

Limited Commitment and Central Bank Lending^{*}

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Abstract

Central bank or IMF lending should be regarded as a line of credit, analogous to private line of credit products. Contractual provisions in private line of credit arrangements are designed to control managerial moral hazard and provide a means for profit-maximizing lenders to credibly commit to withdraw credit and induce closure when appropriate. The contractual mechanisms utilized by private line of credit providers are not effective for a central bank whose primary mission—to maintain financial system stability—can override its obligation to protect public funds and undercut its ability to limit its lending reach. We considered in some detail five broad approaches to a central bank’s commitment problem: good offices only, collateralization and early intervention, constructive ambiguity, extending supervisory and regulatory reach, and reputation building. Our analysis suggests that the first four institutional approaches cannot be counted on to overcome the fundamental forces inducing a central bank to lend. We argue that the only practical way for a central bank to credibly limit lending is for it to build up over time a reputation for restraint.

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Central bank lending is widely regarded as a vital part of the public safety net supporting the stability of the banking system and financial markets more generally. A central bank that is financially independent and has a sizable portfolio of government securities can provide large amounts of liquidity to institutions on very short notice.¹ Indeed, central bank lending has been a prominent part of regulatory assistance to troubled financial institutions in recent years. The idea that a central bank should be a lender of last resort has been around at least since Walter Bagehot wrote about it over one-hundred years ago.

For most of that hundred years it was taken for granted that central bank lending had benefits with little or no cost. That view has been challenged recently. For instance, in the United States the Federal Deposit Insurance Corporation Act (FDICA) of 1991 recognized that Federal Reserve lending to undercapitalized banks has the potential to impose higher resolution costs on the Federal Deposit Insurance Corporation. More recently, the idea that lending by the International Monetary Fund has led to increased risk-taking in international financial markets is being taken seriously by financial market participants and policymakers alike.² In the United States, financial economists have acknowledged “moral hazard” to be a problem for government financial guarantees ever since the savings and loan crisis of the 1980s.

In this paper we take a closer look at central bank lending in light of the concerns mentioned above. Our aim is a practical one: we wish to present some principles to help guide central bank lending policy. Our conceptual framework builds on the observation that central bank lending is a publicly provided line of credit service. There is a fundamental commonality between commercial bank lines of credit and central bank lending because both involve the advancement of large amounts of funds on short notice.

Line of credit products are complex. We make use of recent advances in the theory of financial contracts to interpret the structure of loan commitments. By dissecting the incentive implications of the contractual obligations and rights involved in lines of credit, we develop an appreciation of the tensions involved in offering credit lines. In particular, we see how contract terms control the ex post incentives of the borrower and the lender under limited commitment to assure that the line of credit product is efficient. We then employ our understanding of these issues to benchmark and inform our consideration of central bank lending.

The nature of the problem is this: A line of credit product is designed to meet

¹ Because a central bank can create money, it has the option of financing lending with an increase in the money supply. We would call such lending a combination of monetary policy and credit policy. When we speak of central bank lending in this paper, however, we confine ourselves to pure credit policy. Pure central bank credit policy finances loans with proceeds from the sale of securities (Goodfriend and King, 1988).

² Strictly speaking the International Monetary Fund is not a central bank since it does not have the power to create money. Nevertheless, it is financially a relatively independent governmental organization, and it does make large loans on relatively short notice to countries in financial distress (Masson and Mussa, 1995).

the current obligations of a firm when it is judged to be illiquid though solvent. Inevitably, then, a loan commitment shifts potential losses from short to longer-term claimants. For instance, a line of credit to an ordinary business has the potential to shift losses to the borrowing firm's long-term bond holders. And a central bank's line of credit has the potential to shift losses from uninsured creditors to the deposit insurance fund or general taxpayers. Likewise, lending by the International Monetary Fund to finance a country's balance of payments deficit has the potential to shift losses from short-term investors in that country to that country's taxpayers. Covenant provisions in private line of credit agreements give lenders the ability and the incentive to constrain credit to insolvent firms, limiting moral hazard. In contrast, central banks appear to lack explicit institutional mechanisms to credibly precommit to limit lending. Thus, an excessively liberal central bank line of credit makes short-term capital more inclined to move in the direction of favorable yield differentials irrespective of the risk involved, with the idea that a credit line could finance a quick withdrawal.

The inability to commit to limit lending is the principle weakness of central bank lending policy. The problem is that central banks responsible for the stability of the entire financial system are inclined to lend whenever not lending could plausibly trigger a systemic crisis. That inclination encourages both domestic and international short-term "hot money" investments and increases the scope for violent reversals and flights to safety whenever the market begins to doubt central bank lending intentions. While we are agnostic about whether there is a positive welfare-enhancing role for central bank lending, our premise is that the critical policy problem is how to limit central bank lending to socially appropriate circumstances.

The paper is structured as follows. Section 1 contains a detailed description of the structure and mechanics of private lines of credit. Central bank lending is characterized as a line of credit in Section 2, and the line of credit analogy is exploited to identify the nature and source of the undesirable consequences of lending by central banks. In Section 3, we consider how well some actual and possible components of central bank lending policy cope with the fundamental problem mentioned above. We conclude that no simple institutional mechanisms could confidently precommit a central bank to limit its lending. Reasoning by analogy to the inflation problem, we argue that the only practical way for a central bank to credibly commit to limit its lending is for it to build up a reputation over time for not lending. Exploiting the inflation analogy further, we describe a sequence of events that is likely to have to take place for a central bank to succeed in acquiring a reputation to limit its lending.

1 The economics of private lines of credit

There is a fundamental parallel between central bank lending and private lending under lines of credit, and the comparison is illuminating, both for the similarities

and the differences that emerge (Goodfriend and King, 1988). The similarity is that both involve lending large amounts on short notice. They differ, however, in that private credit lines are explicit contractual commitments, while a central bank's commitment to lend is a matter of policy choice. In this section we review the economics of private lines of credit. Our interest in line of credit arrangements is motivated by the question of when a central bank should lend and when it should not lend. We will be interested, therefore, in the determinants of the contingencies under which private banks deny credit.

1.1 The line of credit product

Lines of credit (or loan commitments) specify a maximum amount that can be borrowed and a formula for determining the interest rate on advances or "take-downs." Interest rates are almost universally set as a fixed markup over a reference rate such as the LIBOR or the lending bank's prime rate. Borrowers pay an up-front fee when the line of credit is initiated, as well as an annual "commitment fee" proportional to either the undrawn portion of the commitment or the entire commitment amount (Crane, 1973; Schockley, 1995). Line of credit lending is generally secured by collateral, although the largest and most creditworthy borrowers can obtain unsecured loan commitments. Some loan commitments provide "back-up" support for commercial paper issued by the firm; the loan is drawn down in the event that maturing paper cannot be rolled over. In this case the line of credit provides a bank guarantee for the liquidity of the commercial paper issued by the firm, assuring holders of an orderly exit in adverse circumstances (Calomiris, 1998).

Loan commitment agreements contain covenants that place restrictions on the borrower's future financial condition. If the borrower is in violation of one of the covenants, the lender has the right (though not the obligation) to terminate the agreement and demand immediate repayment. Some covenants place quantitative restrictions on the borrower's financial condition—minimum net worth, minimum working capital, or maximum leverage ratio, for example. Other types of covenants restrict the disposition of assets or the issuance of other debt. Loan commitment agreements also generally contain a "materially adverse change" clause that allows the bank to declare a default in the event of any "materially adverse change in the financial condition of the borrower." This ambiguously worded clause provides a backstop to the other formal covenants, allowing the lender to terminate lending when the borrower's financial condition deteriorates, even if the specific covenants are still technically satisfied. At the same time, a borrower that is in good financial health can be assured that the bank is still obligated to lend.

Because the markup does not vary with subsequent changes in the borrower's creditworthiness, the line of credit represents an implicit insurance arrangement—a credit risk derivative. The implicit ex post insurance payout in a given state of the world is the present value of difference between the contractual markup and

the risk premium appropriate to that borrower in that state of the world. The contract does not provide full insurance, however, because the bank can limit large payouts by invoking covenants and denying credit. This partial insurance is valuable to borrowers as a way of smoothing the cost of contingent funding across various states of the world. Without a line of credit, the firm would pay a high risk premium if funds were needed when creditworthiness had deteriorated. With a line of credit, the firm pays ex ante fees and agrees to the possibility that credit is denied in some states in order to assure ex post access to funds at a lower risk premium. The ex ante fees compensate the bank for the implicit insurance provided.

Lines of credit tend to be provided by financial intermediaries in general, and banks in particular. By diversifying over a large number of risks that are to some degree independent, banks can offer insurance-like products at low cost. Bank loan officers specialize in evaluating creditworthiness, and are ideally suited to monitor the borrower's condition over the life of the commitment. Such information gathering, built up through repeated interactions with the borrower, is crucial in evaluating later requests by the borrower to take down credit. Historically, lending and related credit evaluation activities often have been combined with issuing demandable liabilities like banknotes or deposits (Goodfriend, 1991; Nakamura, 1993). Thus banking institutions have traditionally dominated the line of credit business.

1.2 Agency problems

The modern approach to understanding the provisions of financial contracts sees them as the result of ex ante negotiation among contracting parties in the context of competition from alternative borrowers and lenders. Contractual provisions play a role in influencing the agency problems that may arise due to asymmetric information during the course of the contractual relationship. Bargaining is presumed to lead to contractual arrangements that are efficient in the sense that no other feasible contracts would make one party better off without making some other party worse off. Competition ensures that no contracting party is worse off than they would be if contracting with some other party instead.³

In the context of bank lending to commercial firms, the critical agency problem is the possibility of managerial moral hazard during the life of the commitment. Many managerial actions are difficult or impossible to specify as explicit conditions of the contract, either because they are not easily verifiable by the lender or a court, or because their complexity makes them too costly to include. Often there are private benefits to the manager-borrower of continuing to operate the business—"control rents"—which are impossible to transfer to outsiders. The manager may have significant human capital tied to the existing organization and operation, the value of which might be lost or diminished in a closure or liquidation.

³ See Harris and Raviv (1991; 1992) for recent surveys of the financial contracting literature.

tion. The manager may enjoy perquisites from controlling the cash flow of the firm. More fundamentally, inducing the manager to take actions beneficial to the firm might require giving the manager a pecuniary interest in the profits of the firm. Borrowers and lenders may in some circumstances have conflicting interests over such actions. When the net worth of the firm is low, the manager's interest in the firm has strongly option-like properties; the manager would reap the upside gain of a recovery in the business, while the costs of a deterioration would affect mainly the creditors. The manager can have a distorted incentive to make "all-or-nothing" gambles on excessively risky prospects.

If left unchecked, the moral hazard problem at a firm will tend to steadily grow over time. Initial losses erode net worth to the point where risk incentives shift. The firm begins to seek out investments with large potential payoffs, hoping to gamble their way back to health. The cost of such investments is below-normal rates of return in the states in which the large payoffs are not realized. Net worth is most likely to erode further as a result, exacerbating the moral hazard problem. Each round of losses further strengthens risk-taking incentives.

Moral hazard can involve more than just the borrower. Other creditors will condition their strategy on the behavior of the firm's line of credit provider. If a lender pulls a line of credit backing up a commercial paper program in a situation in which the borrower does not have the funds to roll over maturing claims, the firm defaults and investors may take a loss. The rate of return on the commercial paper will therefore reflect market expectations about the future funding behavior of the lender. Overly lax lending policy will show up as an inappropriately small risk premium on the firm's commercial paper or as an overly generous willingness to lend on the part of private investors. This issue is crucial for firms with illiquid assets that wish to issue liquid liabilities. A lender with confidence in the solvency of the firm will be willing to lend in support, while an assessment that the firm is insolvent will likely trigger withdrawal.

At the time the lending contract is negotiated, the contracting parties will anticipate the possibility of agency problems arising. Financial contracts deal with agency problems in two ways. First, contractual conditions can explicitly constrain a manager's decisions. Such constraints show up in lending agreements as loan covenants, which we discuss in detail below. Second, a change in control of the firm removes the manager from a decision-making role. Liquidation is a leading example; the firm's tangible assets are sold and the proceeds are distributed to creditors. A "reorganization" supervised by bankruptcy court is another type of control change; management is often removed, but even when management remains in place their decisions are sharply constrained while the firm is under court-sponsored supervision.

Control changes serve three purposes in the context of the agency problems afflicting lending arrangements. First, removing existing management prevents further value-wasting actions on their part. Second, separating management from the quasi-rents associated with controlling the firm acts as a pecuniary punishment that helps provide ex ante incentives to manage the firm faithfully. Third,

control changes facilitate restructuring the liabilities of the firm, realigning them with changing circumstances and repaying creditors that wish to terminate their relationship with the firm.

Liquidation will be efficient *ex post* if it maximizes the total value of the firm. Inefficient liquidation—selling the firm’s assets for less than the value of the firm as a going concern—reduces the total expected value of the firm in those states, and thus reduces the *ex ante* expected value of the firm. Provisions that reduce the likelihood of inefficient *ex post* liquidation will be preferred by both parties *ex ante*, since the *ex post* value of the firm will be larger in those states. On the other hand, managerial control rents are extinguished when the firm is liquidated. The loss of these rents is a legitimate social cost of liquidation. Since control rents can only accrue to the managers, lenders will not take them into account in deciding when to liquidate. The cost of transferring control rights to lenders is that they will want to liquidate too often—when liquidation value exceeds the value as an ongoing concern, excluding control rents. Efficient liquidation rules will balance the benefit of control changes against the cost of inefficient liquidation (Diamond, 1993).

1.3 Credible commitments

The circumstances under which control changes take place are determined by contractual terms (as well as the implicit background rules embodied in the relevant legal codes) that determine the assignment of property rights under various contingencies. The borrower and the lender will have an incentive *ex ante* to design contractual provisions that ensure that *ex post* decisions about liquidation and the allocation of control rights are efficient, in the sense that they maximize the expected ongoing value of the concern as a whole (subject to the constraints imposed by informational frictions they face).⁴ Loan covenants and collateral provisions play a critical role in structuring the *ex ante* incentives to effect control changes under line of credit arrangements.

Loan covenants

Loan covenants play a crucial role in structuring *ex post* incentives for the lender. Under the conditions spelled out in the loan covenants, the lender has the right to withdraw funding. If funding cannot then be obtained elsewhere, as is likely (see discussion below), the lender can essentially force reorganization or liquidation. Absent violation of the covenants, the borrower retains control of the firm. Loan covenants thus can be viewed as conditionally transferring the control of the reorganization/liquidation decision to the lender. Covenants also control other forms of *ex post* moral hazard directly by limiting the manager’s right to take on new risks, change lines of business, assume new indebtedness, and so on (Aghion and Bolton, 1992; Berlin and Mester, 1992).

⁴ Not all control changes are instigated by lenders; they can also take place at the initiative of the firm’s governing board, presumably representing the interests of shareholders.

Loan covenants can be quite strong. Taken together, the set of covenants in a typical loan appears to be quite difficult *not* to violate. In practice, however, violation of a loan covenant is merely an occasion for renegotiation between lender and borrower. The lender can waive the violation, or can use the ability to declare (technical) default as leverage to obtain more favorable monetary terms or more stringent covenant conditions (a partial control transfer). Renegotiation allows outcomes to vary with ex post contingencies in ways that would be difficult to provide for ahead of time in the formal contract. (Huberman and Kahn, 1988; Kahn and Huberman, 1989) Covenant restrictions can be made strict, in the expectation that in some circumstances they will be waived or loosened by the lender. Although the borrower and the lender cannot precommit not to renegotiate, the loan agreement can influence outcomes by having the allocation of property rights depend on future circumstances.

It makes sense, from an ex ante point of view, for the allocation of bargaining rights implied by loan covenants to depend on how risky it would be to lend more to the firm. When covenants are violated, managerial moral hazard is likely to be more pronounced. If further lending is to take place, it will have to make the lender as well off as withdrawing the credit line and forcing reorganization or liquidation, if need be. In this case the lender is in a position to insist on a higher markup or more collateral to compensate for the heightened risk of continued lending. If the lender cannot be satisfied—if no such terms or collateral exist—then further lending is, presumably, ex post inefficient or infeasible and the borrower is insolvent. When covenants are fully satisfied, managerial moral hazard is likely to be muted and so the lender does not have the ability to prevent further lending. The bargaining power rests with the borrower, who is quite likely to be solvent in this case. Lending takes place at the borrower's request at the pre-agreed rate. The ex post self-interest of lenders, the ability to renegotiate, and the presence of relatively strict loan covenants provide a contractual mechanism that credibly commits the lender to limit lending when appropriate.

If given the choice ex post, the lender would never want to extend new lending to an insolvent firm. A firm is insolvent unless the present discounted value of future cash flows exceeds the real current value of liabilities. Without a positive gap between future receipts and future obligations, the present value of anticipated future repayment streams cannot possibly cover the value of the current loan advance. Lending in such circumstances would represent subsidization, and a profit-maximizing lender has no reason to subsidize customers under competitive conditions.⁵

Collateral

The secured lender's ability to seize collateral for nonpayment is an important

⁵ The control rents enjoyed by the manager should, strictly speaking, be counted as part of the total value of the firm as a going concern, but since (by definition) these cannot be pledged to outsiders, they are irrelevant to financing decisions.

contractual right. A lien on an asset that is essential to the borrower's operations can provide the lender with another means of forcing the borrower's liquidation. In addition, collateral reduces the lender's risk by providing compensation in states when the borrower cannot pay the obligation in cash, thus allowing a lower risk markup. Collateral also sharpens the borrower's incentive to repay, which helps relax borrowing constraints by allowing larger credible repayment obligations (Lacker, 1998). Moreover, in bankruptcy, secured debt has a priority claim on the pledged assets. Collateral thus prevents dilution of the lender's position.

The ability to take new assets as collateral later in the lending relationship helps overcome the classic underinvestment problem associated with debt overhang (Stulz and Johnson, 1985). When the value of the firm is below the nominal value of outstanding debt, part of the return to any investment accrues to current debtholders; the real value of their debt increases. By pledging collateral, the borrower and the new lender can appropriate and share between them much of the gains from the new investment. Junior lenders can prohibit financing new projects with secured debt by including a "negative pledge clause" that prohibits pledging collateral to other lenders. Many junior creditors do not do so, however, and it is not in their interest if it would prevent some value-enhancing investments. For many publicly-issued bonds, the firm retains the right to finance new projects with secured debt. Note that the presence or absence of a negative pledge clause for junior debt is a matter of contract. Note also that the lender's decision to take additional collateral is subject to ex post rationality constraints; it must be in the lender's self-interest to do so.

It is important to recognize that collateralized lending is not perfectly safe. The value that can be realized by seizing and disposing of collateral is uncertain, and in some circumstances can fall short of the nominal obligation it backs. This feature is no accident, since borrowers have a greater incentive to default and surrender collateral when its value has fallen below the value of the debt. Why would lenders agree to terms under which they may take a loss on collateral? As noted above, the key role of collateralized debt is to enhance the repayment incentive of the borrower. Collateral that is worth more to the borrower than to the lender, perhaps due to the transactions costs associated with liquidating the collateral, can provide adequate repayment incentives even though the lender suffers a loss when the borrower defaults and transfers the collateral (Lacker, 1998). Moreover, collateralization alters ex post bargaining positions in any renegotiation by the borrower and the lender.

Monitoring

As mentioned above, line of credit lending is accompanied by costly information gathering. Banks assess the borrower's credit risk prior to the contractual commitment in order to set contract prices appropriately and to screen out inappropriate risks to which the lender is unwilling to lend. After the lending commitment has been signed, ongoing monitoring takes place, partly in the form of periodic financial statements required by covenant, and partly through informal contacts.

Note that any arbitrary information gathering can, in principle, be negotiated as part of the commitment agreement. For example, many agreements stipulate that the lender receive audited financial reports. In other cases, particularly for small firms, the burden of audited statements is judged too costly and unaudited reports are accepted instead. In negotiating the monitoring features of the contract, the marginal value of additional information gathering presumably is balanced against the expected incremental joint cost.

Lenders have a strong incentive to engage in ongoing information-gathering in order to be able to assess as accurately as possible the solvency of the borrower. Periodic monitoring thus helps prepare the lender to make critical decisions when the borrower experiences financial distress (Rajan and Winton, 1995). What is learned about the characteristics of the firm's cash flow can help the lender interpret payment problems and form a more accurate assessment of the value of the firm as a going concern. Such information will be useful when the lender decides whether to extend or deny credit in response to covenant violations. In comparison, a lender with no prior lending relationship with the borrower will be at a distinct informational disadvantage.

Information gathering gives rise to "relationship lending"—the observation that ties between lenders and borrowers are typically long-lasting (Berger and Udell, 1995; Petersen and Rajan, 1994; Petersen and Rajan, 1995; Sharpe 1990). This effect is particularly acute in times of distress, when outsiders are unable to acquire information fast enough to assist the firm on the same terms. The informational hurdles facing alternative lenders make the current lender's decision to grant or deny credit all the more crucial. When the informational advantage of a lending relationship enables a firm to obtain funds at a low enough cost to continue operating, and that same firm would not have been able to obtain funds cheaply enough without a lending relationship, we can say that the firm is illiquid though solvent. Withdrawing credit in this setting can effectively force reorganization or liquidation.

Safeguards for the borrower

From the borrower's point of view, the important feature of loan covenants is that they define the limits of the lender's power to abrogate the agreement and demand accelerated payment. In the absence of violation of the covenants, the lender is compelled to lend. As the lending relationship matures over time, the quasi-rents associated with the lender's informational advantage over competing lenders will grow. If the lender had blanket authority to demand repayment, the lender would be tempted to extort concessions from even a financially healthy borrower. All the quasi-rents from the relationship would inevitably accrue to the lender. To safeguard the borrower against such opportunistic behavior, the line of credit agreement stipulates that the lender is compelled to lend at a pre-agreed risk premium, absent any violation of the covenant conditions.

To summarize then, line of credit agreements are crafted to address the moral hazard problems that are anticipated to arise if the borrower later gets into trouble.

In the presence of loan covenants and collateral provisions, the self-interested profit motive of lenders allows them to credibly commit to make appropriate decisions to withdraw credit and induce closure or reorganization. Costly periodic monitoring efforts enhance the lender's ability to gauge the borrower's situation.

2 Central bank lending as a line of credit

The contractual framework governing line of credit lending provides a useful lens through which to view central bank lending policy. In this section we describe the similarities and differences between central bank lending and lending under private loan commitments. Our aim here is to compare central bank lending practices against the benchmark of private lending mechanisms, without prejudging the usefulness of public provision of line of credit lending.⁶

2.1 Central bank lending

At first glance, central bank lending would appear to be quite different from private line of credit lending. Central banks do not necessarily enter into contractual arrangements with potential borrowers. Instead, the central bank is given statutory authority to lend to broad classes of institutions. Central banks are publicly-chartered institutions and, unlike private lenders, profit maximization is not their primary mission.

Despite these apparent differences, central bank lending functions in fundamentally the same way as a private line of credit—by providing guaranteed access to borrowed funds at a predetermined rate. The rate at which central banks lend is generally posted in advance, rather than negotiated *ex post* with each individual borrower. Thus central bank lending rates do not appear to vary much with the borrower's *ex post* creditworthiness. At times, distressed borrowers turn to the central bank because private alternatives would be exorbitant, either in terms of explicit financing cost or because they would require surrender of control. Access to central bank credit therefore appears to provide implicit insurance to those that qualify. One difference between the pricing of central bank credit and private lines of credit is that central banks generally do not charge explicit *ex ante* fees for the service, although one could argue that the central bank commitment is bundled together with an array of regulatory burdens (and privileges).⁷

The classic rationale for central bank lending is to allow illiquid but solvent institutions to meet their maturing short-term obligations. The extreme case is to fund a run on demand deposits. Note that this function closely parallels the role of bank lines of credit in backing up commercial paper programs. The facility is

⁶ See Goodhart (1988) and Schwartz (1992) for alternative views on the desirability of central bank lending.

⁷ See Kwast and Passmore (1997) for evidence on the net subsidy provided by the financial safety net in the U.S.

designed to help the firm cope with an emergency “run”—an inability to roll over the credits. As noted above, a decision to withdraw credit can trigger default on the commercial paper, and closure or reorganization of the firm. Conversely, lending can stave off collapse. In the case of a bank run, central bank lending decisions are often critical to keeping an institution afloat. In many situations, the only alternative to a central bank loan is closure. But note the mechanism that links credit withdrawal and closure in each case. A private lender denies credit, causing a default, which leads creditors to seek remedies by seizing assets. The borrower files for bankruptcy to obtain protection from creditors while a division of the losses can be negotiated. A central bank that denies credit to a bank forces the hand of the chartering agency or the deposit insurance fund. The central bank’s critical role in bank closure brings it face-to-face with the government agencies that have direct responsibility for closing banks.

2.2 Agency problems

Another similarity between central bank lending and private line of credit lending is the importance of borrower moral hazard. A vast array of bank management decisions involve risk-return trade-offs. At any leveraged entity attitudes towards risk are to some degree distorted, because some decisions affect the value of debtholders’ claims. Banks are among the most highly leveraged of institutions. At well-capitalized banks, the value of future quasi-rents owing to banks’ special regulatory privileges acts as an implicit performance bond that offsets risk-taking incentives. When net worth falls, however, the value of the implicit bond vanishes and incentives flip toward risk-taking—little is left to lose. It is now widely recognized that the management of a poorly capitalized bank has incentives to take on excessive risks to attempt to gamble their way out of trouble. When supervisory restraint is lax—as during the U.S. savings and loan crisis, or in the recent emerging markets banking crises—moral hazard steadily grows as the losses pile up (Calomiris, 1998).

Private banks make explicit case-by-case decisions to grant lines of credit. In contrast, central bank lending commitments are not usually made on an individual basis *ex post*. Often there are legislative and regulatory policies delimiting the set of institutions that have access to central bank credit, but sometimes the set of institutions with access is quite large.⁸ The key difference here is that private institutions are able to condition the commitment on an examination of the prospective borrower’s financial health and then tailor the contractual terms to the individual borrower, while access to central bank credit is granted to broad categories of institutions. Also, the terms of central bank lending do not reflect the

⁸ In the U.S., for example, all depository institutions that are subject to reserve requirements are eligible to borrow at the Federal Reserve’s discount window. In addition, section 13 of the Federal Reserve Act allows the Board of Governors “in unusual and exigent circumstances” to authorize the Reserve Banks to extend credit to any individual, partnership, or corporation, provided the Reserve Bank obtains evidence that such entity “is unable to secure adequate credit accommodations from other banking institutions.”

competitive discipline of arm's-length bargaining.

Central bank supervision of institutions with access to central bank credit is a direct counterpart to the ongoing monitoring performed by banks. For central banks without a direct supervisory role, access to supervisory information performs the same function; keeping the prospective lender apprised of changes in the creditworthiness of the borrower. Supervisory information is generally far more detailed than the reporting required of private line-of-credit customers. As noted earlier, private contracts can, in principle, mandate stricter disclosure, but there are impediments to doing so. In the U.S., provisions of bankruptcy law discourage lenders from becoming so intimate with the management of the firm as to be deemed an "insider" (Baird, 1993).

Like private line of credit lending, central bank lending is generally collateralized. Specific assets can be documented and evaluated in advance, drawing on the central bank's supervisory knowledge. In addition, central banks' security interests are generally favored in bank failure resolutions. This tends to make central bank lending relatively safe, although, as noted above, collateralized lending is not risk free in general.

In lending to government-insured institutions, collateral plays a crucial role in the effect of the loan on the insurance fund in the event of a failure. Collateralized lending dilutes junior claimants, which in the case of an insured bank includes depositors. The insurance fund stands in for the depositors in the event of closure, however, so central bank lending effectively dilutes the deposit insurance fund. For example, in the U.S., the FDIC assumes the failed bank's indebtedness to the Federal Reserve, and in exchange retains the pledged assets. When the Fed lends to allow a failing bank to pay maturing short-term obligations, the insurance fund retains the collateral assets, but the maturing short-term obligations have been replaced by a fixed obligation to the Fed. If the released short-term claimants were insured depositors, the operation has merely replaced one fixed obligation for another. If some short-term claimants were uninsured, however, things are different. The short-term claimants would have been junior to the FDIC's claim on behalf of the insured depositors. The insurance fund inherits a bank in which an uninsured junior claim held by the private sector has been replaced by a fixed senior claim held by the Federal Reserve. On the other hand, closure has been delayed and private uninsured creditors have been spared.

2.3 The commitment problem

As with private lines of credit, the critical property of central bank lending is the nature of the circumstances in which it does and does not take place. With private lines of credit, lender profit maximization provides ample incentive to advance credit when it is *ex post* efficient to do so. The environment surrounding central bank lending is in some respects quite different, but it also provides incentives to extend credit when it is desirable to do so. Although their formal organizational structure parallels private banking institutions, central banks do not attempt to

maximize accounting earnings. Instead, they operate under legislative policy oversight and mandates that charge the central bank with responsibility for “the stability of the financial system.” A decision not to lend that is followed by market turmoil creates immediate risks. Most importantly, the central bank could be blamed for the negative consequences for the economy of its refusal to lend. Moreover, a central bank that precipitates the demise of one or more financial institutions may be subject to direct action through the legal system or indirect action through the legislature. Since one of the main responsibilities of a central bank is to protect the financial system, central bank officials might be inclined to interpret a risk to the financial system in a way favorable to lending. Equally important, it is impossible to prove the counterfactual, i.e., that not lending and letting a troubled firm fail in a particular case would not have seriously disrupted markets. It is very difficult for outsiders to question after the fact a central bank’s judgement on such matters.

Even apart from a financial stability mandate, the unique ability of central banks to finance lending by creating high-powered money makes them an irresistible target of forces seeking an off-budget rescue of a troubled but influential institution. The chartering authority may want to delay the immediate budgetary consequences of an institution’s failure, perhaps with the concurrence of the legislature. The chartering agency or the legislature might pressure the central bank to lend to insolvent institutions in order to postpone closure and prevent losses to creditors (Kane, 1989). As we noted above, collateralized central bank lending to delay closure effectively allows uninsured short-term creditors of the troubled institution to escape unscathed. Moreover, widespread perception of a central bank commitment to aid (large) institutions whose demise could threaten financial stability might necessitate a commensurate commitment to smaller institutions on equity grounds. For both reasons, then—safeguarding financial stability and assisting insured institutions’ chartering authorities—central banks have an ample incentive to lend when warranted.

For private providers of lines of credit the prospect of losses, or, more generally, lending at a rate below the appropriate risk-adjusted rate, provides a self-interested motive to deny credit and force closure or reorganization when the borrower is in poor enough condition. Loan covenants give them the ability to do so. Are there countervailing incentives for central banks that would lead them to withhold lending in some circumstances? As noted above, there are usually strong pressures to lend. Is there an institutional mechanism to allow central banks to credibly commit to resist these pressures and withhold lending from insolvent institutions?

Although central banks are not formally responsible for maximizing portfolio earnings, they would seem to have strong incentive to avoid subsidized lending. Lending that appears not to have been necessary to protect the financial system, and that appears to have saved equity interests, has the appearance of cronyism. What’s worse, a central bank could actually lose taxpayer money. In either case, there could be immediate legislative repercussions. As a result, some central

banks lend only on terms that virtually guarantee repayment in full (Hackley, 1973). In the U.S., for example, discount window loans are virtually always collateralized, assuring priority in closure. Moreover, the Federal Deposit Insurance Corporation generally assumes the borrowing bank's indebtedness to the Fed in exchange for the collateral, relieving the Fed of the risk of falling collateral value. This arrangement allows the Reserve Banks to avoid lending losses, but has the effect of shifting those losses to the deposit insurance agency.

Implicitly restricting central bank lending to be risk-free in this sense is a "bright line" policy that is easy to verify *ex post*. Such a policy is one way to limit central bank involvement in credit allocation and restrict the scope for subsidization. Limiting central bank involvement in credit allocation can help buttress the central bank's independence and bolster the fiscal discipline of the deposit insurance fund (Goodfriend, 1994). One might think that a bright-line no-loss policy would sharpen the central bank's incentives, bringing them more closely into line with those of a private line of credit provider. Full collateralization is one such no-loss policy. By itself, however, this policy is not enough. Because the deposit insurance fund has the ability to make the central bank whole by assuming the insured institution's indebtedness, the central bank has no pecuniary reason to object and thus is even more vulnerable to pressure to delay closure by lending.

Central bank lending facilitates roll over of short-maturity bank liabilities, much the way line of credit lending facilitates roll over of commercial paper. As with private backup lending, inappropriate liquidation policy can give rise to moral hazard in the issue of liquid liabilities. Anticipation of such central bank lending by private lenders creates a potentially severe moral hazard problem; markets would expect the central bank to provide the bank with the funds to allow the exit of liquid claimholders. Again, this strongly resembles the role of back-up lines of credit for commercial paper issuers in providing emergency access to liquid funds to allow firms to service maturing short-term debt. The distinction is that central bank lending facilitates a reallocation of wealth among failing bank creditors that the deposit insurance fund has neither the capability nor the legal authority to perform by itself. Unlike private lending, in which the bailout must be *ex post* rational for the lender, the central bank is not subject to the same profit-maximizing discipline. Moreover, private lending to a failing firm is subject to the safeguards of bankruptcy law, including the fraudulent conveyance provision, which under certain conditions allows the court to unwind transactions that occurred immediately prior to bankruptcy if they disadvantaged the bankrupt firm's estate. Central bank lending accompanied by indemnification from the deposit insurance fund is subject to no such discipline, only the vagaries of the political system's response, which, as noted above, is likely to be tilted toward leniency.⁹

The financial stability mandate of the typical central bank can create pressure

⁹ For an account of Federal Reserve lending to depository institutions, see *An Analysis of Federal Reserve Discount Window Loans to Failed Institutions* (1991).

to expand the scope of central bank lending to nonbank financial institutions, for central banks whose formal authority allows it. A wide array of nonbank financial intermediaries are capable of amassing positions the liquidation of which could be seen as a threat to the stability of asset prices and the solvency of many other financial institutions, including insured banks. Moreover, short-term credit linkages between the failing nonbank intermediary and other financial market participants widen the interest in central bank liquidity assistance. A central bank with no formal authority to lend outside a narrowly defined set of institutions is, of course, well positioned to resist influence. Otherwise, we might see a tendency to extend the range of borrowing institutions.¹⁰

We are forced to conclude that the institutional incentives for a central bank to limit lending are relatively weak. As a result, we should expect to see a general tendency for central banks to overextend lending, with the anticipated consequence of exacerbating moral hazard problems among institutions deemed likely to qualify for central bank credit. Moreover, the rate of incidence of financial distress that calls for central bank lending should show a tendency to increase over time, as market participants come to understand the range of the central bank's actual (implicit) commitment to lend and adjust expectations accordingly.

3 Coping with the commitment problem

To summarize the argument so far, we saw above how private banks could efficiently and profitably structure contracts to support private lines of credit. They do so because (1) their own money is at stake, (2) they can choose their borrower relationships, (3) the conditions involve the right to monitor the value of assets on an *ex ante* (ongoing) basis to distinguish illiquid from insolvent borrowers in the event of a request for funds (4) loan covenants give the lender the right to easily withdraw credit when the borrower's financial condition has deteriorated, and (5) competition and profit maximization induce private providers to balance the risks of accommodating a request for funds against the costs of not lending. To be competitive, a line of credit product could not exploit borrowers; and to be profitable, a credit line would have to provide a risk-adjusted return comparable to other products offered by banks.

Central bank line of credit provision is undertaken under such different circumstances that we can't presume lending decisions will be made appropriately. First, financial losses are not borne by the central bank but by the Treasury, and ultimately taxpayers. Second, a central bank cannot offer take it or leave it conditions because it is responsible for protecting financial markets as a whole, and may not be able to refuse to lend to an institution whose failure might threaten the system. Third, for the above reason, a central bank might feel pressure to lend to an institution that it doesn't examine thoroughly, or at all. Fourth, a central bank

¹⁰ For an account of Federal Reserve lending to nonbanks, see Garcia (1990).

is not disciplined by competition or profit maximization.

At any point in time, then, a central bank will be more inclined to lend than not whenever not lending could threaten the entire financial system. Such incentives assure that the central bank carries out its legislative mandate to stabilize financial markets. The problem with such an inclination is that it creates in the public's mind an expectation that if a financial institution is in a protected class, then it can count on credit assistance from the central bank in certain adverse circumstances that could arise in the future. Private lenders will take advantage of central bank assistance by accepting greater credit risks when lending to implicitly protected firms. And borrowing firms in the protected class will take advantage, too, by taking on increasingly risky assets. Over time, the central bank will be inclined to expand the class of firms perceived to be protected and the extent of protection.

The fundamental problem for central bank lending is to find a way to credibly commit to limit lending reach. It is a difficult problem and there are no easy solutions. In what follows we consider the practical effectiveness of five broad approaches to the commitment problem.

3.1 Good offices only

In lieu of establishing a practical means of committing a central bank not to lend except in deserving circumstances, we could imagine legislation precluding a central bank from extending its own credit under any circumstances. This possibility is worth considering because a central bank could still play a useful and effective role in facilitating private credit transactions, or those of other national or international agencies. A central bank has three institutional strengths in this regard. First, its financial independence and independence from the budget process give it an impartiality with respect to financial matters difficult to find anywhere else in the government, or for that matter, in the private sector. Second, a central bank has a large staff with practical experience in economics, supervision and regulation, payments system operations and financial law. Third, in the course of carrying out their normal duties, high central bank officials develop personal relationships with their counterparts in the private sector.

Thus, a central bank could offer its "good offices" to help private creditors negotiate a recapitalization of a troubled financial firm. The central bank might have better knowledge of the troubled firm through existing supervisory relationships. The central bank might be in a position to "certify" the solvency of the firm to others, essentially facilitating "due diligence" efforts. Even in the absence of ex ante central bank knowledge of the institution, the central bank might inspect the portfolio for others, acting as a trusted third party. In negotiations among members of a potential lending consortium, the central bank might play the role of neutral arbitrator.

In principle, the extension of good offices needn't involve pressures or sweeteners from the central bank. In practice, however, as long as a central bank re-

tained supervisory and regulatory powers one could not be sure whether private parties to the agreement were influenced implicitly by a concern about some punishment should they not sign on to the deal. In effect, then, a deal could have been facilitated by implicitly directed credit allocation because of the central bank's involvement. And if the central bank could still lend, then a deal might be implicitly sweetened if the parties believed that the central bank would be more inclined to lend to the troubled firm in the future. Parties could also believe that that regulatory authorities, including the central bank, would forbear if the institutions that lent became troubled themselves. Of course, a deal could very well involve a considerable transfer of equity from the original owners to the new owners. But if a central bank presides over a deal more favorable to the original owners than they would have gotten without its help, moral hazard has increased.

One way to be sure that no implicit pressures or sweeteners are involved when a central bank lends its good offices would be to take the central bank out of both supervision and regulation, and lending. But then the central bank would lose the professional and personal connections that make it a good facilitator in the first place. The upshot is that even limiting a central bank's role to one of facilitator tends to create in the public's mind the possibility of future credit assistance of one kind or another.

3.2 Lending hurdles

Recognizing that there are circumstances when central bank lending would be desirable in order to protect the financial system, we consider various hurdles designed to limit the central bank's inclination to lend except in extreme circumstances and to limit the central bank's exposure if it does lend. We take up these in reverse order. First, we consider the taking of collateral. After that, we consider the effectiveness of hurdles that a central bank might be made to clear before it is authorized to lend in the first place.

Collateral

Some central banks have chosen to lend only on good collateral to fully protect their funds in the event that the borrower cannot repay. The taking of good collateral certainly protects the financial integrity of central bank lenders themselves. And it might appear to limit the exposure of taxpayers, but this is not the case. Allowing a central bank to take good collateral to back its loans permits borrowers to more cheaply obtain funds to continue operating. Moreover, central banks might be inclined to lend as long as good collateral is forthcoming. Consider what this would mean for a bank with insured and uninsured deposits. As word of a bank's possible insolvency got around, uninsured depositors and other uninsured lenders, e.g., interbank loans, would withdraw their funds first. By helping to pay out uninsured creditors, central bank loans help uninsured creditors get their money out of the troubled bank before it is declared insolvent and closed.

Its lending well-protected, a central bank would have little incentive to pre-

precipitate a borrower's insolvency by refusing to lend. A central bank supervising a borrowing bank might be in a good position to evaluate even the illiquid portions of a portfolio for purposes of collateral, and could keep a bank operating for some time. In effect, such central bank lending tends to provide uninsured creditors of a troubled bank with free insurance, and to delay the time when a troubled bank would default to one of its creditors and trigger its closing and reorganization. Assets that could have remained in the bank, if it had been closed sooner, are now pledged to the central bank and are unavailable to help the deposit insurance fund and the taxpayers pay off insured deposits.

In short, fully collateralized central bank lending hides the fact that the central bank is responsible for exposing the insurance fund or the taxpayer to a risk of loss. Moreover, fully protecting the central bank actually increases its inclination to lend.

Early intervention

One option to better protect the deposit insurance fund and the taxpayer is to require bank regulators to close a failing bank when its book value equity capital falls to, say, 2 percent rather than at the point of book insolvency. A deterioration of book capital could trigger progressively heavier regulatory restrictions. Such a restriction might prohibit additional central bank lending at some point, unless written permission to lend is given by the highest officials in the government.

The problem with this hurdle is that it is based on book rather than market value capital. For depository institutions whose assets are in large part illiquid non-traded loans, a bank could become insolvent on a market value basis well before it is declared insolvent on a book value basis. For example, consider the Bank of New England in the United States which was declared insolvent in January 1991. The following day, the Federal Deposit Insurance Corporation estimated that the deposit insurance claim would cost the taxpayer around \$2 billion. Why didn't the regulators act sooner?

The Bank of New England's problems began when the mortgage loans it made in the mid-1980s turned bad. Real estate proved unable to earn a sufficient return to cover the loan payments. The bank, however, still had to pay the competitive interest rate on deposits. Even though the deposits were fully insured, depositors required the same rate of return they could get elsewhere. So the bank had to divert to depositors a portion of the return on assets that had been going to equity holders. The cut in dividends caused the stock price to fall precipitously. In the event, the bank could not meet the competitive deposit rate payments by reducing dividends alone. The bank had to sell off securities, pledge assets to the Federal Reserve's discount window, and attract U.S. Treasury deposits to fund withdrawals of uninsured deposits and interest payments to the remaining depositors. The negative cash flow reduced the book value net worth gradually until it fell far enough for regulators to seize the bank.

In this case it may be said that regulators were too slow in writing down the value of loans. It is well to remember, however, that there are often good reasons

to be cautious. The market value of a loan is the present discounted values of future cash flows. Although current cash flows may be small, tomorrow is another day. Thus, any write down by a regulator is subjective and subject to challenge exposed by high government officials or the bank in question itself. In other words, examiners cannot be expected to be responsible for tough decisions any more than high government officials themselves. Thus, hurdles based on measured capital deficiencies designed to protect the deposit insurance fund and the taxpayer against losses due to excessive central bank lending should not be expected to work very well in practice; they merely shift formal responsibility for an inherently difficult decision.

3.3 Constructive ambiguity

The above argument suggests that simple mechanistic hurdles cannot be counted on to limit a central bank's inclination to lend. The problem is that financial markets know that there are circumstances when a central bank would not refuse to lend to troubled institutions because of the possibility of systemic effects. Thus, owners of institutions that are big enough, or central enough to the payments system or to financial markets more generally have an incentive to increase their risk exposure in just those circumstances. Owners know that they keep the upside returns if things go well, but share any losses more broadly, i.e., with the central bank, an insurance fund, or the taxpayer, if things go badly.

This sort of logic puts a central bank in a box. A central banker's willingness to support the financial system in times of potential crisis (to maintain the confidence necessary to facilitate the functioning of financial markets and the economy more broadly) actually causes risks in the system to grow. For this reason, a central bank might be inclined to keep markets guessing about the exact circumstances in which it would be willing to lend. By creating uncertainty in the minds of potential borrowers, such ambiguity might be thought to be constructive because it causes potential borrowers to take on less risk. Constructive ambiguity, under this interpretation, attempts to reduce market participants' perception of the probability of central bank lending while reserving the central bank's option to lend when systemic concerns seem to warrant.

Some ambiguity is unavoidable in any attempt to state the precise contingencies in which a central bank might lend. The true policy would depend on information available to the central bank at a future date, some of which might be private information about specific firms known only to the central bank. A policy that needs to be based on private unpublishable information would not be verifiable and so could not be made completely free of uncertainty and ambiguity. Moreover, lending policies that depend on future circumstances in complicated ways might be hard to state with clarity in advance.

That said, one might ask whether a central bank might want to deliberately increase the uncertainty surrounding its lending intentions? At one level, ambiguity can be enhanced by not attempting to sharpen or clarify the broad principles

of central bank lending in internal discussions or external speeches of high central bank officials. Over time, however, markets will learn the central bank's actual lending policy. If the central bank does not follow through with actions that ratify the announced ambiguity, its rhetoric will ultimately come to be disregarded. Market expectations will converge on the central bank's actual policy. To be sustainable, therefore, a policy of constructive ambiguity has to be demonstrated in a central bank's lending actions themselves.

In order to increase ambiguity a central bank would have to add extraneous variability to its lending policy—it would have to play a “mixed strategy” in game-theoretic terms. It is as if a central bank would have to couple each lending decision with a spin of a roulette wheel that would randomly point to “follow through” or “not follow through.” The central bank would have to be willing to abide by the wheel. That is, with some positive probability the central bank would lend when its better judgement said the situation didn't call for it; and with some positive probability the central bank would have to follow the wheel and not lend when it would otherwise wish to do so.

Randomization can be economically useful. For example, tax authorities audit randomly, with audit probabilities that vary with some basic features of the return. Randomization balances the beneficial incentive effects on taxpayer behavior against the expected resource cost of the audits. Tax authorities are able to implement mixed strategies credibly because they have learned over time that failing to audit eventually leads to increased tax evasion.

The problem with adding variability to central bank lending policy is that the central bank would have trouble sticking to it, for the same reason that central banks tend to overextend lending to begin with. An announced policy of constructive ambiguity does nothing to alter the ex post incentives that cause the central banks to lend in the first place. In any particular instance the central bank would want to ignore the spin of the wheel. Supporting a policy of random but limited central bank lending would require withholding credit with some positive probability in instances in which it is costly to the central bank. Deliberate enhancement of ambiguity beyond that inherent in lending policy does nothing to make this choice easier.

A policy of constructive ambiguity in the absence of an ability to precommit runs the risk of drifting in an expansive direction. The greater the perceived probability of the central bank lending in various circumstances, the greater the risk-taking incentive for eligible institutions. Whenever the central bank is seen to lend in a situation in which it had not lent before, perceived probabilities will be revised upward, inducing greater risk-taking.¹¹ This increases the likelihood of circumstances in which the ambiguous policy would have recommended a positive probability of lending. When the central bank actually does lend, probabiliti-

¹¹ Note that for the tax authority, the fraction of returns that are audited is published, and may have far more impact on perceived audit probabilities than an individual audit. In contrast, because the frequency of central bank lending is much lower, individual instances have a far greater effect on market expectations of future lending.

es are revised upward yet again. A self-reinforcing dynamic could emerge in which central bank lending encourages risk-taking that makes future lending even more likely.

3.4 Extended supervisory and regulatory reach

Knowing that it cannot credibly commit not to lend to insolvent institutions, a central bank could consider extending its supervisory and regulatory authority, or the authority of other government agencies, to all institutions that it might possibly wish to lend to. In principle, such authority would enable the central bank to limit risk taking directly. A central bank might want to be sure to extend its regulatory authority to financial institutions big enough or central enough to threaten the financial system if they failed. It might be especially interested in preventing insured institutions such as banks from taking on excessive risks.

There are many problems with attempting to control risks by extending regulatory authority. First, regulatory reach does not extend across international borders. An attempt to regulate financial firms too heavily may cause them to locate in those countries willing to impose little regulation in order to attract the business. Second, an attempt to extend regulation to firms within a country causes new institutional forms to develop to escape regulation. Third, the proliferation of new financial instruments associated with derivatives enables institutions to synthesize financial positions in many ways. Sophisticated financial engineering has made circumventing regulatory restrictions much easier. It has become very difficult for regulators to monitor and regulate transactions, i.e., balance sheet and off balance sheet positions within a given firm. This development is the motivation behind the movement away from direct supervision of balance sheet items toward a supervisory philosophy focused on institutions' risk management and control processes.

The extension of supervisory and regulatory authority to a broader array of financial institutions risks feeding back on central bank lending policy. Supervisory involvement in a financial sector can "taint" government authorities with implicit responsibility for the health of institutions in that sector, heightening the perception that the central bank is willing to lend to them in the event of liquidity problems. A central bank might find it costly to disappoint such expectations. Extending the breadth of supervisory and regulation could induce a commensurate extension of the implicit central bank lending commitment.

In short, it is probably fair to say that while supervision and regulation has its place as part of a line of credit package, it is oversold as a means of controlling risk taking on the part of owners of firms who could potentially benefit from access to central bank lending on favorable terms.

3.5 Reputation building

In our view, none of the above institutional mechanisms can credibly commit a central bank to not overextend its lending reach, or prevent increased risk taking

engendered by a central bank's inability to limit its lending commitment. It remains to consider whether a central bank could credibly commit to limit its lending by simply building a reputation for doing so. Given the pressures to overextend its lending discussed at length above, there might seem to be little hope that a central bank could ever build a reputation for not lending. It is hard even to begin to think about how a central bank would start to do so. Yet, we think that the experience by which central banks around the world have built a reputation for maintaining low inflation provides a road map for how a central bank might credibly commit to limit its lending.

Building a reputation for low inflation¹²

At first, the inflation that accompanied stimulative monetary policy was tolerated in the United States as a necessary evil because it seemed consistent with a stable Phillips curve tradeoff in the 1960s. In retrospect, however, we see that deliberately expansionary monetary policy came to be anticipated by workers and firms. Workers learned to take advantage of tight labor markets to make higher wage demands, and firms took advantage of tight product markets to pass along higher costs in higher prices. Increasingly aggressive wage and price behavior tended to neutralize the favorable employment effects of expansionary monetary policy. And the Federal Reserve became ever-more expansionary in pursuit of low unemployment.

Disaffection with inflationary policy arose as the Phillips curve correlation broke down and both inflation and unemployment moved higher in the 1970s. Already in the late 1960s the Fed began from time to time to try to brake the acceleration of inflation with tight monetary policy, well aware that such policy actions caused unemployment to rise. The resulting stop/go monetary policy that characterized the period from the mid-60s until the great disinflation of the early 1980s reversed the rise in inflation and introduced a period when the Federal Reserve began gradually to acquire credibility for low inflation.

Two developments paved the way for the great disinflation. First, was the progress that economists made in understanding the causes and cure for inflation. A professional understanding was critical in giving the Federal Reserve the confidence that monetary policy could bring inflation down with some short run cost, but great potential benefit in the long run. Second, two decades of non-monetary approaches to controlling inflation—for example, wage/price guidelines and controls, fiscal budget policy, and credit controls—had been tried and failed.

By the time that Paul Volcker became Federal Reserve Chairman in 1979, inflationary policy was widely recognized to have costs with no offsetting benefits. But it was recognized that bringing it down would be costly too. Previous experience with stop/go policy made that clear. Indeed, the inflation was not broken until a sustained tightening of monetary policy beginning in 1981 created a serious recession that tested the Federal Reserve's determination and the pub-

¹² This account is drawn from Goodfriend (1997).

lic's support. With widespread public support, the Federal Reserve has maintained low inflation for over a decade now. Macroeconomic performance has been good compared to the inflationary period, and there has been only one mild recession thus far, in 1990-91.

Building a reputation for limited lending

Reasoning by analogy to the acquisition of credibility for low inflation, the road map for how a central bank could acquire a reputation for not lending might be as follows. The process would begin in a situation where the central bank and the public alike recognize only the short-term benefits of central bank lending. Central banks would be inclined to extend emergency credit assistance to any institution whose possible failure could present even the remotest risk of disruption to the financial system. A liberal lending policy would encourage potential beneficiary firms to take on more risks. This, in turn, would create more frequent crises and cause a central bank to extend its lending reach ever further. Policymakers and the public would see the frequency and magnitude of financial crises grow even as the willingness of the central bank to lend increased.

Gradually, under this scenario, a sense would develop that excessively liberal central bank lending was counterproductive. This view would be supported by progress among economists in understanding the cause and cure for the increasing risk in the financial system and its relation to excessive central bank lending. As central bankers came to feel over-extended, they would be more inclined to incur the risk of short-run disruptions in financial markets by disappointing expectations and not lending as freely as before. A series of attempts to move in the direction of more restrictive lending practices might be unable to reverse market expectations that the policy would revert to more liberal practices. Eventually, the public would decide that the increased financial crises were due, in part, to excessively liberal central bank lending. And the public would want the central bank to become more restrictive, even at the cost of precipitating a financial disruption by refusing to lend in a particular crises. Ultimately, with the public's support and a consistent willingness to risk the consequences, a central bank would acquire a reputation for more limited lending. Financial firms might then take on less risk, and financial market crises might become less common.

There appears to be no feasible path toward a credible commitment to curtail central bank lending that does entail acquiring broad-based public and legislative support. Limiting central bank lending would restrict the ability of depository institution chartering authorities to sustain insolvent institutions on life support, requiring earlier closure and recognition of losses. As the U.S. savings and loan episode demonstrated, such a strict closure policy would require legislative endorsement in the form of appropriations sufficient to fund the insurance fund's actual current obligations.

One might wonder where we are in this process today? It was only in the mid-1980s during the saving and loan crisis in the United States that economists and the public became aware of the greater risk-taking engendered by the government

financial safety net, e.g., deposit insurance and central bank lending. It took almost twenty years from the first recognition that inflationary monetary policy was unproductive until the Federal Reserve succeeded in bringing it down permanently. And between the mid-60s and the early 1980s there were four major episodes (1966, 1968, 1973-74, 1979-82) in which the Federal Reserve tightened monetary policy to restrain inflation, with adverse consequences for employment. To date, there are no instances in which a financial crisis has followed a refusal by the Federal Reserve to extend emergency credit assistance. And the Federal Reserve has made emergency credit available on numerous occasions in the last two decades. One might regard the Bank of England's handling of the Barings closure as an instance of a move toward a more restrictive lending policy, however. We think it is fair to say that we are still at the beginning of any path that might eventually reverse the tendency for the safety net to create moral hazard.

4 Conclusion

We have presented some guiding principles for central bank lending. Central bank lending should be regarded as a line of credit, and should be expected to exhibit the tensions inherent in private line of credit products. The most serious problem is managerial moral hazard, the borrower's incentive to take on more risk after arranging a credit line. We discussed in some detail contractual provisions (loan covenants, collateral, and monitoring) designed to control moral hazard. The key point is that contractual provisions enable profit-maximizing lenders to credibly commit to withdraw credit and induce the closure or reorganization of a borrowing firm when appropriate.

The contractual mechanisms utilized by private line of credit providers are not effective for a central bank whose primary mission—to maintain financial system stability—can override its obligation to protect public funds and undercut its ability to limit its lending reach. We considered in some detail five broad approaches to a central bank's commitment problem: good offices only, taking of collateral and early intervention, constructive ambiguity, extending supervisory and regulatory reach, and reputation building. Our analysis suggested that the first four institutional approaches cannot be counted on to overcome the fundamental forces causing a central bank to lend.

On the other hand, we believe that it should be possible for a central bank to build a reputation for limiting its lending commitment, just as central banks around the world acquired credibility for low inflation. In fact, we imagine forces operating on central bank lending policy analogous to those influencing the path of inflation. A period in which liberal lending policy raises expectations of lending is followed by more frequent lending, increased moral hazard, and greater financial instability. Gradually, policymakers and the public become willing to disappoint lending expectations. The economy then experiences a temporary

period of heightened financial instability associated with increasingly restrictive lending which is followed by less financial instability and little central bank lending.

We are agnostic about the ultimate role for central bank lending in a welfare-maximizing steady state. We put off the consideration of that difficult question just as the debate on the desirability of zero vs. 2 percent inflation in the steady state was deferred until inflation was brought down sufficiently. The critical current policy question is how to reverse what we regard as the perception that central banks are increasingly willing to lend, which increases risk-taking and the likelihood that central banks feel compelled to lend. Just as monetary policymakers looked for opportunities to disinflate, we think that financial economists and central bankers should begin to think about opportunities to cut back on central bank lending.

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