

Two Cheers for Bagehot*

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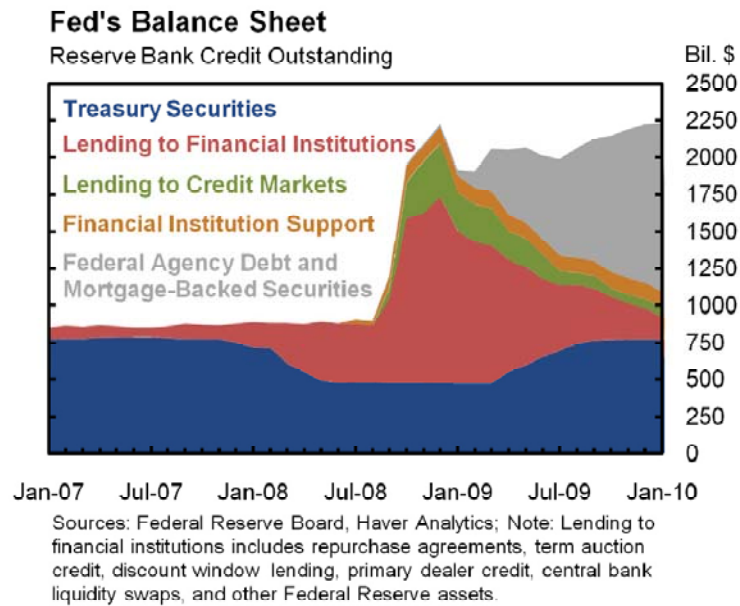
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The global financial crisis and ensuing recession that began in 2007 have tested and stretched the traditional roles of central banking. In particular, the Federal Reserve has undertaken a multi-pronged attack on the sources and consequences of the crisis. This has included conventional and “unconventional” monetary policy actions, including lowering interest rates effectively to zero and greatly expanding its balance sheet holdings of mortgage-related securities. It has joined forces with other regulatory agencies and the Treasury Department in conducting the “stress tests” of the largest bank holding companies with the goal of assuring that these institutions hold adequate capital to see them through the economic storm. Finally, it has acted as a lender of last resort for much of the financial system, greatly expanding the provision of liquidity and support to banks and to key distressed sectors of the financial system. This paper focuses on the third aspect of the Fed’s attack on the crisis.

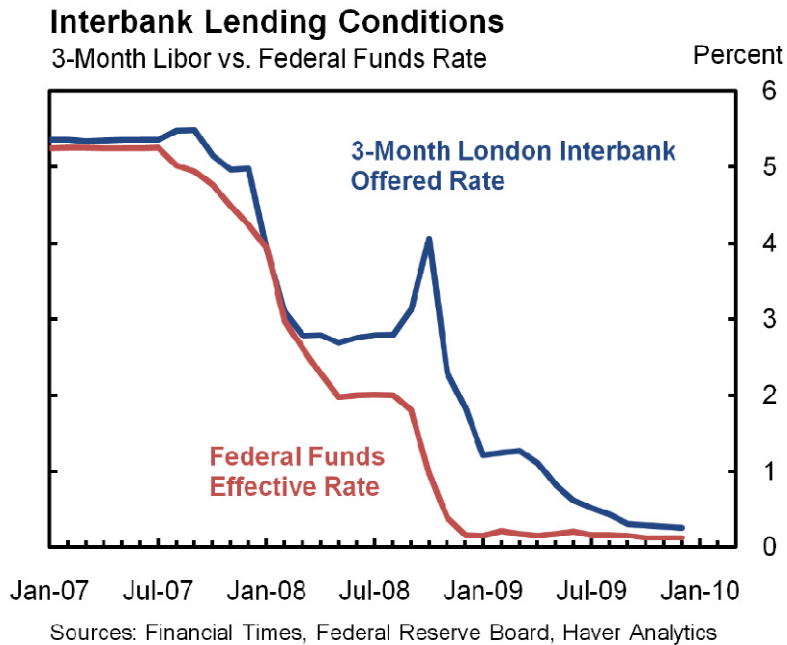
As emphasized by Madigan (2009), modern central bank lender of last resort policies are guided by the dictum laid down by Walter Bagehot over a century ago, that is, to lend freely to solvent institutions on good collateral and at a high interest rate. Kiyotaki and Moore (2008) show that in theory lender of last resort policies of this type can be very powerful at mitigating the effects of liquidity crises. During the crisis the Federal Reserve, as well as other central banks, applied this principle again and again, often in new and innovative ways. The experiences of the crisis have highlighted the critical need for a lender of last resort liquidity policies as well as their limitations.

Figure 1: The Asset Side of the Fed's Balance Sheet



In examining the use and effects of lender of last resort policies, it is useful to divide the financial crisis into two stages. The first stage began in the summer of 2007, when disruptions in interbank lending markets emerged. The Fed's actions during this stage were focused on providing liquidity to the banking sector through various forms of discount window loans. The second stage began in the spring of 2008 when stresses developed in the markets funding investment banks. In the fall of 2008 matters took a sharp turn for the worse, when two large financial institutions failed: the investment bank Lehman Brothers and the savings and loan Washington Mutual. Several others threatened to go under. The danger of the failure of other systemically important financial institutions threatened the entire financial system and caused parts of the commercial paper market and the asset-backed securitization market to freeze up. In response to these events, the Fed extended discount window lending to non-depository institutions in support of key segments of non-bank funding markets. At its peak in late 2008, Fed lending programs (including swaps with foreign banks) totaled over \$1.5 trillion (Figure 1).

Figure 2: A Black Swan in the Money Market



Bagehot and Black Swans

Starting in early 2007, the rising number of delinquencies on subprime mortgages was a wake-up call to lenders and investors that many residential mortgages were not nearly as safe as was once believed. Investors and financial institutions became increasingly nervous about their own exposure to risk and the financial health of firms with which they did business. It became very difficult to determine the value of many loans and mortgage-related securities. In addition, the widespread use of complex and exotic financial instruments made it even harder to figure out the vulnerability of financial institutions to losses. Institutions became increasingly reluctant to lend to each other. In August 2007, these fears about the financial health of counterparties and the banking system as a whole led to disruptions in the wholesale bank lending market.

As shown in Figure 2, the “Libor” interbank lending rate for a term of three months rose significantly above the overnight federal funds rate in August 2007. The rise in term lending

rates relative to corresponding overnight rates was a sharp departure from past experience, causing Taylor and Williams (2009) to label it a “black swan” event. Spreads on other term interbank loans similarly rose. The predominant explanation for the rise in term lending spreads was banks’ unwillingness to tie up funds for even a month despite the existence of otherwise profitable loans. This appetite for hoarding cash was traced back to uncertainty about the future availability of, and need for, funds in light of the mortgage market meltdown. In this view, there was a shortage of “liquidity” for term interbank lending, despite ample liquidity for overnight lending.

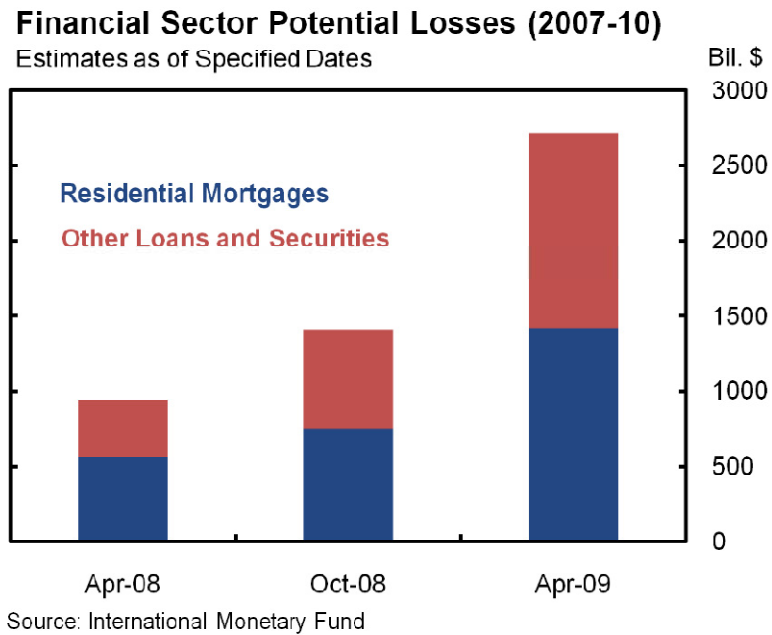
In theory, the presence of the Fed as a lender of last resort should have been very effective at limiting stresses in the interbank market resulting from a shortage of term liquidity that emerged in the summer of 2007. After all, healthy banks with good collateral can borrow from the Fed’s discount window whenever they wish, just as Bagehot advised. Moreover, banks can rollover overnight discount window loans or borrow at terms of up to a month, so the presence of the discount window addresses stresses in term lending markets as well.

Banks initially shunned the discount window, evidently in part owing the perceived stigma associated with borrowing from the Fed. There was a perception that the Fed prefers banks use private sources for liquidity rather than the discount window. In addition, borrowing at a high penalty rate—at that time, 100 basis points above the federal funds target rate—could be perceived as a sign of weakness if discovered by market participants (discount window transactions are not made public, but borrowing totals in each of the 12 Federal Reserve districts are released on a weekly basis.)

The Fed took a number of steps aimed at overcoming stigma and any other impediments interfering with use of the discount window. In August 2007, it publicly encouraged use of the discount window through a press release. It also lowered the “penalty” on discount rate loans to 50 basis points, from 100 basis points (it later lowered to further to just 25 basis points.) In December 2007, it began regular auctions of one-month discount-window loans to banks through the newly-created Term Auction Facility (TAF). The conditions for participating in the TAF were the same as for primary credit loans at the discount window. The key innovation was the auction format. The initial quantity of TAF credit put up for bid was relatively small, but it was expanded several times over the following year and extended to 3-month loans (see Taylor and Williams, 2009, for details on the TAF). At the same time, the Fed also created swap lines with several foreign central banks to increase the availability of dollar-denominated loans to banks in those countries. TAF auctions were setup in Switzerland and the European Central Bank. Because of its auction format, the TAF is generally thought to have been effective at reducing banks reluctance to borrow at the discount window.

However, despite the Fed’s concerted efforts to reduce stigma through the TAF, central bank-provided liquidity alone proved insufficient to relieve stresses in the interbank market. Although spreads on term interbank loans declined following the announcement of the TAF, they remained elevated relative to pre-crisis levels and, in fact, reached all-time highs in late 2008 after the crisis intensified.

Figure 3: Estimated Losses Skyrocket



The Fed's discount window programs could only do so much in reducing term interbank spreads because they are designed to address liquidity shortages, not problems caused by potential insolvency. Of course, liquidity and solvency are inextricably bound and completing separating the two is an impossible task. A number of research papers have investigated the behavior of term interbank spreads during the crisis (McAndrews et al 2009, Christensen et al 2009, Taylor and Williams, 2009, and Wu 2009). A consistent finding in the literature is that counterparty risk, not only liquidity, was an important factor in explaining the rise in term interbank spreads during the crisis. Evidence for the increase in counterparty risks is seen, for example, in the sustained rise in the rates on credit default swap rates for major banks and the rise in the spread between rates on unsecured and secured loans (RPs).

Skyrocketing financial losses potentially threatened the viability of many financial institutions. As the mortgage meltdown intensified, the magnitude of expected losses rose

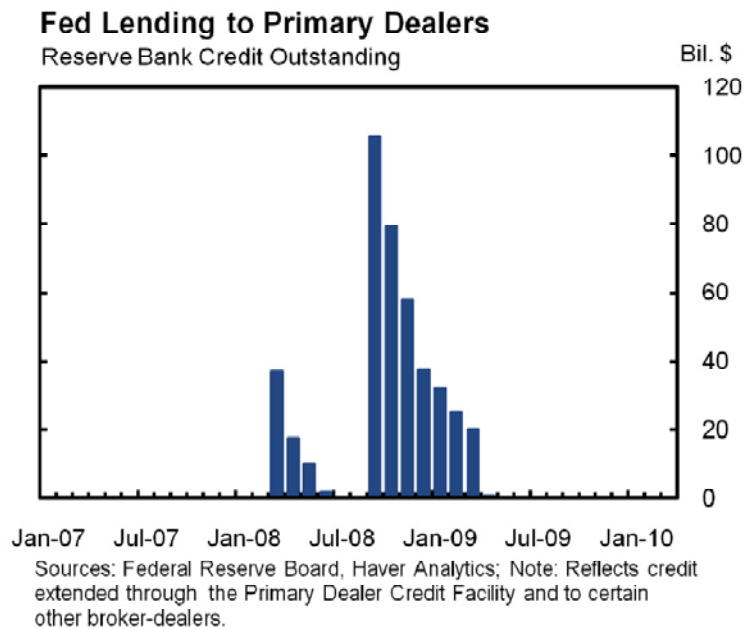
dramatically. In October 2007, shortly after the onset of the U.S. housing bust, the International Monetary Fund (IMF) estimated that financial institutions' losses related to U.S. residential mortgages would total \$240 billion. By April 2009, the IMF's estimate was nearly six times larger, exceeding \$1.4 trillion. Because millions of U.S. mortgages were repackaged as securities, these losses spread across the globe. IMF estimates of losses of all types of loans and loan-related securities, originated in the United States and abroad, skyrocketed as well, as seen in Figure 3. The IMF's (2009) most recent estimate is that global losses over 2007-2010 will total an astounding \$2.8 trillion.

Indeed, term interbank spreads did not return to relatively low levels until other interventions directed at the health of the banking system were enacted. These included capital injections from TARP, the FDIC's introduction in October 2008 of the Temporary Liquidity Guarantee Program, which provided guarantees on newly issued bank debt and expanded deposit insurance coverage, and the regulatory stress tests conducted in the spring of 2009. These interventions improved the stability and helped rebuild confidence in the banking system.

Bagehot for the 21st Century

In early 2008 the tentacles of the crisis spread further throughout the financial system. Amid a widespread collapse of confidence in early 2008, investment banks, including those that were primary dealers of government securities, had trouble obtaining short-term funding. Investment banks, who rely on repurchase agreements for short-term funding, proved to be vulnerable to liquidity shortages very similar to bank runs (Adrian et al 2009). The crucial

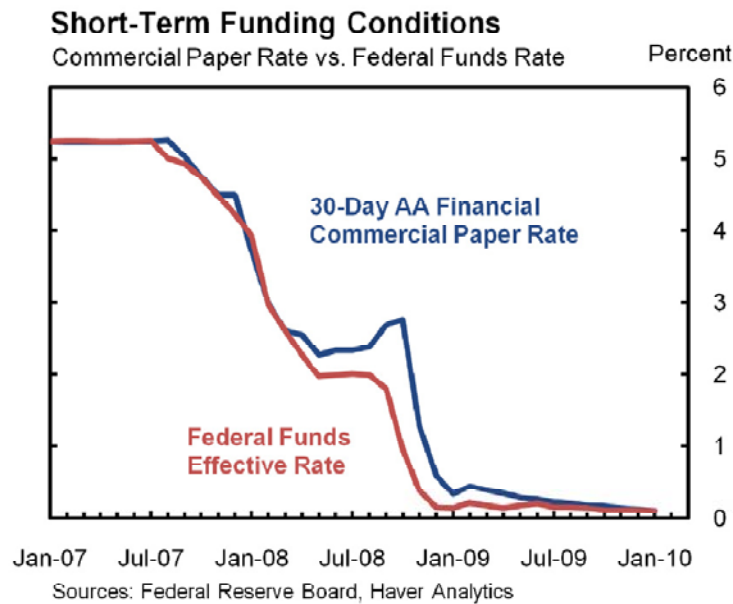
Figure 4: The Primary Dealer Credit Facility (PDCF)



difference being that investment banks are not covered by deposit insurance and do not have access to the discount window.

In response to the impairment in this market, the Federal Reserve expanded its own collateralized lending to primary dealers to ensure that they had access to the critical funding needed for day-to-day operations. Normally, the Federal Reserve provides collateralized discount window loans only to institutions that take deposits, such as commercial banks. But, in March 2008, the Fed, exercised its authority in cases of “unusual and exigent circumstances,” to expand discount window access beyond depository institutions for the first time in many decades (see Fettig, 2002, for a history of the Fed’s authority to lend to non-depository institutions). It created the Primary Dealer Credit Facility (PDCF; see Adrian et al, 2009, for a detailed discussion.)

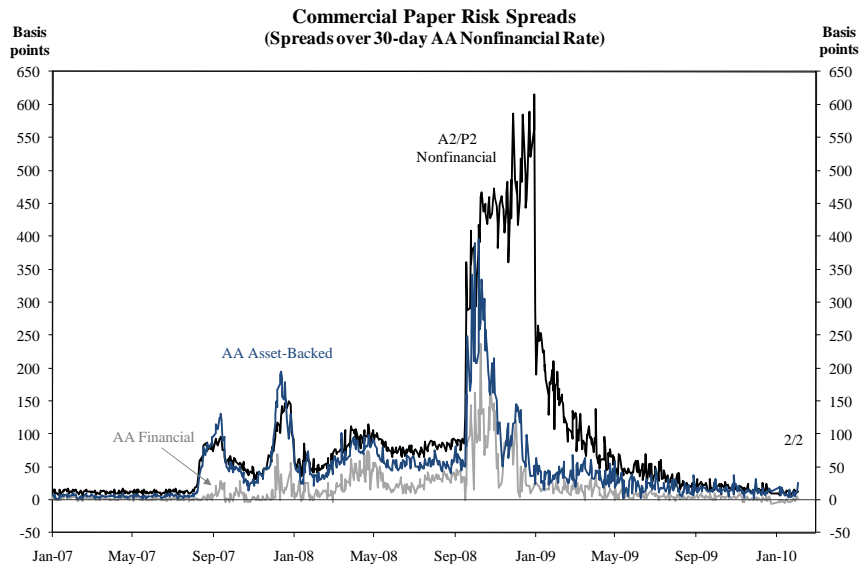
Figure 5: The Commercial Paper Market



The Fed also introduced the Terms Securities Lending Facility (TSLF), which provided term loans of Fed holdings of Treasury securities for certain types of collateral (see Fleming et al, 2009, for a description and analysis). These facilities were designed to improve access to liquidity and to reduce fears of future liquidity shortages. As seen in Figure 4, the PDCF was used during the spring of 2008, but then rose sharply following the intensification of the crisis in September 2008. Like the discount window programs for banks, the PDCF purpose was to provide liquidity consistent with Bagehot's dictum.

The next stage of the widening of the use of discount window occurred in the fall of 2008, following the failure of Lehman Brothers. Large losses at a big money market mutual fund extended the crisis to a part of the financial system previously regarded as safe, prompting investors to pull their money out that held commercial paper. Short-term lending to financial corporations in the commercial paper market froze and spreads on commercial paper shot up, as seen in Figure 5.

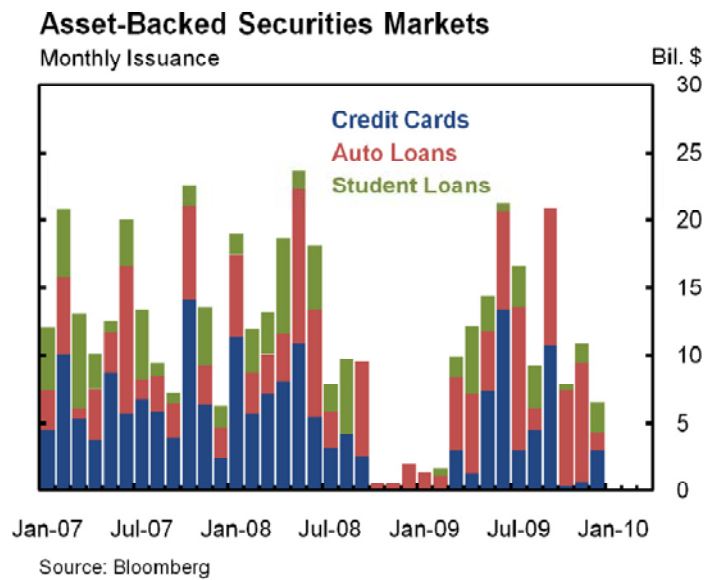
Figure 6: Differential Effects in the Commercial Paper Market



In October 2008, the Federal Reserve provided secured loans to institutions in the money market mutual fund sector and high-quality segments of the commercial paper markets. These programs, the Money Market Investor Funding Facility (MMIFF) and the Commercial Paper Funding facility (CPFF), were designed to restore functioning to these markets that had frozen. These facilities made nonrecourse loans to special purpose vehicles for the purchase of very high-quality commercial paper.

In order to limit the possibility of losses from the CPFF, the Federal Reserve limited the investments to the highest rated securities, which restricted the reach and benefits of the program. The Fed was explicitly taking on a small amount of tail event risk through the CPFF. Some default risk is always present in lender of last resort operations. But, in practice, the haircut on the collateral and the short term of a discount window loan to a bank makes a loss highly unlikely. The structure of the programs directed at capital market funding sources differs from those for banks. To be assured of minimal risk to the Fed limited the program to only very

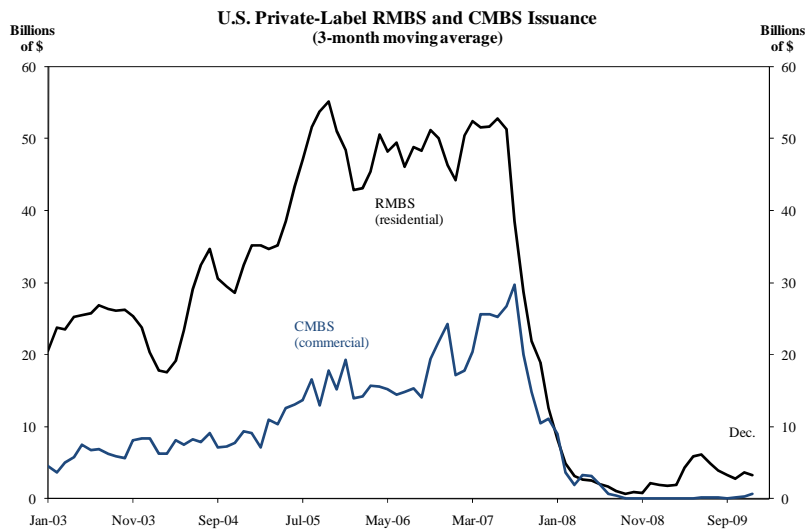
Figure 7: Term Asset-backed Securities Loan Facility (TALF)



high quality commercial paper. These programs were highly effective at bringing commercial paper spreads of high-quality paper back down, as seen in Figure 6. But, spreads on lower-quality paper excluded from the program remained extremely elevated for several months.

The intensification of the crisis in late 2008 also saw a freezing up of securitization markets. As seen in Figure 7, issuance of asset-backed securities for tried-and-true products such as credit cards, auto loans, and students loans came to a grinding halt. In November 2008, the Federal Reserve announced the creation of the Term Asset-Backed Securities Loan Facility (TALF) that provides loans to help finance the issuance of asset-backed securities. Like the CPFF described above, the reach of this program was limited by the requirement that the Fed's loan be adequately safe, which limited its loans to only the highest quality segment. One innovation is that the Treasury department took on some of the risk of the TALF loans, expanding the availability of credit under the program.

Figure 8: Private-label Real Estate MBS Markets Remain Moribund



After a slow start, issuance of asset-backed securities for these types of loans picked up in 2009. Issuance of other segments that did not receive support from the TALF, such as private-label mortgage-backed securities shown in Figure 8, remained moribund through last year (in July 2009 the TALF included some categories of commercial real estate MBS).

The Limits to Bagehot

The recent crisis has highlighted both the importance and limitations of central bank lender of last resort policies. The Federal Reserve acted quickly and creatively to provide liquidity to the banking sector and critical financial markets. These actions significantly reduced the fallout from the financial crisis from what it might have otherwise been. Importantly, they were conducted as part of a concerted international effort to reduce stresses in funding markets.

But, recent events also demonstrate the limitations of Bagehot's principles. Like Irving Kristol's (1978) withholding of one cheer for capitalism, Bagehot's principles, although

valuable, can only go so far in averting panics and crises in the 21st century. In particular, the liquidity crises were often the proximate causes of market disruptions and stresses, while the ultimate cause was the possibility of insolvency of major financial institutions owing to massive losses associated with the mortgage meltdown and the global recession. Of course, issues of insolvency cannot be solved by central bank liquidity policies. These are properly the domain of the fiscal authority. A key lesson of the crisis is the need for fiscal and supervisory interventions that deal with the insolvency issues more directly such as capital injections. In the case of the United States, an additional critical need is a resolution mechanism for systematically important financial institutions that limits the risk of contagion from an institutions' failure.

The crisis also demonstrated the risk of runs on the capital market-based funding system. Like traditional commercial banks, investment banks and commercial paper markets are susceptible to panics and contagion absent a lender of last resort or insurance. The Federal Reserve acted boldly to avert a far worse crisis, but absent regulatory changes, these actions have increased the moral hazard problem regarding liquidity management. A key issue for the future is how to reduce the risks and consequences of runs in these markets. Experience from the crisis suggest that lender of last resort policies will be more effective if there is the fiscal authority takes on some risk, given the limitations on central bank risk taking.

Finally, the crisis put the Federal Reserve and other central banks in the unavoidable, and unwelcome, role of appearing to pick “winners” and “losers” in choosing which market segments to lend to. Such choices blur the distinction between monetary and fiscal policy, potentially undermining central bank independence.

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