

Working Paper 9017

AN INSIDER'S VIEW OF THE POLITICAL ECONOMY
OF THE TOO BIG TO FAIL DOCTRINE

by Walker F. Todd and James B. Thomson

Walker F. Todd is assistant general counsel and research officer at the Federal Reserve Bank of Cleveland and an adjunct instructor in the Cleveland-Marshall College of Law, Cleveland State University. James B. Thomson is an assistant vice president and economist at the Federal Reserve Bank of Cleveland and an adjunct instructor in the Department of Economics, Cleveland State University.

We express our gratitude to Laura Davis for seemingly endless retyping and copying of the manuscript and to Stephen V. O. Clarke, Donald Hester, Tess Ferg, and an unnamed referee for helpful suggestions on the manuscript in various stages.

Working papers of the Federal Reserve Bank of Cleveland are preliminary materials circulated to stimulate discussion and critical comment. The views stated herein are those of the authors and not necessarily those of the Federal Reserve Bank of Cleveland or the Board of Governors of the Federal Reserve System.

December 1990

CONTENTS

	<u>Page</u>
Abstract	ii
Prefatory Quotations	1
Origins of the Modern Too Big to Fail Doctrine	2
Why the Too Big to Fail Doctrine Matters	6
Systemic Risk and Contagious Bank Runs	12
Correspondent Banking and Interbank Exposure	14
Interbank Exposure and Federal Deposit Insurance	16
The Historical Relationship Between Rising Interbank Exposure and Financial Distress	19
A Measure of Interbank Exposure	35
Conclusions and Policy Recommendations	41
Footnotes	47
Appendix A	52
References	55
Tables	
Figures	

ABSTRACT

Understanding interbank exposure is the key to understanding the too big to fail doctrine. In this paper, we present arguments supporting three principal hypotheses: high levels of interbank exposure reduce the safety and soundness of the banking system; interbank exposure affects the ability of the Federal Deposit Insurance Corporation (FDIC) and bank regulators to use market discipline as a constraint on banks' risk-taking; and a rising level of interbank exposure is indicative of reduced stability of the financial system. In addition, we provide evidence that interbank exposure does not, at this time, appear to be a generalized problem for U.S. banks; however, some banks in all categories of asset size still have comparatively high ratios of interbank exposure to capital, despite a general decline in these ratios since the Continental Illinois failure (1984).

The FDIC alone is not to be credited or blamed for the evolution of the too big to fail doctrine out of the FDIC's "essentiality" doctrine: that is, "a bank that is essential could not be allowed to fail no matter what the cost." The Federal Reserve, the Comptroller of the Currency, large U.S. and foreign banks, and politicians also deserve a share of the credit or blame. During Congressional testimony on the Continental failure, former Comptroller of the Currency Todd Conover "hinted that the eleven largest banks in the nation were immune from failure." One of the principal justifications offered by FDIC officials for the Continental bailout was the alleged interbank exposure of 2,300 other banks that would have lost more than the insured amount of their deposits if Continental had been closed without a full

guarantee of repayment to uninsured claimants. That, in brief, is how the federal bank supervisory authorities came to find themselves embroiled in the "disparate treatment/too big to fail" controversy that still is unresolved.

Interbank exposure may arise from normal, efficiency-promoting correspondent banking activities that are not inherently dangerous but that may become so if not closely monitored. The primary focus of this paper is overnight or term interbank exposure that is directly and deliberately undertaken, including sales of federal funds, loans to depository institutions, purchases of securities under agreements to resell (reverse repos), and purchases of acceptances of other banks. Various forms of indirect interbank exposure certainly are worth studying, but information regarding such exposure is difficult to capture from call report data; thus, indirect interbank exposure is mentioned only occasionally in this paper. However, all forms of interbank exposure lie at the heart of the too big to fail doctrine. Interbank exposure acts as a constraint on the FDIC's ability to force its fellow regulators to close insolvent banks, which provides disconcerting guideposts as to probable future experience with cross-guarantee proposals that would be analogous to private deposit insurance schemes. Market-oriented corrective measures, such as market-value accounting for banks, strictly enforced minimum capital standards, per customer lending limits applied to banks as well as nonbanks, and netting out interbank holdings of capital instruments in calculating capital adequacy would go a long way toward reducing and controlling purported systemic failure risk arising from interbank exposure.

Prefatory Quotations

We are living amid the vestiges of old controversies, and we speak their language, though we are dealing with different thoughts and different facts.

-- Walter Bagehot,
Lombard Street, p. 161 (1873).

History is a good teacher but there are inattentive pupils.

-- George Stigler, quoted in
Harold Lever and Christopher
Huhne, Debt and Danger, p. 31
(1986).

[Former FDIC Chairman William M. Isaac] has doubts about the [Continental] rescue. "I wonder if we might not be better off today if we had decided to let Continental fail, because many of the large banks that I was concerned might fail have failed anyway," he said. "And they probably are costing the FDIC more money by being allowed to continue several more years than they would have had they failed in 1984."

-- William Isaac, quoted in Robert
Trigaux, "Isaac Reassesses
Continental Bailout," American
Banker, p. 6 (July 31, 1989).

I. Origins of the Modern Too Big to Fail Doctrine

Former FDIC Director Irvine Sprague describes the origins of the too big to fail doctrine in banking as follows. The text refers to a May 17, 1984, FDIC press release regarding Continental Illinois National Bank and Trust Company of Chicago ("Continental"):

The third paragraph caused more hassling among the regulators themselves and with the banks than all the rest of the press release put together. And well it should have. It was the essence of the rescue. This paragraph granted 100 percent insurance to all depositors, including the uninsured, and all general creditors. It read as follows:

In view of all the circumstances surrounding Continental Illinois Bank, the FDIC provides assurance that, in any arrangements that may be necessary to achieve a permanent solution, all depositors and other general creditors of the bank will be fully protected and service to the bank's customers will not be interrupted.

Its purpose, quite bluntly, was to stop the run and prevent recurrence. We had to have stability. The guarantee was extraordinary but not unprecedented. We had given similar public assurances to buy time for a permanent solution for Greenwich Savings Bank in New York City in 1981 and for the United Southern Bank in Nashville, Tennessee, in 1983. These two were also granted 100 percent insurance by press releases. Only the Continental guarantee, however, touched off a nationwide debate that to this day continues to raise questions and generate controversy. (Sprague [1986], p. 162).

Sprague added that, under former 12 U.S.C. Section 1823(c)(2), the FDIC was authorized to provide open-bank assistance to any failing insured bank if its continued operations were deemed "essential to provide adequate banking service in its community." More liberal authority for the FDIC to provide open-bank assistance was not enacted until the Competitive Equality Banking Act of 1987.

The first use of the FDIC's "essentiality" doctrine occurred in 1971, to bail out Unity Bank, an \$11.4 million, minority-owned bank in Boston (Sprague [1986], pp. 36-44). The size of banks rescued under the essentiality doctrine increased through the \$8 billion First Pennsylvania case in 1980 (Sprague [1986], pp. 86-92) and eventually the \$41 billion Continental case. Sprague notes that the FDIC's May 1984 assistance package for Continental was based on

the essentiality test, "so presumably a bank that is essential could not be allowed to fail no matter what the cost." (Sprague [1986], p. 162). Later, during Congressional testimony on the Continental failure, former Comptroller of the Currency Todd Conover "hinted that the eleven largest banks in the nation were immune from failure." (Sprague [1986], p. 259). That, in brief, is how the federal bank supervisory authorities came to find themselves embroiled in the "disparate treatment/too big to fail" controversy that still is unresolved.

Interestingly, this modern evolution of the FDIC's essentiality doctrine created a situation in which the FDIC's statutory mandate was squarely contradicted:

The pendulum has swung once again toward 100 percent protection of depositors and creditors. Despite the fact that Congress made it clear in the 1950 Act that the FDIC was not created to insure all deposits in all banks, in the years since Congress has gradually increased the insured amount to \$100,000. In addition, the regulators have devised solutions that protect even the uninsured in the preponderance of cases. (Sprague [1986], p. 32; see also, Caliguire and Thomson [1987] and Penning [1968]).

The FDIC alone is not to be credited or blamed for this evolution of the too big to fail doctrine. During the First Pennsylvania rescue (1980), Sprague reports that "there was strong pressure from the beginning not to let the bank fail ... [from] the other large banks, ... the comptroller, ... [and]

frequently from the Fed." (Sprague [1986], p. 88). The following passage is particularly telling in regard to how the "domino theory of banking" (precursor of too big to fail) first appeared in policy-making circles:

I recall at one session [in 1980, regarding First Pennsylvania], Fred Schultz, the Fed deputy chairman, argued in an ever rising voice, that there were no alternatives -- we had to save the bank. He said, "Quit wasting time talking about anything else!" Paul Homan of the Comptroller's office was equally intense as he argued for any solution but a failure. The domino theory dominated the discussion -- if First Pennsylvania went down, its business connections with other banks would entangle them also and touch off a crisis in confidence that would snowball into other bank failures here and abroad. It would culminate in an international financial crisis. The [domino] theory had never been tested. (Sprague [1986], pp. 88-89).

Foreign observers (British, in this case) clearly assumed, by the mid-1980s, in the aftermath of the Continental rescue, "that the Federal Reserve will not allow one of the lynchpin banks to fail." (Lever and Huhne [1986], p. 22). Thus, the Federal Reserve's ever-looser lender of last resort policies since the Franklin National Bank failure (1974) reasonably might be viewed as one of the principal factors in creating the too big to fail doctrine (Todd [1988a]; Schwartz [1987]; Spero [1980]).

Some of those originally involved in the creation of this doctrine have come to repent it, but too late to do the taxpayer much good. Politics, not pure economics, is now clearly the driving factor in preserving the doctrine, which is generally acknowledged to stand in the way of both the expansion of banks' powers and the reduction of taxpayers' costs. Former FDIC Chairman William Isaac has been quoted as saying that the regulators and politicians probably made a costly mistake in trying to save Continental, but Isaac also admits that, if he were Chairman now, he would be trying to save everybody for political reasons, regardless of cost, just like current FDIC Chairman William Seidman (Trigaux [1989]).

II. Why the Too Big to Fail Doctrine Matters

Imprecisely defined terms and policy conceptions that are not rooted in practical reality often determine official decisions regarding banking, regardless of the clarity (or lack thereof) of the terms normally used in economists' discussions of banking theory. Among our favorite examples of such vague or unnatural terms and conceptions are "lender of last resort," "solvency," "liquidity," and the like, at least as those terms currently are used in the policy debate (Thomson [1990]; Todd [1988a]). Clarity of terms and precision of historical conceptions do matter, as does the legitimacy of the line of descent of the policy in question. Otherwise, policy discussions regarding banking tend to deteriorate into the situation described by Joseph Schumpeter (1950, p. 340), as follows:

[I]ndividuals, as well as groups often do not know where, if anywhere, they belong and, sometimes from ignorance, at other times from a correct perception of advantage, they mix up contradictory principles into mongrel creeds of their own. All this confuses observers and accounts for the wide variety of current interpretations.

* * *

Reversing what some might consider normal procedure, we explain why the policy discussion of the too big to fail doctrine matters at both macroeconomic and microeconomic levels, and then we define a few key terms.

The conception of interbank exposure encountered most frequently in policy discussions is the reduction of risk in Federal Reserve-operated and some private-sector payments networks. This risk arises from intraday or daylight overdrafts due to the posting of debit and credit entries for transfers of funds and securities over those networks. By far the greater part of such transfers arises from government securities and foreign exchange trading activities. The volumes of these transfers in recent years, \$183 trillion over Fedwire (1989) and \$32 trillion over CHIPS (1988), have dwarfed the relevant measures of real economic activity (\$5.2 trillion of U.S. gross national product [1989] and \$2.7 trillion of gross world trade [1988] for all countries). A variety of risk-reduction measures have been proposed and implemented in recent years, including institution-specific net debit and net credit limitations, or caps per sender, and the planned imposition of a 25

basis points per annum fee for intraday overdrafts on Fedwire in excess of 10 percent of each sending institution's risk-adjusted capital. Because most payments network transfers are initiated by or paid to money center institutions that are clearing or settling securities or foreign exchange trades (Federal Reserve Bank of New York [1987-88]), the 15 or so largest U.S. banks probably will account for nearly 90 percent of the planned intraday overdraft fees. However, trading (and the magnitude of intraday overdrafts) has become large enough to create Federal Reserve concern only since the 1970s. The failure of Bankhaus I.G. Herstatt during the U.S. banking day in 1974 also increased regulatory concern regarding intraday interbank exposure (Spero [1980], pp. 108-114). Since intraday interbank exposure became a significant Federal Reserve concern during the early 1980s, it has become one of the driving factors behind the too big to fail doctrine and has begun to be addressed by specific policy initiatives (Stevens [1989]; Aspinwall and Scott [1989]; Spero [1980], pp. 108-114).

Interbank exposure also may arise from normal, efficiency-promoting correspondent banking activities that are not inherently dangerous but that may become so if not closely monitored. Clearing or other correspondent balances maintained by smaller banks at large regional or money center banks, or even by larger banks that are not members of the same clearinghouse, may give rise to unexpected credit risk exposure against the respondents. Thus, checks drawn on a large regional bank, accepted for deposit at a small bank in the same region, might constitute a significant risk with respect to the capital of the small bank if the large respondent failed and were closed while in possession of the small bank's checks, before the failed respondent made final settlement for those checks. Such concerns were said to have been a factor in the FDIC's and Federal Reserve's decision to rescue or bail out

Continental in 1984. Then, as during Continental's prior rescue by the old Reconstruction Finance Corporation in 1933, Continental was "a great correspondent bank -- a banker's bank -- in which a large proportion of the country banks ... kept accounts." (Jones [1951], pp. 47-49; Sprague [1986], pp. 250-251). Of course, correspondent banking risk runs downhill also: Cincinnati's commercial banks refused to accept for deposit checks drawn on closed privately insured thrift institutions during the March 1985 crisis in Ohio because recovery of the full value of those checks was uncertain until the thrift crisis actually began to be resolved, about one week after the systemwide closing began. (See Wolfson [1986], pp. 117-121; Kane [1988]; Federal Reserve Bank of Cleveland Annual Report, 1985.)

Neither intraday interbank exposure nor correspondent banking risk is the principal focus of this paper. The primary focus is, instead, overnight or term interbank exposure that is directly and deliberately undertaken, including sales of federal funds, loans to depository institutions, purchases of securities under agreements to resell (reverse repos), and purchases of acceptances of other banks. In addition, various forms of indirect interbank exposure certainly are worth studying, but information regarding such exposure is difficult to capture from call report data; thus, indirect interbank exposure is mentioned only occasionally in this paper. Indirect interbank exposure includes loan participations purchased (often including shared national credits), credits extended against third-party guarantees (including bank-issued guarantees or letters of credit), and risk against bank counterparties on foreign exchange contracts, foreign exchange swap agreements, interest-rate swaps, forward-rate agreements, etc. Interbank exposure also can arise with respect to intraday

overdrafts or correspondent banking activities for the accounts of foreign banks, both in the United States and abroad, because of cross-border transfer risk.

* * *

All these forms of interbank exposure lie at the heart of the too big to fail doctrine. Fears of retail depositors' "cash-over-the-counter" runs on banks are not really the driving factor in the regulators' decisions to protect the largest banks from failure. That is because it takes a very long time to count and disburse large amounts of cash. In Ohio in March 1985, it was unusual for any one banking office to be able to pay out more than \$1 million to \$2 million of cash to retail depositors in a single day. At that rate, it would take up to 43,000 banking-office days to pay off the \$43 billion of domestic deposits of Citibank (1989) in cash to retail customers. The real danger that concerns federal regulators is institutional or electronic runs on banks. When funds leave a bank at the rate of from \$100,000 to \$5 million per electronic transfer, it then becomes possible to empty even a large bank like Citibank (which had about \$115 billion of total deposits at year-end 1989) in only a day or two.

Only banks normally have direct, on-line access to electronic transfers of funds over Fedwire. Banks that are not members of the same clearinghouse have a further incentive to remove funds electronically at the first sign of trouble because Fedwire transfers are final when received, while clearinghouse settlements can be reversed. Thus, in the last 15 years or so, federal regulators rationally have worried more about electronic runs, almost always by other large banks (usually foreign banks, at that), that could empty big

banks in a single day. Regulators rationally worry less about long lines of nervous retail claimants waiting for their money, as in Ohio and Maryland in 1985, but long lines of customers attempting withdrawals (visible runs) still worry bankers and politicians enough to cause them to pester regulators, nevertheless.

Because Continental was the turning point at which interbank exposure and the too big to fail doctrine were linked so as to become one and the same in the minds of bank regulators, it is appropriate to close this section of the paper with the following passage, again from Sprague's Bailout (1986, p. 248):

Martin Mayer ... argued in a Financier article in late 1985 that the FDI Act "almost certainly does not permit what the FDIC did" at Continental. He simply did not accept the attorney general's opinion that the transaction was legally structured. Mayer observed correctly that the real difficulty was that foreign holders of debt securities and commercial paper in the holding company would have yanked their \$17 billion in Eurodeposits out of the bank if the securities holdings were not fully protected in the bailout. If the holding company was not saved, the bank could not be rescued.

Thus, discussions of interbank exposure rationally also must include discussions of interbank holdings of bank holding company commercial paper, deposit notes, and the like.

III. Systemic Risk and Contagious Bank Runs

The risk of contagious bank runs often is discussed as a public policy concern and as a justification for the too big to fail doctrine. Most discussions apparently define this risk as the sensitivity of one bank to the failure of another bank. Although that sensitivity may be indirect (*i.e.*, nervous depositors, noting the failure of one bank, run on another bank, even though the second bank still is solvent), the principal concern of this paper is direct sensitivity (*i.e.*, one bank, fearing the loss of its funds, removes them from another bank). The failure or suspension of one bank, or of a limited number of banks, arguably was an event that could have caused or contributed to multiple failures or suspensions in the banking system in the pre-1933 era. Significant contagion effects of that type would have public policy implications today both for the way banks are regulated and for the solvency of federal deposit insurance funds. Some federal regulators and academics also call this phenomenon "systemic risk" (Corrigan [1990]).

We believe that, for reasons explained below, the type of indirect and irrational systemic risk usually discussed by bank regulators today to justify increased regulatory discretion in applying the too big to fail doctrine never actually existed in the United States, except possibly during the Great Contraction of 1929-1933. Instead, the type of contagion or systemic risk that actually has existed and still exists is both direct and rational. That

is, banks providing funds to a bank in trouble rationally might conclude that they were unlikely to recover those monies and therefore might attempt to remove great quantities of those funds electronically (Thomson [1990]; Kaufman [1988]). In this paper, we use the term "interbank exposure" to refer to such direct, rational contagion or systemic risk,^{1/} recognizing all the while that banks can fail for a variety of reasons that do not necessarily have anything to do with interbank exposure. Rather, our point here is that it is interbank exposure that has become the principal rationale for the too big to fail doctrine, while we believe that interbank exposure could and should be reduced or controlled in such a way that it no longer could be construed as a sufficient justification for the doctrine. Market-oriented corrective measures, such as market-value accounting for banks, strictly enforced minimum capital standards, per customer lending limits applied to banks as well as nonbanks, and netting out interbank holdings of capital instruments in calculating capital adequacy would go a long way toward reducing and controlling alleged systemic failure risk arising from interbank exposure. If the too big to fail doctrine is to continue to be the guiding light of regulators, then let it find something besides interbank exposure as its main reason for being.

Interbank exposure ordinarily is thought to rise to the level of contagion risk because the failure of one bank may be translated into losses at other banks whose asset portfolios include claims against the failing institution. These losses could be large enough to exhaust the claimant bank's capital, causing it to fail. It is not difficult to imagine a situation in which the failure of one medium-to-large bank could result in a chain of bank failures. The FDIC used this very argument, after all, to justify the Continental bailout in 1984.

* * *

The remainder of this paper is organized as follows. Section IV presents a brief explanation as to why interbank claims exist in our banking system. We argue that, up to a given level of exposure, the efficiencies gained by correspondent banking relationships usually outweigh the associated risks. If properly managed, the interbank exposures that arise out of correspondent banking relationships do not represent a serious source of contagion in the banking system. In section V, we look at the implications of interbank exposure for the continued solvency of the FDIC's fund as a constraint on the FDIC's ability to close insolvent banks and as a guide to probable future experience with cross-guarantee provisions that would be analogous to private deposit insurance schemes. Section VI presents the historical relationship between rising interbank exposure and financial crises. Section VII gives a rough picture of the direction of aggregate interbank exposure for U.S. banks since the failure of Continental Illinois. We present our conclusions and policy suggestions in section VIII.

IV. Correspondent Banking and Interbank Exposure

Interbank exposure is defined quantitatively, for the purposes of this paper, as the assets one bank has at risk with respect to another bank. In this study, the interbank-exposure items include cash items in the process of collection (CIPC), balances due from depository institutions (BDDI), loans to depository institutions (LDI), acceptances of other banks (AOB), and federal funds sold and securities purchased with agreements to resell (FFS). We selected these items for our study because they are available from call report data. Recent innovations in banking may have created new categories of

interbank exposure that should be included in future studies, but those innovations, such as interest-rate and currency swaps, are either poorly measured by publicly available data (e.g., the data exist only as measures of undifferentiated aggregate exposure to both banks and nonbanks) or are not measured at all. Tables following the paper present some of the relevant data for correspondent balances and off-balance-sheet interbank exposures.

The first two interbank-exposure items listed, CIPC and BDDI, which comprise variable cash and balances due, arise out of correspondent banking relationships. Indeed, it is likely that correspondent banking is responsible for the lion's share of the interbank exposure accounted for by CIPC and BDDI and at least some of the interbank exposure represented by LDI, AOB, and FFS.

Correspondent banking evolved in the earliest stages of the U.S. and U.K. banking systems and has the effect of arbitraging away much of the inefficiency of a unit banking system.^{2/} Correspondent banking is less important in large, nationwide branching systems like that of post-1920s Canada. (See Kryzanowski and Roberts [1989].) In a correspondent banking relationship there are two types of institutions: correspondent banks (usually small banks) and respondent banks (usually large banks). The relationship allows a correspondent bank to obtain services, such as check clearing, securities safekeeping, and computer services, from its respondent bank at a lower cost than would be incurred if it performed those functions itself. Federal Reserve Banks compete with large regional and money center banks for such correspondent banking business. In addition, a respondent bank can provide its correspondent bank with a source of increased portfolio diversification through loan participations. Correspondents often place

surplus funds with respondents (or use respondents as intermediaries for the onward placement of surplus funds) via sales of federal funds and reverse repos. In return for the services provided by the respondent bank, the correspondent normally keeps noninterest-bearing balances at its respondent bank as a form of implicit payment for the services that it receives. Correspondent banks also keep cash balances at respondent banks that provide their check-clearing services as a reserve account against (to) which the respondent bank can debit (credit) checks drawn on (payable to) the correspondent bank.

To the extent that interbank exposure arises from normal correspondent relationships, most economists assume that the benefits associated with the increased efficiency of the banking system outweigh the risks associated with interbank exposure. Indeed, if properly managed, much of the interbank-exposure risk faced by a correspondent bank can be diversified away by the establishment of multiple correspondent banking relationships, although in actual practice such diversification of risk might prove insufficient if more than one of the respondents were members of the same clearinghouse. Diversification can limit the exposure of a correspondent bank to any one respondent bank and can reduce the replacement costs of establishing new correspondent banking relationships if one of the respondent banks fails.

V. Interbank Exposure and Federal Deposit Insurance

Interbank exposure can increase the risk exposure of the FDIC in at least two ways. First, it reduces the independence of bank failures. That is, interbank exposure increases the probability that the failure of a bank A will

be accompanied by the failure of banks B, C, and D. Second, it reduces the ability of the FDIC to close and dispose of insolvent banks in a manner that does not protect shareholders and uninsured creditors. Most interbank claimants have greater amounts at risk than those covered by the nominal \$100,000 of federal deposit insurance. As in the Continental case (1984), perceived high levels of interbank exposure can create political and regulatory pressures that would force the FDIC to adopt a policy of full or partial forbearance toward a failing bank's uninsured creditors and/or stockholders, thereby removing depositors' discipline as a significant component of market discipline on the bank's behavior (Thomson [1990]).

If bank failures were truly independent events, the risk exposure of the FDIC's insurance fund from any single bank failure would be the expected value of losses should the bank fail, multiplied by the probability that the bank would fail. That is, the FDIC's risk exposure to the bank would be a function of the riskiness of the bank. However, if contagion or systemic risk effects (such as interbank exposure) caused bank failure to be a nonindependent event, then the risk exposure of the FDIC's insurance fund with respect to any single bank would be a function of both the riskiness of the bank's assets and the degree of interbank sensitivity within the banking system. In such a scenario, the cost to the FDIC of bank A's failure would have to include any losses that it would incur from banks that went under as a result of bank A's failure.^{3/} It is clear that interbank exposure increases the risk to the FDIC from a single bank failure. Because contagion effects arising from direct interbank exposure are one form of risk that the FDIC cannot diversify away in its own portfolio (it necessarily is exposed to risks from the failure of any insured bank), interbank exposure may increase the total risk exposure of the

FDIC to the banking industry by creating a situation in which the troubles of one bank necessarily and directly are transmitted to other banks.^{4/}

The second undesirable consequence of direct interbank exposure is its effect on the FDIC's capacity to dispose of failed institutions without extending forbearances to uninsured creditors and stockholders. Kane (1989) presents a set of four constraints that often prevent the FDIC from closing an insolvent bank: information constraints, staff constraints, the implicit and explicit reserves in the FDIC's insurance fund, and political and legal constraints. It is clear that an increase in direct interbank exposure would increase the severity of each of these constraints. For example, with high levels of direct interbank exposure, the information the FDIC would need to close an insolvent institution would have to include the condition of the institution and the impact of its failure on other banks.

As the passages from Sprague (1986) in the first section of this paper indicate, Continental (1984) was and probably still is the leading example of how interbank exposure affected the way a failing bank was handled by the bank regulators. In testimony before the House Banking Committee's Subcommittee on Financial Institutions, Supervision, Regulation, and Insurance, then FDIC Chairman William Isaac stated that one factor that prompted the bailout was the FDIC's concern over the impact Continental's failure would have on small banks with interbank exposure to it. Regarding this concern, Isaac states that:

Hundreds of small banks would have been particularly hard hit. Almost 2,300 small banks had nearly \$6 billion at risk in

Continental; 66 of them had more than their capital on the line and another 113 had between 50 and 100 percent.^{5/}

But was Isaac's statement correct? Later analysis showed that it was unlikely that more than a dozen or so banks (all of them small) would have failed as a result of allowing Continental to fail. In a report to the House Banking, Finance and Urban Affairs Subcommittee on Financial Institutions, Supervision, Regulation, and Insurance, Congressional staff found that, if Continental had been allowed to fail without government assistance, and even if Continental's losses totaled 60 percent of assets (only a 40 percent payment to uninsured claimants), then only 27 banks would have failed, and only 56 banks would have experienced losses between 50 and 100 percent of their capital. Using a more realistic (but still higher than apparently is expected) loss rate of 30 percent of Continental's assets, the Congressional staff found that only six banks would have failed, and only 22 would have experienced losses between 50 and 100 percent of their capital.^{6/} Nevertheless, it is clear from the passages cited from Sprague (as well as from our personal memories) that the regulators' perception of interbank-exposure risk reduced their capacity to dispose of Continental in a manner that would have protected only the 10 percent of all depositors who were insured.

VI. The Historical Relationship Between Rising Interbank Exposure and Financial Distress

We are unaware of any study that indicates that rising interbank exposure

causes financial distress, although Adam Smith describes some situations in which this might be so. However, the historical evidence suggests that interbank exposure is a leading indicator of financial distress, a sign of overlending perhaps (what Adam Smith and Walter Bagehot called "overtrading"). Not all financial panics necessarily have been preceded by rising levels of direct interbank exposure, but several notable instances of increased interbank exposure were followed by financial panics. The liveliest sources to read on this point include studies by Adam Smith (1976 ed.), Walter Bagehot (1873), Charles P. Kindleberger (1978), and, of all people, Herbert Hoover (1952).

Kindleberger, Stephen V.O. Clarke (1983), and Joan Edelman Spero (1980), among other recent writers, consistently have identified either the credit (asset) or funding (liability) risk of direct, international, interbank exposure (or both) as concerns for monetary and bank supervisory authorities. Clarke's study of the international interbank market (1983, pp. 43-48) was prescient regarding both the efficiencies and myopic tendencies of the interbank funds market. He proposed the creation of a risk-related private insurance pool, funded by banks, that would replace the initial involvement of central banks as lenders of last resort in periods of interbank payment difficulties. Active involvement of the central banks would be reserved for truly disastrous, not merely difficult or inconvenient, periods of distress in the interbank market. Adam Smith, Hoover, Kindleberger, Spero, and Clarke all described direct interbank exposure as a device for propagation or transmission of financial distress from one bank to another or from one financial center to another.

Guttentag and Herring (1986) noted the myopic tendencies of international lenders regarding the sustainability of debt service capacities of debtors as a possible explanation of frequent overlending and subsequent economic defaults in contexts analogous to the developing-country debt problems of the 1980s. Lever and Huhne (1986, pp. 31-55), Kaletsky (1985), and Todd (1989), among others, noted this same myopic and amnesiac quality regarding international lending, with particular attention to direct interbank exposure during the 1920s in Todd (1989). Chernow (1990, pp. 636-652) describes in detail the interesting cases of Morgan Guaranty Trust Company, Bankers Trust Company, and Citibank, all of New York, in the rolling over and rescheduling of billions of dollars of credits for Brazil (including interbank or "Project IV" credits) after 1982. Those rollovers and reschedulings were intended to keep alive the fictions that U.S. banks could ignore lessons of the past, in both Europe and Latin America (which the New York banks particularly should have remembered), and that commercial banks could make "good loans" to developing countries with unstable legal and political environments and clouded future repayment prospects (Chernow [1990], pp. 636-639; Todd [1989]). Wolfson (1986, pp. 102-105) analyzes the emergency measures taken regarding Mexican credits in August 1982; a smaller proportion of those credits were interbank claims than in the case of Brazil.

In the pre-World War II era, one of the riskier forms of direct interbank exposure identified in the historical literature was accommodation paper. Accommodation bills of exchange are refinancing drafts drawn by one bank upon another to enable the first bank to share the credit risk of its customer (account party) with another bank (the drawee or accepting bank). In the more arcane forms of accommodation or refinancing drafts, the drawing bank's

underlying customer (account party) may also be a bank, so that long chains of accommodation or refinancing paper can be established. It was not at all unusual to find proposals in the interbank market in the 1980s regarding accommodation bills with at least three banks linked in a chain of legal accountability between the bank with the ultimate liability and asset exposures in the United States (the U.S. accepting bank) and the original underlying nonbank customer (if any) in some foreign country (Todd [1988b]). Fortunately, such proposals still are the exceptions, not the rule, in the U.S. bills of exchange (bankers' acceptances) market.

While most international, interbank claims were concentrated in London and offshore banking havens during the 1970s and early 1980s (Clarke [1983]), U.S. banking offices increased their direct, international interbank exposures for both assets and liabilities in recent years. However, mid-year 1989 exposure levels for the 34 largest U.S. holders of correspondent balances (demand deposits), for example, were \$9.3 billion, down about 12 percent from mid-year 1988 levels (American Banker [1990]). International interbank claims of all types on U.S. banks by unaffiliated foreign banks rose from \$120 billion at year-end 1988 to \$135 billion at year-end 1989 (Federal Reserve Bulletin, May 1990, table 3.17). From the perspective of borrowers of interbank credit, the amounts involved can become quite large: Interbank claims of all types and of all countries on Brazil just before the February 1987 one-year moratorium on Brazil's external debt were reported as approximately \$35 billion, then about one-third of Brazil's total foreign debt and about 12 percent of its gross domestic product (Batista [1988], pp. 39, 191).

* * *

Adam Smith (1976 ed., Book II, chapter 2, pp. 327-337) describes the operations of chains of accommodation paper in the affairs of Scottish banks, particularly the Bank of Ayr, which failed in 1772 after two years of such practices. Essentially, to meet demands upon them that could not be met from existing resources, Scottish banks drew accommodation drafts on London bankers. When the Scottish banks no longer could pay or roll over maturing accommodation drafts, the scheme became unraveled. Smith says that "the operations of this bank [Ayr] increased the real distress it meant to relieve" and that, even had it succeeded, the operation "would only have transferred a great part of [the capital of the country] from prudent and profitable, to imprudent and unprofitable undertakings."

Kindleberger (1978, pp. 53-63) describes the evolution of accommodation paper (or finance bills) in the eighteenth century as follows, and his account is worth restatement here in extenso for our purposes:

Bills of exchange were not necessarily drawn each time a consignment of goods took place, covering the exact amount of the transaction. In 1763, in Sweden, Carlos and Claes Grill bills on Lindegren in London could not be identified with particular shipments, which were often made in rapid succession, but were drawn when the firm needed money, generally for remittances to creditors. This would seem to be the evolution of accommodation paper, in which the credit of a house or individual is gradually separated from that of particular transactions. In the end, the accommodation bill was nothing more than an IOU or promissory note. Real bills partisans, like H. Parker Willis ... were firmly opposed to accommodation paper and regarded commercial bills based on trade as [properly] self-liquidating....

The problem arises where the ratio of the debt represented by the bill to the debtor's wealth gets out of hand, as may happen in periods of euphoria. Drawing of bills in chains is evidently infectious. Described by Adam Smith as a normal business practice [in The Wealth of Nations, Book II, chapter 2, pp. 327-337] it can easily be overdone. A draws on B, B on C, C on D, and so on; all increase the amount of credit available for use. The vice of the accommodation or finance bill, according to [R. G.] Hawtrey, [The Art of Central Banking (1932)], is its use "for construction of fixed capital when the necessary supply of bonafide long-run savings cannot be obtained from the investment market." [Thus, the equivalent practice today would be the use of short-term interbank borrowings to support long-term lending practices.] He claims the system was particularly abused in the London crisis of 1866 [the collapse of Overend Gurney] and the New York crisis of 1907. We have already noted that the spectacular failure of the de Neufvilles in 1763, which produced panic in Hamburg, Berlin, and (to a lesser extent) London as well as Amsterdam, was the result of the unraveling of a particularly impressive chain of discounts. If one house fails, the chain collapses and may bring down good names, those with a reasonable ratio of debt to capital, as well as bad. With accommodation bills, traders with limited capital of their own are able to acquire the use, at least temporarily, of large volumes of borrowed funds, a use they may try to stretch into longer-term.... In 1857, John Ball, a London accountant, reported knowing firms with a capital of under 10,000 pounds and obligations of 900,000 pounds, and claimed it was a fair illustration [of accommodation financing used to support longer-term lending]....

When they were abused, finance or accommodation bills gave rise to excessive credit expansion. At all stages, fictitious names were introduced into the chain from time to time, to improve the appearance of creditworthiness. From time to time, also, such bills were written for odd amounts, to suggest an underlying commercial transaction. And when this was done, claims were sometimes made ... that the banks abroad knew it was finance paper disguised as commercial bills [and thus should not be heard to complain when the practice collapsed].

Hawtrey (1932, p. 129) made the following telling point about accommodation or finance bills: "The real point is that the accommodation bill is a sign of distress. It is not drawn to supply funds for the acquisition of an asset, but to make good a deficiency of cash due to disappointed expectations."

Reviewing the theory of accommodation financing in light of Smith's, Hawtrey's, and Kindleberger's accounts, we see that it may become a dangerous practice for banks in expansionary times to extend credit to other banks, believing themselves to have behaved in a safe and prudent manner because the extensions of credit are entirely short-term in nature. (See Clarke [1983].) A funding gap develops because the borrowing banks, in turn, finance longer-term loans and investments with the proceeds of their drawings. If large credits extended by the ultimately borrowing banks go bad, as happened with the loans participated out to other banks by Penn Square in 1982, the participating banks, such as Seafirst and Continental in that case, may be dragged into severe capital impairment or even insolvency by the collapse of interbank credits (indirect, in that case) that they have extended.^{7/} Accordingly, it would be nothing more than good common sense for bankers and bank regulators to be aware of the nature and extent of interbank commitments, both direct and indirect, as well as the extent to which banks rely on interbank borrowings as significant sources of funds.

We have used Smith's and Kindleberger's examples to illustrate the perils of the variety of interbank exposure that comprises accommodation paper. However, it should be obvious that the same perils may exist for any form of interbank extensions of credit.

The most incisive recent explanation of the potential pitfalls for U.S. banks in the international interbank market is in Clarke (1983). However, for the ultimate historical illustration of what could happen to the U.S. banking system if it became too exposed to foreign interbank credits, it is necessary to turn to the Memoirs of Herbert Hoover. Hoover's account of the international payments crisis during the summer of 1931 shows the important role played by accommodation paper and, by extension, by direct interbank credit exposure in putting the international financial dominoes so close together that they all had to topple after Creditanstalt of Vienna suspended foreign payments in the spring of 1931. Hoover's account of the crisis begins, in relevant part, as follows (Hoover [1952], III, p. 73):

With these bank closings in central Europe, I naturally wanted to know if American banks had any loans to or deposits in the banks of this crisis area. I first telephoned Henry Robinson, chairman of a large California bank [First National Bank of Los Angeles, an ancestral component of Security Pacific], who had had much experience in international banking. He told me that many of our banks had bought German trade bills and bank acceptances, both 60 and 90-day paper. The trade bills were supposed to be secured by bills of lading covering goods shipped, and to be payable on delivery of the goods. The bank acceptances were simply "kited" bills without any collateral. Robinson expressed great alarm.

We believe that what Hoover meant in that passage is that Robinson was expressing discomfort because U.S. banks had been extending direct interbank credit to German and other central European banks via accommodation paper without verifying independently the European banks' assumption that there really were underlying trade transactions to support the volume of refinancing

acceptances or finance bills that the banks of central Europe were drawing on U.K. and U.S. banks. As Hoover's account later shows, the volume of refinancing bills drawn greatly exceeded the actual volume of underlying trade transactions. The drawing banks, in the fashion described above by Kindleberger, resorted to accommodation paper whenever they needed funds, even though there were no trade transactions to support their drawings. While it would have been illegal under U.S. law for drawing banks to fail to disclose that their drafts were not actually connected to particular trade transactions, this practice would not necessarily have created a financial crisis if the central European banks had had the capacity gradually to reduce and ultimately to repay the refinancing bills they drew, or if there had been no precipitating factor causing extensive presentment for payment of finance bills drawn by central European banks instead of routine renewal. Regrettably, neither solution was viable because the volume of bills drawn so far exceeded the value of all central European export accounts receivable that it was inconceivable that the eventual, normal operations of international trade would have enabled the finance bills to be repaid. For example, German gross exports during all of 1931 were only \$1.9 billion, and the export surplus was only \$650 million (Schuker [1988], p. 45). The precipitating factor causing presentment for payment was that French banks, acting with the encouragement of the French government for domestic political reasons, began to redeem all their holdings of accommodation paper issued by German and Austrian banks to protest the formation of a German-Austrian customs union in the spring of 1931. Thus, with the central banking resources available at the time, there

was no way to avoid the crisis through the normal operations of the international interbank market. (See Clarke [1967], pp. 177-201; Clay [1957], pp. 373-398.)

Continuing his account of the 1931 crisis, Hoover writes as follows (1952, III, pp. 73-74):

I at once inquired of Federal Reserve officials what amounts of these bills [the kited or interbank accommodation acceptances] were held by American banks and business houses. After some inquiry, they informed me that our banks held only \$400 million or \$500 million of them and that they could be easily handled. [Notwithstanding the assurances of Federal Reserve officials, those amounts were real money in those days, approximately one-half of one percent of gross national product]. Worrying over the matter during that night, I was somehow not satisfied with this report, and in the morning I directed the Comptroller of the Currency to secure an accurate report on such American holdings direct from the banks. Twenty-four hours later I received the appalling news that the total American bank holdings probably exceeded \$1.7 billion; that certain banks having over one billion dollars of deposits held amounts of these bills, which, in case of loss, might affect their capital or surplus and create great public fears. [Without his naming them, we assume that President Hoover was referring to the New York Clearing House banks.] Here was one consequence of the Reserve Board maintaining artificially low interest rates and expanded credit in the U.S. from mid-1927 to mid-1929 at the urging of European bankers. Some of our bankers had been yielding to sheer greed for the six or seven percent interest offered by banks in the European panic area.

New York rates for commercial loans rose from 4.5 to 6 percent during those two years. Hoover means that, using the rationales usually offered for expanded direct interbank credits, bankers seeking a higher rate of return than is available through normal domestic extensions of credit to nonbank customers may resort to direct interbank extensions of credit, including foreign interbank credits. Hoover continues as follows (1952, III, p. 74):

Worse still, the Comptroller informed me that these European banks were already in default on many bank acceptances and were frantically endeavoring to secure renewals. He thought the acceptances comprised a major part of American bank holdings and informed me that some of the "trade bills" did not have the collateral documents attached.

One of the control devices for preventing naked accommodation acceptances or finance bills from entering the market is to require the attachment of bills of lading or detailed descriptions of the underlying trade transactions that support the drawing of the drafts. This has been traditional market practice for centuries,^{8/} but in periods of euphoria, not unlike the 1980s, sound market practice is abandoned, and it becomes not at all unusual to find U.S. banks accepting drafts drawn on them by foreign banks, ostensibly to support underlying trade transactions on the books of those foreign banks -- transactions that are not disclosed in full to the credit-extending U.S. banks. Similarly, interbank credit extensions in other forms (such as Eurodollar placements) might be obtained by borrowing banks ostensibly for the purpose of supporting their own extensions of trade credit, but it should be apparent that such borrowings could be used merely to cover funding shortfalls that otherwise would cause the closing of the borrowing insolvent foreign institutions. Hoover continues (1952, III, p. 74):

When the Comptroller's information began to come in, I sent for [Under] Secretary [of the Treasury Ogden] Mills who was also fearful, and requested him to ask his friends in the Bank of England by telephone what they knew about the volume of these bills. In a day or two they replied, in alarm, that there might be \$2 billion in the banks of Britain and the Dominions, together with Sweden, Norway, Switzerland, and Denmark. They also stated that there were quantities in Latin American and Asian banks. They said the German and other eastern European banks were frantically trying to renew the bank acceptances and were being refused.

It looked at this time as if Germany, Austria, Hungary and other eastern European countries had as much as \$5 billion of these short-term bills afloat. The Germans had also, over the years since the war, floated many long-term loans by their government, their municipalities, and their business houses. It looked as if the German total external debt alone, excluding reparations but including long-term debt, might possibly exceed \$5 billion. They not only had paid all their reparation installments to the allies out of this borrowed money, but had paid for reconstruction of German industry and their budget deficits. It was obvious that they and the others could not meet their short-term obligations, at least for the present.

For reference, \$5 billion in 1931 would have represented more than 5 percent of U.S. gross national product, would have been approximately one-and one-half times total federal budget outlays, and, in the case of Germany, would have represented at least seven years of that country's trade surpluses plus net capital inflows, excluding debt service on official borrowings, reparations payments, and capital flight. Hoover continues (1952, III, pp. 74-75):

Thus, the explosive mine which underlay the economic system of the world was now coming clearly into view. It was now evident why the European crisis had been so long delayed. They had kited bills to A in order pay B and their internal deficits.

I don't know that I have ever received a worse shock. The haunting prospect of wholesale bank failures and the necessity of saying not a word to the American people as to the cause and danger, lest I precipitate runs on our banks, left me little sleep.

The situation was no longer one of helping foreign countries to the indirect benefit of everybody. It was now a question of saving ourselves....

I cabled Secretaries [Henry] Stimson [State] and [Andrew] Mellon [Treasury] my plan, which was for a stand-still agreement among all banks everywhere holding German and central European short-term obligations. As my cable outlining the plan might

become public, it had to be carefully phrased so as not to fire further alarms as to the already tense central European situation.

Hoover's cable, as he put it, was far more optimistic about Germany's ability to pay than Hoover's private belief indicated. Hoover says that Secretaries Stimson and Mellon were more pessimistic than he. However, Stimson and Mellon also urged Hoover to agree to a French proposal for a \$500 million emergency loan to Germany from the western governments. Hoover replied as follows (1952, III, pp. 77-78):

I replied that this was a banker made crisis, and that the bankers must shoulder the burden of the solution, not our taxpayers; moreover, that the amount proposed would not be a drop in the bucket [compared to the amount actually needed to refund the entirety of the German external debt]. It was merely a partial relief of banks at government expense. Or even if a loan to Germany was provided by American, British, and French and other banks themselves, it [still] would be a wholly inadequate solution. I again informed them [Stimson and Mellon] by telephone in detail of the situation as to German and other central European short-term obligations in the U.S. and abroad. I also stated that such a loan would not even take care of the American situation alone [that is, maintaining current payment status on German obligations to U.S. banks].

At this point I instructed Mr. Mills to ask a friend in the Bank of England by telephone what their idea was of the French proposal. He quickly learned that the Bank of England did not approve of such a loan. Also, the British treasury officials had no faith that it would meet the crisis. The affair began to take the color of the usual attempt of European political officials to make us the first to refuse to do something and therefore the scapegoat for anything that happened. Indeed, one reason given to me by Messrs. Stimson and Mellon for American governmental support of a loan was fear of just that. I finally telephoned them emphatically that we would not participate in such a loan and that I was publishing the gist of the stand-still proposal to the world that very minute. They protested against the publication as undiplomatic. I issued it nevertheless.

The next day, the [International Monetary Conference, meeting in London], with the now public proposal in front of it, adopted the essence of my plan and delegated the Bank for International Settlements at Berne to carry it out. Its success depended on bankers of all countries holding the bills [the frozen interbank or refinancing bills drawn by the central European banks] and agreeing further that they would accept pari passu payments on unsecured bills when payment could be extracted by the Bank for International Settlements.

A group of our New York banks informed me that they could not agree to the stand-still plan and that the only solution was for our government to participate in a large international loan to Germany and other countries. My nerves were perhaps overstrained when I replied that, if they did not accept within 24 hours I would expose their banking conduct to the American people. They agreed.

Strange behavior for an unquestionably conservative Republican president from California toward the New York banks in light of more recent iterations! Hoover says further that, a year later, the Bank for International Settlements (BIS) made a retrospective study of the central European bills of exchange problems and estimated that the total problem was far larger even than Hoover had imagined it. The BIS study, as described by Hoover, said that the total amount of short-term international private indebtedness that existed at the beginning of 1931 was more than \$10 billion.

At that time the magnitude of indebtedness was not known ... central banks began to realize ... a danger and they endeavored ... to strengthen their reserves of foreign exchange. ... The menace ... did not appear as self-evident as it does today. ... It was ... almost certain to break the situation at some point. The liquidation in a single year [was] of more than six billion of short-term indebtedness ... of the balance ... still outstanding, a substantial amount has in fact become blocked. (Omissions in original).

Hoover concluded that "it is also obvious that I was right when I maintained that a half a billion of government money [for the proposed official loan to Germany] would have been only a drop in [this \$10 billion] bucket." (1952, III, p. 79).

Despite his understanding of the dangers of increased international interbank exposure to the American banking system, Hoover nevertheless approved two large private bank loans to support the parity of the pound sterling at or near \$4.86 in the summer of 1931. On August 1, Hoover approved a \$250 million loan, and on August 26, U.S. banks lent another \$400 million to the Bank of England (Hoover [1952], III, pp. 81-82). Hoover should have learned his lesson from the central European experience earlier that summer. Ultimately, the Bank of England suspended redemption of international payments of gold on September 21, 1931. Thus, on top of the central European interbank credit problem, Hoover's acquiescence in private bank lending to the Bank of England resulted in an additional \$650 million dollars of credit exposure (about 0.7 percent of U.S. gross national product) that had little or no value for enabling U.S. banks (principally the money center banks) to meet claims on them from domestic sources.

In the fall of 1931, following the suspension of gold payments by the Bank of England, Hoover gathered leaders of the banking and insurance industries in Washington, together with some cabinet officials and congressional leaders, and proposed the creation of the National Credit Association. The Association, which was similar in concept to the currently discussed cross-guarantee or private deposit insurance schemes, was to be funded with an initial capital contribution of \$500 million from U.S.

banks. The banks were to use that capital pool, together with potential borrowing authority for the Association of \$1 billion more, to make loans to support troubled financial institutions in the United States (Hoover [1952], III, pp. 84-88). However, as Hoover later notes (1952, III, pp. 107-111), the banking situation in this country became so fearful in the winter of 1931-32 that, after a few weeks of effort, the National Credit Association died, and bankers asked for direct federal help. In January 1932, Hoover requested creation of the new Reconstruction Finance Corporation to take over, under federal auspices, the "extended liquidity support" role of the National Credit Association. (See Jones [1951].) There still was no solvency or capital support lender at the federal level (Todd [1988a]).

* * *

The historical record shows us that direct interbank lending can perform a useful function in channeling funds more efficiently from areas of low loan demand to areas of high loan demand, when such a system is managed prudently. The record also shows that, in periods of monetary and credit expansion, it becomes increasingly difficult for bankers to restrain their enthusiasm for lending, including direct interbank lending, so as to remain within the limits of prudence and common sense. Upon occasion, overexposure to direct interbank credits arises, and then disaster follows inevitably, albeit with the delay necessary for the discovery of the nature and extent of the problem (two years in the case described by Smith, up to four years after the onset of expanded direct interbank lending in the case described by Hoover). Increasing interbank exposure probably is an early warning

signal of impending trouble for the banking system and might, in some circumstances, be a principal cause of the kinds of contagion or systemic risk that many bank regulators cite as justification for creation of the too big to fail doctrine. The point those regulators conveniently ignore is that, without direct interbank lending, it usually is difficult for any bank to become, or to long remain, too big to fail.

VII. A Measure of Interbank Exposure

The measures of interbank exposure that can be constructed from publicly available data are flawed in many ways. Currently, it is not possible to construct measures of interbank exposure that include all of the relevant sources of such exposure. In addition, for the interbank-exposure items that can be constructed, the data are highly aggregated, thereby making it impossible to derive an accurate measure of an individual bank's risk. Therefore, this exercise in measuring interbank exposure is performed with three purposes in mind: 1) to demonstrate how one would go about measuring interbank-exposure risk, 2) to obtain an overall impression of the level and direction of aggregate interbank exposure for U.S. banks, and 3) to point out the glaring deficiencies in the data available to construct measures of interbank-exposure risk.

The data used in the study are taken from the Federal Financial Institutions Examination Council's (FFIEC's) Reports of Condition and Income (call reports) from March 1984 through March 1990. This sample period was chosen for two reasons: 1) there was a major revision of the call reports in March 1984 and 2) because interbank exposure

was a factor in the decision to bail out Continental in July 1984, we are interested in the direction of aggregate interbank claims since that time. After all, it would hardly be a triumph of logical consistency for the authorities to have breached precedent by bailing out Continental due to its interbank exposure and then to do nothing about discouraging or reducing interbank exposure generally in the aftermath of the bailout -- but we fear that such inaction and inconsistency is exactly what is still happening.

The banks in the sample are grouped into five subsamples on the basis of size, as measured by total assets: banks with less than \$100 million; banks with at least \$100 million but less than \$300 million; banks with at least \$300 million but less than \$1 billion; banks with at least \$1 billion but less than \$10 billion; and banks with more than \$10 billion.

To measure interbank exposure, we selected five categories of interbank risk: CIPC, BDDI, LDI, AOB, and FFS. We also looked at measures of interbank exposure to foreign banks (FOR) and to banks domiciled in foreign countries (ABR). A brief description of these variables is presented in table 1. Our measure of total interbank exposure, TOTEXP, is not an all-inclusive measure and omits potentially important sources of interbank exposure, such as stock and subordinated debt of other banks and loan participations sold with recourse. These and other possible interbank-exposure items were omitted because they are not readily available to us from our data source.^{9/} Despite the fact that we missed some interbank-exposure items, we believe that TOTEXP picks up the majority of interbank exposure in the asset portfolio.^{10/} We also recognize that the same criticism applies to FOR, our measure of exposure to non-U.S. banks

(both domestic and foreign offices), and ABR, our measure of exposure to banks domiciled in foreign countries (both U.S. and non-U.S. offices).

We construct the variables in table 1 for the entire sample and each subsample (except for FOR and ABR) because of different reporting requirements for different size banks. These variables generally can be constructed only for banks with more than \$100 million in assets. The variables are constructed in two ways: 1) at the individual level and 2) at the group level. The final variables are constructed as ratios of exposure to capital because the ultimate risk that we are concerned with here is the risk of capital impairment due to interbank exposure. The group aggregate interbank-exposure ratios are plotted out over the sample period in figures 1 through 8. The individual interbank-exposure ratios are used to construct tables 4 through 11.

Figure 1 shows that the CIPCC exposure of U.S. banks has been relatively flat since the Continental Illinois crisis.^{11/} These results are confirmed at the individual bank level in table 4. For example, in March 1984, 22.07 (11.66) percent of U.S. banks had CIPCC exposure exceeding 50 (100) percent of capital, while in March 1990, 23.92 (11.18) percent of U.S. banks had CIPCC exposure exceeding 50 (100) percent of capital.

Figure 2 shows that the BDDIC exposure of U.S. banks with more than \$10 billion in assets fell from March 1984 through December 1986. Then BDDIC for these banks increased dramatically, with a general decline thereafter. BDDIC generally declined for all other banks (those with assets of less than \$10 billion) from March 1984 to March 1990. The individual bank statistics in table 5 generally confirm the aggregate pattern of exposure in figure 2. Overall BDDI exposures are high enough at a number of banks in each size

category to warrant further scrutiny by bank supervisory authorities.

Figure 3 and table 6 show the pattern of LDI exposure for U.S. banks. Looking at figure 2, we can see that LDIC is highest for the largest banks and lowest for the smallest banks. From March 1984 until March 1990, LDIC has remained fairly constant for banks with assets less than \$1 billion and has fallen for banks with assets greater than \$1 billion.

Figure 4 and table 7 show the changes in the interbank-exposure ratio AOB over the sample period. For all of the bank groups, AOB is a relatively unimportant source of interbank exposure. AOB is less than 10 percent of capital for every aggregate group in every quarter and was lower in March 1990 than it was in March 1984 for each group. However, table 7 shows that although AOB is generally an unimportant source of interbank exposure for U.S. banks as a whole, it may be an important source of such exposure for a few U.S. banks.

FFSC is plotted in figure 5, and the individual bank numbers are reported in table 8. As one might expect, FFSC shows the greatest variation of all our interbank-exposure ratios. The seemingly erratic behavior of FFSC may be due in part to the short maturity of FFS assets and the way the FFS is recorded on the call reports. The data from the reports reflect the position of the variable on the day the call report is made and not an average quarterly position. Because FFS tend to be very short-term assets, the numbers reported as of the day of the call report may not be representative of the true FFS position of the banks in the sample. Although this problem may influence the numbers reported, it should not dominate the trends for the groups or for individual banks over time. It is more likely than not that the movements in the FFSC over time are driven by

interest rates and the availability of profitable investment opportunities in securities and in the banks' home markets. The oscillation of the exposures around a relatively flat trend line over time is consistent with market factors driving FFSC over time.

TOTEXPC, the sum of the specific interbank-exposure ratios, is plotted in figure 6 and reported in table 9. TOTEXPC follows the same pattern as BDDIC for all our aggregate bank groups. Overall, TOTEXPC has fallen most for the banks with more than \$1 billion in assets and has exhibited a slight decline or stayed the same for the remainder of the banks. The decrease in TOTEXPC for the large banks tends to reflect a decrease in the BDDIC and LDIC over the sample period. The behavior of TOTEXPC for the individual banks in each group in table 9 confirms the results in figure 6.

Figures 7 and 8 present the degree of interbank exposure of U.S. banks to foreign banks (non-U.S. banks in the United States and abroad) and banks domiciled in foreign countries (both U.S. and non-U.S. banks). Banks with less than \$100 million in assets do not report the line items in the call report required to compute FORC and ABRC, so they are omitted from these tables and figures. However, because it is unlikely that small banks have much of this type of interbank exposure, this omission should not affect the analysis. It is interesting to look at measures of foreign banking exposure, such as FOR and ABR, because this type of interbank exposure is subject to sovereign risk. That is, the claimant bank is subject not only to the risk of failure of the banks whose assets it holds, but also to the risks associated with political decisions made by foreign governments. Figures 7 and 8 show that FORC and ABRC decline slightly over the sample period for banks with less than \$10 billion in assets. For banks with

assets greater than \$10 billion, FORC and ABRC have declined at a slightly greater rate over the sample period. Tables 10 and 11 confirm the results of the figures and indicate that FORC and ABRC may represent a potential problem for only a few U.S. banks. In addition, anecdotal evidence, which recent interbank claims data (Federal Reserve Bulletin, table 3.17) tend to confirm, suggests that these exposures may be increasing for money center banks.

Before one reads too much into the relationships in the figures and tables, we must point out several caveats for the results. First, the numbers reflect the aggregate interbank exposure for each bank (group) and do not take into account possible diversification of the bank's (group's) exposure. A bank could have a very high exposure to other banks in the banking system but very little exposure to any one bank. Such a bank would have less interbank-exposure risk than a comparable bank with less exposure to the banking system but a high level of exposure to one bank (or a small group of banks). Second, with currently available data, we cannot determine riskiness of the interbank claims. There is less reason to be concerned about a bank's interbank exposure to a sound and conservatively managed bank than the same level of exposure to one of the "high-fliers" of the banking or thrift industries. Third, there are interbank claims on the liability side of the balance sheet that offset some of the asset exposure. Fourth, to the extent that domestic geographic distribution of interbank exposure matters (e.g., exposure within the same clearinghouse or within the same Federal Reserve District), such distribution cannot be determined from the currently available data. (See table 12.) Finally, we cannot determine the duration of the exposure. Banks with a high level of interbank exposure

concentrated in assets with very short maturities have less interbank-exposure risk, by duration, than banks with the same level of interbank exposure concentrated in assets with longer maturities.

Overall, interbank exposure, as defined in this study (with all its inherent limitations), does not seem to be a problem for U.S. banks during the periods investigated. Aggregate exposure ratios and the majority of individual bank-exposure ratios do not appear to be at levels that are high enough for concern, and there is a general flat or declining trend in our measures of interbank exposure for banks as a whole. However, as we readily admit, the measures that we are able to construct from call report data are so crude that our interpretations of the results are based more on instinct than on hard evidence. On the other hand, it is clear from our study that there are a few banks with aggregate interbank exposure high enough to warrant closer scrutiny by their managements, shareholders, and other investors, and, at the time of their next supervisory examination, by the regulators.

VIII. Conclusions and Policy Recommendations

Interbank exposure is a form of sensitivity that need not (but in the eyes of some influential authorities, at least, potentially does) constitute contagion or systemic risk that has significant public policy implications for the safety and soundness of the banking system.

We present arguments and anecdotal evidence supporting three basic hypotheses. The first is that high levels of interbank exposure reduce the safety and soundness of the banking system. This contagion risk increases the

probability that a single bank failure, or the failure of a limited number of banks, would result in a series of bank failures. Our second hypothesis is that interbank exposure affects the ability of the FDIC to use market discipline as a constraint on banks' risk-taking. A reduction in the independence of bank failures increases the constraints on the FDIC's ability to dispose of insolvent banks without extending forbearances to the bank's uninsured depositors, general creditors, and stockholders. The third hypothesis is that a rising level of interbank exposure is indicative of reduced stability of the financial system. Interbank claims tend to rise as banks see reduced investment opportunities in their traditional markets and as entry into new markets is precluded by either regulatory or competitive factors. As the credit quality of nonbank borrowers decreases, banks will increase indirect lending to these and other comparable borrowers through other banks as a supposedly safer alternative to direct lending. Unfortunately, the historical accounts indicate that the perceived safety of increased interbank lending may be a delusion that chains a greater number of financial institutions together in a 1980s version of the medieval dance of death. Interbank lenders and borrowers become chained to each other and prosper together as long as real, nonfinancial economic activity increases, but they also perish together if real, nonfinancial economic activity decreases without appropriate adjustments in lenders' behavior. Worse yet, as recent experience in northeastern real estate markets illustrates, stories about "credit crunches" appear in the financial press following declines in real economic activity, and these might constitute a signal of enough political pressure to "ease up" so as to deter regulators from pursuing necessary reforms, such as disclosing and reducing direct interbank exposures.

To remedy problems associated with direct interbank exposure, useful solutions might include the following measures:

- 1) The construction of a data collection system geared to measuring direct and some forms of indirect interbank exposure. This could be done by modifying the existing call reports or setting up a separate reporting schedule. As we noted in section VII, data on interbank claims are not collected now in a manner that allows us to properly measure and evaluate interbank-exposure risk. In fact, the remainder of our policy recommendations are based on the assumption that interbank-exposure risk can be accurately measured, in the future if not at present. Some supervisory movement in this direction already is underway; beginning with the June 30, 1987, call reports, commercial banks have had to report aggregate amounts of loans purchased from other depository institutions, as well as loans sold to other institutions.^{12/} Obviously, much more still has to be done to improve collection of data on interbank exposure, but collection of data on loan participations purchased and sold is an important first step.
- 2) Excluding CIPC and insured interbank deposit balances from the measures, we suggest that:
 - Banks be restricted to having not more than 50 percent of their capital at risk to any single financial institution (including bank, thrift, and nonbank-financial holding companies) and that they be required to report to their primary supervisor any combination of direct and indirect

exposures to any financial institution that exceeds 15 percent of their primary capital. Public disclosure of such exposures also would be helpful in advancing the cause of market discipline. For asset exposures to (claims on) other financial institutions in excess of 15 percent of capital, offsetting liability exposure on the claimant bank's balance sheet could be deducted when determining its net interbank exposure to any one financial institution. All net, direct interbank exposures that exceed 50 percent of capital (in the aggregate) should be publicly disclosed and should be scrutinized by examiners as part of the examination process.^{13/}

- Banks have aggregate interbank-exposure limits set by their primary regulators. (Alternative: banks should determine and then publicly disclose their own direct interbank-exposure limits.) These aggregate exposure limits should include a restriction on exposure to banks within the claimant bank's local clearinghouse association and separate limits on total exposure to all banks in the domestic banking system and to all foreign banks for each particular country of origin. Because of regional, concentration-of-risk patterns that emerged in the 1980s, it also might be useful to have banks calculate and disclose aggregate interbank exposures by Federal Reserve District. Because there is no theory or evidence that tells us how high to set the aggregate exposure

levels, we defer to banks' own publicly disclosed judgments or to judgments of the regulators on this issue. However, U.S. bankers do have experience in determining direct interbank-exposure limits, both under Federal Reserve-sponsored payments system risk-reduction initiatives and on their own initiatives, even without Federal Reserve involvement (Clarke [1983], pp. 27-32). Thus, the only truly novel aspect of this proposal would be either regulatorily administered or publicly disclosed interbank-exposure limits.

- Because of sovereign credit risk for nationalized banking systems and cross-border currency transfer risk in general, a limit should be set on the total interbank claims of each U.S. bank on all financial institutions from each foreign country. Limits also should be set on a bank's aggregate interbank exposure to any single region of the world (such as Latin America or Eastern Europe). Historically, self-imposed limits on international interbank exposure have proved to be too weak or too inconsistently enforced to be of practical use in limiting loss when payment flows have been interrupted (Clarke [1983], pp. 27-32). Because of the historical interplay between banks' cross-border lending and foreign policy considerations (see Tolchin [1990]; Chernow [1990]), any regulatory limits on such regional lending might have to be set in consultation with the Treasury and State Departments. We believe that no domestic bank's aggregate net interbank claims on specific countries and

regions of the world should be allowed to exceed the level set for the claimant bank's exposure to the largest (or next-largest) institution in its own local clearinghouse association.

Such measures would limit the alleged ripple effects of irrational, contagious bank failures and would increase the safety and soundness of our banking system. They should allow the FDIC and other bank regulators to exercise market discipline fully in deciding to allow large banks (or interlocked smaller banks) to fail as a consequence of either supervisory intervention or rational bank runs. Thus, the regulators' Continental dilemma would be either avoided or significantly diminished. However, before a meaningful system of supervision or regulation of interbank exposure can be implemented, the definition of interbank exposure needs to be expanded to include off-balance-sheet exposures and other relevant asset exposures, such as holdings of stock and subordinated debt of other banks, that are not currently available from call report data.

* * *

This paper presents a measure of interbank exposure for U.S. banks from March 1984 until March 1990. Interbank-exposure ratios formed on aggregated data indicate that the overall level of interbank exposure declined during this period. The same ratios formed on an individual-bank basis support this conclusion. Overall, the evidence suggests that interbank exposure is not a serious problem. However, a limited number of banks have exposure ratios that are high enough to warrant further investigation by their regulators.

FOOTNOTES

1. Commenting on an earlier draft of this paper, Hester (1987) observed (accurately, we believe) that the terminology we were using then (and that still prevails in academic and policy discussions) is somewhat confused. Hester wrote that "contagion and systemic risks are medical terms with meanings which are quite different. Contagion refers to the spread of disease and systemic risk refers to a simultaneous collapse of different elements or organs. Neither is equivalent to sensitivity, which [is] ... the partial derivative of one variable with respect to another."

2. One explanation for the lack of scale economies in banking found by Benston, Hanweck, and Humphrey (1982) is that correspondent banking enables small banks to capture some of the efficiencies of larger banking organizations.

3. The classic recommendation regarding this type of problem would be for the Federal Reserve, the FDIC, or another lender of last resort to lend freely to banks with exposure to bank A but not to lend so as to prevent the market-determined failure of bank A itself. See, for example, Humphrey (1989); Todd (1988a); Clarke (1983); and Bagehot (1873, p. 197). Clarke's observations on the classic lender-of-last-resort theory are worth restatement here (1983, p. 45):

Although arrangements linking [deposit] insurance assessments with risk would contribute to prudent banking, they do not assure it. So long as banks -- especially big banks -- have reason to assume that the monetary authorities will not let them fail, moral hazard remains a problem. Banks that adopt go-for-broke strategies can bid up deposit rates sufficiently not only to offset the increases in insurance premia but also to attract investors who are willing to gamble. To be sure, a dynamic economy requires a willingness to take risks but whether this willingness should be found in banks may be doubted, especially if the cost of faulty business judgment is borne by the public. In order to provide assurance that they would bear the full cost of risk-taking, banks should therefore be required not only to pay risk-related insurance premia but also to understand clearly that support from the lender of last resort will be provided only to solvent institutions.

In recent years the Federal Reserve has paid lip service to this injunction ... but uncertainty about the precise position of troubled banks has led to slippage in practice. In a significant number of cases, market reports of difficulties at an institution have led to heavy outflows of uninsured deposits and to application for credit from the Discount Window. More often than not, the Fed has responded in the spirit of "Treat the patient first and ask questions about solvency later." Even then the question was not, "Is the institution solvent now?" but rather -- "With reformed management and, perhaps, some capital infusion, does the bank stand a fair chance of becoming solvent at some point in the not-too-distant future?"

4. See Shaffer (1989) regarding the effect of "pooling" on joint failure risks.
5. See William M. Isaac's testimony before the House of Representatives, Committee on Banking, Finance and Urban Affairs, Subcommittee on Financial Institutions, Supervision, Regulation and Insurance (U.S. Congress [Hearings] [1985], pp. 457-491). See also Wolfson (1986, p. 111) for a comparable statement regarding Continental by Comptroller of the Currency Todd Conover.

6. Staff report, U.S. Congress [Hearings] (1985), pp. 418-445.
7. See Zweig (1985). In the Penn Square lending frenzy, Seafirst and Continental may have relied substantially on Penn Square's credit evaluations of the loans in which they participated, thereby creating what can be termed "indirect interbank exposure." Indirect interbank exposure represents a form of agency problem in the spirit of Jensen and Meckling (1976). However, our study is concerned primarily with direct interbank exposure. See also Wolfson (1986, pp. 99-102, 106-113) regarding the legacy of Penn Square.
8. Regardless of one's views on the "real bills" doctrine in monetary policy, a macroeconomic issue, it remains a bedrock principle of safe and sound banking, a microeconomic issue, that only "real bills" should be treated as "prime" bankers' acceptances of the types normally eligible for discount or purchase by a central bank (Todd [1988b]; Hawtrey [1932]).
9. Off-balance-sheet risks, such as interest-rate swaps, are additional sources of interbank-exposure risk in the banking system that are captured, in aggregate form only, by the reporting schedules that banks currently file with their regulators. Also, within the Federal Reserve System, on-line access to complete call report data across district lines is not as readily available as persons outside the System might suppose. Some measures of off-balance-sheet risks are summarized in table 2.

10. There is a form of interbank exposure (some of it offsetting) on the liability side of banks' ledgers, including, for example, claims due to other banks. Such exposure, also referred to as "funding risk," increases the contagion risk regarding banks' funding sources. For the sake of simplicity and manageability, and because funding risk is already a widely recognized and researched problem (see, for example, Wolfson [1986], pp. 106-121), we usually excluded liability items and concentrated on interbank asset exposures instead.

11. Anecdotal evidence (which recent data in aggregated form in Federal Reserve Bulletin table 3.17 tend to confirm) suggests that, among money center institutions, interbank exposure may have increased since the failure of Continental. See table 3 for a list of correspondent balances and interbank deposits held by selected large banks.

12. See Fraust (1987).

13. We base our suggested 50 percent of capital limit on net, aggregate, interbank exposures on the FDIC's citation of 50 percent capital impairment as one of its standard measures of the purported impact of Continental's failure (1984) on its correspondent banks (see footnote 5). The 15 percent reporting or disclosure limitation is not based on any rule or evidence, but it matches the 15 percent of capital per customer lending limit that generally applies to bank customers. Clarke, in an unpublished letter (June 20, 1990) commenting on a draft of this paper, offered the following observations:

I'm not at all confident in the efficacy of such [voluntary, self-imposed] limits. Recent experience in the real estate market in the [Northeast] ... suggests that the banks have already forgotten the lessons of their disastrous Latin American loans. So, in the absence of anything better, I'm inclined to stick with the proposals on pp. 43-48 of my [1983] paper. But what can you do if you get regulators like those in the FSLIC during the '80s and senators like the wicked five and a president and Congress that think the market can do no wrong?

Appendix A

by James B. Thomson

Markets and Banking System Stability

Although it is widely accepted that a free-market solution to the problem of failing banks would be the most efficient one, there are some who would dispute the claim that the market solution is stable at all, let alone the most stable solution. (See Campbell and Minsky [1987]; Corrigan [1989]; and Guttentag and Herring [1986, 1988].) Such reservations about the stability of markets (at least of financial markets) may be traced to the claim that market solutions result in more short-run volatility than regulatorily determined solutions. In the case of banking, bank failure rates and the frequency of runs on insolvent institutions are proxies for volatility. Thus, as the argument goes, the more volatile a banking system is, the less stable it is. One flaw in such arguments is that they rely too heavily on one aspect of systemic stability -- short-run volatility -- and ignore other more important aspects. A second flaw is that such arguments focus on short-run phenomena rather than on long-run evidence, even though stability is a concept that truly has meaning only in a long-run context. In other words, volatility of flows of funds, or liquidity, draws more academic and supervisory attention (wrongly, I think) than sustainability and stability of outcomes (for example, maintenance of solvency, or positive net worth on a market-value basis), which are capital-stock concepts.

Economists use the term "stability" to refer to a specific set of properties that a market or an economic system possesses. In the simplest terms, one can think of the financial system as a ball rolling down a path. The first condition for stability is directed momentum: when there are no outside forces operating on the ball, it follows its equilibrium path. When an exogenous force, for example, new information arriving in the market, acts on the ball, it deviates from its path. How far the ball deviates and how quickly it returns to the equilibrium path are also factors that affect the stability of the system.* Volatility is related to only one of these conditions: that is, it is a measurement of how far and how often the ball deviates from some path. Measures of volatility give us no information on how quickly the ball returns to the equilibrium path and, indeed, cannot tell us whether the ball returns to its path at all.

Market systems naturally exhibit more short-run volatility than regulated ones because market forces continually make corrective adjustments in order to return their ball to its equilibrium path. In regulated systems, corrective actions tend to be deferred (supervisors pretend that the ball has not really deviated from its path), creating an environment in which there are substantial periods of nonadjustment, with substantial adjustments made occasionally. Large-scale adjustments often occur at the expense of having the ball deviate farther and farther from its equilibrium path in the interim. Hence, the ball might stray from its equilibrium path more often and for longer periods of time.

*For simplicity, the discussion here treats the path of the rolling ball as though it were fixed. However, the analysis also is valid when the path is allowed to evolve over time and to be affected by the same forces as those acting on the ball.

The difference between the market and regulatory adjustment processes is equivalent to the difference in exchange-rate adjustments under floating and fixed exchange-rate regimes. Under a floating exchange-rate regime, supply and demand factors in markets cause nearly continuous adjustments of the exchange rate and, at times, a high level of short-run volatility. Under a fixed exchange-rate regime, the official exchange rate is maintained for long periods, with large adjustments made periodically. Short-run volatility measured by movements in exchange rates typically would be low in a fixed-rate regime, while actual volatility in the foreign exchange markets might be quite high. Hence, regulated systems exhibit less short-run volatility than market systems, but conclusions about the relative stability of the two systems, based solely on "measured" short-run volatility, may be as misleading as comparisons of apples and oranges and, in any case, are subject to the same "flows of funds versus capital stock" criticism mentioned above.

To the extent that regulated systems achieve less short-run volatility by suppressing the corrective forces inherent in markets, the greater is the probability that, over time, a major adjustment would be needed. This is analogous to the absence of small earthquakes along a fault line, which allows stress to build up and thereby increases the probability that a major quake eventually will occur. Small quakes, like self-correcting market forces, relieve the pressures that accumulate over time. Suppression of these forces through regulatory interference allows the pressure to rise and increases the magnitude and violence of the resulting adjustment. Therefore, over the long run, regulated financial systems tend to display more volatility and to stray farther from and adjust less quickly to the equilibrium path than market-oriented financial systems.

References

American Banker. 1990. Top Numbers 1990 (cumulative folio publication).
New York.

Aspinwall, Richard, and Scott, Kenneth. 1989. "Federal Reserve Proposals to Modify the Payments System Risk Reduction Program." Statement No. 45. Shadow Financial Regulatory Committee (September 18, 1989). Mid America Institute, Chicago, Illinois.

Bagehot, Walter. 1873. Lombard Street: A Description of the Money Market.
New York: Scribner, Armstrong and Co.

Batista, Paulo Nogueira, Jr. 1988. Da Crise Internacional a Moratoria Brasileira. Rio de Janeiro, Brazil: Paz e Terra. (In Portuguese.)

Benston, George J., Hanweck, Gerald A., and Humphrey, David B. 1982.
"Scale Economies in Banking: A Restructuring and Reassessment." Journal of Money, Credit, and Banking 14 (1982), pp. 435-454.

Board of Governors of the Federal Reserve System. Federal Reserve Bulletins.
Washington, D.C.

Caliguire, Daria B., and Thomson, James B. 1987. "FDIC Policies for Dealing with Failed and Troubled Institutions." Economic Commentary, Federal Reserve Bank of Cleveland, October 1, 1987.

Campbell, Claudia, and Minsky, Hyman P. 1987. "How to Get Off the Back of a Tiger, or, Do Initial Conditions Constrain Deposit Insurance Reform?" Proceedings from a Conference on Bank Structure and Competition (May 1987), Federal Reserve Bank of Chicago, pp. 252-271.

Chernow, Ron. 1990. The House of Morgan: An American Banking Dynasty and the Rise of Modern Finance. New York: Atlantic Monthly Press.

Clarke, Stephen V.O. 1967. Central Bank Co-operation: 1924-1931. Federal Reserve Bank of New York.

_____. 1983. "American Banks in the International Interbank Market." Monograph Series, No. 4. Salomon Brothers Center, New York University, New York.

Clay, Henry. 1957. Lord Norman. London, England: Macmillan.

Corrigan, E. Gerald. 1987. "Financial Market Structure: A Longer View." Annual Report. Federal Reserve Bank of New York.

_____. 1990. "A Perspective on Recent Financial Disruptions." Quarterly Review 14 (Winter 1989-90), Federal Reserve Bank of New York, pp. 8-15.

Federal Reserve Bank of Cleveland. 1985. Annual Report.

Federal Reserve Bank of New York. 1987-88. "Large-Dollar Payment Flows from New York." Quarterly Review 12 (Winter 1987-88), Federal Reserve Bank of New York, pp. 6-13.

Fraust, Bart. 1987. "Regulators Order Banks to Disclose Loan Purchases." American Banker (April 10, 1987).

Guttentag, Jack, and Herring, Richard. 1988. "Prudential Supervision to Manage Systemic Vulnerability." The Financial Services Industry in the Year 2000: Risk and Efficiency. Proceedings of a Conference on Bank Structure and Competition (May 11-13, 1988), Federal Reserve Bank of Chicago, pp. 602-633.

_____. 1986. "Disaster Myopia in International Banking." Princeton Essays in International Finance, No. 164 (September 1986). Department of Economics, International Finance Section, Princeton University, Princeton, New Jersey.

Hawtrey, R.G. 1932. The Art of Central Banking. London, England: Longmans, Green and Co.

Hester, Donald D. 1987. Unpublished letter on earlier draft of this paper, "Interbank Exposure in the Fourth District" (May 29, 1987).

Hoover, Herbert. 1952. Memoirs: The Great Depression, 1929-1941, vol. 3. New York: Macmillan.

- Humphrey, Thomas M. 1989. "Lender of Last Resort: The Concept in History." Economic Review 75 (March/April 1989), Federal Reserve Bank of Richmond, pp. 8-16.
- Jensen, Michael C., and Meckling, William H. 1976. "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure." Journal of Financial Economics 3 (1976), pp. 305-360.
- Jones, Jesse H., with Angly, Edward. 1951. Fifty Billion Dollars: My Thirteen Years with the RFC, 1932-1945. New York: Macmillan.
- Kaletsky, Anatole. 1985. The Costs of Default. Twentieth Century Fund. New York: Priority Press Publications.
- Kane, Edward J. 1989. "How Incentive-Incompatible Deposit-Insurance Funds Fail." Working Paper No. 2836, National Bureau of Economic Research (February 1989), New York.
- Kaufman, George G. 1988. "The Truth About Bank Runs," in The Financial Services Revolution: Policy Directions for the Future. Catherine England and Thomas Huertas, eds., Boston, Massachusetts: Kluwer Academic Publishers, pp. 9-40.
- Kindleberger, Charles P. 1978. Manias, Panics, and Crashes: A History of Financial Crises. New York: Basic Books.

Kryzanowski, Lawrence, and Roberts, Gordon S. 1989. "The Performance of the Canadian Banking System, 1920-1940." Banking System Risk: Charting a New Course. Proceedings of the 25th Annual Conference on Bank Structure and Competition (May 3-5, 1989), Federal Reserve Bank of Chicago, pp. 221-232.

Lever, Harold, and Huhne, Christopher. 1986. Debt and Danger: The World Financial Crisis. Boston, Massachusetts: The Atlantic Monthly Press.

Penning, Ann Cooper. 1968. Aid to Distressed Banks -- Yesterday and Today: An Historical Survey of Federal Assistance to Distressed Banks. 2 vols. Unpublished dissertation. Stonier Graduate School of Banking (June 1968), Rutgers -- the State University, New Brunswick, New Jersey.

Schuker, Stephen A. 1988. "American 'Reparations' to Germany, 1919-33: Implications for the Third-World Debt Crisis." Princeton Studies in International Finance, No. 61 (July 1988). Department of Economics, International Finance Section, Princeton University, Princeton, New Jersey.

Schumpeter, Joseph A. 1950. Capitalism, Socialism and Democracy. 3rd ed. New York: Harper & Row.

Schwartz, Anna J. 1987. "The Lender of Last Resort and the Federal Safety Net." Journal of Financial Services Research 1 (September 1987), pp. 1-17.

Shaffer, Sherrill. 1989. "Pooling Intensifies Joint Failure Risk: Abstract." Banking System Risk: Charting a New Course. Proceedings of the 25th Annual Conference on Bank Structure and Competition (May 3-5, 1989), Federal Reserve Bank of Chicago, pp. 424-431.
www.clevelandfed.org/research/workpaper/index.cfm

- Smith, Adam. 1976 ed. An Inquiry into the Nature and Causes of the Wealth of Nations. Edwin Cannan, ed. (original 1776). Chicago, Illinois: University of Chicago Press.
- Spero, Joan Edelman. 1980. The Failure of the Franklin National Bank: Challenge to the International Banking System. New York: Columbia University Press.
- Sprague, Irvine H. 1986. Bailout: An Insider's Account of Bank Failures and Rescues. New York: Basic Books.
- Stevens, Edward J. 1989. "Payment System Risk Issues." Economic Commentary, Federal Reserve Bank of Cleveland (June 15, 1989).
- Thomson, James B. 1990. "Using Market Incentives to Reform Bank Regulation and Federal Deposit Insurance." Economic Review 26 (1st Quarter 1990), Federal Reserve Bank of Cleveland, pp. 28-40.
- Todd, Walker F. 1988a. "Lessons of the Past and Prospects for the Future in Lender of Last Resort Theory." Working Paper No. 8805 (August 1988), Federal Reserve Bank of Cleveland. Also printed in The Financial Services Industry in the Year 2000: Risk and Efficiency. Proceedings of a Conference on Bank Structure and Competition (May 11-13, 1988), Federal Reserve Bank of Chicago, pp. 533-577.

- _____. 1988b. "A Regulator's View of Bankers' Acceptances." Letters of Credit and Bankers' Acceptances 1988, Reade H. Ryan, Jr., ed., Commercial Law and Practice Course Handbook Series No. 450. New York: Practising Law Institute, pp. 263-390.
- _____. 1989. "A Brief History of International Lending, from a Regional Banker's Perspective." George Mason University Law Review 11, No. 4 (Summer 1989), pp. 1-72.
- Tolchin, Martin. 1990. "Justice Agency Warned [by State Department] on Inquiry of Loans to Iraq." New York Times (June 7, 1990), Midwest edition, p. A-8.
- Trigaux, Robert. 1989. "Isaac Reassesses Continental Bailout." American Banker (July 31, 1989), p. 6.
- United States Congress [Hearings]. House of Representatives. 1985. Committee on Banking, Finance and Urban Affairs, Subcommittee on Financial Institutions, Supervision, Regulation and Insurance. Inquiry into Continental Illinois Corp. and Continental Illinois National Bank, October 4, 1984 (98th Congress, 2nd Session). Washington, D.C.: Government Printing Office. Staff report cited above is at pp. 418-445; testimony of William M. Isaac is at pp. 457-491.
- Wolfson, Martin H. 1986. Financial Crises: Understanding the Postwar U.S. Experience. Armonk, New York: M.E. Sharpe, Inc.
- Zweig, Phillip L. 1985. Belly Up: The Collapse of the Penn Square Bank. New York: Crown Publishers.

Table 1: Definitions of Variables

CAPITAL = Total equity capital.

**CIPC = Cash items in the process of collection and balances due from
depository institutions.**

CIPCC = CIPC/CAPITAL

BDDI = Balances due from depository institutions.

BDDIC = BDDI/CAPITAL

LDI = Loans to depository institutions.

LDIC = LDI/CAPITAL

AOB = Acceptances of other banks.

AOBC = AOB/CAPITAL

FFS = Federal funds sold and securities purchased under agreements to resell.

FFSC = FFS/CAPITAL

TOTEXP = CDBI + LDI + AOB + FFS.

TOTEXPC = TOTEXP/CAPITAL

Table 1, continued

FOR = Exposure to foreign banks in the U.S. and abroad. FOR consists of balances due from foreign banks, loans to foreign banks, and acceptances of foreign banks.

FORC = FOR/CAPITAL

ABR = Exposure to U.S. and non-U.S. banks domiciled in foreign countries. ABR consists of balances due from banks abroad, loans to banks abroad, and acceptances of banks abroad.

ABRC = ABR/CAPITAL

Source: Authors.

Table 2: Off-Balance-Sheet Items of Selected Large Bank Holding Companies

(As of December 31, 1989)
(Amounts in millions of dollars)

<u>Bank holding co.</u>	Total assets	Loan commitments	Standby letters of credit	Commercial letters of credit	Foreign exchange contracts	Interest- rate swaps
Bankers Trust, NY	55,658	13,952	6,992	728	218,831	155,615
Citicorp, NY	230,643	51,751	26,031	4,582	588,393	187,463
Chase Manhattan, NY	107,369	30,895	12,377	2,149	268,940	134,757
Manufacturers Hanover, NY	60,479	19,888	7,025	1,622	141,625	103,848
Bank of N.Y., NY	48,857	18,169	4,113	1,999	33,031	20,018
J.P. Morgan, NY	88,964	32,371	9,959	119	248,489	118,081
Marine Midland, NY	27,067	4,924	3,540	268	89	4,929
Chemical, NY	71,513	26,414	5,268	875	165,316	252,096
First Chicago, IL	47,907	29,864	5,965	1,113	170,869	38,531
Bank of America, CA	98,764	40,549	9,642	2,100	133,009	32,434
Mellon Bank, PA	31,467	16,286	3,152	353	14,480	7,229
PNC Financial, PA	45,661	8,537	4,010	313	1,246	1,247
BancOne, OH (only)	26,514	4,498	1,314	226	69	4,965
Natl. City, OH	22,972	4,379	1,053	130	352	2,149

Source: Federal Reserve Y-9 reports and published financial statements.

Table 3: Correspondent Balances and Interbank Deposits of Selected Large Banks

(As of June 30, 1989)
(Amounts in millions of dollars)

Bank	Demand deposits due to all banks	Time and savings deposits due to all banks	Demand deposits due to foreign banks	Time and savings deposits due to foreign banks	Interbank deposits as a percent of total deposits
Bankers Trust, NY	2,230	574	1,151	0	8.9
Citibank, NY	2,256	49	1,603	18	2.2
Chase Manhattan, NY	1,924	178	1,144	29	3.4
Manufacturers Hanover, NY	1,689	314	679	58	4.6
Bank of N.Y., NY & DE	1,371	82	1,063	4	5.0 (est.)
Morgan Guaranty, NY	1,043	494	523	51	3.1
Marine Midland, NY	366	493	210	22	5.1
Chemical, NY & TX	866	120	57	74	2.5 (est.)
First Chicago, IL	631	412	201	28	3.6
Bank of America, CA	1,410	87	411	59	2.1
Mellon Bank, PA	533	139	88	0	3.3 (est.)
Pittsburgh Natl., PA & KY	393	471	N.A.	N.A.	4.8 (est.)
Bank One, OH, IN, TX, & WI	439	792	N.A.	N.A.	7.6 (est.)
Natl. City, OH	82	4	N.A.	N.A.	1.5

Note: Multistate bank holding companies' totals might be overstated due to double-counting of intra-company claims.

Source: American Banker, Top Numbers 1990.

Table 4: Cross-Sectional Distribution of CIPCC

CIPCC as a percent of capital ^b	Number of Banks												
	Assets											ALL BANKS	
	Under \$100 million	\$100 to \$300 million	\$300 to \$1000 million	\$1 to \$10 billion	Over \$10 billion	3/84		3/90		3/84			3/90
0 to 25%	10337 (84.84) ^c	809 (51.40)	1375 (63.33)	102 (22.72)	311 (43.86)	24 (10.13)	107 (28.38)	0 0.00	2 (4.44)	11272 (77.92)	9911 (76.09)		
25 to 50%	1014 (8.32)	947 (22.49)	354 (21.19)	110 (24.50)	173 (24.40)	27 (11.39)	70 (18.57)	1 (4.55)	9 (20.00)	1506 (10.41)	1659 (12.74)		
50 to 100%	637 (5.23)	493 (20.33)	320 (12.57)	154 (34.30)	170 (23.98)	95 (40.08)	152 (40.32)	12 (54.55)	27 (60.00)	1218 (8.42)	1115 (8.56)		
100 to 200%	172 (1.41)	130 (5.40)	85 (2.44)	68 (15.14)	48 (6.77)	79 (33.33)	44 (11.67)	9 (40.91)	6 (13.33)	413 (2.85)	281 (2.16)		
200 to 300%	14 (0.11)	19 (0.13)	7 (0.32)	12 (2.67)	3 (0.42)	11 (4.64)	2 (0.53)	0 0.00	1 (2.22)	39 (0.27)	32 (0.25)		
Over 300%	10 (0.08)	18 (0.25)	4 (0.14)	3 (0.67)	4 (0.56)	1 (0.42)	2 (0.53)	0 0.00	0 0.00	18 (0.12)	27 (0.21)		
TOTAL	12184 (100.00)	9723 (100.00)	1574 (100.00)	2171 (100.00)	449 (100.00)	709 (100.00)	237 (100.00)	377 (100.00)	22 (100.00)	14466 (100.00)	13025 (100.00)		

a. CIPCC = Cash items in the process of collection.

b. Capital is defined as total equity capital (book value).

c. Percent of banks ().

Source: Federal Deposit Insurance Corporation's Reports of Condition and Income for March 1984 and March 1990.

Table 5: Cross-Sectional Distribution of BDDIC

BDDI ^a as a percent of capital ^b	Number of Banks											
	Assets											
	Under \$100 million		\$100 to \$300 million		\$300 to \$1000 million		\$1 to \$10 billion		Over \$10 billion		ALL BANKS	
	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90
0 to 25%	2666 (21.88) ^c	2715 (27.92)	349 (22.17)	974 (44.86)	109 (24.28)	388 (54.72)	40 (16.88)	230 (61.01)	0 0.00	12 (26.67)	3164 (21.87)	4319 (33.16)
25 to 50%	3628 (29.78)	2631 (27.06)	367 (23.32)	581 (26.76)	102 (22.72)	156 (22.00)	37 (15.61)	59 (15.65)	0 0.00	7 (15.56)	4134 (28.58)	3434 (26.36)
50 to 100%	3482 (28.58)	2496 (25.67)	414 (26.30)	418 (19.25)	94 (20.94)	105 (14.81)	35 (14.77)	46 (12.20)	1 (4.55)	8 (17.78)	4026 (27.83)	3073 (23.59)
100 to 200%	1746 (14.33)	1249 (12.85)	291 (18.49)	153 (7.05)	78 (17.37)	37 (5.22)	68 (28.69)	26 (6.90)	7 (31.82)	10 (22.22)	2190 (15.14)	1475 (11.32)
200 to 300%	409 (3.36)	361 (3.71)	93 (5.91)	32 (1.47)	43 (9.58)	9 (1.27)	28 (11.81)	7 (1.86)	6 (27.27)	3 (6.67)	579 (4.00)	412 (3.16)
Over 300%	253 (2.08)	271 (2.79)	60 (3.81)	13 (0.60)	23 (5.12)	14 (1.97)	29 (12.24)	9 (2.39)	8 (36.36)	5 (11.11)	373 (2.58)	312 (2.40)
TOTAL	12184 (100.00)	9723 (100.00)	1574 (100.00)	2171 (100.00)	449 (100.00)	709 (100.00)	237 (100.00)	377 (100.00)	22 (100.00)	45 (100.00)	14466 (100.00)	13025 (100.00)

a. BDDI = Balances due from depository institutions.

b. Capital is defined as total equity capital (book value).

c. Percent of banks ().

Source: Federal Deposit Insurance Corporation's Reports of Condition and Income for March 1984 and March 1990.

Table 6: Cross-Sectional Distribution of LDIC

LDI ^a as a percent of capital ^b	Number of Banks											
	Assets											
	Under \$100 million		\$100 to \$300 million		\$300 to \$1000 million		\$1 to \$10 billion		Over \$10 billion		ALL BANKS	
	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90
0 to 25%	11887 (97.56) ^c	9635 (99.09)	1481 (94.09)	2094 (96.45)	374 (83.30)	652 (91.96)	107 (45.15)	313 (83.02)	1 (4.55)	28 (62.22)	13850 (95.74)	12722 (97.67)
25 to 50%	129 (1.06)	51 (0.52)	43 (2.73)	38 (1.75)	33 (7.35)	30 (4.23)	46 (19.41)	33 (8.75)	0 (0.00)	6 (13.33)	251 (1.74)	158 (1.21)
50 to 100%	90 (0.74)	23 (0.24)	19 (1.21)	23 (1.06)	23 (5.12)	12 (1.69)	50 (21.10)	16 (4.24)	9 (40.91)	5 (11.11)	191 (1.32)	79 (0.61)
100 to 200%	49 (0.40)	10 (0.10)	24 (1.52)	7 (0.32)	11 (2.45)	6 (0.85)	28 (11.81)	8 (2.12)	8 (36.36)	4 (8.89)	120 (0.83)	35 (0.27)
200 to 300%	17 (0.14)	2 (0.02)	5 (0.32)	6 (0.28)	5 (1.11)	4 (0.56)	3 (1.27)	6 (1.59)	4 (18.18)	1 (2.22)	34 (0.24)	19 (0.15)
Over 300%	12 (0.10)	2 (0.02)	2 (0.13)	3 (0.14)	3 (0.67)	5 (0.71)	3 (1.27)	1 (0.27)	0 (0.00)	1 (2.22)	20 (0.14)	12 (0.09)
TOTAL	12184 (100.00)	9723 (100.00)	1574 (100.00)	2171 (100.00)	449 (100.00)	709 (100.00)	237 (100.00)	377 (100.00)	22 (100.00)	45 (100.00)	14466 (100.00)	13025 (100.00)

a. LDI = Loans to depository institutions.

b. Capital is defined as total equity capital (book value).

c. Percent of banks ().

Source: Federal Deposit Insurance Corporation's Reports of Condition and Income for March 1984 and March 1990.

Table 7: Cross-Sectional Distribution of AOBs

AOB ^a as percent of capital ^b	Number of Banks												
	Assets											ALL BANKS	
	Under \$100 million	\$100 to \$300 million	\$300 to \$1000 million	\$1 to \$10 billion	Over \$10 billion	3/84		3/90		3/84			3/90
0 to 25%	11363 (93.26) ^c	1394 (88.56)	2088 (96.18)	412 (91.76)	698 (98.45)	229 (96.62)	375 (99.47)	20 (90.91)	45 (100.00)	13418 (92.76)	12574 (96.54)	457 (2.00)	260 (2.00)
25 to 50%	366 (3.00)	68 (4.32)	51 (2.35)	17 (3.79)	3 (0.42)	5 (2.11)	1 (0.27)	1 (4.55)	0 (0.00)	457 (3.16)	260 (2.00)	0 (0.00)	0 (0.00)
50 to 100%	280 (2.30)	63 (4.00)	24 (1.11)	10 (2.23)	5 (0.71)	1 (0.42)	1 (0.27)	1 (4.55)	0 (0.00)	355 (2.45)	145 (1.11)	0 (0.00)	0 (0.00)
100 to 200%	136 (1.12)	41 (2.60)	5 (0.23)	9 (2.00)	3 (0.42)	1 (0.42)	0 (0.00)	0 (0.00)	0 (0.00)	187 (1.29)	37 (0.28)	0 (0.00)	0 (0.00)
200 to 300%	25 (0.21)	6 (0.38)	2 (0.09)	0 (0.00)	0 (0.00)	1 (0.42)	0 (0.00)	0 (0.00)	0 (0.00)	32 (0.22)	7 (0.05)	0 (0.00)	0 (0.00)
Over 300%	14 (0.11)	2 (0.13)	1 (0.05)	1 (0.22)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	17 (0.12)	2 (0.02)	0 (0.00)	0 (0.00)
TOTAL	12184 (100.00)	9723 (100.00)	1574 (100.00)	2171 (100.00)	449 (100.00)	709 (100.00)	237 (100.00)	377 (100.00)	22 (100.00)	45 (100.00)	14466 (100.00)	13025 (100.00)	13025 (100.00)

a. AOB = Acceptances of other banks.

b. Capital is defined as total equity capital (book value).

c. Percent of banks ().

Source: Federal Deposit Insurance Corporation's Reports of Condition and Income for March 1984 and March 1990.

Table 8: Cross-Sectional Distribution of FFSC

FFS ^a as a percent of capital ^b	Number of Banks											
	Assets											
	Under \$100 million		\$100 to \$300 million		\$300 to \$1000 million		\$1 to \$10 billion		Over \$10 billion		ALL BANKS	
	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90
0 to 25%	3884 (31.88) ^c	2144 (22.05)	580 (36.85)	628 (28.93)	155 (34.52)	282 (39.77)	72 (30.38)	165 (43.77)	4 (18.18)	10 (22.22)	4695 (32.46)	3229 (24.79)
25 to 50%	2468 (20.26)	1979 (20.35)	287 (18.23)	443 (20.41)	71 (15.81)	143 (20.17)	40 (16.88)	69 (18.30)	3 (13.64)	8 (17.78)	2869 (19.83)	2642 (20.28)
50 to 100%	3164 (25.97)	2758 (28.37)	370 (23.51)	605 (27.87)	100 (22.27)	154 (21.72)	56 (23.63)	76 (20.16)	8 (36.36)	9 (20.00)	3698 (25.56)	3602 (27.65)
100 to 200%	1947 (15.98)	2035 (20.93)	237 (15.06)	341 (15.71)	88 (19.60)	77 (10.86)	52 (21.94)	43 (11.41)	7 (31.82)	14 (31.11)	2331 (16.11)	2510 (19.27)
200 to 300%	458 (3.76)	473 (4.86)	54 (3.43)	75 (3.45)	17 (3.79)	25 (3.53)	10 (4.22)	14 (3.71)	0 (0.00)	3 (6.67)	539 (3.73)	590 (4.53)
Over 300%	263 (2.16)	334 (3.44)	46 (2.92)	79 (3.64)	18 (4.01)	28 (3.95)	7 (2.95)	10 (2.65)	0 (0.00)	1 (2.22)	334 (2.31)	452 (3.47)
TOTAL	12184 (100.00)	9723 (100.00)	1574 (100.00)	2171 (100.00)	449 (100.00)	709 (100.00)	237 (100.00)	377 (100.00)	22 (100.00)	45 (100.00)	14466 (100.00)	13025 (100.00)

a. FFS = Federal funds sold and repurchase agreements purchased.

b. Capital is defined as total equity capital (book value).

c. Percent of banks ().

Source: Federal Deposit Insurance Corporation's Reports of Condition and Income for March 1984 and March 1990.

Table 9: Cross-Sectional Distribution of TOTEXP

TOTEXP ^a as a percent of capital ^b	Number of Banks											
	Assets											ALL BANKS
	Under \$100 million		\$100 to \$300 million		\$300 to \$1000 million		\$1 to \$10 billion		Over \$10 billion		3/84	
3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90	3/84		3/90
0 to 25%	233 (1.91) ^c	190 (1.95)	8 (0.51)	53 (2.44)	4 (0.89)	37 (5.22)	2 (0.84)	17 (4.51)	0 0.00	0 0.00	0 (1.71)	247 (2.28)
25 to 50%	1043 (8.56)	637 (6.55)	44 (2.80)	200 (9.21)	7 (1.56)	68 (9.59)	0 0.00	36 (9.55)	0 0.00	0 0.00	1094 (7.56)	941 (7.22)
50 to 100%	3281 (26.93)	2462 (25.32)	298 (18.93)	646 (29.76)	49 (10.91)	198 (27.93)	4 (1.69)	75 (19.89)	0 0.00	0 (4.44)	3632 (25.11)	3383 (25.97)
100 to 200%	4584 (37.62)	3695 (38.00)	589 (37.42)	814 (37.49)	140 (31.18)	246 (34.70)	37 (15.61)	139 (36.87)	0 0.00	0 (28.89)	5350 (36.98)	4907 (37.67)
200 to 300%	1761 (14.45)	1503 (15.46)	329 (20.90)	265 (12.21)	109 (24.28)	76 (10.72)	55 (23.21)	58 (15.38)	0 0.00	0 (15.56)	2254 (15.58)	1909 (14.66)
Over 300%	1282 (10.52)	1236 (12.71)	306 (19.44)	193 (8.89)	140 (31.18)	84 (11.85)	139 (58.65)	52 (13.79)	22 (100.00)	22 (51.11)	1889 (13.06)	1588 (12.19)
TOTAL	12184 (100.00)	9723 (100.00)	1574 (100.00)	2171 (100.00)	449 (100.00)	709 (100.00)	237 (100.00)	377 (100.00)	22 (100.00)	45 (100.00)	14466 (100.00)	13025 (100.00)

a. TOTEXP = Total measured interbank exposure.

b. Capital is defined as total equity capital (book value).

c. Percent of banks ().

Source: Federal Deposit Insurance Corporation's Reports of Condition and Income for March 1984 and March 1990.

Table 10: Cross-Sectional Distribution of FORC

FOR ^a as a percent of capital ^b	Number of Banks											
	Assets											ALL BANKS
	Under \$100 million 3/84	3/90	\$100 to \$300 million 3/84	3/90	\$300 to \$1000 million 3/84	3/90	\$1 to \$10 billion 3/84	3/90	Over \$10 billion 3/84	3/90	20		13797
0 to 25%	12172	9715	1235	2105	308	658	82	297	0	20	13797	12795
25 to 50%	(99.90) ^c	(99.92)	(78.46)	(96.96)	(68.60)	(92.81)	(34.60)	(78.78)	0.00	(44.44)	(95.38)	(98.23)
50 to 100%	(0.05)	(0.02)	(7.05)	(1.01)	(8.46)	(2.26)	(10.97)	(6.63)	0.00	(8.89)	(1.25)	(0.53)
100 to 200%	(0.02)	(0.02)	(6.86)	(1.01)	(9.58)	(1.97)	(14.35)	(6.63)	0.00	(8.89)	(1.29)	(0.51)
200 to 300%	(0.02)	(0.01)	(4.57)	(0.60)	(7.80)	(0.85)	(20.68)	(4.77)	(18.18)	(17.78)	(1.12)	(0.35)
Over 300%	0	1	28	2	13	5	24	4	8	4	73	16
	0.00	(0.01)	(1.78)	(0.09)	(2.90)	(0.71)	(10.13)	(1.06)	(36.36)	(8.89)	(0.50)	(0.12)
	2	2	20	7	12	10	22	8	10	5	66	32
	(0.02)	(0.02)	(1.27)	(0.32)	(2.67)	(1.41)	(9.28)	(2.12)	(45.45)	(11.11)	(0.46)	(0.25)
TOTAL	12184	9723	1574	2171	449	709	237	377	22	45	14466	13025
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

a. FOR = Exposure to foreign banks abroad, and their U.S. branches.

b. Capital is defined as total equity capital (book value).

c. Percent of banks ().

Source: Federal Deposit Insurance Corporation's Reports of Condition and Income for March 1984 and March 1990.

Table 11: Cross-Sectional Distribution of ABRC

ABR ^a as a percent of capital ^b	Number of Banks											
	Assets											
	Under \$100 million		\$100 to \$300 million		\$300 to \$1000 million		\$1 to \$10 billion		Over \$10 billion		ALL BANKS	
	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90	3/84	3/90
0 to 25%	12177	9717	1331	2113	329	663	86	320	0	20	13923	12833
	(99.94) ^c	(99.94)	(84.56)	(97.33)	(73.27)	(93.51)	(36.29)	(84.88)	0.00	(44.44)	(96.25)	(98.53)
25 to 50%	1	2	50	20	23	18	17	15	0	4	91	59
	(0.01)	(0.02)	(3.18)	(0.92)	(5.12)	(2.54)	(7.17)	(3.98)	0.00	(8.89)	(0.63)	(0.45)
50 to 100%	2	2	72	22	27	13	32	20	0	5	133	62
	(0.02)	(0.02)	(4.57)	(1.01)	(6.01)	(1.83)	(13.50)	(5.31)	0.00	(11.11)	(0.92)	(0.48)
100 to 200%	1	1	74	10	48	10	57	17	4	6	184	44
	(0.01)	(0.01)	(4.70)	(0.46)	(10.69)	(1.41)	(24.05)	(4.51)	(18.18)	(13.33)	(1.27)	(0.34)
200 to 300%	2	0	27	3	12	3	30	1	9	6	80	13
	(0.02)	0.00	(1.72)	(0.14)	(2.67)	(0.42)	(12.66)	(0.27)	(40.91)	(13.33)	(0.55)	(0.10)
Over 300%	1	1	20	3	10	2	15	4	9	4	55	14
	(0.01)	(0.01)	(1.27)	(0.14)	(2.23)	(0.28)	(6.33)	(1.06)	(40.91)	(8.89)	(0.38)	(0.11)
TOTAL	12184	9723	1574	2171	449	709	237	377	22	45	14466	13025
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)

a. ABR = Exposure to U.S. and non-U.S. banks domiciled in foreign countries.

b. Capital is defined as total equity capital (book value).

c. Percent of banks ().

Source: Federal Deposit Insurance Corporation's Reports of Condition and Income for March 1984 and March 1990.

Table 12: What the Federal Reserve Used to Publish

COMMERCIAL BANKS

RESERVES AND LIABILITIES OF COMMERCIAL BANKS, BY CLASSES¹

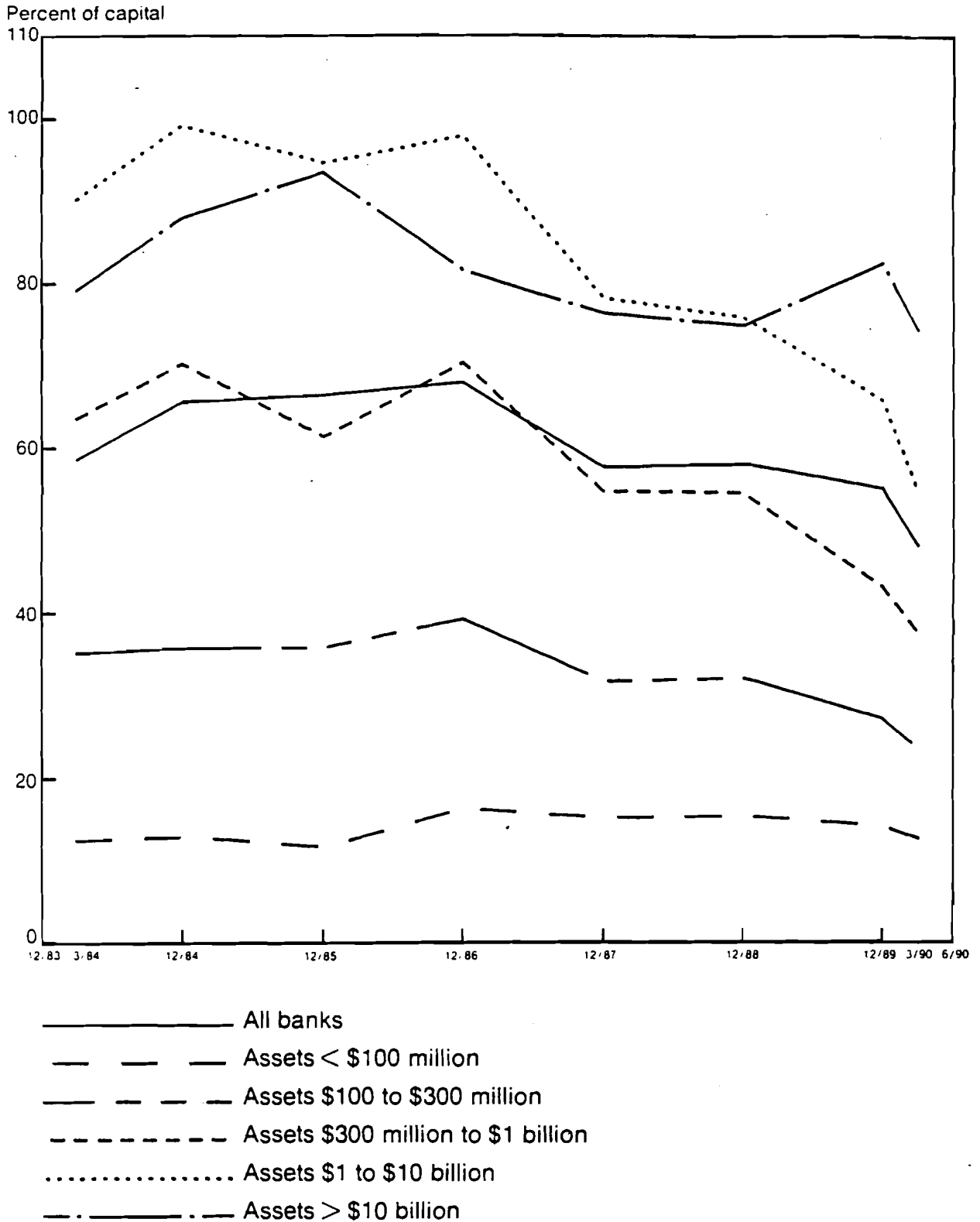
(In millions of dollars)

Class of commercial bank and call date	Reserves with Federal Reserve Banks	Cash in vault	Balances with domestic banks ⁶	Demand deposits adjusted ⁷	Demand deposits						Time deposits				Borrowings	Capital accounts
					Interbank deposits		U. S. Govt.	States and political subdivisions	Certified and officers' checks, etc.	Individuals, partnerships, and corporations	Interbank	U. S. Govt. and postal savings	States and political subdivisions	Individuals, partnerships, and corporations		
					Domestic ⁴	Foreign ⁵										
Total:³																
1947—Dec. 31....	17,796	2,216	10,216	87,123	11,362	1,430	1,343	6,799	2,581	84,987	240	111	866	34,383	65	10,059
1958—Dec. 31....	18,427	3,249	12,609	115,518	14,142	1,657	4,250	10,928	4,043	115,132	2,372	327	3,576	59,590	73	18,486
1959—Dec. 31....	17,931	3,012	12,237	115,420	13,944	1,705	5,050	11,459	3,910	116,225	1,441	285	3,166	62,718	615	19,556
1960—Dec. 31....	16,720	3,346	13,681	115,120	15,453	1,627	5,945	11,674	4,602	117,103	1,799	262	4,544	66,836	163	20,986
1961—June 30....	16,488	2,903	11,184	112,030	12,568	1,064	6,362	11,849	3,759	109,553	461	288	5,266	73,826	443	21,745
All insured:																
1941—Dec. 31....	12,396	1,358	8,570	37,845	9,823	673	1,762	3,677	1,077	36,544	158	59	492	15,146	10	6,844
1945—Dec. 31....	15,810	1,829	11,075	74,722	12,566	1,248	23,740	5,098	2,585	72,593	70	103	496	29,277	215	8,671
1947—Dec. 31....	17,796	2,145	9,736	85,751	11,236	1,379	1,325	6,692	2,559	83,723	54	111	826	33,946	61	9,734
1958—Dec. 31....	18,427	3,227	12,353	114,645	14,025	1,629	4,241	10,841	4,001	114,372	2,209	327	3,512	59,329	67	18,154
1959—Dec. 31....	17,931	2,950	11,969	114,563	13,825	1,675	5,037	11,372	3,866	115,482	1,358	285	3,095	62,478	602	19,206
1960—Dec. 31....	16,720	3,326	13,409	114,292	15,339	1,582	5,932	11,582	4,564	116,388	1,667	262	4,481	66,603	149	20,628
1961—June 30....	16,488	2,885	10,959	111,187	12,443	1,031	6,352	11,754	3,725	108,924	305	288	5,209	73,572	433	21,377
Member, total:																
1941—Dec. 31....	12,396	1,087	6,246	33,754	9,714	671	1,709	3,066	1,009	33,061	140	50	418	11,878	4	5,886
1945—Dec. 31....	15,810	1,438	7,117	64,184	12,333	1,243	22,179	4,240	2,450	62,950	64	99	399	23,712	208	7,589
1947—Dec. 31....	17,797	1,672	6,270	73,528	10,978	1,375	1,176	5,504	2,401	72,704	50	105	693	27,542	54	8,464
1958—Dec. 31....	18,428	2,441	7,977	96,218	13,614	1,613	3,822	8,603	3,712	98,133	2,187	300	2,829	48,004	54	15,460
1959—Dec. 31....	17,932	2,222	7,532	95,274	13,389	1,659	4,504	8,915	3,542	98,532	1,388	259	2,383	50,185	581	16,264
1960—Dec. 31....	16,720	2,518	8,582	94,594	14,875	1,561	5,287	9,016	4,244	99,134	1,639	237	3,559	53,477	130	17,398
1961—June 30....	16,488	2,142	6,897	92,750	12,061	1,016	5,731	9,241	3,441	92,886	276	263	4,203	60,108	382	18,027
Sept. 27....	16,038	2,932	6,761	94,158	12,357	968	7,293	8,479	2,935	93,898	232	254	4,214	61,625	2,128	18,386
New York City:³																
1941—Dec. 31....	5,105	93	141	10,761	3,595	607	866	319	450	11,282	6	.....	29	778	.....	1,648
1945—Dec. 31....	4,015	111	78	15,065	3,535	1,105	6,940	237	1,338	15,712	17	10	20	1,206	195	2,120
1947—Dec. 31....	4,639	151	70	16,653	3,236	1,217	2,67	290	1,105	17,646	12	12	14	1,418	30	2,259
1958—Dec. 31....	4,454	161	92	16,170	3,519	1,267	968	329	1,540	18,835	1,739	36	100	3,345	.....	3,282
1959—Dec. 31....	3,908	151	138	15,494	3,462	1,303	1,027	310	1,536	18,573	988	24	65	3,359	232	3,361
1960—Dec. 31....	3,398	199	147	15,352	4,105	1,184	1,217	305	2,476	19,051	1,216	27	203	3,976	.....	3,554
1961—June 30....	3,563	130	98	16,119	3,462	749	1,380	365	1,825	17,642	167	44	245	6,346	121	3,614
Sept. 27....	3,603	203	78	16,198	3,198	707	1,485	309	1,556	17,452	173	37	245	6,728	1,106	3,670
Chicago:³																
1941—Dec. 31....	1,021	43	298	2,215	1,027	8	127	233	34	2,152	.....	.....	.....	476	.....	288
1945—Dec. 31....	942	16	200	1,153	1,292	20	1,552	237	66	3,160	.....	.....	.....	719	.....	377
1947—Dec. 31....	1,070	30	175	3,717	1,196	21	72	285	63	3,853	.....	2	9	902	.....	426
1958—Dec. 31....	1,058	36	185	4,271	1,314	43	249	302	88	4,746	34	7	7	1,423	3	733
1959—Dec. 31....	920	33	142	4,171	1,187	43	272	329	105	4,636	23	8	12	1,449	40	762
1960—Dec. 31....	899	33	171	3,968	1,327	53	327	298	102	4,499	61	2	7	1,521	35	822
1961—June 30....	994	28	111	3,881	1,093	33	380	364	113	4,125	10	2	8	1,910	10	848
Sept. 27....	927	32	74	3,746	1,174	37	476	330	79	4,118	9	3	8	1,920	94	856
Reserve city:³																
1941—Dec. 31....	4,060	425	2,590	11,117	4,302	54	491	1,144	286	11,127	104	20	243	4,542	.....	1,967
1945—Dec. 31....	6,326	494	2,174	22,372	6,307	110	8,221	1,763	611	22,281	30	38	160	9,563	2	2,566
1947—Dec. 31....	7,095	562	2,125	25,714	5,497	131	4,05	2,282	705	26,003	22	45	332	11,045	1	2,844
1958—Dec. 31....	7,472	768	2,670	35,505	7,217	289	1,429	3,153	1,052	38,054	377	124	1,471	19,480	14	5,760
1959—Dec. 31....	7,532	681	2,381	35,095	7,162	288	1,698	3,304	1,043	38,321	303	95	1,229	20,231	238	6,106
1960—Dec. 31....	7,354	753	2,610	34,357	7,688	301	1,960	3,329	953	37,986	326	85	1,787	20,652	73	6,423
1961—June 30....	7,104	654	2,071	33,432	6,115	220	2,241	3,286	845	35,590	62	101	2,197	22,901	131	6,684
Sept. 27....	6,987	921	2,059	33,745	6,577	209	2,909	2,832	744	35,833	64	102	2,152	23,535	844	6,775
Country:³																
1941—Dec. 31....	2,210	526	3,216	9,661	790	2	225	1,370	239	8,500	30	31	146	6,082	4	1,982
1945—Dec. 31....	4,527	796	4,665	23,595	1,199	8	5,465	2,004	415	21,797	17	52	219	12,224	11	2,525
1947—Dec. 31....	4,993	929	3,900	27,424	1,049	7	432	2,647	528	25,203	17	45	337	14,177	23	2,934
1958—Dec. 31....	5,444	1,476	5,030	40,272	1,565	13	1,175	4,819	1,032	36,498	36	132	1,250	21,755	37	5,685
1959—Dec. 31....	5,573	1,357	4,870	40,514	1,578	24	1,508	4,972	857	37,003	24	132	1,077	25,146	71	6,035
1960—Dec. 31....	5,070	1,534	5,655	40,917	1,755	23	1,783	5,083	713	37,398	37	122	1,562	27,327	23	6,599
1961—June 30....	4,828	1,329	4,618	39,318	1,392	14	1,710	5,226	657	35,530	37	116	1,752	28,952	121	6,861
Sept. 27....	4,521	1,777	4,551	40,470	1,409	15	2,423	5,008	556	36,495	36	112	1,810	29,442	84	7,085
Nonmember:³																
1947—Dec. 31....	.....	544	3,947	13,595	385	55	167	1,295	180	12,284	190	6	172	6,858	12	1,596
1958—Dec. 31....	.....	808	4,633	19,300	528	43	428	2,325	331	16,999	185	27	747	11,613	20	3,027
1959—Dec. 31....	.....	790	4,706	20,146	555	46	545	2,544	359	17,692	103	26	783	12,560	34	3,294
1960—Dec. 31....	.....	828	5,099	20,525	578	65	657	2,658	367	17,970	160	25	985	13,378	33	3,590
1961—June 30....	.....	761	4,288	19,280	507	49	631	2,609	318	16,666	185	25	1,063	13,732	61	3,720

¹ Breakdowns of loan, investment, and deposit classifications are not available prior to 1947; summary figures for earlier dates appear in the preceding table.
² For a discussion of revision in loan schedule, see the BULLETIN for January 1960, p. 12.
³ Central reserve city banks.
⁴ Beginning with 1942, excludes reciprocal bank balances.
⁵ Through 1960, demand deposits other than interbank and U.S. Government, less cash items reported as in process of collection; beginning

with 1961, demand deposits other than domestic commercial interbank and U.S. Government, less cash items reported as in process of collection.
⁶ Beginning with June 1961, reclassification of deposits of foreign central banks reduced foreign interbank demand deposits by about \$400 million and inter

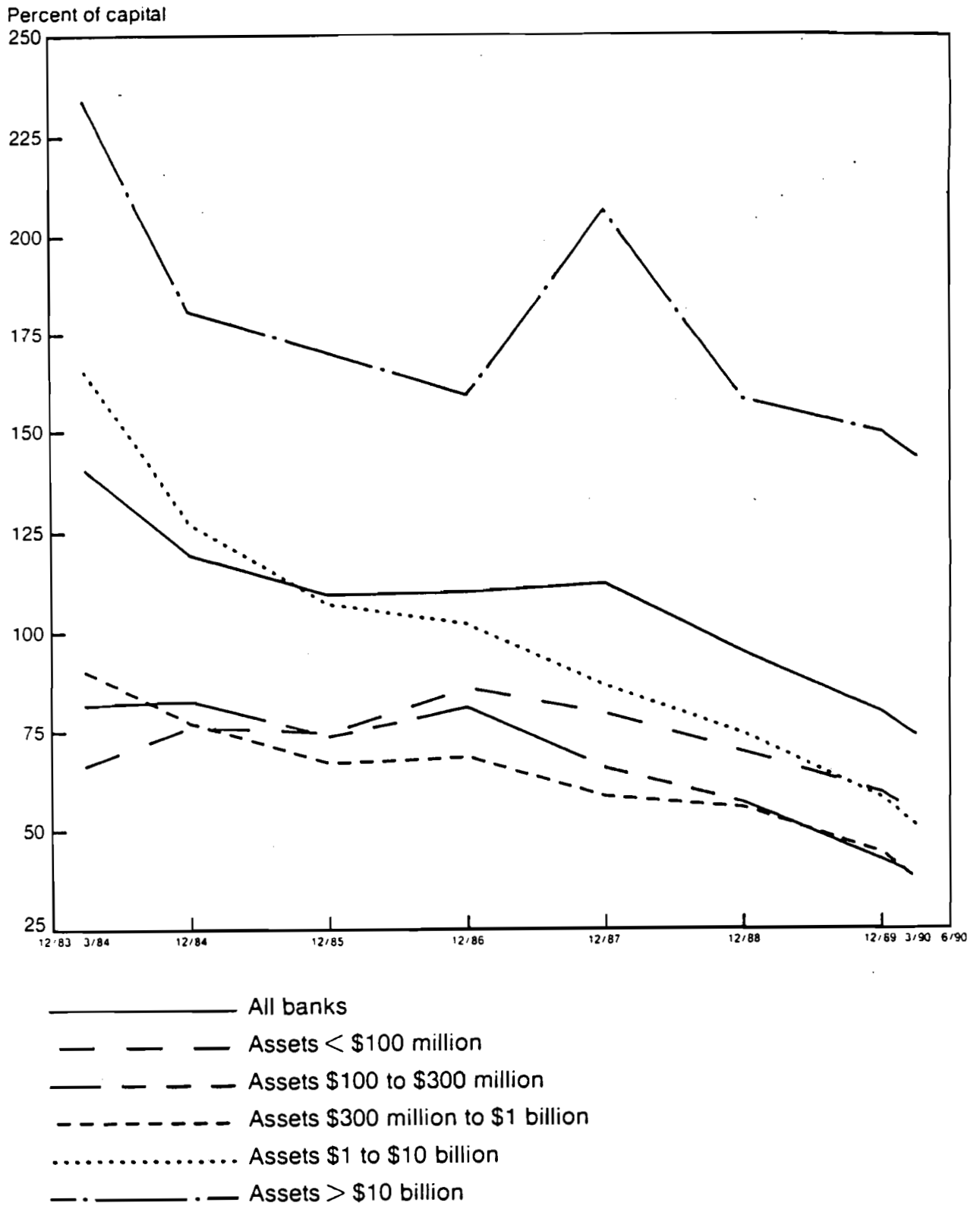
Figure 1: Cash Items in the Process of Collection



SOURCE: Federal Financial Institutions Examination Council's Reports of Condition & Income.

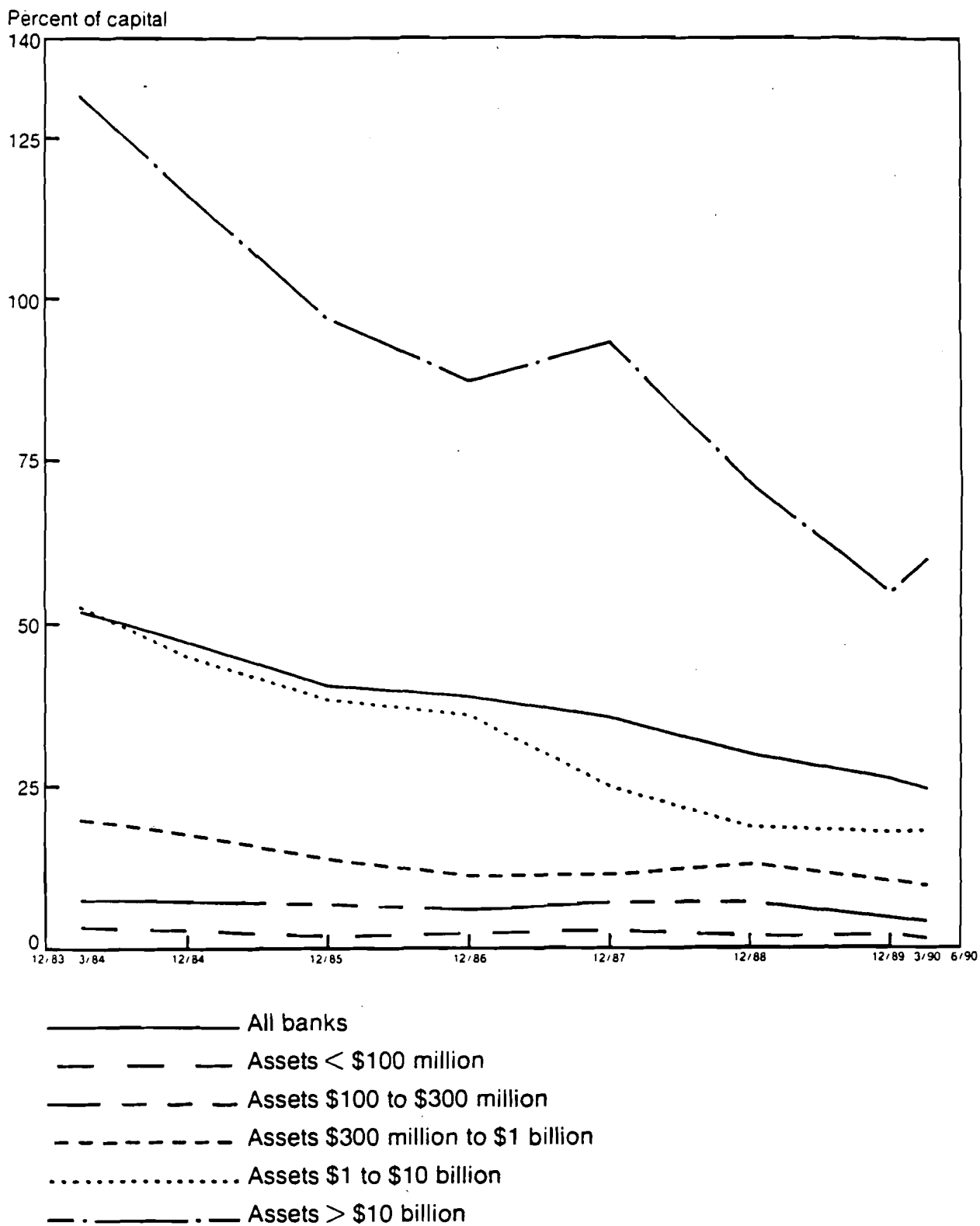
www.clevelandfed.org/research/workpaper/index.cfm

Figure 2: Balances Due from Depository Institutions



SOURCE: Federal Financial Institutions Examination Council's Reports of Condition & Income.

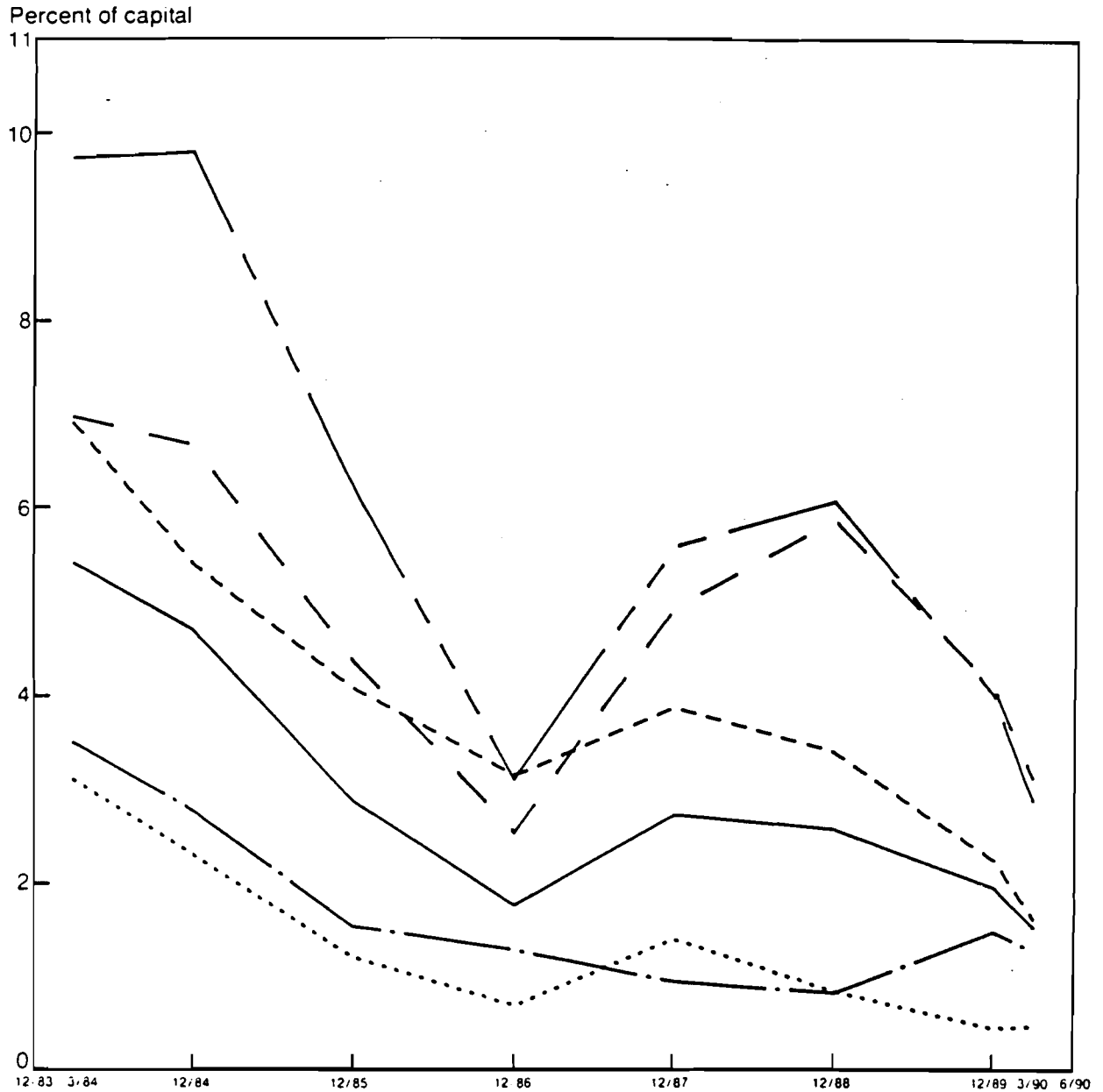
Figure 3: Loans to Depository Institutions



SOURCE: Federal Financial Institutions Examination Council's Reports of Condition & Income.

www.clevelandfed.org/research/workpaper/index.cfm

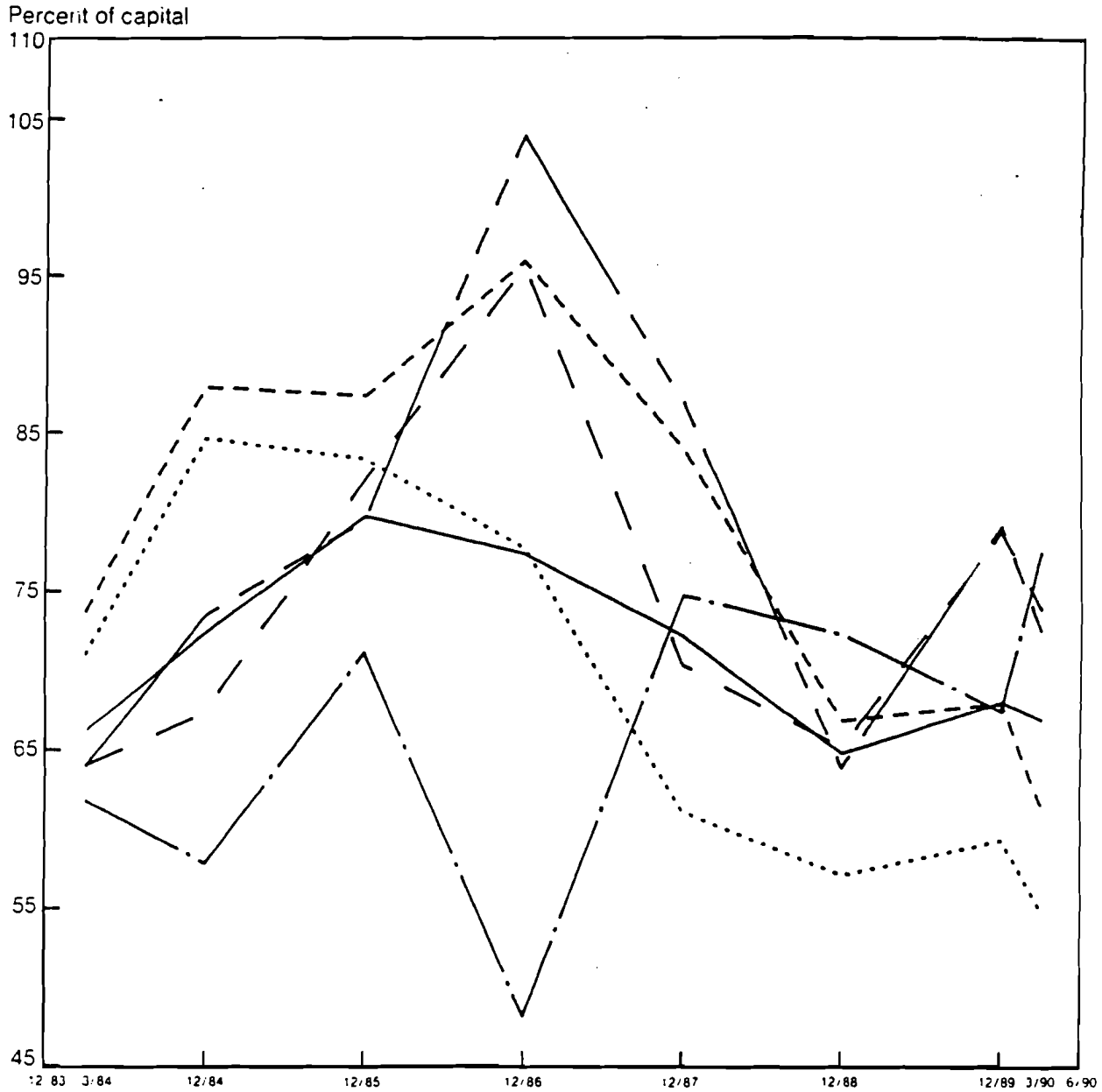
Figure 4: Acceptances of Other Banks



- All banks
- - - - - Assets < \$100 million
- — — — Assets \$100 to \$300 million
- - - - - Assets \$300 million to \$1 billion
- Assets \$1 to \$10 billion
- . - . - . Assets > \$10 billion

SOURCE: Federal Financial Institutions Examination Council's Reports of Condition & Income.

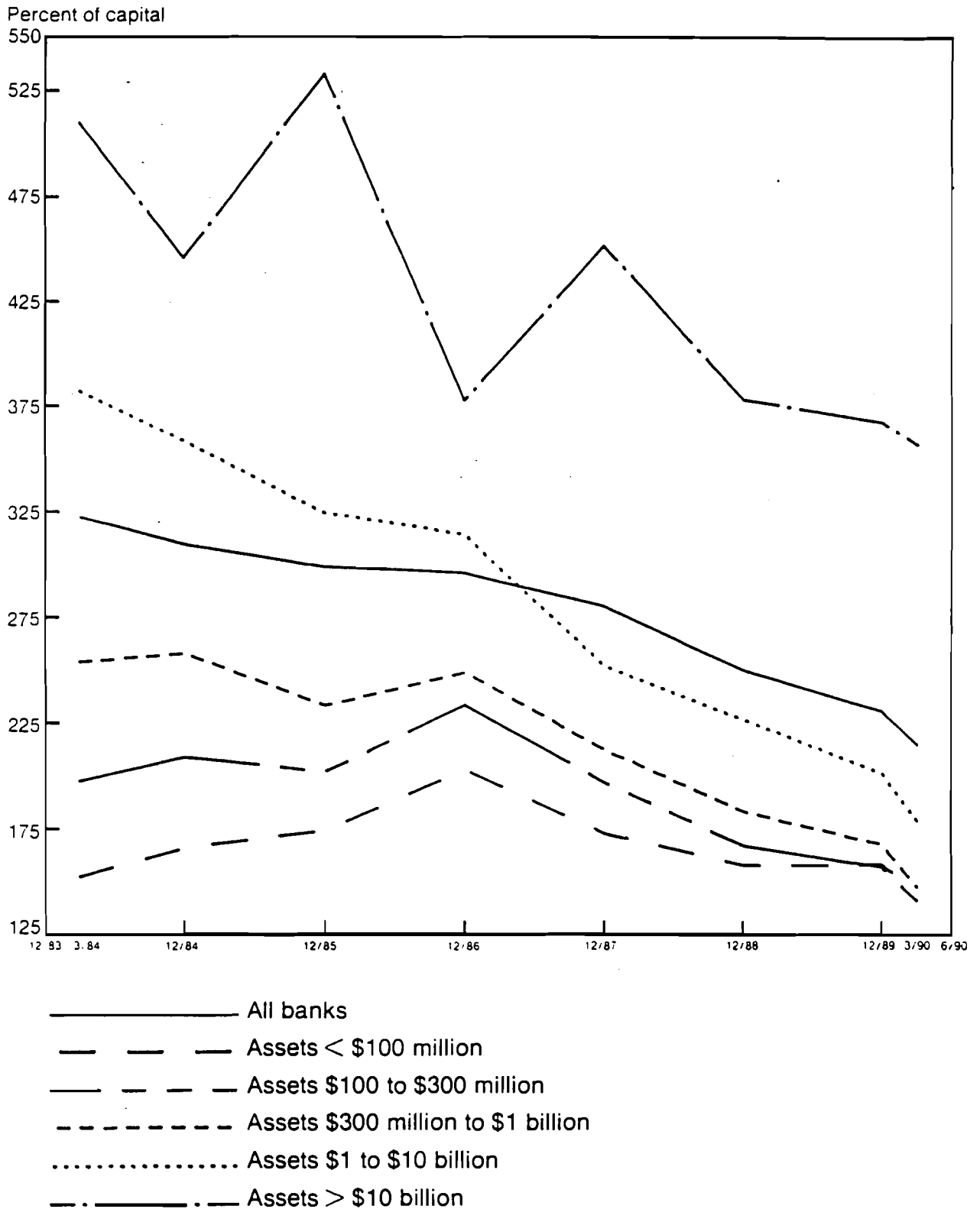
Figure 5: Federal Funds Sold and Repurchase Agreements Purchased



- All banks
- - - - - Assets < \$100 million
- - - - - Assets \$100 to \$300 million
- - - - - Assets \$300 million to \$1 billion
- Assets \$1 to \$10 billion
- . - . - Assets > \$10 billion

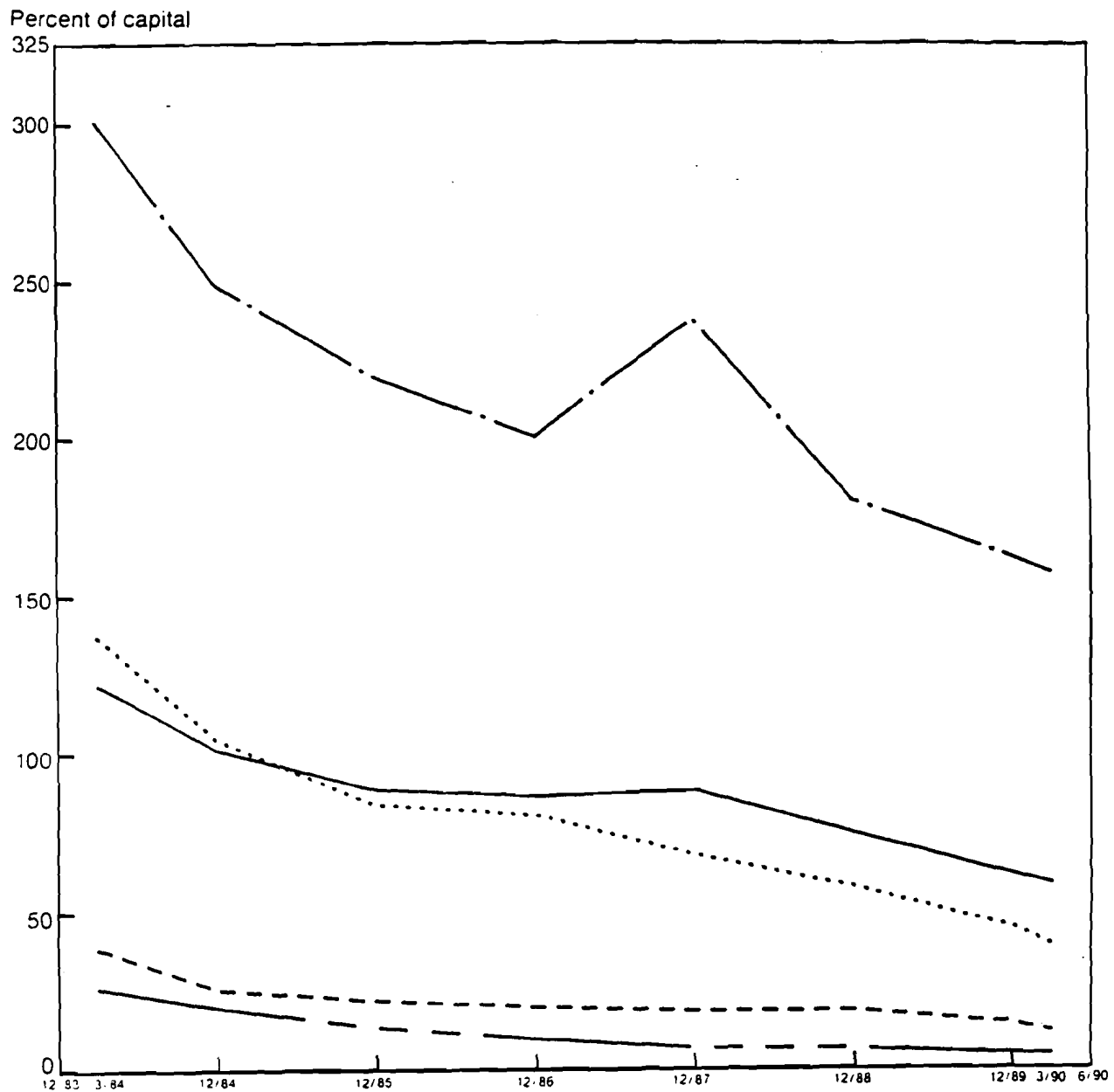
SOURCE: Federal Financial Institutions Examination Council's Reports of Condition & Income.
www.clevelandfed.org/research/workpaper/index.cfm

Figure 6: Total Measured Exposure



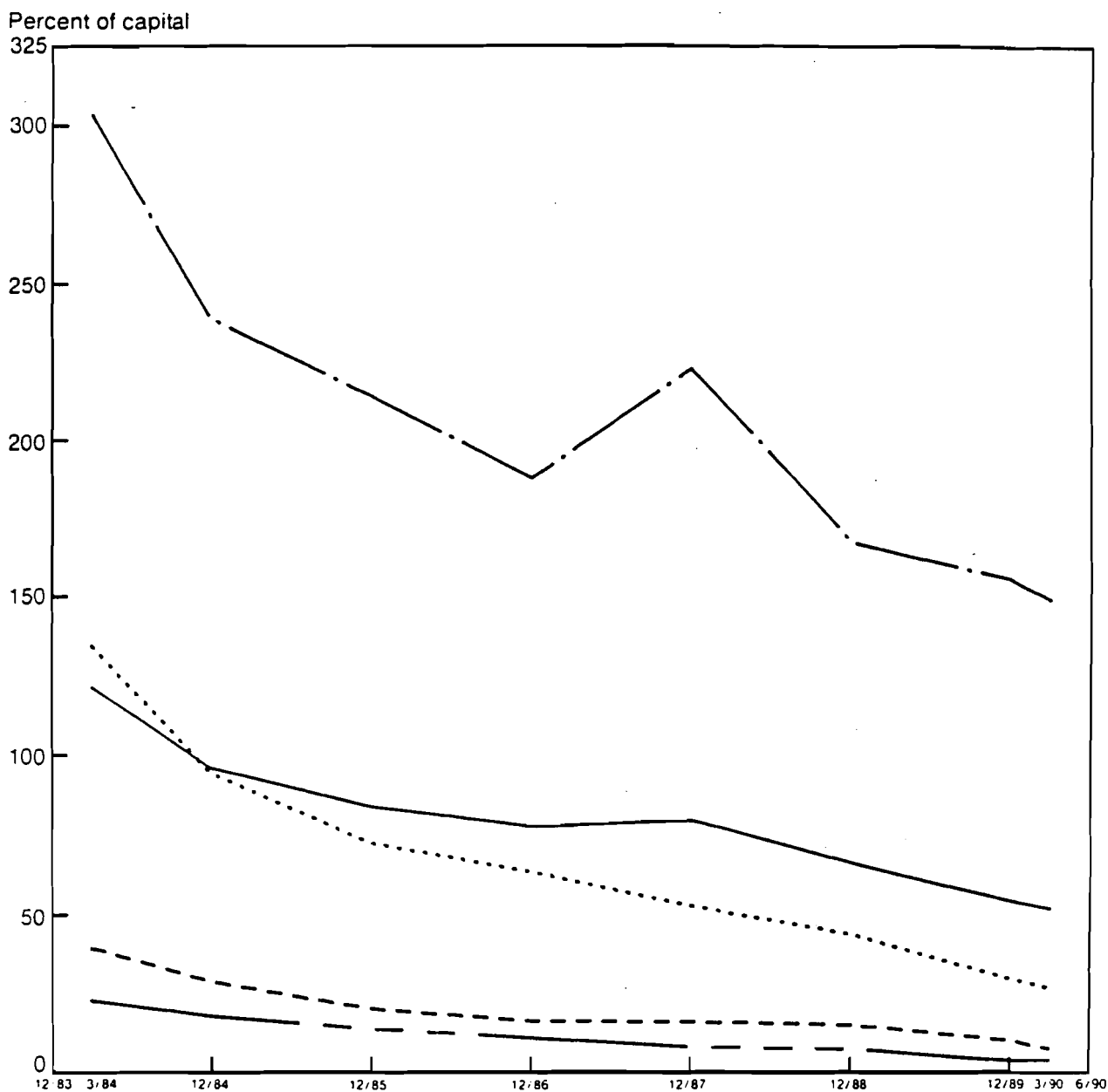
SOURCE: Federal Financial Institutions Examination Council's Reports of Condition & Income.
www.clevelandfed.org/research/workpaper/index.cfm

Figure 7: Exposure to Foreign Banks Abroad and Their U.S. Branches



- All banks
- — — — — Assets \$100 to \$300 million
- - - - - Assets \$300 million to \$1 billion
- Assets \$1 to \$10 billion
- . - . - . Assets > \$10 billion

Figure 8: Exposure to U.S. and Non-U.S. Banks Domiciled in Foreign Countries



- All banks
- — — — — Assets \$100 to \$300 million
- - - - - Assets \$300 million to \$1 billion
- Assets \$1 to \$10 billion
- . - . - . Assets > \$10 billion

SOURCE: Federal Financial Institutions Examination Council's Reports of Condition & Income.
www.clevelandfed.org/research/workpaper/index.cfm