than for asset class suffix as investors will be alerted to risk levels	Yes	More likely, depending on adjustments made to investment guidelines	Yes
Rating confidence suffix	More likely than for asset class suffix as investors will be alerted to risk levels	Yes, depending on the granularity of confidence scale	More likely, depending on adjustments made to investment guidelines	Yes, depending on granularity of confidence scale
<b>Multi-dimensional measures</b>	Likely	Yes, but clarity might suffer with additional dimensions	Likely, depending on adjustments made to investment guidelines	Yes

<sup>1</sup> Simplified exposition. Assumes that ratings depend on the methodology used to calculate risk indicators. For instance, volatility measures can be based on models or on historical data.

<sup>2</sup> Assuming that the separate rating scale will incorporate information on dispersion of the credit loss distribution of SF instruments (see footnote 2 of Table 1).

Adding a second dimension to existing rating scales would draw investors' attention to differences in risk characteristics between single-name and SF ratings more explicitly. This second dimension can be used to convey information on the risk of large rating changes or on the dispersion of the credit loss distribution of SF products. A number of options are available. These include: a simple risk suffix that captures heightened risk relative to single-name products; an ordinal measure of rating risk, perhaps calibrated to the unexpected loss (or volatility) of the credit loss distribution; and a rating confidence indicator to convey increased model risk or parameter uncertainty that can influence rating outcomes strongly. Finally, different risk indicators could be combined in a multidimensional scale.

Each of the above indicators of risk will vary in terms of their effectiveness in achieving the objectives of strengthening investors' due diligence process and in raising their awareness of differences in risk characteristics across debt instruments (Table 2). For instance, notching might discourage investors with limited risk management capabilities from buying products with greater complexity and model risk because credit spreads will be less attractive for the stated credit rating. However, the lower rating would not in itself explicitly signal the different risk characteristics of SF products, and might therefore not alert investors to the need to review risk management systems or to reconsider investment mandates that permit investments in such securities. A separate rating scale for SF products would provide a stronger signalling effect. There is, of course, some risk that investors would simply map the SF rating scale into the single-name rating scale, possibly ignoring the key difference in the likelihood of multi-notch downgrades that the separate scale might be meant to convey.

The advantage of two-dimensional and multidimensional ratings, as mentioned earlier, is that they would explicitly convey information on rating risk and, depending on the granularity of the risk indicator, allow for the riskiness of SF assets to be compared. However, as two-dimensional ratings would be an addition to the existing rating nomenclature, there is a risk that investors might ignore them. Hence, the strength of the signalling effect would very much depend on how regulators take account of the additional rating dimensions.

## 5. Recommendations

1. Investment fund trustees and managers should review their internal procedures and guidelines concerning how ratings information on SF products is used in their investment mandates and decisions.
2. ***Rating reports should be presented in a way that facilitates comparisons of risk within and across classes of different SF products.*** For instance, pre-sale and post-sale performance reports should be standardised. This would particularly be important for resecuritisation products, where relatively little performance information is currently provided.
3. ***Rating agencies should provide clearer information on the frequency of rating updates.*** For instance, CRAs should disclose the timing and completion of post-issuance reviews by CRAs, and disclose whether an existing rating has been reassessed in the light of changes to modelling assumptions.
4. ***More user-friendly access to CRA SF models and their documentation should be provided. Rating models made available by CRAs should facilitate the conducting of "what if?" analysis or stress tests by users on key model parameters.*** For example, what would happen to ratings if default rates on the underlying assets doubled?
5. ***CRAs should document the sensitivity of SF tranche ratings to changes in their central assumptions regarding default rates, recovery rates and***

**correlations.** For instance, how would ratings of different tranches change if the recovery rate assumption were altered?

6. ***CRAs should clearly and regularly disclose to investors their economic assumptions underlying the rating of SF products.*** This includes documenting how they expect each rated tranche of an SF transaction to perform under different economic scenarios, as well as the type of scenario that would lead to severe impairment of a tranche. CRAs could also indicate the extent to which ratings based on historical default experience have been modified by their assumptions about the macroeconomic outlook.
7. ***Limited historical data on underlying asset pools should be clearly disclosed as adding to model risk, as should any adjustment made to mitigate this risk.*** For instance, CRAs should state in reports that they cannot attach the same degree of confidence to the quality and stability of the product's rating as would be the case with more established products.
8. ***CRAs should monitor more intensively the performance of the various agents involved in the securitisation process,*** particularly where potential incentive misalignments and poor quality data inputs can undermine the presumed quality of the underlying assets. One key practical proposal would be that the agencies should assign ratings to mortgage originators' loan approval processes and controls.
9. ***CRAs should periodically consider the wider systemic implications of a rapid growth of similar instruments or vehicles, or of new business undertaken by existing vehicles, for the continued robustness of their original ratings criteria.***
10. ***CRAs should consider how to incorporate additional information on the risk properties of SF products into the rating framework.*** CRAs should, in the next few months, explore with market participants and regulators ways to indicate rating risk for SF instruments in a summary form. For instance, could a simple rating risk suffix, stating rating volatility or uncertainty, increase investor risk awareness without further increasing reliance on ratings? CRAs should provide an analysis of the reliability with which risk suffixes could be calculated. Regulators will also need to consider how additional dimensions of rating risk could be taken into account in determining regulatory capital.

## 6. Private sector responses

The consultation process involved dialogue with investors in SF products, industry associations and all major credit rating agencies. Thirteen respondents, primarily CRAs and large institutional investors, provided feedback on the consultative document with specific reference to the list of recommendations given above to address weaknesses in the rating of SF products. Although the responses comprise substantial feedback from the professional money managers who are the most intensive users of CRA analysis, it does not appear that the consultative process has elicited the views of small investors or of customers of professional money managers who may use credit ratings as rough gauges of the riskiness of a debt portfolio. A summary of the private sector responses to each of the recommendations is given below.

1. ***Investment fund trustees and managers should review their internal procedures and guidelines concerning how ratings information on SF products is used in their investment mandates and decisions.***

There was broad support for this recommendation among the respondents. Investors noted that ratings should be used to support but not to replace internal due

diligence needed in their investment decision process. CRAs, for their part, proposed to continue their efforts to educate investors about the meaning of ratings and their limitations.

2. ***Rating reports should be presented in a way that facilitates comparisons of risk within and across classes of different SF products.***

CRAs questioned the usefulness of standardisation of rating reports, contending that the credit risks associated with different asset classes are diverse and do not necessarily lend themselves to easy comparison. That said, they shared the view that providing standardised reports on stress testing, at least for a given product type, is likely to enhance comparison of risks among SF products. Investors were more supportive of the recommendation that rating reports should facilitate comparison of risks within and across asset classes. They also supported the recommendation that pre-sale and post-sale performance reports should be standardised.

3. ***Rating agencies should provide clearer information on the frequency of rating updates.***

There was broad agreement among investors and CRAs that including a brief rationale for rating updates in surveillance reports would be helpful and would improve transparency. However, CRAs felt that the requirement to provide rating updates on SF products at regular prespecified intervals would be counterproductive as it might have the unintended effect of overburdening the market with potentially redundant information.

4. ***More user-friendly access to CRA SF models and their documentation should be provided. Rating models made available by CRAs should facilitate the conducting of “what if?” analysis or stress tests by users on key model parameters.***

There was a broad consensus among all respondents regarding the usefulness of providing user-friendly modelling tools to conduct scenario analysis, and to assess the ratings and credit support implications of changes to assumptions on key risk factors.

5. ***CRAs should document the sensitivity of SF tranche ratings to changes in their central assumptions regarding default rates, recovery rates and correlations.***

The importance of documenting the sensitivity of SF tranche ratings to changes in the key model parameters was supported by investors and CRAs. Rating agencies indicated plans to include break-even sensitivity analysis and to provide additional detail on how the impact of changes to principal risk factors might affect the assessment of credit risk and ratings.

6. ***CRAs should clearly and regularly disclose to investors their economic assumptions underlying the rating of SF products.***

CRAs concurred with this recommendation and the need to make more transparent the economic assumptions embedded in their rating criteria. While noting that what investors were seeking is enhanced transparency about the content of their ratings, rather than simply an increase in the volume of information that is provided, CRAs indicated that pre-sale reports could be enhanced by providing supplementary break-even sensitivity analysis.

7. ***Limited historical data on underlying asset pools should be clearly disclosed as adding to model risk, as should any adjustment made to mitigate this risk.***

CRAs disagreed with the view that a lack of sufficient historical data may impair credit assessment of SF products, arguing that structural breaks might also render historical data less useful in some circumstances. Specifically, CRAs were of the opinion that while an examination of the historical data informs expectations about future performance, their credit assessments are not confined to a retrospective analysis of the asset class. Investors, however, tended to concur with this recommendation and indicated that they should be able to identify and understand the rationale for the attachment levels of the ratings and trigger points from one level to another, such as from AAA to AA.

8. ***CRAs should monitor more intensively the performance of the various agents involved in the securitisation process.***

While noting that this recommendation would be valuable from an investor perspective, one industry association noted that this recommendation appears ambitious in practical terms. CRAs felt that the underwriting of most securities is a regulated activity and that information from the originators is subject to the appropriate regulatory standards. Notwithstanding this, CRAs indicated that efforts are under way to collect more information about the processes used by issuers and originators to assess the accuracy and integrity of their data and fraud prevention measures. Investors generally welcomed this recommendation.

9. ***CRAs should periodically consider the wider systemic implications of a rapid growth of similar instruments or vehicles, or of new business undertaken by existing vehicles, for the continued robustness of their original ratings criteria.***

Opinions on this recommendation varied. One industry association felt that this recommendation should be embedded in a wider process of ratings monitoring where the more general macroeconomic environment is factored into the analysis in addition to product-specific issues. Some investors felt that while systemic risk is difficult to address for private institutions, more efforts should be directed towards avoiding conflicts of interest between issuers and CRAs. CRAs drew attention to the fact that they will not be in a position to manage their rating systems to eliminate the incidence of financial market “bubbles”.

10. ***CRAs should consider how to incorporate additional information on the risk properties of SF products into the rating framework.<sup>19</sup>***

With respect to the question of how the rating risk of SF products can be better captured or differentiated from that of plain vanilla credit instruments, one view expressed by some institutional investors and CRAs was that alternative rating scales for SF products may be costly and could create confusion among users of rating information. The respondents were supportive of retaining existing rating scales and favoured the continued use of expected loss or probability of default as a key input for the decision on a products' credit rating.

At the same time, the provision of more information and of additional indicators that captures rating risk was supported by both investors and CRAs themselves. In particular, including a separate rating volatility indicator was considered to improve the information available to investors and to distinguish risks across different credit instruments. Moreover, investors favoured enhancements to the analysis and

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<sup>19</sup> IOSCO has recommended that CRAs should differentiate ratings of SF products from those of traditional corporate bond ratings, preferably through a different rating symbology. See item 3.5b in “Code of conduct fundamentals for credit rating agencies”, IOSCO, May 2008.

transparency of SF ratings, including improved disclosure of information on the key qualitative and quantitative criteria used in the ratings process.

CRAs indicated that they are exploring several indicators to convey additional dimensions to rating risk. These include summary risk indicators for rating volatility, recovery rate, correlation between various assets in the collateral pool, and liquidity of the SF instrument. A separate presentation of such summary risk indicators was preferred to adding suffixes to existing ratings as this would help to distinguish more clearly default risk from other sources of rating risk.

After the completion of the consultation process, one of the CRAs has now publicly announced that it proposes to retain existing rating scales for SF products but will provide in addition volatility scores and loss sensitivities for SF securities.<sup>20</sup> The volatility score is intended to draw attention to the uncertainty around the assumptions and the modelling that underlie the ratings, while loss sensitivities quantify how changes in collateral pool loss expectations affect ratings.

## **7. Follow-up work**

The Study Group is considering further consultations with CRAs in order to follow up the specific actions they have taken to improve the rating information on SF products, and how they are responding to the recommendations made in this report. The follow-up work will also focus on gathering investors' experience in using additional rating indicators on SF products that some CRAs have indicated they will publish.

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<sup>20</sup> See, "Introducing assumption volatility scores and loss sensitivities for structured finance securities", *Moody's Global Credit Policy*, May 2008.

## **Annex 1: US subprime mortgages**

We review here the differences between subprime residential mortgage-backed security (RMBS) credit ratings and corporate credit ratings, and explore the main reasons why subprime credit rating performance has been so poor.<sup>21</sup>

### **A.1.1 Subprime and corporate ratings are different**

When a firm becomes distressed, it has the option to change its investment strategy or inject more capital. As long as a firm is deemed to be creditworthy during neutral economic conditions, one might expect that the firm could take prompt corrective action in order to avoid defaulting on its debt during a transitory decline in aggregate or industry conditions. This is, in fact, what corporate credit ratings attempt to measure. However, the pool of mortgages underlying an RMBS is typically fixed, and investors do not expect an issuer to support a weakly performing deal. The static nature of the underlying pool combined with the fast prepayment speeds of subprime mortgages leaves the performance of subprime RMBS highly vulnerable to the path of future economic conditions.

This difference is important because corporate bond (obligor) ratings are largely based on firm-specific risk characteristics, and reflect idiosyncratic risk. However, RMBS deals are typically secured by a portfolio large enough that much of the idiosyncratic risk is diversified away, leaving largely exposure to systematic risk factors. In contrast, a substantial amount of idiosyncratic risk may remain in transactions with smaller asset pools, for instance CDOs.<sup>22</sup>

With this background, we discuss the main reasons why the subprime RMBS model has performed so poorly.

### **A.1.2 CRAs underestimated the severity of the downturn in the housing market**

As discussed above, the accuracy of subprime RMBS credit ratings depends significantly on the accuracy of the CRA's economic forecast. From this perspective, the observed performance of subprime loans is due in part to the occurrence of what was widely viewed by market participants as a low-probability economic event. In particular, a number of economists published academic studies documenting that much of the increase in home prices in 2000–03 could be explained by lower long-term interest rates and improvements in quality.<sup>23</sup> Historically, real estate markets in the United States were thought of as being local, and there had not been a nationwide decline in home prices since the 1930s.

While economic projections were an important factor at the time of structuring, they remain an important factor in subprime RMBS surveillance, as the CRAs have changed their outlook for the housing market dramatically over the last year. Roughly speaking, the CRAs have changed their view, from expecting zero nationwide HPA from peak to trough of the housing

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<sup>21</sup> In industry jargon, this sector is typically referred to as the home equity ABS sector, which includes securitisation of both first-lien and second-lien subprime mortgage loans. However, as the rating criteria for MBS backed by subprime mortgages are an extension of those for jumbo and Alt-A loans, we choose to refer to this sector as subprime RMBS.

<sup>22</sup> CGFS, "The role of ratings in structured finance: issues and implications", 2005; J Amato and E Remolona, "The pricing of unexpected credit losses", *BIS Working Papers*, no 190, 2005.

<sup>23</sup> J McCarthy and R Peach, "Are home prices the next bubble?", *Economic Policy Review*, vol 10, no 3, December 2004; C Himmelberg, C Mayer and T Sinai, "Assessing high house prices: bubbles, fundamentals, and misperceptions", *Federal Reserve Bank of New York Staff Report No 218*, 2005.

cycle in January 2007 to expecting price declines of about 10% in July 2007, and of 20% in January 2008.

While the projections are grim, there remains a significant amount of macroeconomic uncertainty. In a recent report,<sup>24</sup> Moody's states that losses on the 2006 vintage of subprime loans could be anywhere from 12% to 24% depending on how this uncertainty is resolved. In particular, uncertainty about lifetime losses on subprime loans will depend on how uncertainty about the following factors is resolved: the future path of home prices and employment; the impact of payment reset and FHA Secure;<sup>25</sup> the willingness of borrowers to walk away from their homes; the impact of monetary policy; the impact of fiscal stimulus; the impact of higher government-sponsored entity (GSE) loan limits; and the impact of streamlined loan modification.

In order to put this point in better context, a recent working paper by staff economists at the Boston Fed reports that a substantial fraction of the increase in foreclosures can be explained by slower HPA.<sup>26</sup> This perspective may or may not be a significant point in the narrative of what has happened. On the one hand, much of the horrific performance of subprime loans can be explained by a low-probability economic event, so that the performance of ratings is regrettable but understandable. On the other hand, one could argue that errors in the CRA's subprime RMBS model discussed below contributed to a nationwide mortgage credit and housing bubble, creating a correlation across local real estate markets which did not previously exist. There is probably some truth to both points of view.

### **A.1.3 CRAs underestimated the impact of slower HPA on the performance of subprime loans because of their use of limited historical data**

There is evidence that the relatively worse performance of the most recent vintages of subprime loans cannot be completely explained by economic conditions, suggesting the existence of model error.<sup>27</sup> One important source of this model error is clearly the lack of comprehensive historical data.

Limited historical data will impair the ability to estimate tail risk. For example, historical data on subprime loans are largely confined to a relatively benign economic environment, with very little data on periods of significant negative home price appreciation. Given the importance of refinancing to the performance of subprime loans, and the inherent non-linearities in the payoff of the refinancing option, this could be an important source of model error as the limited historical data will provide inadequate information on the underlying risks. Fitch has recently noted that the increased "willingness of borrowers to simply walk away from mortgage debt has contributed to extraordinary levels of early default".<sup>28</sup>

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<sup>24</sup> Moody's, "Moody's updates loss projections for 2006 subprime loans," *Structured Finance Special Report*, 30 January 2008.

<sup>25</sup> FHA Secure is a programme started in autumn 2007 by the Federal Housing Administration (FHA), which permits borrowers to refinance resetting subprime loans as long as they have been current up until reset, delinquent after reset, and have at least 3% equity in their homes.

<sup>26</sup> K Gerardi, A H Shapiro and P S Willen, "Subprime outcomes: risky mortgages, homeownership, and foreclosures", *Working Paper 07-15*, Federal Reserve Bank of Boston, 2007.

<sup>27</sup> Y Demyanyk and L O Van Hemert, "Understanding the subprime mortgage crisis", 2007, <http://ssrn.com/abstract=1020396>.

<sup>28</sup> Fitch, 31 January 2008, as quoted in <http://calculatedrisk.blogspot.com/2008/02/fitch-concerned-about-borrowers-walking.html>.

The absence of adequate historical data generally results in the need for stress testing and scenario analysis.

#### **A.1.4 CRAs underestimated the impact of slower HPA on the performance of subprime loans by ignoring the originator risk factor**

Since all of the loans in a pool are serviced by the same firm, and are originated by at most a few firms, there is correlated risk across the loans related to servicer and/or originator quality. The rating agencies have noted that servicer quality has a dramatic impact on the loss distribution, and publish servicer quality ratings in order to minimise this source of uncertainty.<sup>29</sup> However, the rating agencies do not deal with differences in originator quality with the same amount of analytical rigour.

The July 2007 subprime RMBS downgrades were concentrated in the issues of four firms, suggesting that there are important unobserved differences in underwriting across originators. Some weakly capitalised originators may have taken advantage of transparent rating agency criteria enabling borrowers to misrepresent occupancy, income, down payment source, and/or property appraisals. A recent report by Fitch observes that for a significant fraction of early payment defaults, there were clear signs of fraud in the loan files that were ignored in the underwriting process.<sup>30</sup> To deal with this problem, Moody's changed its surveillance criteria in October 2007, splitting originators into three tiers, with loss expectations increasing significantly from the highest to the lowest tier.

The inability of investors and CRAs to deal with fraud is a recurring problem, with echoes of defaults in the US corporate bond market in 2002 (ie Enron).

#### **A.1.5 CRAs did not envisage a sharp fall in refinancing opportunities**

Slow prepayment speeds through to June 2007 can be largely explained by the relatively low rates of home price appreciation during 2006 and early 2007. Underwriting standards did tighten slightly, but it became harder for subprime borrowers' refinancing option to be in the money because prices did not increase as much as they had previously.

In contrast, slow prepayment speeds since July 2007 are partly explained by the evaporation of refinancing opportunities. Lenders tightened underwriting standards significantly, and many originators completely stopped originating subprime loans in response to significant changes to CRA subprime RMBS criteria in July 2007, the introduction of subprime regulatory guidance in June 2007, and a continuing deterioration in investor appetite for subprime credit risk. The impact of these changes on the availability of subprime mortgage credit was dramatic. Indeed, the scheduled roll of the ABS home equity index (ABX) into the 08-1 vintage was cancelled due to a lack of issuance in the second half of 2007.

The inclusion of HPA in the subprime RMBS model helps capture the ability of borrowers to meet underwriting standards, but there is nothing in the model which captures changes in the standards themselves.

The evaporation of refinancing opportunities is expected to be an important problem for the future performance of these loans, especially for hybrid adjustable rate mortgages (ARMs) upon payment reset.

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<sup>29</sup> Moody's estimates that a servicer can increase or decrease the level of losses by 10%.

<sup>30</sup> Fitch, "The impact of poor underwriting practices and fraud in subprime RMBS performance," *US Residential Mortgage Special Report*, 28 November 2007.

## **Annex 2: Role of monoline insurers in structured finance**

Financial guarantors (or *monoline insurers*) have originally operated mainly in US municipal bond insurance, providing a commitment to make up any shortfall in interest and principal, in return for a fee that is typically collected at the time of issue. Monolines serve at least three potentially valuable functions in the municipal bond market that might be unlikely to be performed as effectively by other institutions. First, the willingness of the monoline to guarantee the obligations of a municipal issuer provides a certification of credit-worthiness that, with the guarantor's own capital at risk, provides additional credibility over and above a credit rating. Second, relative to dispersed bond holders, a monoline that had guaranteed an entire bond issue would have a stronger incentive to pursue legal remedies in the event of default, which may make default less likely. Third, because income tax treatment causes many municipal investors to concentrate in bond issues originating from within their home state, bond insurance can serve as an indirect vehicle for diversification of risk across US states, while preserving the full benefits of preferential tax treatment.

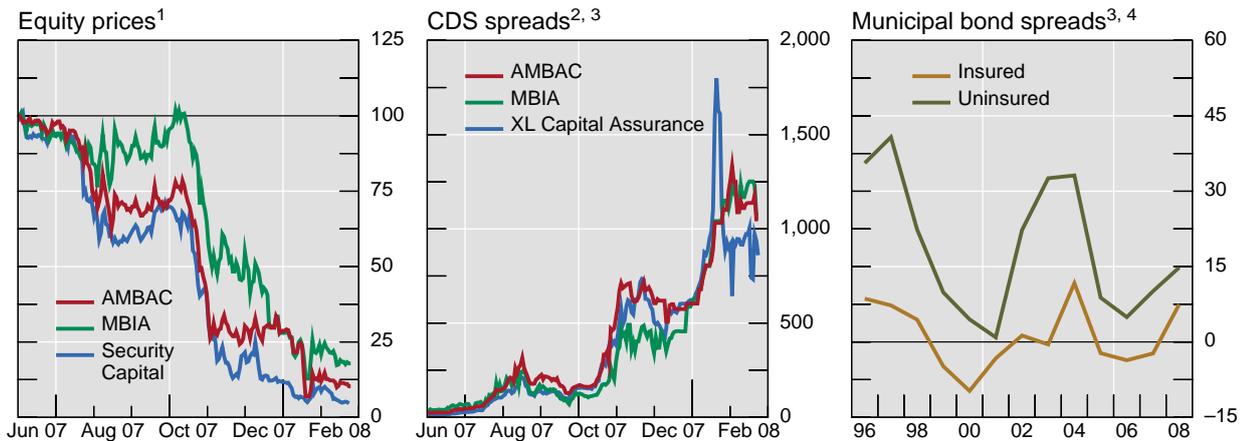
Although public finance still accounts for a majority of monolines' insurance books, since the mid-1990s, an increasing share of their business has come from guarantees (or "wraps") of SF tranches. The guarantor typically receives the associated insurance premium in instalments over the life of the vehicle. The economic rationale for monoline wraps in structured finance is less clear than for the role of guarantees in US municipal finance. It also seems unlikely that monolines' comparative advantage in structured finance would be through legal remedies upon default – structured finance instruments are intended to be designed so that lawsuits are not necessary for investors to collect on their claims. And unlike US municipal bonds, which are widely held by households, SF tranches are mainly held by institutional investors, who would be better positioned to pursue legal claims efficiently. Finally, any indirect diversification benefits are almost certainly less important for SF wraps than in the US municipal market, because SF pools usually are already fairly well-diversified across underlying credits, at least to the extent possible within a given asset class, and there is no tax distortion supporting an additional role for monolines in risk diversification.

The major monoline insurers maintain capital of less than 1% of their net guarantees in force, and accordingly, they only intend to insure very moderate credit risks. The effective leverage can make it possible for a monoline to earn a competitive return on capital while charging its insurance customers premiums of as little as a few basis points. In addition, the flow nature of the guarantee commitment also mitigates the potential for impaired assets in an insured pool to strain the guarantor's resources – any shortfall in principal is not paid until the wrapped tranche matures. Similarly, the lack of liquid markets for the underlying collateral typically does not pose a problem for the guarantor when there is no obligation to liquidate a distressed SF vehicle.

The effect of the exposure of monolines to the deterioration in MBS collateral and associated SF vehicles is clear from the recent holding company stock prices declines (Graph A1, left-hand panel) and soaring CDS premiums (Graph A1, centre panel). Faced with huge mark to market losses, monolines have sought new capital to forestall rating downgrades. It appears that monolines have made (at least ex post) misjudgments in SF markets similar to those made by the rating agencies and by most investors. Thus, to the extent that monolines might have served as an independent check on credit risk assumed through SF markets, they appear, at least ex post, to have fallen short in that role.

Graph A1

**Monoline insurers: equity prices, CDS spreads and value of insurance guarantees**



<sup>1</sup> In local currency; 1 June 2007 = 100. <sup>2</sup> Five-year on-the-run US dollar CDS spreads; senior debt; document clause (MR). <sup>3</sup> In basis points. <sup>4</sup> 2008 values as of February.

Sources: Bloomberg; Markit.

Nevertheless, an analysis of US municipal bond spreads suggests that investors still value the guarantees that monolines provide in that market (Graph A1, right-hand panel), although guarantors that suffered most from SF exposure appear to have lost some of their municipal customers.

The future of the monolines' participation in SF is unclear. Given their recent experience, they may decide to be much more cautious about underwriting SF guarantees in the future, perhaps demanding more disclosure and performing more due diligence. However, the role of monolines may not be crucial for the future of SF – an industry source estimates that the proportion of SF transactions that monolines have wrapped in recent years has declined to about 5% or 10%, compared to roughly 50% penetration in US municipal bond guarantees.

## **Annex 3: Structured investment vehicles**

### **A.3.1 The SIV business model**

A SIV is a bankruptcy-remote, leveraged company that buys highly rated financial assets and is financed via a combination of short-term commercial paper (35% on average), medium-term notes (MTNs) and long-term capital notes (7%). The objective of the SIV is to maximise the difference between the interest earned on the assets and the cost of funding. Much of this difference derives from a maturity mismatch between the SIV's assets and liabilities. SIVs rely on short-term funding to a greater degree than most firms, other than regulated banks with deposits; therefore, SIVs may be quite vulnerable to "runs".

SIVs' portfolios generally consist of financial institution debt (30% on average) and structured finance assets (70%). By holding highly rated portfolios (95% AA or higher), SIVs aim to have very low credit risk. However, the leverage of SIVs, together with the concentration of a significant portion of assets in a single industry sector, scales up the risk.

Given their characteristics, SIVs resemble a hybrid between ABCP conduits (or unregulated financial institutions) and managed CDOs. Like ABCP conduits, SIVs are long-lived and profit from a maturity mismatch between assets and liabilities. Like CDOs, the SIV capital notes serve as credit enhancement for the senior debt of the SIV, similar to the CDO equity tranche, although the capital notes of SIVs are typically rated. The SIV manager is responsible for dynamic management of the portfolio, subject to a number of restrictions and tests, some of which are imposed by investors, others of which are required by rating agencies, as SIVs are dependent upon their commercial paper (CP) and MTNs achieving the highest ratings.

### **A.3.2 Ratings and triggers**

The documentation of structured finance transactions typically specifies tests which must be performed in order to protect the interests of senior creditors. Triggers are sometimes incorporated structurally in these tests. Two critical tests for SIVs are the capital adequacy test and cumulative net outflow liquidity tests. The starting point of the capital adequacy test is the assumption that the SIV cannot roll over its funding and will have to liquidate assets. The framework assumes the ability to liquidate assets over a period of months or years, in order to repay liabilities as necessary. The liquidity tests for the SIV rely on daily estimates of net cash outflows from the vehicle during the following 365 days. These tests generally require that liquidity be held to cover the one-, five-, 10-, and 15-day periods with the greatest cumulative net outflows. When liquidity or capital adequacy tests are violated, SIVs may have to move from a normal operation mode into a "restricted operations" mode or enforcement (wind-down).<sup>31</sup>

### **A.3.3 Looking forward**

The SIV crisis has occurred without a drastic deterioration in the actual credit risk of SIV portfolios; indeed only a very small proportion of their portfolios have been downgraded. Rather, market and liquidity risk, together with high leverage, have united to create fissures

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<sup>31</sup> Some SIVs have put into place triggers related to net asset value (NAV), which is measured as the difference between the market value of the assets and the par value of senior notes, divided by the par value of the capital notes. According to the analysts of one rating agency, NAV tests have been required by investors.

in the SIV business model. This recent experience has raised several questions with respect to structured finance markets, and SIVs in particular.

*Triggers:* Triggers are designed to protect senior (or all) creditors if portfolio quality begins to deteriorate. While they may serve a useful purpose following an idiosyncratic shock, they may actually exacerbate problems when the shock is systemic. One of the recent SIV restructuring measures has been to remove or modify certain market value tests that may cause premature wind-downs.

*Transparency:* Lack of transparency regarding the SIVs' exposures may have contributed to the evaporation of liquidity in their CP markets. Monthly SIV investor reports typically provided high-level information about the portfolio; therefore, it would not have been possible for investors to determine the extent of exposure to US subprime markets on the basis of the monthly report. This raises the question as to whether the SIVs' reports lacked asset-level transparency because senior investors had never asked for this level of disclosure. One view is that prior to the turmoil, senior ABCP investors based their decisions entirely on ratings and failed to differentiate according to type of conduit or underlying exposures. As a result, the shock to US subprime transactions caused a uniform withdrawal from ABCP markets. It appears that investors have now begun to differentiate across types of conduits, as short-term financing is returning to ABCP conduits but much less so to SIVs. This difference appears to be explained by the full liquidity coverage of ABCP conduits.

*Market-value structures:* Given the potential vulnerability of market value structures to price volatility, the question has arisen as to whether AAA ratings should routinely be assigned to such structures. An unresolved question is whether the confluence of the shock to SIVs' asset values and the disappearance of liquidity in ABCP was a "AAA stress" or whether a combination of market value triggers and a very high degree of effective leverage made the SIVs inherently vulnerable. Some observers argue that it simply is not possible to assess the market risk of typical market value structures with sufficient confidence to assign a AAA rating. Rating agencies are currently reflecting on this question.

**Annex 4:  
Members of the Study Group and central bank participants  
at the London workshop**

***Study Group members***

Chairperson, Bank of England	Nigel Jenkinson
National Bank of Belgium	Janet Mitchell
Bank of England	Colin Miles
Bank of France	Nadège Jassaud
Board of Governors of the Federal Reserve System	John Ammer
Federal Reserve New York	Adam Ashcraft
Bank for International Settlements	Srichander Ramaswamy (Secretary) Dietrich Domanski

***Central bank participants at the London workshop***

Reserve Bank of Australia	Keith Hall
National Bank of Belgium	Janet Mitchell
Bank of Canada	Mark Zelmer
Deutsche Bundesbank	Martin Wieland
Bank of England	Colin Miles Adrian Penalver
Bank of France	Alain Duchâteau Nadège Jassaud
Hong Kong Monetary Authority	Henry Yung
Bank of Italy	Antonio Di Cesare
Bank of Japan	Satoshi Kawazoe
Bank of Korea	Jong-Suk Won
Netherlands Bank	Ronald Bosman
Bank of Spain	Raquel Lago
Sveriges Riksbank	Mia Holmfeldt
Swiss National Bank	Stephan Bandini
Board of Governors of the Federal Reserve System	John Ammer
Federal Reserve Bank of New York	Adam Ashcraft John Clark