

ESSAYS IN INTERNATIONAL FINANCE

No. 164, September 1986

DISASTER MYOPIA
IN INTERNATIONAL BANKING

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Library of Congress Cataloging-in-Publication Data

Guttentag, Jack M., 1923

Disaster myopia in international banking.

(Essays in international finance, ISSN 0071-142X ; no. 164)

Bibliography: p.

1. Banks and banking, International. 2. International finance. I. Herring, Richard. II. Title. III. Series. HG136.P7 no. 164 [HG3881] 332'.042 s 86-15258

ISBN 0-88165-071-4 [332.1'5]

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

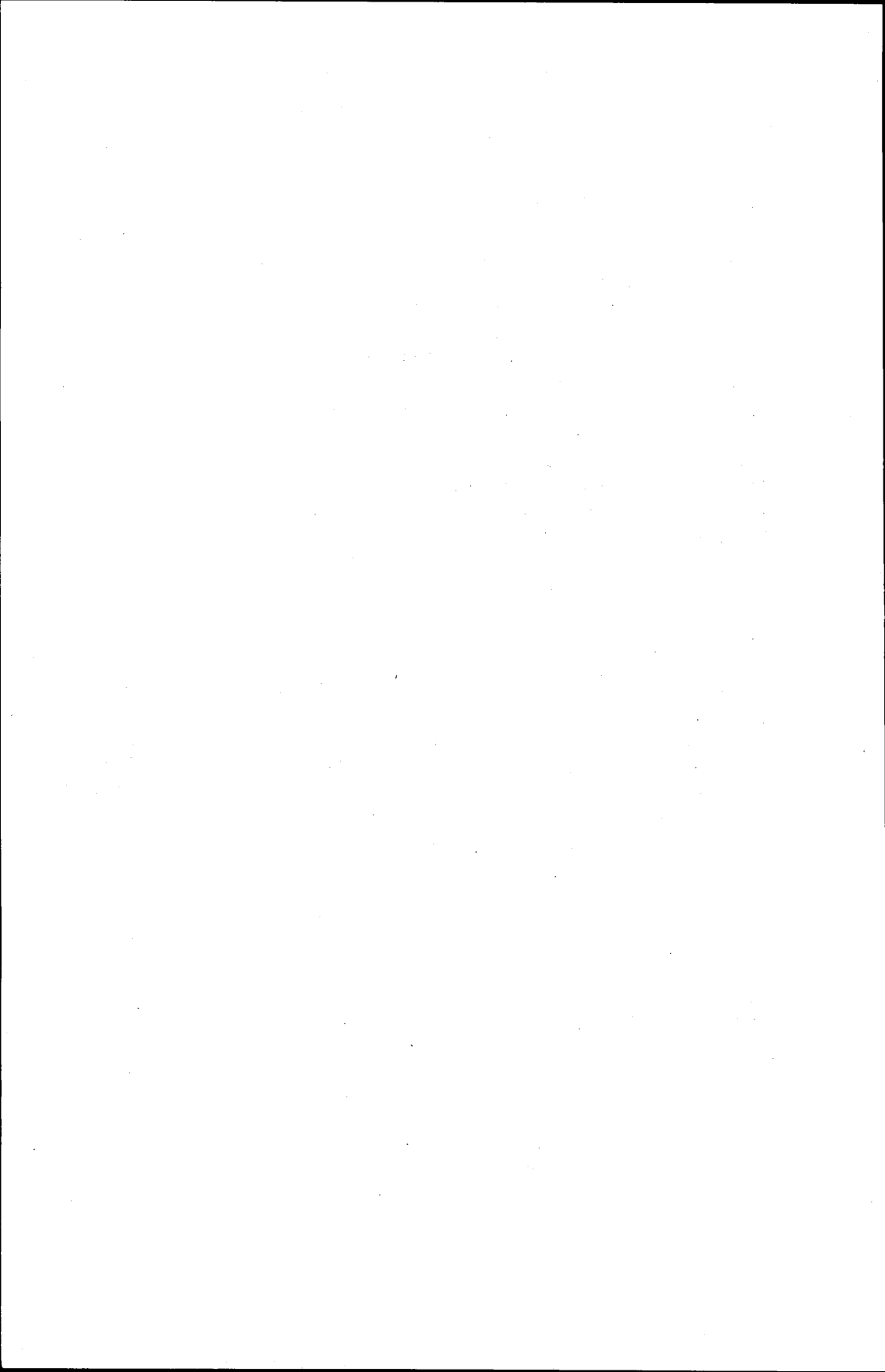
ISSN: 0071-142X

ISBN: 0-88165-071-4

LC Catalog Card Number: 86-15258

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DISASTER MYOPIA IN INTERNATIONAL BANKING

This essay explores the hypothesis that international banks tend to assume excessive exposure to insolvency. It builds on a framework developed in an earlier paper (Guttentag and Herring, 1984) that shows why the financial system tends to become increasingly vulnerable to major shocks during long periods when no such shocks occur. The focus in this essay on a particular sector of the financial system is not only a compelling illustration of the general thesis but also of interest in its own right because international banking has assumed strategic importance in the financial disorders of the 1980s.

Section 1 sets out the basic conceptual framework and explains the conditions conducive to disaster myopia. Section 2 examines the exposure of international banks to major transfer shocks, and section 3 examines their exposure to funding shocks. Section 4 assesses the ability of regulators to prevent an increase in vulnerability to both types of shocks.

1 Conceptual Framework

Risk and Uncertainty

We follow a venerable and useful tradition in economics, extending from J. M. Keynes and F. H. Knight, that distinguishes risk from uncertainty. Suppose p_i is the probability that the i^{th} event will occur. Pure uncertainty describes the situation where we know nothing about the size of p_i . Pure risk describes the situation where p_i takes on a value between zero and one that is known with complete confidence. (Perfect certainty describes the situation where we know that p_i is either zero or one. Note that our usage differs from one commonly employed in the modern literature on finance, where risk is the dispersion of possible outcomes around the expected outcome.)

With regard to most events, our knowledge is intermediate between pure uncertainty and pure risk. We do not know p_i , but we have some evidence that allows us to estimate it. The greater our confidence in that estimate, the closer we approach the case of pure risk. The lower our confidence, the closer we approach the case of pure uncertainty.

Two major factors determine the extent to which our knowledge about an event is characterized by risk or uncertainty. The first is the frequency with

Research for this essay has been supported by a grant from the National Science Foundation to the Brookings Institution for an experimental program of research on issues of international economic policy. The views expressed here should not be attributed to the officers, trustees, or other staff members of the Brookings Institution. The authors are grateful to an anonymous referee for helpful comments on an earlier draft.

which the event occurs relative to the frequency of changes in the underlying causal structure. If that structure changes every time an event occurs, the events do not generate evidence regarding probabilities. If the event occurs many times but the structure is stable, we accumulate evidence that permits us to estimate probabilities with considerable confidence. For example, if floods over a plain occur on average only once in every twenty-five years but basic topographic and climatic conditions are stable, an historical record over several hundred years may yield good estimates of flood probabilities. Despite the low probability of a flood in any short period, our knowledge about the probability of a flood is closer to pure risk than to uncertainty. In contrast, the causal structure underlying economic developments is unlikely to remain stable for long periods, so that it is very difficult to estimate the probability of low-frequency economic events with much confidence. Our knowledge about their probability is much closer to uncertainty.

The second factor that determines whether a situation is better characterized by risk or uncertainty is our understanding of the underlying causal structure. The probability that the fair toss of a coin will generate heads is an example of pure risk, because our prior knowledge of the mechanism determining the result allows us to specify its exact probability, even if we have no knowledge of the results of prior tosses. In contrast, our understanding of the causal structures underlying economic processes is much less comprehensive and therefore much more likely to be subject to uncertainty.

Sometimes the probability of an event can be estimated with greater confidence by investing in information and analysis. This conversion of uncertainty into risk is the central objective of the risk analysis that takes place in most financial institutions.

Shocks and Insolvency Exposure

“Shocks” are events that occur very infrequently and have very large potential effects. Since our understanding of the causal structure underlying economic shocks is imperfect and since the causal structure may change between occurrences, our knowledge regarding economic shocks is closer to the case of pure uncertainty than pure risk.

Financial institutions engage in a variety of activities exposing them to such shocks. The shocks include defaults by a major category of borrowers (“credit shocks”) and runs by depositors (“funding shocks”). Any shock that would reduce an institution’s net worth is a source of insolvency exposure. An institution’s insolvency exposure becomes “excessive” when its exposure-management policies have been based on underestimates of shock probabilities. “Disaster myopia” is a systematic tendency to underestimate shock probabilities.

The Disaster-Myopia Hypothesis

Under conditions of uncertainty, there can be no presumption that the subjective probabilities that market participants attach to a shock will converge to the actual probabilities. The argument that market discipline will require decisionmakers to form correct expectations has little force: the shock may occur so infrequently that institutions which disregard it completely may survive for decades. Indeed, competition may drive prudent institutions from the market. An institution that attempts to charge an appropriate premium to develop a reserve against a low-probability shock is likely to lose business to competitors who are willing to disregard the shock.

How are subjective shock probabilities formulated? Economic theory offers little guidance. As Lucas (1977) has observed, the rational-expectations hypothesis and efficient-market axioms simply do not apply in situations of uncertainty. Our hypothesis is drawn instead from work on cognitive psychology and the behavioral approach to decisionmaking under uncertainty. We believe that two of the "heuristics" that have been found to characterize human behavior with regard to low-probability, high-loss hazards provide insights into the behavior of international banks confronted with shocks of low but unknown probability.

The "availability heuristic" is a term employed by Tversky and Kahneman (1982, p. 164) to describe situations in which the decisionmaker "estimates frequency or probability by the ease with which instances or association can be brought to mind." Its validity has been verified in both controlled laboratory experiments and field work.¹ Frequent events are usually easier to recall than infrequent events. But ease of recall is affected by other factors that may have little or no relationship to probabilities, giving rise to an availability bias. One such factor is the time elapsed since the last occurrence.

The "threshold heuristic" is an implicit rule by which decisionmakers allocate one of their scarcest resources, managerial attention, and it may also contribute to bias. The rule is that when a probability reaches some critically low level, it is treated as if it were zero.²

¹ Tversky and Kahneman (1982) report results of ten controlled experiments performed with 1,500 subjects which demonstrated that even when probabilities could be objectively determined, people tended to employ the availability heuristic. The authors argue that their results are equally applicable to very infrequent events where probability judgments cannot be based on a tally of relative frequencies. Kunreuther *et al.* (1978) conclude from a field survey of 2,000 homeowners in flood-prone areas and 1,000 homeowners in earthquake-prone areas that insurance decisions with regard to low-probability, high-loss hazards are subject to the availability bias.

² The threshold heuristic is based on the work of Herbert Simon concerning procedural rationality (see Simon, 1978, for a recent overview). Slovic *et al.* (1977) employed the hypothesis to

The availability heuristic in combination with the threshold heuristic may lead to disaster myopia, which can be defined as a tendency to underestimate shock probabilities. The subjective probability of a shock becomes a negative function of the length of time since the last shock and at some point is treated as if it were zero.³ Disaster myopia leads decisionmakers to allow the shock exposure of their firms to rise and the ability of their firms to withstand shocks to decline. In consequence, insolvency exposure grows as the period since the last shock lengthens. If this pattern is widespread among firms, the entire system becomes more vulnerable to shocks and to a possible financial crisis (see Guttentag and Herring, 1984, for a further discussion of the evolution of the conditions leading to a financial crisis).

There are epistemological limitations to use of the disaster-myopia hypothesis as an explanation of insolvency exposure, and to use of the availability and threshold heuristics as explanations for disaster myopia itself. It is impossible to demonstrate *ex ante* excessive insolvency exposure to shocks of unknown probability. Indeed, it is impossible even after a shock has occurred. If excessive insolvency exposure is nondemonstrable, disaster myopia, which is only one of the possible causes of excessive insolvency exposure, is also nondemonstrable.

Nevertheless, valid judgments on both topics can be made, even though they will be inconclusive. Many diseases have been known by their symptoms, and sometimes by the conditions associated with the symptoms, well before the pathogenic substance could be identified by a definitive diagnostic test. While a definitive test for disaster myopia is probably impossible, we know many of its symptoms and the conditions that encourage it. For example, a lack of information about shock exposures is a good indication that no thought has been given to the probability that a shock will occur. From a policy standpoint, however, it is less important to recognize the symptoms of disaster myopia than to understand the conditions that encourage it.

Conditions Conducive to Disaster Myopia

Disaster myopia is a perceptual bias that we have associated with two heuristics commonly used to deal with uncertainty. This perceptual bias will lead to excessive insolvency exposure if toleration of exposure to potential shocks appears profitable. Given disaster myopia, the incentive to increase insolvency

explain why people may refuse to buy insurance against low-probability hazards. Kunreuther *et al.* (1978) find evidence supporting the threshold heuristic in their field survey of the insurance decisions of 3,000 households.

³ When the interval between shocks is very long, the Bayesian approach to decisionmaking leads to the same behavior as the availability heuristic, i.e., the subjective probability of a shock declines with the passage of time since the last such shock and at some point reaches zero (see Guttentag and Herring, 1984).

exposure rises with the anticipated returns (net of underestimated required loss reserves).

To some degree, uncertainty can be converted into risk through investment in information. Information confronts disaster myopia with contrary evidence that may correct it. But the conditions that encourage disaster myopia also reduce the willingness of firms to invest in the information needed to convert uncertainty into risk. Some of these conditions are noted here. While several of them affect insolvency exposure directly as well as affecting it indirectly by encouraging disaster myopia, no attempt is made to evaluate all the factors influencing insolvency exposure.

Underinvestment in information is likely if decisionmakers believe they can reduce their exposure quickly and cheaply should shock probabilities suddenly rise. If the cost of maintaining flexibility is sufficiently low, there is little incentive to invest in information regarding the probability of a shock over the medium to long term or to set aside appropriate reserves.

Expectations of government assistance that would shield the firm from the full impact of a potential shock may also lead to underinvestment in information. Of course, expectations of government assistance can lead to excessive exposure even if decisionmakers have unbiased estimates of shock probabilities.

Compensation systems for managers that emphasize short-term performance can likewise discourage investment in information regarding low-frequency shocks. Decisionmakers will have little interest in determining and setting aside appropriate reserves if, by increasing the exposure of their firms, they can raise their own incomes while shielding themselves personally from the impact of a shock. The less frequent the shock and the higher the decisionmakers' job mobility, the greater will be the disparity between the exposure of decisionmakers and the exposure of their firms. Dysfunctional incentive systems may also play an independent role, just like expectations of government assistance. Even if shock probabilities are perceived without bias, the personal interests of decisionmakers may cause them to subject their firms to excessive insolvency exposure.

These factors are part of the process by which an institution becomes increasingly vulnerable to shocks that threaten its solvency. In this framework we examine international banking as an example of the phenomenon.

2 International Banking and Exposure to Transfer Shocks

International banks are subject to four basic kinds of shock: transfer shock, foreign-exchange shock, interest-rate shock, and funding shock.⁴ A transfer

⁴ We have avoided the traditional terms "transfer risk" and "liquidity risk" because in our framework the events to which these terms refer are governed more by uncertainty than by risk.

shock is a marked decline in the ability or willingness of foreign borrowers to convert their local currency into the currency in which interest and amortization payments are denominated. A foreign-exchange shock is an abrupt change in exchange rates that, depending on an institution's pre-existing foreign-exchange position, reduces its capital value and income. An interest-rate shock is an abrupt change in interest rates that, depending on the maturities of an institution's assets and liabilities, reduces its capital value and income. A funding shock is a sudden restriction of credit that jeopardizes an institution's ability to refinance maturing liabilities. Transfer shocks and foreign-exchange shocks are inherently international, while funding shocks have an important international component because many banks rely on the international interbank market. We will focus on transfer shocks and funding shocks, because they appear to pose the most substantial threats to the international financial system.

Exposure to Transfer Shocks

During the 1970s major international banks in all the industrialized countries substantially expanded their cross-border lending. By 1982 their exposures had become so large that the banks would suffer large, perhaps catastrophic, losses in the event of default by any one of several foreign borrowers. Table 1 illustrates this point for the nine major money-center banks in the United States. It lists all countries to which they had exposures (adjusted for external guarantees) exceeding 10 percent of capital in December 1982, just four months after the debt crisis erupted. Since these are averages for the nine banks, individual exposures must have been considerably higher in many cases. Among the ten largest U.S. banks, eight disclosed combined loan exposures to five countries experiencing debt-servicing difficulties—Argentina, Brazil, Chile, Mexico, and Yugoslavia—that were greater than 100 percent of equity. Three disclosed exposures to these troubled countries greater than 200 percent of equity (Bennett, 1983, p. D3).

Potential Hazards of Exposure to Transfer Shocks

Many countries have laws or regulations limiting bank exposures to individual borrowers, but these do not apply to countries. In the United States, for example, national banks are subject to a limit on the amount that they can lend to any one borrower, but under current interpretations each borrower within a foreign country is considered an independent entity if it has an independent means of repayment in its local currency and uses the loan proceeds in the "conduct of its business and for the purpose presented in the loan agreement."⁵ (See Herring, 1985b, for an analysis of the case for lending limits.)

⁵ Quoted by Ekin (1978). The Garn-St. Germain Act of 1982 increased the limits from 10 percent to 15, 20, or 25 percent, depending on circumstances.

TABLE 1
LARGEST EXPOSURES OF NINE U.S. MONEY-CENTER BANKS, ADJUSTED FOR GUARANTEES
(in percent of capital, December 1982)

	Exposure ^a	Exposure plus Contingent Claims ^b
Japan	73.3	84.7
United Kingdom	55.2	87.7
Brazil	48.8	52.1
Mexico	45.2	48.3
France	39.7	57.0
Canada	31.1	41.9
Germany, Federal Republic	26.3	34.8
South Korea	25.8	30.9
Belgium-Luxembourg	18.7	24.2
Italy	19.5	27.5
Spain	14.0	17.4
Philippines	13.1	15.6
Eastern Europe (total)	12.7	13.6
Australia	11.5	21.4
Hong Kong	11.0	17.7
Chile	11.0	12.3
Switzerland	10.2	18.2

^a The numerator is the sum of cross-border, nonlocal currency claims on residents of the countries identified in the left-hand column, adjusted for external guarantees. The denominator is the total capital of the nine money-center banks, including equity, subordinated debentures, and provisions for loan losses, estimated to be \$29.0 billion in December 1982. The nine banks are Bank of America, Bankers Trust, Chase Manhattan, Chemical Bank, Citibank, Continental Illinois, First National Bank of Chicago, Manufacturers Hanover, and Morgan Guaranty.

^b Contingent claims, adjusted for external guarantees, are added to the numerator in the previous column.

SOURCE: Federal Financial Institutions Examination Council, *Statistical Release E.16*, 126 (June 1, 1983).

This interpretation of the lending limit ignores a fundamental distinction between domestic and foreign lending. Foreign borrowers that are independent entities in the sense of meeting the means and purposes tests are nevertheless linked in a way that independent domestic borrowers are not. Loans to foreign borrowers are subject to transfer shock—the possibility that the borrower will be unable to convert local currency into the currency in which the loan is denominated. Even when borrowed funds have been productively employed so that they increase the local-currency profits of a private borrower or the local-currency revenues of a governmental borrower, mismanagement of the economy as a whole can reduce net earnings of foreign exchange and interrupt debt-service payments. Politically motivated actions by the government can also block convertibility. Hence, the borrower's govern-

ment is implicitly (if not directly) a party to each loan contract denominated in a foreign currency. In the worst case, debt service will stop on loans to *all* borrowers dependent on that government for foreign exchange.

High exposure to a specific country generates several related problems. The first and most obvious is the possibility of large losses on all outstanding loans to that country. If a sovereign borrower chooses to repudiate, losses may be very large, even total. Unless specific assets are pledged and are under the control of the lender, the legal remedies available to the lender may be very limited. Individual foreign borrowers that decide to repudiate may find it relatively easy to shield themselves from such legal remedies. Xenophobia may make it difficult for lenders to sue borrowers in local courts, and ways may even be found to avoid legal recourse in the third-party jurisdictions that are often specified in loan contracts. Even when legal recourse is available, bankruptcy costs are likely to be higher in a foreign default than in a domestic one. When the cause of default is an action by the borrower's government, legal recourse is often irrelevant, and the danger of a major write-down, even total repudiation, always lurks in the background.

The second problem is that heavy concentration puts excessive bargaining power in the hands of the borrower. A country's large indebtedness may place it in a position to gain by repudiating its debt, so that a threat of repudiation becomes a credible bargaining ploy. (See Eaton and Gersovitz, 1983, and Sachs and Cohen, 1982, for formal statements of the circumstances in which repudiation is optimal.) Indeed, a large borrower may *threaten* default, even when default can be avoided, as a way of extracting additional funds or more favorable terms. The threat of a default is potentially effective in international lending because the bank's usual defenses—the enforcement of restrictive covenants and the ability to attach the borrower's assets—are often useless when dealing with a sovereign power.

The third problem is that, even absent any tendency* of a borrower to threaten a default, the borrower's payments difficulties may induce its creditors to increase their exposure even further so as to protect outstanding loans. A bank that initially set its exposure limit to a given country at x percent of capital may willingly allow its exposure to exceed that limit because the imminent possibility of losing x percent is more worrisome than the potential but more distant danger of an even higher exposure. This "quicksand" aspect—high exposure leading to even higher exposure through "bail-out" loans to borrowers in distress—can be contrasted to the banks' intended and often stated policy of keeping their options open so that they can respond flexibly to changed conditions.

Finally, once outstanding exposures become so large that a bank's unimpaired capital is smaller than the size of the bail-out loan required to protect its old loans, the bank's creditors and insurers are subject to grave moral haz-

ard because they will share any future loss on the bail-out loan. Furthermore, the allocation of credit between domestic and foreign borrowers is seriously distorted. This may happen even before unimpaired capital falls below the size of the bail-out loan if the bank attempts to protect the book value of its claims as well as their true economic value. (See Herring, 1985b, for a formal analysis of the economics of bail-out lending.)

We believe that disaster myopia helps to explain why banks have subjected themselves to the hazards associated with heavy exposure to country risk. We will show that all the conditions conducive to disaster myopia, listed earlier, are present in international banking.

The Historical Pattern of Infrequent Shocks

An important factor contributing to disaster myopia is the infrequency of major shocks. The history of cross-border lending is characterized by long periods in which losses were low or nonexistent followed by a short period of calamitous losses. Foreign bonds marketed in the United States followed this pattern during the 1920s. No major default occurred from 1920 to 1930. Only two of some eight hundred individual issues suffered any interruption of debt service, and even those two continued to pay interest until 1929 and 1932, respectively. In 1937, however, 84 percent of bonds issued from 1920 to 1930 were in some degree of default (Mintz, 1951, pp. 29, 90, 91).

The history of lending to sovereigns tends to follow the same pattern. From the beginning, bankers have been aware that lending to a sovereign is hazardous because the sovereign's obligation to repay is unenforceable. In the fourteenth century, the three most important banks of the Middle Ages, headquartered in Florence but with branches spanning the known world—the Bardi, the Peruzzi, and the Acciajoli—were ruined when Edward III of England defaulted on a loan “equal to the value of a realm” (Bautier, 1971, p. 151).⁶

In the fifteenth century, the Medici were so keenly aware of the hazards of lending to sovereigns that strict prohibitions on such lending were included in the agreements incorporating their various subsidiaries. Nevertheless, the Medici began to make exceptions and eventually became heavily involved with Charles the Bold and Edward IV, the successor to the king who had bankrupted the Florentine banks. Defaults by these sovereign borrowers were partly responsible for the decline of the Medici bank. (For details, see de Roover, 1963.) A similar pattern is evident in the relationship between the Spanish Hapsburgs and the Fugger Bank, which became insolvent in the mid-seventeenth century after numerous moratoria and reschedulings of the sovereign's debts.

⁶ Ehrenberg (1963, p. 50) reports that when these banks suspended payments, they “brought down with them in their fall most of the other Florentine banking houses.”

Why did these banks lend to sovereigns? The temptations were great: the potential profits seemed large, and the sovereign, then as now, could give the banks access to substantial additional business. Moreover, most sovereigns were careful to repay their debts when those debts were small (often with the proceeds of new borrowing), making it all too easy to extrapolate favorable experience. As a sovereign's debts rose over time, however, the temptation to default must have risen correspondingly. Ehrenberg (1963, p. 131) reports that the Fugger Bank sustained a loss on its claims against the Hapsburgs equal to "the greater part of the Fugger's earnings in the course of a hundred years"

The Rewards of Heavy Exposure to Transfer Shocks

The rewards of heavy country concentration are returns generally higher than those obtainable on domestic lending, so long as no major shock occurs. This condition appears to have held in the 1970s. In a survey made by the Group of 30 (1982, p. 29), two-thirds of the banks reported that international lending was more profitable than domestic lending. Moreover, the loss rate on international loan portfolios appears to have been lower than on domestic portfolios. For example, Guenther (1981) reported that Citibank's losses from 1971 to 1980 averaged 0.29 percent of outstanding foreign loans compared with 0.70 percent for domestic loans.

While banks would undoubtedly prefer to diversify their holdings, their ability to do so is limited by the opportunities available. The point is illustrated by information given to us in early 1982 by a large Japanese bank. Its country lending quotas and its actual exposures, listed in order of magnitude, were as follows:

<i>Quotas</i>	<i>Exposures</i>
United States	Mexico
West Germany	Brazil
Canada	Italy
Australia	England
Switzerland	Canada

Only one country, Canada, is on both lists.

A country's net foreign borrowing can be viewed as filling a gap, the current-account deficit, that must equal the difference between domestic investment and savings plus the government's deficit. Therefore, most opportunities for net bank lending are in countries that run current-account deficits, as these are countries in which firms or the government will want to borrow. Indeed, the opportunities are limited to the subset of such countries in which the banks have confidence—those that can be expected to undertake