

Market liquidity and banking liquidity: linkages, vulnerabilities and the role of disclosure

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During the course of 2007, global financial markets went through noticeable periods of turbulence. In particular, complex credit markets suffered a marked set-back. Oddly, turmoil in these fairly new markets contributed to severe liquidity shortages in short-term money and interbank markets, triggering repeated large-scale monetary interventions by central banks worldwide. Recent events have thus demonstrated that banks are considerably intertwined in financial markets; dependent on and exposed to them as regards liquidity. The aim of this article is to better understand this complex relationship and to frame relevant aspects of the latest financial market turmoil accordingly. In particular, we explore the mechanics of a market liquidity crisis and its impact on individual banks' liquidity, as well as possible spillovers to other banks. These dynamics of course raise a number of policy issues. Here, we focus on the role that greater disclosure to markets on banks' liquidity situation itself could play as a market-stabilising device.

In summary, global banks have increasingly integrated into capital markets and in terms of both funding and asset liquidity rely considerably on functioning, liquid financial markets. This is particularly visible in the shift towards secured lending transactions; growth of the securitisation market; the broadening of collateral to encompass complex products with shifting levels of market liquidity; and the rise in committed credit or liquidity lines to sponsored special purpose vehicles (SPVs) and corporates. While some of the recent developments in financial market liquidity can be attributed to technological progress, importantly, more temporary factors resulting from an environment of low interest rates have accelerated market liquidity beyond sustainable levels. While, per se, banks' ability to "liquify" assets represents a positive development which should help mitigate the fundamental liquidity risk that banks face, increased sensitivity with respect to market liquidity risk has also created new vulnerabilities with respect to sudden reversals of market liquidity. Importantly, adverse circumstances could trigger a combined increase in demands on liquid assets via margin requirements and activation of credit lines and reduced liquidity of assets and related market funding sources. The severe loss of liquidity in asset-backed securities markets and its repercussions on global interbank markets during 2007 provide a vivid illustration of the channels that link market liquidity to banks' funding and asset liquidity and of the wider externalities of idiosyncratic liquidity shocks. How can these risks be addressed? Together with active liquidity management, disclosure may represent one tool through which such vulnerability may be reduced. A large literature exists on the merits of transparency in banking. Greater transparency should alleviate refinancing frictions related to asymmetric information. When information problems are however deeper and concern aggregate uncertainty, improved disclosure on credit fundamentals may be less effective to restore confidence. Instead, better information on liquidity itself may be necessary. We explore the current availability of information on banks' liquidity and funding risks. Overall, information appears to be limited –failing to disclose in a comprehensive and comparable way the underlying dynamics of liquidity demands and funding sources. But liquidity is volatile and banks are subject to inherent liquidity mismatches. Can greater disclosure in this area ever be a useful tool to reinforce market discipline in a systemically stabilising fashion? While this question merits serious reflection, the 2007 market events have shown that current information gaps are large and need addressing.

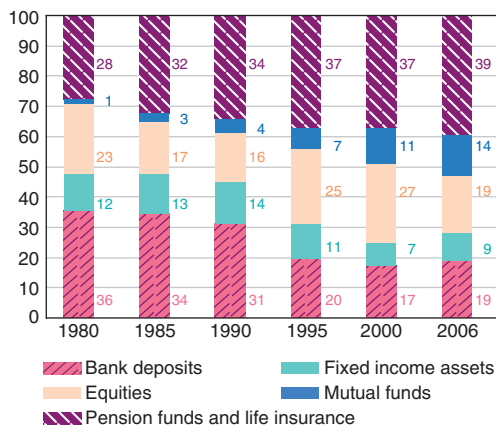
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1 | THE RISING INTERDEPENDENCE OF BANKS AND CAPITAL MARKETS

Banking disintermediation has been widely recognised as one of the key developments to have shaped the financial system in the recent years. This is well illustrated by the evolution in the structure of US household financial assets. While bank deposits represented 36% of those assets at the end of 1980, this share had fallen to 19% by 2006, mainly to the benefit of assets held through institutional investors (Chart 1).

But the shift of investors away from bank deposits need not be a permanent fixture. Chart 1 indicates that, from 1995 onwards, the share of bank assets in US household portfolios has more or less stabilised. More generally, banks' balance sheets have strongly increased in the recent years. The yearly growth rate in total assets of euro area monetary financial institutions (MFIs) was almost 8% between 2000 and 2006 and has recently accelerated to reach, on an annual basis, 13% during the three first quarters of 2007. Moreover, funding structures differ across banks, with some still relying extensively on customer deposits (Chart 2). At a more fundamental level, the relationship between banks and markets therefore cannot be reduced to a simple question of market share, determined by the degree of substitution between two channels of intermediation. Nor can analysts rely on a casual overview of balance sheets

Chart 1
Financial assets of US households
(in % of total¹⁾)

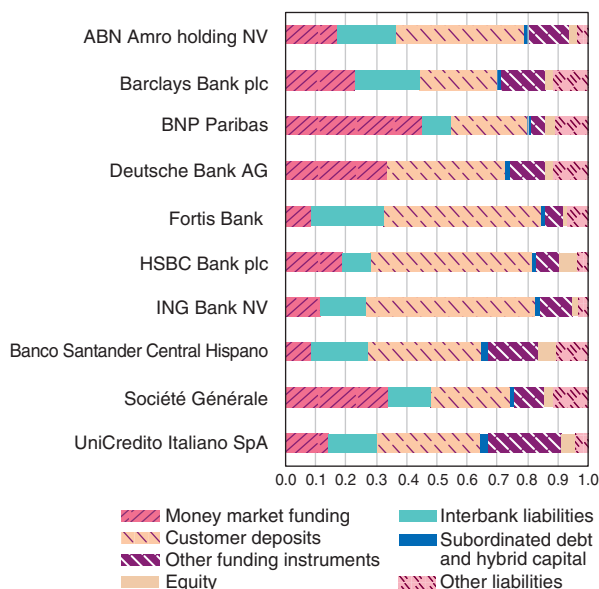


1) Excluding miscellaneous items.

Source: US Federal Reserve

1 See ECB (2007): "Euro money market survey 2006", February.

Chart 2
Liability structure of large European banks
(share in total)



Note: Money market funding consists of certificates of deposits, commercial paper and other short term money market instruments. "Other funding instruments" include funding derived from short term financial trading and derivatives.

Source: Bankscope

to fully comprehend the intricacies of the two-way bank-market relationship. In fact, banks and securities markets are increasingly intertwined and there are many indications of that.

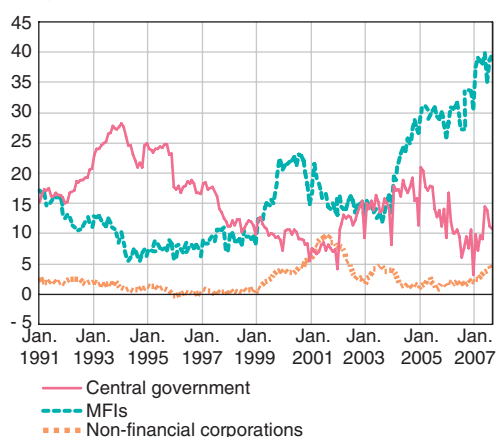
Banks are themselves major issuers of securities. In the euro area, they have even become the dominant player, the outstanding amount of debt securities issued by MFIs having recently exceeded the value of government debt securities (Chart 3).

There is also some evidence that banks are making more use of derivatives to manage funding risks.¹ Moreover, interbank funding is itself becoming increasingly dependent on market liquidity as a growing proportion of interbank transactions is carried out through repurchase agreements. An ESCB survey shows that, between 2000 and 2006, the share of secured operations in total euro money market transactions has risen from 22% to 30%. This increasing reliance on secured operations means that banks are mobilising a growing fraction of their securities portfolio as collateral. Secured funds borrowed by banks are, in turn, used to a large degree to lend secured to other market participants.

Chart 3
Euro-denominated debt securities, by issuing sector –flows and stocks

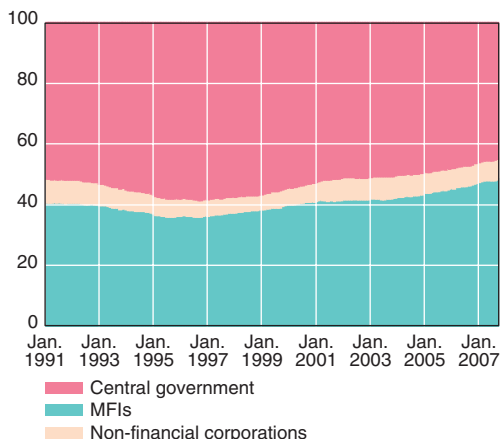
12-month moving average net monthly issue

(EUR billions)



Percent shares in outstanding amounts at end of period

(%)



Source: ECB

However, the collateral used for both legs of this secured borrowing and lending is not necessarily of the same nature nor of the same liquidity. In fact, banks are increasingly mobilising their traditional government and corporate bond portfolios to finance less liquid, but higher yielding forms of assets that again can be reused as collateral. According to a repo market survey published in June 2007, the importance of corporate bonds and asset-backed securities (ABSs) has been rising steadily.² The survey also notes a sharp rise in equity used in tri-party repos. What we observe here are in fact profound changes in liquidity management, with a view to higher efficiency and

lower operational risks.³ Aspects of this shift in behaviour include centralisation of certain functions of liquidity management and just-in-time payment approaches. These changes in collateral and liquidity management are not inconsequential, as will be discussed in Section 2.

Banks are also increasingly supplying the market with new securitised products. Many banks originate, structure and repackage in tranches illiquid assets which they redistribute to investors with corresponding risk preferences. In some cases, securitisation represents a new form of secured funding to banks. In the US, around 56% of outstanding residential mortgages are believed to have been repackaged as residential mortgage-backed securities (RMBSs) and sold on to investors, as well as 60% of subprime mortgage loans issued in 2006.⁴ Securitisation also strongly gained in importance in Europe in recent years. Issuance volume grew almost sixfold between 2000 and 2006 to reach 459 billion euro, with also complex products such as collateralised debt obligations (CDOs) being used as securitisation support.

The packaging and repackaging of assets has been assisted by the creation by banks of off-balance sheet special purpose vehicles (SPVs), the so-called "financial conduits". Asset-backed commercial paper (ABCP) conduits such as multi-seller programs or structured investment vehicles (SIVs) were designed as a cost-efficient infrastructure to the off-loading of risk and access to broad funding markets. It is worth noting that already before the summer 2007 market events, ABCP issuance was increasingly concentrated at the short end of maturity tenors, in contrast to non-collateralised commercial paper (CP), suggesting increasing rollover risk for this asset category (Chart 4).

Bank lending, too, is taking new forms. In addition to traditional corporate or retail lending, many banks are now lending directly to specialised investors such as hedge funds or other highly leveraged institutions. These exposures have been collateralised, including (until recently) by the newly created classes of assets mentioned earlier. In some cases, financing is also contingent, representing back-up credit or liquidity lines, for example to financial conduits. Liquidity

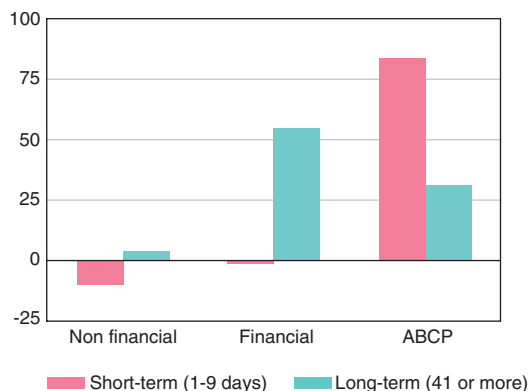
² See ICMA (June 2007).

³ See *The Institute of International Finance (2007)*.

⁴ See "Securitisation: when it goes wrong", *The Economist Magazine*, 22 septembre 2007.

Chart 4
Change in gross issues of US CP 2007-2005
by type of issuer and maturity profile

(USD millions)



Note: Change between May 2007 and average for 2005

Source: Federal Reserve Board

lines provide insurances to CP investors in case the conduit faces roll-over risks. While this protects the conduit from liquidity risk, it indicates the possibility of sudden short-term demands for bank funding – notably in periods of market turbulence.

Table 1 provides a snapshot of some of the largest European banks’ liquidity exposures *vis-à-vis* conduits recorded before the summer 2007 turmoil. Banks are also providing bridge loans to pending leveraged buy-out deals or during “ramp-up”

Table 1
European banks with some of the largest liquidity facilities to funding ratios

(liquidity facilities in USD billions; liquidity facilities/funding and Tier 1 ratio in %)

	Liquidity facilities	Liquidity facilities/funding	Tier 1 ratio
Sachsen Landesbank	24.02	31.60	7.8
IKB Deutsche Industriebank	19.47	28.82	7.2
Hypo Real Estate Bank	17.95	8.70	6.9
Lloyds Bank Group	39.09	7.19	-
Bayerische Landesbank	27.65	6.58	11.0
Calyon	19.39	6.35	9.6
Dresdner Bank	37.77	6.23	10.4

Funding = deposits + senior and subordinated debt based on end 2006 and Q1 2007 numbers; liquidity facilities show maximum commitments.

Source: Citibank

5 See BSC (2007 and 2003).

6 Securitisation has developed also thanks to: the development of statistical models and scoring techniques to standardise risk; legal changes to allow true sale and bankruptcy remoteness of SPVs; adjustments to tax systems to avoid double taxation. Some regulatory measures may have also provided incentives to shift exposures off-balance sheet. See Kendall and Fishman (2000).

7 See Bernanke, IMF (April 2007) and Bank of England (April 2007).

periods to broker-dealers and have particular links with sponsored funds –another potential source of contingent cashoutflows. ESCB data show that total off-balance sheet credit commitments of EU banks amounted to close to 17% of on-balance sheet assets in 2006, up from very low levels in 2001.⁵

As a result of all these various developments, banking activities are now more deeply embedded in markets. This trend is further reinforced by the implementation of the new IAS/IFRS accounting standards generalising the principle of fair value accounting with the consequence that a large portion of banks’ balance sheets must now be marked to market.

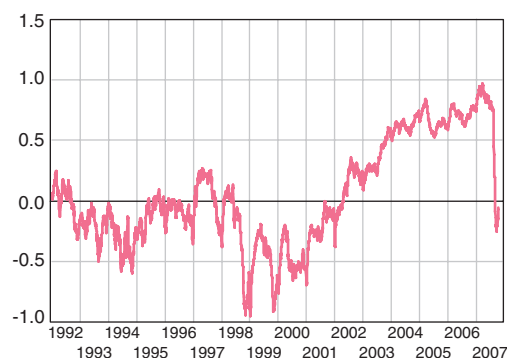
2 | THE ROLE OF MARKET LIQUIDITY: HOW IT MADE BANKS MORE VULNERABLE TO MARKET LIQUIDITY SHOCKS

2|1 Market liquidity and banking liquidity

The deepening symbiosis between banks and capital markets has probably led to a more efficient allocation of savings through the financial system and has mitigated the fundamental liquidity risk underlying the intermediation of liquid savings by banks into illiquid long-term assets. What factors have brought this about?

While a number of long-term structural factors are clearly at play, importantly, more short-term and reversible developments may have helped speed up banks’ integration into markets.⁶ Low nominal and real interest rates since 2000 probably stimulated increased leverage and risk tolerance (the so-called “search for yield”).⁷ This has led to a proliferation of different types of instruments with increasing degrees of complexity, some of which were designed to maximise returns for a given rating. Low borrowing

Chart 5
Financial market liquidity



Note: Reflects the mean of different market liquidity measures

Source: Bank of England

costs are also likely to have enhanced market liquidity in secondary markets (on-trading) (Chart 5).⁸ This is because the lower the borrowing costs, the cheaper it is for market makers, who provide assets on demand and therefore ensure secondary market liquidity, to hold certain positions.

In turn, more liquid secondary financial markets allow banks to rely to a greater extent on markets to quickly adjust exposures, and to meet unexpected funding needs. But market liquidity conditions can be subject to sudden "regime shifts" as developments in 1997/1998, during 2000 and more recently demonstrate (Chart 5), with more detrimental effects on banking liquidity than was previously the case.

Banking liquidity risk relates to the inability of a bank to meet outstanding obligations at a reasonable cost. There are a number of market frictions that can prevent a solvent bank from covering a liquidity shortage. Asymmetric information represents a major one. Investors may have imprecise information on a bank's solvency position, leaving them unwilling to lend, even though the bank may be fundamentally solvent.⁹ As will be discussed later, banks' deeper embeddedness in markets has created new information challenges for banks. Another possible source of market friction affecting banks' liquidity risk relates to imperfect competition. Banks may want to restrict liquidity to other banks in order to exploit their failure.¹⁰ Banks may also be hit by aggregate liquidity preference shocks, resulting from increased uncertainty.¹¹

The next section will explore how banking liquidity risks interact with market liquidity risks. We discuss: first, the mechanics of a single bank's market-banking liquidity relationship; second, the possible dynamics of a market liquidity crisis and its implications for overall liquidity in the banking sector; and third, illustrate such dynamics with the help of market events observed between June and September 2007.

2|2 The mechanics of a bank's market-banking liquidity relationship under stress

On the asset side of a bank, securitisation of mortgage or corporate loans provides a source of cash to banks through the sale of these assets to SPVs. A shift in market liquidity for structured assets can lead to unintended increases in on-balance sheet exposures by banks to warehoused assets and to valuation problems with these assets. The resultant pressure on earnings and the increase in capital requirements, if serious enough, may affect the bank's access to funding markets.

The value of assets held by a bank as a buffer against liquidity shocks is also contingent on market liquidity conditions. For example, ABSs may be liquid at some stage but may suffer significant haircuts and/or valuation uncertainty at other points in time. In addition, market liquidity conditions may be different across issuing and secondary markets, and this difference might be subject to shifts over time as well. For some assets, secondary markets may even not exist, despite strong issuance. Before the recent market turmoil, CDOs had been liquid in primary issuing markets, yet secondary market trading remained limited, notably for bespoke operations. Perhaps, observing robust issuance trends, market participants made incorrect inferences about market liquidity in secondary markets –notably about the effect the absence of such liquidity would have on the ability to evaluate assets and adjust portfolios under stress. Moreover, a bank's asset position in a particular instrument may be large enough to trigger disruptions if its position were partly or fully

⁸ Market liquidity risk is typically defined as the risk that market transactions cannot take place and/or only with significant impact on market clearing prices. See Kyle (1985), for a discussion of three key dimensions of market liquidity.

⁹ See Chari and Jagannathan (1988).

¹⁰ For example, Acharya, Gromb and Yorulmazer (2007).

¹¹ See, for example, Holmstrom and Tirole (1998).

unwound –again impairing the liquidity of its own asset stock.

On the liability side of banks' balance sheets, collateralised borrowing –including in the interbank market– also renders banks vulnerable to changes in the value and market liquidity of the underlying collateral. The broadening of the range of acceptable collateral in secured borrowing, especially to more complex and less liquid securities, has similarly widened the vulnerability to market liquidity shocks. Moreover, in periods of stress, margin and collateral requirements may increase if counterparties have retained the right to increase haircuts or if margins have fallen below certain thresholds. In addition, if liquidity in the market for the collateral asset suddenly dries up, valuation difficulties and disputes may result, as well as lags in transferability of collateral and uncertainty about the suitability of the collateral, thereby undermining borrowing flows.

Banks may also face unexpected cash outflows due to the activation of liquidity lines or bridge loans to the off-balance-sheet vehicles to which structured assets have previously been transferred. A shock to the liquidity of these assets can trigger the activation of bank liquidity lines if the value of the assets falls enough or if funding to the vehicle itself is disrupted by the shock. Yet, in some cases, the availability of (to-be-received) committed lines of credit (or cash inflows) may not be guaranteed if the situation is not covered by the line's terms and conditions.

Collateralised exposures to other market participants, such as banks, broker-dealers or hedge funds, are also vulnerable to shifts in market liquidity of the collateral. Besides, some of the less-regulated counterparties may themselves be highly leveraged and particularly susceptible to market shocks.

Moreover, the fragility of liquidity management in periods of stress goes beyond the quantitative effects just outlined: past models and historic relationships used to manage liquidity risk on normal days become obsolete. Consequently, as markets become illiquid, it becomes difficult to manage out of exposures or to hedge. Asset liquidity may no longer depend on

the characteristics of the asset itself, but rather on whether vulnerable counterparties have substantial positions that need liquidating.

Finally, the simultaneous pro-cyclicality of these various liquidity stresses suggests that banks' vulnerability to market liquidity risks may be greater than what the sum of individual risks suggests: deteriorating market liquidity conditions can result in reduced liquidity of collateral, increased demand for high-quality collateral; greater probability of activation of liquidity lines; and diminished scope for securitisation.

2|3 The dynamics of a market liquidity crisis and its implications for overall liquidity in the banking sector

A disturbance in the market can start off with a single, perhaps leveraged, market participant suffering an idiosyncratic liquidity shock. This might occur, for example, because of losses in a particular activity, a hedge that has gone wrong, or because of operational problems. The participant may have to adjust his portfolio as he faces stop-loss levels and margin calls.¹² In order to generate the required cash, he has to sell assets, which may start weighing on prices.

Other market participants who have followed similar trading strategies may also begin selling, but this may be widely anticipated by the rest of the market, which has little incentive in being on the asset buying side. For example, in 1998, markets expected Salomon Smith Barney to offload its inventory following an article in the press that the firm was closing its fixed-income proprietary desk. As a result, liquidity providers closed their positions, waiting for the inventory to be wound down and triggering sharp falls in prices of fixed-income instruments. This in turn negatively affected the prospects of LTCM, a hedge fund that had previously suffered losses on its Russian bond exposures and had to restore cash levels.¹³

¹² See Brunnermeier and Pedersen (2007).

¹³ See Bookstaber (1999).

The liquidity shock to a single institution thus has the potential to spread further, either through a downward spiral in the price of affected assets or by contagion to other, adjacent financial markets. Such a spiral could arise because of an insufficient number of market makers in a particular market. The smaller the number of market makers willing to match trades, the more volatile the market will be when hit by a shock.¹⁴ For example, LTCM seemed to have been a key liquidity provider to markets in the 1990s. Its exit opened up a big gap in the market for fixed-income assets, further undermining market liquidity.

Agents may also face timing mismatch problems because potential buyers require more time to analyse the potential shift in fundamentals, compared with sellers acting out of urgency to meet margin calls. Arbitrage/hedging relationships between different markets (*e.g.* derivative and underlying assets) then contribute to other asset classes also being affected. Finally, a rise in volatilities may blur the information content of price signals and increase uncertainty regarding fundamentals. These factors may prevent a gradual closing of deviations between observed prices and what is considered to be their fair value in a wide range of markets.

But because of banking liquidity externalities, market liquidity shocks have the potential to propagate even further, notably to money and/or interbank markets, with the potential to severely threaten financial stability. A liquidity shock to a bank can be transmitted to another bank *via* classical interbank links, as the former withdraws funds to meet its domestic shortage. Liquidity shocks can also spread if counterparties refuse to provide short-term liquidity because of uncertainty over whether someone will lend to them if a secondary liquidity shortage arises.¹⁵ Smaller-sized banks with activities in financial markets may also face negative spillovers to their retail funding sources. Deposit outflows towards larger, more systemic banks that are perceived as more robust, competent or benefiting from

implicit government support can further weaken small banks' liquidity positions.¹⁶

2|4 A recent illustration of the market-banking liquidity dynamics under stress: the June-September 2007 market turmoil episode

In June 2007, two highly leveraged hedge funds sponsored by Bear Stearns suffered considerable losses on their USD 20 billion portfolio of ABSs, which contained exposures, including *via* CDOs, to subprime RMBSs.¹⁷ Margin calls triggered the sale of around USD 4 billion of ABSs over a week period, driving down prices and undermining confidence in the market for these assets. AAA-rated CDO tranches were increasingly difficult to liquidate in the absence of a secondary market. In light of these developments, the funds' brokers further tightened collateral requirements, including on highly rated assets. According to the IMF, haircuts during July and August 2007 on AAA-rated ABSs and CDOs rose from 2-4% to 8-10% and, consistent with this, the cost of insuring AAA home equity loans as measured by various ABX indices soared, even though there had been virtually no defaults on AAA-rated ABSs.¹⁸ Some of the large brokers themselves held a considerable stock of ABSs, which most likely sent additional negative signals to markets as regards ultimate clearing prices, further undermining market liquidity.

Market disturbances then spread from ABS to money markets over the summer 2007, further increasing banks' liquidity risks. Short-term money markets, including interbank, CP and ABCP markets, experienced falling maturities, rollover problems and rising spreads (Charts 6 and 7). Banks relying on securitisation funding had to seek alternative funding sources, as warehousing risks materialised.¹⁹ In some cases, committed, credit or liquidity lines to

14 See Allen and Gale (1994); Huang and Wang (2007).

15 See Allen and Gale (2000); Rochet and Vives (2004).

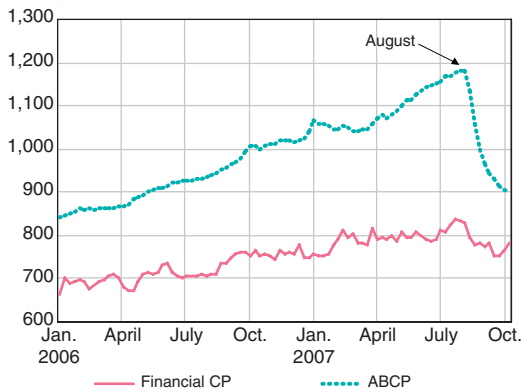
16 See Gatev, Schuerman and Strahan (2005).

17 The subprime residential mortgage market in the US suffered rising delinquencies in 2006 and 2007 as house price inflation slowed and interest rate resets kicked in, resulting in increased uncertainty about the quality of RMBS, including highly rated tranches.

18 See International Monetary Fund -IMF- (September 2007).

19 Fitch (September 2007).

Chart 6
Financial CP (AA) and ABCP outstanding (seasonally adjusted)
(USD billions)

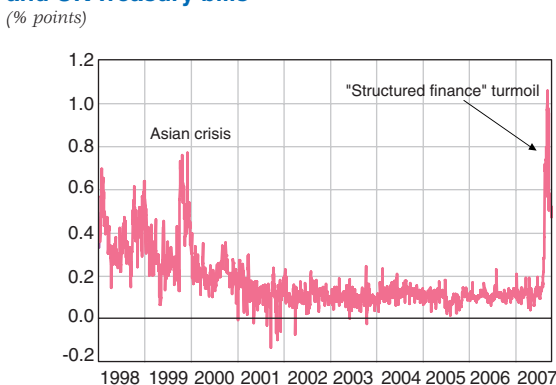


Source: Federal Reserve Board

ABCP conduits, LBOs, and other market participants were activated, further increasing demands on bank liquidity.²⁰

The effects of the initial market liquidity shock and heightened banks' liquidity risks that resulted possibly went beyond levels that can be explained by simple interbank links or by exposures to a common shock. There may have been some rationing of liquidity related to uncertainty about activation of contingent claims stemming from ABCP programs. There may also have been reputational externalities involved. Given asymmetric information, liquidity shortages

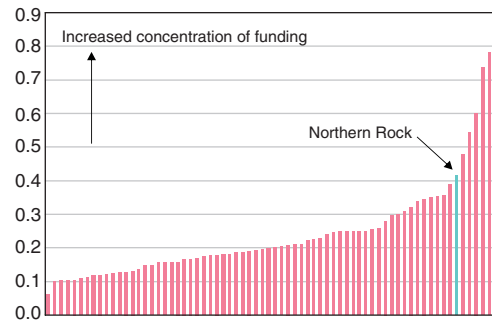
Chart 7
Spread between 3-month UK interbank and UK Treasury bills
(% points)



Source: Datastream

²⁰ The rescue of two German banks, Sachsen LB and IKB Deutsche Industriebank AG, were triggered by an inability to honour liquidity obligations to off-balance sheet vehicles (see Table 1)

Chart 8
Measure of funding concentration of European bank's in 2005
(normalised index)



Note: Based on the Herfindahl index. The higher the index the more concentrated a bank's funding. Here, it is normalised to 1 and based on the sum of squares of the relative shares of nine funding categories provided by Bankscope. The categories are interbank liabilities, retail deposits, wholesale deposits, money market funding, mortgage bonds and subordinated debt, other funding, equity and other liabilities.

Source: Bankscope, based on largest 100 European commercial banks.

revealed at one bank might have signalled something about the banking sector more generally, irrespective of the direct interbank exposures. This might explain the degree of contagion in equity markets from seemingly localised European events, such as the revelation of IKB's problems on 31 July 2007 in Germany to US banks.

Retail deposit funding of smaller-sized banks was also negatively affected in late summer of 2007: Northern Rock, an "originate and distribute" medium-sized UK mortgage lender, was exposed to a run on its retail deposits in mid September 2007 when it emerged that it had difficulties accessing securitisation markets, a major source of concentration of its overall funding. While limited and partial in its description of banks' funding vulnerabilities, a simple measure of funding concentration would indeed have suggested relatively high levels for Northern Rock (Chart 8).

Because of these spillovers between banks and with markets, idiosyncratic liquidity shocks generated considerable aggregate liquidity shortages in August and September 2007, triggering large-scale interventions by central banks worldwide.

3 | MANAGING LIQUIDITY RISKS: THE ROLE OF DISCLOSURE

Banks' vulnerability to market liquidity shocks has clearly increased. To mitigate this fragility, liquidity management is of course of crucial importance. It encapsulates within a forward-looking maturity gap framework the management of liquidity buffers, collateral, credit and liquidity lines and funding sources. Moreover, banks conduct liquidity stress tests to assess their resilience to liquidity shocks, including in changed market liquidity conditions.

Liquidity management practices do of course vary across banks, reflecting different business models and banking environments and partly explaining differences in liquidity buffers from one bank to another. These differences are illustrated in Chart 10 in Section 3|3. Individually, certain banks may also hold liquidity buffers for strategic reasons, to buy up competitors' assets cheaply when the latter experience liquidity problems. Some argue that Citibank's success in the early 20th century was based on such a strategy.²¹ But given that information imperfections are at the heart of liquidity risks, this section focuses explicitly on the role transparency may play in reducing underlying frictions.

3|1 The benefits and costs of disclosure

The 2007 market turbulence episode has led to increased calls for disclosure in the financial sector, largely motivated by a desire to reduce market uncertainty. Indeed, a large body of economic literature supports disclosure of information to investors as a means of reducing asymmetric information and hence facilitating a better allocation of resources. Greater transparency permits greater market discipline, whereby well-managed banks are rewarded, while poorly-managed banks are penalised with higher costs of capital and deposits. Thus, market forces can encourage bank management to adopt safer banking practices, lowering the risk that market disruptions will become systemic problems.

A related argument put forward is that financial institutions would be less exposed to volatile investor behaviour responding to misinformation. Of course, a prerequisite for effective use of disclosure is that there is a functioning market that can exert the necessary discipline on banks (transparency thus depends on financial development).²²

That said, even though greater disclosure may be socially desirable, market failures may prevent sufficient provision of information by market participants. There are a number of reasons why that may be the case. Informational externalities (when information about one bank is mistakenly used to infer information about another bank) could be one of these reasons. This might be because the value of banks' assets is correlated, perhaps because banks have similar business models, asset compositions, or are located in the same region.²³ In such a setting, the release of negative information by one bank can contaminate other banks perceived to be suffering from similar problems.

Empirically, the question whether disclosure always enhances financial stability is not settled either. In 1989, for example, the US Congress decided in the midst of a banking crisis to substantially increase disclosure of supervisory information. According to Jordan, Peek and Rosengren, the information released on supervisory concerns regarding the solvency of individual banks during the banking crisis did not trigger spillovers to healthy banks.²⁴ Yet, in 2007, although transparency about asset compositions appears to have been at the core of recent turbulence, there does not seem to be a clear relationship between disclosure standards in different countries' banking sectors more generally and recent banking-sector stock market declines (Chart 9).²⁵

Asymmetries in information, however, may be just part of a broader information problem prevailing in financial systems. Uncertainty and *imperfect* information that afflict both lenders and borrowers to the same extent may also be significant. A lot of work currently focuses on improving disclosure on the risks of securitisation products and losses experienced in relation to subprime mortgage defaults. In this context, investors, banks and markets are all

21 See Acharya, Gromb and Yorulmazer (2007).

22 See Ratnovski (2007).

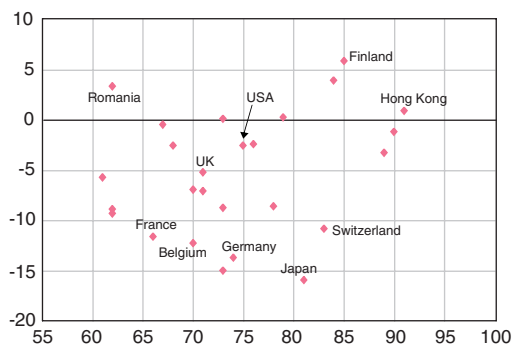
23 See Admati and Pfleiderer (2000); Chen and Hasan (2005).

24 See Jordan, Peek and Rosengren (1999).

25 Of course, share price movements in Chart 9 might also be driven by other factors.

Chart 9
Global banking sectors' initial share price correction and global bank disclosure index

(X-axis: bank disclosure index 2006; Y-axis: % change between 23/8-29/6 2007)



Note: The disclosure index (100 = highest disclosure) is a composite index that aggregates six categories of reporting, namely on loans, other earning assets, deposits, other funding, memo-lines (e.g. contingent liabilities) and income.

Sources: Datastream; World Bank

struggling simultaneously with the issue of how to value complex positions. This suggests that disclosure on uncertain credit fundamentals may be insufficient to restore market confidence. *Instead, disclosure on banks' liquidity itself might be important.* But, as will be shown in Section 3|3, current practices in this area may suffer from severe shortcomings.

3|2 Current practices in disclosure on banks' liquidity and funding risks

According to the 2001 disclosure survey conducted by the Basel Committee, liquidity was one of the areas where most progress on disclosure had been reported.²⁶ Indeed, a large number of banks report positions on liquid assets, notably cash, advances to banks or customers; market and non-market funding sources and related ratios. Data providers such as Bankscope aggregate the various components to produce comparable narrow and broad liquidity measures across banks.

Figures on loan commitments and liquidity lines are also sometimes provided. In some cases, banks disclose in their annual reports the amount

of securities pledged and received as collateral, lines of credit and degree of secured and unsecured lending. Moreover, they also publish liquidity gap analyses, showing the banks' net liquidity positions for different maturities. Qualitative information typically covers the existence of procedures and systems to deal with liquidity risks such as the setting of liquidity limits and establishment of monitoring committees, liquidity contingency plans, responsibility of local entities, policies on exposure to funding sources and limits on unsecured funding gaps. Some banks also explicitly reveal stress test scenarios and the resultant effects on banks' liquidity positions.²⁷ In some cases, central banks conduct such tests jointly with a number of banks.²⁸ Rating agencies also supply the market with information on the strength of banks' liquidity positions. Short-term ratings pick this up explicitly.

In terms of international regulation, there are few concrete mandatory disclosure requirements on liquidity. Under Pillar 3 of the Basel II regime, banks' disclosure is expected to be in line with risk management principles and proportional to the relevance and materiality of information. Specific disclosure requirements largely concern Pillar 1 and capital-related risks. Liquidity risk is specifically only mentioned in relation to securitisation and possibly related liquidity lines.²⁹ Overall, is this disclosure enough for investors to paint an accurate picture about liquidity risks in the banking sector?

3|3 Issues in liquidity disclosure

Firstly, starting off with liquidity buffers, they can only imperfectly capture the liquidity risk of a bank. The book value of assets may differ from the liquidity they can generate. Haircuts on liquid assets vary with market conditions and this is not captured by simple static balance sheet statistics. Moreover, narrow liquidity buffers shown in Chart 10 only report a fraction of "true" liquid assets –some government bonds held outside the trading portfolio (but which

²⁶ See BCBS (2003): "Public disclosure by bank: results of the 2001 disclosure survey".

²⁷ See, for example, Deutsche Bank.

²⁸ See Janssens, Lamoot and Nguyen (2007) for Belgium.

²⁹ Furthermore, when specifically considering the issue of liquidity risks in banks, the Basel Committee states in its "Sound practices for managing liquidity in banking operations" (2000) that "each bank should have in place a mechanism for ensuring that there is adequate disclosure of information about the bank in order to manage public perceptions of the organisation and its sound management (principle 13)".

are potentially very liquid) are for example excluded, but are covered by the broader liquidity measure. How banks categorise assets across the balance sheet thus affects the size of liquidity buffers and comparisons made between banks. In addition, the broad measure shown in Chart 10 excludes securities, such as equities which may be liquid, while it includes other assets –such as less liquid interbank loans with longer-term maturities.

Different buffer measures may also tell different stories over time. In Table 2, changes in classification of debt securities and changes in accounting rules may partly explain why a narrow liquid asset ratio (1) indicates a sharp fall in liquidity buffers between 2001 and 2006, while a broader measure (2) suggests the opposite.³⁰

Similarly, on the basis of the reported assets and liabilities, it may sometimes be difficult to determine whether a given security is available, *i.e.* if it could be used in a repo transaction or not. For

instance, although government bonds are generally considered to be liquid, they may have a liquidity value of zero if they already have been mobilised in a secured transaction, although they are still present on the balance sheet.³¹ Indeed, in repos, the value of securities remains on the borrowing bank's balance sheet despite the potential transfer of ownership.

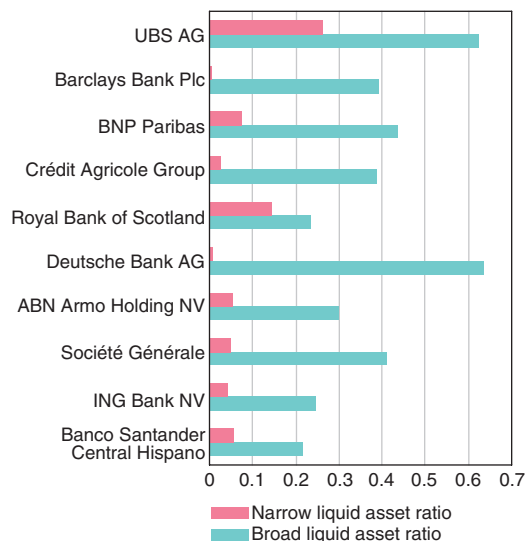
Banks can also use the cash derived from repo transactions to borrow less liquid securities in reverse repos. This again would not be recognised on the balance sheet. Liquid asset positions recorded at one point in time may thus appear more liquid than they really are.

Secondly, some banks centralise liquidity management, which of course affects liquidity ratios of the individual entities and of the consolidating group. A measure at group level is appropriate if liquidity can easily circulate among all the entities of a group, if there are no legal obstacles to its transfer across national borders and if solidarity among all the group entities is ensured.

Finally, liquidity buffers should be compared with potential liquidity needs on the liability side of the balance. A gap or cash flow analysis that matches incoming and outgoing flows of cash for several maturity buckets captures better the time dimension that lies at the heart of liquidity risk management. However, publicly-available information does not allow outsiders to construct an accurate gap analysis for individual banks. For instance, in terms of funding risk, while there may be information on the maturity of funding sources, this does not reveal much about the ease with which these sources could be renewed and how concentrated they are. In sum,

Chart 10
Liquidity buffers across large European banking groups

(share of total assets)



Note: Narrow liquid assets: Deposits and loans to banks (incl. central banks) and governmental authorities with less than three months to run to maturity; quoted/listed government bonds known by Bankscope to be realisable within three months; cash & equivalent.

Broad liquid assets: Deposits with banks (all); loans to banks (all); deposits with central banks & governmental authorities (all); all securities except equities; cash & equivalent.

Source: Bankscope

Table 2
Liquid asset ratios of EU banks

(% of total assets)

	2001	2006
Cash	1.2	1.4
Debt securities	21.7	5.6
Shares/other financial assets booked through P&L	3.7	22.2
(1) Liquid asset ratio (cash + debt)	22.9	7.0
(2) Liquid asset ratio [(1) + shares/other financial assets]	26.6	29.2

Source: BSC (2003) and (2007), 2006 data only refer to IFRS reporting countries.

³⁰ Note, however, that changes over time may also be affected by changes in the underlying sample.

³¹ The data in Chart 10 however adjust for pledgeability.

maturity gap reporting does not explicitly reveal the mechanisms of liquidity management and its underlying complexity.

Previous sections illustrated the difficulty inherent in assessing a credit institution's liquidity risk, especially on the basis of limited public information. A better assessment of liquidity risk may therefore require improved disclosure practices. The definition of best practice with regard to disclosure is no easy task, however.

As already mentioned, the lack of comparability between the data currently disclosed by banks raises questions. With the generalisation of IAS/IFRS, reporting across banks should become more systematic and comparable. But given the principles-based approach of IAS/IFRS, disclosure may still differ in many cases. Taking the example of loan commitments, banks will continue to have significant leeway as to how they report on these contingent exposures. The amount of disaggregation of liquid assets available to make industry-wide comparisons will also remain limited: "due to banks" (which typically accounts for the largest part of liquid assets) covers a broad range of exposures, including short-term collateralised loans. Disclosure of liquidity lines to conduits depends on the degree of consolidation, which itself is open to interpretation, depending on whether the bank "controls" the SPV or not. Recent events suggest that the perimeters of risk consolidation may need to be reconsidered for disclosure to be meaningful.

It might also be difficult for markets to draw relevant conclusions across banks on the basis of qualitative information currently disclosed by banks. For example, on stress tests, it is difficult for outsiders to assess whether a bank's stress test assumptions are internally consistent and how the severity of assumed shocks compares across banks. The following quote, taken from the 2006 *Annual Report* of Northern Rock, illustrates this point: *"The Group's liquidity policy is to ensure that it is able to meet retail withdrawals, repay wholesale funds as they fall due, and meet current lending requirements. [...] This is achieved by managing a diversified portfolio of high quality liquid assets, and a balanced maturity portfolio of wholesale and retail funds."*

Given that liquidity is volatile, contingent and complex, the question relating to the frequency and comprehensiveness at which information should be provided is an important one. In many countries, banks disclose relatively frequently significant details on their liquidity position to supervisors. In Belgium, for example, the scope of reporting to supervisors has recently been enhanced.³² If supervisors benefit from these data, should they not be made available more widely?

Precisely because of its volatile nature, high frequency liquidity information can easily be misinterpreted and thus create destabilising "noise" in markets. There is a risk that by "forcing firms to talk on liquidity", solvent institutions –but with a vulnerable liquidity position– could be subject to runs. Predatory trades and strategies discussed earlier could be encouraged if it is well known who is cash-rich and who is cash-poor, potentially curtailing the provision of liquidity to solvent institutions. Market liquidity could also dry up if markets anticipate the unwinding of large portfolios in particular assets by vulnerable counterparts –as was mentioned in Section 2 in relation to the LTCM crisis. Yet, perhaps if comprehensive and frequent reporting on liquidity *flows* (instead of stocks at a particular point in time) had already been released *ex ante*, institutions might have behaved more conservatively in "liquid" times, thus avoiding the erosion of liquidity under stress. Assuming such discipline is achievable, on which aspects should disclosure focus?

The multidisciplinary working group suggested in 2001 exploring the possibilities of more transparency on funding sources and on market liquidity risks.³³ Instead of static ratios, banks could be requested to publish the output of VaRs that explicitly factor in the risk of reduced market liquidity and to explain funding sources, including risks of concentrations. In addition to what was suggested at the time, regulators could request banks to publish more comprehensive information on liquidity risk management systems, comparable details of stress tests and funding contingency plans. Moreover, information on liquidity and funding flows, the components and counterparts and fluctuations over time could be helpful, as well

³² See Janssens, Lamoot and Nguyen (2007).

³³ See "Multidisciplinary working group on enhanced disclosure", BCBS, CGFS, IAIS, IOSCO (2001).

as an analysis of how these flows feed into and affect banks' balance sheets. Finally, in the spirit of recent reports, it might be useful if rating agencies monitored regularly –on a no-external-support basis– banks' robustness *vis-à-vis* liquidity risks.³⁴

But would these suggestions really help in enhancing banks' resilience to liquidity shocks and overcome problems related to imperfect information and aggregate uncertainty? To answer this question, one would first need to address some of the following deeper issues: can the market really play a disciplining role as regards banks' liquidity management or do markets only take an interest in

liquidity once it has become a problem? In other words, to what extent will markets continuously monitor potential future tail liquidity events –especially if they expect to count on central bank liquidity interventions? For example, assuming that markets knew about Northern Rock's funding concentration, why did they not put pressure on the bank earlier by raising borrowing spreads? Could mandatory disclosure as suggested above make any difference and encourage banks and markets to give more weight to liquidity issues in normal times? While these questions merit deeper reflection and further work, the 2007 market events have clearly shown that current information gaps are large and need addressing.

³⁴ See, for example, Fitch's ad-hoc report (2007): "Liquidity analysis of US securities firms", August.

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