



Working  
Paper Series

**Central Banks, Asset Bubbles, and  
Financial Stability**

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Working Papers Series  
Research Department  
(WP-98-12)

Federal Reserve Bank of Chicago

**Revised  
November 2, 1998**

**CENTRAL BANKS, ASSET BUBBLES, AND  
FINANCIAL STABILITY**

**George G. Kaufman\***

With the rapid disappearance of product (goods and services) inflation as the major policy concern for central banks in many countries over the last decade, asset price inflation (bubbles) and financial stability have increasingly become important concerns. A recent survey by the International Monetary Fund (IMF) reported serious banking and financial market problems in more than 130 of its 180 plus member countries since 1980, and that was before the most recent round of financial crises in Asia (Lindgren, Garcia, and Saal, 1996). The cost of resolving these crises is high. The transfer costs from the use of public (taxpayer) funds to finance the negative net worths of insolvent banks and at times of other financial institutions resulting from the shortfall of the market value of the institutions' assets from the par value of their deposit and other liabilities, which are explicitly or implicitly protected from loss by the government, exceeded 10 percent of GDP in a significant number of countries.

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\*Loyola University Chicago and Federal Reserve Bank of Chicago. This paper was prepared for presentation at the Fourth Dubrovnik Conference of Transitional Economies in Dubrovnik, Croatia on June 24-26, 1998, sponsored by the Croatian National Bank. It was also presented at the annual meeting of the Western Economic Association in Lake Tahoe, CA. June 29-July 1. I am indebted to the participants at both conferences and, in particular, to the assigned discussants, John Bonin (Wesleyan University) and Richard Nelson (Wells Fargo Bank) as well as to Douglas Evanoff and James Moser (Federal Reserve Bank of Chicago) for their helpful comments and suggestions.

The overall cost of the banking problems is increased further by the costs from any

unused labor and capital resources as well as the misallocation of employed resources that reduce GDP, from the depreciation of the domestic currency (which is frequently translated into a higher rate of inflation), and from increased uncertainty that shortens investment time horizons and contributes to slower macroeconomic growth. As a result, financial instability is an important cause of macroeconomic instability and poor performance. The costs can also spillover to other countries either because of reductions in the values of cross border financial claims or because downturns in macroeconomic activity or depreciations of local currencies cause slowdowns in imports from other countries. Moreover, industrial countries are often called upon to provide direct financial as well as technical assistance to less industrial countries experiencing serious banking difficulties.

On the other hand, evidence also suggests that macroeconomic instability is an important cause of financial instability. In particular, inflation in either or both product prices and asset prices reduces the efficiency and endangers the survival of financial institutions. Although central banks have a long history of targeting and affecting product inflation and both the strategies used and their abilities to do so have been analyzed in depth, the role of central banks in targeting asset prices is less well chartered and considerably more controversial.<sup>1</sup>

This paper 1) reviews the evidence on the causes and implications of financial instability, in particular the role of asset price bubbles, 2) discusses the potential role of central banks in preventing financial instability, and 3) describes a prudential regulatory

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<sup>1</sup>Economists have only recently devoted much attention to either incorporating asset prices into measures of the general price level theoretically (Goodhart, 1995) or even to developing aggregate asset price indexes for a wide range of countries (Borio, Kennell, and Prowse, 1994).

scheme and strategy that could help central banks insulate financial institutions from asset price bubbles and reduce disruptions to the macroeconomy.

## I. **Financial Instability**

Andrew Crockett, the General Manager of the Bank of International Settlements (BIS) has defined financial stability as stability of the key institutions and markets that make up the financial system.<sup>@</sup> He continues that:

Stability in financial institutions means the absence of stresses that have the potential to cause measurable economic harm beyond a strictly limited group of customers and counterparties....[S]tability in financial markets means the absence of price movements that cause wider damage...[S]tability requires (1) that the key institutions in the financial system are stable, in that there is a high degree of confidence that they can continue to meet their contractual obligations without interruption or outside assistance; and (2) that the key financial markets are stable, in that participants can confidently transact in them at prices that reflect fundamental forces that do not vary substantially over short periods when there have been no changes in fundamentals (Crockett, 1997, pp 9-10).

This paper focuses primarily on financial institutions, although institutions and markets are closely interrelated. A major cause of bank instability is instability in financial markets in the form of asset price bubbles. Conversely, bank instability feeds back onto financial markets, reducing their stability.

In market oriented economies, financial institutions mobilize savings and channel them to the most potentially productive uses. The more efficient this transfer, the more efficiently are real resources allocated and the greater is the aggregate welfare of the economy. Financial institutions also assist in monitoring the performance of the borrowers for the lenders and in policing corporate governance. Recent empirical evidence supports

the theoretical arguments that banking matters, namely that the more developed is the financial sector in a country, the faster is real per capita macroeconomic growth. (The evidence is reviewed in Levine, 1997a and Rajan and Zingales, 1998.) Moreover, countries that have both developed banking markets and liquid capital markets appear to grow faster, on average, than countries that have only one developed market, which in turn grow faster than countries in which neither banks nor capital markets are very well developed (Levine, 1997b).

Although the evidence suggests that the behavior of banks importantly affects the macroeconomy for both good and bad, the predominant focus to date has been on the bad-breakdowns in banking spreading to breakdowns in the macroeconomy. A large number of studies report that the frequency of bank failures in industrial countries is inversely correlated with the stage of the business cycle -- rising during recessions and falling during expansions -- although the relationship appears stronger in the U.S.. (A review of the literature appears in Benston and Kaufman, 1995; Bordo, 1986; Kaufman, 1994; Mishkin, 1997.) For example, the correlation between annual changes in the number of bank failures and industrial production between 1875 and 1919 in the U.S. was -0.42 and in only two periods of sharp increases in bank failures did industrial production fail to decline (Benston et.al, 1986). The studies differ on how banking crises begin -- whether bank problems exogenously ignite the macroeconomic problems or are ignited by the macroeconomic or other exogenous forces and, in turn, feedback on the macroeconomy and intensify the magnitude and duration of the macro problem.

Among more contemporary economists, Hyman Minsky (1977) and Charles

Kindleberger (1985 and 1996) are the major proponents of banks exogenously igniting problems that spread first throughout and then beyond the banking and financial sectors. Like most economic agents, banks get caught up in the euphoria of budding economic expansions and expand credit rapidly to finance the increase in economic activity, particularly in areas subject to the greatest increase in demand and consequently in prices, e.g. stock market and real estate. Moreover, the credit is often collateralized by the assets purchased. The credit expansion fuels and accelerates the economic expansion, accelerates asset price increases, and encourages additional speculation. Both lenders and borrowers fall victim to *Irrational exuberance*.<sup>®</sup> Through time, borrowers become more highly leveraged and turn increasingly to shorter-term debt. Their margin of safety in covering their debt service payments from operating revenues or continued increases in asset prices declines and approaches zero. Increasingly, debt servicing is financed out of new debt (in Minsky's terms-- Ponzi finance). Given the high leverage, any slight decline or even slowdown in expected revenues, no less the bursting of asset price bubbles, and even moderate increases in interest rates can cause defaults. The financial system crashes off its own weight. This leads to a self-feeding sequence of distress-selling, fire-sale losses, further defaults, business failures, bank runs, and bank failures and the expansion turns into a macroeconomic downturn. Bank problems precede macroeconomic problems.

Most contemporary analysts, however, view the bank problems during macroeconomic downturns to be caused primarily by the accompanying increase in business failures and rising unemployment, which in turn are often caused by some

exogenous shock, including government policies that reduce aggregate bank reserves and therefore the money supply and the bursting of asset price bubbles (Bordo, Mizrach, and Schwartz, 1998 and articles included in Hubbard, 1991). Increased business failures and unemployment and sharply lower asset prices increase defaults on bank loans and also the perceived risk of performing bank loans. The banking problems make it increasingly difficult for depositors to evaluate the financial health of their banks and to differentiate financially healthy from sick institutions (Mishkin et al, 1995). As a result, in the absence of deposit insurance, they are encouraged to run from deposits at their banks into currency outside the banking system, rather than to other safe banks. Unless the accompanying loss in aggregate bank reserves is offset by a central bank lender of last resort, a multiple contraction in money and credit is ignited (Kaufman, 1988). This, in turn, feeds back onto the macroeconomy, transmitting and magnifying the initial downturn.

Kaminsky and Reinhart (1996) have recently examined 25 banking crises worldwide between 1970 and the early 1990s and developed a series of stylized facts. These are shown in Figure 1. Note that, on average, the banking crises are dated a number of months after declines in both aggregate output and the stock market and increases in real domestic credit and bank deposits. Kaminsky and Reinhart conclude that recessionary conditions characterize the periods preceding...banking...crises (Kaminsky and Reinhart, 1997, p.15).

Asset price bubbles have received particular attention in recent years as evidence has accumulated that they contributed importantly to banking problems in many countries, e.g., bubbles in real estate and energy in the U.S. in the mid and late-1980s; bubbles in

real estate and stock prices in Japan in the early 1990s; and bubbles in real estate and stock prices in Korea and Southeast Asia in the mid-1990s.<sup>2</sup> Financial institutions are particularly sensitive to abrupt asset price declines because many of them engage in asset-based lending in which the institutions finance the acquisition of assets, which are pledged as collateral. If asset prices decline abruptly, the institutions must either require additional collateral or sell the assets to repay the loans. If the asset sales are not quick enough, the banks may generate insufficient funds to retire the outstanding amount of the loans and the banks will suffer losses and, if large enough, may be driven into insolvency.

Capital impaired banks are likely to cutback on their new lending until their capital is replenished. Moreover, abrupt price declines increase general uncertainty. In such an environment, even solvent banks encounter difficulties in evaluating the value of risky assets and ventures and are likely, in the absence of deposit insurance and other guarantees, to reshuffle their loan portfolios towards safer projects; the more so, the closer the bank is to insolvency. Combined with the cutbacks in total bank lending, this behavior creates a **credit crunch** that makes it more difficult to ignite and/or sustain recoveries in macroeconomic activity.

As Anna Schwartz has frequently and eloquently argued, financial institutions, and banks in particular, do not do well in periods of uncertainty and macroeconomic instability (Schwartz 1988). To a great extent these institutions effectively deal in forward contracts. They commit themselves to pay sums of money on deposits and collect sums of money

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<sup>2</sup>The BIS has estimated that, after the bursting of property price bubbles in industrial countries in recent years, commercial property traded at near 30 percent of its peak values and residential property at near 70 percent in real terms (BIS, 1998).

on loans in the future at prices (interest rates) determined today. In the process, they assume a number of risks, including:

- C credit risk -- risk that all future payments are not made in full or on time
- C interest rate risk -- risk that interest rates change differently than expected
- C foreign exchange risk -- risk that exchange rates change differently than expected
- C liquidity risk -- risk that assets cannot be sold or liabilities replaced quickly at equilibrium prices
- C operational risk -- back office and general management risk
- C legal risk -- risk that priorities in default change
- C regulatory/legislative risk -- risk that regulations or legislation change abruptly
- C fraud risk

Banks undertake some or all of these risks because they believe that they can manage them better than others; that is, because they believe that they have a comparative advantage arising from greater knowledge and expertise in both measuring and managing the risks involved. This involves forecasting interest rates, prices, exchange rates, income, and economic activity in the relevant market areas, as well as more specialized factors, such as political stability. As a result, the banks believe that they can sell their risk-taking services for more than the expected losses and generate a positive return on average. But to do so, their forecasts must be right. If they are wrong, any excess losses suffered are charged to capital. Because banks tend to be highly leveraged and have low capital-to-asset ratios, losses, which may appear relatively small to nonbanks that are less highly leveraged, may drive banks into insolvency. On the other hand, if the banks do not engage in any risks, they cannot expect to earn more than a risk-free return on their equity. To fulfill their economic role, banks must manage not eliminate risk taking.

The more volatile the economic, political, or social environment, the greater are the risks assumed in unhedged forward contracts and the greater must be the risk premiums charged in order to avoid losses. Empirical evidence suggests that, although banks fancy themselves as experts in risk management, their record is not exemplary. Their losses are occasionally substantial. Bank failures are highly correlated with volatility in product prices, asset prices, and interest rates. Michael Bordo (1997) has plotted the bank failure rate in the U.S. since 1870 with the rate of product inflation. This is shown in Figure 2. It is evident that, with the primary exception of the post - FDIC period through the late 1970s, bank failures peak after product inflation peaked and prices slowed sharply or declined. For S&Ls in the U.S. in the 1980s, the failure rate is effectively pushed forward some 10 years to when product inflation first accelerated sharply, pushing up interest rates unexpectedly abruptly at a time the institutions were heavily asset - long, and then slowed equally sharply.

Asset inflation plays a similar role. Many analysts have blamed the large increase in U.S. bank failures during the 1929-33 Great Depression on the collapse in stock prices following a sharp run up, which they believed was fueled by excessively liberal bank credit. Earlier studies of banking problems in other countries as well as the U.S. have also identified collapses or bubbles in asset prices as a major culprit (Kindleberger, 1996; Friedman and Schwartz, 1963; Schwartz, 1988). In only two of the eight periods of sharp increases in bank failures in the U.S. before the Great Depression of the 1930s did the stock market not decline and the correlation between bank failures and the annual S&P stock index was -0.53 (Benston et. al, 1986). More recently, as noted, asset price bubbles

have played a major role in producing large banks losses and widespread bank insolvencies in many countries.

In the U.S., a large number of the S&Ls and banks that failed in the 1980s and early 1990s experienced large losses from the bursting of energy prices, particularly in the Southwest, and real estate prices, primarily in the Southwest and New England. The institutions had lent heavily to finance both the acquisition of these assets and ventures based on projected increases in these asset prices. When the bubbles burst, defaults increased sharply both directly as the value of the collateral declined and indirectly as economic activity spurred by the asset price runups slowed. The banks victimized included the very large Continental Illinois Bank (the eight largest bank in the country at the time), the Bank of New England (Boston), and seven of the largest 10 banks in Texas (Kaufman, 1995). Kindleberger summarizes more than 30 banking and financial crises throughout Western Europe and the U.S. from the early 1600s through 1990, starting with the Thirty Years=War in Europe in the 1620s, Tulipmania in Holland in the 1630s, and the South Sea Bubble in England in the 1720s. In almost all of these, he identifies peaks in asset speculation (asset price bubbles) as preceding the crisis (Kindleberger, 1996, Appendix B).

### **Bank Fragility**

Banks are widely perceived as particularly vulnerable to excessive risk taking because they are perceived to be more structurally fragile than other firms and therefore more likely to fail. Their perceived fragility arises from three sources:

- C Low cash-to-assets ratio (fractional reserve banking)

- C Low capital -to-assets ratio (high leverage)
- C High demand debt (deposit)-to-total debt (deposit) ratio (high ability to run).

Each one of these sources by itself is perceived to reflect fragility, but all three in combination are perceived as particularly fragile and dangerous. At the first signs of doubt about the ability of their banks to be able to redeem deposits in full and on time, demand and other short-term depositors can run on the banks in order to be first in line and withdraw their funds without loss. Because they hold cash equal to only a fraction of their deposits, the banks are likely to have to sell some earning assets quickly to accommodate all fleeing depositors. In the process, they are likely to suffer fire-sale losses, the more so the more opaque are the assets. These losses, in turn, may exceed the small capital base of the banks and drive them into insolvency.

Not only were banks perceived to fail more frequently than other firms, but their failures were perceived to be more detrimental and costly to the economy for a number of reasons. Among other things, the failures would:

- C Reduce deposits and thereby the aggregate money supply and hamper trade,
- C Reduce the most liquid wealth holding of a large number of lower and middle income households,
- C Reduce the availability of the major source of credit to households, business enterprises, and governments, and
- C Give rise to fears that the failures would spread to other banks and beyond to the financial system as a whole, the macroeconomy, and other countries, i.e., produce systemic risk.

But fragility per se does not necessarily imply breakage or failure. Rather, it implies ~~A~~handle with care.<sup>@</sup> And, when encouraged to do so, the market does so. As a result, the

breakage rate for fine wine glasses and china is likely to be lower than for ordinary drinking glasses and dishware. And the same is true for banking. U.S. experience in this area is useful for a number of reasons. Reasonably long and accurate historical data is available. The U.S. has had a large number of privately owned banks. Until recently, most were particularly fragile because narrow restrictions on geographic and product-line expansion hindered them from reducing their risk exposures through diversification as much as otherwise. In addition, with the exception of the repudiation of gold contracts in 1933, the U.S. Government did not expropriate or devalue deposits and, with the exception of the South after the Civil War, the U.S. did not experience changes in governments where the new government repudiated the debt (money) of the old government or confiscated bank balances.<sup>3</sup> This permits us to analyze the performance of the U.S. banking system over a sufficiently long uninterrupted period of time to derive a meaningful number of observations both before and after the introduction of the safety-net. The U.S. experience also permits us to analyze the effects of imposing government guarantees on a previously basically uninsured banking system.<sup>4</sup>

From after the Civil War in 1870 through 1995, the average annual failure rate for banks in the U.S. was greater than for nonbanks (Kaufman, 1996b.) But all the difference is attributable to the large number of bank failures during the Great Depression from 1929

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<sup>3</sup>Much fear of bank failures in many countries appears to stem from government actions that devalue, tax, expropriated, or freeze bank deposits and often also currency in some way, even though the banks may be healthy. That is, the fear of banks in these countries stems more from fear of government intervention than of bank insolvency.

<sup>4</sup>Nonfederal government provided deposit insurance schemes had been introduced in a number of states before 1933. National bank notes issued by nationally chartered banks were required to be fully collateralized and any deficit paid by the U.S. Treasury Department. Thus, early national banks had some of the characteristics currently proposed by proponents of "narrow banks"

to 1933, when nearly 10,000 banks failed. In the absence of this period, the annual bank failure rate was about the same as the rate of nonbank failures. Indeed, for the period 1870 to 1914, before the establishment of the Federal Reserve System and the beginning of the federal government safety net under banks, the annual bank failure rate was lower than that for nonbanks.<sup>5, 6</sup> However, for all periods, the variance in the annual bank failure rate was greater; banks failures were clustered in a small number of years. Such clustering is consistent with the presence of bank contagion and systemic risk and contributes to the widespread public fear of bank failures.

Moreover, more thorough analysis of the numerical values of the three bank ratios that are widely perceived to reflect fragility indicates the opposite, particularly in the period before the bank safety-net. These values were determined by the marketplace. Despite the perception, bank cash ratios were not lower than for other firms nor were their earning assets necessarily more opaque. Although demand deposits facilitate runs on banks, the very fact that they do serves as a powerful form of market discipline on bank management to curtail risk taking (Calomiris and Kahn, 1991.) That is, while runs may be detrimental to bank stability, the ex-ante threat of runs from demand depositors serves to enhance stability by making management more cautious.

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ormiris, 1989 and Kaufman, 1987).

<sup>5</sup>The low bank failure rate appears to have existed even before the Civil War. Alan Greenspan, Chairman of the Board of Governors of the Federal Reserve System as recently observed that:

the very early history of American banking was an impressive success story. Not a single bank failed until massive fraud brought down the Farmers Exchange Bank in Rhode Island in 1809. (Greenspan, 1998, p.2)

<sup>6</sup>Schwartz (1988) reports similar evidence for other countries.

The low capital ratios before deposit insurance (even after adjustment for double liability) could only have existed if the market perceived banks to be less risky rather than more risky than other firms. Indeed, the evidence suggests that in the U.S. in this period, not only was the bank failure rate lower than for nonbanks, but insolvent banks were resolved more quickly with less loss to depositors or creditors than insolvent nonbanks (Kaufman, 1992, 1994, and 1996a.) In the U.S., insolvent banks then as now were resolved by their chartering regulatory agency. They do not go through the regular corporate bankruptcy process. In the absence of deposit insurance, depositor runs on perceived insolvent banks quickly produced liquidity problems and forced the banks to suspend operations. Bank examiners determined whether the bank was experiencing a liquidity or solvency problem. If they concluded the bank was insolvent, it was resolved by the regulators through recapitalization by existing shareholders, merger, sale, or liquidation. The bank did not have much opportunity to operate while insolvent and increase its losses, as could happen after federal government provided deposit insurance was introduced and the need for depositors to run and force resolution was reduced. The decision to resolve insolvencies and the timing were effectively transferred from the market place to the regulatory agencies. In contrast, nonbank insolvencies are resolved through the bankruptcy process, which both before and after introduction of the safety-net is much slower and, in the U.S., less favorable to creditors. Thus, creditors demand higher capital ratios at these firms to protect themselves from failures, which are associated with relatively larger losses.

It should be noted that the runs before deposit insurance and the accompanying

liquidity problems were largely the result and not the cause of the bank insolvencies. That is, with rare exception, the solvency problems caused the liquidity problems, rather than the liquidity problems, causing the solvency problems (Kaufman, 1996a.) An analysis of the causes of some 3,000 national bank failures before deposit insurance by J.F.T. O'Conner (1938), who served as Comptroller of the Currency from 1933 through 1938, reported that runs accounted for less than 10 percent of all causes listed for these failures (some failures had multiple causes) and were a cause in less than 15 percent of all failures.

Despite this evidence on the small number and low cost of bank failures on average before deposit insurance, the clustering of large numbers of bank failures in a few years was scary when they occurred and gave rise to fears of systemic risk. The failures were widely perceived to represent serious market failures. This led to calls for improvements. In response, the government imposed a government-provided safety net under the banks, first in the form of a discretionary Federal Reserve lender of last resort and then, when this failed to prevent the severe banking crisis of the early 1930s (less than 20 years after it was introduced), in the form of less discretionary, at least on the downside, deposit insurance by the FDIC. Gerald Corrigan, former President of the Federal Reserve Bank of New York, has stated that

More than anything else, it is the systemic risk phenomenon associated with banking and financial institutions that makes them different from gas stations and furniture stores. It is this factor--more than any other--that constitutes the fundamental rationale for the safety net arrangements that have evolved in this and other countries. (Corrigan, 1991, p. 3)

When the government provides deposit insurance, it has, like any insurer/guarantor, a financial stake in the financial condition of the bank and will act to protect its interest

through regulating prices and/or rules. Government-provided deposit insurance by necessity begets government regulation.

## II. Government Regulation and Financial Stability

By guaranteeing the par value of deposits, government provided deposit insurance (and other parts of the safety net under banks) changed the banking landscape greatly. Because it relieves some or all depositors of the need to be concerned about the financial health of their banks, deposit insurance, like all insurance, reduced the market discipline that insured depositors previously exerted. But, unlike private insurance, it generally did not either price or increase regulatory discipline sufficiently to offset the relaxation in market discipline. As a result, banks engaged in moral hazard behavior and increased their risk exposures by increasing their asset and liability portfolio exposures to credit, interest rate, and other risks and lowering their capital - asset ratios. Moreover, governments were able to use banks to help pursue their economic and political objectives regardless of the increase in risk imposed on the banks. For example, to foster home ownership, the government in the U.S. in the 1960s and 1970s persuaded the S&L industry to extend progressively longer fixed-rate mortgages funded by short-term insured deposits, which greatly increased their interest rate risk exposure. Likewise, to support its foreign policy, the U.S. Government persuaded large money center banks in the late 1970s to make loans to less developed countries (LDCs). Without deposit insurance, it is highly likely that depositors would have run on these risky institutions and discouraged them from participating in these activities. As it turned out, both policies resulted in large losses

(Barth, Brumbaugh and Litan, 1992). Nor is it likely that Hong Kong and East Asian banks would have had as large portfolios of real estate and stock market loans in recent years in the absence of perceived government guarantees.

In addition, with insurance and little fear of depositor runs, government regulators became less vigilant than their private counterparts in imposing sanctions on troubled institutions and, particularly, closure on economically insolvent institutions in order to minimize losses to the healthy banks, that contributed premiums to the insurance fund, and to the taxpayers, who are the ultimate guarantors of the fund. That is, the regulators became poor agents for their healthy bank and taxpayer principals. Regulators frequently tend to be motivated by political forces, such as friendships, bestowing favors, succumbing to pressures from powerful bankers or bank customers, and maintenance of personal reputations, as much if not more than by economic forces. Excessive moral hazard behavior by banks and poor agency behavior by regulators is, however, not inherent in government-provided deposit insurance. Rather, it is only a likely outcome as governments tend to economically misprice and misstructure their services, including deposit insurance.

The evidence from almost each and every country in recent years is that some government-provided deposit insurance, be it explicit or implicit, direct or indirect (backup to private insurance), and on all depositors or on only some depositors, is a political reality. Except for foreign owned banks in small countries, only governments are perceived to have the financial resources to stem a loss of confidence in large banks or the banking system as a whole, at least in terms of domestic currency. The evidence also suggests that it is

best to provide such insurance explicitly, so that the rules are known in advance and the coverage not fought out ex-post on the political battlefield.

Thus, the solution to the deposit insurance and bank safety-net problem is to maintain some government-provided protection, but to structure it in such a way that it is based on economic considerations and restricts both bank moral hazard behavior and regulator poor agent behavior to that that would exist if private firms provided the insurance.

This is the objective of a scheme of structured early intervention and resolution (SEIR), which in large measure was enacted in weakened form in the U.S. in the prompt corrective action (PCA) and least cost resolution (LCR) provisions of the FDIC Improvement Act (FDICIA) of 1991, which was adopted at the depth of the banking and thrift crises. The particulars of SEIR, its history, and the experience to date have been discussed elsewhere and there is little need and even less room to review them again in any detail here (Benston and Kaufman 1997 and 1998, Kaufman 1997a). Suffice it to say that this structure attempts both to 1) supplement government regulation, required by the limited and explicit government deposit insurance provided, with market regulation and 2) structure the government regulation to mimic private market regulation. In the process, SEIR introduces explicit regulatory sanctions on financially troubled banks that become both progressively harsher and progressively more mandatory as a bank's performance deteriorates and it approaches insolvency. The major provisions are shown in Table 1.

In addition, and probably most importantly, SEIR introduces a mandatory *Aclosure*<sup>®</sup> rule, through which banks are resolved by recapitalization, merger, sale, or liquidation before their capital is fully dissipated, say, when their capital declines to some small but

positive percentage of their assets.<sup>7</sup> In theory, if a bank could be resolved at such a point, losses are confined to shareholders and do not affect depositors. Deposit insurance is effectively redundant. Moreover, if losses from bank failures can be eliminated or at least minimized, fears either of a competitive banking system, which encourages the failure of individual inefficient banks, or of systemic or contagion risk, which occurs only when losses are sufficiently large to wipe out a bank's capital and the resulting large negative net worths cascade from bank to bank wiping out the next counterparty's capital, are no longer warranted. Unlike other insurance companies, which can limit but not eliminate all losses, e.g., fire and automobile insurance, a government deposit insurance agency can effectively eliminate its losses completely by monitoring and strictly enforcing its closure rule at no lower than zero economic capital. That is, except for major fraud, losses from bank failures are effectively under its own control.

The incentive for banks to engage in excessive moral hazard behavior is restrained by copying the constraints that private insurance companies impose through insurance contracts and creditors on debtors through covenants. Risk exposure is priced by risk-based insurance premiums. The ability of the bank to shift its losses to its creditors or insurance firms is reduced by imposing increasingly harsher and broader sanctions as insolvency approaches. The use of multiple performance zones or tranches, measured by capital-asset ratios or such, permits the sanctions to be graduated in strength rather than increased sharply and abruptly. This increases the credibility of regulators imposing the

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<sup>7</sup>Liquidation or physically closing and liquidating insolvent banks should be employed only rarely when the demand for bank services at the locations involved appears insufficient to promise competitive returns.

sanctions and decreases the incentive for the institution to increase its risk exposure as its performance deteriorates to near the bottom of a particular zone. To supplement the sanction sticks, carrots in the form of additional powers, fewer and faster examinations, etc., are specified to encourage banks to perform well.

Regulatory discipline is reinforced by market discipline exerted by uninsured larger depositors and other creditors, who both may be reasonably assumed to be informed or at least informable creditors and make credit quality decisions regularly in the normal course of their business. They may be expected to require higher interest rates as the financial condition of a bank deteriorates and/or run from these to safer banks. In contrast, small depositors are less likely to be very knowledgeable in credit evaluation procedures and efforts to force them to do so would be inefficient and represent a dead weight loss to the economy. In addition, small depositors are the only depositors who can operate with currency and therefore are likely to run into currency instead of other, safer banks and to drain reserves from the banking system as a whole. The definition of *small* depositors is as much political as economic. It may be defined as those depositors to whom any loss from bank failure represents a significant loss in their wealth and who are likely to take to the political battlefield to protest the loss and gain the sympathy of the country in the struggle.

Evidence from the U.S. and Canada before deposit insurance strongly indicates that at least many larger depositors are able to differentiate financially strong from weak banks (e.g., Calomiris and Mason, 1997; Kaufman, 1994; and Carr, Mathewson, and Quigley, 1995). Likewise, a comparative analysis of deposit behavior during the 1994-95 banking

crises in Argentina, which had limited deposit insurance, and in Mexico, which guaranteed all deposits, showed that deposits declined more at banks with progressively greater nonperforming loans in Argentina but not in Mexico (Moore, 1997). This is shown in Figure 3.

SEIR restrains the incentive for regulators to delay and forbear in imposing sanctions in response to political pressures or other agendas by specifying loss minimization from bank insolvencies as effectively the sole objective of prudential regulation and imposing explicit and visible rules that mandate sanctions, including resolution, when banks fail to respond to earlier discretionary sanctions. The sanctions become progressively more mandatory as the performance of a bank deteriorates. The threat of mandatory sanctions increases the credibility and effectiveness of discretionary sanctions and serves to supplement rather than to replace the discretionary sanctions. The mandatory sanctions also increase certainty, treat all banks equally, and help free regulators from political pressures. Identifying insolvency loss minimization as the objective of prudential regulation establishes the same objective as private insurers and creditors have. By aligning the objectives and achieving objective compatibility, deposit insurance becomes incentive compatible, so that all players -- private and government -- will row in the same direction. At the same time, increased transparency enhances regulatory agency compliance and accountability. While SEIR should reduce the number of bank failures, it is particularly designed to reduce, if not to eliminate, the costs of bank failures. The exit of banks that fail through either bad management or bad luck is required to attain and maintain an efficient banking industry.

To date, the PCA and LCR structure in FDICIA appears to have been successful in the U.S. However, because the combined effects of the prolonged recovery of the U.S. economy, the virtual elimination of product inflation, the avoidance of asset price bubbles in energy and real estate (where U.S. banks are big lenders), and an upward sloping yield curve have enhanced the recovery of banks and thrifts from the debacle of the 1980s to their healthiest level since the 1960s, the precise contribution of FDICIA is difficult to isolate. But both the rapid build up in bank capital ratios through the sale of new shares in the early 1990s, before renewed bank profitability was established, to the highest levels since the 1960s and the imposition of shared losses on uninsured depositors at resolved banks in almost all resolutions in which the FDIC suffered a loss, indicates strongly that market discipline had been awakened (Benston and Kaufman, 1997 and 1998). On the other hand, because no major money center bank has failed since 1992 or even deteriorated sharply in performance, a true test of too big to fail -- TBTF (or, more accurately, too big to impose pro-rata losses on uninsured deposits) -- has not yet occurred.

It is important to note, however, that TBTF has become substantially more difficult for the regulators to impose. With one exception, the FDIC is prohibited from protecting uninsured depositors at insolvencies where doing so will increase its losses. In order to protect uninsured deposits at such insolvent institutions, a determination must be made in writing by two-thirds of the FDIC directors and the Board of Governors of the Federal Reserve System and by the Secretary of the Treasury in consultation with the President of the United States that not protecting the uninsured depositors ~~w~~ould have serious adverse

effect on economic conditions or financial stability<sup>6</sup> and that protecting these depositors would avoid or mitigate such adverse effects.<sup>6</sup> If afterwards the protection results in a loss to the FDIC, a special assessment must be levied on all banks based on their total assets. Thus, most of any cost would be borne by other large and likely competitor banks, who may be unenthusiastic about using their monies to keep an insolvent competitor in operation. In addition, the documentation underlying the decision must be provided by the Secretary of the Treasury to the Congress and reviewed by the General Accounting Office. This requirement should discourage aggressive use of the TBTF exception. Moreover, TBTF would be invoked only if a very large bank had been unresponsive to the series of PCA sanctions that had been imposed on it earlier to prevent it from failing. If the sanctions were imposed on a timely basis, few if any banks should be in a position to require such protection.

It is also important to understand how prorata losses could be imposed on uninsured deposits without affecting the economy adversely. As noted earlier, in the U.S., insolvent banks are resolved by federal regulators without going through the bankruptcy courts. The FDIC generally also acts as the receiver. Insured depositors have full and complete access to their funds on the next business day at either the bank that assumed these deposits or at the bank in receivership until liquidated. Because, under FDICIA's PCA requirements, regulators become increasingly involved with a troubled institution before it requires resolution in an attempt to turn it around, including identifying and notifying other banks that may be potential bidders of the possible insolvency of the bank, the FDIC has the opportunity to value its assets before resolution. Thus, at the time of resolution, it is in a

position to make a reasonably accurate estimate of the recovery value of the assets and of the loss it will incur in protecting insured depositors. It then provides an advanced dividend of the prorata, albeit conservative, estimated recovery value to the uninsured depositors available the next business day. In effect, the uninsured depositors will have immediately available funds equivalent to the par of their deposits amount less the prorata estimated loss, which under FDICIA should be relatively small. If such provisions were not in place, it is likely that long delays would result in uninsured depositors receiving their funds, substantial unnecessary economic harm may occur, and political pressure to protect uninsured deposits fully become too strong to resist.

SEIR has a large number of advantages over other prudential regulatory structures that also makes it desirable for countries other than the U.S. (Kaufman 1997b). These include:

- C Maintains existing banking structure
- C Maintains insurance for **A**small@ depositors only
- C Reduces number of failures
- C Reduces losses from failures (makes deposit insurance effectively redundant)
- C Reduces bank insurance premiums and incorporates risk-based premiums
- C Reduces probability of systemic (contagion) risk
- C Reduces too big to fail (protection of uninsured depositors)
  
- ! Treats all banks equally
- C Encourages market discipline from **A**large@ depositors to supplement regulatory discipline
- C Reduces moral hazard behavior by banks
- C Reduces agency problem for regulators
- C Provides for carrots as well as sticks to improve bank performance
- C Permits wide range of product powers for well-capitalized banks

C Reduces regulatory micro-management of banks

But, because countries differ in significant ways, it is important to tailor the structure to the particular economic, political, social, legal, and cultural characteristics of the country (See Working Party on Financial Stability, 1997). To be effective, SEIR depends on the abilities of both the regulators and the market place to impose sufficient discipline to curtail bank risk taking and losses, of bankers to manage their operations in a way to maximize value to both shareholders and the economy, and of governments to accept loss minimization in insolvencies as the primary goal of bank regulation. If these parties can agree to these preconditions, SEIR may be modified to be effective in the particular countries. The more important modifications required depend on the countries:

- C Macroeconomic instability
- C Political instability
- C Strength of private market and tradition of market discipline
- C Structure of banking, including solvency and the importance of SOBs and SCBs.
- C Sophistication of bankers
- C Sophistication of bank regulators, supervisors, and examiners
- C Sophistication of market participants
- C Credit culture
- C Equity culture
- C Bank control of nonbanks and nonbank control of banks
- C Loan concentration in banks
- C Quality of accounting information and disclosure
- C Bankruptcy and repossession laws
- C Bank reliance on foreign currency deposits

More specifically, the following features need to be tailored carefully to the country:

- C Values of the tripwires for PCA and LCR
- C Types of regulatory sanctions
- C Division between regulatory rules and discretion
- C Definition of **A**small@depositors

- C Regulation of foreign currency exposure
- C Bankruptcy (resolution) process for insured banks

The greater the macro and political instability in a country, the higher need be the numerical values of the tripwires for the PCA and LCR tranches, particularly for resolution of potential insolvencies. If these zones are stated in terms of capital asset ratios, it is important to note both that assets must include both on - as well as off-balance sheet activities and that the Basle capital ratios are minimum requirements for large, international banks in industrial countries with relatively high macroeconomic and political stability. For most other banks and countries, the capital ratios for each zone need to be considerably higher. These values need also be higher, the poorer is the quality of accounting information. Although poor quality accounting information may either overstate or understate the true information, incentives are to overstate. Thus, banks almost universally under reserve for loan losses and find additional ways of at least temporarily hiding losses. Because the value of the final tripwire for resolution determines the potential for losses to the insurance agency, assigning a value that is too low to prevent or minimize losses can defeat the objective of SEIR.

What is the appropriate capital ratios for banks in a particular country? Because deposit insurance insulates banks from full market discipline, the market solution in an insurance environment implicitly incorporates a provision for loss sharing and therefore understates the private capital ratio that the market would require in the absence of the insurance. A proxy for this value may be obtained in each country by observing the ratio the market requires of noninsured bank competitors, e.g., independent finance companies, insurance companies, etc. In most countries, these ratios are significantly higher. Thus, increasing bank capital ratios to these levels does not increase their costs unfairly, but primarily removes a subsidy. Moreover, because capital is effectively any claim that is

subordinated to the insurance agency, it can consist of such subordinate debt, which in some countries has tax advantages over equity. Resolving a bank before its capital becomes negative does not represent confiscation. Current shareholders are given first right to recapitalize the institution. It is only if they prefer not to do so, most likely because they believe that the bank's true capital position is even worse than the reported position, that resolution through sale, merger, or liquidation proceeds. Any proceeds remaining after resolution are returned to the old shareholders.

It also follows that the values of the tripwires for each zone need to be higher, the weaker the credit and equity cultures in a country; the less sophisticated the bankers, regulators, and market participants; the more concentrated bank loan portfolios; the larger the definition of a small depositor; and the greater bank reliance on foreign currency deposits. Likewise, these conditions also suggest greater emphasis on regulatory rules than on regulatory discretion.

Foreign currency denominated deposits are particularly important in smaller, open economies. Exchange rate (currency) problems and banking problems are often interrelated and easily confused. Foreign currency problems can spillover and ignite banking problems. Banks that offer deposits denominated in foreign currencies assume exchange rate risk, unless offset by foreign currency denominated assets or hedged otherwise. And the shorter term the deposits -- the hotter the money --, the greater the risk. Banks are particularly tempted to raise funds in foreign currencies when domestic interest rates greatly exceed those on the foreign currencies. Economic theory, however, indicates that in equilibrium such rate differences should be matched by equal differences in the opposite direction between spot and forward exchange rates. This condition is referred to as interest rate parity.<sup>8</sup>

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<sup>8</sup>Before the recent crisis, banks in a number of Asian countries were borrowing heavily in short-term foreign currencies (primarily

Any downward pressure on the country's exchange rate will impose losses on unhedged banks and, if large enough, may cause banking problems in previously strong banking systems or exacerbate problems in weak banking systems, such as in many Asian countries in the past year. In addition, downward pressure on the exchange rate in a country with a financially strong banking system may encourage depositors in domestic currency to run into deposits in foreign currencies, possibly even at the same safe banks. This is a run on the domestic currency, not on banks. The run exerts downward pressure on the country's exchange rate. If the country attempts to protect its exchange rate (maintain fixed exchange rates), it needs to sell foreign reserves. This reduces aggregate bank reserves.<sup>9</sup> Unless this decrease is offset by infusions of reserves from other sources by the central bank, which would be difficult in these countries without intensifying the problem, it will ignite a multiple contraction in money and credit. This is likely to impair the financial solvency of the banks and may possibly ignite bank runs.

Such a scenario is visible in the stylized facts on banking and balance of payments crises compiled by Kaminsky and Reinhart. As shown in Figure 1, foreign reserves begin to decline before the banking crises. The banking impact, however, is offset temporarily by increases in the money (deposit) multiplier that permit both deposits and credit to continue to increase. At some point, the banking crises occurs and sets in motion the series of adverse effects. In some countries, there is evidence that the rapid increases in deposits and credit before the banking crisis were fueled by

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ars) at low interest rates and lending in domestic currency much higher rates in amounts that may have suggested that they were operating under the illusion that their governments could and did repeal the law of interest rate parity. The BIS recently estimated that nearly 60 percent of the international interbank borrowing by banks in Indonesia, Korea, Malaysia, the Philippines, and Thailand in 1996 were denominated in dollars and most of the rest in yen. Two-thirds had a maturity of less than one year (BIS, 1998).

<sup>9</sup>The same effect is encountered if the run on the domestic currency takes the form of a run from bank deposits denominated in domestic currency to currency, which is then shipped to banks in foreign countries for redeposit into foreign currency deposits.

increased bank reserves resulting from large capital inflows and government policies of maintaining fixed exchange rates, which required purchasing the foreign currency.

Conversely, if a country with a strong foreign currency position but a financially weak banking system experiences depositor runs to domestic currency deposits at **Asafe@** banks or into domestic currency, the banking problem will not spread to foreign currency (exchange rate) problems. But, if the runs are from domestic currency deposits to foreign currency deposits even at the same **Asafe@** banks, downward pressure will be exerted on the exchange rate and ignite an exchange rate problem. Thus, exchange rate problems can cause banking problems and banking problems can cause exchange rate problems.<sup>10</sup> But, because the causes differ, the solutions also differ.

Banking problems require first the recapitalization of insolvent or undercapitalized banks and then the introduction of SEIR-like deposit insurance provisions. Because state owned banks (SOBs) and at times also state controlled banks (SCBs) are perceived to have complete government protection, they provide unfair competition to other private banks and are likely to prevent these banks from gaining or even maintaining market share, unless equal protection is provided them either explicitly or implicitly. Indeed, it is difficult to have a system of limited deposit insurance in a banking system that includes major SOBs or SCBs.

Major SOBs and SCBs should be completely privatized with sufficient capital to be both economically solvent and politically independent. Because their insolvencies or negative net worth are likely to be greater than their going concern or franchise values, it is unlikely that private parties will bid on these banks unless the capital deficits are reduced. This requires the use of public (taxpayers) funds.

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<sup>10</sup>Kaminsky and Reinhart (1997) find that banking crises predict balance of payments (exchange rate) crises, but balance of payments crises do not predict banking crises.

Because the sale will change bank management and ownership and value will not accrue to the old shareholders, such a use of public funds is necessary and appropriate and differs significantly from the inappropriate use of public funds to prop up existing shareholders and managers as is being practiced in a number of countries including Japan.<sup>11</sup> Permitting well-capitalized foreign banks to purchase SOBs in competitive bidding is desirable for at least four reasons. One, in some countries, the foreign banks will be relatively small units of much larger and well capitalized organizations that may be perceived to be able to protect their small affiliates more securely than the domestic government can protect deposits at domestically owned banks through deposit insurance. Two, foreign banks are likely to bid a higher premium for insolvent or barely solvent institutions in order to get a toehold in the country, thereby reducing the need for any public funds to lower the negative net worth position of insolvent institutions to a level that domestic private parties are willing to absorb. Three, the foreign banks are likely to enhance competition and encourage a more efficient domestic banking system, particularly in countries which are dominated by a few large domestically owned banks. Four, large international banks are likely to be better diversified than smaller domestic banks and will reduce the vulnerability of the banking sector to adverse shocks.<sup>12</sup>

Foreign currency problems generally reflect macroeconomic problems with which central banks have traditionally dealt. The solution does not require changes in prudential bank regulations, although the scheme discussed in this paper is helpful if governments permit these problems to deteriorate into banking problems.

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<sup>11</sup>The use of taxpayer funds in supporting banks is often misunderstood. See, for example Working Party on Financial Stability, p. 41.

<sup>12</sup>As some countries break up into smaller countries, the ability of banks to diversify geographically domestically is reduced.

### **III. Central Bank Policies to Enhance Financial Stability**

As discussed earlier in this paper, financial instability is often ignited by instability in product and asset prices. Stabilizing product prices is a time honored, traditional central bank operation that most banks appear to have achieved successfully in recent years, at least temporary. Affecting asset prices is a less well traveled path for central banks. Indeed, although the harm both to financial institutions and markets and to the macroeconomy from instability in asset prices has been well documented, the theoretical and policy links between the central bank and asset prices have only rarely been developed.

This is not to argue that central banks have not had a long standing interest in asset prices and preventing asset price bubbles. The uncertainty focuses on when asset price changes become undesirable and what should and could central banks do about them when they do occur. In the late 1920s, the Federal Reserve became greatly concerned about the rapid increase in stock prices in the U.S. and directed policy actions at slowing the increase (Friedman and Schwartz, 1963). The discount rate was increased to increase the cost of credit used in the stock market and to reduce its amount. Some analysts have blamed these actions for the severity and long duration of the subsequent Great Depression. They argue that, while stock prices may have been rising rapidly, the rest of the economy was not overheated and the Federal Reserve's restrictive actions were unwarranted and dangerous. More recently, again in response to rapidly rising stock prices, Federal Reserve Chairman Alan Greenspan has attempted to talk-down any potential bubble by cautioning market participants about the possibility of irrational exuberance and the unstainability of the current rate of price increases. However, unlike in the 1920s, the Federal Reserve did not take any specific policy actions directed at

the stock market and , after briefly dipping in response to the comments, market prices have continued their upward spiral to date before declining sharply in response to the intensification of the banking and financial problems in East Asia and Russia.

The recent Japanese experience resembles the U.S. experience of the 1920s and 1930s, at least in terms of monetary policy and asset bubbles. As shown in Figure 4, stock prices and real estate prices both surged rapidly in the mid-and late-1980s to far above their trend values. At first, the Bank of Japan did not respond, in part because product inflation was moderate. Moreover, the asset price increases and in particular the land prices were believed to be fueled by sharp increases in bank credit following liberalization of bank deposit rates and portfolio restrictions. Only when product inflation started to accelerate in early 1989, did the Bank tighten policy (Bordo, Ito, and Iwaisako, 1997). It increased its discount rate sharply from 2.5 percent to 6 percent and restricted bank credit extensions to real estate. At least in partial response, both stock and land prices started their sharp and prolonged declines. However, the real economy remained strong for another year or two, before it weakened, and monetary policy remained restrictive over that period.

In its 1997 Annual Report, which devotes considerable attention to the issue of asset prices and financial stability, the BIS lists three reasons why central banks may wish to respond to sharp movements in asset prices. Such movements: 1) may lead to financial instability, 2) play a major role in the transmission mechanism for monetary policy by being a major component of changes in aggregate wealth, and 3) contain valuable information about expectations of future prices, income, and policies, e.g., the yield curve on Treasury bonds.

But the BIS is nevertheless uncertain about what central banks can or should do with this information. **A**While asset prices may be useful indicators, gearing policy directly to them could give

self-validating asset price movements<sup>®</sup> (BIS, 1997, p.75). Unlike product inflation, which experience has shown should be targeted to be low and the harm caused by not constraining it has been amply verified, appropriate targets for asset inflation have not been developed and the harm caused by asset inflation before prices bubbles burst has not been demonstrated. Asset price bubbles are recognized only after they occur -- ex-post. While asset prices are rising--bubble? What bubble? One person's bubble is another's equilibrium price based on solid fundamentals. Current asset prices to a large extent reflect future asset prices or future prices of the goods or services generated by the assets. Without knowing the future and disagreeing with it, it is difficult for a central bank to argue that the current asset prices are either too low or too high, i.e., that the stock market or real estate are either over-or under-valued. Nor do asset prices necessarily move in high correlation with product prices. Although the energy-price bubble of the early 1980s in the U.S. occurred simultaneously with the sharp acceleration in product inflation, the real estate bubbles in the energy belt and New England in the mid- and late-1980s occurred while product inflation was slowing. Likewise, as noted, the sharp runup in real estate and stock prices in Japan in the late-1980s occurred in a period of slow product inflation, as did the real estate and stock market bubbles in Southeast Asia in the late 1990s.

Although central banks may not target asset prices directly, their actions directed at product prices and other targets affect asset prices. Decreases in interest rates increase asset prices and increases in interest rates decrease asset prices. At times, conflicts may arise between central bank policies required to achieve product price and macroeconomic stability and to achieve asset price and financial/banking stability. For example, in periods after asset price bubbles have contributed to both a weakened banking system and a macroeconomic recession, central banks pursue expansive monetary policies. But undercapitalized banks are constrained from expanding lending and likely even to curtail

it. To stimulate lending and energize its expansive measures, central banks may be tempted to ease prudential standards before the commercial banks have recovered. In contrast, in periods of accelerating product inflation and income growth, the central bank needs to pursue restrictive policies, but may be constrained by fear that the accompanying higher interest rates might induce sharp reductions in asset prices and financial instability. Thus, it is likely that the strategy of relatively low interest rates to avoid choking off the current macroeconomic expansion in the U.S. in light of the low rate of product inflation may have contributed to the acceleration in stock prices as well as accelerating a budding rise in real estate prices. The conflicts and pitfalls facing central banks at times of asset price bubbles are well summarized in the following two statements by long-time students of monetary policy.

In reviewing recent central bank policy in Japan, Bordo, Ito, and Iwaisako write:

In the second half of the 1980s, partly preoccupied by the exchange rate fluctuations, Japanese monetary policy ignored the speculation in domestic asset markets. After mid-1989, containing the asset price boom became an objective for the monetary authorities. Admittedly, many economists were supportive of the Bank of Japan in its policy toward stopping a bubble during this period. However, both Japanese monetary authorities and academic economists may have underestimated the effects of asset deflation on the Japanese economy. So we learned an old lesson once again in a hard way: the monetary authority should pay regard to the asset markets, but stopping short of including asset prices as one of the objectives policy...[As a result] the Japanese monetary authorities repeated the mistake the U.S. authorities made; using monetary policy to end speculation in asset markets carries a risk of subsequent deflation (Bordo, Ito, and Iwaisako, 1997 pp.12 and 29)

Likewise, based on his analysis primarily of the U.K. and U.S., economies, Goodhart concludes that:

[M]acro-policy has been systematically mishandled.... This was partly because they [central banks] were concentrating on a limited index of inflation, current service flow prices, and ignoring the message about inflation given by asset prices...The monetary authorities, therefore, share responsibility, along with the commercial banks, for the recent asset price/banking cycle.

There is an inbuilt conflict...between the imposition of generalized prudential regulations and macro-monetary stability, since the former, almost by definition, must bite harder at times of (asset price) deflation, and hence must, to some extent, aggravate the accompany credit contraction. But it would make a mockery of such regulations, and negate their impact, if they were to be regularly relaxed at such times; though I would advocate that Central Banks should have a, carefully restricted, right of override of these regulations at times of severe, unforeseen shocks. Faced with this conflict, the correct response for the Central Banks is to take more aggressive expansionary action during such deflations, while still using their traditional rescue policies, to prevent systemic panics, in the time-honored fashion. (Goodhart, 1995, p. 294).

### **Insulating Banks from Price Bubbles**

In the absence of agreement on stabilizing asset prices to avoid financial instability, central banks can protect the financial sector and thereby the macroeconomy from asset bubbles by adopting a version of SEIR and permanently increasing the numerical values of all capital - asset tripwires to provide greater protection against losses from the increased risk exposures of banks when asset inflation accelerates. Because capital absorbs losses before they are charged to depositors and other creditors, the higher the ratios, the less likely is the probability of bank insolvency. Excessive leverage has been identified as a major cause of failure in most banking debacles, particularly in the recent Asian banking crises. However, its is unlikely and undesirable to raise required capital ratios for all banks to levels that would absorb all shocks and prevent all insolvencies. But, as discussed earlier, government provided deposit insurance and other forms of the safety-net encourage banks to substitute public for private capital and to hold smaller private capital-asset ratios than either the market requires of noninsured bank competitors or that is consistent with the degree of instability in the macroeconomic in the absence of deposit insurance. Thus, increases in private capital ratios to these levels would not be inappropriate.

The higher capital ratios would not impose an unfair competitive disadvantage on banks nor reduce their potential return on equity below that of comparable noninsured firms. Rather, the increases reduce any subsidy that banks may be deriving from underpriced deposit insurance or would be matched by decreases in insurance premiums if the probability of failure and losses are reduced. Nor would the higher capital requirements necessarily encourage banks to increase their risk exposures unduly. To the extent the higher requirements match the requirements the market would impose in the absence of insurance, the risk exposures should also be comparable. (See Esty, 1998 for historical evidence.) Moreover, the banks remain subject to the SEIR sanctions when losses from any greater risk taking occur and their capital deteriorates through the multizones. In addition, the regulators could subject excessively risky banks to harsher and/or earlier sanctions. Lastly, as long as the performance of the banks can be monitored by the regulators on a reasonably accurate and timely basis and, in the absence of large abrupt declines in asset values (jump processes), the severe penalty of resolution at no less than zero economic capital also serves to constrain bank risk taking behavior.

At least until the theory and practice of central bank intervention in asset prices is better developed, increasing capital ratios is a relatively costless but effective way of insulating banks and the macroeconomy from the bursting of asset price bubbles that are associated with larger losses and defaults than otherwise.

Unfortunately, many banks and bank regulators have a strong aversion to requiring additional private capital of banks, despite the overwhelming evidence of recent years that insufficient capital was a major cause of the widespread bank failures in effectively every country. Indeed, regulators appear schizophrenic on the issue. On the one hand, ex-post, they identify insufficient capital as an important factor in almost every banking crisis. On the other hand, ex-ante, they oppose increasing it. As argued

above, banks currently maintain private capital ratios well below those that would be required in a nonsafety-net environment. Part of the hostility may be due to a misunderstanding of the cost of bank capital. Basic finance theory tells us that, in the absence of mispriced deposit insurance, taxes, and other institutional details, the overall cost of bank funding is independent of the source of the funding. The lower the proportion raised through capital, the higher is the cost of debt financing and vice versa. With fairly priced deposit insurance, the premiums paid should approximate the reduction in interest rates paid on deposits, as the risk is shifted from the depositor creditor to the insurance agency. Again, the total cost of funds to the bank remains basically unaffected. Only if deposit insurance were underpriced for the protection provided, would reductions in capital reduce the total cost of funds and lead to higher returns on equity than otherwise.

Under SEIR, sufficient capital is required to validate that a strictly enforced closure rule at some low positive capital ratio that would, at best, eliminate or, at worst, minimize losses to depositor creditors. The stronger the validation, the lower would be the insurance premiums charged on insured deposits and the interest rates on uninsured deposits and other funds.

Capital is sometimes confused with assets or number of banks, particularly in discussions of excess capacity in banking. Because deposit insurance and other government guarantees to banks permit insolvent banks to continue to operate and thus prevent exit from the industry through failure, there are more assets in the banking industry in some countries than can earn a competitive return and than would exist without these guarantees. But this **Overbanking** does not imply that there is also too much private capital in banking. Indeed, the presence of insolvent banks in such environments indicates that there is too little capital. Requiring additional private capital would encourage exit by banks that cannot generate a competitive return. This distinction is also missed by others. A recent

article in the prestigious Economist argued that the problem with the Japanese banking system was too much, rather than too little, capital (Economist, 1998). Nor does the presence of such overbanking suggest that there are too many banks. Reducing the number of banks without reducing the amount of aggregate banking assets will only reduce the intensity of competition and be counterproductive and dangerous public policy.

Another reason that increases in capital are opposed is that capital is perceived to be a flawed measure of the health of a bank. Many banks that failed had high reported capital ratios.<sup>13</sup> But this reflects primarily problems with the measurement of capital rather than the concept of capital per se. Reported capital often differs significantly from economic capital, or the capital that is available to absorb losses before they must be charged to depositors. Regulators frequently permit banks to under-reserve for loan losses and underreport nonperforming loans. Adjustments frequently are not made for loans made to the holders of a bank's capital (bank owners), or connected credit.<sup>14</sup> Such credit needs to be subtracted from the bank's capital in order to obtain a measure of the net funds that capital providers have at risk. Losses (and gains) in securities due to increases (decreases) in interest rates are also generally not recorded in accounting measures of capital, so that market values of capital differ from book or historical values of capital (Benston, 1990).<sup>14</sup>

Moreover, in many countries, regulators permit, if they do not outright encourage or require,

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<sup>13</sup>The BIS, for example, notes that many Asian banks had much higher reported capital ratios before the crisis than required by the Basle Accord (BIS, 1998).

<sup>14</sup>Because of the difficulty in measuring and monitoring capital correctly, some countries, particularly developing and transition economies, partially shift prudential emphasis to cash reserves, which are easier to measure and monitor. The larger is the percentage of cash reserves required, the less important is capital, although banks could attempt to offset the loss in earnings from high reserve requirements by selecting riskier earnings assets. Problems of connected lending may also be reduced by requiring arms-length type transactions between the bank and the owners' entities. But caution still suggests that the amounts lent be excluded from regulatory capital.

reported capital to be inflated by accounting trickery, to deliberately project a misleading image of a stronger than actual banking system to ease public fears of a banking crisis and/or the need for public (taxpayer) funding support. Such trickery includes capitalizing loan losses and amortizing them slowly over time, recording guarantees of support by the government as assets, and recording upward adjustments for increases in the market values of bank buildings or securities but not requiring reporting of comparable losses, i.e., reporting the higher of market or book values. A description of the fast footwork practiced during the 1980s by U.S. regulators to increase the reported official capital ratios of S&Ls is reviewed by Kane (1989) and Barth (1991) and of banks by Barth, Brumbaugh, and Litan (1992). Bank regulations in Japan are currently promoting such accounting trickery, as well as using government funds to purchase bank stock. Neither strategies are likely to fool many anymore and only postpones and very likely increases the cost of the ultimate resolution.

Some reduction in the meaningfulness of reported capital is brought about by the regulators themselves. The amount of capital a private noninsured firm is required to hold by the market place is determined by the market's evaluation of its risk exposure. The riskier the market evaluates the operation of a firm, the greater will be the capital demanded by its creditors to preserve a given level of credit risk. In recent years, bank regulators in industrial countries have attempted to mimic the market and require capital adjusted for, at least, the bank's credit risk. Major banks in industrial countries that prescribe to the Basle Accord are subjected to a minimum 8 percent risk-adjusted capital requirement. Similarly risk-adjusted capital-to-asset ratios are used to partially define the capital zones for PCA under FDICIA. But while worthy in objective, the Basle risk-based capital measures are badly flawed and possibly counterproductive in implementation. The risk categories and weights assigned to each asset by the regulators are determined not by the market, but by relatively arbitrary and broad

classifications and political pressure. The less risky regulators classify a particular activity relative to the market assigned risk, the lower is the regulatory required capital relative to the market determined capital and the more profitable is it for banks to extend credit for the activity. The potential distortions have been described in the literature by Grenadier and Hall, (1995), Kane (1995), and Williams (1995), among others. Until better, more objective risk measures are developed by regulators, on which they are currently working, risk-adjusted capital measures are less useful for regulatory purposes than simple market value and even book value (adjusted for off-balance sheet entries) capital-to-asset leverage ratios that may be interpreted more easily. FDICIA requires that the performance zones be defined by both unadjusted and risk-adjusted capital measures.

Basle regulators also divide capital between that which is permanently provided, basically equity (Tier 1), and that which has a maturity date and needs to be repaid (Tier 2). Tier 1 is rated higher than Tier 2. But this division not only fails to recognize the basic function of capital and is inconsistent with any accepted financial theory, but discourages the use of an efficient type of capital in the form of subordinated debt. The basic function of capital is to absorb losses to avoid charging them against other higher priority claims. What serves as capital depends on the legal rank of a particular claimant in insolvency. The more senior the claim, the more other types of claims serve as protection or capital (Kane 1992, Benston 1992, Kaufman 1992, and Miller 1995). From the vantage point of bank regulators, capital should be any financial claim that is junior to the government's claim through deposit insurance, regardless of whether it is equity or debt with the exception that the debt must have a sufficiently long remaining maturity, say two years, so that it cannot run and disappear at times of trouble and that interest payments may not be made if they reduce remaining capital below the resolution tripwire value.

In countries that have developed capital markets, such subordinated debt is a particularly useful type of capital for a number of reasons. Knowing its junior standing and its inability to participate in the bank's upside earnings potential beyond the amount of the coupons, holders of the debt will monitor the issuing bank carefully and sell the debt if they perceive undesirable increases in risk taking. This reaction increases interest rates on the debt and signals other participants and the regulators. In the U.S., FDICIA prohibits critically undercapitalized banks from making any payment of principal or interest on their subordinated debt after sixty days from the date of their being so classified. The market discipline so induced will supplement and reinforce regulatory discipline. In addition, to the extent the debt is not perpetual and is issued in staggered maturities, the bank must refinance it periodically and any difficulties encountered in doing so would be visible to the market and the regulators. In response to its banking crisis of 1994 and 1995, Argentina required all banks to issue subordinated debt equal to 2 percent of their deposits. At least in the U.S., failure to give full regulatory weight to subordinated debt discourages banks from holding as much capital as otherwise as interest on the debt is tax deductible while dividends on equity is not. Thus, subordinated debt is a cheaper but just as effective source of capital for banks in some countries for protecting the insurance agency as is equity.<sup>15</sup>

At times, regulators also appear to lose sight of the fundamental role of capital -- to absorb losses -- and view it only as a high cost source of funds to penalize banks. In the U.S., for example, they appear to be wedded to the numerical values for the FDICIA capital zones that they set in 1992, regardless of the changes in conditions since. It may credibly be argued that the values set in 1992

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<sup>15</sup>Recently, some Basle and other industrial countries have permitted large banks to use additional subordinated debt with a minimum maintained maturity of two years as a newly added Tier 3 capital against market risk in trading accounts.

were set deliberately low in order not to identify too many banks as poorly capitalized in a period in which the industry was still in crisis. But now that the industry is healthier. Almost all banks are not only classified as **A**well-capitalized<sup>®</sup> but are maintaining capital well in excess of this criterion. Nevertheless, the regulators are still hesitant to increase the tripwire values, even though it would downgrade few banks. At the same time, reductions in the capital ratios of large banks are beginning to be reported as a concern in the press (Padgett, 1998).

Regulators need not be concerned about all losses in banking, even losses that may periodically exceed one or a few banks' capital and threaten insolvency. Indeed, market discipline requires periodic losses to remind participants of the penalties for being wrong and to encourage them to operate prudently. Periodic small losses are the best deterrent to large losses and market failures in the future that are likely to give rise to calls to replace market regulation with government regulation. If the market does not enforce proper corporate governance of financial institutions and markets, governments will and many countries will find themselves back in the periods of broad government intervention and subsequent regulatory failures from which they are now trying to escape through financial liberalization.

In many countries, financial deregulation or liberalization is being introduced at the same time as deposit insurance reform and for the same reasons. The two reforms are not independent of each other. Because SEIR retains some government-provided deposit insurance, it retains the need for some government regulation, in particular for government supervision and examination to be able to monitor banks on an adequate basis. Deregulation does not imply desupervision.

Indeed, supervision may need to be intensified as many banks, after laboring for years under a repressed system, are often ill prepared to suddenly operate in a market structure with penalties as well

as rewards. In particular, they are likely to have weak if any credit cultures and engage in insufficient credit analysis and monitoring. Moreover, many borrowers have also been protected and are not used to either operating profitably on an unsubsidized basis or repaying loans promptly. Thus, bank risk exposures and subsequent losses are likely to virtually explode following a sudden changeover from financial repression to financial liberalization, unless the liberalization is structured correctly (Working Party on Financial Stability, 1997). Unfortunately, this was not recognized sufficiently in many countries, including both in the U.S. in the early 1980s and in Japan in the late 1980s, and was an important cause of the banking debacles. Banking liberalization must be phased in or sequenced in such a way that at any one time regulatory discipline is not reduced by more than market discipline is reasonably able to replace. The weaker is the sum of market and regulatory discipline, or total discipline, on banks, the higher need be the required private capital ratios to achieve the same degree of stability.

### **Other Short-Term Assistance**

Although the role of central banks in targeting asset prices is both largely unchartered and controversial, its role in preventing the adverse effects of a bursting of asset price bubbles is better chartered and less controversial, although not entirely without controversy. This role has been explored, at least in industrial countries, even before Bagehot in 1873 (Humphrey, 1989 and Kaufman, 1991). As discussed earlier, burstings of important asset price bubbles are highly disruptive to both the financial system and the macroeconomy. Not only do the sudden and sharply falling prices trigger losses and defaults, but they destroy valuable price information necessary for economic agents to allocate resources efficiently and to be willing to trade in financial markets. If price information becomes too uncertain and unreliable, agents increasingly tend to make their portfolio adjustments in

quantities (withdrawals and runs) rather than in prices. It is better to be safe than sorry at almost any price until conditions settle! This further reduces liquidity and reinforces the tendency for price declines to temporarily overshoot their new lower equilibrium levels and increase fire-sale losses. Information processing and decision making are not instantaneous, even in the current high tech world, and the more uncertain the environment, the longer the delays. In addition, trade clearing and settlements systems also slow when price information becomes less reliable and both delivery and payment fails increase.

As is well recognized, at such times, central banks need to act as active or standby lenders of last resort, injecting sufficient liquidity into the markets to avoid trading stalls. However, this is not straightforward for three reasons. One, central banks are unlikely to know the new lower equilibrium prices and thus how much liquidity support to provide. Although they may reasonably be expected to err on the side of too much rather than too little liquidity, they should not attempt to support the old prices. In addition, excessive liquidity to slow or offset the asset price declines carries the risks of both igniting product inflation and misallocating resources. Any excess liquidity needs to be withdrawn quickly (Mishkin, 1997).

Two, at least in developed countries with viable money and capital markets, central banks are unlikely to know the financial condition of individual institutions better than the market does. Thus, any liquidity assistance in these countries should be provided to the market as a whole through open market operations rather than directly to individual institutions through the discount window (Kaufman, 1991). That is, in developed economies the lender of the last resort and the discount window can and should be separated. Bagehot was writing in a very different environment. In countries with less developed financial markets, the discount window remains as the primary channel

for lender of last resort funding. As a result, the central bank incurs the risk of misallocating resources through error or political pressure.

Three, central banks have unlimited capabilities of providing liquidity only in their own domestic currency. As discussed earlier in the paper, in smaller, open economies, banking and foreign currency problems are often interconnected, so that the bursting of asset price bubbles could require liquidity support in both domestic and foreign currencies. However, sufficient foreign currency support is unlikely to be provided by the domestic central bank and is likely to require multinational agreement or an international lender of last resort. This is a highly complex, controversial, and charged issue and will not be discussed in this paper.

#### **IV. Summary and Conclusions**

Financial stability is a prerequisite for macroeconomic stability in market economies. Recent experiences in many countries, differing widely in economic, political, legal, and cultural characteristics, have clearly demonstrated the high cost of bank crises both to the countries themselves and often also to other countries. Asset price bubbles have increasingly been a cause of banking crises. In contrast to product price stability, which is widely accepted as a legitimate goal of central bank policy and whose attainment is reasonably well known, asset price stability is clouded in controversy. Disagreement surrounds its definition, its causes, the role of central banks in targeting it, and the mechanism by which the central bank can affect asset prices, if indeed the bank wished to do so, without triggering major disruptions to the macroeconomy. To date, central banks have not been very successful in containing the damage from asset price bubbles. This paper argues that central banks can protect the financial system and the macroeconomy from much of the adverse effects of asset price

bubble bursts through appropriate prudential and lender of last resort policies.

Commercial banks are particularly susceptible to asset price bubbles as their primary ongoing reason for being is the management of risk. The ability to manage bank risk successfully becomes more difficult, the less stable is the price and income environment. Ironically, government attempts to stabilize banking in the form of safety nets under the industry have unintentionally released powerful destabilizing forces that have to date rarely been held in check and have been counterproductive at least as frequently as they have been productive.

This paper examines the sources of these counterproductive forces and recommends a scheme for prudential regulation of banking that curtails these forces and promises to produce a more efficient and safer banking system. The scheme was recently enacted in the United States, following its banking crisis of the 1980s, and with relatively minor changes appears adaptable to other countries. The scheme permits the regulators to protect both the banking system and the macroeconomy from the full adverse effects of asset price bubbles by focusing on bank capital sufficient to absorb the greater losses and defaults that typically arise when asset price bubbles burst. The particulars of this strategy are dependent on a number of important characteristics of the country to which it is applied and may be expected to vary across countries. Nevertheless, higher ratios of economic capital to total bank assets represent a relatively costless and effective means of neutralizing asset price bubbles until effective strategies are developed for asset price stabilization by central banks.

Finally, central banks need to act as lenders of last resort, if sudden asset price declines appear to overshoot their new lower equilibrium levels. But, as central banks are unlikely to know these new levels and likely to err on the side of excessive ease, this policy could result in misallocating resources and igniting product inflation. It would be best to avoid asset price bubbles beforehand, if only we

knew how!

## REFERENCES

- Bank for International Settlements, 67th Annual Report, Basle: Switzerland, June 1997.
- Bank for International Settlements, The Transmission of Monetary Policy in Emerging Market Economies (BIS Policy Papers No. 3), Basle, Switzerland: Bank for International Settlements, January 1998.
- Bank for International Settlements, 68th Annual Report, Basle, Switzerland, June 1998.
- Barth, James R., The Great Savings and Loan Debacle, Washington, D.C.: American Enterprise Institute, 1991.
- Barth, James R., R. Dan Brumbaugh, Jr., and Robert E. Litan, The Future of American Banking, Armonk, NY: M.E. Sharpe, 1992.
- Basle Committee for Banking Supervision, Core Principles for Effective Banking Supervision, Basle, Switzerland, Bank for International Settlements, April 1997.
- Benston, George J., Market-Value Accounting by Banks: Benefits, Costs and Incentives in George Kaufman, ed., Restructuring the American Financial System, Boston: Kluwer Academic, 1990, pp. 35-56.
- Benston, George J., The Purposes of Capital for Institutions with Government-Insured Deposits,<sup>@</sup> Journal of Financial Services Research, April 1992, pp. 369-384.
- 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 Is the Banking and Payments System Fragile?,<sup>@</sup> Journal of Financial Services Research, December 1995, pp.209-240.
- Benston, George J. and George G. Kaufman, FDICIA After Five Years,<sup>@</sup> Journal of Economic Perspectives, Summer 1997, pp. 139-158.
- Benston, George J. and George G. Kaufman, Deposit Insurance Reform in the FDIC Improvement Act: The Experience to Date,<sup>@</sup> Economic Perspectives (Federal Reserve Bank of Chicago), Second Quarter 1998, pp. 2-20.

- Bordo, Michael, "Financial Crises, Banking Crises, Stock Market Crashes and the Money Supply: Some International Evidence 1870-1933" in Forrest Capie and Geoffrey E. Wood, eds., Financial Crises and the World Banking System, New York: St. Martin's Press, 1986, pp. 190-248.
- Bordo, Michael D., "Financial Crises and Exchange Rate Crises in Historical Perspective," Working Paper, Rutgers University, August 1997.
- Bordo, Michael D., Takatoshi Ito, and Tokuo Iwaisako, "Banking Crises and Monetary Policy: Japan in the 1990s and U.S. in the 1930s," Working Paper, University of Tsukuba (Japan), 1997.
- Bordo, Michael D., Bruce Mizrach, and Anna J. Schwartz, "Real vs. Pseudo International Systemic Risk: Some Lessons from History," Review of Pacific Basin Financial Markets and Policies, March 1998, pp. 31-58.
- Borio, C. E. V., N. Kennedy, and S.D. Prowse, Exploring Aggregate Asset Price Fluctuations Across Countries (BIS Economic Papers No. 40), Basle, Switzerland: Bank for International Settlements, April 1994.
- Calomiris, Charles W., "Deposit Insurance: Lessons from the Record," Economic Perspective (Federal Reserve Bank of Chicago), May/June 1989, pp.10-30.
- Calomiris, Charles W. and Charles M. Kahn, "The role of Demandable Debt in Structuring Optimal Banking Arrangements," American Economic Review, June 1991, pp. 497-513.
- Calomiris, Charles W. and Joseph R. Mason, "Contagion and Bank Failure During the Great Depression: The June 1932 Chicago Banking Panic," American Economic Review, December 1997, pp. 863-883.
- Caprio Jr., Gerald and Daniela Klingebiel, "Bank Insolvency: Bad Luck, Bad Policy, or Bad Banking," Working Paper, World Bank, April 1996.
- Carr, Jack, Frank Mathenson, and Neil Quigley, "Stability in the Absence of Deposit Insurance: The Canadian Banking System 1890-1966," Journal of Money, Credit, and Banking, November 1995, pp 1137-1158.
- Corrigan, E. Gerald, "The Banking - Commerce Controversy Revisited," Quarterly Review (Federal Reserve Bank of New York), Spring 1991, pp. 1-13.
- Crockett, Andrew, "Why is Financial Stability a Goal of Public Policy" in Maintaining Financial Stability in a Global Economy, Kansas City: Federal Reserve Bank of Kansas City, August

1997, pp. 7-36.

- Esty, Benjamin, **A**The Impact of Contingent Liability on Commercial Bank Risk Taking,<sup>@</sup> Journal of Financial Economics, February 1998, pp. 189-218.
- Friedman, Milton and Anna J. Schwartz, A Monetary History of the United States, 1867-1960, Princeton, N.J.: Princeton University Press, 1971.
- Goodhart, Charles, A.E., **A**Price Stability and Financial Fragility<sup>@</sup>in C.A.E. Goodhart, ed., The Central Bank and the Financial System, Cambridge, MA.: MIT Press, 1995, pp. 263-302.
- Greenspan, Alan, **A**Remarks,<sup>@</sup> Washington, D.C.: Board of Governors of the Federal Reserve System, May 2, 1998.
- Grenadier, Steven R. and Brian J. Hall, **A**Risk-Based Capital Standards and the Riskiness of Bank Portfolios: Credit and Factor Risk,<sup>@</sup> Working Paper No. 5178, National Bureau of Economic Research, July 1995.
- A**How to Waste \$250 Billion,<sup>@</sup> The Economist, January 24, 1998, p.16.
- Humphrey, Thomas M., **A**Lender of Last Resort: The Concept in History,<sup>@</sup> Economic Review (Federal Reserve Bank of Richmond) March/April 1989, pp. 8-16.
- Kaminsky, Graciela L. and Carmen M. Reinhart, **A**The Twin Crises: The Causes of Banking and Balance of Payments Problems,<sup>@</sup> International Finance Discussion Papers (No. 544) Washington, D.C.: Board of Governors of the Federal Reserve System, March 1996.
- Kane, Edward J., The S&L Insurance Mess, Washington, D.C., Urban Institute Press, 1989.
- Kane, Edward J. **A**Difficulties in Transferring Risk-Based Capital Requirements to Developing Countries,<sup>@</sup> Pacific Basin Finance Journal, September 1995, pp. 193-216.
- Kaufman, George G., **A**The Federal Safety Net: Not for Banks Only,<sup>@</sup> Economic Perspectives (Federal Reserve Bank of Chicago), November/December 1987, pp. 19-28.
- Kaufman, George G., **A**Bank Runs: Causes, Benefits, and Costs,<sup>@</sup> Cato Journal, Winter 1988, pp. 539-587.
- Kaufman, George G., **A**Lender of Last Resort: A Contemporary Perspective<sup>@</sup>, Journal of Financial Services Research, October 1991, pp. 95-110.
- Kaufman, George G., **A**Capital in Banking: Past, Present, and Future,<sup>@</sup> 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, @ The Financier, May 1995, pp. 9-26.

Kaufman, George G., Bank Failures, Systemic Risk, and Bank Regulation, @ Cato Journal, Spring/Summer 1996a, pp.17-45.

Kaufman, George G., Bank Fragility: Perception and Historical Evidence, @ Working Paper Series (96-18), Chicago: Federal Reserve Bank of Chicago, September 1996b.

Kaufman, George G., Banking Reform: The Whys and How To's @ Working Paper, Loyola University Chicago, August 1997a.

Kaufman, George G., Lessons for Transitional and Developing Economics from U.S. Deposit Insurance Reform @ in George M. von Furstenberg, ed., Regulation and Supervision of Financial Institutions in the NAFTA Countries and Beyond, Boston: Kluwer Academic, 1997b pp.16-35.

Kindleberger, Charles P., Bank Failures: the 1930s and 1980s, @ in The Search for Financial Stability: The Past Fifty Years, San Francisco: Federal Reserve Bank of San Francisco, 1985, pp 7-34.

Kindleberger, Charles P., Manias, Panics, and Crashes: A History of Financial Crises (3rd ed), New York, Wiley, 1996.

Levine, Ross, Financial Development and Economic Growth: Views and Agenda, @ Journal of Economic Literature, June 1997a, pp.688-726.

Levine, Ross, Stock Markets, Economic Development, and Capital Control Liberalization, @ Perspective (Investment Company Institute), December 1997b, pp. 1-7.

Lindgren, Carl-Johan, Gillian Garcia, and Matthew I. Saal, Bank Soundness and Macroeconomic Policy, Washington, D.C.: International Monetary Fund, 1996.

Miller, Merton H. Do the M&M Propositions Apply to Banks? @ Journal of Banking and Finance, June 1995, pp. 483-489.

Minsky, Hyman P., A Theory of Systematic Financial Fragility @ in Edward Altman and Arnold Sametz, eds., Financial Crises: Institutions and Markers in a Fragile Environment, New York:

Wiley, 1977, pp.138-152.

Mishkin, Frederic S. **A**The Causes and Propagation of Financial Instability: Lessons for Policy Makers<sup>@</sup> in Maintaining Financial Stability in a Global Economy, Kansas City: Federal Reserve Bank of Kansas City, August 1997.

Mishkin, Frederic S. et al, **A**The Monetary Transmission Mechanism<sup>@</sup> Journal of Economic Perspective, Fall 1995, pp. 3-96.

Moore, Robert R., **A**Government Guarantees and Banking: Evidence from the Mexican Peso Crisis,<sup>@</sup> Financial Industry Studies, Federal Reserve Bank of Dallas, December 1997, pp 13-21.

O'Conner, J.F.T., The Banking Crisis and Recovery Under the Roosevelt Administration, Chicago, Callaghan and Co., 1938.

Padgett, Tania, **A**Capital Slide Could Spur Big Banks to Debt Market,<sup>@</sup> American Banker, March 12, 1998, pp. 1-2.

Rajan, Raghuram G. And Luigi Zingales, **A**Financial Dependence and Growth,<sup>@</sup> American Economic Review, June 1998, pp. 559-586.

Schwartz, Anna J., **A**Financial Stability and the Federal Safety Net<sup>@</sup> in William S. Haraf and Rose Marie Kushmeider, eds., Restructuring Banking and Financial Services in America, Washington, D.C.: American Enterprise Institute, 1988, pp. 34-62.

Williams, Michael G., **A**The Efficacy of Accounting-Based Bank Regulation: The Case of the Basel Accord,<sup>@</sup> Working Paper No. 95-9, Santa Monica, CA.: Milken Institute, May 1995.

Working Party of Financial Stability in Emerging Market Economies, Financial Stability in Emerging Market Economies, Basle, Switzerland, April 1997.

**Table 1**

**SUMMARY OF PROMPT CORRECTIVE ACTION PROVISIONS OF THE  
FEDERAL DEPOSIT INSURANCE CORPORATION IMPROVEMENT ACT OF**

**(percent)**

<b>Leverage Zone</b>	<b>Mandatory Provisions</b>	<b>Discretionary Provisions</b>
1. Well capitalized		
2. Adequately capitalized	1. No brokered deposits except with FDIC approval	
3. Undercapitalized	1. Suspend dividends and management fees 2. Require capital restoration plan 3. Restrict asset growth 4. Approval required for acquisitions, branching, and new activities 5. No brokered deposits	1. Order recapitalization 2. Restrict inter-affiliate transactions 3. Restrict deposit interest rates 4. Restrict certain other activities 5. Any other action that would better carry out prompt corrective action
4. Significantly Undercapitalized	1. Same as for Zone 3 2. Order recapitalization* 3. Restrict inter-affiliate transactions* 4. Restrict deposit interest rates* 5. Pay of officers restricted	1. Any Zone 3 discretionary action 2. Conservatorship or receivership if fails to submit or implement plan or recapitalize pursuant to Zone 3 provisions 3. Any other Zone 5 provision if such action is necessary to carry out prompt corrective action
5. Critically undercapitalized	1. Same as for Zone 4 2. Receiver/conservator within 90 days* 3. Receiver if still in Zone 5 four quarters after becoming critically under-capitalized	

4. Suspend payments on subordinated debt\*
  5. Restrict certain other activities
- 

\* Not required if primary supervisor determines action would not serve purpose of prompt corrective action or if ce  
SOURCE: Board of Governors of the Federal Reserve System.

**Figure 1**

**Source:** Kaminsky and Reinhart, p. 26.

**Figure 2**

**Source:** Bordo.

**Figure 3**

**Real Deposit Growth and Bank Asset Quality  
in Argentina and Mexico  
December 1994-June 1995**

**Argentina**

**Mexico**

**Source:** Moore, pp.18-19

**Figure 4**

**Source:** Bordo, Ito, and Iwaisako.