ESSAYS IN INTERNATIONAL FINANCE

No. 151, May 1983

THE LENDER-OF-LAST-RESORT FUNCTION IN AN INTERNATIONAL CONTEXT

JACK GUTTENTAG

AND

RICHARD HERRING

INTERNATIONAL FINANCE SECTION

DEPARTMENT OF ECONOMICS

PRINCETON UNIVERSITY

Princeton, New Jersey

ESSAYS IN INTERNATIONAL FINANCE

ESSAYS IN INTERNATIONAL FINANCE are published by the International Finance Section of the Department of Economics of Princeton University. The Section sponsors this series of publications, but the opinions expressed are those of the authors. The Section welcomes the submission of manuscripts for publication in this and its other series, PRINCETON STUDIES IN INTERNATIONAL FINANCE and SPECIAL PAPERS IN INTERNATIONAL ECONOMICS. See the Notice to Contributors at the back of this Essay.

Both authors of this Essay are at the Wharton School of the University of Pennsylvania. Jack Guttentag is Robert Morris Professor of Banking, and Richard Herring is Director of the Wharton Program in International Banking and Finance. This Essay is part of a major study they are undertaking of prudential aspects of international banking.

PETER B. KENEN, *Director*
International Finance Section

ESSAYS IN INTERNATIONAL FINANCE

No. 151, May 1983

THE LENDER-OF-LAST-RESORT FUNCTION IN AN INTERNATIONAL CONTEXT

JACK GUTTENTAG

AND

RICHARD HERRING

INTERNATIONAL FINANCE SECTION

DEPARTMENT OF ECONOMICS

PRINCETON UNIVERSITY

Princeton, New Jersey

Library of Congress Cataloging in Publication Data

Guttentag, Jack M., 1923-
The lender-of-last-resort function in an international context.

(Essays in international finance, ISSN 0071-142X; no. 151 [May 1983])
Includes bibliographical references.
1. Banks and banking, International. 2. Lenders of last resort. 1. Herring, Richard. II. Title. III. Series: Essays in international finance; no. 151.
HG136.P7 no. 151 [HG3881] 332'.042s [332.1'5] 83-8444
ISBN 0-88165-058-7

Printed in the United States of America by Princeton University Press at Princeton, New Jersey.

International Standard Serial Number: 0071-142X

International Standard Book Number: 0-88165-058-7

Library of Congress Catalog Card Number: 83-8444

CONTENTS

The Lender-of-Last-Resort Function in an International Context

Traditionally, discussion of the role of the lender of last resort (LLR) has focused on the national economy, without regard for international complications. To be sure, Thornton (1802) and Bagehot (1873) considered the response of international capital flows to actions taken by the LLR, but they assumed that the LLR was a national central bank that would provide funds to solvent, national institutions. Over the last two decades, the marked growth of international banking raised two key questions about the function of LLRs. First, has the growth of international banking increased the probability of a crisis that will require LLR intervention? Second, has the growth of international banking reduced the ability of national LLRs to respond effectively to incipient financial crises? The first question is addressed in other papers by the authors, which argue that banking systems have become increasingly vulnerable because of their exposure to international disturbances. The second question is the subject of this essay.

After briefly summarizing the reasons why banking systems have become increasingly vulnerable to international disturbances, we reassess the rationale for having an LLR, set forth the requirements for an effective LLR, and then consider how the growth of international banking has altered the effectiveness of national LLRs. This last issue involves problems in defining lines of LLR responsibility as well as in executing LLR functions effectively even when responsibilities are well defined. Because we are pessimistic about the prospects for establishing effective international LLR arrangements and find no merit in proposals for an international system of deposit insurance, we suggest "second best" alternatives. And because we conclude that even an effective LLR would be inadequate to cope with some crises, we try to indicate where LLR responsibilities should end and other governmental responsibilities should begin.

The authors would like to thank Arthur Bloomfield, Stephen Clarke, Roger Kubarych, David Willey, a study group organized by William Diebold at the Council on Foreign Relations, and an anonymous referee. This research was supported in part by a grant from the Xerox Foundation to the Wharton Center for International Management Studies. Richard Herring gratefully acknowledges support from the Council on Foreign Relations. The views expressed here are not necessarily shared by any of these individuals or institutions.

The Increasing Vulnerability of the Banking System to International Disturbances

Over the past two decades, the growth of international banking activity has had a marked impact on the banking systems of most nations and has transformed international credit relationships. Between 1960 and 1980, the number of foreign branches of U.S. banks grew from 124 to nearly 800. During the 1970s, the number of foreign banks and foreign banking offices in the United States tripled from fewer than 50 foreign banks with 100 banking offices to more than 150 foreign banks with about 350 banking offices. The Eurocurrency market has mushroomed from negligible levels in 1960 to a gross size of nearly $2 trillion. By 1980, several developing countries and the Eastern bloc had debts to private banks larger than their total obligations to governments, international organizations, and direct investors. And in several years during the 1970s, more than 50 per cent of the earnings of the ten largest U.S. banks stemmed from foreign sources.

This rapid expansion of international banking has produced significant and well-understood benefits for the world economy: it has greatly increased the efficiency with which savers in one part of the world can be connected with foreign investors; it has increased the interest elasticity of international capital flows; and it has reduced the transactions costs of international intermediation. But the growth in international banking has also caused some problems, not the least of which is that it has increased the risk of an international banking crisis.

Risk has increased for several reasons. First, international banking exposes banks to certain hazards that either do not arise in domestic operations or are much more easily controlled. These are associated with the relatively high cost of obtaining information on borrowers (including foreign banks), the greater danger of "moral hazard" as a factor increasing the likelihood of borrower default,[1] the possibility that borrowers will be unable to convert local currencies into loan-transaction currencies, the vulnerability of deposit flows to political cross-currents, the exposure to foreign-exchange uncertainties, and the relatively light regulatory controls that contribute to intensely competitive markets and allow banks to assume greater risks without challenge. Under benign financial conditions, international diversification can partly or wholly offset these risks. But if major shocks occur in a vulnerable world, international diversification will not help much when questions about bank solvency arise.

Second, the increasing burden of debt service being borne by several

[1] Moral hazard is the danger that individuals or firms in a position to shift losses or costs onto others will increase their risk exposure, act imprudently, or even commit fraud or other illegal acts.

major countries has reduced their ability to withstand disturbances to their foreign-exchange earnings or expenses. As a result, such disturbances are more likely to be transmitted to international banks.

Third, as the exposure of major banks to international shocks has increased, their ability to withstand them has declined. Capital ratios have been falling, and there has been a growing concentration of claims against specific countries. The behavior of yield spreads on syndicated country loans is consistent with the hypothesis that, except during periods of unusual stress, banks view the probability of a major shock as zero and collect no risk premiums to cover it.[2] Such behavior is, in turn, consistent with general findings in the natural-disaster literature regarding human behavior in the face of low-probability/high-loss hazards (see Kunreuther *et al.*, 1978, and Kunreuther and Slovic, 1978). It has historical counterparts in bank lending to sovereigns in the fourteenth to seventeenth centuries (see Guttentag and Herring, 1982b) and in the deterioration of foreign bond issues in the United States during the 1920s (see Mintz, 1951).

International banking is subject to both liquidity and solvency crises. A liquidity crisis could arise in many ways, for example from the suspension of convertibility by the governments of one or more countries in which major banks have large positions. If, say, the British government blocked convertibility of the pound sterling into U.S. dollars, a bank that had been funding sterling assets with dollar deposits might require LLR assistance if its deposits were withdrawn. A similar problem could arise if a government froze the accounts of residents of one or more foreign countries (as the United States did in 1980 with the accounts of Iranian depositors). A bank's ability to withstand a liquidity crisis depends on its liquidity position in each currency, that is, on its ability to meet cash needs in each currency in which it has obligations due.

A solvency crisis might be triggered by a development that substantially raised the expenses or reduced the revenues of one or more countries with heavy loans outstanding to banks. One such event would be a marked rise in world interest rates. Under the floating-rate loan contracts characteristic of Eurocurrency loans, banks have protected themselves against interest-rate risk by shifting this risk to borrowers. A default by these borrowers could exhaust the net worth of lending banks, lead to a loss of confidence in them, and induce a run by the creditors of those and other banks. With

[2] The spread over the London Interbank Offer Rate (LIBOR) may understate the return on a country loan. For example, LIBOR is generally ⅛ to ¼ per cent above the rate at which banks purchase funds (the bid rate). Moreover, some banks, especially the syndicate managers, earn additional revenues by obtaining other business from the borrower or from front-end fees. The fact remains, however, that some, and probably most, banks that participate in a syndicated loan get very little compensation beyond the spread.

the rising indebtedness of major borrowers and increasing interest-rate volatility, an insolvency crisis has become increasingly likely. A bank's ability to withstand a solvency crisis depends on its capital position, that is, on its ability to absorb losses. Of course, a solvency crisis can easily set off a liquidity crisis, because even the rumor of insolvency can lead to a run, and, if not checked, the liquidity crisis could spread even more quickly than the solvency crisis that caused it.

In general, a solvency crisis is much less tractable than a liquidity crisis. An illiquid bank with a strong capital position and an effective central bank can ride out a liquidity crisis. But an insolvent bank with a strong liquidity position, while it may continue to operate for a period, will be forced to close sooner or later unless it receives a capital infusion.

Rationale for a Lender-of-Last-Resort Function

A lender of last resort is an institution with responsibility for providing credit under conditions of stress. The LLR function should be distinguished from the provision of discount or other routine credit facilities. An institution may provide discount facilities but not be an LLR if its policy is to limit to some predetermined amount the credit extended to a borrower or to withdraw credit at the first hint that the borrower is in trouble. Conversely, an LLR committed to action in an emergency might not provide any other credit facilities. Central to the LLR function is a willingness to accept a risk unacceptable to other lenders.

The classical view of the LLR function developed in the nineteenth century by Thornton and Bagehot charged the LLR with a responsibility to the entire financial system for the prevention or rapid cure of financial crises but required it to extend credit only to specific banks. The LLR was obliged to lend to all sound borrowers who turned to it as a last resort, but it was obliged to refrain from lending to unsound borrowers. Taking the classical position, we view direct lending as the crux of the LLR function, and the adequacy of facilities for making direct loans to international banks is the focus of this essay.[3]

Let us examine several premises underlying the classical view of the LLR function: (A) Because of capital-market imperfections, the LLR function requires direct credit extensions to individual banks. (B) Banking is peculiarly

[3] Although we shall concentrate on direct loans to banks, it may sometimes be more efficient for the LLR to provide direct assistance to an illiquid but solvent nonbank borrower than to assist the banks that would be impaired by the borrower's failure to make timely debt-service payments. This is especially likely when the nonbank borrower is very large and there are many lending banks with heavy exposures. The loans from the Bank for International Settlements to Hungary and Mexico in 1982 may be such instances.

subject to crises. (C) The social costs associated with bank failures during a financial crisis are larger than the private costs. (D) Banking crises are preventable by an LLR at relatively small social cost.

A. Direct vs. Indirect Support

Some contemporary analysts take the view that direct LLR lending is not an essential function of a central bank. Humphrey (1975) argues that Bagehot would have taken this position if open-market operations had been available to the Bank of England in the nineteenth century.

It is true that if capital markets were "perfect" in the sense that all participants had perfect foresight, no LLR function would be needed. If banks were solvent, they could borrow at the same rate as the government; if they were insolvent, they could not borrow at all. The central bank could use open-market operations to achieve the desired degree of stringency in the market without worrying about whether individual solvent institutions could obtain the credit they needed to meet their liabilities.

Granted that credit markets can never be perfect in this sense, they might still be competitive and "efficient" if no market power existed and information on borrowers was rapidly disseminated. Creditors of banks would always react to the possibility of bank insolvency by demanding an appropriate default premium, and the case for a direct-lending LLR function would be weakened. (It would be limited to avoiding the social costs associated with the failure of banks to which private lenders would not consider lending at a premium that those banks could afford to pay.) However, this is not the way credit markets work. Because information regarding bank solvency is hard to obtain and often dated, and because of the moral hazard faced by creditors of banks whose solvency is in doubt, solvent banks may at times be unable to borrow in private markets.

If a bank in this situation offers higher interest rates to its depositors, it may make its problem worse. When a bank comes under suspicion and information about it is unreliable, its offer to pay a higher interest rate is interpreted by the market as confirmation of its weakness. This was, indeed, the crux of Bagehot's case for an LLR. As he pointed out, "Every banker knows that if he has to *prove* that he is worthy of credit, however good may be his arguments, in fact his credit is gone . . ." (1873, p. 68; for an extended analysis of this point, see Guttentag and Herring, 1982a).

An LLR may have better information than the private markets about the condition of a bank and may know that the bank is solvent when the private market does not. Moreover, the LLR may be in a better position than the private markets to impose conditions on a borrowing bank in order to assure its continued solvency. These conditions, backed by sanctions, include requiring the bank to provide information and requiring or prohibiting certain

behavior. Finally, to avoid the social costs incurred by some bank failures, the LLR may be willing to take risks that a private lender will not.[4]

While financial markets are imperfect, so are LLRs, especially when they must deal with international banks. To some extent, LLRs and lending by financial markets are alternative means for preventing the failure of solvent banks. Which means is likely to be most effective depends on a wide range of circumstances. Domestically, most societies have decided that an LLR is more effective, but the same conclusion may not hold in the international arena. And if it does not hold, efforts to improve the efficiency of markets may well provide a larger payoff than efforts to improve the efficiency of LLRs.

B. Vulnerability of Banks to Crises

Banking is subject to crises for two reasons. First, banks must maintain the inherently fragile confidence of their creditors. Perceptions about the soundness of banks are subject to great uncertainty; they are heavily influenced by assessments of the quality of the banks' loans and securities, on which timely information is often difficult or impossible to obtain. Furthermore, banks are very highly leveraged; there is always the possibility that a major unanticipated shock will wipe out their capital. Since a large proportion of bank liabilities is very short term, creditors have the opportunity to run when they suspect the possibility of such a shock.

Second, banking is subject to contagion. In a fractional-reserve banking system, a "run" on one bank reduces the total reserves available to other banks, and the entire system is weakened if these reserves are not replaced.[5] Banks typically lend heavily to each other, moreover, so that shocks may spread throughout the system. In both the foreign-exchange market and the Eurocurrency market, liabilities to banks are much larger than liabilities to nonbanks. A weakening of creditor confidence in one bank may easily lead to suspicions about others.

Vulnerability to financial crises can be reduced or eliminated by a comprehensive system of deposit insurance or by 100 per cent reserve require-

[4] Under the best of circumstances, a judgment of solvency is a probabilistic assertion: "If the bank is allowed to borrow freely from the LLR, it has an x per cent chance for survival." What chance for survival should be considered sufficient to qualify the bank for aid? No general answer to this question is possible. The higher the threshold is set, the higher the probability that some solvent banks will be denied aid, but the lower the probability that resources will be wasted on insolvent banks.

[5] This danger no longer exists in domestic systems like that of the United States, where reserve effects of currency drains are automatically neutralized by open-market operations, but the other factors continue to be a problem.

ments.[6] In Eurocurrency markets, however, deposit insurance is unworkable, as we shall see, while 100 per cent reserve requirements are impossible.

C. The Social Costs of Banking Crises

To assess the social costs of banking crises, we distinguish between those that can be prevented by general support to the banking system through open-market operations or changes in reserve requirements and those that can be prevented only by direct lending to individual banks.

The most obvious and important costs of a banking crisis arise from the deflationary consequences—unemployment, income declines, and losses in capital values—that come when a portion of the public's liquid wealth is wiped out. If the central bank has adequate tools, it can prevent or offset these deflationary effects through its general monetary powers (as the government can, using fiscal tools) without direct lending to individual banks. Unfortunately, a central bank's general tools may not be adequate. In Bagehot's world, the Bank of England relied on direct lending to implement general monetary objectives, and this still remains true for many central banks, including some in advanced industrial nations.

Even if a central bank is able to provide general support to the banking system, it may be unable to avoid a second category of costs, those associated with failures of individual solvent banks. These costs can usually be prevented only by direct lending to those banks. The failure of an insolvent bank may lead directly to the failure of a solvent one—the contagion problem referred to earlier. The failure of a solvent bank involves the needless loss of the bank's value as a going concern ("going-concern value"), including the loss of customer relationships that have accumulated over the years. Furthermore, solvent banks that fail are likely to be small and to have customer relationships with small borrowers, which raises issues of income distribution and equity among both banks and individuals. Such failures may also have unfavorable impacts on market structure if the number of banks in the market is already small.

Historically and institutionally, LLRs do not deal with problems associated with insolvent banks, although these could be dealt with by a central bank wearing a different hat. Any extended discussion of these problems exceeds the scope of this essay, but their general nature must be defined so that we understand what an LLR is not fitted to do. (For a more extensive analysis, see Guttentag and Herring, 1982c.)

[6] In his widely read Fordham lectures delivered in 1959, Milton Friedman argued that deposit insurance in the United States had made our banking system panic proof, although he would have preferred 100 per cent reserves (Friedman, 1960). This observation seems much less secure today because of the rapid growth of uninsured liabilities at U.S. banks and of uninsured money-market funds.

Two important problems are specifically associated with insolvent banks. The first is how to protect creditors and prevent the dissipation of the insolvent bank's assets at their expense. If an institution is insolvent, new creditors not aware of the bank's condition will share the losses of its old creditors when the institution is eventually liquidated. More important, both new and old creditors are subject to the risk that any delay in closing the bank will *increase* their losses.[7] This reflects the moral hazard that the bank's managers will take on riskier loans (or interest-rate or foreign-exchange positions) in an attempt to benefit the shareholders at the potential expense of the bank's creditors (or insurers or LLR). When a bank's capital has been depleted, the management has an incentive to engage in high-risk/high-return ("go for broke") ventures in which any gains will benefit management and stockholders while losses will be borne entirely by creditors.[8] Incentives also increase for "self-dealing" transactions and fraud.

Closing a financial institution thus avoids the risk that losses are very likely to accelerate once capital is depleted. Closing an insolvent bank is usually the legal responsibility of the political entity that chartered it, although the LLR may "pull the plug" by refusing to make additional loans, or, if the bank's deposits are insured, the insuring agency may do the same by terminating insurance. Formal or informal linkages among the chartering agency, the insuring agency (if any), and the LLR usually ensure the coordination of such actions.

The second problem connected with an insolvent bank is how to minimize the loss of going-concern value that would result from an outright liquidation. Banks usually are worth much more alive than dead even when their worth alive is negative.

The two problems can be illustrated by the following hypothetical example. A bank has assets and liabilities with market values of \$70 and \$100, respectively, or an immediate liquidation value of −\$30. This would be the loss to creditors if the bank were closed immediately. If the bank continued

[7] In most European countries, depositors who can demonstrate to the courts that a bank was insolvent when they made a deposit have a prior claim on the bank's assets over old creditors.

[8] For example, a bank with loans outstanding to a country on the verge of default that are equal to its capital might make an additional bail-out loan of the same amount that carries only a 10 per cent chance of full recovery. Ignoring interest, the expected social benefit of the additional loan would be $0.20L$ (10 per cent times the value of both the old and new loan) exclusive of any externalities involved in keeping the bank alive, and the expected loss from the bail-out loan would be $0.90L$. Even if externalities are important enough to outweigh this disparity, should the new loan go the way of the old one, the bank might make still another loan on which the expected loss was larger. So long as the bank continues to operate, there is no limit on the losses it can impose on its creditors. For a more general treatment of this phenomenon, see Guttentag and Herring (1982b).

to operate and the bank's managers pursued a go-for-broke strategy, losses could mount to a maximum of −$100 without attracting any additional liabilities. If the bank were closed immediately and sold to another bank under competitive bidding, the loss might be reduced to −$10, the $20 that was paid above liquidation value being the bank's going-concern value.

An insolvent bank's going-concern value can be captured by keeping the bank operating with financial assistance (and probably new management) or by merging it with another bank. This is a natural function of a deposit-insuring agency because the agency minimizes its own losses by saving the insolvent bank's going-concern value. If there is no deposit-insuring agency to perform this function, it must be performed *ad hoc* by some other official agency. If a bank's insolvency is due to losses on loans to a limited category of borrowers, the insolvency could be cured by providing assistance to the borrowers so that they can repay their loans. None of these tasks is within the traditional purview of a central bank.

D. The Social Costs of an LLR Function

There are three costs of offering an LLR function. First, there is the direct cost of the loan procedures that must be administered by the LLR. This cost is very small. Second, there may be substantial indirect costs to the extent that the availability of LLR facilities leads some banks to assume riskier positions than are socially optimal and thereby makes the whole banking system more vulnerable.[9] The extent to which this moral hazard becomes a real problem depends partly on the ability of central banks and other agencies to prevent it through regulatory sanctions. Third, if general monetary powers are inadequate, direct assistance to a troubled bank may cause the authorities to diverge from their macroeconomic objectives.

An inadequate LLR involves another serious cost. An LLR that will not be able to deliver assistance in a time of real stress seriously weakens the banking system by discouraging the development of private relationships that could, even if imperfectly, perform that function. The worst of all possible worlds would be an LLR arrangement which encouraged banks to believe that it would be available when needed, which could not constrain the tendency of banks to overexpose themselves on the basis of faith in the LLR, and which then, when a crisis occurred, could not meet its obligations. It would be far better for the central bank to declare that for specified banks or under specified circumstances there will be no LLR and to use its powers and influence to provide the market with as wide a range of timely and relevant information as possible.

[9] If markets are not competitive, LLR assistance to solvent banks may also involve an efficiency cost. This is a good reason for central banks to be concerned with market structure.