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Bank Fragility: Perception and Historical Evidence

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The fragility of banks and the financial system has been a persistent source of public concern throughout modern history. Anna Schwartz (1995, p. 445) defines financial fragility as a state in which "the ability of the financial system to withstand economic shocks is weak." It follows that it is feared that fragility will result in failure. Thus, if the financial system were more fragile than other sectors of the economy, we should expect the failure rate of financial institutions and markets to be higher than that in other sectors. Commercial banks are generally viewed as both the most important and the most fragile of all financial institutions. Moreover, their failure is viewed as having the most adverse effect on the economy (Minsky, 1995). As a result, much public policy in banking in all countries is directed at coping with the fragility of banks in order to reduce the probability of their failure (Benston and Kaufman, 1995). But the recent history of widespread bank failures in

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almost all countries—differing widely in economic, social, cultural, and political structure—casts doubt about the efficacy of these prudential policies.¹ This paper examines:

- The degree of bank fragility relative to the perception of their fragility,
- Why banks are viewed as more fragile than other firms,
- The reasons that the greater fragility has generally not resulted in greater failure,
- Changes in the indicators of bank fragility through time,
- The relationship of bank fragility and the bank safety net, and
- The implications of bank fragility for bank failures in the future.

Because of their availability, the data analyzed in this paper are only for the United States.

The primary purpose of this paper is to challenge a number of widely held conventional wisdoms about the fragility of banks and the need for and effectiveness of much of the extant prudential bank regulatory policies that appear to be both costly and even counterproductive. As such, the paper should be viewed as a "bugle call" to motivate and encourage additional research in this important public policy area.

1. WHY BANKS ARE VIEWED AS MORE FRAGILE THAN OTHER FIRMS

A review of the historical and contemporary literature suggests that banks are perceived to be relatively more fragile than other firms primarily because of three stylized facts. They have:

1. Low capital-to-assets ratios (high leverage),

¹A recent survey found that 131 of the 181 IMF member countries have reported serious banking problems and failures in recent years (Lindgren, Garcia, and Saal, forthcoming 1996).

2. Low cash-to-assets ratios (fractional reserve banking), and
3. High demand deposits (debt)-to-total deposits (debt) ratios (high potential for run).

The first factor reduces the ability of a bank to absorb losses and avoid insolvency. A given adverse shock, say, a credit loss (default) or an interest rate mismatch loss, is thus more likely to drive a bank into insolvency than it is to drive a nonbank firm that has a higher capital-to-assets ratio into insolvency. Small holdings of cash increase a bank's need to sell earning assets in order to meet deposit outflows. To the extent the bank's earning assets are not very liquid, fire-sale losses may be generated when they are sold. This reason takes on greater significance the more illiquid or opaque are the bank's assets. A high proportion of demand debt intensifies the effects of the low cash ratio as a large unexpected withdrawal of deposits would force a fast sale of assets and potentially increase the bank's fire-sale losses. Thus, depositor runs on banks, which almost by definition occur unannounced, are likely to ignite liquidity problems, which, in turn, are widely considered to lead to solvency problems because of the banks' low capital ratios.

Although each of these three factors by themselves are perceived to make banks fragile, the interaction among the three produces an even higher degree of fragility that gives rise to heightened concern. However, the interrelationship of these three factors permits substitutions among them so that various combinations of the three can yield the same degree of overall fragility. Empirically, banks, on average, have substantially lower capital-asset ratios and higher (short-term) demand-to-total-debt ratios than other firms, but they have substantially higher cash-to-asset ratios. The values of the cash-to-asset and

capital-to-asset, ratios for banks and nonfinancial firms and demand to total deposits for banks for selected periods from 1870 through 1992 are shown in Table 1.

2. ACTUAL VS. PERCEIVED BANK FRAGILITY

The fragility of banks is viewed as a public policy concern both because it is feared that it may cause a larger number of failures and because of the substantial adverse consequences that bank failures are widely perceived to cause in other sectors of the economy. And, at least for the United States, the annual rate of bank failures has been higher than the rate of nonbank failures, on average, since the end of the Civil War. As can be seen from Table 2, the annual average bank failure rate from 1870 through 1994 was 1.03 percent, while that for nonbanks was 0.78 percent.² The annual variability in bank failures is also considerably greater than that of nonbank failures. As a result, however, in most years, the bank failure rate was substantially below that of nonbanks. Indeed, if one excludes the unusually large number of bank failures during the Great Depression from 1930 to 1933, the average bank failure rate for the remaining 120 year period would be lower than that of nonbanks (0.65% vs. 0.76%). Likewise, in the period from 1870 to 1913, before the introduction of the first federal government safety net under banks in the

²These figures are likely to overstate the bank failure rate somewhat as the number of banks reported before 1896, but not the number of failures, appears to substantially understate the actual number (Benston, et al, 1986). This causes the reported failure rate before 1896 to be overstated. On the other hand, temporary bank suspensions are not included as failures.

form of the Federal Reserve's lender of last resort facilities in 1914, the failure rate for banks was also lower than that for nonbanks (0.91% to 1.01%).^{3,4}

Moreover, the lower bank failure rate in the pre-safety net period and the only moderately higher overall bank failure rate occurred despite the fact that until very recently banks in the U.S. have been prohibited from reducing their risk of failure as much as they may have liked by government legislation and regulation that restricted them from diversifying fully across either geographic (unit banking) or product lines. Indeed, particularly in the earlier years, a stranger to the U.S. may rightfully have believed that the U.S. banking system was almost designed to maximize failure.

Thus, there appears to be an inconsistency between the widely held perception of substantial bank fragility based on the values of three financial fragility ratios and the historical evidence of only a slightly, if any in many periods, higher failure rate than for nonbanks. The historical bank failure rate suggests little actual fragility relative to other firms. The next section considers why the perceived high fragility did not translate into an unusually high failure rate.

³Using 1914 for the introduction of the initial bank safety net and as the appropriate dividing year between the pre- and post-safety net periods is supported by an analysis by Federal Reserve Chairman Alan Greenspan, who argued that

Over time, societies concluded that [bank] leverage and intermediation were essential to economic performance, but also that some bank failures could have unacceptable economic costs. In response, central banks were created and were accorded new responsibilities, and what we now call prudential regulation evolved. In the United States, these initiatives took the shape of the creation of the Federal Reserve in 1913 after several financial panics in the late 19th and early 20th centuries, and of federal deposit insurance and a broadened role for bank supervisors in the 1930's....This expanded role of governments, central banks, and bank supervisors implies a complex approach to managing and even sharing the risks of failure between governments and privately owned banks (Greenspan, 1996, p. 5).

⁴Because of the high variability in the bank failure rate, none of the differences between the bank and nonbank failure rates for any of these periods are statistically significant at the 5 percent level.

3. REASONS WHY APPARENT FRAGILITY MAY NOT TRANSLATE INTO GREATER FAILURE

Fragility per se does not imply breakage or, in the case of firms, failure. Rather, it implies "handle with care." Thus, the breakage rate for fragile glass, porcelain, and even economists' egos need not be unusually high if these objects are handled correctly. Only the potential for breakage is automatically greater. Similar for banks. The numerical values of the three fragility ratios signal that banks need to be handled with care in order to avoid failure. And that is what the market appears to have done. In the period before the establishment of the safety net under banks in the United States, first in 1914 with the establishment of the Federal Reserve lender of last resort facilities and then reinforced by the introduction of deposit insurance by the FDIC in 1934, there was relatively little government prudential regulation of banks and much market regulation.^{5,6} As noted earlier, the average annual failure rate for banks before 1914 was slightly lower than that for nonbanks. Moreover, both the average annual bank failure rate and the annual standard deviation were lower than afterwards (0.91% vs. 1.09% and 1.00% vs. 3.32%), when

⁵The third part of the modern safety net in the U.S. is finality by the Federal Reserve in payments settlements over Fedwire. It became important in the 1960s, when technology permitted real-time large value fund transfers during the day rather than only dayend transfers. Because the Fed requires settlement only at dayend, intraday or daylight overdrafts became possible. Because the Federal Reserve guarantees all fund transfers at the time they are made (provides finality), it assumes the risk of default if settlement cannot be made by the paying bank at dayend. To stimulate use of Fedwire, the Federal Reserve did not restrict or price such overdrafts until the late 1980s. Even since then, the charges have been well below what private market would have charged for such credit.

⁶Nonprudential regulations were more common in this period. For example, restrictions on the number and location of banking offices have always been specified in federal and state legislation and restrictions on product powers are specified in federal and state charters. These restrictions were imposed primarily to reduce competition and increase revenues to the government, rather than for prudential purposes (Wallis, Sylla, and Legler, 1994 and Sylla, Wallis, and Legler, 1995). Restrictions on geographic and product powers of bank holding companies, however, did not originate until 1956. For an analysis of the justification for bank regulation, see Benston and Kaufman, 1996.

government prudential regulation increased in importance as a source of discipline on the banks and market regulation declined.⁷

Before the establishment of the safety net, the market not only permitted the observed numerical values of the three fragility ratios that were perceived to make banks fragile to continue, but actually determined their values through depositor and other customer discipline, presumably after taking account of the risks of failure. Thus, the market did not appear to view these values as particularly fragile or dangerous relative to other firms. Why may the market have permitted these "fragile" values before 1914?

The market appears to have established the lower private capital ratios for banks than nonbanks before 1914 for three reasons. (Data on balance sheet accounts and capital ratios for nonfinancial firms as a whole are difficult to obtain before 1926. But capital ratios for selected nonfinancial industries for the earlier period indicate capital ratios well in excess of 50 percent. Capital ratios for nonfinancial firms for selected years from 1902 to 1992 are shown in Appendix Tables A1 and A2.) One, the reported capital ratios understate the actual capital ratios. To pay losses to depositors at failed institutions, shareholders of all national banks and of state banks in some states were subject to double liability in which the shareholders were liable in case of failure beyond the value of their stock holdings in an amount up to the initial par value of the securities. Payments equal to about one-half of the stated liability were, on average, collected from shareholders at failed national banks to repay losses to depositors (Macey and Miller, 1992). But even

⁷As is discussed later, although the increase in the annual mean bank failure rate is not statistically significant at the 5 percent level, the decline in the nonbank failure rate between these two periods is statistically significant.

after adding this sum to the banks' capital, their capital ratios were still below that of nonbanks. Moreover, banks tend to have greater off-balance sheet assets than nonbanks. This causes their reported capital to on balance sheet assets to overstate their overall capital ratios.

Two, on average, depositor creditors suffered substantially smaller relative losses at failed banks than did creditors at failed nonbanks firms (Kaufman, 1994). The smaller losses appear to reflect a quicker failure resolution process, in part attributable to quick suspensions of banks by regulators when depositor runs produced liquidity problems and sufficiently large fire-sales losses to bring about possible insolvency. Regulators suspended the bank's operations until they could determine whether the institution had sufficient capital to reopen or could raise the appropriate amount quickly. This gave banks less opportunity to operate while insolvent and from ongoing operations as well to continue to generate losses to "gamble for resurrection." Bankruptcy courts in the U.S., to which banks are not subject, apparently gave nonbank firms greater opportunity to do both. Thus, depositors and other creditors were willing to permit banks to operate on a smaller capital base.

Three, the losses from fire-sales of assets may not have been perceived as very large and well within the loss absorbing capabilities of the low capital ratios maintained by the banks. Even when such losses were greater than a bank's capital they were, as noted above, smaller than those experienced by creditors of insolvent nonbanks. This suggests that the market believed that, at least, some portion of the banks' earning assets were not as illiquid or opaque as is sometimes suggested, even in the period before banks were

operated much beyond local markets and technology increased the marketability of loans through better information and means like securitization. The lower capital ratios before the introduction of the safety-net suggest that the market viewed banks to be less rather than more fragile than other firms and/or subject to smaller creditor losses when they did fail.

The cash held by banks relative to their assets is considerably greater in more recent years than that held by nonfinancial firms. It is unlikely that this was reversed in earlier years. In large part, the higher cash ratios of banks are likely to reflect reserve requirements imposed on banks by law or regulation. It is unlikely that, *ceteris paribus*, the cash ratio contributed greatly, if at all, to the perceived fragility of banks.⁸

The implications of the higher ratio of demand to total debt for perceived fragility may be interpreted in two opposite ways. On the one hand, these deposits may be withdrawn quickly and without notice and force the hurried sale of earning assets, possibly at a loss. This would increase perceived fragility. On the other hand, particularly before government deposit insurance, the ability to remove their funds quickly increases the effectiveness of monitoring by informed bank depositors by permitting them to exert more effective market discipline (Flannery, 1994; Calomiris and Kahn, 1991). That is, the threat of a run, as opposed to a run itself, is a powerful source of market discipline that operates to stabilize banking and reduce its fragility (Kaufman, 1988). Thus, one cannot say without additional evidence whether a high demand-to-total deposit ratio contributes to bank fragility or stability.

⁸The higher cash-to-asset ratios may explain part of the lower capital and higher demand deposit ratios.

4. CHANGES IN BANK FRAGILITY CONDITIONS THROUGH TIME AND THE EFFECTS OF THE SAFETY NET

Changes in the economic environment through time may be expected to change the values of all three indicators of bank fragility. Two major economic developments that may be expected to have affected the values of the indicators are 1) the introduction of the bank safety net and 2) advances in communications and computer technology. Table 1 shows that the values of all three of the banks' fragility measures—capital-to-asset, cash-to-asset, and demand-to-total deposits—have declined through time.

With infrequent exception, these ratios and changes are consistent with what theory would predict. (These hypothesized effects are summarized in Table 3.) The introduction of the government safety net, which, until the enactment of FDICIA in 1991, tended to be poorly designed and underpriced, particularly after the introduction of deposit insurance with its design flaws of nonrisk related premiums and weak regulatory intervention and closure rules, *ceteris paribus*, should lower the reported capital ratios of banks by permitting them to substitute public capital for private capital and encouraging moral hazard behavior on the part of shareholders (Kane, 1989a and b; Benston and Kaufman, 1988; and Kaufman, 1995).⁹ Indeed, the 1994 Annual Report should also lower the banks' cash of the FDIC drive this point home when it states that "the FDIC remains today the symbol

⁹In addition to underpriced deposit insurance premiums, the Fed frequently extended credit to insolvent and near-insolvent banks at lower interest rates than the market would have charged and did not charge for or limit daylight overdrafts in clearing settlement until the late 1980s (U.S. House of Representatives, 1991). Thus, Fed practices likely encouraged both moral hazard and agency problems.

The current emphasis on public rather than private capital as a measure of bank financial strength is reflected in a recent statement by the FDIC that "the FDIC remains today the symbol of banking confidence" (Federal Deposit Insurance Corporation, 1995, p. 35).

of banking confidence" (FDIC, 1995, p. 35). The introduction of the underpriced safety net should also lower the banks' cash ratios to the extent permitted by reserve requirements both by encouraging moral hazard behavior and by providing for an alternative source of liquidity through the Fed's discount window.

The direction of the impact of the safety net on the demand to total deposit ratio is less certain. On the one hand, to the extent the safety net reduces the need for depositor monitoring, it should reduce the ratio. But, on the other hand, to the extent the safety net permits greater fragility to exist without a widespread perception or concern over increased failure or losses to depositors, it would encourage an increase in the ratio.

Advances in communications and computer technology, *ceteris paribus*, should increase the liquidity of bank earning assets through better information and securitization and permit banks to reduce their risk exposures through additional product-type and geographic diversification. In addition, these should advances permit quicker, cheaper, and more effective bank monitoring by depositors. These forces should in turn reduce the need for banks to hold both private capital and cash, subject to any reserve requirement constraint. On the other hand, however, to the extent that these advances have permitted banks to engage in a greater volume of accounting "off-balance sheet" activities relative to accounting "on-balance sheet" activities, the reported capital to only on balance sheet assets may increase, even though the capital to overall economic balance sheet asset ratio is constant or even declining slightly. To the extent that the advances in technology have also permitted depositors to develop closer substitutes for demand deposits, e.g., money

market funds, the demand for bank demand deposits should be reduced and the demand to total deposit ratio decline.

Thus, the observed declines in the capital and cash ratios are generally consistent with both the introduction of the safety net and advances technology explanations. The decline in the reported capital ratio reflects the greater combined impact of the substitution of public for private capital and a greater decrease in perceived risk of both on- and off-balance sheet activities than the effect of an increase in off-balance sheet activities. The observed decline in the demand deposit ratio is consistent with both the technology explanation and the hypothesis that the safety net protects greater fragility and thus reduces the need for depositor discipline, but inconsistent with the reduced depositor concern hypothesis. However, to the extent that either of the first two effects alone or in combination with each other are strong, they can outweigh any effect of the reduced need for depositor concern explanation of the impact of the safety net and need not disprove the existence of that effect. The decline in the cash ratio is also likely to reflect the prolonged decline in reserve requirements, particularly as, except for the 1930s, excess reserves are typically quite small. We attempt to differentiate between these two explanations in the next section.

Lastly, it is interesting to consider whether the observed changes are consistent with concern over bank fragility by the market. The reductions in both the capital and cash ratios would suggest no. However, it may also reflect the fact that many of the costs of bank failure are now absorbed by the deposit insurance agency or taxpayer rather than by

individual depositors. On the other hand, the decrease in the demand deposit ratio is consistent with this hypothesis.

5. THE IMPLICATIONS OF BANK FRAGILITY FOR BANK FAILURES IN THE FUTURE

The decrease in the capital and cash-to-asset ratios through time suggests that banks may have become more fragile. As discussed in the previous section, the increase in fragility is consistent with both the impact that the introduction of a poorly designed bank safety net and the impact that advances in technology may be expected to have. It is, however, possible to differentiate between these two hypotheses. To the extent that the safety net makes any contribution to an increase in fragility, so that fragility is greater than in its absence, the increase in fragility would translate into an increase in bank failures. If advances in technology were the only force increasing fragility, in the absence of a decrease in market discipline or an increase in macroeconomic instability, there should be no increase in bank failures. As noted earlier, the average bank failure rate increased somewhat, or, at least, did not decrease between the pre- and post-safety net periods. At the same time, however, the average annual nonbank failure rate declined substantially from 1.01 percent to 0.65 percent, a rate only 60 percent as great as that of banks¹⁰. As nonbanks are not insured and subject only to market discipline, the decline in their failure rate suggests both that macroeconomic or regional instability is unlikely to have increased greatly relative to the extant degree of market discipline and that the intensity of market

¹⁰The decline in the nonbank failure rate is statistically significant at the 5 percent level.

discipline on noninsured firms is unlikely to have declined greatly. In the absence of the introduction of the safety net, there is no reason not to expect the bank failure rate to also have declined significantly.

Thus, it appears likely that the observed increases in the bank fragility indicators may at least partially be attributed to the introduction and subsequent broadening of the safety net under banking and that the safety net was poorly designed in terms of not sufficiently curtailing the moral hazard and principal-agent problems that were introduced concurrently. In particular, the decline in capital ratios left many banks with insufficient capital to withstand losses from the instability in the macro or regional economies that occurred in the 1930s and 1980s and that they were better able to absorb before. That is, the introduction of the safety net increased their perceived and actual fragility.

6. CONCLUSION

This paper has provided evidence that, at least in the U.S., the perceived fragility of banks arising from their low capital-to-asset and cash-to-asset ratios and their high demand to total deposit (debt) ratio has not always been translated into actual fragility as reflected in a high failure rate. Indeed, although for the entire 1870 to 1994 period analyzed the bank failure rate in the U.S. was moderately higher than that of nonbank firms, before the introduction of the first safety net under banks in 1914, the bank failure rate was slightly lower than that of nonbanks. Both the perceived fragility of banks, as measured by two of the three indicator ratios, and the annual average failure rate of banks increased after the introduction of the safety net and the accompanying partial replacement of market

discipline by regulatory discipline. Indeed, in the period since 1914, the average annual failure rate for banks exceeded that for nonbanks by nearly 70 percent.

Although the increase in the fragility measures is consistent with the introduction of the safety net, it is also generally consistent with the advances in technology and communications. However, in the absence of a concurrent decrease in market discipline brought about for reasons other than either the introduction of the safety net or an increase in macroeconomic instability, the increase in the bank failure rate is inconsistent with greater fragility from advances in technology and communications alone. Moreover, the statistically significant decline in the average failure rate of noninsured nonbanks between the pre- and post-1914 periods suggests that macroeconomic and regional instability did not increase relative to the degree of market discipline and, *ceteris paribus*, contribute to the increased (or unchanged) bank failure rate. Rather, it appears that the introduction of the federal government safety net, which was intended in large measure to reduce the likelihood of systemic risk, has unintentionally increased the fragility of banks by reducing, in particular, their capital ratios to levels inconsistent with the prevailing instability in the macro and regional economies and contributed significantly to an increase in the instability of both individual banks and the banking system (Kaufman, 1996). Because banks also operated with lower capital ratios than nonbanks before 1914, the market did not appear to perceive them as unusually fragile. The capital ratios were sufficiently high to restrict both the bank failure rate and creditor (depositor) losses to below that of nonbanks.

Thus, the public perception of banking as fragile and susceptible to failure is currently largely correct, but ironically primarily because of government policies intended to

enhance the safety of banks. Before the introduction of such policies in 1914, regulation by the marketplace apparently was effective in preventing the perceived fragility of banks from being translated into actual fragility. That is, the market appears to have handled "fragile" banks with care and did not permit them to fail at a greater rate or with greater cost than perceived less fragile nonbanks. The increase in bank failures since the introduction of the safety net thus reflects primarily regulatory (government) failure than market failure. The safety net was introduced in 1914 and expanded in 1934 in response to periodic sharp increases in the rate of bank failures, particularly in 1907-1908 and 1929-1933. Rather than repair defects in the market mechanism that had produced relatively low average rates of bank failures, the government chose more dramatic and visible policies.¹¹ In banking, at least, the perfect became the enemy of the good.

To the extent that these policies have reduced or eliminated systemic risk, which may or may not have existed before 1914 and which may have existed in the 1930s; they appear to have done so only at a very high cost to society. Because the evidence presented in this paper is primarily circumstantial, the conclusions are only suggestive rather than conclusive. Nevertheless, they challenge much conventional wisdom about banking and suggest that the usefulness and effectiveness of particularly the pre-FDICIA

¹¹This outcome, of course, is not unique to public policy applied to banking. Charles Schultze has recently observed that

[N]oneconomists have an almost universal desire to deal with market failures through carefully specified regulation rather than a change in incentive structures. Such specification is the natural function of lawyers....When government intervenes in the marketplace, our political leaders typically rule out the manipulation of economic incentives to deter undesirable actions because reliance on market responses injects an uncertain, partially random, and therefore "unfair" set of forces into the picture (Schultze, 1986, p. 27).

prudential regulations on banks are worthy of more rigorous analysis and reevaluation.¹² Moreover, because as noted earlier, serious and costly banking problems have plagued many other countries in recent years despite the existence of similar prudential regulatory policies, particularly the safety net, the evidence developed for the U.S. also suggests that a reexamination of the costs and benefits of these policies is warranted worldwide.

¹²A study of historical stock and bond market volatility in the U.S. came to a similar conclusion. The authors found that

In contrast with impressions one receives from financial and other historians, the National Banking era before 1914 exhibits less, not more, stock and bond market volatility than the period from 1914 to the present. This raises questions about the effectiveness of financial and regulatory reforms that were put in place in 1914 and later years. (Wilson, Sylla, and Jones, 1990, p. 112).

TABLE 1
Fragility Measures for Banks And Nonfinancial Firms
1870-1992

Years	CASH/TOTAL ASSETS		CAPITAL/TOTAL ASSETS		DEMAND DEPOSITS/TOTAL DEPOSITS	
	Banks	Nonfinancial Firms	Banks	Nonfinancial Firms	Banks	Insured Banks
1870-1970	0.186 ^a		0.158 ^a			
1896-1970	0.186 ^a		0.122 ^a		0.706 ^e	
1870-1913	0.191 ^a		0.229 ^a			
1896-1913	0.201 ^a		0.183 ^a		0.796 ^e	
1913-1970	0.182 ^a		0.104 ^a		0.678 ^e	
1934-1992	0.198 ^b	0.055 ^c	0.076 ^b	0.522 ^c		0.552 ^b
1950-1992	0.170 ^b	0.042 ^d	0.071 ^b	0.629 ^d		0.480 ^b
1950-1969	0.200 ^b	0.053 ^d	0.075 ^b	0.643 ^d	0.653 ^e	0.660 ^b
1970-1992	0.144 ^b	0.032 ^d	0.067 ^b	0.617 ^d		0.323 ^b

^a All banks, Historical Statistics of the United States, Colonial Times to 1970 (U.S. Department of Commerce, Bureau of the Census).

^b All insured commercial banks, FDIC Statistics on Banking - Historical 1934-1994.

^c Nonfinancial firms include corporations other than banks, security dealers, insurance companies and agents, real estate firms, and investment companies. Historical Statistics of the United States, Colonial Times to 1970; Statistical Abstract of the United States (U.S. Department of Commerce, Bureau of the Census), (various years); and Statistics of Income: Corporation Income Tax Return (U.S. Internal Revenue Service), (various years).

^d Balance Sheets for the U.S. Economy 1945-1994 (Board of Governors of the Federal Reserve System).

^e All commercial banks, Historical Statistics of the United States, Colonial Times to 1970.

TABLE 2
Annual Failure Rates for Banks and Nonbank Firms
1870-1994

	Banks^a	Nonbanks^b
	(Percent)	
1870-1994	1.03 (2.74) ^c	0.78 (0.35)
1870-1913	0.91 (1.00)	1.01 (0.21)
1914-1994	1.09 (3.32)	0.65 (0.35)
1870-1929, 1934-1994	0.65 (0.87)	0.76 (0.34)

^a Includes chartered commercial and savings banks.

^b Excludes finance, real estate, and railroad firms, professionals, and farmers.

^c Standard deviations in parenthesis.

Sources: *Annual Report* (Board of Governors of the Federal Reserve System), (various years); *Annual Statistical Digest 1970-1979* (Board of Governors of the Federal Reserve System); *Annual Reports* (Federal Deposit Insurance Corporation), (1990 and 1994) ; *Historical Statistics of the United States, Colonial Times to 1970* (U.S. Department of Commerce, Bureau of the Census); and *Statistical Abstract of the United States* (U.S. Department of Commerce, Bureau of the Census), (various years).

TABLE 3

Changes in Indicators of Bank Fragility Through Time

Stylized Facts About Fragility Measures	Consistent With Introduction of Safety Net	Consistent with Advances in Technology	Consistent With Fragility Concern
K/A: Low and declining	Yes, banks willing to gamble more	Yes and no: Yes-Permits greater diversification of assets and improved monitoring No-reported "on-balance sheet" ratio rises to maintain constant total balance sheet ratio.	No
C/A: Declining	Yes, alternate source of liquidity^a	Yes, permits greater diversification^a	No
DD/TD: High and declining	Yes and no: Yes-requires less monitoring No-increases fragility	Yes, permits more close substitutes for transaction purposes	Yes and no: Yes-declining No-high level

-
- K = Net worth**
 - A = Total on-balance sheet assets**
 - C = Cash on hand or balances at other banks**
 - DD = Demand and other transaction deposits**
 - TD = Total deposits**
 - ^a = Subject to reserve requirement constraint.**

TABLE A1

CAPITAL-TO-ASSET RATIOS AT CORPORATIONS BY INDUSTRY SELECT YEARS, 1926-1992

Year	INDUSTRY								
	Total	Excluding Finance	Finance	Construction	Mining	Manufacturing	Public Utilities	Trade	Services
1926	45.5	60.3	21.3	40.5	68.6	71.5	46.3	63.0	52.5
1930	48.3	62.3	28.9	48.3	69.8	75.3	50.7	63.6	57.1
1940	43.2	61.0	27.1	49.7	70.9	72.9	48.7	59.8	48.2
1950	37.4	61.2	13.4	43.8	67.0	68.5	51.4	58.2	53.3
1960	33.9	56.1	14.9	34.6	63.0	64.5	48.5	50.4	38.6
1970	28.5	44.9	14.2	28.6	57.1	51.2	42.3	41.1	32.8
1980	25.5	39.3	13.2	24.7	42.6	43.8	37.3	34.4	29.7
1986	26.1	35.5	18.8	24.1	47.8	38.4	37.7	28.0	26.2
1990	26.1	32.5	21.0	26.2	50.0	35.5	35.0	24.5	24.0
1992	28.5	32.3	25.7	31.0	48.6	34.3	34.1	25.6	29.7

Source: *Statistics of Income: Corporation Income Tax Returns* (Washington, D.C.: U.S. Internal Revenue Service, Department of the Treasury), various years.

TABLE A2

CAPITAL-TO-ASSET RATIOS FOR SELECTED INDUSTRIES 1902-1970

Year	INDUSTRY			
	Telegraph	Telephone	Street and Electric Railroads	Electric Light and Power Mining
			(percent)	
1902	69	62	52	
1907	67	54	49	
1912	60	50	46	52
1917	56	58	42	48
1922	54	58	37	44
1927			34	47
1932			31	50
1937				48
1940				49*
1950				45
1960				42
1970				40

*Break in series.

Source: U.S. Department of Commerce, *Historical Statistics*, p. 939.

REFERENCES

- Benston, George J., Robert A. Eisenbeis, Paul M. Horvitz, Edward J. Kane, and George G. Kaufman, Perspectives on Safe and Sound Banking, Cambridge, MA.: MIT Press, 1986.
- Benston, George J. and George G. Kaufman, Risk and Solvency Regulation of Depository Institutions: Past Policies and Current Options, New York: Salomon Brothers Center, Graduate School of Business, New York University, 1989.
- Benston, George J. and George G. Kaufman, "Is the Banking and Payments System Fragile," Journal of Financial Services Research, December 1995, pp. 209-240.
- Benston, George J. and George G. Kaufman, "The Appropriate Role of Bank Regulation," Economic Journal, May 1996. pp. 688-697.
- Calomiris, Charles W. and Charles M. Kahn, "The Role of Demandable Debt in Restructuring Optimal Banking Arrangements," American Economic Review, June 1991, pp. 497-513.
- Federal Deposit Insurance Corporation, 1994 Annual Report, Washington, D.C., 1995.
- Flannery, Mark J., "Debt Maturity and the Deadweight Cost of Leverage: Optimally Financing Banking Firms," American Economic Review, March 1994, pp. 320-331.
- Greenspan, Alan, "Remarks at the International Conference of Bank Supervisors in Stockholm, Sweden," Washington, D.C.: Board of Governors of the Federal Reserve System, June 13, 1996.
- Kane, Edward J., The S&L Mess, Washington, D.C.: Urban Institute, 1989a.
- Kane, Edward J., "Changing Incentives Facing Financial-Services Regulators," Journal of Financial Services Research, September 1989b, pp. 265-274.
- Kaufman, George G., "Bank Runs: Causes, Benefits, and Costs," Cato Journal, Winter 1988, pp. 559-587.
- Kaufman, George G., "Capital in Banking: Past, Present and Future," Journal of Financial Services Research, April 1992, pp. 385-402.
- Kaufman, George G., "Bank Contagion: A Review of the Theory and Evidence," Journal of Financial Services Research, April 1994, pp. 123-150.
- Kaufman, George G., "The U.S. Banking Debacle of the 1980s: An Overview and Lessons," Financier, May 1995, pp. 9-26.
- Kaufman, George G., "Bank Failures, Systemic Risk, and Bank Regulation," Working Paper Series (96-1), Federal Reserve Bank of Chicago, January 1996.

- Lindgren, Carl-Johan, Gillian Garcia and Matthew Saal, Bank Soundness and Macroeconomic Policy, Washington, D.C.: International Monetary Fund (1996, forthcoming).
- Macey, Jonathan R. and Geoffrey P. Miller, "Double Liability of Bank Shareholders: History and Implications," Wake Forest Law Review 27, No. 1, 1992, pp. 31-62.
- Minsky, Hyman P., "Financial Factors in the Economics of Capitalism," Journal of Financial Services Research, December 1995, pp. 197-208
- Schultze, Charles L., "The CEA: An Inside Voice for Mainstream Economics," Journal of Economic Perspectives, Summer 1996, pp. 23-39.
- Schwartz, Anna J., "Coping With Financial Fragility: A Global Perspective," Journal of Financial Services Research, December 1995, pp. 445-451.
- Sylla, Richard, John J. Wallis, and John B. Legler, "Historical Economics: U.S. State and Local Government," NBER Reporter, April 1995, pp. 14-16.
- U.S. House of Representatives, Committee on Banking, Financial and Urban Affairs, "An Analysis of Federal Reserve Discount Window Loans to Failed Institutions," Staff Report, June 11, 1991.
- Wallis, John J., Richard E. Sylla, and John B. Legler, "The Interaction of Taxation and Regulation in Nineteenth Century U.S. Banking," In Claudia Goldin and Gary Lidecap, eds., The Regulated Economy, Chicago: University of Chicago Press, 1994, pp. 121-144.
- Wilson, Jack W., Richard E. Sylla, and Charles P. Jones, "Financial Market Panics and Volatility in the Long-Run, 1830-1988" in Eugene N. White, ed., Crashes and Panics: The Lessons From History, Homewood, Il.: Dow Jones-Irwin, 1990, pp. 85-125.