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**U.S. Banks'
Exposure to
Foreign
Financial Losses**





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May 2002

Note

Numbers in the text and tables may not add up to totals because of rounding.

Preface

In the early 1980s, several large U.S. banks verged on insolvency because of losses from their international lending exposure in emerging-market countries. More recently, episodes of financial instability abroad have raised the question of how vulnerable U.S. banks currently are to serious downturns in foreign economies or to crises in global financial markets.

This Congressional Budget Office (CBO) paper reports on the U.S. banking industry's foreign exposure and discusses the limitations of currently reported measures of such financial claims. The paper was prepared at the request of the Senate Committee on Banking, Housing, and Urban Affairs. In keeping with CBO's mandate to provide objective, impartial analysis, this report makes no recommendations.

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Dan L. Crippen
Director

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Summary

A critical part of the business of modern banking institutions is managing the risk of financial loss—a risk that in recent years has become both more diverse and more complex as the global scope of many U.S. banks' operations exposes them to the vagaries of foreign markets. Understanding the amount and types of risk that banks assume in both their domestic and foreign operations is critical for bank regulators seeking to ensure the safety and soundness of the banking system. It is also critical for private investors, who impose market discipline through their transactions with and investments in those banks.

This Congressional Budget Office (CBO) paper focuses on the foreign exposure of U.S. banks—the money owed to them by residents, businesses, and governments of other countries—and the difficulties involved in measuring it and assessing its accompanying risk. Foreign exposure is worthy of special attention because episodes of financial instability originating in other countries, as well as the fact that foreign parties are often beyond the reach of the United States' legal system and its debt-recovery mechanisms, might trigger losses that threaten U.S. banks' stability. Also motivating close scrutiny of banks' foreign claims is the concentration of international banking operations in a few large institutions. Such concentration heightens concerns about risk to the financial system as a whole.

Foreign exposure in and of itself is not a measure of risk. Exposure is a measure of banks' business; consequently, it approximates the amount a bank could theoretically lose rather than gauges the likelihood of losses. Thus, banks must assess the level of risk associated with their exposure. The risks most pertinent to banks' foreign exposure are credit risk, market risk, liquidity risk, and country risk. Credit risk refers to the possibility that borrowers will not be able to pay what they owe. Market risk, also known as price risk, is the risk that the value of a bank's assets or liabilities will change as interest rates, exchange rates, or other prices vary. (For example, banks with foreign exposure face significant price risk in the form of changes in foreign exchange rates.) Liquidity risk involves the possibility that assets cannot be sold quickly without a big effect on their price. Country risk, which encompasses political, legal, and economic considerations, refers to the difficulties that banks may confront in collecting what is owed to them by residents in a specific country. Systemic risk is the possibility that the failure of one financial institution could trigger a chain reaction of defaults throughout the financial system. That risk is naturally a primary concern of regulators and policymakers.

Measuring and Reporting Foreign Exposure

Regulators require banks to provide data on their foreign exposure, which are published in the Country Exposure Lending Survey (CELS). The CELS reports data for groups of banks rather than for specific institutions, for the stated purpose of protecting banks' confidentiality.

Foreign claims are separated into two categories, cross-border claims and local country claims, in part because conditions in and actions taken by foreign nations are likely to affect the two categories differently. Cross-border claims originate outside the foreigners' home countries, usually at a U.S. bank's head office in the United States. Local country claims originate at the offices of U.S. banks in the foreigners' home countries. A bank's total foreign exposure is the sum of its cross-border and local country claims.

The large U.S. and foreign banks that account for most of the transactions in world capital markets profit by making direct loans and by intermediating—acting as the middleman for—other transactions that transfer risk from one party to another. In foreign transactions, banks have traditionally provided mechanisms to hedge the foreign exchange risk of their customers. But increasingly, they are also providing customized financial instruments, known loosely as over-the-counter (OTC) derivatives, ostensibly to hedge other types of risk as well. Such investments, which in many cases take the form of contracts between two parties, "derive" their value from changes in the price of some underlying asset or from shifts in an index or rate.

OTC derivatives allow their users to "unbundle" a wide variety of risks and thus help markets to function efficiently. But the complexity of many OTC derivative contracts may obscure the nature of the risks that one party is transferring and the ability of the other party to assume them. That loss of transparency often makes it difficult for regulators and investors to assess the risk that OTC derivatives may pose.

Changes in U.S. Banks' Foreign Exposure Since 1982

The data collected about banks' foreign exposure permit only limited insight into the risks it may represent for those banks. Some changes in that exposure since 1982 may have decreased those risks, whereas other developments may have increased them.

A factor suggesting less vulnerability for banks today than in the early 1980s is that although foreign exposure has grown in real (inflation-adjusted) terms, it has shrunk relative to bank capital (see Summary Table 1). That ratio dropped during the 1980s largely because banks were reducing their foreign exposure; it continued to decline in the 1990s primarily because banks built up their capital. Capital levels rose in large part because of a lengthy period of

Summary Table 1.**Total Foreign Exposure of U.S. Banks, 1982 and 2000**

	1982	2000
Total Foreign Exposure (Billions of 1996 dollars)		
Cross-border claims		
Excluding derivatives	531	382
Derivative exposure ^a	<u>0</u>	<u>82</u>
Subtotal	531	464
Local country claims including derivative exposure ^a	<u>119</u>	<u>318</u>
All Foreign Exposure	650	782
Ratio of Banks' Total Foreign Exposure to Capital	6	2
Percentage of Total Foreign Exposure in Emerging-Market Countries	39	23
Percentage of Total Foreign Exposure Accounted for by Money Center Banks ^b	58	80
Percentage of Cross-Border Claims on Private, Nonbank Borrowers	28	43

SOURCE: Congressional Budget Office based on year-end data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E.16 (1982 and 2000).

NOTE: U.S. banks' foreign exposure is the amount owed to them by (or their financial claims on) residents, businesses, and governments of other countries. The total foreign exposure of U.S. banks is the sum of their cross-border and local country claims. Cross-border claims are amounts owed by foreigners that originate outside the foreigners' home countries, usually at a U.S. bank's head office in the United States. Local country claims are amounts owed by foreigners that originate at the offices of U.S. banks in the foreigners' home countries. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative exposure is the positive market value of derivative contracts that U.S. banks have with foreign counterparties.

a. Data on banks' exposure through derivatives have been collected only since 1997.

b. The nine largest U.S. banks in 1982; the five largest banks in 2000.

favorable economic conditions in the 1990s and partly because of strengthened regulations regarding the capital that banks are required to hold.

Also suggesting reduced risk for U.S. banks is that they have less exposure to emerging-market countries in 2000 than they had in 1982. Exposure in such nations, whose markets and financial structures are immature because their legal, fiscal, and financial systems are not always stable and can be prone to problems, is frequently riskier than exposure in developed countries.

In contrast, it is unclear whether the growth of banks' foreign derivative exposure since 1982 implies greater risk for banks. Derivative exposure is not inherently riskier than traditional lending exposure, but assessing the risk associated with it may be more complicated. The leverage inherent in derivative exposure systemwide, as well as such exposure's concentration in the largest U.S. banks, adds urgency to understanding the risk it may pose.

Perhaps the greatest danger associated with foreign derivative exposure is its inopportune tendency to increase rapidly, both in amount and riskiness, during times of financial turmoil. For example, as the financial upheavals in Asian countries in 1997 intensified, U.S. banks' derivative exposure in those nations shot up (largely because of currency devaluations) at the very time that the risk associated with that exposure also increased. The fact that U.S. banks ultimately were little affected by the problems in Asia does not by itself prove that currently collected data are sufficient to assess the risks taken on by U.S. banks in foreign markets.

Can the Risk of Foreign Exposure Be Better Assessed?

Whether, on balance, the changes in foreign exposure discussed above increase or decrease risk to the banking system is difficult to determine. Data are lacking that would aid in that assessment, particularly data on banks' growing foreign derivative exposure. For example, only since 1997 have local country claims been reported by country and derivative claims been included in total foreign exposure; no earlier data are available to help estimate trends and assess potential risk. And derivative exposure is still not reported separately for local country claims, which constitute nearly half of all foreign exposure. Banks' own risk-assessment models may yield more-informative measures of their potential derivative exposure than are currently available in the public domain.

Investors could benefit from the disclosure of foreign exposure by individual banking organizations: knowing the location and other details of a bank's foreign claims could help inform their decisionmaking. That information, perhaps accompanied by improved accounting standards or updated guidelines from the Securities and Exchange Commission, could bolster market discipline by identifying banks whose foreign commitments might pose undue risk.

U.S. Banks' Exposure to Foreign Financial Losses

As the lending operations of U.S. banks have become increasingly global over the past two decades, concerns have heightened about the banks' foreign exposure and the ability of regulators to monitor it. (U.S. banks' foreign exposure is the amount owed to them, or their financial claims on, residents, businesses, and governments of other countries.) Those rising concerns are linked to events in the early 1980s. At that time, U.S. banks faced a crisis when several emerging-market countries ran into problems repaying their debts to U.S. commercial banks. The four nations—Mexico, Brazil, Venezuela, and Argentina—owed roughly \$37 billion to the eight largest U.S. banks, and that exposure represented about 150 percent of the banks' capital and the reserve funds they hold to cover estimated losses.¹

Federal bank regulatory agencies—the Office of the Comptroller of the Currency, the Federal Deposit Insurance Corporation, and the Federal Reserve—apparently viewed the debt crisis of the early 1980s as a threat to the U.S. financial system as a whole and not just to the banks that were directly affected. The regulators did not require the banks to write off their large losses on the foreign loans immediately; instead, they allowed the banks to take about a decade to clear their books of the bad debts. According to L. William Seidman, chairman of the Federal Deposit Insurance Corporation from 1985 to 1991, bank regulators adopted that policy of regulatory forbearance because to do otherwise might have caused seven or eight of the 10 largest banks in the United States to be deemed insolvent, which could have precipitated an economic crisis.² In that case at least, the foreign exposure of U.S. banks was perceived to increase systemic risk—the danger that the failure of one bank could launch a domino effect of failures throughout the financial system.

The vulnerability of U.S. banks to upheavals in foreign economies continues to be a matter of concern to bank regulators and policymakers, particularly the banks' exposure through

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1. Federal Deposit Insurance Corporation, "The LDC Debt Crisis," in Federal Deposit Insurance Corporation, *History of the Eighties: Lessons for the Future*, vol. 1, *An Examination of the Banking Crises of the 1980s and Early 1990s* (December 1997), p. 191.
 2. L. William Seidman, *Full Faith and Credit: The Great S&L Debacle and Other Washington Sagas* (New York: Times Books, 1993), p. 128.

their holdings of a variety of financial instruments called derivatives. Derivatives are agreements to buy, sell, or swap future cash flows at prices that depend on changes in the value of some other underlying security, index, rate, price, or commodity. For the most part, banks use derivatives to hedge against losses arising from those changes and to lend stability to their operations. But they may also use them to assume risk.

Banks' exposure through derivatives has grown in recent years. With that growth has come some concern about over-the-counter (OTC) derivatives, many of which are not traded on an exchange but are bilateral contracts made through dealers. In contrast to exchange-traded derivatives, OTC derivatives lack formal, centralized mechanisms for trading and settling, which may result in greater potential risk of default. Furthermore, OTC derivatives are customized contracts and thus have limited transparency. The specifics of some OTC agreements are known only to the parties involved and not to other investors or regulators—at least, not at the time the initial transactions occur. That limited transparency makes it difficult to assess any risks that OTC derivatives may pose. Also of concern to regulators and policymakers is that the OTC derivatives market is fairly concentrated among a group of large, systemically important financial institutions that are globally interlinked by a web of bilateral contracts extending virtually worldwide.

Direct lending in foreign nations as well as derivative contracts with foreign entities are affected by conditions in other countries that may expose banks to the risk of losses. Two key questions that this paper seeks to answer are, first, how much risk are U.S. banks now taking on, and, second, do current requirements for reporting on exposure provide regulators and investors with sufficient information—in the first case, to allow regulators to assess the U.S. banking system's vulnerability to disruption stemming from foreign markets, and in the second, to allow investors to better discriminate among institutions and thus impose market discipline through their investments and transactions?

Risks Associated with Banks' Foreign Exposure

Risk is present whenever future outcomes are uncertain. Risk can be described as a distribution of possible outcomes weighted by the probability of their occurring. The broader the range of potential outcomes or the higher the probability of their being extreme, the greater the associated risk.

Banks face various types of risk. When a U.S. bank makes a loan to or enters into a derivative contract with a foreign party, the risks that the bank accepts are in most ways similar to the risks it bears in any domestic loan or derivative transaction; they include credit risk, market risk, and liquidity risk. A fourth type, country risk, is uniquely associated with foreign transactions. To manage such risks, banks have turned increasingly to derivatives.

A fifth type of risk, systemic risk, is the direct concern of regulators and policymakers rather than of individual banks. Assessing and monitoring systemic risk has become a demanding task as rising numbers of foreign transactions create significant interdependence among the world's financial markets.

Credit Risk

Credit risk (also known as default risk) is the possibility that a borrower will not meet his or her contractual obligations. For a traditional loan, credit risk is the possibility that a bank's loan customer will not make timely interest or principal payments. For derivatives, that concept extends to the risk that the other party in a derivative contract—the so-called counterparty—will be unable to meet the contract's obligations. In recent years, banks have begun to manage credit risk by using credit derivatives—contracts in which the payoffs depend partly on the creditworthiness of one or more commercial or governmental entities.³

Banks analyze the credit risk of potential borrowers or derivative counterparties along several dimensions. They look at the borrower's reputation, which is usually measured by credit history or credit rating. They also investigate the borrower's ability to make the payments required on the loan on the basis of projected income, and they consider borrowers' financial reserves and sometimes their collateral. (Collateral is an asset pledged to the bank in the event that the borrower defaults; it is sometimes used to reduce credit risk.) General economic conditions may also have a bearing on whether borrowers can meet their obligations and may also affect other categories of risk discussed later.

Banks can never entirely eliminate credit risk, and some level of defaults on loans or derivative contracts is inevitable. Among investments available in the United States, only securities issued by the U.S. Treasury are considered free from the risk of default. The safety of those securities is bolstered by the size and strength of the U.S. economy combined with the full faith and credit of the U.S. government, which has the power to tax its residents, if necessary, to pay interest and principal. However, banks generally seek to invest their funds in instruments with higher yields than those offered by Treasury securities, and they can obtain such yields only by making relatively riskier loans and investments. Many analysts contend that competitive pressure has led U.S. banks in recent years to accept ever-greater credit risk in both their foreign and domestic activities. That increased pressure has come in part because banks have lost some of their best borrowing customers as more large corporate bor-

3. Credit derivatives are often used to insure against or speculate on credit risk. For example, a credit default swap is a derivative contract in which one counterparty pays periodic payments to a second for the right to receive the face value of a bond in the event of the bond issuer's default.

rowers choose to bypass bank loans and draw directly on capital markets by issuing their own stock or marketable debt.⁴

Market Risk

Market risk is the possibility that the value of assets or liabilities will change because of ups or downs in their prices. It is a standard measure of risk in the financial world in part because it is easier to quantify than are many other types of risk: analysts can examine past changes in prices and so calculate the variance of returns. (Variance is a statistical measure of the extent to which returns differ from the average over some period.) The greater that variance, the greater the market risk—that is, the greater the likelihood that returns may swing widely in the future. The volatility of prices or returns has traditionally been used as a proxy for market risk. Accordingly, some analysts refer to market risk as price risk.

Internationally active banks may face significant market risk from changes in foreign exchange rates. In particular, institutions that are dealers in foreign exchange or that hold assets or liabilities denominated in various currencies may be exposed to gains or losses from movements in exchange rates. Banks often try to hedge their foreign exchange risk by using foreign exchange derivatives; they also use statistical models to measure and manage market risk (see the later discussion).

Liquidity Risk

An asset is said to be liquid if it is readily convertible to cash with a minimal loss in value. In a liquid market, sellers of an asset can quickly find buyers willing to pay a price for it that comes close to its current price. U.S. Treasury securities are an example of liquid assets—the market for them is deep (many buyers and sellers), so they can be easily traded at virtually any time and in large quantities with little effect on their prices.

When a financial institution holds assets that are liquid, it is able to meet unexpected demands for cash by selling some of them. A bank or other financial entity bears liquidity risk when it holds illiquid assets. If it has to meet demands for cash, it may have to sell the assets at a loss; if the market is very illiquid, it may not be able to sell them at all.

Liquidity risk is not as easy to quantify as is credit or market risk, and there is no commonly accepted way to measure it. In fact, liquidity risk points to a shortcoming of focusing simply on price volatility (or market risk) as the indicator of overall risk. For example, because

4. Those issues are discussed in more detail in Franklin Edwards, *The New Finance: Regulation and Financial Stability* (Washington, D.C.: AEI Press, 1996).

illiquid assets are infrequently traded, they could show relatively little variance in a series of data on prices over time. Thus, a measure of the volatility of such assets might make them appear rather safe, even though attempts to sell them in a deteriorating market could result in sharp drops in their prices and possibly substantial losses for their owners.

Country Risk

The term "country risk" denotes the difficulties that banks may confront, as a result of some development in another country, in collecting what is owed to them from borrowers there. The development could be political or economic; or it could be a combination of the two, since dire economic conditions may lead a foreign government to act in a previously unanticipated way.

Part of country risk is the possibility that the actions of a foreign government will impede repayment of money owed to foreigners. Central banks typically hold currencies of many foreign countries to facilitate international finance and trade. If a foreign country's holdings of U.S. dollars are low, for example, its government may prohibit any further repayment of debt to outside creditors in dollars. If a foreign borrower's loan or derivative contract specifies payment in dollars, the government's action may force that borrower to default, even though, when considered on its own, the borrower appears to be a good credit risk. Or, as another example, a foreign government that had borrowed money from a U.S. bank might be overthrown, and the successor government might refuse to repay the loan. In either case, a lender's legal remedies to recoup the money it is owed are very limited.

In addition to the risk of governmental actions that impede debt repayment to foreigners, the credit risk associated with borrowers and derivative counterparties in foreign nations has become an increasingly important component of country risk. If a foreign economy suffers a sudden downturn, for example, all borrowers and counterparties in that country may be at increased risk of defaulting on their obligations. And should a foreign counterparty default on its obligation to a U.S. bank, the foreign legal system might not compel payment.

Systemic Risk

The confluence of high levels of market, credit, and liquidity risk may amplify potential systemic risk. As noted earlier, systemic risk is the possibility that the failure of one financial institution to meet its obligations to other banks will trigger a chain reaction, depriving those banks of expected funds and preventing them from settling their transactions (broadly speaking, collecting what is due them and paying what they owe). Carried to its logical extreme, such a series of events could mean that institutions that had no business dealings with a failed bank would ultimately be affected in a general shutdown of banks' normal clearing and settlement operations—in other words, payment-system gridlock. Moreover, the in-

creasing globalization of financial markets raises the possibility that financial failures in one country will be transmitted around the world. That kind of risk to the functioning of the global financial system is a primary concern of policymakers and regulators.

Managing Risk

One reason that banks have used derivatives more and more in recent years is that those contractual arrangements allow various types of financial risks to be "unbundled" and transferred. Through derivative transactions, banks may either take on or shed risk. The term "risk management," for bankers and others in the financial services industry, encompasses using derivatives to both speculate (assume risk) and hedge (reduce risk).

Broadly speaking, when banks hedge, they make offsetting transactions that limit their losses but also restrict their gains. For the most part, banks use derivatives for hedging rather than speculating. For example, they may hedge against changes in exchange rates. Say that a bank knows that it will receive a million British pounds in three months (perhaps as payment on a loan) and wants to avoid the risk that changes in the dollar/pound exchange rate between now and then could cause it to lose money when it converted the pounds to dollars. The bank could hedge its "position" by entering into an agreement today to sell the pounds in three months at a specified rate of exchange—for illustration's sake, 1.4 dollars per pound. The agreement ensures that in three months, when the bank receives the 1 million pounds, it will be able to sell them for 1.4 million dollars, whether or not the prevailing dollar/pound exchange rate has shifted.

Speculators use derivatives to take on risk with the expectation of commensurately higher profits. Indeed, the potential for gain (or loss) may be relatively unlimited for speculative investments. Suppose, for example, that a speculator believes that the U.S. dollar will weaken relative to the British pound; that is, one pound will buy more dollars in the future than it does now. If the current three-month-forward dollar/pound exchange rate is 1.4 dollars per pound, the speculator could take the other side of the transaction described above—that is, contract to buy 1 million pounds for 1.4 million dollars in three months. If the dollar weakens relative to the pound to such an extent that three months from now, a pound can be exchanged for 1.5 dollars, the speculator can buy 1 million pounds for 1.4 million dollars and then immediately sell them for 1.5 million dollars, clearing a profit of \$100,000. However, if the dollar strengthened relative to the pound and the exchange rate was 1.3 dollars per pound, the speculator would lose money.

Identifying the purpose of a given derivative transaction is generally difficult because the reports that banks are required to make do not distinguish between gains from hedged positions and gains from speculative ones. That lack of distinction reduces the ability of inves-

tors—and, to a lesser extent, of regulators—to assess a bank's risk exposure since the two kinds of positions are susceptible to different degrees of risk. Moreover, intention aside, a position hedged with respect to market risk may nevertheless be subject to credit, country, and liquidity risk.

How Foreign Exposure Is Measured and Reported

Central to any analysis of the foreign exposure of U.S. banks is the availability of reliable data. Yet the span of measuring and reporting on banks' foreign claims is relatively brief—approximately the past two decades. Lawmakers became concerned in the 1970s about the buildup of banks' financial claims in emerging-market countries and held hearings to assess the risk those claims posed for banks.⁵ They found little information, which spurred bank regulators to begin in 1977 to collect data on banks' foreign exposure. The Congress codified that collection requirement in the International Lending Supervision Act of 1983; the law calls on banks with foreign exposure to report quarterly to regulators and to publicly disclose "information regarding material foreign country exposure in relation to assets and to capital."⁶ Regulators began providing that information to the public in 1984 through the Country Exposure Lending Survey (CELS), which is published by the Federal Financial Institutions Examination Council.⁷

Changes made to the CELS in 1997 increased the level of detail that the report provides. Those improvements allow regulators and investors to better assess the locations and types of banks' foreign claims and banks' vulnerability to losses.

Overview of the CELS

The CELS reports data on U.S. banks' foreign exposure by the country in which claims originate, but at varying levels of detail. At the most general level, it provides aggregated data—that is, for all reporting banks. In no instance does it report data by individual bank. All banks chartered in the United States that have at least one foreign branch or foreign subsidiary and at least \$30 million in consolidated claims on non-U.S. residents must report for the CELS. In 1982, 171 banking organizations met those criteria. In December 2000, partly because of mergers and consolidations, 99 organizations met them.

5. See *International Debt*, hearings before the Subcommittee on International Finance of the Senate Banking, Housing, and Urban Affairs Committee, 95th Congress, 1st session, August 29, 1977.

6. Section 907 of the International Lending Supervision Act of 1983, 12 U.S.C. 3906.

7. The council is a formal interagency body empowered to prescribe uniform principles, standards, and reporting forms for the federal examination of financial institutions. The CELS is published quarterly as Statistical Release E. 16.

Regulators also break down the overall totals on foreign exposure to report data by bank group and by type of claim. Reporting banks fall into one of three categories: money center banks (a collection of the largest U.S. banks, which over time has shrunk from nine to five in number as a result of mergers, but which has grown in assets as the banking sector consolidated), other large banks, and all other reporting banks. For each bank group, the CELS reports two categories of foreign exposure: cross-border claims and local claims, which are differentiated—as their titles imply—by whether or not they originate at a U.S. bank's office in the country of the foreign entity that bears the claim.⁸

Cross-border and local claims are distinguished as well by the way they are reported in the CELS. Cross-border lending exposure is reported by bank group and by country of borrower. It is further broken down into three categories of borrowers: foreign banks, foreign governments, and private nonbank borrowers. (For the sake of expediency, cross-border claims excluding derivative exposure, which is discussed in the next section, are referred to in this paper as cross-border lending exposure, even though those claims include more than just loans.)

Measuring a bank's cross-border lending exposure is not as simple as totaling its lending by the country of residence of borrowers. In some cases, the borrower has a guarantor in another country that is the ultimate source of repayment; consequently, the bank's exposure may actually be to conditions in a country other than the one in which the direct borrower is located. In reporting, banks allocate their exposure to the country of ultimate responsibility. As an example, for purposes of reporting, bank branches and agencies carry the credit guarantee of their head office. Thus, if a U.S. bank made a loan to a branch of a Japanese bank located in South Korea, it would report that exposure as a claim in Japan, not South Korea.

Local claims now constitute nearly half of U.S. banks' total foreign exposure; knowing the countries in which those claims originate is important for gauging the risks that banks are facing. Before 1997, those claims were denoted as "local currency claims"—that is, claims in that country's currency—and were reported as a single worldwide total. Beginning in 1997, regulators altered the name to "local country claims" and changed the definition to include local claims denominated in currencies other than the local one. (In some Latin American countries and in other parts of the world, the major "other currency" for local claims is the

8. In addition to the foreign exposure defined and discussed in this paper, banks may have indirect exposure, which is not measured. For example, when a bank lends to a U.S. multinational corporation, the bank in some sense is also exposed through its loan to developments in other countries. However, since the corporation is subject to U.S. bankruptcy laws, there is less uncertainty about repayment than in cases in which a U.S. bank lends directly to foreign governments or to private foreign entities.

U.S. dollar.) Thus, the CELS's revised definition of local claims now provides better information on the risks that banks may be taking on, because it hinges on where the claim originated rather than the currency in which it is denominated and includes dollar-denominated obligations originating at bank offices in the foreign country.

Given the growth over the past two decades in banks' use of derivatives, the decision by regulators in 1997 to start reporting foreign derivative exposure improved the CELS. Again, that dimension of reporting differs for cross-border and local country claims: the CELS reports cross-border derivative exposure separately, by country, but it does not break out the derivative component of local country claims. The complexity of many derivative transactions and the interconnections among markets and nations that they often represent suggest that many U.S. banks—especially large ones—may be subject to substantial risk through their derivative contracts.

Reporting Derivative Exposure

Some forms of derivatives, such as commodity options and forward contracts, have been available for a long time, but since the mid-1980s, derivatives' variety and volume have grown markedly (see the appendix).⁹ Correspondingly, banks' exposure to potential losses through financial derivatives was minimal in 1982; by 1986, it had become significant.¹⁰ By 1997, when cross-border derivative exposure was first reported in the CELS, it accounted for about one-third of banks' total cross-border exposure.

At least one reason that it took so long for regulators to begin requiring banks to report their foreign derivative exposure is the difficulty of measuring it. Derivatives do not lend themselves to traditional accounting principles and practices in which banks report their assets and liabilities on their balance sheet at the original transaction value, or "historical" cost. Not only does that cost frequently have little relation to the future cash flows associated with a derivative contract, but in some cases, such as in an interest rate swap, the derivative contract is neither an asset nor a liability at the time it is entered into because its net present value is zero.¹¹

9. General Accounting Office, *Financial Derivatives: Actions Needed to Protect the Financial System*, GAO/GGD-94-133 (May 1994), p. 35.

10. Bank for International Settlements, *Recent Innovations in International Banking*, Study Group Report, Central Banks of the Group of Ten Countries (Basel: Bank for International Settlements, April 1986).

11. The present value is a single number that expresses the flow of current and future income or payments as an equivalent lump sum received or paid today. In an interest rate swap, for example, in which two parties agree to exchange streams of interest payments based on a notional amount of principal for a predetermined

Lacking a better measure of exposure, banks initially reported the size of many of their derivative holdings, particularly their swaps, as the "notional principal"—that is, the amount of principal on which the periodic payments specified in the derivative contract are based. (In an interest rate swap, for example, the notional principal is the value of the loan on which interest is calculated.) Those amounts appeared as footnotes on a bank's financial statements, but by the mid-1990s, they were strikingly large, totaling trillions of dollars for all internationally active banks.¹² Although notional principal gives some sense of the size of a derivative contract, it is not a good measure of exposure—the amount of money at risk—because it never changes hands. What is at risk are the payments based on that notional amount.

Dissatisfaction with the way banks accounted for derivatives helped move accounting practices for those instruments toward measures based on market values. Since 1994, the Financial Accounting Standards Board, the organization that sets accounting standards for the private sector, has established rules that significantly expand what financial and nonfinancial companies must disclose about their use of derivatives. Bank regulators also expanded reporting requirements for all banking organizations effective in 1995; the requirements include, among other things, reporting the market value of derivatives. Those efforts were intended to make derivatives more transparent, presenting relevant information in a way that allows the public and regulatory authorities to make informed judgments about a firm's derivative exposure.

A further complication in evaluating foreign exposure resulting from derivative contracts concerns appropriate netting—that is, how banks take offsetting claims into account so that the exposure they report is the net amount owed to them. Most derivative contracts written by banks state that if a counterparty defaults on one derivative contract with a particular bank, it must terminate all such outstanding contracts with the bank. If an institution has several derivative contracts with a particular counterparty, some of the contracts may have negative value at any one time and some may have positive value to the bank. If that counterparty should default, the bank's exposure would be the net of the counterparty's

period, the swap transaction is typically arranged at current market rates so that the net present values of payments to each party are equal. However, the value of a derivative contract changes as the value of the instrument it is derived from changes—in this case, the "instrument" is the behavior of interest rates. At some point, the interest rate swap may be an asset to one of the parties, earning money on balance; at another time, it may be a liability, requiring the net payment of money.

12. See John Kambhu, Frank Keane, and Catherine Benadon, "Price Risk Intermediation in the Over-the-Counter Derivatives Markets: Interpretation of Global Survey," *Economic Policy Review*, Federal Reserve Bank of New York (April 1996), Table 1.

outstanding contracts. The data reported in the CELS are netted for transactions with the same counterparty, as long as the bank has a legally enforceable master netting agreement with it.¹³

For the moment, bank regulators have settled on revaluation gains as the measure of derivative exposure. Such gains are the market value of a U.S. bank's derivative contracts in which foreigners owe positive amounts to the bank. In simple terms, revaluation gains represent the amount that should flow to the bank if it liquidates all of its positive-value derivative contracts with foreign counterparties.¹⁴

How U.S. Banks' Foreign Exposure Has Changed Since 1982

Some of the changes that have occurred in U.S. banks' total foreign exposure over the past two decades bode well for banks' financial stability. Although exposure has increased in both real (inflation-adjusted) and nominal-dollar terms, it has diminished relative to capital (mostly because banks' capital has grown). Moreover, in contrast to the early part of the period, banks' foreign exposure now is largely centered in less risky, more developed countries.

Nevertheless, three developments contribute to some uncertainty about banks' current financial risks. First, their foreign exposure today comprises more claims on private nonbank parties than on governments or on other banks, and such parties might be more likely than governments or banks to default in times of financial turmoil. Second, local country claims are growing, possibly as a result of some banks stepping up their retail banking activities in foreign countries. Those claims may include a high percentage of relatively riskier derivative transactions, but that cannot be determined because banks are not required to separately report local country derivative exposure for the CELS. Third, the level of risk associated with derivative exposure is unclear. Such exposure tends to rise during times of financial crisis, and although it could represent hedging activity, which would tend to reduce risk, some of it might reflect riskier positions. Moreover, even when the intent of that exposure is to hedge against losses, turbulent financial conditions tend to increase the danger that a foreign counterparty may default.

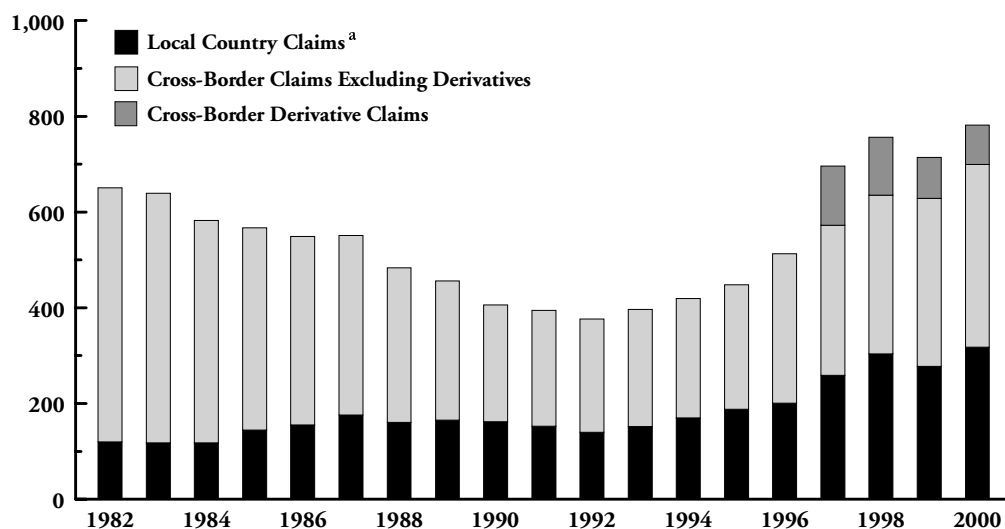
13. Netting agreements involving some foreign countries may not be considered legally enforceable.

Consequently, the CELS may report some exposures with a single counterparty that are not netted.

14. Revaluation gains can also be thought of as the positive replacement value of a derivative contract—that is, the amount that a bank would have to pay a new counterparty to accept that contract in the event that the original counterparty defaults.

Figure 1.**Total Foreign Exposure of U.S. Banks, 1982-2000**

(In billions of 1996 dollars)



SOURCE: Congressional Budget Office based on year-end data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E. 16 (1982 through 2000).

NOTE: U.S. banks' foreign exposure is the amount owed to them by (or their financial claims on) residents, businesses, and governments of other countries. The total foreign exposure of U.S. banks is the sum of their cross-border and local country claims, which since 1997 include exposure through derivatives. Cross-border claims are amounts owed by foreigners that originate outside the foreigners' home countries, usually at a U.S. bank's head office in the United States. Local currency claims are claims denominated in the local foreign currency. The definition of local claims in the Country Exposure Lending Survey was changed from local currency claims to local country claims in 1997 because some countries, particularly in Latin America, conduct local transactions in U.S. dollars. Local country claims (which can be denominated in any currency) are amounts owed by foreigners that originate at the offices of U.S. banks in the foreigners' home countries. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative exposure is the positive market value of derivative contracts that U.S. banks have with foreign counterparties.

a. Data for 1997 through 2000 include derivatives.

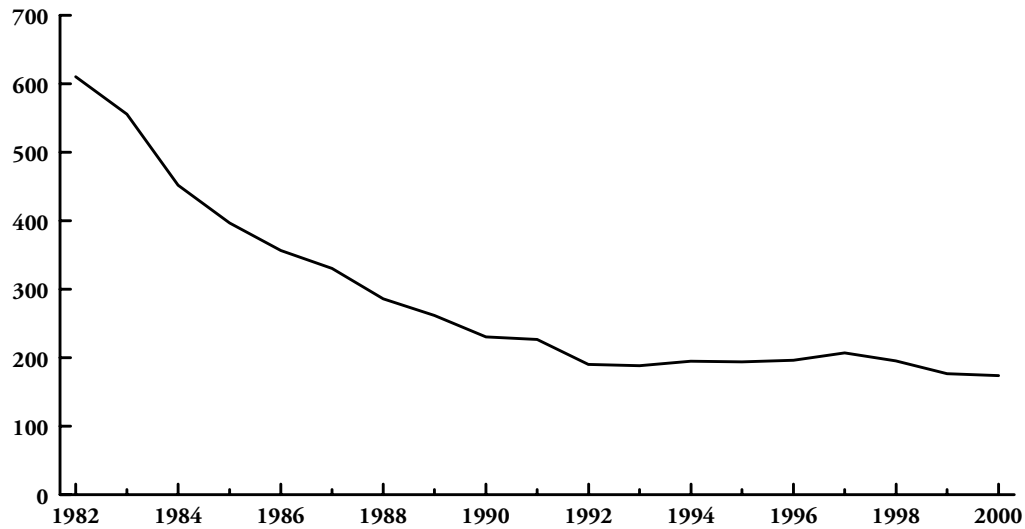
Changes in Overall Foreign Exposure

Total foreign exposure has increased in real terms since 1982 (see Figure 1). Changes in the dollar amounts of foreign exposure, however, do not offer a complete picture of how banks' vulnerability to it has changed. An additional indicator is the ratio of foreign exposure to

Figure 2.

Total Foreign Exposure as a Percentage of the Total Capital of U.S. Banks Reporting Foreign Exposure, 1982-2000

(Percent)



SOURCE: Congressional Budget Office based on year-end data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E. 16 (1982 through 2000).

NOTE: U.S. banks' foreign exposure is the amount owed to them by (or their financial claims on) residents, businesses, and governments of other countries. The total foreign exposure of U.S. banks is the sum of their cross-border and local country claims, which since 1997 include exposure through derivatives. Cross-border claims are amounts owed by foreigners that originate outside the foreigners' home countries, usually at a U.S. bank's head office in the United States. Local country claims are amounts owed by foreigners that originate at the offices of U.S. banks in the foreigners' home countries. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative exposure is the positive market value of derivative contracts that U.S. banks have with foreign counterparties.

bank capital. The capital of a bank is a measure of its financial strength and a cushion against losses.¹⁵ Because bank capital has increased since 1982 (owing to both the strength of the U.S. economy in the 1990s and the implementation of risk-based rules for the capital that banks must maintain), foreign exposure relative to capital has been declining (see Figure 2).¹⁶ In 1982, foreign exposure was more than six times the total capital of banks

15. Total capital includes a bank's equity, subordinated debentures, and loan-loss reserves.

16. In 1988, the banking regulatory agencies of 12 countries (including the United States) reached an accord on new guidelines for banks' capital holdings. The new risk-based standards, which were to be fully

involved in any foreign lending; as of December 2000, the ratio of foreign exposure to the total capital of banks with any foreign exposure was slightly less than twice total capital. That reduction suggests an improvement in overall safety, assuming that the banks' other assets and their foreign exposure have not become riskier.

Another indication of the risk that U.S. banks' foreign exposure represents is the level of development of the countries in which that exposure occurs. Exposure in other developed countries such as Germany, Japan, and the United Kingdom is considered less risky than exposure in emerging-market countries because in general, developed countries reliably enforce contract and bankruptcy laws. Currently, the bulk of U.S. banks' foreign exposure is in other developed countries (see Figure 3). Indeed, by the end of 2000, less than one-fourth was in emerging-market nations (see Figure 4).

Cross-Border Lending

In real terms, U.S. banks had less cross-border lending exposure in 2000 (\$382 billion) than they had in 1982 (\$531 billion), and their exposure in 2000 was located in less risky, more developed countries. Since 1992, however, cross-border lending exposure has been rising and has become increasingly concentrated in the money center banks (see Table 1). In 1992, money center banks accounted for less than 60 percent of banks' total cross-border lending exposure; their share in December 2000 was 75 percent.

The regional composition of cross-border lending exposure has also changed since 1982 in that banks' lending to emerging-market countries has declined. By the end of 2000, such countries accounted for just 19 percent of U.S. banks' cross-border lending, compared with a share of 39 percent in 1982 (see Table 2 on page 18). In 2000, for example, borrowers from African, Latin American, and Asian countries claimed both smaller percentage shares and smaller total dollar amounts of lending than they did in 1982. Those shifts have probably lessened the risk associated with U.S. banks' cross-border lending because lending in emerging-market countries is generally riskier than lending in developed countries.

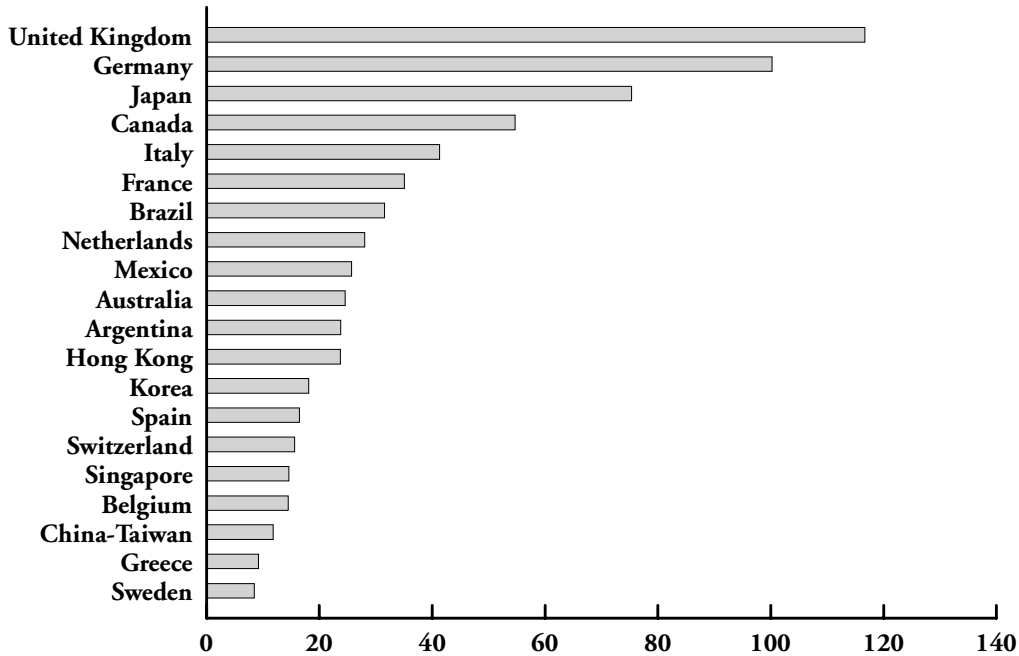
Data on cross-border exposure include information on the type of borrower—whether it is a bank, a government entity, or a private nonbank borrower. The data show that the share of exposure to private nonbank entities has increased over the years, rising from 28 percent of

implemented by the end of 1992, require banks to hold different minimum percentages of capital for different categories of assets on the basis of the assets' perceived riskiness. The new standards also require banks for the first time to hold capital against so-called off-balance-sheet activities, such as derivative contracts.

Figure 3.

Total Foreign Exposure of U.S. Banks, by Country, December 2000

(In billions of dollars)



SOURCE: Congressional Budget Office based on year-end data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E. 16 (2000).

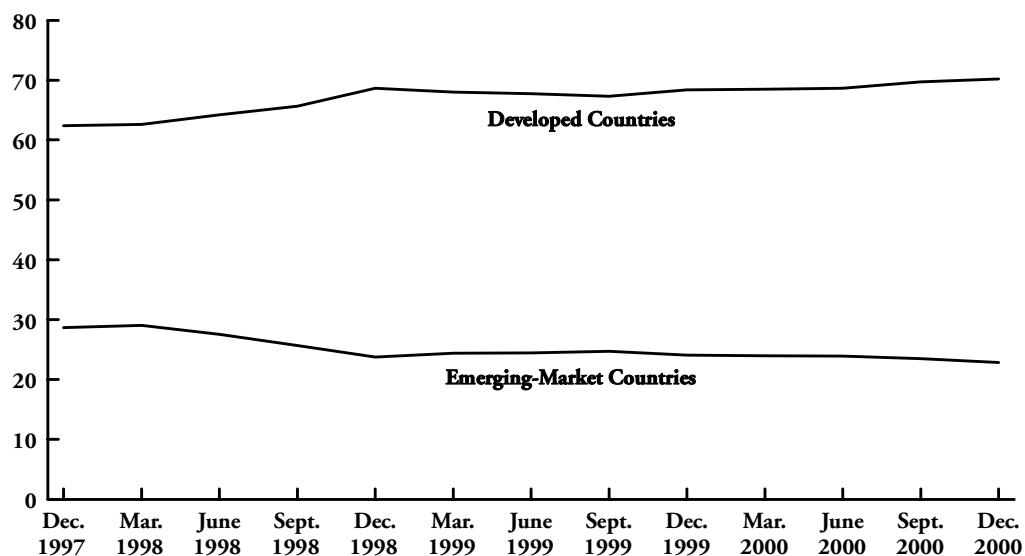
NOTES: The figure shows only the 20 countries in which U.S. banks had the most exposure.

U.S. banks' foreign exposure is the amount owed to them by (or their financial claims on) residents, businesses, and governments of other countries. The total foreign exposure of U.S. banks is the sum of their cross-border and local country claims, which since 1997 include exposure through derivatives. Cross-border claims are amounts owed by foreigners that originate outside the foreigners' home countries, usually at a U.S. bank's head office in the United States. Local country claims are amounts owed by foreigners that originate at the offices of U.S. banks in the foreigners' home countries. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative exposure is the positive market value of derivative contracts that U.S. banks have with foreign counterparties.

Figure 4.

Foreign Exposure of U.S. Banks in Developed and Emerging-Market Countries as a Percentage of Total Foreign Exposure, by Quarter, December 1997 to December 2000

(Percent)



SOURCE: Congressional Budget Office based on quarterly data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E. 16 (1997 through 2000).

NOTE: U.S. banks' foreign exposure is the amount owed to them by (or their financial claims on) residents, businesses, and governments of other countries. The total foreign exposure of U.S. banks is the sum of their cross-border and local country claims, which since 1997 include exposure through derivatives. Also included in total exposure are claims on banking centers and international and regional organizations. Cross-border claims are amounts owed by foreigners that originate outside the foreigners' home countries, usually at a U.S. bank's head office in the United States. Local country claims are amounts owed by foreigners that originate at the offices of U.S. banks in the foreigners' home countries. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative exposure is the positive market value of derivative contracts that U.S. banks have with foreign counterparties.

Table 1.

Cross-Border Claims of U.S. Banks Excluding Derivative Revaluation Gains

in Selected Years

	1982	1987	1990	1992	1994	1996	1997	1998	1999	2000
All Banks (Billions) of 1996 dollars)	531	375	245	237	250	312	314	332	351	382
Money Center Banks										
In billions of 1996 dollars	308	217	144	136	171	227	220	260	272	288
As a percentage of total cross-border claims	58	58	59	57	68	73	70	78	77	75

SOURCE: Congressional Budget Office based on year-end data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E. 16 (various years).

NOTES: Cross-border claims of U.S. banks are amounts owed by foreign residents, businesses, and governments that originate outside the foreigners' home countries, usually at the bank's head office in the United States. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative exposure, which is not included in this table, is the positive market value of derivative contracts that U.S. banks have with foreign counterparties.

The nine money center banks for 1982, 1987, and 1990 were Bank of America, Bankers Trust, Chase Manhattan Bank, Chemical Bank, Citibank, Continental Illinois, First National Bank of Chicago, Manufacturers Hanover, and Morgan Guaranty. As a result of mergers in 1992, 1994, 1996, and 2000, the number of money center banks stood at five by the end of 2000.

cross-border claims in 1982 to 43 percent in 2000. As noted earlier, that change might increase banks' vulnerability to the risk of losses.

Local Country Claims

From 1982 to 1995, local country claims as a share of total foreign exposure rose from 18 percent to a peak of 42 percent. Since 1998, they have hovered around 40 percent (see Figure 5). As of December 1997, the CELS has broken down local claims by country, and through December 2000, about one-third of such claims were in emerging-market countries (see Figure 6 on page 20). Today, local country claims make up a slightly higher proportion of banks' total foreign exposure in emerging-market countries than they do in developed countries. As noted earlier, revaluation gains on derivative contracts are now part of the overall totals of local country claims reported in the CELS.

Table 2.

Cross-Border Claims of U.S. Banks Excluding Derivative Revaluation Gains, by Region

in Selected Years (In billions of 1996 dollars)

	1982	1987	1990	1992	1994	1996	1997	1998	1999	2000
Developed Countries	302	231	165	160	152	185	190	231	259	295
Emerging-Market Countries										
Africa	11	4	2	1	1	1	1	1	1	1
Asia	62	30	21	22	28	41	36	22	22	21
Eastern Europe	9	4	2	1	2	7	7	4	3	3
Latin America and the Caribbean	<u>127</u>	<u>97</u>	<u>46</u>	<u>42</u>	<u>51</u>	<u>58</u>	<u>57</u>	<u>53</u>	<u>45</u>	<u>48</u>
Subtotal	208	134	71	66	82	107	100	80	71	72
Banking Centers ^a	20	9	8	9	14	20	22	17	18	14
International and Regional Organizations ^b	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>2</u>	<u>2</u>
Total Exposure	531	375	245	237	250	312	314	332	351	382

Memorandum:

Percentage of Total

Exposure Owed by

Emerging-Market Countries 39 36 29 28 33 34 32 24 20 19

SOURCE: Congressional Budget Office based on year-end data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E. 16 (various years).

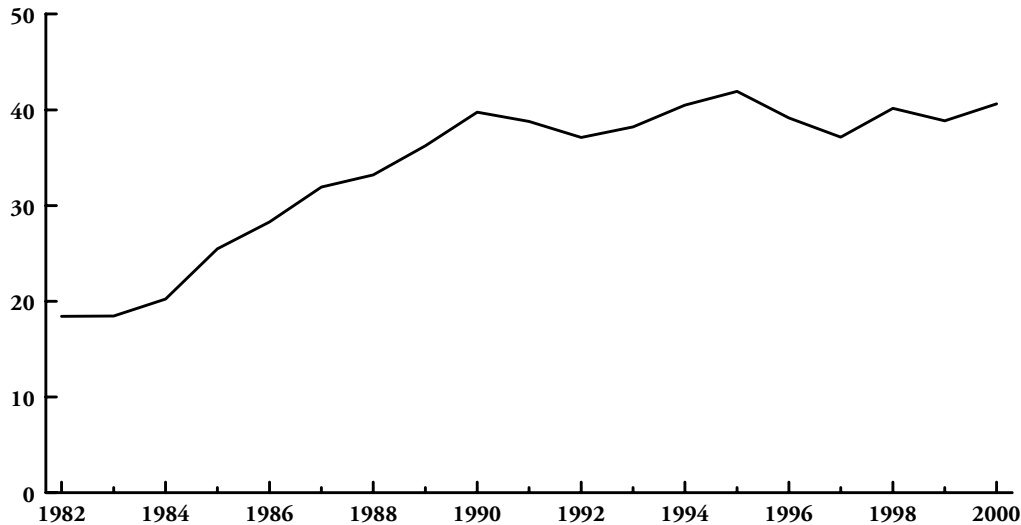
NOTE: Cross-border claims of U.S. banks are amounts owed by foreign residents, businesses, and governments that originate outside the foreigners' home countries, usually at a U.S. bank's head office in the United States. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative revaluation gains, which are not included in this table, are the positive market value of derivative contracts that U.S. banks have with foreign counterparties.

- a. Banking centers include the Bahamas, Bahrain, Bermuda, Cayman Islands, Hong Kong, Lebanon, Liberia, Macao, Netherland Antilles, Panama, and Singapore.
- b. For example, the World Bank and the International Monetary Fund (international organizations) and the Asian Development Bank (regional organization). Banks' lending to such organizations cannot be allocated to a specific country.
-

Figure 5.

Local Country Claims as a Percentage of Total Foreign Exposure of U.S. Banks, 1982-2000

(Percent)



SOURCE: Congressional Budget Office based on quarterly data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E. 16 (1982 through 2000).

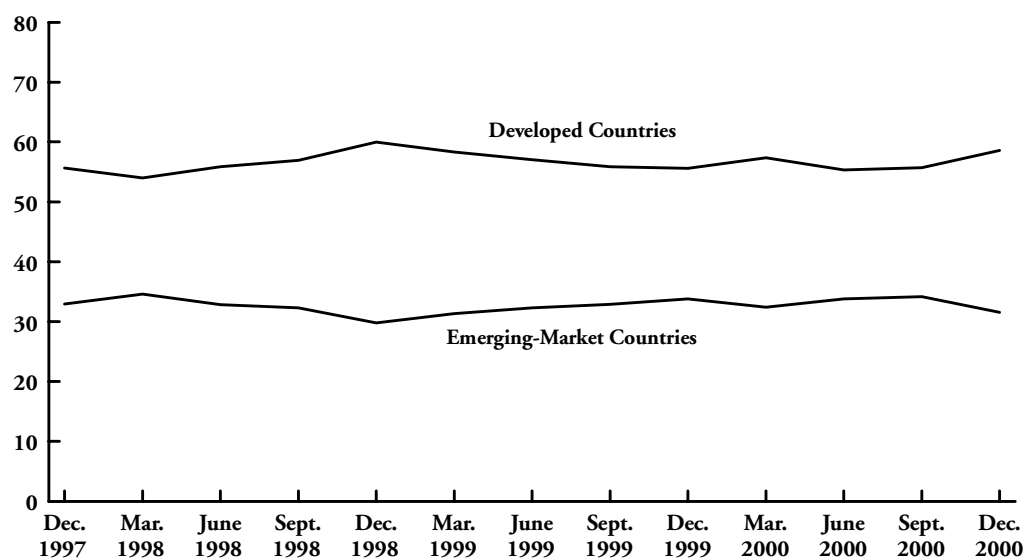
NOTE: U.S. banks' foreign exposure is the amount owed to them by (or their financial claims on) residents, businesses, and governments of other countries. The total foreign exposure of U.S. banks is the sum of their cross-border and local country claims, which since 1997 include exposure through derivatives. Cross-border claims are amounts owed by foreigners that originate outside the foreigners' home countries, usually at a U.S. bank's head office in the United States. Local country claims are amounts owed by foreigners that originate at the offices of U.S. banks in the foreigners' home countries. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative exposure is the positive market value of derivative contracts that U.S. banks have with foreign counterparties.

Whether local country claims are riskier than cross-border claims is difficult to determine. On the one hand, local country claims may be less risky, particularly if the claim is denominated in the local currency. Foreign exchange crises sometimes lead governments to restrict payments on cross-border claims, but local country claims in the local currency are in many cases not affected. On the other hand, local country loans denominated in U.S. dollars at a bank's office in a foreign country may carry more risk, especially if such loans are made to borrowers whose income is not denominated in U.S. dollars. Furthermore, U.S. bank branches in foreign countries are subject to those countries' laws, which may also affect the riskiness of local country claims. For example, the Argentine government recently forced

Figure 6.

Local Country Claims in Developed and Emerging-Market Countries as a Percentage of Total Local Country Claims of U.S. Banks, by Quarter, December 1997 to December 2000

(Percent)



SOURCE: Congressional Budget Office based on quarterly data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E. 16 (1997 through 2000).

NOTES: Local country claims, which since 1997 include exposure through derivatives, are amounts owed by foreigners that originate at the offices of U.S. banks in the foreigners' home countries. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative exposure is the positive market value of derivative contracts that U.S. banks have with foreign counterparties.

The data do not include local country claims on banking centers such as the Bahamas, Hong Kong, and the Cayman Islands.

banks to accept pesos for payment of many loans denominated in U.S. dollars, at the predevaluation rate of one peso per dollar. At the same time, the government required that dollar deposits be converted at the rate of 1.4 pesos per dollar, resulting in losses for the banks. Argentine courts made matters worse for banks by ordering that dollar deposits be paid at the current exchange rate, which reached nearly four pesos per dollar at the end of March 2002.¹⁷

17. "Countdown to Disaster," *The Economist*, March 30, 2002, p. 64.

Table 3.

Foreign Exposure of U.S. Banks Measured as Revaluation Gains on Cross-Border Derivative Contracts, by Quarter, June 1997 to March 2000

by Region (In billions of 1996 dollars)

	June 1997	Sept. 1997	Dec. 1997	Mar. 1998	June 1998	Sept. 1998	Dec. 1998	Mar. 1999	June 1999	Sept. 1999	Dec. 1999	Mar. 2000
Developed Countries	82.3	82.4	99.9	92.9	91.3	104.1	106.3	95.6	82.3	74.6	75.5	71.4
Emerging-Market Countries												
Africa	0.3	0.3	0.2	0.2	0.3	0.2	0.2	*	*	*	0.4	0.1
Asia	3.1	6.6	10.8	6.8	6.1	5.7	4.9	4.0	2.0	2.2	2.0	1.8
Eastern Europe	0.3	1.2	0.4	0.5	0.7	0.8	0.5	0.3	0.2	0.2	0.2	0.2
Latin America and the Caribbean	<u>1.9</u>	<u>2.3</u>	<u>2.5</u>	<u>2.4</u>	<u>2.5</u>	<u>3.2</u>	<u>2.2</u>	<u>3.3</u>	<u>2.5</u>	<u>2.5</u>	<u>3.0</u>	<u>3.3</u>
Subtotal	5.5	10.4	14.0	9.9	9.6	9.9	7.9	7.6	4.8	4.8	5.6	5.4
Banking Centers ^a	3.4	7.1	7.3	5.6	5.0	5.1	3.8	3.5	1.3	1.4	2.0	2.2
International and Regional Organizations ^b	<u>0.8</u>	<u>1.1</u>	<u>1.9</u>	<u>1.3</u>	<u>1.8</u>	<u>2.1</u>	<u>2.4</u>	<u>2.0</u>	<u>2.0</u>	<u>2.1</u>	<u>2.4</u>	<u>2.0</u>
Total Exposure	92.0	100.8	122.9	109.8	107.8	121.3	120.3	108.5	90.4	82.8	85.4	81.0

SOURCE: Congressional Budget Office based on quarterly data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E. 16 (various years).

NOTES: Cross-border claims of U.S. banks are amounts owed by foreign residents, businesses, and governments that originate outside the foreigners' home countries, usually at a U.S. bank's head office in the United States. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative revaluation gains are the positive market value of derivative contracts that U.S. banks have with foreign counterparties.

* = Less than \$50 million.

- a. Banking centers include the Bahamas, Bahrain, Bermuda, Cayman Islands, Hong Kong, Lebanon, Liberia, Macao, Netherland Antilles, Panama, and Singapore.
- b. For example, the World Bank and the International Monetary Fund (international organizations) and the Asian Development Bank (regional organization). Banks' lending to such organizations cannot be allocated to a specific country.
-

Derivative Exposure

In real terms, U.S. banks' cross-border exposure measured as revaluation gains on derivatives has ranged between \$81 billion (in March 2000) and \$123 billion (in December 1997) since reporting began in June 1997 (see Table 3). In all quarters of those years, the majority of that exposure was in developed countries. For example, as of December 1998, counterparties in developed countries owed U.S. banks \$106 billion (in 1996 dollars) as a result of revaluation gains on derivatives; in contrast, counterparties in emerging-market countries in Asia owed about \$5 billion, and Latin American counterparties owed about \$2 billion. Counterparties in "banking centers" (such as Hong Kong, Singapore, and the Cayman Islands) owed \$3.8 billion.

Of course, those figures denote only cross-border derivative exposure and not all foreign exposure through derivatives. Moreover, the trend of total foreign exposure is further disjointed because no data on exposure from derivatives were reported before 1997 (see Table 4). Yet the view of the change in total foreign exposure presented in Table 4 is largely accurate because the exposure of U.S. banks that is attributable to derivatives was minimal in 1982. With derivatives included, total foreign exposure at the end of 2000 stood at \$782 billion (in 1996 dollars).

The data allowing after-the-fact analysis of the Asian crisis of 1997 show that the market-value measure of derivative exposure—that is, revaluation gains—can change rapidly, without forewarning. Thus, those gains do not accurately reflect the potential future value of banks' derivative contracts and provide policymakers with only a poor measure of foreign risk exposure.

Why Derivative Exposure Increases During Financial Turmoil. Data from 1997 demonstrate that during a foreign financial crisis, banks' cross-border lending exposure tends to creep down and their cross-border derivative exposure tends to shoot up. Why does that happen? In general, foreign exposure alters when two factors change: the market value of banks' existing loans and derivative contracts and the pace of new lending and contracting. If existing cross-border lending in a country is denominated in U.S. dollars and the country's currency is devalued relative to the dollar—which frequently happens in a foreign financial crisis—the contractual amounts owed to U.S. banks do not change (although the burden on debtors will be greater, because they will owe more in terms of their local currency). When cross-border lending is denominated in the local foreign currency, the dollar value of foreign exposure will decline if the foreign currency is devalued. Consequently, the foreign currency's devaluation tends overall to reduce cross-border lending exposure, but that effect will be weakened to the extent that cross-border lending is denominated in dollars.

Table 4.**Total Foreign Exposure of U.S. Banks**

by Region, in Selected Years (In billions of 1996 dollars)

	1982 ^a	1997	1998	1999	2000
Developed Countries	302	436	520	489	549
Emerging-Market Countries					
Africa	11	3	3	4	4
Asia	62	85	67	65	64
Eastern Europe	9	12	9	7	11
Latin America and the Caribbean	<u>127</u>	<u>100</u>	<u>102</u>	<u>97</u>	<u>100</u>
Subtotal	208	200	180	173	178
Banking Centers ^b	20	59	52	50	48
International and Regional Organizations ^c	<u>1</u>	<u>3</u>	<u>5</u>	<u>4</u>	<u>7</u>
Total Exposure	531	697	758	715	782

SOURCE: Congressional Budget Office based on year-end data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E. 16 (various years).

NOTE: U.S. banks' foreign exposure is the amount owed to them by (or their financial claims on) residents, businesses, and governments of other countries. The total foreign exposure of U.S. banks is the sum of their cross-border and local country claims, both of which include derivative exposure. Cross-border claims are amounts owed by foreigners that originate outside the foreigners' home countries, usually at a U.S. bank's head office in the United States. Local country claims are amounts owed by foreigners that originate at the offices of U.S. banks in the foreigners' home countries. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative exposure is the positive market value of derivative contracts that U.S. banks have with foreign counterparties. Derivative exposure may be both cross-border and local country, depending on where the derivative contract originates.

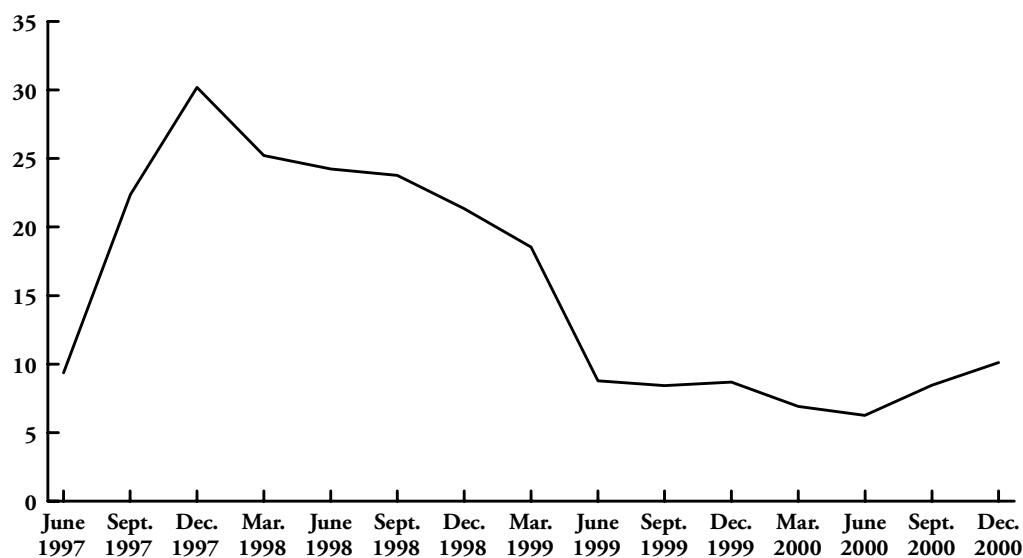
- a. Calculations do not include derivative exposure or local country claims.
- b. Banking centers include the Bahamas, Bahrain, Bermuda, Cayman Islands, Hong Kong, Lebanon, Liberia, Macao, Netherland Antilles, Panama, and Singapore.
- c. For example, the World Bank and the International Monetary Fund (international organizations) and the Asian Development Bank (regional organization). Banks' lending to such organizations cannot be allocated to a specific country.

The pace of lending in countries experiencing financial disturbances would also tend to slow. Banks presumably try to scale back their activities in a foreign country when its economic conditions deteriorate, not making new loans and not rolling over existing loans when they mature. Under such conditions, reported foreign exposure may also decline

Figure 7.

Cross-Border Derivative Exposure as a Percentage of Total Cross-Border Claims for Parts of Asia, by Quarter, June 1997 to December 2000

(Percent)



SOURCE: Congressional Budget Office based on quarterly data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E. 16 (1997 through 2000).

NOTES: Cross-border claims are amounts owed by foreigners that originate outside the foreigners' home countries, usually at a U.S. bank's head office in the United States. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative exposure is the positive market value of derivative contracts that U.S. banks have with foreign counterparties.

The data cover Hong Kong, Indonesia, Malaysia, the Philippines, Singapore, South Korea, and Thailand.

because lending banks write off claims on borrowers when the prospect of repayment looks dim.

Changes in exchange rates or interest rates affect banks' exposure through derivatives differently than they affect exposure through lending. Banks may try to lessen their derivative exposure by reducing the number and amounts of their contracts, but unlike their lending, what they owe on the contracts may increase sharply during financial upheavals as a result of wide swings in the variables underlying the contracts. Before a crisis, many derivative contracts may have values close to zero; that is particularly true of swaps (for which, as noted earlier, the net present value of the contract at its inception is zero). When a crisis erupts, the

contracts' values may shift dramatically—revaluation gains may zoom from zero to millions of dollars.

As intermediaries, or middlemen, in the derivative market, banks usually try to balance their exposure to shifts in exchange or interest rates by taking both sides of derivative positions. Consequently, changes in those rates associated with a foreign financial crisis will lead to revaluation gains for the banks on some contracts and losses on others. Indeed, banks count on the gains to offset the losses. The problem with the increased derivative exposure triggered by deteriorating economic conditions is the correspondingly greater risk that the counterparty owing money to the U.S. bank may default. Of course, the increased risk of default applies to banks' foreign lending exposure as well.

Volatility of Derivative Exposure During the Asian Crisis. Before the Asian financial crisis in 1997 and 1998, U.S. banks' cross-border derivative exposure in emerging-market nations in Asia was a small component of their total foreign exposure. In the last half of 1997, however, their derivative exposure rose dramatically on a percentage basis. Banks' exposure through cross-border derivative contracts in Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore, and Thailand measured as a percentage of total cross-border exposure in those countries jumped from 10 percent to 30 percent between June 1997 and December of that year (see Figure 7).

In dollar terms, the amount owed by counterparties in Thailand, for example, went from \$417 million to \$2.5 billion (see Figure 8). In both Singapore and Indonesia, derivative exposure increased more than fivefold over a span of three to six months at the onset of the crisis. And in South Korea, where U.S. banks' total exposure was fairly large, the amount owed to them by South Korean entities through cross-border derivative contracts more than tripled between September 30, 1997, and December 31, 1997, rising from \$1.3 billion to \$4.7 billion.

In comparison, U.S. banks' cross-border lending exposure during the crisis period edged up modestly or declined. For example, such exposure in Thailand dropped by more than 35 percent.¹⁸

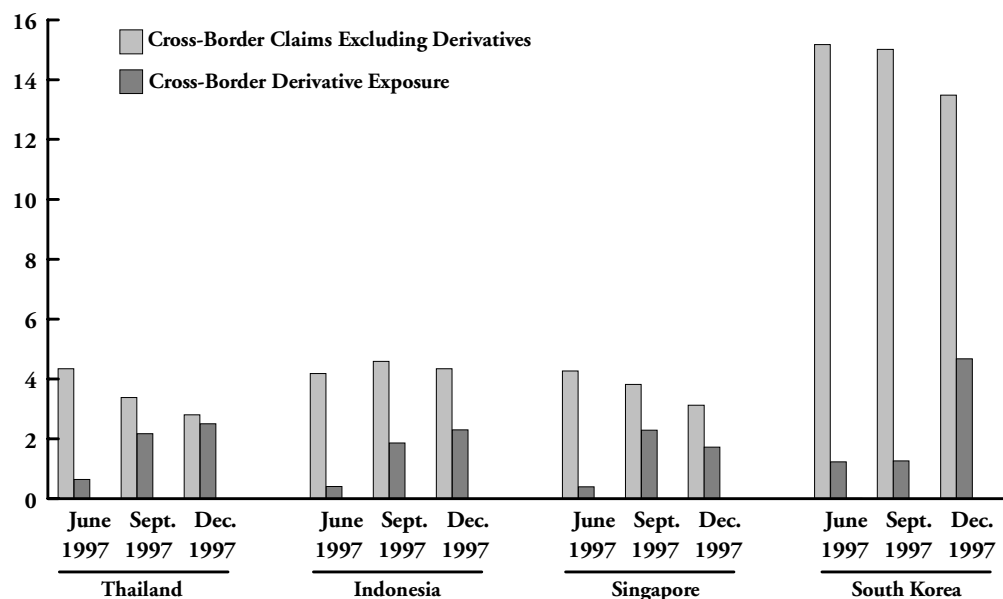
The years of the Asian crisis saw U.S. banks' derivative exposure increasing with counterparties all over the world, not just in Asia. The amounts owed to the banks as a result of

18. Not all components of cross-border lending exposure were necessarily marked to market (valued at market prices). Thus, the market value of such exposure may have dropped by more than the CELS data indicated. In that case, there would be even more disparity between changes in lending exposure and changes in derivative exposure during foreign financial crises.

Figure 8.

Cross-Border Claims in Four Asian Countries, by Quarter, June Through December 1997

(In billions of dollars)



SOURCE: Congressional Budget Office based on quarterly data from Federal Financial Institutions Examination Council, *Country Exposure Lending Survey*, Statistical Release E. 16 (1997).

NOTE: Cross-border claims are amounts owed by foreigners that originate outside the foreigners' home countries, usually at a U.S. bank's head office in the United States. Derivatives are financial contracts and instruments that derive their value from changes in some underlying asset, index, or rate. Derivative exposure is the positive market value of derivative contracts that U.S. banks have with foreign counterparties.

their cross-border derivative transactions in all regions arched upward from \$92 billion in June 1997, peaked at \$123 billion in December 1997 (both numbers are in 1996 dollars), and then fell to lower levels by 1999 (see Table 3 on page 21). The pattern is more pronounced when just the amounts owed by emerging-market countries are considered. That derivative exposure more than doubled from June 1997 to December 1997, before retreating over the next six quarters. The data also show the spread of instability across regions. The rise-and-fall pattern was first evident in Asia in the second half of 1997; it later appeared in Eastern Europe and Latin America, roughly coinciding with currency devaluation and economic declines in each region.

Can the Risks of Foreign Exposure Be Better Assessed?

Since the early 1980s, financial markets have become both globally integrated and more complex. Those developments have made assessing banks' vulnerability to losses in international financial markets, particularly their exposure through derivative holdings, both more important and more difficult. The current measure of derivative exposure, revaluation gains, has some limitations as an assessment tool. Moreover, several other factors make risk assessment particularly challenging—the correlation of different types of risk, the lack of transparency in the over-the-counter derivative market, the inherent leverage in derivative exposure, and the additional complexity that indirect exposure brings. As a result, what derivative exposure means for banks' systemic risk is unclear.

Banks have implemented a number of techniques to assess risk, including the evaluation of potential future exposure and the use of value-at-risk models and stress testing. Some observers have proposed that banks improve their reporting of exposure by disclosing the results of their assessments. Other improvements mentioned in the debate include changing the Country Exposure Lending Survey to report on specific banks and requiring banks to provide more-detailed exposure information for publication in the survey.

Challenges in Assessing Derivative Exposure

The speed at which the markets for derivatives grew during the 1980s and 1990s initially outpaced the ability of regulators, investors, and the banks themselves to evaluate how those new markets would affect the risk borne by individuals, firms, and the financial system as a whole. In recent years, large banks have worked hard to assess those risks. But the markets' complexity as well as several specific factors makes that task difficult, not only for banks but for regulators and investors also.

First, market (or price) risk, credit risk, and even liquidity risk are often correlated, and hedging for one does not necessarily avert another. Risks can snowball; for example, increased market risk can trigger increased credit risk. A bank may have a hedged position in a derivative contract with respect to market risk, but when prices change suddenly so that the foreign counterparty owes the bank money, that is precisely when the counterparty's creditworthiness may plummet and it may default. Credit risk may also be amplified by liquidity risk. If counterparties on the losing side of a derivative contract are unable to sell assets without depressing the assets' prices (or if liquidity dries up completely and they are unable to sell their assets at all), their risk of default may rise.

The lack of transparency in the over-the-counter derivative market is a second factor that clouds the picture of banks' foreign exposure. Unlike the established exchanges, the OTC derivatives market is a dealers' market and lacks formal, centralized limits on individual positions or leverage (the financing of investment at least partly with borrowed money), as

well as rules and mechanisms for ensuring that the market will remain stable. Information about who owns which risks is unavailable for the most part, making it difficult for derivative counterparties to monitor one another effectively. However, participants in the market can generally exert some discipline and affect its operations by choosing not to transact or by limiting their exposure to certain counterparties. For those reasons, some observers believe that the information currently provided to investors and participants in the OTC derivative market is adequate.

The leverage inherent in derivative exposure is a third factor that makes risk assessment difficult. Leverage amplifies the profits or losses that result from a derivative contract, but it cannot be determined from the CELS data.¹⁹ An example of the leverage inherent in derivative contracts is an interest rate swap in which the amount of exposure to changes in interest rates is largely determined by the notional size of the contract. If the parties to the contract want the payments to be large, even for small changes in rates, they specify a large notional value, which determines the implicit leverage.

A fourth factor, indirect exposure, introduces additional complexity. Just as U.S. banks' foreign lending exposure may be indirect (for example, loans to U.S. multinational corporations), so their exposure through financial derivatives may be, as borrowers themselves enter into derivative contracts and thus add to their lenders' exposure in derivative markets. Indirect exposure is not necessarily captured in any regularly reported data. Yet it may be particularly risky because U.S. banks count among their customers "highly leveraged institutions," a subset of which are commonly called hedge funds. Hedge funds are unregulated with regard to the investments they make. The exposure from such loans may compound the risk that a bank faces if the bank's investments in derivatives mirror those of the parties to whom the bank lends. Some observers have indicated that such piggybacking was among the problems that surfaced with the failure of Long-Term Capital Management (LTCM) in 1998.²⁰

The web of interconnections among counterparties may increase systemic risk, but the complexities of the derivative markets make such risk difficult for regulators to evaluate. On the one hand, if a major participant in the markets defaulted on its contracts, it might cause others to default, and what began as an isolated occurrence could give rise to systemic problems that threatened the solvency of key market participants. (That scenario was evident in

19. Leverage is inherent, for instance, when a bank does not need to commit as much money to enter into a derivative contract as it would have required to buy the underlying asset. Of course, derivative exposure can be further leveraged by borrowing money to take on derivative contracts.

20. See Franklin Edwards, "Hedge Funds and the Collapse of Long-Term Capital Management," *Journal of Economic Perspectives*, vol. 13, no. 2 (Spring 1999), p. 202.

the now classic example of LTCM.)²¹ On the other hand, interconnections and complex markets might allow risk to be placed with the parties that were most prepared to accept it, which might help stabilize the financial system. As things stand now, the question of whether the growth of derivative markets has increased or decreased systemic risk remains unanswered.

Disclosure of Banks' Risk Assessments

The techniques and computer models that banks use today to assess and manage risk are a substantial improvement over earlier methods. Though far from perfect, the new measures go beyond simple market-value assays of exposure (see Box 1); they are forward-looking and attempt to assess the consequences for a bank of low-probability but high-loss outcomes. Such techniques may be useful in overcoming at least some of the difficulties in assessing the risk inherent in derivative transactions and thus in U.S. banks' foreign exposure.

In pursuit of that goal, international banking regulators have recommended that banks provide information on the techniques they use or, at the least, disclose the actual assessments those methods produce. For example, a major focus of the Basel Committee on Banking Supervision's new capital accord is to bolster the discipline that investors' transactions can impose on markets by calling on banks to more fully disclose the internal methodologies they use to assess and mitigate credit risk.²² In addition, the Multidisciplinary Working Group on Enhanced Disclosure (a joint venture of four international organizations that regulate financial services) has also recommended that financial intermediaries such as banks disclose a number of measures of their relevant financial risks.²³ The group's final report urged both qualitative and quantitative disclosures, stressing that the information should be expressed in ways "consistent with firms' own risk-management practices." The group also advocated that banks disclose the efficacy of those practices.

21. *Ibid.*, p. 199. After it became known that LTCM might default, some dealers were concerned that their counterparties were heavily exposed to the hedge fund. A liquidity run quickly ensued, as market participants tried to shed risk with LTCM and replace their positions with risk-free U.S. Treasury securities. In response to deteriorating market conditions, the Federal Reserve acted to increase liquidity in financial markets, cutting interest rates twice within two weeks in the autumn of 1998 and then a third time at its regular Federal Open Market Committee meeting in November.

22. See Basel Committee on Banking Supervision, Bank for International Settlements, *The New Basel Capital Accord* (January 2001), available at www.bis.org/bcbs/index.htm.

23. Multidisciplinary Working Group on Enhanced Disclosure, *Final Report to Basel Committee on Banking Supervision, Committee on the Global Financial System of the G-10 Central Banks, International Association of Insurance Supervisors, and International Organization of Securities Commissions* (April 26, 2001), available at www.bis.org/publ/joint01.pdf.

Box 1.

Risk-Quantification Techniques

The ultimate goal of risk-measurement techniques is to estimate the distribution of the future returns from (or values of) a given portfolio of assets. The range of possible changes in the prices of those assets and the probability of each change's occurring make up the portfolio's risk profile. Measures of potential future exposure, value-at-risk models, and stress testing are some of the risk-quantification techniques used by many banks today.

Potential future exposure estimates the future replacement cost of a derivative contract—in other words, how changes in the underlying instrument or index would affect the contract's value over its remaining term. Risk managers for banks may use probability analysis in the form of simulation studies, option pricing models, or other statistical methods to generate measures of potential future exposure. The analysis generally involves modeling the volatility of the underlying variables that affect the derivative contract's value. Various values may be calculated, such as the expected (or average) potential future exposure and the maximum (or worst-case) exposure.

Value-at-risk (VaR) models measure market risk by estimating, at a given level of statistical confidence, the maximum amount that a bank can expect to lose under normal market conditions over a specified time. In essence, the value-at-risk calculation attempts to make a statement of the form "We are X percent certain that we will not lose more than V dollars in the next N days";¹ it gives banks a single, bottom-line figure measuring their potential loss (V , in the previous sentence), which can be compared among different types of trading portfolios. VaR models generally use historic price volatility to estimate possible losses. The models are best at measuring typical losses (those that could be expected to occur on the order of 95 or 99 times out of 100). But as with all models based on historical data, they are less useful in estimating how large losses might be in the case of unusual or unprecedented events. Efforts are under way to adapt value-at-risk concepts to incorporate credit and liquidity risk.

Stress testing focuses on the lower end of a distribution of returns from a portfolio's assets. Stress tests simulate catastrophic financial events, such as the most extreme historical shocks to the financial markets over the past 10 or 20 years. They then assess how such extreme movements of the market might change a portfolio's value. Stress testing is a way to take into account extreme events that have a small probability of occurring but that do arise from time to time.

1. John C. Hull, *Options, Futures, and Other Derivatives*, 4th ed. (Upper Saddle River, N.J.: Prentice Hall, 2000), p. 342.

Some observers have proposed other ways to help regulators, investors, and creditors to better assess the risk posed by banks' foreign exposure. For example, the President's Working Group on Financial Markets recommended that banks be required to measure and report on leverage.²⁴ There are many ways to measure it; most informative would be a gauge that incorporates the inherent leverage in the positive replacement value of derivative contracts.

Still unclear, however, is the usefulness of banks' disclosing additional detail on their foreign derivative exposure garnered through techniques such as future potential exposure or value-at-risk measures. One advantage of keying reporting to the output of banks' own assessment models is that it would yield the most accurate risk profile and keep up with the latest developments in risk-assessment techniques; as banks' models improved, disclosure would improve. However, comparing risk assessments among institutions might present problems, especially if those assessments were drawn from banks' own internal risk-management models. Another issue is the potentially proprietary nature of such information: requiring banks to disclose more of their assessments could place them at a competitive disadvantage.

Another issue is the usefulness and accuracy of the methods banks use to assess risk, which might not be known until the measures were tested by an episode of financial turmoil. Some research, for example, has called into question the performance of value-at-risk models. Such measures are based on historical volatility and may underestimate the risk of so-called outlier events, such as the Russian government's default, that are not likely to occur but nevertheless sometimes happen. A case study by the Federal Reserve on improving bank disclosure says, "In particular, there appears to be little connection between the degree of risk suggested by a firm's value-at-risk (VaR) disclosures and its actual trading account performance in the wake of the financial shock in the third quarter of 1998."²⁵

Improving Public Reporting

Expanding the scope of the data published in the Country Exposure Lending Survey and in banks' annual reports might help improve public reporting on foreign exposure. As noted earlier, the CELS currently provides aggregated exposure data for all banks with any foreign exposure and for three smaller groups (money center banks, other large banks, and all other banks). A simple improvement that would aid investors and policymakers in assessing foreign exposure would be to report those data bank by bank.

24. Constraining leverage was a major focus of the findings in the group's report, *Hedge Funds, Leverage, and the Lessons of Long-Term Capital Management* (April 1999).

25. Study Group on Disclosure, Federal Reserve System, *Improving Public Disclosure in Banking*, Staff Study 173 (March 2000), p. 32.

The data now provided in annual reports and other filings required by the Securities and Exchange Commission (SEC) could also be expanded. Currently, such reports provide limited information about the foreign exposure of bank holding companies. The SEC requires a bank holding company to report, by country, the amount of its cross-border "outstandings" but only for countries in which such exposure exceeds 1 percent of the company's total assets. However, that measure is limited in what it includes. For example, it does not include total local country claims, which now make up a significant share of foreign exposure. The SEC requires only that net local country claims—the extent to which local country claims exceed local country liabilities—be included in reported foreign exposure. The uneven treatment of loans and deposits in Argentina in early 2002, as discussed earlier, is an example of a case in which it may be more appropriate to include total local country claims in foreign exposure rather than just net local country claims.

Separately reporting local country derivative exposure would also improve the information that the CELS provides about banks' risks. Local country claims as a share of total foreign exposure have been growing faster than have cross-border claims. But whether that increase is due to lending exposure or derivative exposure—which, in any case, may move in different directions in times of financial uncertainty—is unknown. Because the CELS does not break out the two components in calculating total local country claims, changes in them may offset each other and obscure potentially valuable information about exposure and risk. The speed with which derivative exposure can change raises the deeper question of whether better measures of such exposure might be devised.

Appendix: Derivatives and Their Markets

The expanding use of derivatives by banks and other investors has spurred the development of new forms and more complex transactions. As the range of derivative contracts has grown, so have the markets in which they are traded. Today, much attention centers on the market for over-the-counter derivatives—privately traded instruments that can be designed to meet the needs of the parties involved.

Types of Derivatives

Options and forward contracts are the two basic types of derivatives. *Options* are the right but not the obligation to buy or sell some underlying asset at a specified price (the strike price) by a specified date (called the expiration date). Options with standard features, such as an option for an exchange-traded stock with a set strike price and expiration date, can be traded on an organized exchange or negotiated privately.

A *forward contract* is the obligation of one counterparty to buy and the other counterparty to sell an underlying commodity or security at a specific price at a date in the future—in other words, a bilateral agreement. Forward markets exist for many kinds of "underlyings," such as commodities, currencies, and interest rates. The value of a forward contract may fluctuate during the life of the contract, but no money changes hands until the maturity date (although collateral may be used to guarantee a party's performance).

A *futures contract* is a special type of forward contract. The purchaser (or seller) of a futures contract is obligated to buy (or sell) a specific underlying at a specific price on the contract's maturity date. However, unlike the operation of a forward contract, in which no money and no underlying security or commodity changes hands until the maturity date, any changes in the value of a futures contract are settled, or paid, daily on an organized exchange such as the Chicago Board of Trade. To facilitate trading, certain features of futures contracts are standardized.

A *swap* is a forward-based derivative. Like a forward contract, it is a bilateral agreement, tailored to meet the specific needs of the counterparties. A swap obligates a pair of counterparties to exchange a series of cash flows, based on a notional amount of principal, at specified intervals, or settlement dates. The cash flows exchanged in a swap are calculated by

multiplying the underlying notional principal by the interest rate, exchange rate, or price specified in the contract. Thus, a swap is equivalent to a series of forward contracts.

In a simple currency swap, principal and interest payments in one currency are swapped for principal and interest payments in another. The principal amounts, which are set to be equivalent using the exchange rates prevailing at the initiation of the swap agreement, are usually exchanged at the beginning and at the end of the agreement's life. A currency swap can effectively transform borrowing in one currency to borrowing in another.

In an interest rate swap, interest payment streams of different types are exchanged. The three main types of interest rate swaps are a coupon swap, which swaps the payment stream from a fixed interest rate for the stream from a floating interest rate; a basis swap, which exchanges one floating rate for another; and a cross-currency interest rate swap, which swaps a fixed rate in one currency for a floating rate in another.

Markets for Derivatives

Some derivatives—for example, options and futures contracts—may be bought and sold on organized exchanges, and some are privately negotiated in the so-called over-the-counter (OTC) market. To be "exchange-traded," derivative contracts must be standardized with regard to the amount of the underlying, the settlement or expiration date, and so forth. They are then listed and traded on the exchange, and accounts are settled through a clearinghouse. Legally, the clearinghouse is the counterparty for exchange-traded derivatives—that is, the agent responsible for upholding the derivative contract. A benefit of that system is that transactions can occur in an active, liquid market.

OTC derivatives, in contrast, are essentially bilateral contracts—privately negotiated transactions between counterparties. Nevertheless, many OTC derivatives are traded using standardized agreements, resulting in low transaction costs. Interest rate swaps, which have an extremely active, liquid market, are an example of such derivatives. The main benefit of OTC derivatives is that they can be tailored to the needs of the two parties; their major drawback is that they pose a higher risk of default than do exchange-traded derivatives. Some very specialized agreements may also be illiquid.

Why Markets for Derivatives Have Grown

The growth in financial derivatives has been fueled by both demand and supply factors. First, on the demand side, sustained shifts (such as the advent of floating exchange rates in 1973) and surges in the volatility of markets led to increased demand for derivatives that allow investors to separate and transfer market risk—that is, the possibility that the value of assets or liabilities will change because of ups or downs in their prices. Market volatility, as measured by the standard deviation of returns on Treasury bonds, rose from an average of

8 percent per year in the 1970s to 15 percent in the 1980s.¹ Since the mid-1980s, several temporary surges in market volatility have occurred, such as those in the summer of 1997 (associated with the Asian crisis) and the autumn of 1998 (accompanying Russia's default on its debt).

A second factor that led banks to increase their demand for derivatives was the considerable competitive pressure from other financial institutions that they have faced over the past two decades. On the deposit side, banks encountered more competition for household savings from entities such as pension funds, insurance companies, and mutual funds, and that competition induced them to pay more competitive and more variable interest rates to attract deposits. At the same time, competition on the lending side also intensified, as many of the best borrowers turned to the securities markets to raise funds. With the cost of funds so sensitive to the market, banks learned to separate funding risk from market risk by using interest rate swaps and other derivatives.

A third factor driving banks' demand for financial derivatives was the capital standards imposed by regulators. For example, under the Basle Accord of 1989 (a multilateral agreement that established a uniform standard of capital adequacy to safeguard against financial risks), an interbank swap required banks to hold only a small fraction of the capital required for an equivalent interbank cash position on the balance sheet.²

Supply factors also contributed to the huge growth of derivative use since the mid-1980s. Such factors include technological advances in telecommunications and computing power and the development of option pricing and simulation models. In particular, the greatly reduced costs and expanded scope of telecommunications helped create a global market by allowing financial institutions to match up users of derivatives who were previously isolated from each other.³

1. Eli Remolona, "The Recent Growth of Financial Derivative Markets," Federal Reserve Bank of New York, *Quarterly Review*, vol. 17, no. 4 (Winter 1992-1993), p. 34.

2. *Ibid.*, p. 41.

3. Bank for International Settlements, *Recent Innovations in International Banking* (April 1986), p. 181.



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