

## The Role of Central Bank Lending in the Conduct of Monetary Policy

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Central banks can extend credit in pursuit of different policy objectives, two of which are discussed in this *Economic Brief*. First, lending can be used to achieve interest rate control. Second, lending can be used to provide liquidity insurance. A narrow view of central bank lending emphasizes the first objective, in which subsidized credit to targeted market participants is not seen as essential. A broader view considers targeted lending as sometimes necessary. Which perspective is favored is largely, though not wholly, dependent on judgments about the prevalence of frictions that inhibit the market's ability to allocate liquidity.

The preamble to the Federal Reserve Act states that the Fed was created to “furnish an elastic currency.” During the early years of the Fed, this objective was accomplished primarily through loans from the Fed to commercial banks. In particular, regional Reserve Banks provided lending through their “discount windows.” While the Fed now primarily uses open market operations — the buying and selling of government securities — to expand or contract the amount of money in the banking system, it continues to lend directly to market participants.<sup>1</sup>

This *Economic Brief* discusses two alternative views of the role of central bank lending in the conduct of monetary policy. First, under a narrow view, central bank lending serves a limited role as one of the tools for achieving interest rate control. In particular, a standing lending facility is often thought to be useful in limiting high-frequency volatility in a policy rate that results from trading among market participants. Second,

under a broader view, the central bank's activities go beyond interest rate control and extend to the provision of liquidity insurance to eligible institutions. Direct lending is the primary tool for providing this insurance.<sup>2</sup>

These two different views rest on different perceptions of how well the interbank market is able to allocate liquidity across firms. Under the narrow view, central bank lending is a way to change the aggregate supply of money in the economy. This frictionless view suggests that implementation of monetary policy can be accomplished entirely with open market operations that affect the aggregate supply of central bank money without specific attention to the distribution of that supply among financial institutions — which is left to be determined by market forces. If the central bank has the flexibility to conduct operations whenever it perceives a significant shift in the demand for central bank money — for instance due to unusually

large interbank payment flows — then it can satisfy that demand without resorting to direct lending.

The broader view rests on the idea that significant frictions inhibit the market’s ability to re-allocate liquid assets across institutions. We will discuss later some of the frictions that have been suggested in the literature as justifications for direct and targeted lending by the central bank.

When the central bank provides credit to individual institutions as a form of liquidity insurance, the problem of moral hazard can arise. Moral hazard is a potential concern in any form of insurance because the insurance can dampen incentives to avoid risks. Hence, banks with access to central bank credit might put themselves at greater risk of illiquidity — for instance by increasing the mismatch between the maturities of their assets and liabilities. If, in addition, the central bank cannot perfectly differentiate between liquidity stress and solvency problems, then moral hazard problems become even more severe. When lending creates the possibility of subsidized credit to insolvent institutions, then banks’ risk-taking incentives are dampened in a way that includes not just their liquidity management decisions, but also broader portfolio decisions that affect their risk of failure. An important additional consideration is that extensive central bank lending can alter the allocation of credit across markets or institutions, resembling fiscal policy, a function of Congress, not the central bank.<sup>3</sup>

Weighing costs against benefits of liquidity provision is difficult. While the theoretical literature has provided stylized models of frictions that can motivate such central bank interventions, these are generally not well-suited to making quantitative cost-benefit assessments. For instance, both the costs and the benefits of an intervention in such a model typically depend on the severity of informational or other problems, which are inherently difficult to quantify.

### **The Narrow View**

The narrow view of the role of central bank lending in the conduct of monetary policy is based on the hypothesis that there are only minimal frictions af-

fecting the redistribution of reserves across the banking system. Under this hypothesis, the central bank can achieve effective control of short-term interest rates by managing the supply of money (mainly bank reserves) with open market operations and by setting the interest rates on depositing with or borrowing from the central bank.

Among the most common articulations of interest rate policy under the narrow view is the model of reserves management developed by William Poole.<sup>4</sup> In this framework, the demand for reserves is driven by uncertainty in the interbank payment flows arising from banks’ intermediary services to customers combined with a cost to banks of finding themselves short of reserves late in the day. The nature of that cost depends on the central bank’s treatment of bank reserves — often some combination of reserve requirements and a penalty rate for overnight borrowing from the central bank. In terms of frictions, the important assumption in this model is that interbank trading is more difficult and/or more costly late in the day than earlier, when most trading takes place.

Within this framework, the terms on which banks can borrow from the central bank affect the perceived costs of being short of their desired reserve balances late in the day and thereby affect the demand for reserves. The possibility of borrowing from the central bank also reduces volatility of market rates by placing a ceiling on interbank borrowing. An important assumption in the Poole framework is that the central bank finds it difficult or costly to adjust the supply of reserves through open market operations at multiple times during the day. If the central bank could intervene after banks receive any late-day payment shocks, it could largely eliminate the risk of banks being short on reserves late in the day, reducing the need for banks to hold “precautionary” reserve balances.

Even if the central bank is not able to conduct open market operations multiple times during the day, there are still arrangements that can achieve interest rate control with minimal use of central bank credit. The main example is a regime in which the central bank pays interest on reserves and supplies

reserves abundantly. This is called a “floor” system because the supply of reserves is made so large that interbank loans of reserves will not take place at rates above the rate paid by the central bank. This is essentially the system the Federal Reserve has been using since reserve balances grew dramatically during the financial crisis. The experience of the first rate increase in December 2015 suggests that with large reserves, interest rate control primarily through the rate paid on reserves can be effective with essentially no need for routine central bank lending.<sup>5</sup>

### **A Case for Limiting Central Bank Lending**

If interbank markets, or wholesale funding markets more generally, are effective in allocating liquid assets among market participants, then open market operations should in principle be the most appropriate tool to deal with the regular conduct of monetary policy, understood as interest rate targeting and control. This is the conclusion reached, for example, by Marvin Goodfriend and Robert King in a now classic article on this topic.<sup>6</sup> They argue that open market operations are sufficient to accomplish the monetary objectives of interest rate policy. Within this paradigm, one way to think about lending facilities (such as the discount window) is as a mechanism for automatic smoothing of interest rate spikes, due for example to an increase in the demand for central bank money, or liquidity more generally. As such, a lending facility is not strictly necessary to conduct appropriate monetary policy, but it may be a convenient (semi-automatic) arrangement to deal with the possibility that unexpectedly high demand for reserves pushes interbank interest rates higher than the level targeted by policymakers.

This use of central bank lending as an automatic supply adjustment brings with it the costs of administering a lending facility, such as the discount window. Goodfriend and King argue that these costs are the ones associated with monitoring banks and their asset holdings in order to assess on an ongoing basis banks’ eligibility to borrow and the suitability of their pledged collateral. In their view, reducing such costs is one of the benefits of implementing interest rate policy in a way that does not require central bank lending. An idea related to Goodfriend and King’s ar-

guments is for the central bank to lend only against collateral that is also used in open market operations — typically treasury securities. Such a narrow lending facility might also achieve Goodfriend and King’s cost minimization goal.

### **The Broader View**

To the extent that a central bank lending facility is intended to go beyond controlling risk-free interest rates, and in particular, target solvent but illiquid institutions seeking emergency credit, the arrangement is less about implementation of monetary policy (strictly speaking) and more about pursuing what Goodfriend and King call banking policy — with the associated regulatory responses.

Frictions in financial markets may create a beneficial role for liquidity insurance provided by a central bank lending facility. To perform this function properly, the central bank faces the problem of distinguishing between solvent and insolvent institutions, as well as the extent to which liquidity strains are the result of firm-specific problems versus market-wide conditions. If the main cause of illiquidity is that other financial market participants cannot readily determine the status of institutions demanding funding, then the central bank policy of making loans to those institutions relies on an informational advantage — the central bank’s ability to better identify solvent but illiquid banks. Furthermore, to the extent that this policy is aimed exclusively at the banking system, it presumes that assistance to troubled banks is more important than assistance to other firms in industries outside banking (or finance more generally).

The informational demands involved in conducting an efficient central bank lending policy are particularly high during periods of financial stress. Especially, although not exclusively, during crises, there is generally a mixture of individual-bank problems and a general increase in the real aggregate demand for liquidity. The ideal situation would be to be able to separate the way the central bank deals with each of the issues, adjusting the aggregate supply of central bank liquidity (reserves) through open market operations (potentially at various times in the day) when necessary.

## **Frictions in the Interbank Market**

The main argument for including direct lending to institutions as part of the appropriate conduct (and implementation) of monetary policy is the recognition of imperfections in the functioning of certain financial markets. In other words, frictions in the flow of liquidity within the financial system may get in the way of the ability of the central bank to achieve certain monetary policy goals. These frictions may increase during periods of financial stress. The lending facilities created during the recent financial crisis were mainly intended to deal with such problems.

Frictions in financial markets have long been studied by economists, with considerable work occurring recently. One important distinction to make is whether the frictions would generate deviations from the desired allocation of liquidity (and resources more generally) for a few hours in a day, several days in a week, or several weeks in a month. In part, this distinction is important because it determines the impact that not addressing the issue could have on the general stance of monetary policy within a relevant period.

Below are a few examples of frictions that have been studied in the literature, describing circumstances under which there may be a benefit to providing liquidity insurance through central bank lending.<sup>7</sup>

### ***Insurance against Idiosyncratic Liquidity Shocks***

One way to think about the interbank market is as a mechanism for banks to insure against temporary idiosyncratic liquidity shocks by borrowing and lending among themselves.<sup>8</sup> If banks have some degree of private information about the realization of their liquidity shocks and about their ex-ante choice of liquidity, then moral hazard becomes an issue. In general, liquid assets have lower expected rates of return than illiquid ones. For this reason, each individual bank has incentives to reduce their ex-ante liquidity and rely more on the interbank market in anticipation of possible idiosyncratic liquidity shocks. The consequence of this moral hazard can be a higher ex-post interest rate in the interbank market than what would be optimal at that time. In principle, the central bank could try to use a lending facility as a way

to place an upper bound on the interest rate and, in that way, try to improve the ex-post allocation.

This approach is not the only alternative for dealing with such a problem, though. For example, ex-ante liquidity regulations, combined with strict supervision — that is, closely monitoring liquidity positions — may be a better way to address the issue. Indeed, while central bank lending can soften the effects of illiquidity, access to such lending could exacerbate the moral hazard affecting banks' liquidity decisions. If banks choose less liquid portfolios, then the likelihood of liquidity strains increases.

### ***Cash-in-the-Market Constraints and Fire Sales***

A common approach to rationalizing liquidity concerns is to use the idea of “cash in the market.” There are different ways to motivate cash-in-the-market pricing. One leading example is market segmentation.<sup>9</sup> The idea is that some assets need to be purchased by a particular set of agents to be able to generate the optimal allocation of resources in the economy. But those agents do not happen to have enough cash at the appropriate time to buy those assets while paying the efficient price. Hence, without intervention, the price in the market falls below the efficient price. Since lower asset prices imply higher yields, the situation translates into sub-optimally high interest rates. In principle, there are several possible interventions that could improve the situation.

The central bank could either buy some of the assets or it could make loans to those agents that are supposed to acquire the assets. When agents have expertise about the assets that the central bank does not have, it may be optimal to make loans through a lending facility instead of making open market purchases of the assets. This is a case in favor of direct central bank lending.

In practical terms, market segmentation is generally regarded as rather temporary. Note that in principle, with enough time, agents with cash could become experts in order to buy the assets that were selling at a discount. But acquiring expertise takes some time. The central bank could provide the temporary liquid-

ity necessary to make this process of adjustment less costly. Furthermore, the use of short-term loans by the central bank has the added benefit of making the cash injection clearly temporary: it can safely be expected to reverse itself when the loans are repaid. In that way, agents would not regard the monetary expansion as permanent, limiting any potential impact on expected inflation.

### ***Adverse Selection in Financial Markets***

Private information about the ability to repay debts is another friction that has received attention in the literature as a source of potential inefficiencies and as a justification for central bank interventions in the interbank market. When firms have private information about their future cash flows, the equilibrium interest rate in the market reflects the average repayment risk of borrowing firms. As a result, those firms with low repayment risk find market interest rates less attractive for investment and, hence, are less active in the market. In turn, this “selection” process tends to increase the average repayment risk of firms active in the market and the resulting market interest rate even more. In the end, interest rates are too high when compared to the case of full information, and not all investment projects with positive net present value get funded.<sup>10</sup>

The central bank could, in principle, improve the situation by making loans directly to investors.<sup>11</sup> One way to think about standing facilities in this context is to consider the case where the amount of information available to market participants is changing over time, inducing fluctuations on the market interest rate due to changes in the incidence of adverse selection. A central bank lending facility, then, could put a ceiling on the level of adverse selection that would be tolerated by policymakers.

### ***Flight-to-Quality Episodes***

Another situation where a central bank lending facility has been proposed as potentially beneficial for the economy is when agents become overly concerned about a particular idiosyncratic risk.<sup>12</sup> When an agent has a heightened concern about such risk, he or she dedicates more resources to insure against that risk and, in principle, reduces the amount of insurance

obtained to address other risks. One way this tilt in insurance may manifest itself is by a shift in investors’ portfolios toward, for example, certain highly safe assets (a flight to quality). If the agent’s concerns are overemphasized from an economy-wide perspective, then the resulting allocation of resources would become inefficient.

The central bank, by taking a more aggregate perspective, is not subject to the same bias in the assessment of uncertainty that individual agents are. In consequence, the central bank may want to implement policies that seek to improve efficiency in the aggregate economy. In a flight-to-quality event, one such policy could be to have an active lending facility. Central bank lending could help those institutions in need of liquidity when the flight-to-quality event makes liquidity less available in the market. Furthermore, the mere presence of a lending facility would allow agents to reduce the amount of insurance ex ante that they acquire to deal with flight-to-quality scenarios, and in this way it would shift (even) the ex-ante allocation of resources closer to what would be optimal under an unbiased assessment of risks.

The role of a standing lending facility in these situations seems mainly related to containing the implications of volatility in financial markets (associated with large shifts in the assessment of risk by market participants). While it may not be directly related to the stance of monetary policy, as expressed by the level of the target short-term interest rate, reducing volatility could be a legitimate central bank objective.

### **Conclusion**

There are two views on the role of central bank lending in the conduct of monetary policy: a narrow view and a broad view. Under the narrow view, lending could play a role by improving interest rate control in the process of setting monetary policy. However, open market operations can accomplish effectively the same goals without the moral hazard concerns that arise from direct lending. Under the broader view, to conduct monetary policy appropriately, the central bank may at times need to rely on actively using a lending facility. It then becomes crucial to iden-

tify and understand the frictions in financial markets that act as an impediment to the flow of liquidity to certain pockets of the financial system, a problem that direct lending is intended to address. In all cases, central bank lending involves significant challenges. The provision of liquidity insurance can easily degenerate into subsidization — in the form of providing funding to insolvent institutions. And even without significant subsidies, insurance always generates some degree of moral hazard. For this reason, providing liquidity through direct lending requires the central bank to complement this policy with a set of adequate controls over moral hazard that involve supervision and regulation and, potentially, other costly actions.

We conclude, then, that under the narrow view, open market operations (potentially several rounds during each trading day) could provide an adequate mechanism for achieving interest rate control in support of monetary policy objectives. Under the broad view, weighing the costs and benefits of operating a standing lending facility involves a determination that the frictions impeding the flow of liquidity within the financial system are significant enough to justify the moral hazard and other costs associated with the central bank providing direct lending. To us, given the current understanding of those frictions (quantitatively and qualitatively), and considering the potentially considerable associated costs, making such a determination in favor of an active approach to central bank lending seems like a tall order. ■

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## Endnotes

- <sup>1</sup> For an account of the Fed's evolving role in the financial system over time, see Renee Haltom and Jeffrey M. Lacker, "[Should the Fed Do Emergency Lending?](#)" Federal Bank of Richmond *Economic Brief* No. 14-07, July 2014.
- <sup>2</sup> Over the past year, Federal Reserve System staff have been engaged in a project to consider options for how to implement monetary policy over the long run, including options for the role of central bank lending in the policy framework. As noted in the minutes of recent Federal Open Market Committee meetings, staff have reported to the Committee on this project, and

work will continue in the coming year. This *Economic Brief* is derived from the authors' work related to that project.

- <sup>3</sup> See, for instance, Jeffrey M. Lacker, "[Government Lending and Monetary Policy](#)," Speech before the National Association for Business Economics, Alexandria, Va., March 2, 2009.
- <sup>4</sup> William Poole, "Commercial Bank Reserve Management in a Stochastic Model: Implications for Monetary Policy," *Journal of Finance*, December 1968, vol. 23, no. 5, pp. 769–791. For a useful recent exposition, see Huberto M. Ennis and Todd Keister, "[Understanding Monetary Policy Implementation](#)," Federal Reserve Bank of Richmond *Economic Quarterly*, Summer 2008, vol. 94, no. 3, pp. 235–263.
- <sup>5</sup> See Renee Haltom and Alexander L. Wolman, "[How Did Short-Term Market Rates React to Liftoff?](#)" Federal Reserve Bank of Richmond *Economic Brief* No. 16-09, September 2016.
- <sup>6</sup> Marvin Goodfriend and Robert G. King, "[Financial Deregulation, Monetary Policy, and Central Banking](#)," Federal Reserve Bank of Richmond *Economic Review*, May/June 1988, vol. 88, no. 1, pp. 3–22.
- <sup>7</sup> For a more detailed review of the theory behind discount window lending, see Huberto M. Ennis, "Models of Discount Window Lending: A Review," Federal Reserve Bank of Richmond *Economic Quarterly*, forthcoming.
- <sup>8</sup> See Sudipto Bhattacharya and Douglas Gale, "Preference Shocks, Liquidity and Central Bank Policy," in William A. Barnett and Kenneth J. Singleton (eds.), *New Approaches to Monetary Economics*, New York: Cambridge University Press, 1987, pp. 69–88. See also, Mark Gertler and Nobuhiro Kiyotaki, "[Financial Intermediation and Credit Policy in Business Cycle Analysis](#)," in Benjamin M. Friedman and Michael Woodford (eds.), *Handbook of Monetary Economics, Volume 3A*, Amsterdam: Elsevier, 2010, pp. 547–599.
- <sup>9</sup> See, for example, Scott Freeman, "Clearinghouse Banks and Banknote Over-Issue," *Journal of Monetary Economics*, August 1996, vol. 38, no. 1, pp. 101–115. A [working paper version](#) is available online. See also, Viral V. Acharya and Tanju Yorulmazer, "[Cash-in-the-Market Pricing and Optimal Resolution of Bank Failures](#)," *Review of Financial Studies*, November 2008, vol. 21, no. 6, pp. 2705–2742.
- <sup>10</sup> See, for example, Thomas Philippon and Vasiliki Skreta, "Optimal Interventions in Markets with Adverse Selection," *American Economic Review*, February 2012, vol. 102, no. 1, pp. 1–28. A [working paper version](#) is available online.
- <sup>11</sup> One issue that arises when the central bank provides lending in an environment with private information is discount window stigma. For an explicit model of this phenomenon, see Huberto M. Ennis and John A. Weinberg, "Over-the-Counter Loans, Adverse Selection, and Stigma in the Interbank Market," *Review of Economic Dynamics*, October 2013, vol. 16, no. 4, pp. 601–616. A [working paper version](#) is available online. For compelling empirical evidence that discount window stigma played a role in the United States during the 2007–08 financial crisis, see Olivier Armantier, Eric Ghysels, Asani Sarkar, and Jeffrey Shrader, "Discount Window Stigma during the 2007–2008 Financial Crisis," *Journal of Financial Economics*, November 2015, vol. 118, no. 2, pp. 317–335. A [working paper version](#) is available online.

<sup>12</sup> See Ricardo J. Caballero and Arvind Krishnamurthy, "Collective Risk Management in a Flight to Quality Episode," *Journal of Finance*, October 2008, vol. 63, no. 5, pp. 2195–2230. A [working paper version](#) is available online.

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