

## CHAPTER 13:

# Reforming Last-Resort Lending: The Flexible Open-Market Alternative

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The most fundamental of the Federal Reserve System's many responsibilities is that of serving as the U.S. financial markets' ultimate source of liquidity. Federal Reserve notes, along with account balances held by private depository institutions at the various Fed banks, are the U.S. economy's final means of payment, and hence its most liquid assets, the scarcity of which is a crucial determinant of the scarcity of other liquid assets.

A particular challenge facing the Fed and other central banks is that of avoiding liquidity shortages during financial emergencies, when private credit markets may malfunction. By what means, and according to which rules, should the Fed make additional credit available to financial (and perhaps nonfinancial) firms that might otherwise be rendered illiquid by such emergencies? Which emergency lending powers ought it to possess, and which facilities ought it to employ, beyond the powers it exercises, and the facilities it employs, in conducting its ordinary monetary policy operations? What kind of arrangements, if any, might allow the Fed to deal adequately with financial emergencies without contributing to the moral-hazard problem, or otherwise undermining the efficient allocation of credit?

This chapter draws on recent experience, both in the U.S. and elsewhere, to answer these questions, and to thereby suggest a plan for reforming the Fed's means for preserving

the liquidity of financial as well as nonfinancial firms and markets, especially during financial emergencies, but also in normal times.

Among other things, the proposed plan would:

- **Allow** a single Fed standing (as opposed to temporary) facility to meet extraordinary as well as ordinary liquidity needs as these arise, with no need for ad hoc changes in the rules governing the facility, or for special Fed, Treasury, or congressional action;
- **Make** Fed lending to insolvent, or potentially insolvent, institutions both unlikely and unnecessary, no matter how "systemically important" they may be, by allowing most financial enterprises to take part directly in the Fed's ordinary credit auctions;
- **Dispense with** any need for direct lending, including both discount window and 13(3) loans, whether aimed at particular institutions or at entire industries, and

otherwise radically simplify existing emergency lending provisions of the Federal Reserve Act;

- **Eliminate** any general risk of Fed mispricing or misallocation of credit, including such underpricing as might create a moral hazard;
- **Replace** the ad hoc and arbitrary use of open-market operations to favor specific firms or security markets with a “neutral” approach to emergency liquidity provision, by making the same facility and terms available to a wide set of counterparties possessing different sorts of collateral;
- **Enhance** the effectiveness of the Fed’s open-market purchases during periods of financial distress by automatically providing for extraordinary Fed purchases of less-liquid financial assets; and
- **Eliminate** uncertainty regarding the availability of emergency credit and the rules governing its provision.

## AN UNHELPFUL DICHOTOMY

Conventional wisdom has it that, apart from regulatory responsibilities that may also be assigned to them, central banks must perform two fundamentally distinct duties. They are responsible, first of all, for implementing monetary policy, meaning that they must manage the aggregate supply of liquid reserves so as to reach various short-term and long-term macroeconomic targets. They must also serve as sources of last-resort credit when doing so prevents or contains financial crises.<sup>1</sup>

This established dichotomy of central-bank duties has, in turn, informed a corresponding division of central-bank facilities, with one facility or set of facilities designated for the implementation of “ordinary” monetary policy, and the rest devoted to supplying last-resort credit. In the United States, until the recent crisis, ordinary monetary policy was implemented by means of both permanent and temporary open-market purchases and sales of Treasury securities, conducted with a limited set of counterparties, known as primary dealers.

Although the Federal Open Market Committee (FOMC) is responsible for determining the nature and objectives of the Fed’s open-market operations (OMOs), those operations are overseen by the manager of the System Open Market Account (SOMA) at the Federal Reserve Bank of New York, and conducted by the New York Fed’s Securities Trading Desk. The Trading Desk estimates the daily open-market purchases or sales needed to fulfill the FOMC’s general directive, and then conducts auctions with primary dealers according to that schedule, buying securities from those dealers offering the lowest prices, and selling securities to those offering the highest, using an auction system called FedTrade. Because primary dealers, though not banks themselves, have accounts at depository institutions known as clearing banks, in order to purchase securities from them, the Fed simply credits their clearing bank accounts, thereby increasing the banking system’s reserves. When it sells bonds, in contrast, the Fed debits dealers’ bank accounts, and so reduces total banking system reserves.<sup>2</sup>

The Fed’s permanent OMOs consist mainly of outright security purchases aimed mainly at accommodating long-run growth in the public’s demand for paper currency, which would otherwise result in a net reduction in bank reserves. Securities thus purchased are generally held until maturity in the New York Fed’s SOMA portfolio. The Fed’s temporary OMOs, in contrast, serve to accommodate general changes in the demand for liquidity, and to thereby meet the Fed’s short-run monetary policy targets. The Fed conducts these temporary operations by means of repurchase agreements (repos). In a repo, the Fed buys securities from a dealer who agrees to repurchase the securities from the Fed at a later date (frequently the next day). In effect, the transaction resembles a secured loan from the Fed to the dealer, with Treasury securities serving as collateral. In conducting “reverse” repos, the Fed sells securities to a dealer who agrees to buy them back at a later date. In this case, the dealer effectively makes a collateralized loan to the Fed.

By contrast, genuine secured loans, rather than repos, have been the traditional means by which the Fed has supplied last-resort credit to illiquid financial institutions using genuine secured loans as opposed to repos. Each of the 12 Federal Reserve Banks is responsible for making such “discount window” loans to eligible financial institutions operating in its region. Most deposit-taking institutions are eligible for discount-window loans, which can be secured using a wide range of private and public financial assets. Separate ordinary and last-resort liquidity-provision facilities have also been standard in other central-banking systems.

Although the recent crisis witnessed extraordinary modifications of central-bank liquidity-provision facilities, both in the U.S. and elsewhere, and although some of these modifications have been made permanent, the conventional dichotomy of duties and facilities has survived, if indeed it has not been reinforced. The most obvious consequence of the crisis consisted of the creation of various new, though mostly temporary, last-resort lending facilities, aimed at supplying emergency credit to institutions that could not or would not get it from established facilities. The new facilities were sometimes open to counterparties to which established facilities were closed; or they were prepared to accept collateral that those facilities would not. In some instances, such as the Fed’s Term Auction Facility (TAF), the new facilities dealt with the usual counterparties and collateral, but did so in a manner calculated to avoid the stigma attached to ordinary last-resort borrowing.

It would be wrong, however, to draw the lesson from recent experience that a permanent increase in the number of specialized last-resort lending facilities, or in the Fed’s authority to engage in bilateral lending of any sort, is needed if future crises are to be avoided. Instead, a review of the special steps that central bankers felt compelled to take during and since the crisis, heeding not so much those steps’ particulars as their general *drift*,

suggests a very different lesson. The lesson is not that the Fed and other central banks have lacked adequate *emergency* lending facilities and authority. It is that they have lacked *efficient arrangements for implementing ordinary monetary policy*. The special credit facilities established during and since the crisis, especially in the U.S. and the U.K., are, in other words, best understood as having served to rectify the shortcomings of established open-market frameworks. By reforming those frameworks, central banks might succeed in meeting both their monetary policy targets and extraordinary demands for liquidity, without having to make any use of either standing or temporary emergency lending facilities.

More fundamentally, recent experience suggests that the conventional dichotomy of “emergency” and “ordinary” central-bank liquidity provision, though it may have had some merit in the distant past, has outlived its usefulness. When implementing “ordinary monetary policy” meant little more than maintaining the gold standard, last-resort lending posed a separate, if not conflicting, challenge. A modern fiat-money-issuing central bank, in contrast, has but one fundamental duty to fulfill. That duty consists of supplying cash, meaning currency and bank reserves, in amounts sufficient to meet macroeconomic targets, and doing so *efficiently*, that is, so that newly created cash is assigned to those parties that can gain, and are therefore willing to pay, the most for it.

#### SPECIAL LAST-RESORT LENDING FACILITIES: INHERENTLY INEFFICIENT

Assuming that it is indeed possible to design a single open-market facility capable of supplying all the liquidity an economy may need, and of doing so efficiently, even during emergencies, discount windows and other dedicated emergency credit facilities serve, at best, to compensate for the absence of such a facility.

At worst, the tendency to suppose that central banks have not one, but two, duties

to perform, by encouraging them to employ separate facilities for each, makes the efficient allocation of both ordinary and emergency credit highly unlikely, if not impossible. This follows from the fact that, taking its “ordinary” monetary targets—and the amount of new reserve creation needed to achieve them—as given, a central bank operating multiple facilities, each catering to different sets of counterparties or dealing in different sorts of collateral and offering credit on different terms, must allot specific portions of the credit to be created among the various facilities. Some of these allotments may be negative, as when last-resort loans are “sterilized” by open-market sales. Such allocations are bound to be somewhat arbitrary, if not flagrantly so. Even if the allocations were somehow correct, the facilities themselves, in so far as they offer credit on implicitly (if not explicitly) distinct terms, would likely favor certain eligible counterparties over others. Finally, because counterparties do not all compete with one another for the same pool of funds, the ultimate allocation of those funds may be inefficient even when all face similar terms.<sup>3</sup>

In contrast, the understanding that central banks have but one overarching duty, which is to supply their economies’ most liquid assets, not just in adequate amounts but efficiently, points to the desirability of assigning as large a role as possible to the price mechanism as the means for allocating new central-bank credits among rival applicants. That goal is best accomplished, not by using multiple facilities, but by having all eligible counterparties compete on equal terms for central-bank credit auctioned off at one facility only. Under this arrangement, the central bank, once having set the terms of the auction, would have no other duty to perform save that of determining the aggregate amounts of credit to be auctioned. Last-resort lending, instead of being a distinct central-bank duty, would become an incidental counterpart of ordinary monetary policy, consisting of that part of auctioned credits taken up by liquidity-strapped counterparties that choose to take part in auctions

only as a last resort. Thus, while there would still be last-resort borrowers, there would be no last-resort lending operations as such.

## ACHIEVING “FLEXIBLE” OPEN-MARKET OPERATIONS

So much for the theory. How can the ideal just sketched out be achieved in practice? Because the present Federal Reserve System is, in many respects, further removed from the ideal than either the European Central Bank (ECB) or the Bank of England, achieving it here is relatively difficult. Yet, even in the U.S. case, the steps involved in moving from existing arrangements for supplying last-resort credit to an ideal open-market framework, involving “flexible” OMOs, are relatively straightforward.

The first step is the primary dealer system—the system that confines the Fed’s ordinary open-market dealings to a small set of counterparties—should be abolished. That system can no longer be justified by appealing to its technological merits or to the claim that by dealing with primary dealers the Fed limits its counterparty exposure to “the soundest of the sound.”<sup>4</sup>

Indeed, during the recent crisis, primary dealers proved to be among the least sound of the unsound. For this reason, among others, the primary dealer system, “blocked, or seriously undermined the mechanism through which monetary policy influences the economy.”<sup>5</sup> Consequently, as Donald Kohn observed at the time, when he was the Fed’s deputy governor,

The fact that primary dealers rather than commercial banks were the regular counterparties of the Federal Reserve in its open market operations, together with the fact that the Federal Reserve ordinarily extended only modest amounts of funding through repo agreements, meant that open market operations were not particularly useful during the crisis for directing funding to where it was most critically needed in the financial system.<sup>6</sup>

Although new names have replaced former ones on the Fed's list of primary dealers,<sup>7</sup> the system remains fundamentally unchanged, in that it allows only a very small number of financial institutions to take part in the Fed's routine credit auctions. If the Fed's OMOs are to serve as a reliable source of liquidity both in ordinary times and during times of extreme financial distress, the outmoded primary dealer system must be scrapped. Instead, all commercial banks presently eligible for discount-window loans should be able to take part, along with presently designated primary dealers, in the Fed's routine credit auctions.<sup>8</sup>

Second, while continuing its traditional practice of confining outright or "permanent" open-market purchases to U.S. Treasury and agency securities, the Fed should stand ready to accept other sorts of collateral, including all collateral that is presently accepted as security for its discount-window loans, while assigning appropriate "haircuts" to riskier collateral, in its temporary open-market purchases or repos.

Third, the Fed should offer "term" (30-day or even 60-day) repos as well as the more usual overnight repos, as the former may prove especially helpful in tiding over liquidity-strapped firms during financial emergencies. Since, other things equal, such repos expose the Fed to a greater risk of losses stemming from a counterparty's failure, additional steps should be taken to guard against the extra risk, including arrangements for having counterparties supply additional collateral in the event that the market value of supplied collateral declines substantially during the life of a contract, and (perhaps) the application of haircut "add-ons" to collateral submitted by riskier counterparties, including non-banks and banks with high CAMELS ratings.<sup>9</sup>

Fourth, to allow counterparties to compete for credit using different sorts of collateral, the Fed should adopt a version of the "product mix" auction originally developed several years ago by Paul Klemperer, and employed since by the Bank of England in its indexed long-term repo operations (ILTRs).<sup>10</sup> Klemperer's procedure allows bidders to submit

multiple mutually exclusive "sub" bids for a desired amount of credit, each offering different sorts and amounts of collateral. Then, as *The Economist* explains,

Having received a set of bids for different goods, at various prices and quantities, the auctioneer in Mr. Klemperer's set-up then conducts a proxy auction on bidders' behalf to see who should get what, and what the price should be. Because nothing is revealed to the bidders and they know they cannot influence this process, their best bet is to tell the truth. What is more, since the auctioneer has price information for a range of quantities, it is possible to see how prices change as supply does.<sup>11</sup>

Participants' bids indicate the nominal quantity of funds they wish to purchase, the (positive) spread from the bank's policy rate that they are willing to pay, expressed in basis points, and the collateral they intend to provide. The bids are then ranked in descending order, with credit assigned to the higher-ranking bidders until the full amount has been allocated. When a qualifying bidder submits two or more sub-bids, rather than a single bid, the qualifying sub-bid that maximizes the bidder's value is accepted. Because of its commitment to uniform pricing, the Bank of England allows all successful bidders to pay the lowest rate accepted for the sort of collateral they offer. But discriminatory pricing, with bidders actually paying what each offers, is an option that might also be considered.

Further details concerning the conduct of product-mix auctions can be found in Klemperer's publications on the subject as well as in various Bank of England assessments of its own employment of his idea.<sup>12</sup> The bottom line, though, is (in *The Economist's* words again) that the auction design serves to "provide accurate information on individual banks' demand for liquidity and the prices they are willing to pay for it." What is more, the Bank of England has discovered that it can "use the

pattern of bids in each auction to assess the extent of stress in the market,” and to thereby “inform its decisions on the size and maturity of future operations.” In other words, flexible OMOs not only make last-resort lending facilities redundant, but help guide ordinary monetary policy, making it less likely that monetary authorities will err by incorrectly gauging the aggregate demand for liquidity, as federal officials did, with tragic results, in 2008.

Once flexible OMOs are established, the Fed should permanently close its discount window, which such operations will render redundant at best and a source of inefficient credit allocation at worst. Any institution that resorted to the discount window as a source of last-resort credit in the past will be able to participate in the Fed’s routine credit auctions using the same collateral it might have employed in securing a discount-window loan. However, instead of being guaranteed support, under pre-established terms, or having the Fed unilaterally determine to support it, it must secure funds by outbidding rival applicants. Thus the flexible OMO alternative improves upon bilateral Fed lending, not only by avoiding the stigma connected to the latter, but also by checking moral hazard.

Finally, Congress should improve oversight of the Fed’s broadened open-market operations, to assure that those operations are conducted in a manner consistent with efficient credit allocation, and especially with the avoidance of any implicit subsidization of risk-taking.

Although some authorities have treated the minimization of the Fed’s involvement in “credit” or “fiscal” policy as an ideal, while in turn equating that ideal with the complete avoidance of risky asset purchases, this view seems chimerical. As Willem Buiter has observed, “[T]here is an unavoidable fiscal dimension to a central bank’s activities.”<sup>13</sup> The most obvious sense in which central banks, including the Fed, play a fiscal role is, indeed, precisely by acquiring relatively riskless Treasury securities, and then remitting the interest earned from them, net of their operating costs and losses, to the U.S. Treasury.

While confining the Fed to Treasury purchases may enhance its long-run contribution to government revenue, it cannot be said to minimize its fiscal footprint. On the contrary: It involves the Fed quite decidedly in the allocation of credit, albeit in a manner that favors the federal government over other parties.

Although the proposed broadening of the Fed’s open-market framework reduces the Fed’s fiscal footprint to the extent that it minimizes the Fed’s role in credit allocation, it also exposes the Fed to a greater degree of liquidity and credit risk. Whether these combined changes amount to a broadening or a reduction in the Fed’s overall involvement in “fiscal” or “credit” policy ultimately depends on the extent to which it succeeds in limiting its risk exposure by assigning proper haircuts to any risky securities it acquires.

Still, the fact that OMOs would not be entirely risk-free supplies grounds for subjecting them to occasional congressional scrutiny. The Dodd–Frank Wall Street Reform and Consumer Protection Act already goes some way toward addressing this need by requiring “ex-ante authorization of risky portfolio management decisions” as well as by providing some ex-ante accountability. But it should also be possible for the Government Accountability Office (GAO) to more generally assess the Fed’s administration of flexible OMOs, particularly when these involve substantial acquisitions of risky assets. Allowing the GAO’s inquiries and assessments to concern open-market procedures only, including the setting of haircuts and other rules for auctioning credit, but not the scale of those operations, should suffice to avoid any risk that the GAO’s enhanced authority would supply Congress with means for interfering any more than it has in the past with the Fed’s freedom to determine its policy stance.

## FLEXIBLE OMOS AND THE EFFECTIVENESS OF MONETARY POLICY

Flexible OMOs would make the provision of last-resort credit to liquidity-stricken institutions a byproduct of the Fed’s

implementation of ordinary monetary policy, rather than a separate activity. This way, flexible OMOs would also enhance the *effectiveness* of the Fed's routine OMOs, and hence its ability to achieve its monetary policy targets by means of such operations, at times when conventional OMOs might be ineffective.

That conventional open-market purchases, meaning the exchange of central-bank funds for low-risk securities, and short-term sovereign debt especially, may cease to be effective during episodes of extreme financial distress was among the more striking lessons of recent experience. The crisis caused many private securities, especially asset-backed securities that had previously been reckoned good collateral for securing private-sector credit, to cease to be so regarded.<sup>14</sup> The resulting collateral shortage had as its counterpart an extraordinary increase in the demand for short-term Treasury securities, with which illiquid firms were still able to secure private-sector credit. Central-bank open-market purchases of the usual sort, meaning swaps of their credits for short-term Treasury securities, were obviously incapable of relieving such a general liquidity shortage, and for that reason also proved far less effective than usual as means for achieving the central banks' monetary policy targets.<sup>15</sup> By resorting to special facilities and programs aimed at swapping new reserves for less-liquid but still valuable securities, central banks hoped to more effectively combat the overall shortage of liquidity, not just directly but by increasing the effective liquidity of the securities in question, and hence their usefulness in securing private credit, and to thereby achieve greater success in meeting their general monetary policy goals. In effect, the central banks attempted to compensate, using special facilities established for the purpose, for the severe haircuts being applied by private-sector lenders to subprime-related securities by reducing those applied to other less-doubtful though formerly less-liquid private-sector securities.

In a flexible OMO system, the same result—an increased share of open-market purchases

of riskier and less-liquid collateral—would tend to be achieved automatically, because an exceptional demand for liquidity like that experienced recently would manifest itself in more aggressive and successful bidding for Fed funds by holders of relatively risky and illiquid but still valuable collateral. Also, because the holders of such collateral can succeed in securing credit with it *only* by offering to pay a relatively high price for it, the mechanism offers better protection against both moral hazard and adverse selection than might ad hoc alternatives.

Pointing to the potential monetary-policy advantages of flexible OMOs is not to suggest that having them would mean that repo financing of less-liquid securities would ordinarily play a substantial role of the Fed's monetary policy operations. Instead, those operations would, except on rare occasions, not differ substantially from the Fed's ordinary monetary policy operations in past times, with the Fed dealing mainly, if not exclusively, in Treasury securities, and with only a relatively small fraction of eligible counterparties taking part in its auctions.

## FLEXIBLE OMOS AND CENTRAL-BANK DISCRETION

Superficially, the changes proposed in this chapter may appear to award the Fed more powers than it has enjoyed in the past by allowing more counterparties to engage in OMOs with it, using a widened range of collateral. But such an impression is mistaken for a number of reasons.

First, as noted, flexible OMOs are meant to render all emergency lending operations and facilities, whether actual or potential, redundant. That means that they eliminate the rationale, not just for ordinary discount-window lending, but also for lending targeted at specific banks deemed too “systematically important” to fail, as well as direct lending to non-banks under the Fed's current 13(3) authority. By opening access to the Fed's ordinary credit auctions to numerous counterparties, including all those institutions, whether

banks or non-banks, that play a prominent role in the payments system, flexible OMOs should make it possible for any of these counterparties that are for any reason unable to secure needed liquidity from private sources to apply directly to the Fed for it, and, by outbidding rival applicants, to get it. What is more, by dealing with the Fed's ordinary credit-creation facility, rather than with any facility explicitly devoted to last-resort or emergency credit provision, firms will avoid any risk of finding themselves stigmatized, and therefore worse off, than they might be if they refused central-bank credit altogether.

Second, by having all counterparties compete for credit offered through a single facility and on common terms, the reform eliminates opportunities for favoritism that arise when different counterparties must deal with different facilities operating under different rules.

Third, by eliminating distinct last-resort lending operations, flexible OMOs make it unnecessary for authorities responsible for such operations to coordinate their efforts with those of separate central-bank authorities charged with conducting ordinary monetary policy operations. The elimination of multiple authorities also reduces the risk of shirking, by placing responsibility for adequate aggregate liquidity provision firmly on the shoulders of a single decision-making authority—here, the FOMC.

Fourth, flexible OMOs should rule out any future resort to ad hoc emergency lending facilities, establishing instead a stable and predictable arrangement for central-bank liquidity provision, meant to meet both ordinary and extraordinary liquidity needs. The existence of fixed arrangements for liquidity assistance, combined with the competitive pricing of such assistance, allows prospective borrowers to prepare themselves for potential liquidity shocks, while ruling out moral hazard. This achievement alone would represent a considerable improvement upon past policy, for, as Thomas Humphrey has argued, one of the Fed's chief errors during the subprime crisis consisted of its "failure to specify and announce a

consistent LLR [lender of last resort] policy in advance...so that market participants [could] form stabilizing expectations." By generating uncertainty and otherwise confusing market participants, this "lack of a clearly laid-out LLR commitment" proved highly counterproductive to quelling the crisis.<sup>16</sup>

Fifth, and finally, flexible OMOs simplify central-bank decision making by reducing it to two components: (1) the determination of aggregate credit amounts to be auctioned, and (2) the setting, and occasional re-adjustment, of various auction parameters, including collateral haircuts. Credit allocation, including its allocation to solvent firms faced with a liquidity shortage that have sought funding from the Fed only as a last resort, is otherwise automatic. There would be no practical distinction between the Fed's conduct during episodes of financial distress and its conduct on other occasions. The only changes would be in the unusual counterparties taking part in the Fed's auctions, the wider range of collateral types offered, and the higher-than-usual interest rates implicit in winning bids.

The relatively automatic nature of last-resort credit provision under a system of flexible OMOs makes such a system a natural counterpart to rule-based, if not fully automatic, systems for determining the scale of central-bank aggregate credit creation, such as John Taylor's proposal for formally enshrining the rule bearing his name, and the proposals of Scott Sumner, David Beckworth, and others for targeting nominal gross domestic product.<sup>17</sup>

## PRECEDENTS

Although the proposal in this chapter may seem radical, its various elements are far from being without precedent. As noted, the Bank of England already employs product-mix auctions to allocate funds, using its Indexed Long-Term Repo (ILTR) Facility, among competing bids involving different sorts of collateral. It has also established an Extended Collateral Term Repo (ECTR) Facility, to auction liquidity against a still-broader range of

collateral, identical to the range accepted by the Bank's Discount Window Facility, during emergencies.<sup>18</sup> The bank's ordinary short-term repo operations have, on the other hand, been suspended since the crisis, while its Discount Window Facility (the analogue of the Fed's discount-window, though designed specifically to accommodate banks confronted with liquidity shocks between monthly ILTR operations), has been almost completely inactive since its inauguration in October 2008, owing in large part to banks' fear of being stigmatized if they resort to it.

In short, the bank's currently functioning facilities do not differ greatly from the single facility proposed here. Were the bank to follow recommendations made in a review of its liquidity framework that it commissioned, the difference would be even smaller. Among other things, the review recommends that the bank consider adding ECTR-eligible collateral to its ILTR, thereby allowing the latter facility to serve as a source of last-resort credit ("liquidity insurance") both in normal times and "in response to market-wide shocks originating in the banking sector."<sup>19</sup>

The ECB, for its part, has always accepted a relatively wide range of collateral in its ordinary (short-term) OMO; it also conducts those operations with numerous counterparties. The ECB was, for both of these reasons, able to cope with the first year of the financial crisis without having had to make any changes to its operational framework.<sup>20</sup>

The Fed itself has, finally, occasionally and temporarily resorted to unorthodox OMOs, involving a larger number of counterparties, a wider range of securities, and different repurchase terms. To supply liquidity in connection with Y2K, it extended the term of its repurchase agreements, while also offering to purchase a wider range of securities. During the late 1990s and early 2000s, when confronted with what was then a looming shortage of Treasury securities, the Fed also gave serious thought to the possibility of permanently expanding the list of securities it might purchase, both in its repo operations and outright.

During the subprime crisis, the Fed established its Term Auction Facility (TAF)—a term repo facility to which all banks were given access, and at which all discount-window collateral could be financed. The TAF was intended to bypass the primary dealer system, while also avoiding the stigma attached to discount-window loans. The TAF proved far more successful than either the Fed's ordinary open-market operations or the discount-window at getting liquidity funds where they were most needed.<sup>21</sup>

Still more recently, in September 2013, the Fed established a special overnight reverse repo (ON-RRP) facility, through which it deals, not with its usual set of primary dealers, but with money market mutual funds, government-sponsored enterprises, and a broader set of commercial banks. More recently still, it began undertaking sizable term (as opposed to overnight) reverse repos using that facility.

What distinguishes the flexible-OMO plan from these precedents is that it envisions a single facility only, supplying both routine and emergency credit, and doing so in a way that relies to the fullest extent possible on market forces, rather than on decisions by bureaucrats, to achieve an efficient allocation of liquidity among competing applicants. By allowing a broad set of potential applicants, using a wide range of eligible collateral, to compete for available funds, not only in private markets, but, when necessary, at a single Federal Reserve facility, flexible OMOs *minimize* the Federal Reserve's credit footprint, and thereby prevent it from taking part in either deliberate or inadvertent credit-allocation exercises for which fiscal rather than monetary authorities ought to be responsible.

## BACK TO BAGEHOT?

Because it dispenses altogether with facilities devoted exclusively to last-resort lending, or to bilateral central-bank lending (as opposed to auctioning of credit) of any sort, the reform proposed here may also seem inconsistent with received wisdom regarding

the principles of last-resort lending. But it is certainly far more faithful to that wisdom, particularly as formulated by Walter Bagehot, than existing arrangements. Consider Bagehot's seminal statement of now-conventional last-resort lending principles, as found in his 1873 book *Lombard Street*:

First. That [last-resort] loans should only be made at a very high rate of interest. This will operate as a heavy fine on unreasonable timidity, and will prevent the greatest number of applications by persons who do not require it. The rate should be raised early in the panic, so that the fine may be paid early; that no one may borrow out of idle precaution without paying well for it....

Secondly. That at this rate these advances should be made on all good banking securities, and as largely as the public ask for them. The reason is plain. The object is to stay alarm, and nothing therefore should be done to cause alarm. But the way to cause alarm is to refuse some one who has good security to offer.... No advances indeed need be made by which the Bank will ultimately lose.... If it is known that the Bank of England is freely advancing on what in ordinary times is reckoned a good security—on what is then commonly pledged and easily convertible—the alarm of the solvent merchants and bankers will be stayed. But if securities, really good and usually convertible, are refused by the Bank, the alarm will not abate, the other loans made will fail in obtaining their end, and the panic will become worse and worse.<sup>22</sup>

Allowing for the trivial difference between repos and secured loans, there is very little difference after all between what Bagehot recommends and what flexible OMOs would accomplish, and accomplish far more reliably and consistently than existing Fed facilities. In particular, flexible OMOs would make for a more certain commitment to the principle of making last-resort credit both “largely” (that is, widely) available, and available only at suitably “high” (that is, penalty) rates, for the auction procedure itself assures that, in times of extraordinary need, high rates are bound to prevail. Owing to these considerations, and supposing Bagehot were both alive today and familiar with current, high-tech means for auctioning credit that were unavailable in Victorian times, it is tempting to speculate that it is not the reform proposed here, but the dizzying array of emergency lending facilities seen in the course of the recent crisis, with all the opportunities for inefficient credit allocation those facilities entailed, that would have struck him as odd.

## CONCLUSION

To propose an alternative arrangement for last-resort lending is not necessarily to regard the proposed alternative as an ultimate solution to the problem of avoiding financial crises. On the contrary: The very need for last-resort lending is evidence of structural weaknesses in private-market financial arrangements, where such weaknesses are, in turn, more often than not, a result of misguided government interference in the free development of financial markets and institutions.<sup>23</sup> As desirable as it is to have effective and efficient arrangements for supplying additional liquidity during financial emergencies, a more fundamental goal of reform should be that of making such emergencies far less likely than they have been.

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## ENDNOTES

1. In the Bank of England's publications and statements, this second duty is referred to as that of serving as a source of "liquidity insurance" to private-sector financial institutions.
2. M. A. Akhtar, "Understanding Open Market Operations," Federal Reserve Bank of New York, 1997, <https://research.stlouisfed.org/aggreg/meeks.pdf> (accessed September 1, 2016).
3. Imagine having the Olympics held at two facilities, with half the teams competing at one and half at the other.
4. For critical assessments of the primary dealer system, see Chris Giles and Gillian Tett, "Lessons of the Credit Crunch," *Financial Times*, February 11, 2008, <http://www.ft.com/cms/s/0/5d533184-d8d3-11dc-8b22-0000779fd2ac.html#axzz4ISf20rxQ> (accessed August 4, 2016); Robert Eisenbeis, "Primary Dealers," Cumberland Advisors *Market Commentary*, February 17, 2009, <http://www.cumber.com/primary-dealers/> (accessed August 1, 2016); Robert Eisenbeis, "The New York Fed and Primary Dealers," Shadow Financial Regulatory Committee Statement No. 355, December 8, 2014, <https://www.aei.org/wp-content/uploads/2014/11/statement-355.pdf> (accessed August 1, 2016); and Marco Armone and George Iden, "Primary Dealers in Government Securities: Policy Issues and Selected Countries' Experience," International Monetary Fund *Working Paper* No. 03/45, March 2003, <https://www.imf.org/external/pubs/ft/wp/2003/wp0345.pdf> (accessed August 3, 2016). According to Eisenbeis ("The New York Fed and Primary Dealers"), apart from its other shortcomings, the primary dealer system is partly to blame for "the undue influence of large Wall Street financial institutions over monetary policy" and their occasionally slack supervision by the Federal Reserve Bank of New York.
5. Richard Fisher and Harvey Rosenblum, "The Blob that Ate Monetary Policy," *The Wall Street Journal*, September 27, 2009, <http://www.wsj.com/articles/SB10001424052748704471504574438650557408142> (accessed August 2, 2016). See also Gara Afonso, Anna Kovner, and Antoinette Schoar, "Stressed, Not Frozen: The Federal Funds Market in the Financial Crisis," *Journal of Finance*, Vol. 66, No. 4 (August 2011), pp. 1109–1139.
6. Donald L. Kohn, "Policy Challenges for the Federal Reserve," speech at the Kellogg Distinguished Lecture Series, Kellogg School of Management, Northwestern University, Evanston, IL, November 16, 2009, <https://www.federalreserve.gov/newsevents/speech/kohn20091116a.htm> (accessed September 28, 2016).
7. For the current list, see Federal Reserve Bank of New York, "Primary Dealers List," [https://www.newyorkfed.org/markets/pridealers\\_current.html](https://www.newyorkfed.org/markets/pridealers_current.html) (accessed September 22, 2016).
8. Eisenbeis, "The New York Fed and Primary Dealers," suggests a very similar reform.
9. The CAMELS (Capital Adequacy, Assets, Management Capabilities, Earnings, Liquidity, Sensitivity) rating system, developed at the Fed's instigation and implemented by it and other U.S. bank regulators, ranks financial institutions on a scale of 1 to 5, where ratings of 1 and 2 indicate "strong" and "satisfactory" performance, respectively, while those 3, 4, and 5 stand for "flawed," "poor," and "unsatisfactory" performance.
10. Paul Klemperer, "The Product-Mix Auction: A New Auction Design for Differentiated Goods," *Journal of the European Economic Association*, Vol. 8, No. 2-3 (April–May 2010), pp. 526–536, <http://onlinelibrary.wiley.com/doi/10.1111/j.1542-4774.2010.tb00523.x/full> (accessed September 24, 2016). See also Paul Klemperer, "Central Bank Liquidity and 'Toxic Asset' Auctions," VOX, September 25, 2009, <http://voxeu.org/article/new-way-auction-toxic-assets> (accessed August 6, 2016).
11. "Hammer Time," *The Economist*, July 14, 2012, <http://www.economist.com/node/21558573> (accessed September 22, 2016).
12. See footnote 9, and Paul Fisher, Tarkus Frost, and Olaf Weeken, "Pricing Central Bank Liquidity Through Product-Mix Auctions—the First Anniversary of the Bank of England's Indexed Long-Term Repo Operations," Bank of England Working Paper, October 4, 2011, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.361.6358&rep=rep1&type=pdf> (accessed September 25, 2016). In the Bank of England's ILTRs, auction bids are ranked separately for each collateral category, with arbitrary allocations to each. However, that seems neither necessary nor desirable: Instead, haircuts can be used to discount offers involving riskier collateral. Suppose, for example, that while no haircut is applied to Treasury bills, a haircut of 6 percent is applied to BBB corporate bonds. Then, if two 100 basis-point bids are submitted, the first offering Treasury bills, and the second BBB corporate bonds, as collateral, the latter would be treated as equivalent to a 96 basis-point offer. Thus, in addition to posting more (nominal) collateral to secure loans they receive, applicants offering riskier collateral must pay a higher effective repo rate (that is, a greater spread relative to the general collateral rate) to secure credit in the first place. The procedure offers additional protection from adverse selection. It also mimics the normal (and normally efficient) workings of private repo markets, where repos used to finance less-liquid securities, including asset-backed securities and corporate bonds, involve both higher rates and bigger haircuts than those used to finance Treasury bonds. Concerning the last point, see Marcus Studart, "Repo Financing of Illiquid Securities: Maturity Choice and Pricing," UCLA *Working Paper*, November 28, 2014.
13. Willem H. Buiter, "The Role of Central Banks in Financial Stability: How Has It Changed?" in Douglas Evanoff, Cornelia Holthausen, George G. Kaufman, and Manfred Kremer, *The Role of Central Banks in Financial Stability: How Has it Changed?* (Singapore: World Scientific Publishing, 2014), p. 24.

14. More precisely, the crisis involved what Gary Gorton and Andrew Metrick describe as “a prolonged series of increases in haircuts” applied by private lenders to various private-market securities, culminating in their complete refusal of subprime-related ABS. Gary Gorton and Andrew Metrick, “Haircuts,” Federal Reserve Bank of St. Louis *Review*, Vol. 92, No. 6 (November/December 2010), pp. 507–519, <https://research.stlouisfed.org/publications/review/10/11/Gorton.pdf> (accessed September 22, 2016).
15. François Koulischer and Daan Struyven explain that “if banks have too little [good] collateral available, they may suffer from a collateral crunch.... By relaxing its collateral policy, the central bank can reduce the spread between the policy rate and the funding cost in the real economy. At the zero bound...reducing the spread becomes the only option available to central bankers wishing to bring down interest rates in the real economy.” François Koulischer and Daan Struyven, “Central Bank Liquidity Provision and Collateral Quality,” *Journal of Banking and Finance*, Vol. 49, No.12 (December 2014), p. 122. See also Stephen D. Williamson, “Monetary Policy Normalization in the United States,” Federal Reserve Bank of St. Louis *Review* (Second Quarter 2015), pp. 95–101, <https://research.stlouisfed.org/publications/review/2015/q2/Williamson.pdf> (accessed August 1, 2016).
16. Thomas M. Humphrey, “Lender of Last Resort: What it Is, Whence it Came, and Why the Fed Isn’t It,” *The Cato Journal*, Vol. 30, No. 2 (Spring/Summer 2010), pp. 36 and 37.
17. John B. Taylor, “Legislating a Rule for Monetary Policy,” *The Cato Journal*, Vol. 31, No. 3 (Fall 2011), pp. 407–415; Scott B. Sumner, “Nominal GDP Targeting: A Simple Rule to Improve Fed Performance,” *The Cato Journal*, Vol. 34, No.2 (Spring/Summer 2014), pp. 315–337; and David Beckworth, “The Case for Nominal GDP Targeting,” *Macro and Other Market Musings*, December 22, 2010, <http://macromarketmusings.blogspot.com/2010/12/case-for-nominal-gdp-targeting.html> (accessed August 23, 2016).
18. The facility’s name has since been changed to Contingent Extended Term Repo Facility. Jeremy Kronick has recently recommended that the Bank of Canada supply emergency liquidity using product-mix auctions held by a facility open to all financial institutions and accepting a wide range of collateral. See Jeremy Kronick, “Looking for Liquidity: Banking and Emergency Liquidity Facilities,” C. D. Howe Institute *Commentary* No. 445, February 2016.
19. Paul Winter, “Review of the Bank of England’s Framework for Providing Liquidity to the Banking System,” presented to the Court of the Bank of England, October 2012.
20. Samuel Cheun, Isabel von Köppen-Mertes, and Benedict Weller, “The Collateral Systems of the Eurosystem, the Federal Reserve System, and the Bank of England and the Financial Market Turmoil,” European Central Bank *Occasional Paper* No. 107, December 2009.
21. Larry D. Wall, “TAF: The Cure-All for Stigma?” Federal Reserve Bank of Atlanta Center for Financial Innovation and Stability *Notes from the Vault*, June 2016, <https://www.frbatlanta.org/cenfis/publications/notesfromthevault/1606> (accessed August 25, 2016).
22. Walter Bagehot, *Lombard Street: A Description of the Money Market* (London: Henry S. King and Co., 1873), p. 197.
23. George Selgin, “Legal Restrictions, Financial Weakening, and the Lender of Last Resort,” *The Cato Journal*, Vol. 9, No. 2 (Fall 1989), pp. 429–459, and Charles W. Calomiris and Stephen H. Haber, *Fragile by Design: The Political Origins of Banking Crises and Scarce Credit* (Princeton, NJ: Princeton University Press, 2014).