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Liquidity Provision by the Federal Reserve

Remarks by

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Well-functioning financial markets are an essential link in the transmission of monetary policy to the economy and a critical foundation for economic growth and stability. However, since August, severe financial strains have shaken this foundation. A sharp housing contraction has generated substantial losses on many mortgage-related assets and a broad-based tightening in credit availability. Consistent with its role as the nation's central bank, the Federal Reserve has responded not only with an easing of monetary policy but also with a number of steps aimed at reducing funding pressures for depository institutions and primary securities dealers and at improving overall market liquidity and market functioning.¹

In my remarks today, I will begin by reviewing the principles that should guide central banks' actions to support market liquidity. Then, in light of those principles, I will discuss the liquidity measures implemented by the Federal Reserve in response to the financial turmoil. I will conclude by offering some thoughts on liquidity regulation.

The Principles Behind Central Bank Liquidity Provisions

The notion that a central bank should provide liquidity to the banking system in a crisis has a long intellectual lineage. Walter Bagehot's *Lombard Street*, published in 1873, remains one of the classic treatments of the role of the central bank in the management of financial crises. Bagehot noted that the basis of a successful credit system is confidence. In one passage, he writes, "Credit means that a certain confidence is given, and a certain trust reposed. Is that trust justified? and is that confidence wise? These are the cardinal questions" (p. 11). He pointed out that confidence is particularly important in banking and in other situations in which the lender's own liabilities are

¹ Primary securities dealers are broker-dealers that trade in U.S. government securities with the Federal Reserve Bank of New York. The New York Fed's Open Market Desk engages in the trades on behalf of the Federal Reserve System to implement monetary policy.

viewed as very liquid by its creditors. In such situations, as Bagehot put it, "...where the 'liabilities,' or promises to pay, are so large, and the time at which to pay them, if exacted, is so short," borrowers must demonstrate "an instant capacity to meet engagements" (p. 11).

Meeting creditors' demands for payment requires holding liquidity--cash, essentially, or close equivalents. But neither individual institutions, nor the private sector as a whole, can maintain enough cash on hand to meet a demand for liquidation of all, or even a substantial fraction of, short-term liabilities. Doing so would be both unprofitable and socially undesirable. It would be unprofitable because cash pays a lower return than other investments. And it would be socially undesirable, because an excessive preference for liquid assets reduces society's ability to fund longer-term investments that carry a high return but cannot be liquidated quickly.

However, holding liquid assets that are only a fraction of short-term liabilities presents an obvious risk. If most or all creditors, for lack of confidence or some other reason, demand cash at the same time, a borrower that finances longer-term assets with liquid liabilities will not be able to meet the demand. It would be forced either to defer or suspend payments or to sell some of its less-liquid assets (presumably at steep discounts) to make the payments. Either option may lead to the failure of the borrower, so that the loss of confidence, even if not originally justified by fundamentals, will tend to be self-confirming. If the loss of confidence becomes more general, a broader crisis may ensue.

How should a central bank respond to a sharp increase in the demand for cash or equivalents by private creditors? Before talking about Bagehot's answer, I should note that the Bank of England in his time was a hybrid institution--it was privately owned by shareholders, but it also had a public role. To fulfill its public role, the Bank of England

did not in all cases maximize its profits; notably, it held a larger share of its assets in liquid form than did other banks, thereby foregoing some return. Nevertheless, in the context of the gold standard, the Bank's stock of liquid assets was relatively modest in size, raising the possibility that even this quasi-public institution could run out of cash should the demand for liquidity become high enough.² In this context, Bagehot's advice on how the Bank of England should respond to a generalized liquidity shortage was somewhat counterintuitive. He wrote:

In opposition to what might be at first sight supposed, the best [policy] . . . to deal with a drain arising from internal discredit, is to lend freely. The first instinct of everyone is the contrary. There being a large demand on a fund which you want to preserve, the most obvious way to preserve it is to hoard it--to get in as much as you can, and to let nothing go out which you can help. But every banker knows that this is not the way to diminish discredit. This discredit means, 'an opinion that you have not got any money,' and to dissipate that opinion, you must, if possible, show that you have money: you must employ it for the public benefit in order that the public may know that you have it. The time for economy and for accumulation is before. A good banker will have accumulated in ordinary times the reserve he is to make use of in extraordinary times. (p. 24)

And what are the terms at which the central bank should lend freely? Bagehot argues that "these loans should only be made at a very high rate of interest" (p. 99). Some modern commentators have rationalized Bagehot's dictum to lend at a high or "penalty" rate as a way to mitigate moral hazard--that is, to help maintain incentives for private-sector banks to provide for adequate liquidity in advance of any crisis. I will return to the issue of moral hazard later. But it is worth pointing out briefly that, in fact, the risk of moral hazard did not appear to be Bagehot's principal motivation for

² Such a circumstance could arise in two ways: The banking reserve--that is, the liquid assets backing deposits at the Bank of England--could fall to a low level as a result of heavy discounting or the issue reserve--that is gold bullion backing Bank of England notes--could run short because of substantial redemptions by note holders. Indeed, the Bank of England's gold reserves, its ultimate store of liquidity, along with the gold in circulation, were quite small relative to total sterling deposits in the U.K. banking system. This implied, as English historian Sir John Clapham (1945) noted, that there was just a "thin film of gold" (p. 299) tying the pound to the gold standard.

recommending a high rate; rather, he saw it as a tool to dissuade unnecessary borrowing and thus to help protect the Bank of England's own finite store of liquid assets.³ Today, potential limitations on the central bank's lending capacity are not nearly so pressing an issue as in Bagehot's time, when the central bank's ability to provide liquidity was far more tenuous.

Bagehot defined a financial crisis largely in terms of a banking panic--that is, a situation in which depositors rapidly and simultaneously attempt to withdraw funds from their bank accounts. In the 19th century, such panics were a lethal threat for banks that were financing long-term loans with demand deposits that could be called at any time. In modern financial systems, the combination of effective banking supervision and deposit insurance has substantially reduced the threat of retail deposit runs. Nonetheless, recent events demonstrate that liquidity risks are always present for institutions--banks and nonbanks alike--that finance illiquid assets with short-term liabilities.

For example, since August, mortgage lenders, commercial and investment banks, and structured investment vehicles have experienced great difficulty in rolling over commercial paper backed by subprime and other mortgages. More broadly, a loss of confidence in credit ratings led to a sharp contraction in the asset-backed commercial paper market as short-term investors withdrew their funds. And remarkably, some financial institutions have even experienced pressures in rolling over maturing repurchase agreements (repos). I say "remarkably" because, until recently, short-term repos had always been regarded as virtually risk-free instruments and thus largely immune to the

³ A high rate, Bagehot (1873) wrote, "will prevent the greatest number of applications by persons who do not require it" (p. 99) and ensure that "no one may borrow out of idle precaution without paying well for it; that the [Bank of England's] reserve may be protected as far as possible" (p. 99). Moreover, as Clapham (1945) observed, higher interest rates during a period of crisis would draw in gold from abroad, easing strains on the Bank.

type of rollover or withdrawal risks associated with short-term unsecured obligations. In March, rapidly unfolding events demonstrated that even repo markets could be severely disrupted when investors believe they might need to sell the underlying collateral in illiquid markets. Such forced asset sales can set up a particularly adverse dynamic, in which further substantial price declines fan investor concerns about counterparty credit risk, which then feed back in the form of intensifying funding pressures.

Recent research by Allen and Gale (2007) confirms that, in principle at least, “fire sales” forced by sharp increases in investors’ liquidity preference can drive asset prices below their fundamental value, at significant cost to the financial system and the economy. Their work underscores the basic logic in Bagehot’s prescription for crisis management: A central bank may be able to eliminate, or at least attenuate, adverse outcomes by making cash loans secured by borrowers’ illiquid but sound assets. Thus, borrowers can avoid selling securities into an illiquid market, and the potential for economic damage--arising, for example, from the unavailability of credit for productive purposes or the inefficient liquidation of long-term investments--is substantially reduced.

Liquidity Powers of Other Central Banks

This prescription for providing liquidity in a crisis is simple in theory, but, in practice, it can be far more complicated. For instance, how should the central bank distinguish between institutions whose liquidity pressures stem primarily from a breakdown in financial market functioning and those whose problems fundamentally derive from underlying concerns about their solvency? The answer, at times, is by no means straightforward. There are other complexities, too. Central banks provide liquidity through a variety of mechanisms, including open market operations and direct

credit extension through standing lending facilities. The choice of tools in a crisis depends on the circumstances as well as on specific institutional factors.

The European Central Bank (ECB), for example, routinely conducts open market operations with a wide range of counterparties against a broad range of collateral. In recent months, in light of intense pressures in term funding markets, the ECB has provided relatively large quantities of reserves through longer-term open market operations. Extending this strategy, the ECB also introduced a new refinancing operation with a six-month maturity. The first of these was executed on April 2 and was well received. The Bank of England has followed a similar strategy, expanding their term open market operations and accepting a wider range of collateral. Very recently, the Bank of England also initiated a special liquidity facility that allows banks to swap high-quality mortgage-backed and other securities for U.K. Treasury bills.

Differences in legal and institutional structure have affected the methods used by various central banks to inject liquidity in their markets. In the United States, in ordinary circumstances only depository institutions have direct access to the discount window, and open market operations are conducted with just a small set of primary dealers against a narrow range of highly liquid collateral. In contrast, in jurisdictions with universal banking, the distinction between depository institutions and other types of financial institutions is much less relevant in defining access to central bank liquidity than is the case in the United States. Moreover, some central banks (such as the ECB) have greater flexibility than the Federal Reserve in the types of collateral they can accept in open market operations. As a result, some foreign central banks have been able to address the recent liquidity pressures within their existing frameworks without resorting to extraordinary measures. In contrast, the Federal Reserve has had to use methods it does

not usually employ to address liquidity pressures across a number of markets and institutions. In effect, the Federal Reserve has had to innovate in large part to achieve what other central banks have been able to effect through existing tools.

The financial distress since August has also underscored the importance of international cooperation among central banks. For some time, central banks have recognized that managing crises involving large financial institutions operating across national borders and in multiple currencies can present difficult challenges. Funding pressures can easily arise in more than one currency and in more than one jurisdiction. In such cases, central banks may find it essential to work closely together. For just this reason, the Federal Reserve, the ECB, and the Swiss National Bank have established currency swap arrangements and have coordinated their provision of dollar liquidity to international financial institutions over recent months.

Federal Reserve Liquidity Operations

In the United States, open market operations have long been the principal tool used by the Federal Reserve to manage the aggregate level of reserves in the banking system and thereby control the federal funds rate. The discount window has typically functioned as a backstop, serving as a source of reserves when conditions in the federal funds market tighten significantly or when individual depository institutions experience short-term funding pressures. Throughout much of the Federal Reserve's history, this basic structure has proven adequate to address liquidity pressures, even during some periods of market turmoil.

However, it became abundantly clear that this traditional framework for liquidity provision was not up to addressing the recent strains in short-term funding markets. In particular, the efficacy of the discount window has been limited by the reluctance of

depository institutions to use the window as a source of funding. The “stigma” associated with the discount window, which if anything intensifies during periods of crisis, arises primarily from banks’ concerns that market participants will draw adverse inferences about their financial condition if their borrowing from the Federal Reserve were to become known.

The Federal Reserve has taken steps to make discount window borrowing through the regular primary credit program more attractive. Most notably, we narrowed the spread of the primary credit rate over the target federal funds rate from 100 basis points in August to only 25 basis points today. In addition, to address the pressures in term funding markets, we now permit depositories to borrow for as long as 90 days, renewable at their discretion so long as they remain in sound financial condition. These actions have had some success in increasing depository institutions’ willingness to borrow. Moreover, the existence of the option to borrow through the discount window, even if not exercised, likely has improved confidence by assuring depository institutions that backstop liquidity will be available should they need it.

Still, the continuing disruptions in short-term funding markets over recent months suggested that new ways of providing liquidity were necessary. Last December, the Federal Reserve introduced the Term Auction Facility, or TAF, through which predetermined amounts of discount window credit are auctioned every two weeks to eligible borrowers for terms of 28 days. In effect, TAF auctions are very similar to open market operations, but conducted with depository institutions rather than primary dealers and against a much broader range of collateral than is accepted in standard open market operations. The TAF, apparently because of its competitive auction format and the certainty that a large amount of credit would be made available, appears to have

overcome the stigma problem to a significant degree. Indeed, a large number of banks--ranging from 52 to more than 90--have participated in each of the 11 auctions held thus far. The TAF has also simplified the implementation of monetary policy by providing greater predictability of the level of borrowings by depository institutions and consequently of bank reserves. The size of individual TAF auctions has been raised over time from \$20 billion at the inception of the program to \$75 billion in the auctions this month. We stand ready to increase the size of the auctions further if warranted by financial developments.

The recent market turmoil has also affected the liquidity positions of financial institutions that do not ordinarily have access to the discount window. In particular, prior to the recent experience, it was believed that primary dealers were not especially susceptible to runs by their creditors. Primary dealers typically rely on short-term secured financing arrangements, and the collateralization of those borrowings was thought sufficient to maintain the confidence of investors. Consequently, dealers' liquidity management policies and contingency plans were typically based on the assumption that they would not be faced with a sudden loss of financing.

But these beliefs were predicated on the assumption that financial markets would always be reasonably liquid. As I have already noted, recent events have proven that assumption unwarranted, and the risk developed that liquidity pressures might force dealers to sell assets into already illiquid markets. This might have resulted in Allen and Gale's fire sale scenario that I mentioned earlier, in which a cascade of failures and liquidations sharply depresses asset prices, with adverse financial and economic implications.

This heightened risk led the Federal Reserve to expand its ability to supply liquidity to primary dealers. In March, to ease strains that had developed in the agency mortgage-backed securities market, the Federal Reserve initiated as part of its open-market operations a series of single-tranche repurchase transactions with terms of roughly 28 days and cumulating to up to \$100 billion. For the purposes of these transactions, primary dealers can deliver as collateral any securities eligible in conventional open market operations. Additionally, the Federal Reserve introduced the Term Securities Lending Facility (TSLF), which allows primary dealers to exchange less-liquid securities for Treasury securities for terms of 28 days at an auction-determined fee. Recently, the Federal Reserve expanded the list of securities eligible for such transactions to include all AAA/Aaa-rated asset-backed securities.

By mid-March, however, the pressures in short-term financing markets intensified, and market participants were speculating about the financial condition of Bear Stearns, a prominent investment bank. On March 13, Bear advised the Federal Reserve and other government agencies that its liquidity position had significantly deteriorated, and that it would be forced to file for bankruptcy the next day unless alternative sources of funds became available. A bankruptcy filing would have forced Bear's secured creditors and counterparties to liquidate the underlying collateral and, given the illiquidity of markets, those creditors and counterparties might well have sustained losses. If they responded to losses or the unexpected illiquidity of their holdings by pulling back from providing secured financing to other firms, a much broader liquidity crisis would have ensued. In such circumstances, the Federal Reserve Board judged that it was appropriate to use its emergency lending authorities under the Federal Reserve Act to avoid a disorderly closure of Bear. Accordingly, the Federal Reserve, in close consultation with the

Treasury Department, agreed to provide short-term funding to Bear Stearns through JPMorgan Chase. Over the following weekend, JPMorgan Chase agreed to purchase Bear Stearns and assumed the company's financial obligations. The Federal Reserve, again in close consultation with the Treasury Department, agreed to supply term funding, secured by \$30 billion in Bear Stearns assets, to facilitate the purchase.

In a further effort to short-circuit a possible downward spiral in financing markets, the Federal Reserve used its emergency authorities to create the Primary Dealer Credit Facility (PDCF). The PDCF allows primary dealers to borrow at the same rate at which depository institutions can access the discount window, with the borrowings able to be secured by a broad range of investment-grade securities. In effect, the PDCF provides primary dealers with a liquidity backstop similar to the discount window for depository institutions in generally sound financial condition.

To date, our liquidity measures appear to have contributed to some improvement in financing markets. The existence of the PDCF seems to have bolstered confidence among primary dealers' counterparties (including the clearing banks, which provide the dealers with critical intra-day secured credit). In addition, conditions in the Treasury repo market, which became very strained around mid-March, have improved substantially. Liquidity is better in several other markets as well. For example, spreads on agency mortgage-backed securities have dropped in recent weeks after reaching very high levels in mid-March, as have spreads between conforming fixed-rate mortgage rates and Treasury rates. Spreads on jumbo mortgage loans have retraced a portion of their earlier large increases, but recent regulatory and legislative changes make it difficult to assess the impact of liquidity measures in that segment of the market. Corporate debt spreads have also declined somewhat from recent highs.

These are welcome signs, of course, but at this stage conditions in financial markets are still far from normal. A number of securitization markets remain moribund, risk spreads--although off their recent peaks--generally remain quite elevated, and pressures in short-term funding markets persist. Spreads of term dollar Libor over comparable-maturity overnight index swap rates have receded some from their recent peaks but remain abnormally high.⁴ Funding pressures have also been evident in the strong participation at recent TAF auctions even after the recent expansions in auction sizes, and, of late, depository institutions have borrowed significant amounts under the primary credit program for terms of up to 90 days.

Ultimately, market participants themselves must address the fundamental sources of financial strains--through deleveraging, raising new capital, and improving risk management--and this process is likely to take some time. The Federal Reserve's various liquidity measures should help facilitate that process indirectly by boosting investor confidence and by reducing the risks of severe disruption during the period of adjustment. Once financial conditions become more normal, the extraordinary provision of liquidity by the Federal Reserve will no longer be needed. As Bagehot would surely advise, under normal conditions financial institutions should look to private counterparties and not central banks as a source of ongoing funding.

Liquidity Regulation and Moral Hazard

The provision of liquidity by a central bank can help mitigate a financial crisis. However, central banks face a tradeoff when deciding to provide extraordinary liquidity support. A central bank that is too quick to act as liquidity provider of last resort risks inducing moral hazard; specifically, if market participants come to believe that the

⁴ Libor is the London interbank offered rate, a standard measure of the cost of funds in the interbank market.

Federal Reserve or other central banks will take such measures whenever financial stress develops, financial institutions and their creditors would have less incentive to pursue suitable strategies for managing liquidity risk and more incentive to take such risks.

Although central banks should give careful consideration to their criteria for invoking extraordinary liquidity measures, the problem of moral hazard can perhaps be most effectively addressed by prudential supervision and regulation that ensures that financial institutions manage their liquidity risks effectively in advance of the crisis. Recall Bagehot's advice: "The time for economy and for accumulation is before. A good banker will have accumulated in ordinary times the reserve he is to make use of in extraordinary times" (p. 24). Indeed, under the international Basel II capital accord, supervisors are expected to require that institutions have adequate processes in place to measure and manage risk, importantly including liquidity risk. In light of the recent experience, and following the recommendations of the President's Working Group on Financial Markets (2008), the Federal Reserve and other supervisors are reviewing their policies and guidance regarding liquidity risk management to determine what improvements can be made. In particular, future liquidity planning will have to take into account the possibility of a sudden loss of substantial amounts of secured financing. Of course, even the most carefully crafted regulations cannot ensure that liquidity crises will not happen again. But, if moral hazard is effectively mitigated, and if financial institutions and investors draw appropriate lessons from the recent experience about the need for strong liquidity risk management practices, the frequency and severity of future crises should be significantly reduced.

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