

The Unfolding Turmoil of 2007–2008: Lessons and Responses

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Abstract

While the unfolding financial turmoil has involved new elements, more fundamental elements have remained the same. New elements include structured credit, the originate-to-distribute business model and expanded markets for repurchase agreements (repos). The recurrence of crises reflects a basic procyclicality in the system, which is characterised by a build-up of risk-taking and leverage in good times and an abrupt withdrawal from risk and an unwinding of leverage in bad times. To deal with the adverse liquidity spiral that has characterised the current crisis, central banks have tried to strike a balance between the importance of the continued availability of market liquidity as a public good and the moral hazard that any market intervention may induce. In proposing long-term responses to the crisis, the Financial Stability Forum has focused on areas where incentives for risk-taking may be aligned more properly and areas where risk management may be made more robust. Nonetheless, a recognition that the procyclicality of the system lies at the root of the crisis would suggest more aggressive countercyclical measures are needed.

1. Introduction

We are now well into the eleventh month of a financial crisis that has been extraordinary in its persistence, its global reach and the questions it has raised about the workings of the financial system. In past episodes of systemic stress, such as the Asian financial crisis of 1997 or the Long-Term Capital Management episode of 1998, which have occurred from time to time in all of our economies over the years, the policy questions in the aftermath have tended to centre around such issues as how to encourage more responsible behaviour among borrowers and how to resolve bad debt problems more effectively. While these questions have rightly been asked in the context of the current crisis, we have also had to grapple with more fundamental questions about the financial system itself.

To understand the crisis, we have had to look very closely at such questions as how credit has been intermediated, how losses are propagated and how market liquidity is generated and lost. To address the problems, we have had to ask what information should be available about borrowers and instruments, how regulation

1. The views expressed are solely our own and do not necessarily reflect those of the Bank for International Settlements or the Financial Stability Forum. For helpful comments, we thank Grant Spencer, Richard Portes and other participants at the Reserve Bank of Australia Conference in Sydney on 14–15 July 2008.

can most effectively prevent unnecessary disruptions to the functioning of the system without stifling innovation, and how central banks should act in their capacity as lenders of last resort.

In this paper, we focus on the turmoil itself and the short-term and medium-term policy responses it has elicited. First, we describe the chain of events that constituted the crisis, discuss the underlying causes and draw lessons from the events. In characterising the crisis, we distinguish among the elements that are new, those that have remained the same and those that we do not understand. Second, we examine the policy responses thus far, both in terms of efforts by central banks to stabilise markets in the short term and efforts by financial authorities to strengthen the underpinnings of the system over the longer term. We will end by emphasising the importance of recognising the issue of procyclicality.

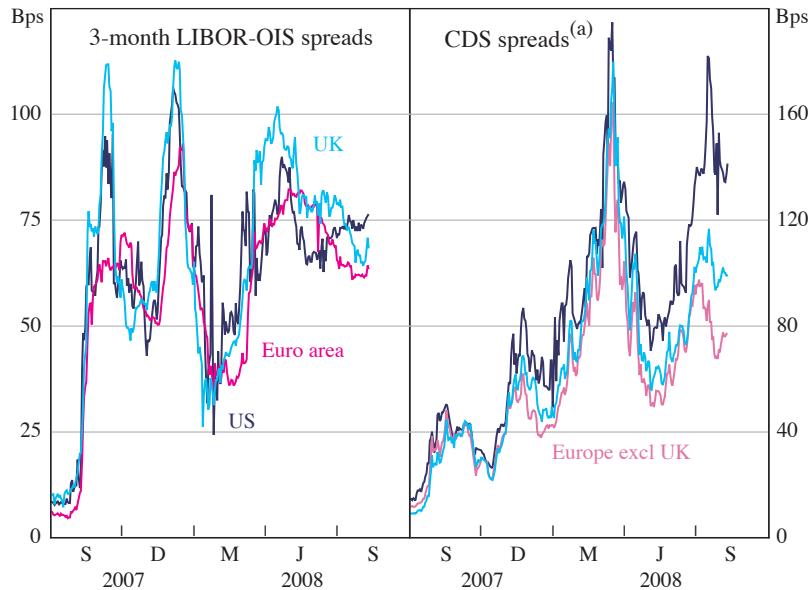
2. Origins of the Crisis: What's New, What's the Same and What We Don't Understand

Most commentaries about the crisis have focused on the unusual structures of the financial system and the role of excessively complex financial innovations. It is true that an important factor in the run-up to the turmoil was the reckless use of recent financial innovations, especially in markets for credit risk transfer. However, as Borio (2008) argues, these are but idiosyncratic elements that represent ‘more fundamental common causes’. Indeed the current turmoil displays a number of important features that it shares with previous crises. At the same time, it is important to acknowledge that there are critical characteristics of the current crisis that we do not fully understand.

2.1 The chain of events

To understand what triggered the crisis and how it spread, it helps to follow the chain of events. Two types of interest rate spreads are especially helpful in tracking events as they have unfolded: the spreads of 3-month London Interbank Offered Rate (LIBOR) over the overnight index swap (OIS) and spreads on credit default swaps (CDS). The former is a good indicator of liquidity in interbank markets and the latter of credit risk premia. As shown in Figure 1, LIBOR-OIS spreads in the United States, the euro area and the United Kingdom rose sharply in August and September 2007, rose again in November and December 2007 and yet again in March and April 2008, in each case indicating a lack of liquidity. For their part, average CDS spreads in the same three regions followed roughly the same pattern, except that the widening of these spreads became more pronounced in each successive episode, especially in February and March 2008. There was also a jump in CDS spreads in July 2008 that was not echoed in LIBOR-OIS markets. What led these spreads to behave in this way?

Although US sub-prime mortgage default rates, and the spreads on associated securities, had been rising since late 2006, the first significant event in the broader financial market turmoil seems to have been the emergence of rumours during

Figure 1: Interbank Term and CDS Spreads

Note: (a) 5-year CDS spreads; simple average of major banks

Sources: Bloomberg; JPMorgan Chase

the third week of June 2007 about heavy losses in two hedge funds managed by Bear Stearns.² The losses were later confirmed, and they turned out to be related to positions in US sub-prime-backed structured securities. By July, major credit rating agencies had either downgraded or placed on review a large number of collateralised debt obligations (CDOs) that relied on mortgages as collateral. In August, the troubles spread to asset-backed commercial paper (ABCP) issued by entities that had invested in CDOs of mortgage-backed securities, and interbank markets around the world began to experience shortages of liquidity. On 9 August, the markets were jolted by the news that BNP Paribas, France's largest bank, halted withdrawals from three of its investment funds because it could not 'fairly' value their holdings. All these events culminated in September with a run on Northern Rock, a UK mortgage lender, when its liquidity problems became known. During this phase, the LIBOR-OIS spread rose to close to 100 basis points in the US interbank market and even higher in the UK market.

The second major event occurred in October 2007, as participants in the interbank and credit markets were again caught by surprise when large monoline bond insurers revealed losses related to credit enhancements they had provided to structured securities; not many observers knew the insurers had even been involved in this business. The losses were large enough to threaten the AAA/Aaa ratings that the monolines needed to operate. In December, mounting concerns by various lenders,

2. For a good narrative of these events, see Chapter VI of BIS (2008).

waves of margin calls in the repo markets and the anticipation of increased liquidity demands over the year-end led to widening CDS spreads and a second liquidity crisis in the money markets, prompting five major central banks to announce concerted actions to make more funding liquidity available. The LIBOR-OIS spread in the US and euro area interbank markets reached unprecedented levels, while in the United Kingdom these spreads rescaled the peaks they had reached in September.

The third and perhaps most alarming period of the turmoil is also the most difficult to explain. In late February and early March 2008, a new wave of deleveraging suddenly engulfed the fixed-income markets. There seems to have been no significant event that could have precipitated this episode, although mounting concerns about monoline insurers, the continued worsening in the US economic outlook, and associated valuation and liquidity problems in high-yield corporate debt, as well as in both prime and non-prime US housing-related paper, certainly were part of the background (see Rappaport, Mollenkamp and Richardson 2008; Shellock 2008). What is evident is that concerns about counterparty risk became extraordinarily intense. Dealers in mortgage-backed securities and in over-the-counter (OTC) derivatives started asking for more collateral from their counterparties. In repo markets, lenders sharply increased their margin calls and refused to accept as collateral anything but US Treasury securities or German bunds. Since bond dealers finance themselves in the repo markets, they abruptly withdrew from making markets in the broader fixed-income markets. Liquidity in US and European fixed-income markets seemed to vanish overnight.

In early March, the news headlines began to report what has become known as an adverse liquidity spiral, in which the US investment bank, Bear Stearns, was rumoured to be caught. On 16 March, after several days of customer outflows, shrinking capital, and fevered activity on Wall Street and at the Federal Reserve, the troubled investment bank was taken over by a US commercial bank, JPMorgan Chase, with the help of an arrangement by which the Fed would lend up to US\$30 billion (later reduced to US\$29 billion) to finance Bear's portfolio of troubled securities.

Markets appeared to stabilise in the aftermath of the Bear Stearns episode, but remained subject to episodes of turbulence. Equity and debt markets were buffeted by concerns about the prospects for various segments of the US financial system, as losses spread to the government-sponsored enterprises and to smaller and medium-sized banks. As of mid 2008, the impact of the financial system's troubles on the real economy remains a major source of uncertainty worldwide.

2.2 What's new

The blame for the turmoil has been linked to a wide variety of financial innovations. In particular, many observers have argued that, while these financial innovations have been fundamentally beneficial for the financial system, a reckless use of them has led to the crisis. Borio (2008), for example, has identified the two most salient innovations as structured credit and the originate-to-distribute business model. We would suggest that, while these have been the source of substantial losses and

uncertain valuations over the past 12 months, a little-noticed innovation in the repo market – the tri-party repo – also contributed significantly to the crisis.

The innovation of structured credit includes both CDOs and CDS. CDOs use the device of subordination to transform instruments with high credit risk into instruments that receive high credit ratings. The introduction of CDS contracts in turn allowed CDOs to be created more easily by serving as the underlying instruments for what are called ‘synthetic CDOs’. The pricing of these instruments relies critically on assumptions about default correlations, which have been intractably difficult to model or to measure.³

These instruments had been developed in the 1990s and had proven to be fundamentally important in improving the pricing and distribution of credit risks. But in the environment of the past few years, their use became quite widespread and complex variations on the instruments proliferated rapidly, aided by advances in modelling techniques. These variations included CDOs based on asset-backed securities (ABS), as well as ABCP issued by structured investment vehicles (SIVs) that held highly-rated credit instruments including CDO tranches. The sheer scale and variety of the use of these innovations outstripped the capacity of even the most sophisticated dealers and investors to understand and manage the risks associated with them.

The proliferation of CDOs owed much to the originate-to-distribute business model pursued by many of the world’s largest commercial and investment banks. The model itself is not new, having been used in the syndicated loan market for years. Nonetheless, it achieved new prominence in banks’ business strategies with the securitisation of mortgages. Under this model, a mortgage lender would routinely package its loans into mortgage-backed securities, which it would sell to investors, thereby providing funding for the loans. In the period leading up to the turmoil, the originate-to-distribute model contributed to the rapid growth of the US mortgage market (as Frankel (2006) has emphasised), but also evidently weakened the incentives of mortgage originators to properly screen loans. Once the first sub-prime mortgage defaults materialised, standard covenants of the securitisations forced the originators to take back newly minted loans. However, these types of securities had become so widely dispersed that a generalised crisis of confidence ensued. Banks were stuck with ‘warehouses’ of unpackaged loans that could not be sold and rapidly lost value as markets fell. They also discovered that the ‘super-senior’ CDO tranches, which the banks typically retained in order to facilitate the sale of other parts of the structure, were far riskier and less liquid than they had expected.

3. For the most part, price discovery in credit markets now takes place in the trading of CDS indices and of component parts called ‘loss tranches’. The spreads on these indices and their loss tranches in turn drive spreads on single-name CDS contracts as well as prices of CDO tranches. The most common pricing models in these markets attempt to account for default correlations in an ad hoc way, typically through a ‘Gaussian copula’. See, for example, Duffie and Singleton (2003), pp 237–242.

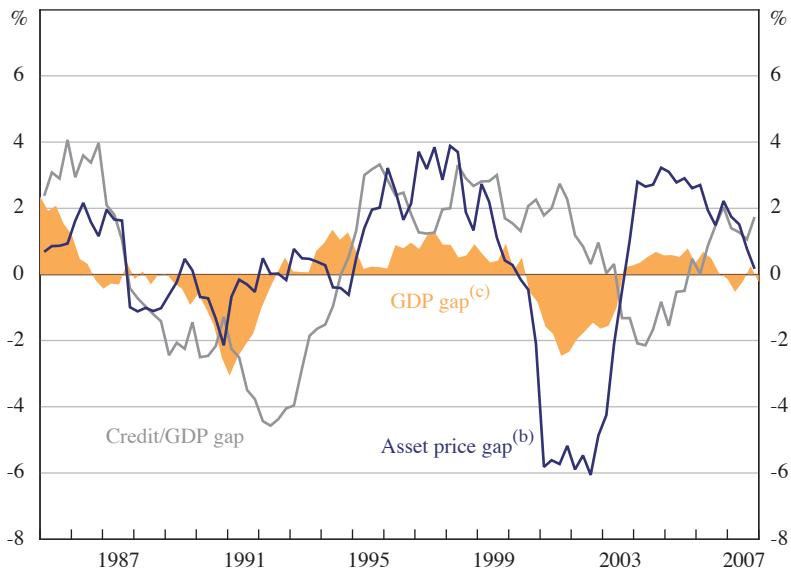
While the problems in CDS and CDO markets have been much commented upon during the crisis, the role of the tri-party repo has attracted less attention. This innovation has become the standard way of transacting in repo markets. In a tri-party repo, the third party is a clearing bank, which knows both the lender and borrower of a repo transaction and takes custody of the collateral. The arrangement has the advantages of avoiding delivery of collateral, facilitating substitution of collateral and reducing clearing costs. In recent years, the tri-party repo has allowed the repo market to accept a wide range of collateral, including mortgage-backed securities and CDOs and almost any asset that the clearing banks could hold in custody. Hence, it has allowed investors in various securities to more easily secure financing in the repo market by simply putting up their positions as collateral. However, an important factor contributing to the loss of liquidity in fixed-income markets in February and March 2008 was the sudden refusal of lenders in the repo market to accept as collateral the same wide range of assets as before. This made it difficult or impossible for holders to value the instruments, and also led to a sharp worsening of the liquidity profile of institutions, such as Bear Stearns, that had a large quantity of these assets on their balance sheets.

2.3 What has remained the same

The focus on what is new suggests that episodes such as the unfolding turmoil are ‘black swans’ or events so rare and unexpected that there is little that can be done about them. The truth, however, is that (just like black swans) the underlying causes of the turmoil are in many ways familiar.

The early part of this decade saw a long period of unusually easy macroeconomic conditions, with low or negative real interest rates in the major economies and a glut of savings centred in east Asia and the Middle East. In this environment, the global weight of excess savings and excess liquidity fed a steady run-up in asset prices, especially in credit instruments and housing markets, which in turn encouraged a build-up in leverage and risk-taking, among both regulated and unregulated entities. When the environment turned bad, the overextension of risk resulted in heavy losses and a rush to unwind leverage. As shown in Figure 2, this risk-taking behaviour has resulted in a correlation between credit growth, asset prices and the real economy in what Goodhart (2004) has termed the ‘excessive procyclicality’ of the financial system.

An environment that was increasingly tolerant of risk was evident in the tendency of banks to take on more risk and in a decline in risk premia to low levels, especially in the case of credit instruments. As shown in Figure 3, the value-at-risk (VAR) estimates that banks themselves reported show that they took on more risk. This is especially striking given that the realised and implied volatilities of most major asset classes, which form a central input to VAR calculations, were falling steadily throughout this period (see BIS 2006). Even more striking was the steady decline in credit spreads as reflected, for example, in such traded CDS indices as the iTraxx in Europe or the CDX in North America.

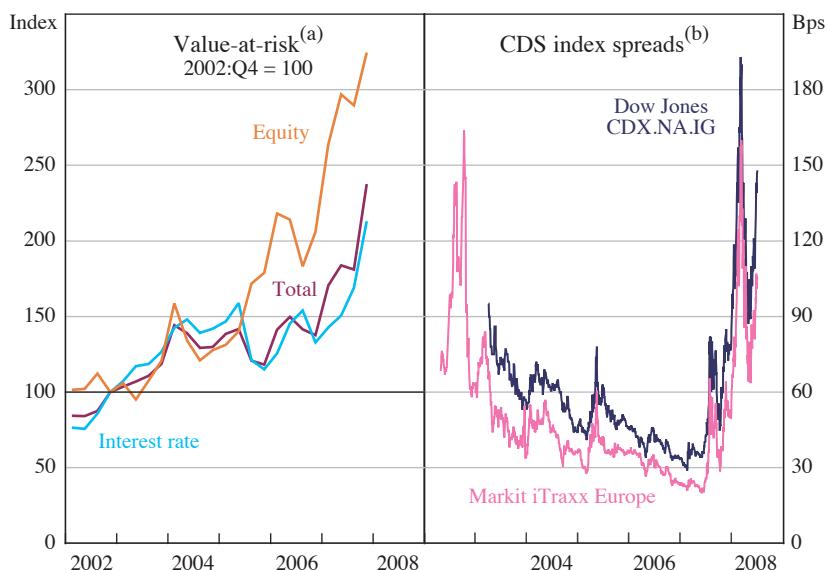
Figure 2: US Financial Markets and the Real Economy^(a)

Notes: (a) Deviations from trend – each trend is derived on the basis of data available in real time

(b) Based on an index of real equity and residential & commercial property prices; scaled down by a factor of 3

(c) Based on the logarithm of real GDP

Sources: Bloomberg; IMF; Thomson Reuters; national data

Figure 3: Banks' Value-at-risk and CDS Index Spreads

Notes: (a) Market capitalisation-weighted average of value-at-risk data of Citigroup, Crédit Suisse, Deutsche Bank, Goldman Sachs, JPMorgan Chase, Morgan Stanley, Société Générale and UBS

(b) 5-year on-the-run CDS spreads

Sources: BIS; JPMorgan Chase

But as the upswing in markets gathered pace, there were also important *qualitative* shifts in financial market participants' attitude towards risk-taking. At many large financial institutions, forward-looking risk assessments were poor, reflecting inadequate risk measurement and lax governance of risk-taking within those institutions. Misaligned incentives cropped up throughout the financial system, as the penalties for poor decisions were ignored. Disclosure weakened, in part because investors slackened in their demand for it. Reviews by supervisors have also made it clear that some banks managed these risks substantially better than others, thanks to closer engagement by senior management and more effective internal controls (see Senior Supervisors' Group 2008). This suggests that at least a portion of the subsequent losses suffered by many banks were by no means inevitable.

In this world of ravenous appetites for risk, market participants became increasingly willing to hold rather complex instruments of unproven liquidity, and increasingly reluctant to apply sound risk management practices to them. In the end, mistakes in the valuation and risk management of these instruments turned out to be the critical errors that triggered the crisis. Risk management errors with respect to the super-senior tranches of CDOs of sub-prime mortgage-backed securities evidently had especially significant systemic effects, thanks in part to maturity and liquidity mismatches involving these instruments. When investors lost faith in ABCP that had been issued by conduits and SIVs holding these instruments, a credit risk event turned into a liquidity event.

2.4 What we don't understand

The combination of a credit risk event and a liquidity event seems to have led to the unique depth and duration of the current crisis. Over the past decade or two, financial markets in the developed economies have become pretty good at absorbing large losses, resolving them, and moving on, albeit usually with an altered set of players and altered judgments about risks. In the current turmoil, by contrast, the underlying functioning of the system has come into question. Whole classes of previously abundant assets can no longer find buyers – notably CDOs of ABS, and the instruments based on them, but also seemingly unrelated products such as municipal auction-rate securities.

While stories explaining the turmoil abound, these remain 'Just So Stories'. There are many fundamental things we just do not (yet) understand. How, for example, could defaults in a relatively small corner of the US mortgage market lead to such massive losses in broader credit markets and turn into a global turmoil of such proportions and such long duration? Greenlaw *et al* (2008) argue that leverage was a major contributing factor. While it is clear that leverage did play a role in the magnification of losses, it is still puzzling how instruments that were designed to spread and diversify risks ended up concentrating the risks.

The sudden evaporation of market liquidity has been even more surprising. Three-month spreads in the international interbank lending markets widened in August 2007 and have remained wide ever since. By late February and early March 2008, investors had seen the near cessation of trading activity in all but the most liquid

government securities. Repo markets, supposedly the most robust source of funding liquidity, experienced what can only be described as a run on all ‘eligible’ collateral except for the highest-rated government bonds. How could liquidity disappear so suddenly from markets that had not seen any sign of defaults or even credit rating downgrades? Brunnermeier and Pedersen (2007) demonstrate that the interaction of market liquidity and funding liquidity can generate what they describe as a liquidity spiral. Nonetheless, an explanation of the sudden disappearance of funding liquidity during February and March 2008 remains beyond the scope of their paper.

Deleveraging and the hoarding of liquid securities by market-makers who also happened to be investors in a broad range of markets played some role in these phenomena. Indeed there were bouts of deleveraging in August 2007, December 2007, and February and March 2008. The first two episodes may have been triggered by disconcerting news about losses in hedge funds or banks. But it is hard to identify a specific trigger for the February–March episode. Market participants say they just had a ‘bad feeling about things’. The fact that many market participants seemed to get that bad feeling at about the same time suggests that a common factor was at work. But what that common factor was remains a mystery.

In trying to resolve the liquidity issues, monetary authorities have been mystified by the persistent stigma associated with borrowing from the central bank and the fact that this gets worse at the very time when such borrowing becomes most critical. As discussed below, it is also surprising how the simple mechanism of an auction can make such stigma go away.

3. The Challenges for Policy-makers: Short-term and Long-term Responses

The challenges that this episode of financial market turmoil has posed for public authorities can be divided into those meriting short-term responses and those meriting long-term responses. In what follows, we focus on the short-term efforts of central banks to provide liquidity and on the longer-term recommendations of the recent report of the Financial Stability Forum (FSF) to the Group of Seven (G7) finance ministers and central bank governors (FSF 2008).

3.1 Short-term responses: what central banks did

The short-term responses of central banks to the unprecedented and fast-changing situation have been creative, energetic and, in terms of the specific goal of keeping the system from grinding to a halt, effective. As Kearns and Lowe (this volume) point out, market liquidity has a large public good component, and a sudden loss of such liquidity is often the result of a market failure. At the same time, Davis (this volume) emphasises the moral hazard that accompanies any form of central bank emergency lending. In their efforts to restore market liquidity, central banks have clearly been seeking to strike the right balance between providing a public good and avoiding moral hazard.

With respect to operations in short-term money markets, central banks have initiated a wide variety of actions. One set of responses may be characterised as a broadening of the scope of their operations.⁴ This broadening took place along four dimensions:

- first, there has been a widening of the collateral accepted, which means that central banks have taken a *de facto* interest in the liquidity of a wider range of asset markets;
- second, there has been a widening of the set of counterparties, notably with the introduction of the primary dealer credit facility (PDCF) by the US Federal Reserve;
- third, central banks have done more to funnel liquidity in their own currencies to entities in other economies, through instruments such as swap agreements; and
- finally, central banks have increased their operations at terms longer than overnight, in order to satisfy the market's increased demand for term liquidity.

A second set of responses by central banks is designed to deal with the stigma associated with borrowing from them. Perhaps the most interesting efforts have been those by the Bank of England and the US Federal Reserve, because they address issues of transparency and the appropriate pricing mechanism for liquidity support.

The Bank of England had in past episodes provided liquidity support to an ailing bank in secret, generally with good results. In September 2007, however, the central bank planned to depart from past practice by announcing liquidity support for Northern Rock. As Davis (this volume) tells it, this plan was pre-empted by a leak to the British Broadcasting Corporation, which led to a run on the troubled bank. This was a forceful reminder of the stigma of borrowing from the Bank of England, and other banks then refused to access the central bank's lending facilities. It remains an open issue whether the Bank of England would have been well advised to keep to its practice of covert financing, or indeed whether such financing would have been feasible in the modern-day environment of more transparent financial markets.

In the case of the US Federal Reserve, banks had been reluctant to make use of the discount window because of the stigma associated with borrowing from it. Various efforts to mitigate the stigma during the early phases of the crisis had failed, and the discount window had remained inactive. For example, the Federal Reserve had reduced from 100 basis points to 50 basis points the interest premium over the target federal funds rate for borrowing from the discount window and had allowed banks to borrow funds for up to 30 days.⁵

What finally succeeded was an auction mechanism. The term auction facility (TAF) was announced on 12 December 2007, and the first auction conducted five days later. It was a single-price auction with a predetermined total amount of US\$20 billion and a fixed 28-day term. The Federal Reserve was no doubt pleased

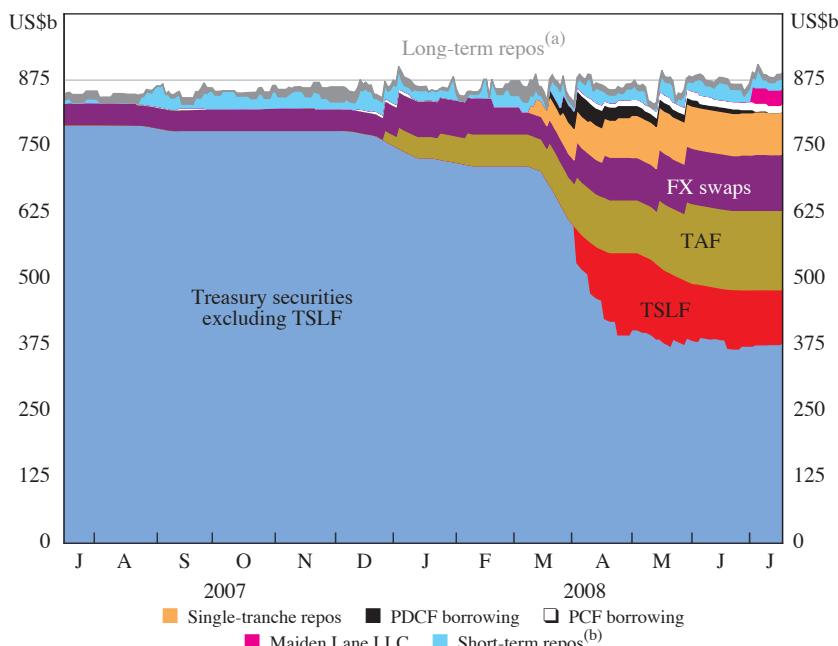
4. CGFS (2008) provides a comprehensive review of these operations by the major central banks. Hilton (this volume) provides a similarly comprehensive review of monetary operations by the Federal Reserve.

5. See Almantier, Krieger and McAndrews (2008) for a more comprehensive discussion.

when 93 banks showed for the auction and took up the entire amount. The question this episode raises is why did such an auction work while Bagehot's dictum to lend freely at a penalty rate, which underlays the operation of the discount window, did not? Is it because there appeared to be 'safety in numbers' associated with the auction process? This may well be so. However, by relying on safety in numbers, such auctions may not ensure that liquidity goes to the institutions that need it most, as Goodhart (2004) has pointed out.

One result of the central banks' liquidity operations was to change the *composition* of their balance sheets. As Cecchetti (2008) explains, this is conceptually different from the usual operations related to monetary policy, which change the size of the central bank's balance sheet rather than its composition. Indeed, in the case of the Federal Reserve, the change in the composition of the balance sheet has been quite dramatic. As shown in Figure 4, the Federal Reserve started out in July 2007 with a balance sheet of US\$850 billion (excluding 'other' assets), with outright holdings of largely Treasury securities accounting for 93 per cent of the assets shown. A year later, the size of the balance sheet had risen to US\$890 billion but uncommitted outright holdings of Treasury securities now accounted for only 42 per cent of the balance sheet, with the rest presumably consisting of less liquid securities obtained through the various operations. In effect, the Federal Reserve has used its balance sheet to supply the repo market with the assets that market participants now prefer; in turn it has taken from the market those assets that were no longer desired.

Figure 4: Evolution of the Federal Reserve's Balance Sheet



Notes: (a) Repos with an original maturity of 10–19 days

(b) Repos with an original maturity of 2–9 days

Sources: Board of Governors of the Federal Reserve System, Federal Reserve Statistical Release: H.4.1; Federal Reserve Bank of New York

Taken together, these types of liquidity operations by central banks more generally have helped to stabilise short-term money markets. Nevertheless, these markets remain plagued by wide spreads and, from time to time, volatile rates, reflecting the underlying balance sheet problems which still need to be resolved. Moreover, in several cases, central banks will sooner or later have to decide whether these actions are temporary measures responding to unusual circumstances, or whether they should retain a more permanent place in their operational toolbox.

At the same time, there are some worrying signs that policy-makers may be sowing the seeds for future liquidity and credit problems, and that market participants' expectations of inflation may already be on the rise as a result. Thanks to higher inflation expectations and falling or stable policy rates, global real monetary policy interest rates, which had already been at low levels for some years, have recently dropped to negative levels in many key jurisdictions. In addition, many countries, particularly emerging market economies, have been reluctant to allow their currencies to appreciate against the dollar and other major currencies, consequently continuing their massive foreign exchange intervention purchases. This combination of a rapid and very large decline in real policy interest rates in key jurisdictions and massive foreign exchange interventions by emerging markets has been contributing to a large expansion in liquidity at the global level.

3.2 Long-term responses: the FSF Report

None of these short-term responses by central banks will be sufficient to stabilise the financial system unless market participants can be reassured that the more fundamental issues that led to this turmoil are being addressed. In this section, we focus on the actions set out by the FSF (2008) in their April report to the G7 Finance Ministers and central bank governors. The report draws on an extensive body of work by national authorities and the main international regulatory, supervisory and central bank bodies.

Speaking broadly, the goal is a financial system where risks are more accurately identified and managed, where perverse incentives are reduced and where build-ups of leverage pose less of a threat. There is no silver bullet that will accomplish all of these goals at once, but concerted action in a few key areas can accomplish a lot.

In the area of *strengthened prudential oversight*, the key steps recommended by the FSF report involve the capital and liquidity frameworks. Implementing Basel II will, by itself, eliminate several of the perverse incentives that were created by the existing regulatory framework. The Basel Committee is also looking actively at ways to strengthen Basel II, and in particular has proposed increasing capital charges for complex structured credit products, for credit exposures in banks' trading books, and for liquidity facilities provided to off-balance sheet vehicles. They have also issued guidance for strengthening liquidity risk management at regulated firms.

With respect to *transparency*, the FSF report sets out leading practices for disclosures based on a survey of large banks and securities firms, with an emphasis on exposures, such as US sub-prime products, that the marketplace considers to

be especially risky. Supervisors in a number of countries have actively encouraged their banks to follow these practices for their 2008 mid-year accounts.

Current discussions about *valuation* are also important. Better disclosure means nothing if markets are not confident that the numbers are meaningful. The report makes clear that completely suspending fair value accounting would be a mistake, because such a step would do more to reduce confidence in the system than any short-term relief it might bring to holders of problem assets. But there are legitimate questions regarding how to value assets when markets are illiquid. In response to concerns expressed by the FSF, the International Accounting Standards Board has established an expert panel – drawn from financial institutions, supervisors, investors and auditors – to assist it in developing enhanced guidance in this respect. The objective will be to reinforce sound valuation practices and transparency, not to undermine confidence in accounting standards or valuations.

Beyond the issue of valuing assets when markets are illiquid, it is evident that, at least in the short term, asset prices tend to be driven by changes in investors' risk appetites rather than by what may be characterised as fundamentals. For example, Amato and Remolona (2005) show that CDS spreads are largely accounted for not by any measure of default risk, but rather by what can only be described as the general appetite for risk. This calls into question the value of marking to market on a daily basis when, at this horizon, risk appetites rather than fundamentals drive market prices. Nonetheless, in the absence of reliable alternative measures of fundamental inputs such as correlation or expected volatility, market values are likely to be the most consistent, if imperfect, way to generate useful asset valuations. The challenge then becomes how to make effective use of the information they contain without ignoring their limitations as guides to fundamental values.

This brings us to the issue of the role and use of *credit ratings*. Credit ratings clearly play an important role in financial markets by helping investors to filter information critical to their portfolio decisions. But the crisis revealed shortcomings regarding how the ratings are generated and how investors use ratings. The FSF has called on the rating agencies to:

- improve the quality of the rating process, including by better managing conflicts of interest in line with the revised International Organization of Securities Commissions Code of Conduct (see IOSCO 2008);
- differentiate ratings on structured finance from those on bonds, as a signal of the critical differences in their risk characteristics under stress; and
- enhance the information they provide on the risk characteristics of structured products.

Others also have a role to play so as to improve the use of credit ratings. Investors will need to better exercise due diligence and use their own independent judgment of risks, while regulators have begun to investigate the ways in which ratings are sometimes 'hard-wired' into regulatory and supervisory frameworks.

Finally, the FSF has outlined a number of ways in which *public authorities*, both at the national and international levels, need to do a better job in assessing and responding to risks. In particular, they need to:

- better translate risk analysis into action, by upgrading their expertise and communicating more directly with the management and boards of regulated institutions about the risks they see;
- improve information exchange and cooperation, for example through broader use of supervisory colleges for banks that are active in several national markets;
- enhance the effectiveness of international bodies, such as those that meet under the auspices of the BIS, by improving prioritisation and conducting joint strategic reviews; and
- clarify and strengthen national and cross-border arrangements for managing crises and dealing with weak banks.

4. Living with Pro cyclicality

This paper began by discussing the broad rise in risk-taking and leverage that took place in the years preceding the crisis. The recent recommendations of the FSF and the subsequent work program deal with the various ways that regulators, firms, investors and rating agencies can improve the system's ability to measure, assess and manage risk, which are important steps. But whether there is anything more fundamental that we can do to prevent financial crises remains an open question. This crisis shares many characteristics with past crises in terms of underlying causes, most notably the inherent procyclicality of the financial system. It seems reasonable, therefore, to suggest that more could be done to reduce this tendency of the financial system to accumulate too much risk in good times and to shed it rapidly in bad times. But how can this be achieved?

In the foreword to its April 2008 report to the G7, the FSF stated its intention to examine the drivers of procyclical behaviour and possible options to mitigate it. This process has now begun. Among the issues that are being considered are capital requirements, fair value accounting, compensation systems and funding liquidity. In each case, the idea is to investigate the procyclical drivers involved and potential policy responses. This is not always easy, in view of ongoing structural changes in financial systems. Many more recent structures are only now being fully tested in a downturn. But the authorities can seek to ensure that regulatory systems, such as the capital regime, do not reinforce the natural cycles of the financial system. They can also seek to ensure that the incentives are well aligned, which points policy-makers towards taking a closer look at private-sector compensation systems and counterparty risk management to ensure that they do not foster excessive risk-taking behaviour.

In a widely cited paper, Borio, Furfine and Lowe (2001) call for the use of supervisory instruments in an 'explicitly *countercyclical* fashion'. The object of this policy is '... [to] encourage the building-up of a protective cushion in good times that can be drawn down in bad times' (p 2). In principle, the cushion could take

the form of loan-loss provisions as well as capital. It may also involve the lowering of regulatory loan-to-value ratios at times when the prices of the underlying assets have been rising at an especially rapid pace. Recent events suggest that a further cushion could take the form of robustly liquid securities – for example, highly rated and actively traded government bonds – which the repo markets will always accept as collateral, to guard against the runs we have recently seen on most other forms of repo collateral.

Finally, an unusual buoyancy of markets should serve to remind the financial stability departments of central banks and supervisory authorities to monitor especially closely any related innovative financial instruments. This is because excesses in risk-taking tend to involve the use of such instruments. The object of these monitoring efforts would be to understand the various ways in which these instruments are used and track the channels through which they proliferate. The development of such market intelligence would then help alert the authorities to times when it would be appropriate to apply countercyclical supervisory instruments to particular segments of the financial markets.

5. Conclusion

In this paper, we have emphasised that certain elements are new to the current episode of financial turmoil, while many elements have remained the same. The new elements include structured credit, the broader use of the originate-to-distribute business model and new arrangements in repo markets that allow the use of almost any financial asset as collateral. These are fundamentally good innovations but their reckless use has helped to underpin the crisis. The elements that have remained the same are those processes that underpin the basic procyclicality in the system, that is, the tendency for a build-up of risk-taking and leverage to occur in benign economic environments and the abrupt withdrawal from risk and an unwinding of leverage that typically happens once the environment turns bad.

In their short-term response to the dramatic loss of liquidity, central banks have had to trade off the importance of ensuring the continued availability of market liquidity as a public good against the moral hazard that any market intervention is likely to induce. Overall, central banks have acted to broaden the scope of their liquidity operations. At the same time, however, they have had to deal with the stigma often associated with borrowing from them, which seems to get worse at the very time when liquidity from the central bank is needed the most.

In proposing long-term responses to the crisis, the FSF has focused on areas where incentives for risk-taking may be aligned more properly, for example through strengthened capital requirements and more judicious use of credit ratings, and areas where risk management may be made more robust, such as through better disclosure rules and valuation standards. Nonetheless, recognising that the procyclicality of the financial system lies at the root of this and other financial crises before it would suggest that more extensive policy responses may be required. The use of supervisory instruments in an explicitly countercyclical way is one avenue requiring further investigation. Policies here would be designed to build adequate buffers in the system to prevent shocks from propagating too far.

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