Reforming Deposit Insurance: Lessons from the Savings and Loan Crisis

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INTRODUCTION

The savings and loan industry is in the midst of its greatest financial crisis since the Great Depression. Losses suffered by thrifts since 1980 have generated an insolvency crisis of historic proportions, bankrupting the Federal Savings and Loan Insurance Corporation (FSLIC) and requiring taxpayers to finance the claims of insured depositors. With a significant number of savings and loans still facing serious financial difficulties, a growing number of analysts have come to question the continued viability of the entire industry.

Nor have costly failures been limited to savings and loans. While the commercial banking industry has not experienced financial problems of the same severity that beset so many savings and loans, recent years have witnessed the most costly bank failures in history. As a result, the Federal Deposit Insurance Corporation (FDIC) reported operating losses for two consecutive years, 1988 and 1989, the first such occurrences in its 55-year history. These events, especially the widely publicized problems of the thrift industry, have spurred growing concerns that the present financial regulatory system might be in need of reform.

Recent experience makes it clear that although the current deposit insurance system has largely insulated depositors from loss, it has not eliminated the economic costs of bank failures. Rather, it has shifted the burden of bank insolvencies to the taxpayer. An important lesson emerging from the current crisis is that guaranteeing the safety of deposits does not guarantee the safety of the banking system.

It is now widely acknowledged that flaws in the design of the savings and loan regulatory system contributed to the magnitude of the current crisis.

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* Conversations with Marvin Goodfriend, Eric Hirschhorn, Jeffrey Lacker, Alan Stockman, and Walker Todd were extremely valuable. The views expressed in this paper are those of the authors and do not necessarily reflect the views of the Federal Reserve Bank of Richmond or the Board of Governors of the Federal Reserve System.

However, there is less agreement about the best way to reform the system. In addition to rising numbers of bank failures and the unfolding savings and loan crisis, the past decade has been characterized by deregulation and an accelerating pace of financial innovation. Because these events accompanied the onset of the savings and loan crisis, many observers have concluded that deregulation created the financial difficulties that beset the industry. According to this view, deregulation combined with lax supervision ultimately produced a crisis in the thrift industry.

This paper offers a different explanation for the savings and loan crisis. We conclude that deregulation was not the root cause of the savings and loan industry's financial difficulties. To the contrary, overly stringent limitations on the investment powers of thrifts can be blamed for the onset of the crisis. Moreover, the crisis could never have attained its present dimensions in the absence of deposit insurance and the accompanying regulatory structure. The high cost of resolving the thrift industry crisis, now estimated to be well in excess of $100 billion, is a product of the blanket guarantees provided by deposit insurance, which permitted insolvent institutions to continue attracting deposits and to engage in high-risk activities that ultimately resulted in heavy losses. A review of the events of the past decade suggests that the insolvency of the FSLIC does not represent a single isolated incident resulting from either bad luck or the actions of a few incompetent or unscrupulous individuals. Rather, the analysis supports the earlier conclusions of Kane (1989a), who has argued that the incentives embedded in the current system made the present outcome all but inevitable.

We conclude that meaningful reform of that system will require providing for the automatic and prompt closure of failing institutions. The current crisis shows that when a federally sponsored deposit insurance fund becomes insolvent, there is no mechanism to ensure that insured institutions are closed if they become insolvent. To the contrary, regulators faced competing incentives that interfered with an

efficient resolution of thrift insolvencies once the FSLIC became insolvent. Our suggestions for reform arise from an analysis of the bankruptcy law as it applies to unregulated nonfinancial firms, which do not have access to the kinds of government guarantees provided by deposit insurance. Recommended changes include incentives to discourage depositors from funding insolvent institutions together with a system of judicial oversight of bank and thrift failure resolution proceedings similar to legal bankruptcy proceedings established to deal with financially troubled firms.

The paper is organized as follows. Section I provides general background on private lending arrangements and the nature of bankruptcy proceedings. These arrangements are compared with the system of government regulation and failure resolution proceedings for insured deposit-taking institutions. Section II examines the evolution of federal deposit insurance and provides a detailed history of the savings and loan crisis. Section III explores different reform proposals. Section IV presents a summary and conclusions.

I. MARKET DISCIPLINE, DEPOSIT INSURANCE, AND BANK FAILURES

The present-day financial regulatory system is in part a legacy of the waves of Depression-era bank failures. Legislation enacted in response to the events of that period created a "financial safety net," comprised of federally sponsored deposit insurance together with increased government regulation and supervision of financial intermediaries. (A third important element of this safety net, access to the Federal Reserve discount window, had been established in response to earlier financial crises.) The government assumed responsibility for protecting depositors in the resulting system, with the federal deposit insurance funds (the FDIC and the now defunct FSLIC) assuming the role of creditor to insured depository institutions. Acting in this role, government regulatory agencies assumed responsibility for ensuring the safe and sound operation of insured institutions. To facilitate this task, these agencies were given the authority to issue regulations restricting the activities of insured banks and thrifts and also to supervise them to ensure that the rules were followed.

When viewed from this perspective, it appears that the goals and interests of government policy with regard to bank regulation should coincide with those of depositors and other private creditors. But recent history suggests otherwise. In an attempt to understand why the system failed, the analysis that follows will compare the incentives created by the federal financial safety net with the incentives inherent in purely private financial arrangements. We analyze market mechanisms designed to cope with problems that arise when private funds are managed by others. In particular, we concentrate on the methods employed by private creditors to "regulate" the activities of borrowers and examine the resolution of creditor claims under the legal bankruptcy proceedings. We also describe the self-regulatory practices of the nineteenth century American clearinghouses, which offered depositors a form of private deposit insurance. The description of private financial arrangements provides a model that can be used to critically evaluate the federal system of deposit insurance and regulation.

Risk, Market Discipline, and Bankruptcy

The contemporary view of the modern business firm emphasizes the diverse interests of the different parties participating in the operation of the organization (Coase 1937; Alchian 1968; Jensen and Meckling 1976; Fama 1980; Fama and Jensen 1983a, 1983b). Firms are viewed as a nexus for a set of contracting relationships among different economic agents. This "property rights" view treats suppliers of productive inputs, such as labor, as well the holders of financial claims (shareholders and creditors), as stakeholders whose claims against the firm are governed by either implicit or explicit contractual arrangements. The managers of a firm constitute a special type of labor input responsible for coordinating the activities of others and executing contracts among suppliers of productive inputs.

Most large organizations are characterized by a separation of risk-bearing and decision-making. Individuals who bear the residual risks associated with the operation of an organization typically delegate decision-making responsibility to professional managers. The modern business corporation provides the most familiar example of this type of organizational structure. Corporate managers make decisions for the firm, taking risks whose costs are borne by shareholders as well as others with a stake in the firm. Since managers rarely hold a significant fraction of corporate equity, they do not bear the full cost of bad decisions nor reap the full benefits of good ones. Financial mutuals such as mutual insurance companies and, notably, many savings and loan associations, are also characterized by a separation of

decision-making and risk-bearing. Residual profits of mutuals accrue to their customers, who therefore bear the residual risks stemming from the operation of those organizations (although deposit insurance limits the extent to which depositors bear residual risks at insured savings and loans). In this sense, the policyholders of a mutual insurance company or depositors in a mutual savings and loan can be thought of as "owners" (Fama and Jensen 1983a, 1983b).

Since managers do not bear the full costs resulting from their decisions, their interests may differ from those of shareholders and creditors. To ensure that managers have incentives to act in the interests of shareholders, large firms typically rely on hierarchical organizational structures to monitor and evaluate performance. A board of directors consisting in part of individuals outside the firm's management hierarchy evaluates the performance of its senior management.

Markets play an important role in providing both managers and board members with incentives to act in the interests of shareholders. Managers have an incentive to acquire a reputation for effective performance to enhance their career prospects. Outside directors often sit on more than one board and have an incentive to discharge their duties effectively so as to secure invitations to join other boards of directors. The market for corporate control also provides a powerful incentive for corporate boards of directors and managers to act in the interests of shareholders. Poor performance by management is often reflected in a corporation's share price, making the organization susceptible to a takeover from another management team.

For financial mutuals, such as savings and loan associations and insurance companies, the channels through which the market disciplines the firm's decision-makers are somewhat different. The residual claims of mutuals are redeemable on demand at a price determined by a prespecified rule. Thus, the policyholders of a mutual insurance company can redeem their policies before they mature according to terms specified in the policy. Similarly, depositors at mutual savings and loans can withdraw their deposits, receiving the amount deposited plus the stated interest. In the absence of deposit insurance, depositors would be expected to withdraw their funds upon learning that the association's management had embarked upon a risky and imprudent investment strategy. As Fama and Jensen (1983a, p. 317) ex-

plain, "The decision of a claim holder to withdraw resources is a form of partial takeover or liquidation which deprives management of control over assets."

The role of risk-bearing is most often associated with the shareholders of a firm, but the limited liability feature of common equity imposes some of the residual risk on a firm's other stakeholders, most notably its creditors. Private lending arrangements reflect a recognition on the part of lenders that the borrowers can potentially benefit by undertaking actions that shift risk to the lender after a loan is made. A borrowing firm can effectively transfer risk to lenders by siphoning off assets to the stockholders through excessive dividend payments, by increasing the riskiness of the business, or by pledging its assets to another creditor.

For this reason, the extension of credit is often accompanied by a legally binding agreement limiting the uses of borrowed funds. Banks typically extend credit only after gathering extensive information about the borrowing firm, and typically continue to monitor the activities of borrowing firms after funds are disbursed (Stiglitz 1985). Other creditors, such as outside bondholders, commonly require covenants limiting the actions of the borrowing firm. In addition to restricting the use of the borrower's assets, such "bonding" agreements typically require the borrower to disclose certain events to the lender and may provide for direct supervision of the borrower's business by the lender (Black, Miller, and Posner 1978). Legal bankruptcy proceedings provide the ultimate means of enforcing the interests of creditors by alleviating important incentive problems that arise when a firm is insolvent or nearing insolvency.

When shareholders hold a substantial stake in a firm they bear much of the residual risk stemming from its activities. But once shareholder equity is dissipated, the limited liability feature of common stock makes added risk-taking consistent with the interest of shareholders. Under such conditions a risky investment strategy may actually benefit shareholders because even a small probability of a large gain can result in large residual profits and restore the firm to solvency, while any losses stemming from such a strategy are borne by creditors.

At the same time, the threat of pending bankruptcy can affect the incentives faced by the managers of the firm. Managers advance their careers by demonstrating competence at coordinating the activities of firms. While the insolvency of a firm need not always

be due to managerial incompetence, bankruptcy proceedings typically damage the career prospects of a firm's managers. Thus, the managers of a failing firm may perceive themselves as having little to lose from pursuing a strategy of excessive risk-taking, viewing it as the only opportunity left to rescue the firm as well as their reputations. For these reasons, creditors typically seek to take control of a firm away from its existing management at the first sign of insolvency.

The Resolution of Claims Under Bankruptcy Laws

Legal bankruptcy proceedings can be initiated by the management of a debtor firm as well as by its creditors. A firm can be forced into legal bankruptcy proceedings by its creditors when it can no longer meet its debt obligations as they come due, or when it violates certain debt covenants. In practice, bankruptcy proceedings are often initiated by a firm's management when default is imminent. When a firm files for protection from its creditors under Chapter 11 of the Bankruptcy Code, its management nominally retains control of the organization. But although management remains responsible for supervising the day-to-day operation of the firm, its decisions are subject to judicial review and approval by creditors. Creditor committees form to oversee the operations of a firm. As Todd (1986) notes, these creditor committees hold the real power over all important operating decisions. In effect, the creditor committees become co-managers of the bankrupt firm, with their legal representatives meeting frequently with management. A trustee may be appointed to administer the operations of the bankrupt firm if there is evidence of fraudulent behavior on the part of management.

A firm need not be insolvent to file a voluntary petition for Chapter 11 protection from its creditors. Modern bankruptcy law provides for the rehabilitation of debtors. The idea behind Chapter 11 proceedings is to effect a reorganization of financially troubled firms where possible. Once a bankruptcy petition is filed, the firm is granted an automatic stay permitting it to stop payments to its unsecured creditors. Secured creditors are prohibited from taking possession of property from the bankrupt's estate unless they can obtain relief from the automatic stay. In cases where the bankruptcy judge deems the property securing a loan to be necessary for the continued operation of a bankrupt organization, a secured creditor may be effectively forced to renew an extension of credit to the bankrupt firm.

The management of a firm in Chapter 11 proceedings is given an opportunity to draw up a reorganization plan specifying a new financial structure along with a revised repayment schedule for outstanding debts. Creditors are sometimes called upon to forgive a portion of the firm's debt to ensure the viability of the reorganized firm. They may agree to such a restructuring of the firm's debts if it seems likely to yield a greater repayment than the amount that could be realized under any other course of action, including liquidation.

If a firm's management does not offer its own reorganization plan, or cannot produce a plan acceptable to creditors and to the bankruptcy judge, creditors can propose an alternative reorganization plan. The creditors' plan may call for a new management team to be installed.

A bankruptcy judge acts as a mediator or referee between management and the different parties with claims against the firm. Judicial decisions are governed by a set of Bankruptcy Rules (See Treister, et al. 1988). If creditors cannot agree on a reorganization plan, the bankruptcy judge may under certain circumstances impose a reorganization plan. In some cases the court may order the liquidation of a bankrupt firm.

Liquidation of a bankrupt firm's assets is governed by Chapter 7 of the bankruptcy code. When a firm enters Chapter 7 proceedings, a trustee is appointed to legally represent and administer the estate. The Bankruptcy Code establishes a schedule of priorities for the distribution of liquidation proceeds among unsecured creditors. Administrative expenses of managing the bankrupt's estate receive first priority. Unpaid wages and benefits, up to a certain limit come next, followed by claims of governmental units for taxes, customs duties, and accrued penalties. The claims of holders of investment securities are subordinate to all other unsecured creditors. Thus, holders of subordinated debt, which includes bond and note holders, are reimbursed only after the claims of all other unsecured creditors are satisfied. Preferred shareholders are next, with common equity shareholders receiving lowest priority. Secured creditors are not subject to the schedule of priorities (Todd 1986; Treister, et al. 1988, chapter 6).

To summarize, private lenders employ a number of strategies, including loan covenants, monitoring, and bankruptcy proceedings when necessary, to protect their claims against a borrowing firm. Although

these safeguards do not prevent insolvencies, they do help to limit losses when a borrower becomes financially distressed.

Private Regulation of Commercial Banking

Today, regulation is most often viewed as a governmental activity. However, private regulatory organizations often evolve to provide for the orderly functioning of market activity in the absence of government intervention. Notable examples of private regulation include the futures and securities exchanges, which evolved as purely private organizations formed to set and enforce trading rules. The nineteenth century American commercial bank clearinghouses, which essentially regulated a significant part of the banking industry before the advent of the Federal Reserve, provide another example of private regulation. These clearinghouses provided an informal system of deposit insurance to depositors at member banks. The historical lessons offered by the operation of the clearinghouse system therefore seem relevant to the study of deposit insurance reform, and the system merits comparison with present-day deposit insurance arrangements.

Commercial bank clearinghouses were first organized to conserve on the transactions costs associated with clearing checks. Banks, as organizations that specialized in information-intensive loans based on the evaluation of the creditworthiness of individuals, had a natural advantage in monitoring the creditworthiness of other banks. Moreover, their need to exchange checks with other banks gave them an incentive to engage in some form of monitoring. Thus, the clearinghouses developed into a form of private regulatory agency.

Because private regulatory arrangements are based on the premise that participation is motivated by self-interest, the most common penalty for failure to abide by the rules is expulsion from the system. Thus, futures and securities traders who systematically violate trading rules are banned from trading on the exchanges. Likewise, the early clearinghouses denied access to banks that failed to meet the financial standards established by the clearinghouse member banks.

As a prominent example of how such regulation was effected in practice, Gorton and Mullineaux (1987) describe the operations of the New York clearinghouse. Admission to the clearinghouse required banks to meet an admissions test that required banks to be well-capitalized and to submit to periodic examinations. In times of panic, the clearinghouse organized suspensions of deposit convertibility and issued loan certificates to member banks that they could use in the clearing process in place of specie. Through the issue of such loan certificates, member banks essentially pooled their resources to assure depositors of the ultimate safety of individual member bank liabilities. In effect, the clearinghouse insured the deposits of its member banks through this mechanism.

Such pooling arrangements exposed clearinghouse members to the threat of losses if a bank proved insolvent. Clearinghouse members therefore had an incentive to ensure that only sound banks were part of the clearinghouse. To this end, the clearinghouses closely monitored member banks and expelled those that did not satisfy rigorous standards.

Denial of access to the clearinghouse made it much more difficult and costly for banks to clear checks, so the threat of expulsion provided banks with a strong incentive to conform to clearinghouse rules. Moreover, expulsion was a signal that the banking community had determined that there was a high probability that the affected bank would not be able to meet its deposit obligations. Thus, clearinghouses became credible suppliers of information about the financial condition of member banks.

On balance, the nineteenth century clearinghouses appear to have functioned as effective private regulatory organizations. Available evidence indicates that the ultimate losses suffered by depositors of failed banks during this period were negligible (Timberlake 1984). Despite its effectiveness in this regard, this private system of regulation was replaced with government regulation with the formation of the Federal Reserve, and, after the collapse of the banking system in the early 1930s, with federally sponsored deposit insurance.

The Federal Reserve System was created to impose greater centralized government control over the banking system (Timberlake 1984). Under the clearinghouse system there were recurrent financial panics and bank suspensions that were viewed as a source of macroeconomic instability.[1] In addition, there was some concern that the clearinghouse structure led to industry cartelization and monopoly

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[1] The assertion that banking panics have been a primary cause of macroeconomic instability in U.S. economic history has been disputed by recent research, however (see Benston, et al. 1986, chapter 2).

profits (Carosso 1973). The power of exclusion gave clearinghouse members the potential ability to limit entry into their markets.

Yet, it is worth emphasizing again that the clearinghouse system actually worked quite well at limiting depositor losses. Moreover, demands for greater governmental control over monetary policy and concerns over macroeconomic instability, while justified, do not necessarily provide an argument in favor of government regulation of banking. As Goodfriend and King (1988) point out, the exercise of monetary policy only requires a central monetary authority empowered to carry out open market operations. Thus, monetary policy should be able to prevent widespread bank suspensions so long as the monetary authority stands willing to supply reserves to stabilize the relative price of currency and bank liabilities. To the extent that preventing financial panics and bank runs is perceived as an important goal of public policy, available evidence suggests that liberalizing regulatory restrictions that limit the ability of banks to establish branches would be the most effective solution (Calomiris 1989b). Finally, in the area of antitrust concerns, existing antitrust laws should be adequate to guard against anticompetitive behavior in the banking system.[2]

Deposit Insurance and Bank Failure Resolution

Because a deposit insurer effectively becomes a creditor to banks and thrifts, a system of government regulation and supervision is a necessary adjunct to a system of government-sponsored deposit insurance. Government regulation and supervision in this instance is analogous to the monitoring behavior and other protective devices employed by creditors in private financial arrangements. The scope of this regulatory system is comprehensive and extends to legal arrangements for dealing with bank and thrift failures, which differ from bankruptcy proceedings for nonfinancial firms.

Commercial banks and savings and loan associations, along with certain other heavily regulated financial firms such as insurance companies, are not subject to the bankruptcy laws that apply to commercial firms. Responsibility for closing an insolvent bank or savings and loan rests with its chartering agency. In the case of national banks, the charter-

ing agency is the Office of the Comptroller of the Currency (OCC). Before being disbanded in 1989, the Federal Home Loan Bank Board chartered federal savings and loan associations. The Bank Board's chartering authority has since been delegated to a new agency, the Office of Thrift Supervision (OTS). In addition to the federal chartering agencies, each state also charters commercial banks and savings and loan associations. The state banking or savings and loan superintendents are responsible for closing state-chartered institutions.

Role of the deposit insurer When an insured bank or thrift is declared insolvent, the deposit insurer pays off insured depositors and, in most cases, becomes the receiver for the failed institution.[3] Once the insured depositors are paid, the deposit insurer assumes their claims against the failed institution. Thus, the role of the deposit insurer in dealing with a failing bank or savings and loan differs considerably from that of a bankruptcy judge or trustee. Rather than acting solely in the role of a mediator between different claimants, as a bankruptcy judge does, the deposit insurer assumes the dual role of receiver and claimant.

As receiver, the deposit insurer assumes responsibility for administering the assets of the insolvent firm and has a fiduciary responsibility to all other claimants, such as uninsured depositors and non-deposit creditors. In its role as a claimant, the deposit insurer attempts to secure repayment of deposits from the failed institution on behalf of insured depositors. Federal banking law does not grant the deposit insurer preference over other unsecured creditors, although some states have enacted "depositor preference" statutes (Hirschhorn and Zervos 1990).

The law gives the deposit insurer substantial discretion in dealing with a failing institution. Nevertheless, the insurer must seek the cooperation of other creditors when attempting to reorganize and restructure the debts of an insolvent bank. Although commercial bank and savings and loan failures are not subject to the same kind of stringent judicial over-

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[2] Kuprianov (1985) gives an account of how antitrust laws assured savings and loans access to the Automated Clearing Houses operated by the commercial banking industry.

[3] In the past, the FSLIC bore responsibility for administering federally insured savings and loan institutions when they were declared insolvent. However, with the enactment of FIRREA, the FSLIC was dissolved and the FDIC was given responsibility for administering both the Bank Insurance Fund (BIF), which insures the deposits of commercial banks, and the Savings Association Insurance Fund (SAIF), the new deposit insurance fund for savings and loans. In its new role, the FDIC is responsible for handling insolvent savings and loans as well as commercial bank failures.

sight mandated by bankruptcy laws, creditors who feel they have been treated unfairly do have recourse to the courts.

FSLIC failure resolution procedures Before it became insolvent and was itself dissolved, the FSLIC enjoyed a large degree of discretion in the way it dealt with failing savings and loans. It could: [1] liquidate the organization and pay off its depositors and other creditors; [2] reorganize the enterprise and return it to private sector control; or [3] extend direct assistance to enable a troubled institution to remain in operation.

In a liquidation, or payout, a failing savings and loan would be closed, its insured depositors paid, and its assets liquidated. Receivership expenses had first priority against liquidation proceeds, with remaining proceeds distributed to the association's creditors. In states with depositor preference statutes, the claims of the FSLIC and any uninsured depositors against the failed institution received preference over other unsecured creditors. In states with no depositor preference statutes, the FSLIC was forced to share the liquidation proceeds with other unsecured creditors. Most often, a troubled savings and loan was not closed before it had accumulated large losses, so that liquidation proceeds rarely covered all outstanding creditor claims in full. Only a relatively small number of failed savings and loans have been liquidated. Between 1980 and 1988 only 78 of the 489 insolvencies officially resolved by the FSLIC were liquidated.[4]

In reorganizing a failing savings and loan, the FSLIC could: [1] directly augment the net worth of the enterprise, either through direct cash contributions or through the issue of its own promissory notes; [2] purchase subordinated debt or preferred stock as part of a recapitalization; [3] provide the acquirer of an insolvent institution with financial guarantees and yield maintenance agreements guaranteeing the performance of the troubled organization's assets; or [4] purchase the impaired assets of a troubled institution at a negotiated price (Zisman and Churchill 1989). Thus, the FSLIC sometimes maintained an explicit financial stake in an institution after it was reorganized. In addition to directly augmenting the

net worth of a troubled institution in these ways, the Federal Home Loan Bank Board, which administered the FSLIC, would often grant acquirers of troubled thrifts special permission to acquire other institutions at a later date. To augment the franchise value of financially troubled institutions, the Bank Board sometimes provided acquirers with enhanced branching opportunities or permission to acquire healthy savings and loans in other states, actions that state-mandated branching restrictions would otherwise prohibit.

Reorganizations of troubled thrifts often took the form of a *supervisory merger*. In a supervisory merger, regulators would arrange the merger of a financially troubled institution with another institution deemed to be in better financial condition. Supervisory mergers were accomplished without the explicit financial assistance of the FSLIC. Normally, the FSLIC would have been expected to recapitalize a failing institution before arranging a merger. But as the deposit insurer's financial resources became strained, the Bank Board was forced to grant regulatory forbearances to arrange mergers of insolvent organizations. In some cases, regulatory forbearance amounted to a waiver from regulatory minimum net worth requirements. In many cases, however, such forbearances involved permission to employ liberal accounting procedures that authorized the acquirer to defer recognition of the losses of the insolvent thrift almost indefinitely. Thus, supervisory mergers often simply consolidated losses into larger organizations that were permitted to continue operating without private capital. Between 1980 and 1988, 333 institutions were involved in supervisory mergers (Barth, Bartholomew, and Bradley 1989b, Table 1).

Since supervisory mergers did not require explicit action on the part of the FSLIC, they are not officially counted as failure resolutions. As Kane (1989b) notes, however, the grant of regulatory forbearance made the FSLIC the residual risk-bearer for undercapitalized enterprises that would otherwise have been unable to attract funding. To the extent that supervisory mergers were based on promises of regulatory forbearance, the FSLIC maintained an implicit equity stake even in cases where its stake in the merged firms was not made explicit.

The Bank Board had the authority to assume control of a financially troubled organization until it could be reorganized and sold to private investors. It exercised such "conservatorship" powers in its Management Consignment Program, which is discussed in greater detail in Section II.

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[4] The number of official failure resolutions understates the true number of thrift insolvencies during this period. Some troubled institutions were handled through "supervisory mergers," described below, while hundreds more insolvent institutions have been taken over by regulators but have not yet been closed or reorganized. Barth, Bartholomew, and Bradley (1989b) give data on thrift failure resolutions and costs from 1934 to 1988.

Finally, the FSLIC (as well as the FDIC) was authorized to extend direct assistance to a financially troubled institution if such an action was deemed less costly than any of the other available courses of action, or in cases where the institution was judged to be "vital" to its community (Benston, et al. 1986, chapter 4).

Ostensibly, then, FSLIC failure resolution procedures resemble legal bankruptcy proceedings in that they are meant to bring about the reorganization of a failing firm or provide for its liquidation in cases where reorganization is not deemed worthwhile. In practice, however, the savings and loan regulatory system has proved ineffective at limiting the losses incurred by insolvent institutions. Whereas legal bankruptcy proceedings ensure that the debts of an insolvent firm are restructured in such a way that shareholders have an equity stake before the firm is returned to private control, the same has not always been true of FSLIC failure resolution procedures. Moreover, the system proved ineffective at curbing the risks taken on by the management of failing institutions. The practical importance of these differences will become evident in the ensuing account of the evolution of the savings and loan crisis.

II. HISTORY OF THE SAVINGS AND LOAN CRISIS

The origins of the savings and loan crisis are rooted in the system of regulation imposed on the industry. The ensuing account describes the evolution of the system and highlights the characteristics that later precipitated an industry-wide crisis. We then proceed to a detailed account of the crisis itself.

Federal Regulation of Savings and Loans

The savings and loan regulatory system of the 1980s was a product of legislation enacted during the Great Depression. Before 1932, the federal government had little involvement in thrift regulation. Savings and loans shared in the financial distress that afflicted commercial banks during this episode. In an attempt to assist the thrift industry, which had begun to contract due to heavy deposit withdrawals, Congress passed the Federal Home Loan Bank Act in 1932. The Act created the twelve Federal Home Loan Banks and the Federal Home Loan Bank Board as their supervisory agent. The goal of this legislation was to provide thrifts with an alternative source of funding for home mortgage lending, much in the same way that the Federal Reserve Banks provided temporary funding for commercial banks. While the

Federal Reserve Banks only provided short-term credit, however, the Federal Home Loan Banks were created to provide longer-term credit in support of mortgage lending.

The federal government became involved in chartering savings and loans for the first time in 1933 with the passage of the Home Owners' Loan Act, which authorized the FHLBB to charter and regulate savings and loan associations. In 1934, a year after a system of deposit insurance was established for commercial banks, the National Housing Act of 1934 created a deposit insurance fund for savings and loan associations. Unlike the FDIC, which was established as an independent organization separate from the Federal Reserve System and the Comptroller of the Currency, the FSLIC was placed under the auspices of the FHLBB.

The legislation creating the FSLIC called for the establishment of a reserve fund equal to five percent of all insured accounts and creditor obligations within 20 years, and empowered the agency to assess an annual insurance deposit of 1/4 of one percent on the total deposits of insured S&Ls. The FSLIC was further authorized to collect an additional emergency assessment of 1/4 percent if it needed additional funding. At first, deposits were insured up to a maximum of $5,000 per depositor.

When federal deposit insurance was first established, both the FDIC and the FSLIC were expected to accumulate and hold reserves sufficient to pay off all insured depositors under any foreseeable circumstances. The legislated deposit insurance assessments and reserve fund targets were based on estimates of the historical losses of depositors. But federal deposit insurance had not been in existence long before the deposit insurance assessments were cut and coverage expanded. In 1935, a year after the FSLIC was established, statutory deposit insurance assessments for insured savings and loans were cut in half, to 1/8 of one percent of deposits. The emergency assessment authority was similarly cut to 1/8 of one percent. That same year, the FDIC's assessments were cut from 1/2 of one percent to 1/12 of one percent, and its emergency assessment rights were rescinded.

The argument for lowering deposit insurance rates was based upon the assertion that enhanced regulation and supervision would keep future losses of insured banks below the historical averages. At the same time, however, there appears to have been

some awareness that lowering deposit insurance assessments could result in future funding problems for the deposit insurance funds. FDIC deposit insurance assessments were reduced to 1/12 of one percent by the Banking Act of 1935, which also provided the agency with the right to borrow from the U.S. Treasury. The FSLIC was granted similar borrowing authority in 1950, when deposit insurance assessments for S&Ls were cut to 1/12 of one percent.

Over the ensuing years, basic insurance coverage for S&L depositors was raised several times: to $15,000 in 1966, $20,000 in 1969, $40,000 in 1974, and, most recently, to $100,000 in 1980. These increases in coverage, together with a rapid growth in deposits throughout most of the postwar period, far outpaced the accumulation of reserves in the FSLIC insurance fund. The five percent reserve fund target originally mandated by the National Housing Act was never attained. The FSLIC's primary reserve fund never exceeded two percent of insured deposits (Barth, Feid, Riedel, and Tunis 1989).

Thus, historical data on bank losses suggests that neither deposit insurance fund has had the necessary reserves to deal with the contingency of widespread bank failures. Both the FDIC and the FSLIC have faced a chance of insolvency almost since their inception. Moreover, both agencies received the authority to borrow from the U.S. Treasury as part of legislated reductions in deposit insurance rates and increases in deposit insurance coverage. As Barth, Bradley, and Feid (1989) note, however, no formal procedures were ever established for dealing with the insolvency of one of the deposit insurance funds, even though the funds were structured in a way to make such a contingency distinctly possible, if not inevitable. Thus, the stage for the present-day savings and loan crisis was set as early as 1950.

Origins of the Savings and Loan Crisis

The first signs of trouble surfaced in the mid 1960s, when rising inflation and high interest rates created funding problems for savings and loans. Regulations prohibited federally insured savings and loans from diversifying portfolios that were concentrated in long-term, fixed-rate mortgages. Thrift industry profitability eroded as deposit rates crept above the rates of return provided by their existing holdings of home mortgage loans. Congress attempted to address the problem by placing a ceiling on maximum deposit rates paid by thrifts in 1966. Thrifts were given a slight competitive advantage, being authorized to pay

1/4 of one percent more on savings deposits than commercial banks were allowed to pay, to encourage deposit flows to the industry.

But interest rate controls led to periods of disintermediation whenever market interest rates rose too far above statutory deposit rate ceilings. The problem became increasingly severe as the inflation and accompanying high interest rates that characterized the economic environment of the late 1970s made the existing system of interest rate controls unworkable. Misguided regulation was blamed for the thrift industry's woes, and lawmakers began to debate the merits of financial deregulation.

The first significant step to deregulate the thrift industry came in 1980 with the passage of the Depository Institutions Deregulation and Monetary Control Act (DIDMCA). The DIDMCA provided for the phase-out of interest rate regulations and permitted thrifts to diversify their asset portfolios to include consumer loans other than mortgage loans, loans based on commercial real estate, commercial paper, and corporate debt securities. The act also raised the limit on federal deposit insurance applicable to individual accounts from $40,000 to $100,000.

This first attempt at deregulation came too late to help thrifts cope with the steep rise in interest rates that began in 1981 and continued into 1982. Federally chartered S&Ls were not given the legal authority to make variable-rate mortgage loans until 1979, and then only under severe restrictions. They did not receive the authority to freely negotiate variable-rate mortgage loans with borrowers until 1981. By that time, deposit rates had risen well above the rates most institutions were earning on their outstanding fixed-rate mortgage loans. As funding costs rose, many thrifts experienced heavy losses. Federally insured savings and loans collectively lost over $4.6 billion in 1981 and $4.1 billion in 1982.[5] By one estimate, 85 percent of all thrifts were unprofitable in 1981, and most were insolvent on an economic basis (Barth, Bartholomew, and Labich 1989). From the start of 1980 through year-end 1982, the number of FSLIC-insured thrifts fell almost 20 percent, from 3,993 to 3,287.

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[5] Net operating income, which more accurately reflects the true losses suffered by thrifts during this period because it excludes nonrecurring gains, presents an even more devastating picture of losses suffered by savings and loans during this period. According to Barth, Bartholomew, and Bradley (1989, Appendix I-8), aggregate net operating income for the U.S. thrift industry in 1981 was −$7.1 billion and −$8.8 billion for 1982.

The industry's staggering losses overwhelmed the resources of the FSLIC. Hundreds more institutions that had become economically insolvent were not closed because the FSLIC lacked the resources to deal with them. Many economically insolvent thrifts were able to maintain the appearance of solvency even though they were economically insolvent because generally accepted accounting practices (GAAP) permitted them to report their net worth based on historical asset value, instead of requiring them to recognize the true market value of assets. But as interest rates continued to rise, a significant number of institutions soon accumulated such massive losses that some action was required. The FSLIC resolved 32 thrift insolvencies in 1980, another 82 in 1981, and 247 in 1982. During the same period, another 493 savings and loans voluntarily merged with other institutions (Barth, Bartholomew, and Bradley 1989b, Table 1). In spite of this record-breaking caseload, Kane (1989b) estimates that 237 FSLIC-insured thrifts were GAAP-insolvent at the end of 1982. The number of insolvent insured thrifts in operation continued to climb through 1988.

Regulatory Forbearance

Once the crisis in the savings and loan industry had begun, it was perpetuated by policies of regulatory forbearance, which permitted insolvent institutions to remain open in the hope that they could grow out of their financial problems. The policies adopted to deal with the growing number of insolvent savings and loans during this episode stand in stark contrast to the restrictions on management typically imposed in the course of legal bankruptcy proceedings for nonfinancial firms.

FHLBB policies Lacking the resources to deal with all the problem institutions under its supervision, the Bank Board adopted a policy of regulatory forbearance. Minimum net worth requirements were lowered in 1980 and 1982. Regulatory accounting principles (RAP) were liberalized in 1981, and again in 1982, to permit distressed savings and loans to defer recognizing their losses. These permissive rules encouraged thrifts to record inflated net worth values so as to present an appearance of solvency. Together, lenient net worth requirements and permissive regulatory accounting principles lowered the number of official "problem" institutions the overburdened Bank Board staff was forced to deal with, although only for a short time (Brumbaugh 1988).

By this time, many thrifts had accumulated such large losses that even these new and permissive

accounting rules could not conceal the fact that they were insolvent. Concerned that acknowledging the large number of insolvent savings and loans could bring about a crisis of confidence among depositors, the FHLBB implemented its income-capital certificates (ICC) program. Under this program, insolvent thrifts could issue income capital certificates to the FSLIC to supplement their regulatory net worth. The idea behind the program was for the FSLIC to purchase the certificates to restore troubled institutions to solvency. Because the FSLIC lacked the money, it most often exchanged its own promissory notes for the certificates. Institutions receiving such promissory notes could include them on their balance sheets as assets, while income capital certificates were reported as an equity item. Such transactions amounted to the purchase of equity in an insolvent enterprise by the FSLIC using its own credit.

Income-capital certificates gave the FSLIC a financial interest in these troubled thrifts. If participating institutions eventually regained profitability, as it was hoped they would, the income-capital certificates would entitle the FSLIC to a share of their profits. But in the event a participating institution was declared insolvent, the FSLIC had virtually no chance of regaining its investment. FSLIC claims based on income capital certificates were subordinate not only to the claims of depositors, but of other creditors as well.[6]

Where possible, the FSLIC used income-capital certificates to facilitate mergers and reorganizations. Prospective buyers were hesitant to assume the liabilities of insolvent thrifts when it appeared that the value of the institutions' assets fell far short of deposit obligations. Sometimes, the FSLIC transferred assets from thrifts it was in the process of liquidating to other institutions it was trying to sell. This latter course was typically pursued where purchasers of insolvent thrifts were reluctant to accept FSLIC promissory notes. Many prospective acquirers either could not or would not invest enough of their own resources to fully recapitalize a failing institution. In such cases, the FSLIC would help effect a recapitalization by exchanging its promissory notes for income-capital certificates, which were transferable to the acquiring institution. In essence, the

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[6] Income-capital certificates did not have any stated maturity, and were not collateralized or secured. Thus, in the event of legal insolvency, income-capital certificates gave the FSLIC essentially the same status as those of a holder of preferred equity and not those of a creditor (see GAO, *The Management Consignment Program*, September 1987; and *American Banker*, 12/26/85).

FSLIC became a partner in the new, reorganized institution.

In many of these reorganizations, the thrift's new owners had very little of their own financial resources at stake. Many times, the acquirer was a marginally solvent thrift with little or no capital of its own. Such institutions were able to expand rapidly by taking over other thrifts in even worse financial condition. In the end, the FSLIC bore virtually all residual risks while the management and shareholders of the acquiring institution stood to profit handsomely if their attempts to expand their operations proved profitable.

The Bank Board pursued such policies out of a lack of good alternatives. It lacked the resources to close the insolvent institutions, and because only the chartering agency — which was the Bank Board itself in the case of federally chartered thrifts—could declare a savings and loan legally insolvent, financially troubled thrifts could be kept open indefinitely. Unfortunately, the Bank Board also lacked the resources to adequately monitor the many insolvent savings and loans for which the FSLIC had become the residual risk bearer. At the same time, deposit insurance made it possible for even the most poorly managed and unprofitable thrifts to continue expanding their operations. Keeping insolvent thrifts open under these circumstances permitted the FSLIC to defer recognizing its losses, but exposed the fund to the risk of very large future losses.

The Garn-St. Germain Act Lawmakers responded to these developments by enacting the Garn-St. Germain Act of 1982, which combined a program of regulatory forbearance together with further thrift industry deregulation. To encourage greater regulatory forbearance toward financially troubled thrifts, the Act created the "net worth certificate" program. The net worth certificate program was essentially a derivative of the income-capital certificates program devised earlier by the Bank Board. Net worth certificates differed from income capital certificates in that they did not constitute a permanent equity investment, but were issued only for a set time period authorized by the legislation. Unlike income-capital certificates, net worth certificates were not transferable and so were not useful in reorganizing insolvent institutions or arranging mergers. In fact, the stated purpose of the net worth certificate program was to forestall forced mergers or other regulatory actions against insolvent thrifts (see GAO, *Net Worth Certificate Assistance Programs*, 1984).

At the same time, the Garn-St. Germain Act attempted to reform the elements of the regulatory structure most often blamed for the industry's problems by liberalizing investment powers of federally chartered thrifts. Some states such as California took the initiative to deregulate savings and loans even further, authorizing state-chartered thrifts to engage in activities such as direct participation in real estate development. Other states, notably Texas and Florida, had granted their state-chartered savings and loans liberalized investment powers years earlier.

Thus, the Garn-St. Germain Act attempted to forestall action in the hope that the combined policies of forbearance and deregulation would facilitate a return to profitability and financial health among insolvent thrifts. These policies were adopted in an effort to avert the need for a federally financed rescue of the FSLIC. Rather than providing the Bank Board with the resources needed to begin closely monitoring and closing problem institutions, the net worth certificate program discouraged regulators from acting. But the added risks that continued regulatory forbearance posed to the FSLIC fund were underestimated. Those risks were soon to become apparent.

Early attempts at reregulation Instead of improving with time as policymakers had hoped, the financial condition of insolvent thrifts continued to deteriorate. Market interest rates had begun a pronounced and sustained decline by the end of 1982, and economic conditions improved as the severe recession that had begun a year earlier ended. Lower interest rates and favorable economic conditions throughout the nation as a whole did facilitate the recovery of some thrifts, but a large and rapidly growing segment of the industry continued to incur heavy losses. Although rising interest rates had triggered the savings and loan crisis, the subsequent decline in interest rates to more normal levels failed to restore financial health to many of the insolvent institutions that had been kept open.

It was apparent to all in the industry by this time that the FSLIC did not have the resources to give attention to more than a few of the most financially troubled institutions. The number of Bank Board and FHL bank examination and supervisory personnel actually declined between 1981 and 1984, even as the number of thrift insolvencies soared (Barth and Bradley 1988, 46-47). Attempts by the Bank Board to augment the supervisory staff were discouraged by the Office of Management and Budget. Armed

with an unlimited government financial guarantee and new investment powers, many insolvent thrifts found it easy to engage in a variety of risky and imprudent investment schemes. As time went on, evidence surfaced that the losses at many institutions were attributable to gross mismanagement, and in some cases to outright fraud.

The rapidly deteriorating financial condition of the many insolvent S&Ls that had been kept open had begun to become apparent as early as 1983, when the Bank Board began taking steps to limit the risks that poorly capitalized but aggressively managed thrifts imposed on the FSLIC. The agency proposed rules to limit the use of brokered deposits by undercapitalized, rapidly expanding thrifts. That attempt ultimately proved unsuccessful, however, when the courts ruled that the agency lacked the legal authority to impose such a rule and lawmakers refused to grant the necessary authority.

Capital requirements were raised for newly chartered institutions, but the new capital requirements were not applied to existing institutions. The income-capital certificate program was briefly discontinued, only to be revived again two years later. In 1985, the Bank Board proposed to effectively raise minimum net worth requirements by rescinding some of the liberal accounting rules introduced in 1981. It also proposed to limit the investment powers of undercapitalized federally insured thrifts.

Unfortunately, these initiatives proved largely ineffective in stemming the growing losses incurred by insolvent and inadequately supervised thrifts. Attempts by the Bank Board to restrict the activities of state-chartered thrifts drew considerable resistance from legislators and regulators in states such as California, Florida, and Texas, where those institutions had been granted broad investment powers. Managers of insolvent thrifts, aware that the FSLIC lacked the resources to closely supervise more than a fraction of all the undercapitalized institutions it insured, proved difficult to control. Thrift industry assets grew almost 20 percent in 1984 alone (See GAO, *Thrift Industry Restructuring*, 1985, p. 8). Unlike the initial financial difficulties of most insolvent thrifts, which were largely attributable to the effect of high interest rates on the value of their mortgage portfolios, most losses after 1982 stemmed from credit quality problems. According to Brumbaugh (1988, p. 67), asset quality problems were the principal cause behind the losses experienced by 80 percent of the institutions comprising the FSLIC's

caseload of problem thrifts in 1984. In contrast, asset quality problems were seen to be the primary cause of the losses experienced by only 20 percent of problem thrifts between 1980 and 1984.

In certain respects the Garn-St. Germain Act can be judged to have achieved its goals. Mortgage assets declined as a proportion of all assets held by savings and loans after 1982, with insolvent institutions taking greatest advantage of their new investment powers. Unfortunately, the institutions most aggressive in exploiting their new powers also experienced the greatest deterioration in asset quality. Those institutions subsequently exposed the FSLIC to large losses (Barth and Bradley 1988, Tables 4 and 5).

The Management Consignment Program By 1985, it was becoming apparent that the combined policy of regulatory forbearance and deregulation first adopted in response to the thrift industry crisis had failed to restore financial health to the industry. Instead, it was proving to be a prescription for disaster. In an attempt to gain greater control over insolvent thrifts that continued to experience growing losses, the Bank Board instituted its "Management Consignment Program" (MCP). An institution brought into the MCP typically had its management replaced with a conservator selected by the Bank Board. The program was conceived as a means of temporarily warehousing hopelessly insolvent institutions until they could be sold or liquidated by the FSLIC. Many institutions placed in the MCP in 1985 were still in the program and still incurring losses two years later (see GAO, *The Management Consignment Program*, 1987).

The income-capital certificates program was reintroduced for institutions placed in the MCP. Using its own promissory notes to "recapitalize" insolvent thrifts, the FSLIC attempted to sell or merge those institutions. But as industry conditions grew worse, it became increasingly apparent to market participants that the FSLIC lacked the financial resources to deal with the heavy losses accumulated by troubled S&Ls. Potential acquirers became reluctant to accept the FSLIC's promissory notes, further hampering the agency's efforts to sell off insolvent thrifts. Investor reluctance to accept FSLIC notes stemmed at least in part from a ruling by the Financial Accounting Standards Board that such notes could not be counted as assets in determining net worth under Generally Accepted Accounting Principles (see GAO, *The Management Consignment Program*, 1987).

The Demise of the FSLIC

By 1985, the rapidly deteriorating condition of many insolvent thrifts had so strained the resources of the FSLIC that the Bank Board finally had to admit that the insurance fund needed outside funding. But as long as depositors at insolvent thrifts felt confident that the U.S. Treasury would ultimately guarantee the safety of their deposits, they had no reason to withdraw their funds. And as long as insolvent thrifts could continue to attract deposits, there was no incentive to appropriate the funds needed to recapitalize the FSLIC. As a result, hundreds of insolvent institutions were permitted to continue accumulating losses until the condition of the FSLIC become so critical that private investors began to question whether the U.S. government would ultimately honor all the debts accumulated by the FSLIC. In the end, the actions of private investors ultimately forced lawmakers to recapitalize the savings and loan industry's insurance fund.

Early attempts to recapitalize the FSLIC In 1985, a study published by staff members of the FHLBB concluded that 400 to 500 FSLIC-insured thrifts were GAAP insolvent and estimated the cost of resolving those insolvencies at $15.8 billion. The FSLIC's official reserves in 1985 were less than $6 billion. The report concluded that closing or reorganizing even a fraction of the insolvent thrifts insured by the FSLIC would deplete the insurance fund's reserves (Barth, Brumbaugh, Sauerhaft, and Wang 1985).

Later that year, FHLBB Chairman Edwin Gray acknowledged to Congress that the FSLIC lacked the funding it needed to deal with its caseload of problem institutions. To raise the necessary funds, he proposed imposing a one-time assessment of one percent on all FSLIC-insured thrifts, as the Bank Board was authorized to do by law (see *American Banker*, 10/17/85). But Gray's proposal encountered a great deal of resistance from the savings and loan industry and was subsequently withdrawn. Instead, the FSLIC exercised its authority to impose a 1/8 percent special deposit insurance assessment. The special assessment generated an additional $1 billion in 1985, but that amount fell far short of providing the FSLIC with the funding it needed to continue operating (Brumbaugh 1988, p. 51).

Alarmed by the Bank Board's bleak assessment of financial condition of the thrift industry and its insurance fund, Congress asked the General Accounting Office to prepare a report on industry conditions and the implications for the FSLIC fund. The GAO report, released in February of 1986, concluded that the cost of closing insolvent FSLIC-insured thrifts in operation at the time could be as high as $22.5 billion, an amount well in excess of the FSLIC's reserves (see GAO, *Potential Demands on the FSLIC Fund*, 1986). In a subsequent Congressional hearing, a GAO official concluded that most of the insolvent thrifts being "warehoused" by the FSLIC were unlikely to ever recover. He went on to estimate that it could take anywhere from 5 to 20 years to work out the problems of insolvent thrifts (see *Washington Financial Reports*, 3/10/86).

Obstacles confronting recapitalization Bank Board and U.S. Treasury officials had begun meeting in late 1985 to devise a recapitalization plan for the FSLIC. FHLBB Chairman Edwin Gray unveiled the Reagan administration's plan in March of 1986. The stated goal of the plan was to effect a recapitalization of the FSLIC without taxpayer funding. The plan relied on a transfer of resources from the Federal Home Loan Banks and a continuation of the special deposit insurance assessment against thrifts as part of an elaborate arrangement devised to keep funding costs off the government budget.[7]

Enactment of the recapitalization measure was delayed for over a year, however, because it encountered a great deal of opposition from the thrift industry. There were two reasons for this opposition. The first was the plan's reliance on an indefinite continuation of the annual 1/8 percent special deposit insurance assessment. Thrift industry spokesmen maintained that the plan's reliance on a continuation of the special deposit insurance assessment to service such a debt load placed an unfair burden on the solvent institutions. Industry representatives argued further that the proposed $15 billion funding authority would give the FSLIC much more than it needed to deal with its caseload of troubled institutions.

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[7] The plan called for the creation of a shell funding corporation that would issue bonds to fund the FSLIC. The funding corporation was to be capitalized through the transfer of a portion of the excess capital of the Federal Home Loan Banks. The initial capitalization was to be used to purchase zero-coupon Treasury bonds. These bonds were to provide collateral securing the repayment of the bond principal. Interest payments on the bonds were to be serviced by revenues to be generated by continuing the special deposit insurance assessment imposed on FSLIC-insured thrifts. This complicated funding scheme was chosen because it avoided the direct appropriation of federal funds and so permitted the cost of the plan to be kept off the government's budget. The plan provided the basic framework behind the Competitive Equality Banking Act of 1987, which established the Financing Corporation (FICO) to issue off-budget debt obligations. See Brumbaugh (1988, ch. 3) for more details.

As an alternative to the administration-sponsored initiative, industry representatives proposed a plan that would require less borrowing by delaying the reorganization of some insolvent thrifts for ten years or more. They also lobbied for a formal timetable for the phaseout of the special deposit insurance assessment (see *Washington Financial Reports,* 7/28/86).

A second objection to the recapitalization plan stemmed from the prospect of an end to policies of regulatory forbearance. Regulatory forbearance had become a politically popular policy. So many thrifts had become financially troubled by this time that the group constituted a powerful special interest lobby. The majority of thrift insolvencies were concentrated in geographic areas experiencing severe regional economic problems. Congressional representatives from economically depressed areas argued that closing or reorganizing the financially troubled institutions in their districts would further exacerbate economic problems in those regions (Brumbaugh 1988, p. 174). Attempts by some lawmakers to link recapitalization of the FSLIC with a broader regulatory reform proposal further slowed down action on the measure.

FSLIC declared insolvent As debate over the recapitalization measure dragged on into 1987, the FSLIC's need for funding began to grow critical. Insolvent thrifts in Texas and the Southwest, where most problem institutions were concentrated, were forced to pay rising premiums over market rates in an effort to attract deposits (Brumbaugh 1988, pp. 70-74; Hirschhorn 1990). As public concern over the FSLIC's financial condition grew, the risk premiums paid by insolvent institutions rose significantly (Hirschhorn 1989a, 1989b).

In an effort to find an alternative funding source, the Bank Board had turned to the Federal Home Loan Banks. The FHL banks typically extended advances to member institutions under the security of certain collateral, most often home mortgages. Insolvent thrifts experiencing the greatest difficulty attracting deposits could not easily expand their borrowing from the FHL banks, however, because they could not post the necessary collateral. The Federal Home Loan Bank System had been established to provide a source of funding for home mortgages, not to supply capital to insolvent thrifts. To facilitate lending to insolvent S&Ls, the Bank Board authorized the FHL banks to extend advances secured by promissory notes issued by the FSLIC (see GAO,

Forbearance for Troubled Institutions, May 1987; and *The Management Consignment Program,* September 1987). By the end of 1986, the Dallas FHLB had issued over $1 billion in advances to insolvent thrifts secured only by FSLIC notes.

Early in 1987, the GAO announced that the FSLIC had become officially insolvent, with its deficit estimated to exceed $3 billion at the end of 1986 (see "Statement of Frederick D. Wolf" in U.S. Congress, House, March 1987; and *Wall Street Journal,* 3/4/87). The announcement by the GAO raised concerns over the creditworthiness of the FSLIC's promissory notes. A few days after the GAO's public statement, the accounting firm of Delloite, Haskins and Sells, which had been hired to audit the financial statements of the Federal Home Loan Banks, threatened to issue a qualified opinion on the financial condition of the Federal Home Loan Bank of Dallas.

The $1 billion the Dallas FHLB had advanced solely on the security of FSLIC notes constituted a significant fraction of the bank's capital. Based on the GAO audit of the FSLIC, the Dallas bank's auditor had concluded that the fund might be unable to back the guarantees securing the bank's advances to insolvent thrifts. A qualified auditor's opinion would have made it virtually impossible for the Dallas bank to raise funds in private capital markets. The FSLIC's mounting financial problems had come to threaten the financial stability of the entire Federal Home Loan Bank System.

To avoid receiving a qualified opinion, the Dallas FHLB demanded immediate repayment of the $1 billion in FSLIC notes it was holding. Fearing that a qualified opinion on the condition of the Dallas bank could cast doubt on the creditworthiness of the entire FHLB system, the Bank Board quickly acceded to the Dallas FHLB's demand and instructed the FSLIC to repay the notes it had issued.[8] Repayment of the notes left the FSLIC with less than $1 billion in cash reserves.

During this period, the Dallas FHLB instituted a program to secure an alternative funding source for

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[8] The Federal Home Loan Bank System funds the advances it extends to member institutions through the sale of bonds to private investors. Obligations issued by the Federal Home Loan Bank System are the joint liability of all twelve Federal Home Loan Banks. Moreover, the Dallas FHLB was not the only bank in the system that had lent against the security of FSLIC notes; it just had a relatively greater exposure to loss in the event of a default by the FSLIC (see *American Banker,* 3/16/87).

insolvent thrifts. Relatively healthy thrifts that could still attract deposits were induced to place insured deposits with insolvent thrifts experiencing funding problems (see *Wall Street Journal*, 3/2/87). But this program by itself failed to provide sufficient funding for insolvent thrifts. In June, the outflow of deposits from troubled Texas thrifts began to accelerate. Officials of the Dallas FHLB were forced to negotiate with deposit brokers in an effort to ensure that troubled thrifts in that district could continue to raise funds through brokered deposits (see *American Banker*, 6/11/87). It was only a few years earlier that the Bank Board had attempted to curb insured thrifts' reliance on deposit brokers. Ironically, the agency found itself relying on the same brokers to continue funding the problem institutions it was struggling to keep open while waiting for the enactment of a recapitalization measure.

The Competitive Equality Banking Act of 1987 For a time, it appeared that opponents of the recapitalization bill would be successful in limiting the amount of funding approved by Congress to $5 billion, an amount the GAO had concluded would be insufficient to deal with the magnitude of losses accumulated by insolvent thrifts (see GAO, *The Treasury/Federal Home Loan Bank Board Plan for FSLIC Recapitalization*, March 1987). However, revelations of large-scale fraud at a number of financially troubled thrifts that had been kept open through regulatory forbearance created pressure to enact a larger recapitalization measure. The Competitive Equality Banking Act (CEBA), enacted in the summer of 1987, authorized the issue of $10.8 billion in bonds to recapitalize the FSLIC. The bill also included language mandating the extension of forbearance to financially troubled thrifts operating in certain designated economically depressed areas of the country.

Legal status of FSLIC Notes questioned Within months of the passage of the recapitalization bill, articles discussing the ultimate necessity of a taxpayer-funded bailout of the FSLIC began appearing in the financial press (see *American Banker*, 11/18/87). In November, the American Institute of Certified Public Accountants (AICPA) issued its *Practice Bulletin 3* warning auditors to consider the risks associated with any FSLIC notes appearing on the balance sheets of thrifts because of the insurer's questionable financial condition. A provision pledging the full faith and credit of the U.S. government behind all federally insured deposits had been included in the CEBA. But whether this pledge extended to promissory notes issued by the FSLIC to private investors was uncertain. As the ensuing events show, the AICPA warning marked an important turning point in the unfolding crisis. By limiting the FSLIC's ability to continue issuing debt, the AICPA bulletin helped to precipitate a funding crisis that ultimately forced lawmakers to recapitalize the savings and loan industry's insurance fund.

In April of 1988, the Federal Home Loan Bank of Dallas was forced to issue its 1987 annual report without an auditor's opinion. Since its last audit, the Dallas bank had once again begun lending on the security of FSLIC notes and had $500 million in such advances outstanding. Its accounting firm, Delloite, Haskins and Sells, withheld its opinion on the bank's financial condition pending the release of the GAO's audit of the FSLIC (see *BNA's Banking Report*, 4/18/88).

When the FSLIC released its preliminary 1987 annual report a week later, it acknowledged that despite the additional funding the agency had received in 1987, it was still insolvent at the end of the year. According to Bank Board officials, the extent of the FSLIC's insolvency had almost doubled, to $11.6 billion, during 1987 (see *BNA's Banking Report*, 4/25/88).

Based on its audit, the GAO concluded that the FSLIC had understated the extent of its insolvency. The government's auditors projected the cost of resolving the FSLIC's existing caseload of insolvent thrifts would be in excess of $17 billion, leaving the agency with a deficit of $13.7 billion at the end of 1987. The GAO report went on to warn of the costs of dealing with the more than 300 insolvent thrifts that the FSLIC had yet to formally place under receivership, which it cautioned could reach as high as $19 billion. Based on these cost projections, a GAO spokesman concluded that "further congressional action, beyond that already taken under the Competitive Equality Banking Act of 1987 to recapitalize the Corporation [FSLIC], may well be needed to enable the Corporation to continue to meet its obligations (see U.S. Congress, Senate, May 1988). Later that year, the GAO would acknowledge that its earlier estimates had grossly underestimated the extent of the FSLIC's insolvency.

In July, the accounting firm of Delloite, Haskins and Sells finally released an unqualified opinion on the financial condition of the Dallas FHLB. However, its report voiced concerns over the ultimate collectibility of the FSLIC notes the bank held as collateral

for its advances to insolvent thrifts, and warned the bank to limit such advances in the future (see *American Banker*, 7/29/88).

Although the Dallas FHLB had received an unqualified opinion on its financial condition, there was still considerable concern over the ultimate creditworthiness of the FSLIC's promissory notes. The Bank Board had announced an ambitious plan to reorganize and sell a record number of insolvent thrifts during 1988, but the plan depended on the willingness of private investors to accept FSLIC promissory notes and other financial guarantees. But news of the FSLIC's deteriorating financial condition made buyers increasingly reluctant to accept the fund's notes. Because the AICPA had warned auditors to consider the ultimate collectibility of FSLIC notes as questionable, potential acquirers faced the risk that auditors would not grant the institution an unqualified opinion if its balance sheet included FSLIC notes among its assets. Securities and Exchange Commission regulations made it virtually impossible for a firm that received a qualified auditor's statement to sell its securities to investors.

To facilitate the issue of more FSLIC notes, FHLBB Chairman Wall asked the U.S. Congress to pass a resolution placing the full faith and credit of the U.S. government behind notes issued by the FSLIC. The Senate voted in favor of such a measure in August, but the proposal encountered resistance in the House of Representatives.

At issue was the question of whether the issuance of notes and financial guarantees by the FSLIC constituted unauthorized borrowing in excess of the amount the FSLIC was legally permitted to borrow under the CEBA. Confidence in the Bank Board had been undermined by the fact that the agency kept revising its estimates of the ultimate cost of resolving insured thrift insolvencies. Between the start of the year and July of 1988, the Bank Board revised its estimates of the cost of resolving thrift insolvencies on at least three separate occasions, almost doubling its projected costs from $22.7 to $42.5 billion. Some members of Congress felt that the Bank Board had not been forthcoming with details of its planned expenditures. Rep. John LaFalce clearly summarized the issues surrounding the debate over granting FSLIC notes full faith and credit status: "We are now in a position where the Bank Board has, in effect, issued at its whim unlimited Treasury debt at levels in excess of its FICO bond authority which the Congress is now being pressured to belatedly

guarantee in order to keep the FSLIC and the industry afloat (see *BNA's Banking Report*, 8/15/88)."

The prospects for a favorable vote on the resolution requested by the Bank Board were, therefore, dubious at best. In an apparent effort to avoid an explicit rejection of the full faith and credit resolution by Congress, Chairman Wall announced he had withdrawn his request for a vote on the resolution on September 8. Although Reagan administration officials had supported enactment of the resolution at first, Treasury Department officials later announced that the request was withdrawn because they had determined that notes issued by the FSLIC already enjoyed U.S. government backing (see *BNA's Banking Report*, 9/19/88).

The GAO publicly supported the Treasury Department's position (see *BNA's Banking Report*, 11/11/88[2]). But the AICPA was not satisfied by these pronouncements. The organization told the Bank Board that in the absence of a congressional resolution, it would require an opinion by the U.S. Attorney General on the legal status of FSLIC notes before it would reconsider its warning to auditors on the status of FSLIC notes. At first the Bank Board agreed to ask the Attorney General to issue an opinion (see *BNA's Banking Report*, 9/19/88 and 11/7/88). However, in November a Bank Board spokesman announced that FHLB Chairman Wall had decided not to seek the Attorney General's opinion after all. Instead, legislation clarifying the legal status of FSLIC notes would be sought from the 101st Congress when it convened the following year (see *BNA's Banking Report*, 11/11/88[1]).

By this time the FSLIC's situation had become desperate. The 1987 recapitalization measure had failed to provide enough funding and the 100th Congress had refused to authorize the issue of more promissory notes. The Bank Board had estimated it could not service more than $16 billion in notes and guarantees (see *American Banker*, 9/19/89). But by November the agency had committed itself to nearly $25 billion in obligations, which included various financial guarantees to purchasers of insolvent thrifts as well as promissory notes (*BNA's Banking Report*, 11/11/88[3]). For almost a decade the Bank Board had struggled to keep insolvent thrifts open in an effort to forestall the need to close those institutions and pay off insured depositors. Insulated from the discipline that the market normally places on risk-taking, many of those institutions had embarked upon questionable and risky investments that

had produced staggering losses. Now a default by the FSLIC appeared imminent. Private investors would no longer accept the insurance fund's promises and financial guarantees, but insisted on firm evidence that it would be given the resources to meet those obligations. In the end, it was the discipline imposed by private investors that finally forced action to restore the thrift industry's insurance fund to solvency.

The Financial Institutions Reform, Recovery, and Enforcement Act of 1989

Projected costs of dealing with the growing backlog of hopelessly insolvent thrifts continued to climb throughout 1988. By the end of the year, the GAO had raised its estimate to over $100 billion (see *BNA's Banking Report*, 12/19/88). But the 100th Congress had adjourned without providing additional funding for the FSLIC, and so one of the first problems facing the incoming Bush Administration was that of devising a plan to rescue the insurance fund from an impending default.

The Bush Administration unveiled its plan to deal with the burgeoning crisis in the savings and loan industry on February 6, 1989. In addition to asking Congress to authorize funding to recapitalize the FSLIC, the Bush Plan also mandated a complete reorganization of the federal savings and loan regulatory system. The FDIC was called upon to assume supervisory control of insolvent savings and loans until the proposed legislation was ratified by Congress (see *BNA's Banking Report*, 2/13/89). The Bush Plan became the model for the Financial Institutions Reform, Recovery and Enforcement Act, or FIRREA, enacted in August of 1989.

The new savings and loan regulatory system created by the act is noteworthy in at least two respects. First, FIRREA represents an effort to reregulate savings and loans by restricting their investment powers and requiring them to specialize more in mortgage lending. It also calls for an end to the capital forbearance policies instituted in the 1980s, requiring savings and loans to meet capital requirements at least as stringent as those imposed on commercial banks. The new regulations are to be enforced through enhanced supervisory controls and stricter penalties in cases involving fraudulent or criminal activities.

Second, FIRREA brought about a complete reorganization of the federal savings and loan regulatory agencies. The law dissolved the FSLIC and established a new deposit insurance fund, the Savings Association Insurance Fund, or "SAIF," under the auspices of the FDIC. It created a new agency, the Resolution Trust Corporation (RTC), to take control of the FSLIC's caseload of insolvent savings and loans. FIRREA also disbanded the Federal Home Loan Bank Board, replacing it with a new federal chartering agency under the direction of the Secretary of the Treasury, known as the Office of Thrift Supervision, or OTS. The goal behind this restructuring was to eliminate perceived conflicts of interest inherent in the old system, whereby the chartering agency was also responsible for administering the deposit insurance fund. As the history of the savings and loan crisis revealed, that organizational structure created a situation where the chartering agency had both the incentive and the means to delay resolution of the problem for a protracted period.

Unlike earlier attempts to resolve the financial difficulties facing the savings and loan industry, the enactment of FIRREA was accompanied by a recognition that government funding would be needed to resolve the crisis. In addition to allocating funds to pay off the obligations incurred by the FSLIC before its dissolution, the RTC is to receive $50 billion in additional funding.[9] The law also imposed higher deposit insurance assessments for commercial banks as well as thrifts to raise the reserves of each industry's deposit insurance fund.

III. DEPOSIT INSURANCE REFORM

With the demise of the FSLIC, government regulators have been left to deal with a backlog of almost 600 insolvent savings and loans. Estimates of the ultimate cost of resolving the remaining thrift

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[9] In addition to providing for continued funding of FSLIC obligations incurred prior to the dissolution of the fund, FIRREA authorized the RTC to borrow $50 billion to use in dealing with insolvent thrifts. A new funding agency, the Resolution Funding Corporation (REFCORP), was created to borrow $30 billion. Like the funding corporation used to borrow the funds allocated by the CEBA, REFCORP was capitalized by a transfer of surplus capital from the Federal Home Loan Banks and was created to minimize the impact of the deposit insurance rescue plan on the government's budget deficit. Because the Federal Home Loan Banks provided the funding to guarantee repayment of the principal, funds borrowed by REFCORP are not officially classified as U.S. Treasury debt. The Treasury was authorized to borrow the remaining $20 billion and to transfer the proceeds to the RTC. To the extent that deposit insurance assessments levied against savings and loans fall short of the amount needed to service REFCORP debt, the Treasury bears responsibility for providing the funds needed to maintain the interest payments on such debt.

insolvencies have continued to rise since the enactment of FIRREA. The crisis created by the collapse of the savings and loan industry's insurance fund suggests that the deposit insurance system is in need of reform. In this section we critically analyze alternatives for regulatory and deposit insurance reform, beginning with the reforms put in place by FIRREA.

A Critical Review of FIRREA

FIRREA represents the most sweeping financial regulatory legislation enacted since the Great Depression. It not only created a new deposit insurance fund, but completely restructured the savings and loan regulatory system established in the 1930s. FIRREA also marks at least a temporary halt in a trend toward financial deregulation evident in legislation enacted earlier in the decade.

The new law's emphasis on stricter regulation and enhanced supervision represents an attempt to limit potential future losses stemming from bank and thrift insolvencies, but such measures address the symptoms of the present crisis rather than its causes. The financial problems that beset savings and loan institutions earlier in the decade were rooted in restrictive regulations that prohibited thrifts from diversifying their investments, making them vulnerable to interest rate risk. While it is prudent to limit the investment powers of insolvent institutions until they can be reorganized, the events of the last decade give cause to question whether such a regulatory structure can assure a financially sound and profitable industry over the longer run.

Recently, some analysts have begun to question whether depository institutions limited to investing predominantly in residential mortgages can remain viable. Brumbaugh and Carron (1989), for example, argue that recent changes in the financial markets have made funding mortgage lending less profitable for insured deposit-taking institutions. As the market for mortgage-backed assets has become more efficient, with investors bypassing financial intermediaries by buying and holding mortgage-backed securities directly, there appears to be less of a need for specialized, deposit-taking intermediaries dedicated to warehousing mortgage loans.

To be certain, intermediaries specializing in residential housing finance will continue to play an important role in the U.S. economy. But it now appears that only a fraction of existing savings and loans will find it profitable to continue specializing in mortgage lending. What this means is that the

industry may well need to contract. Much of that contraction will come about through consolidation. But the contraction of an industry is often accompanied by the withdrawal of firms from that industry. If the new, more restrictive regulatory structure makes it difficult for insured thrifts to earn profits, the industry could continue to experience financial difficulties in the future. Financial intermediaries specializing in residential lending may prove viable only if affiliated with larger, diversified financial firms. FIRREA permits commercial banks to acquire financially healthy thrifts for the first time (in the past, commercial banks were only permitted to take over failing savings and loans). And, as Brewer (1989) observes, simply requiring savings and loans to specialize more in mortgage lending will not prevent excessive risk-taking if that is the goal of an institution's management.

Can "It" Happen Again?

One area of regulation FIRREA did not address is the mechanism for resolving failures of insured depositories. New rules specify higher minimum net worth requirements for savings and loans, but there is no statutory provision ensuring that insolvent institutions will be closed more promptly in the future than they have been in the past. As long as deposits are fully insured there is no market mechanism to ensure the prompt closing of insolvent institutions. In the end, how thrift insolvencies are handled will still depend on the resources available to the deposit insurance fund.

An important lesson emerging from the savings and loan crisis is that the deposit insurance funds themselves can become insolvent. As Barth, Bartholomew, and Bradley (1989a) have noted, the system as it is presently organized lacks certain important safeguards that one would expect to be present in private insurance arrangements. Government-sponsored deposit insurance was not intended to be self-financing, as private insurance arrangements are, but ultimately relies on government guarantees to provide depositors with assurances of the safety of the funds they place with banks. At the same time, existing laws do not mandate immediate action to recapitalize the deposit insurance fund if it becomes insolvent, nor do they specify how the claims against an insolvent fund are to be resolved. Thus, the conditions that made the present-day crisis in the savings and loan industry possible are still present.

Regulation and Deposit Insurance

The rationale most often given for government bank regulation centers around the importance of

promoting the safety and soundness of the banking system. But much of the existing financial regulatory system cannot easily be rationalized on these grounds. A growing body of historical research makes clear that the existing regulatory structure developed to address many different public policy goals, with bank safety and financial stability constituting only one of those goals.[10]

When legislation sets out complex rules governing economic relations and market structure, it is common for government regulatory agencies to be established to interpret, administer, and enforce those rules. Because legislation rarely specifies exact responses to every conceivable set of circumstances, regulatory agencies typically are granted a certain amount of discretion in interpreting policy guidelines and engaging in rulemaking. But when the underlying goals of an agency are vague or seem to conflict, the grant of discretion gives regulatory agencies the power to establish the relative importance of different policy goals.

With discretionary powers, the incentives facing regulators become important factors determining the primary goals of regulation. As Posner (1974) points out, employees of government agencies have strong incentives to please their legislative overseers and to perform competently to increase the value of their future prospects in the private sector. The incentives and priorities of lawmakers, in turn, are determined by political forces.

Because the actions of regulators can and often do result in a redistribution of economic resources, regulated firms have a considerable incentive to lobby for rules that they perceive to be in their own self-interests. Thus, regulators invariably face political pressures when setting goals and priorities, though these pressures are not always explicit.

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[10] Kareken's (1986) comprehensive analysis of the present-day system of bank regulation led him to conclude that the system could not be rationalized by an appeal to concerns over safety and soundness, especially in the area of regulatory restrictions on bank branching and geographic expansion. Shull (1983) produces historical evidence that early laws mandating the separation of banking and commerce were rooted in concerns unrelated to safety and soundness issues. Other authors have concluded that the securities underwriting activities of commercial banks had little to do with the widespread bank failures that accompanied the Great Depression, and have attributed the motivation behind the legal separation of commercial and investment banking to factors unrelated to safety and soundness concerns (Huertas 1984; Flannery 1985; Kaufman 1988; and Shughart 1987).

Deposit insurance requires some form of regulation and supervision to contain the incentives for risk-taking inherent in the system. Therefore, the issue of deposit insurance reform cannot be addressed separately from that of regulatory reform. To address the issue of regulatory reform, one must first ask whether the existing regulatory structure imposes conflicting goals that compromise the ability of regulators to limit risk-taking by banks and thrifts.

A review of the events leading to the present thrift crisis reveals that early resolution of the industry's financial problems was hampered by conflicting goals embedded in the regulatory system. The regulatory structure imposed on the savings and loan industry was designed in large part to subsidize credit flows for residential housing by increasing the supply of mortgage lending. In addition to being the agency that chartered federal savings and loans, the Federal Home Loan Bank Board also bore responsibility for managing the FSLIC. The Bank Board was also explicitly charged with promoting private home ownership as well as the interests of the savings and loan industry.

The situation is further complicated by the fact that state legislatures also have the authority to charter and regulate insured savings and loans. These legislatures can gain much of the political benefits derived from the subsidization of thrifts and local construction interests while allowing the FSLIC to underwrite much of the risk.

Once the crisis began, deposit insurance was used to keep many insolvent thrifts open in an attempt to prevent the reallocation of resources from those institutions and the regions they served. Debate over how much of the cost of recapitalizing the FSLIC should be borne by the thrift industry itself paralyzed action to resolve the crisis for a number of years. A reluctance on the part of lawmakers to appropriate the funds needed to close insolvent thrifts and recapitalize the FSLIC further delayed a resolution of the crisis.

Excessive risk-taking on the part of insolvent thrifts was tolerated because the regulatory system gave no one the incentive to take the decisive steps that would have been necessary to stop it. When hundreds of savings and loans began to fail, industry regulators lacked the resources to close those institutions and pay off depositors, or, for that matter, to adequately monitor them. At this point, the FSLIC itself was insolvent and its management began behaving as any

other insolvent organization would be expected to behave. Under the circumstances, the only alternative the Bank Board had to keeping insolvent institutions open would have been to impose losses on insured depositors, an action that was never seriously considered. Legislation enacted during this period, notably the Garn-St. Germain Act, made it clear that lawmakers preferred accepting the risks that came with taking no action against insolvent institutions to other available alternatives.

The response of the federal regulatory system to events as they unfolded in the course of the thrift crisis stand in stark contrast with the way insolvencies are resolved in unregulated private market arrangements. In periods of financial distress, the nineteenth century clearinghouses sometimes found it necessary to suspend payments. But those organizations continued to monitor all members closely and acted promptly to force banks that exposed other clearinghouse members to excessive risks out of the system. Although bank and thrift regulators have the right to revoke deposit insurance, they rarely exercise this right as a practical matter.

Simply giving regulators more discretionary powers to deal with failing institutions does not appear to offer a solution to the problem of limiting losses borne by the deposit insurance funds. Administrators of the FSLIC had greater discretionary powers in choosing how to deal with financially troubled savings and loans than did the FDIC in its dealings with failing banks. But the historical record shows that the grant of greater discretionary powers did not ensure that the losses insolvent institutions were permitted to impose upon the insurance fund would be contained. As Kaufman (1989, p. 1) notes:

> bank regulators . . . avoid taking actions that could put them in conflict with powerful parties who would experience large dollar losses, such as uninsured depositors or other creditors, management, owners, and even large borrowers. In addition, the regulators frequently believe that such actions would be an admission of failure not only of the bank but also of their own agency, which is charged with bank safety and evaluated by many on its ability to achieve this condition.

Insulating the economy from the potentially disruptive effects of bank and thrift failures remains an overriding goal of regulators. While it is hard to take issue with this goal, history shows that when attempts to minimize disruption are permitted to completely subvert the normal market forces that would otherwise act to close insolvent institutions, the results can be disastrous. Unless market participants are

forced to internalize some of the risk associated with their actions, they have no incentive to limit risk-taking.

That thrift industry regulators were hampered by conflicting goals that interfered with their ability to protect the resources of the deposit insurance fund now seems to be widely acknowledged. Avoiding a repetition of the current thrift industry crisis depends on our ability to devise a system that will guarantee the prompt closure of institutions once they become insolvent while limiting the potential disruptive effects of such occurrences.

Lessons from Bankruptcy Law Reform

The present system of bankruptcy laws were enacted by Congress in 1978 and amended in 1984 and 1986. This legislation instituted sweeping reforms to the administration of bankruptcy courts and the system of bankruptcy resolution. Before these recent reforms, the bankruptcy judge had duties much broader than those of an impartial referee. Under the old law, the bankruptcy judge (originally called the "bankruptcy referee") was given the role of administering bankruptcy cases under the general supervision of the district judge, who held the ultimate legal authority to adjudicate any cases arising from the bankruptcy proceedings. But over time, the role and authority of the referee grew until the "referee" became a bankruptcy judge who exercised judicial power to decide disputes among different parties.

Thus, the role of the bankruptcy referee, or administrator, had grown beyond that envisioned by the laws that created the position. The authors of the earlier law had envisioned a court-appointed administrator acting under the oversight of an independent and impartial judicial authority. But oversight and administrative duties had come to be delegated to a single agent, one who lacked the insulation from outside influence normally provided to members of the judiciary. According to Treister, et al. (1988, pp. 5-7), this dual role came to be perceived as the "most glaring defect of the former bankruptcy system."

Dissatisfaction with this system led Congress to establish a special Commission on Bankruptcy Laws of the United States to study, analyze, and recommend changes in the bankruptcy laws in 1970. The Commission's findings, published in 1973, noted that:

making an individual [the bankruptcy judge] responsible for conduct of both administrative and judicial aspects of a bankruptcy case is incompatible with the proper performance of the judicial function. Even if a paragon of integrity were sitting on the bench and could keep his mind and feelings insulated from influences which arise from his previous official connections with the case before him and with one of the parties to it, he probably could not dispel the appearance of a relationship which might compromise his judicial objectivity (as cited in Treister, et al. 1988, p. 7).

One of the principal reforms brought about by the Bankruptcy Reform Act was to free the bankruptcy judge from acting in the role of administrator and enhance his judicial role. Before the Act, bankruptcy "referees" were only appointed to serve "during good behavior." The Bankruptcy Reform Act provided for the appointment of bankruptcy judges to fixed 14-year terms. Appointments were made by the president, with the advice and consent of the Senate. The Act also provided for an independent system of United States Trustees under the auspices of the Justice Department for cases where an administrator for the bankruptcy estate needed to be appointed.[11]

What lessons do these events hold for deposit insurance reform? The bankruptcy code explicitly recognizes the possibility of conflicts of interest inherent in a system where an agent appointed to resolve firm insolvencies is given roles that may create conflicting goals. To avoid such potential conflicts, bankruptcy law provides for a separation of the different roles, separating the referee, or bankruptcy judge, from the role of the trustee appointed to administer the estate. The role of the bankruptcy judge is intentionally limited to mediating disputes among different parties with claims against the firm.

Banking law gives the deposit insurer the dual role of receiver and claimant in the event of a bank failure. The potential for conflicting goals arising from such a system would appear to greatly exceed those inherent in the old bankruptcy system. Recent bankruptcy law reforms suggest an alternative framework, one based on judicial oversight that would sharply limit the discretion of the deposit insurer in dealing with failing institutions.

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[11] At first Congress was not convinced that an administrative apparatus such as this, outside the Judicial Branch, was needed. Accordingly, a pilot project was established. The United States Trustee system was made a permanent part of the bankruptcy system in 1986 (Treister, et al. 1988, pp. 85-91).

A Role for Enhanced Judicial Oversight

One necessary ingredient for providing successful deposit insurance is a precommitment to closing insolvent depository institutions promptly. With unregulated commercial firms, this precommitment is achieved through legal bankruptcy proceedings in which claims against the insolvent firm are resolved under the auspices of an independent judiciary. This observation suggests that one way to credibly commit to close failing banks and thrifts would be to expand the role of the judicial system to make the resolution of bank and thrift insolvencies subject to the same kind of judicial oversight that characterizes regular bankruptcy proceedings. Posner (1974) emphasizes that many features of law are designed to pursue overall efficiency gains. By its very design, the legal system is more immune to political pressures than government regulators. Using the judiciary to limit the discretion of regulatory agencies may be one way of ensuring that the regulatory process is governed by legislative guidelines.

To ensure that failing banks and thrifts are forced into legal insolvency proceedings, some depositors must be put at risk of loss. Otherwise, market participants will have no incentive to force a failing institution into insolvency proceedings. The distinction between the insured and uninsured depositor must be restored. As Todd (1988) notes, deposit insurance was never intended to prevent all bank failures, only to provide for the prompt resolution of such failures.

Boyd and Rolnick (1988) have forwarded a plan to administer federal deposit insurance more like private insurance arrangements by instituting a system of coinsurance. Under this plan, deposits would be fully insured up to some amount sufficient to protect small, unsophisticated depositors. Large depositors would be subject to some risk of loss, receiving perhaps 90 or 95 cents for every dollar on deposit in the event of a bank failure. The advantage of this plan is that it would place known limits on the maximum extent of losses borne by depositors, while still giving large, sophisticated depositors the incentive to monitor their banks.

In the event of a bank failure, depositors could be given prompt access to most of their funds through a procedure similar to the modified payout procedure used by the FDIC before the failure of Continental Illinois National Bank (Benston, et al. 1986, ch. 4). In a modified payout, uninsured depositors were given immediate access to most of their funds

based on preliminary estimates of expected losses resulting from the liquidation of the failed bank. But whereas a modified payout involved liquidation of the affected institution, regulators could place the failed institution in a conservatorship and continue to operate it until it could be reorganized and returned to the private sector. Kaufman (1989) argues that insured depositors would have no incentive to withdraw their funds, and uninsured depositors would have no incentive to run on the financially troubled institution after it had been "failed" because they could be assured of no further losses.

Bank failures could be administered under a system of judicial oversight with such a system. The deposit insurer would represent one of the claimants against the firm. In cases where retaining present management is not deemed desirable, a conservator could be appointed to run the institution. Under such judicial proceedings, the deposit insurer would be limited to paying only insured depositors.

Other Alternatives

Simply placing bank failure resolution under a system of enhanced judicial oversight is unlikely to provide a panacea for all the problems currently facing the banking and thrift industries. But it would bring about an improvement in bank failure resolution methods, and would be consistent with other reforms now under debate. Two sets of reforms are noted briefly below.

100 percent reserve banking Some analysts and policymakers have argued that imposing market discipline on depositors is not practical because it would disrupt banking markets. One argument says that there are too many potential externalities involved with the operation of the payments system to risk letting a large depository institution fail. If safety and soundness is truly an overriding policy goal, then that goal can be achieved by requiring banks to hold only safe assets. This is the 100 percent reserve banking proposal, advocated by Mints, and later, Friedman, and most recently resurrected by Kareken (1985), and, in a slightly different form, by Litan (1986). Such a system would truly be safe because it would remove all private credit risk from the payments system, substituting instead the credit of the government, the ultimate guarantor of the safety of the system. Kareken (1985), Gorton and Pennachi (1989), and Jacklin (1989) postulate that this type of banking, which amounts to a money market mutual fund in short-term safe securities,

would be a natural product of free-market competition under current technology and modern financial market arrangements.

With the institution of "safe banks," lending activities would be conducted by uninsured affiliates. Such uninsured affiliates would still face a risk of insolvency. The proposed insolvency resolution procedures outlined above could be adopted to deal with failing lending affiliates.

An enhanced role for market forces As experience with the nineteen century clearinghouse system shows, banks have a natural advantage in monitoring the creditworthiness of other banks. If given the proper incentives, private monitoring by banking firms could substantially augment government supervisory efforts. Banks would then be expected to police themselves as they did prior to the advent of deposit insurance.

Certain kinds of deregulation could actually enhance the safety and soundness of the banking system and lessen the danger of bank runs. As Calomiris (1989) points out, nationwide branching would probably go a long way toward providing additional safety and soundness. Canadian history is instructive in this regard, since Canada's nationwide branching system proved immune to bank runs during the Great Depression. Haubrich (1988) notes that there were no bank failures in Canada during the 1930s, even though their depression was as severe as that of the United States. In the event of deregulation, normal application of antitrust laws could ensure that competition in banking markets is preserved. Monetary policy could provide banks with liquidity in the event of a financial panic leading to an aggregate change in desired holdings of currency.

IV. CONCLUSION

This paper has provided a detailed analysis of the savings and loan crisis. To understand the events and the needed reforms, we have drawn heavily on the operation of private market relationships. Like private bondholders, the deposit insurance agencies bear the risk associated with bank failures and, therefore, have an incentive to promptly close or reorganize failing banks or savings and loans. But as recent events have clearly demonstrated, the deposit insurance funds themselves bear some risk of insolvency. As long as no formal mechanism for dealing with the insolvency of a deposit insurance fund exists, there is some chance that the crisis that beset the savings and loan industry could be repeated.

The history of the crisis suggests that simply giving regulators more discretionary authority will not be sufficient to guarantee against future insolvencies of one of the deposit insurance funds. The Bank Board and the FSLIC had more discretionary power than the FDIC, yet thrift industry regulators were not able to prevent the insolvency of the FSLIC.

These considerations, as well as the lessons learned from looking at the operation of the early clearing-houses, point to a number of key ingredients that must be present in any successful publicly administered deposit insurance scheme. The clearinghouse system was successful in maintaining safety and soundness among banks because the members of the system had the incentive to enforce minimum net worth standards. Through the threat of expulsion, the clearinghouses could discipline members that failed to meet the conditions of membership.

Of course, administrators of the deposit insurance funds also have such power in principle, but do not always have the incentive to exercise it. As Milgrom and Roberts (1988) point out:

> Even if the executive authority is unusually competent, public spirited, and immune to bribes . . . it may still be desirable to limit its discretion, for two reasons. First, in order to provide correct incentives to others in the organization, the authority must be able to make commitments to act against its own interests in the future, and these commitments are not credible unless there are some effective limits on the centre's powers. . . . The second reason to limit the discretion of an honest, competent decision-maker is to discourage rent-seeking behavior by others who are affected by the centre's decision. . . . the mere willingness of the centre to consider seriously a decision with large redistributional consequences will cause other economic agents to waste significant resources in attempts to influence or block it or to delay its implementation. In public decision-making, for example, enormous resources are spent in proposing legislation or regulations and in advocating or opposing these proposals, as well as in filing and maneuvering for advantage in lawsuits.

Deposit insurance as it is presently administered removes all elements of market discipline from banking markets, making it a political rather than an economic decision to let an institution fail. With the potential transfer of such large amounts of resources at stake, some form of breakdown in regulatory discipline should not be surprising.

In the case of the FSLIC, the agency was forced to exercise regulatory forbearance because it lacked the resources it would have needed to close insolvent institutions. Acknowledging the fund's insolvency and forcing insured depositors to bear a part

of the cost was never regarded as an acceptable solution to dealing with the crisis. But lawmakers, while not wishing to impose losses on insured depositors, proved reluctant to appropriate the funding needed to deal with the problem. The strategy chosen was one of tolerating greater risk-taking on the part of insured savings and loans, in the hope that the need for government funding could be obviated.

While recently enacted reforms place limits on the ability of failing thrifts to take on excessive risks, they do not change the incentives facing market participants and regulatory agencies, and cannot guarantee that one of the deposit insurance funds will not become insolvent in the future. Therefore, the reforms enacted to date cannot ensure that failing institutions will always be dealt with promptly in the future.

Deposit insurance reform should include legislative guidelines specifying how bank and thrift failures are resolved and how the insolvency of one of the deposit insurance funds is to be resolved. A central conclusion of this paper is that such legislative guidelines could be enforced through a greater role for judicial oversight. There may be good reasons for exempting banks and thrifts from the same bankruptcy laws applied to unregulated firms, but increased market discipline and enhanced judicial oversight of bank failure resolution proceedings could play a constructive role in deposit insurance reform.

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Takeovers and Stock Price Volatility

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I.
INTRODUCTION

There is now a large literature documenting the statistical relation between stock prices and dividends at the aggregate level. A robust finding is that stock prices are too volatile to be explained by subsequent changes in dividends. Observations of large market swings, like the crash of October 1987 and the mini-crash of October 1989, encourage the popular perception that stock prices are excessively volatile. While these observations have provoked a great deal of analysis, there has been little discussion of the possible link between excess stock price volatility and the fact that changes in the control of large corporations often take place via market acquisition of the outstanding shares. These transactions—takeovers—are often associated with dramatic increases in the price of the shares of the firm being acquired; these are called "takeover premia." In fact, some commentators argue that movements in the stock market in the 1980s, including the large market declines of October 1987 and October 1989, were linked to changes in takeover activity. In this article we explore the possible link between takeover activity and stock price volatility.

The explanation we propose relies on recent advances in our understanding of imperfections in the monitoring of firm managers. These imperfections imply that there is a "value of control" (we make this term more precise below) that is appropriable by the managers of a large corporation. This private value of control arises out of the delegation of decision-making authority that is intrinsic to the separation of ownership and control in the modern corporation. The value of control explains, in part, the premium often paid to shareholders to acquire control of a firm.

We will argue that the value of control, along with the probability that someone will be willing to pay it, can vary independently of the expected present value of dividends. This adds an independent source of variation to the price of the traded shares of publicly held corporations.

The plan of the paper is to first describe the Martingale Model of stock prices, often referred to as the "efficient markets theory." This serves as a benchmark, both for the excess volatility findings and for the alternative model we propose. We then survey some of the key empirical regularities concerning stock prices; these include the excess volatility finding in time series of aggregate stock prices, as well as the behavior of individual stock prices before and after control change transactions.

We then proceed to outline the essential elements of our model of the link between takeovers and stock prices. First, we describe imperfections in the relationship between a large firm's managers and the people who hold claims issued by the firm. Next, we describe the implications of these imperfections for some of the characteristics of the claims issued by the firm—specifically, the legal control mechanism associated with them. We argue that traded shares are bundled claims giving the holder the right to help determine the control of the firm as well as a claim on a stream of dividends. We then show how such shares can display excess volatility because of variations in the expected future value of the control right embedded in the claim. The final section describes some of the implications of these insights for policy and for economic theory. The appendix provides a more rigorous derivation of our model of excess volatility.

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II.
THE MARTINGALE MODEL
OF STOCK PRICES

As a benchmark, consider a simple but general model of the determination of stock prices, the Martingale Model. The empirical findings of excess volatility that we describe below are essentially

contradictions between the properties of the Martingale Model and those of actual stock market data; stock prices are more volatile relative to dividends than is predicted by the Martingale Model. When we describe an alternative explanation for stock price volatility, a comparison of the predictions of the alternative model with those of the Martingale Model will be useful.

According to the Martingale Model—often referred to as the "efficient markets theory" or the "expected present value relation"—the price of a given stock at any given time is equal to the expected present value of the stream of future dividends that will accrue on that stock[1]. To be more explicit, let p_t be the price of a share of stock at time t (after payment of dividends due at time t); let d_{t+s} be the amount paid in dividends paid at time $t+s$, where the index s takes on the values $1,2,3, \ldots$. We abstract from inflation, and so we assume that d_{t+s} is the real value of dividends at time $t+s$. We also abstract from stock splits or repurchases, and so the sequence of dividends, d_{t+s} for $s=1,2,3 \ldots$, captures the total return to an investor who purchases the share at time t and holds it to eternity. Note that from the point of view of an investor at the current date, the future stream of dividends is a sequence of random variables.

The Martingale Model asserts that there is a constant rate r, where $r > 0$, at which future expected returns are discounted back to the present, and that the current price is related to next period's price and next period's dividend by the equation

$$(1) \quad p_t = (1 + r)^{-1} E_t[p_{t+1} + d_{t+1}],$$

where $E_t[w_{t+s}]$ is notation for the expected value of a random variable w_{t+s}, with the expectation taken using only information available at period t. Equation (1) states that the current price of a stock equals the expected value of the sum of next period's price and dividends, discounted back to the present at rate r.[2]

Equation (1) can be used to derive an equation relating the current stock price to the entire stream

of future dividends. First, update equation (1) one period, replacing $t+1$ by $t+2$ and t by $t+1$, and substitute the resulting expression in (1) for p_{t+1} to get

$$(2) \quad p_t = (1 + r)^{-1} E_t[(1 + r)^{-1} E_{t+1}[p_{t+2} + d_{t+2}] + d_{t+1}],$$

where $E_{t+1}[w_{t+2}]$ is the expected value of the random variable w_{t+2} given information available at time $t+1$. The law of iterated expectations implies that $E_t[E_{t+1}[p_{t+2}]] = E_t[p_{t+2}]$. Equation (2) can then be rewritten as

$$(3) \quad p_t = (1 + r)^{-1} E_t[d_{t+1}] + (1 + r)^{-2} E_t[p_{t+2} + d_{t+2}].$$

If one repeats this substitution n times, the result is an equation relating p_t to the stream of dividends from period $t+1$ to period $t+n$, plus the term $(1 + r)^{-n} E_t[p_{t+n}]$. One can assume that this term converges to zero as n approaches infinity. This assumption rules out speculative bubbles. (We'll discuss this assumption below.) Under this assumption, the equation obtained as the limit of this repeated substitution is

$$(4) \quad p_t = v_t^d,$$

$$\text{where } v_t^d = \sum_{s=1}^{\infty} (1 + r)^{-s} E_t[d_{t+s}].$$

Equation (4) states that the current price of a stock equals v_t^d, the present value of expected future dividends.

This model was first advanced by Paul Samuelson (1965), and is often called the "efficient capital markets model," a term associated with Eugene Fama's (1970) exposition. The model can be viewed as arising in particular classes of artificial economies. An artificial economy is just a particular mathematical specification of the preferences, technological opportunities, and informational abilities of economic agents, together with some notion of the mutual consistency of plans, or equilibrium. In one class of artificial economies that gives rise to the Martingale Model, agents are risk-neutral, discount the future at the same rate, and share common information and beliefs about future returns (see Lucas (1978)). In another such class there is a perfectly risk-free asset, and all randomness in stock returns is idiosyncratic to individual stocks (see Connor (1984)).

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[1] Stephen F. Leroy (1989) calls this theory the Martingale Model. His article also contains an excellent description, history, and survey of empirical tests of the theory. This section follows his exposition.

[2] A martingale is any random series $\{w_t\}$ that always satisfies $w_t = E_t[w_{t+1}]$. The model is called the Martingale Model because there is a simple variable that is a martingale—the present value of the value of a mutual fund that reinvests all dividend earnings. See Leroy (1989, pp. 1589-90).

In many other artificial economies, equation (1) does not always hold. However, there is usually a more general version of equation (1) that does hold. In general, the current stock price is related to the entire probability distribution governing the sum of next period's price and dividends, rather than just the mean, as in (1). This implies that risk premia can affect the current price of a stock, as in the Capital Asset Pricing Model or the Arbitrage Pricing Theory (see Connor (1984)). More general economies also imply that discount rates can vary over time, rather than remain constant as in (1). It turns out, however, that empirical contradictions of (1) or (4) do *not* seem to be attributable to risk premia or time-varying risk premia (see West (1988b)).

Even in economies in which equation (1) holds, the stock price may not satisfy equation (4) because of the presence of a speculative bubble. A stock price is said to contain a bubble if it can be written as

$$(5) \quad p_t^b = p_t + b_t,$$

where p_t is given by equation (4), and b_t is the bubble term. In order for p_t^b to satisfy (1), it must be true that $b_t = (1 + r)^{-1} E_t[b_{t+1}]$. In fact, any random b_t series that satisfies this condition implies that p_t^b satisfies (1). There are an infinite number of b_t random variable series that satisfy this condition, so there are an infinite number of solutions, p_t^b, that satisfy equation (1). Only one solution is consistent with (4), however, and that is the solution in which $b_t = 0$. Recall that in deriving equation (4) we assumed that the expression $(1 + r)^{-n} E_t[p_{t+n}]$ converges to zero as n grows very large. This effectively rules out any solution other than $p_t^b = p_t$.[3] A negative value for b_t implies that there is a positive probability that the stock price is eventually negative, which is inconsistent with the free disposal of stocks. This case is conventionally ruled out. A positive value for b_t implies that the stock price is always above the fundamental value, given by equation (4). It is useful to keep in mind the properties of bubble solutions to equation (1) because our model of takeovers and stock prices predicts that an econometrician would be unable to reject the hypothesis that stock prices contain a bubble term.

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[3] To see this, note that:

$$(1 + r)^{-n} E_t[p_{t+n}^b] = (1 + r)^{-n} E_t[b_{t+n} + p_{t+n}]$$
$$= b_t + (1 + r)^{-n} E_t[p_{t+n}],$$

which converges to b_t if p_{t+n} is the series defined by (4).

III.
SOME EMPIRICAL REGULARITIES IN STOCK PRICES

Aggregate Stock Prices

The Martingale Model has some strong implications for the joint behavior of stock prices and dividends. One of the most striking of these is an upper bound on the variability of stock prices relative to dividends. There is now a large literature, beginning with the seminal papers by Leroy and Porter (1981) and by Shiller (1981), that documents the failure of empirical data on stock prices and dividends to satisfy this inequality; see West (1988b) and Leroy (1989) for recent surveys.

To understand this variance bound, first define a variable e_{t+s} as the difference between the actual and expected dividends in period $t+s$. In other words,

$$(6) \quad e_{t+s} = d_{t+s} - E_t[d_{t+s}], \text{ for } s = 1,2,3, \ldots .$$

Then define a variable d_t^* as the present discounted value of *actual* dividends. Shiller called this the "ex post rational" stock price. This is what the price of the stock would be if the entire stream of future dividends were known with perfect certainty, and the Martingale Model, equation (4), determined the price. More explicitly,

$$(7) \quad d_t^* = \sum_{s=1}^{\infty} (1 + r)^{-s} d_{t+s}.$$

Using these two definitions, we can obtain the following relation between p_t and d_t^*:

$$(8) \quad d_t^* = p_t + x_t^d,$$

where $x_t^d = \sum_{s=1}^{\infty} (1 + r)^{-s} e_{t+s}.$

Equation (8) states that the ex post rational price is equal to the actual current price plus the present value of the unexpected component of future dividends.

One immediate implication is that the current price is an unbiased forecast of the ex post rational price; in other words, $p_t = E_t[d_t^*]$. This follows from the fact that $E_t[e_{t+s}] = 0$ because of the optimality of forecasts of future dividends. The optimality of forecasts also implies that the forecast errors, e_{t+s}, $s = 1,2, \ldots$, are uncorrelated with p_t, and this implies that p_t and x_t^d are uncorrelated. Therefore,

we can derive the following relation between the variances of p_t and d_t^*:

$$(9) \quad \text{var}(d_t^*) = \text{var}(p_t) + \text{var}(x_t^d).$$

Since variances are positive, equation (9) implies that the variance of stock prices has an upper bound:

$$(10) \quad \text{var}(d_t^*) \geq \text{var}(p_t).$$

The variance of the actual stock price can be no greater than the variance of the present value of actual future dividends.

The original tests of the inequality (10) were first published in 1981 by Leroy and Porter, and by Shiller; both papers reported violations that were large in magnitude and statistically significant. A large number of papers have appeared since developing or applying this inequality test (see the recent survey by West (1988b)). Some initial work questioned the finding of excess volatility on econometric grounds, arguing that small sample bias and/or the presence of unit roots in dividends may explain the results (see Flavin (1983), Marsh and Merton (1986), and Kleidon (1986)). Subsequent studies taking account of the possibility of unit roots and small sample bias "still tend to find substantial excess volatility" (West (1988b), p. 639).

Recent work has examined the possibility that risk aversion causes stock prices to deviate from the Martingale Model, as might be expected from more general theories of asset pricing (see Singleton (1987)). Allowing risk averse investors, however, fails to explain excess volatility. Other recent work has examined the possibility that the expected rate of return, r, varies over time (see Campbell and Shiller (1988a and 1988b), and West (1988a)). Although this line of work is at a very preliminary stage, initial results suggest that the variance of the expected rate of return would have to be implausibly large to explain the excess volatility results. Consequently, many of the simplifications inherent in the Martingale Model do not seem to be responsible for the inconsistency between the model and the data.

Some researchers have examined whether the finding of excess volatility could be caused by speculative bubbles. It appears that empirical evidence on stock prices is consistent with the presence of bubbles, which is not surprising, because bubbles can take many forms (see West (1987 and 1988a), and Shiller (1984)). Bubbles are often associated (in many people's minds) with large sustained increases in asset prices followed by a sharp collapse, as in Tulipmania, the South Sea Bubble, and other famous cases (see Mackay (1852), but see also Garber (1989)).

Bubbles need not take such a spectacular form, however. In the model of takeovers and stock prices that we consider below, an econometrician examining data generated by the model would be unable to reject the conclusion that the stock price includes a bubble. But in our model, what appears to the econometrician to be a bubble term is uniquely determined and has an economic rationale—it is actually part of the fundamental of the stock, properly defined. Therefore, one way of interpreting our explanation of stock price volatility is that the characteristics of the financial claims of the modern corporation could give rise to *what appears to be* a bubble in stock prices. This exemplifies the point made by Hamilton and Whiteman (1985) and Hamilton (1986) that movements in the true fundamental that are unobserved by the econometrician are indistinguishable from bubbles.

Takeovers and Individual Stock Prices

The research discussed above focuses on the behavior of the aggregate stock price and dividend series. At the level of the individual firm, the relationship between the market for corporate control and stock prices has been extensively investigated using the "event study" methodology. This approach examines the behavior of share prices of participating firms around the date of the announcement of a takeover or other change in control. To the extent that stock price changes cannot be explained by a market model (the Capital Asset Pricing Model, for example), these abnormal changes are attributed to the takeover event. Much of the event study literature on takeovers was surveyed by Jensen and Ruback (1983).[4] Averaging over the results of a large number of studies, Jensen and Ruback find that there is a 30 percent abnormal increase in the stock price of a target firm in the event of a tender offer takeover (a takeover executed by a direct purchase of shares). In the case of mergers, when there is agreement on the acquisition between the managements of the acquiring and target firms, the gains in the target's stock price are substantially lower (20 percent). One might conclude, in these cases, that part of the premium that the acquirer is willing to

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[4] Also see the recent survey by Jarrel, Brickley and Netter (1988).

pay is going in some form to the incumbent management. When a change in control is executed through a proxy contest with little or no direct purchase of shares by those acquiring control, the abnormal stock price change is much smaller (8 percent). In the cases of tender offers and mergers, Jensen and Ruback report that the abnormal changes in the stock prices of bidding firms are much smaller than those for the target firms; there is a 4 percent change for bidding firms in tender offers and no significant change in mergers.

Jensen and Ruback interpret the results from the event study literature as providing evidence that the market for corporate control reallocates productive resources from less to more efficient users (managements). That is, takeovers create value for shareholders because they result in an improved use of resources. One might call this the "inefficient management hypothesis." This hypothesis suggests a world in which some managements are better matched than others to the assets and activities of any given firm. Hence, in this view, the market for corporate control is a market in which managers search for and acquire firms to which they are well matched.

Like the inefficient management hypothesis, the process described in this paper is also one of searching and matching. In our view, however, a manager can earn private benefits from an improved match between management and assets. If managers are motivated by this private value, then one would expect to see acquiring managements pay a premium for control. At the same time, one would not necessarily expect acquisitions to generate value for shareholders of the acquiring firm. These expectations are supported by the distribution of stock price gains observed in the event study literature; large gains accrue to target firm shareholders in tender offer takeovers and little or no gains accrue to acquiring firm shareholders. Similarly, one would not necessarily expect acquisitions driven by the value of control to result in improved profitability after the acquisition. An extensive literature, surveyed by Mueller (1987), has examined post-merger performance using accounting data. The most notable result is the failure to find evidence of improved performance after mergers. While this evidence has been used to discredit the inefficient management hypothesis, it is consistent with the approach described in this paper based on the private value of control.

Takeovers and Aggregate Stock Price Movements

If one accepts the existence of a control premium in a takeover transaction, there are sharp implications for the time series behavior of an individual firm's stock price; the price would fluctuate not only with information about future dividends, but also with information about the probability of a change in control of the firm. The existence of a control premium does not, by itself, have any implications for aggregate stock price behavior. If the probability of a takeover were independent across firms and over time, then the effect on stock prices would average out across firms. Stock price indices would, then, be expected to vary only with information about expected future aggregate dividends. If, however, there are systematic movements in aggregate takeover activity over time, then takeover activity (or expected future levels of takeover activity) will affect aggregate stock prices.

There is evidence suggesting that aggregate takeover activity is subject to systematic movements over time. Shughart and Tollison (1984) examine annual data on the number of takeovers in the U.S. from 1895 to 1979. They find that they cannot reject the hypothesis that merger activity follows a random walk. If this is so, then an unexpected rise in takeover activity has persistent effects. Hence, future expected rates of takeover activity will depend on the current rate. If a higher aggregate rate of takeovers implies a higher probability that a randomly selected firm will face a challenge for control, then the random walk behavior of takeover activity has implications for the behavior of aggregate stock prices. A rise in takeover activity implies a rise in the rate at which control premia are realized in changes of control. This, in turn, implies higher stock prices in the aggregate.

The notion that there is a link between takeover activity and aggregate stock prices is certainly consistent with casual observation of the behavior of stock prices in the 1980s. The decade witnessed an unprecedented wave of activity in the market for corporate control, coinciding with a sustained and substantial rise in stock prices. The two large declines in the market in the late 1980s, in October 1987 and October 1989, both came at times when many were beginning to suspect that the takeover and buyout boom might be coming to an end. In fact, much of the discussion surrounding the mini-crash of October 1989 centered on the collapse of a single deal, the UAL buyout. It was feared that the failure of the pilots' union to raise the financing for their offer was a signal of similar problems arising for future deals. Many commentators attributed the preceding increase in overall stock prices from January to August of 1989 in part to expectations of increased takeover activity. Most notably, some recent research seems to indicate that the over 10 percent decline in the

stock market on October 14-16, 1987, which arguably triggered the crash of October 19, 1987, was caused by U.S. House Ways and Means Committee consideration and approval of a tax bill containing restrictive antitakeover provisions (Mitchell and Netter (1989)).

IV.
AN ALTERNATIVE EXPLANATION OF STOCK PRICE VOLATILITY

The previous section summarized the empirical literature on the volatility of aggregate stock prices and argued that volatility is too large to be consistent with the Martingale Model described in Section II. In this section we present a theory of stock price volatility that is based on takeovers. The theory is also consistent with the empirical regularities displayed by individual stock prices around control change events. In addition, the theory offers an explanation for the broad comovements in stock prices and control change activity described above.

The key to the relationship between takeovers and the volatility of stock prices is the value of control of a firm. In this section we discuss the concept of "the value of control," and describe how the value of control can affect stock prices.

The Nature of the Firm and the Value of Control

To make precise just what we mean by the term "value of control," we briefly describe some important features of the way the modern, publicly held corporation is organized.

The diverse activities associated with the modern large corporation involve a large number of people: employees, directors, and the individuals and institutions holding the contractual liabilities of the firm, to name just a few. We focus on two main groups. We refer to the individual or group of individuals exercising effective control over the firm's operations as the management or managers: the chief executive officer, for example. We will refer to the people or institutions that own the explicit financial claims issued by the firm as claimholders: for example, shareholders, bondholders, or banks that have made loans to the firm.

The relationship between managers and claimholders is a complex one, governed by a variety of legal (and other) arrangements. For example, loan and bond contracts often contain explicit covenants

that restrict future actions of the firm, including investment decisions, financial restructuring, or excessive dividend payouts (see Smith and Warner (1979)). Publicly held firms generally have a rather elaborate and explicit governance structure. Holders of shares of stock have the right to vote periodically on various matters affecting the firm. A board of directors, formally elected by the shareholders, is charged with the responsibility of overseeing the operation of the firm, and has the vested authority to hire and dismiss the managers of the firm. Managers submit important policy decisions to the board at regular meetings for formal approval. While holders of various forms of claims do have some ability to monitor and, perhaps, affect the actions of managers via these mechanisms, managers in the typical large corporation have wide discretion over how they use the firm's productive resources.

A more detailed description of these complex arrangements is beyond the scope of this paper. There is an extensive literature on the design of the arrangements between managers and claimholders, much of which draws its inspiration from Berle and Means (1932) (see, for instance Jensen and Meckling (1976) and Fama and Jensen (1983). From this literature, one can identify an important tradeoff between two opposing forces: sharing risk widely versus minimizing conflicts of interest.

The desire to allocate risk efficiently leads to widely dispersed ownership of the (risky) residual claim usually associated with ownership of the firm. The dispersion of ownership leads immediately to the need for delegated decision making authority. The communication and coordination costs which would be associated with direct decision making by a large number of claimholders makes the appointment of professional managers (with relatively small ownership stakes) a virtual necessity. This is a key characteristic distinguishing the modern corporation from the sole proprietorship in which the owner and manager are one individual.

The delegation of decision-making authority is not without its costs. The fact that management's ownership stake is relatively small suggests that the goals and incentives of managers may not always coincide perfectly with those of the claimholders. In addition, managers, who are directly involved in the operation of the firm, are likely to have a significant informational advantage over claimholders regarding alternative uses of the firm's resources. The delegation of decision-making allows managers to pursue private objectives that might harm the long-term interests of the firm.

Many of the legal arrangements between claim-holders and the firm's managers alluded to earlier are designed to mitigate the misalignments of incentives. Managerial compensation schemes are often explicitly tied to the performance of the firm. This strategy imposes part of the residual risk associated with managerial decisions on the managers themselves. This type of compensation, however, works against the goal of efficient risk sharing which originally led to the dispersion of ownership and the delegation of decision-making authority, since managers are made to bear the risk rather than claimholders. Some managerial decisions can be directly mandated by claimholders through, for instance, covenants in bond and loan contracts. More specifically, covenants give the claimholder certain rights—to declare bankruptcy for example—in certain predetermined circumstances. This presumably discourages the firm's managers from taking the undesirable actions. The manager's informational advantage, however, makes the monitoring of such agreements imperfect at best. And finally, the board of directors, ostensibly representing shareholders' interests, supervises managers and attempts to ensure that managerial decisions are in the interest of shareholders. The limitations of the supervisory role of boards of directors are apparent: because they devote very little time to a given firm, they are unable to duplicate the managers' knowledge, and so must rely on limited and self-serving reports by managers in evaluating managers' performance. In short, the nature of the relationship between corporate management and corporate claimholders leaves management with wide discretion in allocating the firm's productive resources.

The problems associated with the separation of ownership and control suggest that managers may be able to extract private benefits, or "rents," from their insider positions. There may be actions that managers can take that benefit themselves without adding to the value of the firm and, therefore, to the wealth of the claimholders. The value of control, then, is the value of the stream of benefits which necessarily accrue to those in control of the firm. This is a private value in the sense that those in control cannot credibly commit to transfer these benefits to claimholders. These benefits may take the form of private consumption of "perks" or of the pursuit of private goals distinct from value maximization. It has also been suggested by Jensen (1986) that managers can derive private benefits from the discretionary control over the firm's free cash flow. For instance, in order to pursue firm growth as an end in itself, a manager may use retained earnings to fund invest-

ments with negative net present value. More generally, access to internal funds for investment shelters managers' decisions from the scrutiny they would receive in obtaining external sources of finance.

Allowing management to extract private value may, in fact, be part of the (imperfect) scheme for providing managers with correct incentives. If managers are able to extract more rents during good (profitable) times than bad—because, for example, managers' actions come under more direct scrutiny during bad times—then managers have an incentive to take actions that make good times more likely. In addition, control of a large organization may be valuable in and of itself, quite apart from any resources directly obtained thereby. It could provide utility directly for managers in the form of enhanced prestige or ego gratification.

Corporate Financial Claims

We can now describe how the value of control of a firm affects the nature of the financial claims issued by the firm. It is essential to our argument that a financial claim is a contract between the issuer (the corporation) and the holder of the claim. This contract specifies payments to be made by the corporation under a variety of contingencies. Sometimes these specifications are explicit, as in the case of bank loans or corporate bonds. In other cases, promised payments are implicit, as in the expectation of dividend payments to equity holders based on an announced dividend policy. In addition to stipulating payments, the financial claim gives the holder certain rights. A debt holder may have the right to directly monitor some of the actions taken by corporate management, as specified in a bond covenant. Debt claims also carry important rights in the case of bankruptcy. The main right attached to a standard common stock equity claim is the right to vote on some corporate governance matters on a one-share-one-vote basis. Most important, shareholders have the collective ability to choose corporate management through the election of the board of directors.

Debt and common stock equity are the predominant forms of financial claims issued by the modern corporation. Other forms of claims can be viewed as hybrid varieties, such as preferred stock or convertible debt. Uncovering the determinants of the mix of claims issued by corporations remains one of the major challenges of financial economics. A recent paper by Harris and Raviv (1988) is particularly relevant to the concerns of this paper. They

assume that managers derive private value from the control of a firm and examine the implications of this assumption for the design of securities. They find that if claims are to be issued with an interest in promoting efficiency-enhancing changes in control but deterring efficiency-reducing changes, then rights to vote on changes in control should be attached to equity claims and not debt claims. This is, of course, exactly the allocation of rights observed.

Given our arguments above that managers derive private rents or value from the control of firms, it is useful to view equity claims as bundled claims. The voting feature of tradeable equity shares implies that control can be acquired through the purchase of shares; buy enough shares, and you can install yourself or anyone of your choosing in top management positions. Hence, the claim to a stream of dividends is bundled with a claim to the premium that a potential manager might pay to acquire enough votes to take control of the firm. Note that this feature is unique to equity; one cannot acquire control of a firm by buying all of its debt. Hence, the equity claim is necessarily linked to the process of change in control, regardless of how those changes come about.

It is interesting to note that firms often issue voting and nonvoting classes of equity. While nonvoting equity is relatively unimportant in publicly held firms in the U.S., in some other countries it is more important. The relative prices of voting and nonvoting shares often reflect the value of control. For instance, Hermann and Santoni (1989) show that when Swiss firms began allowing foreign investors to hold voting shares, the value of the voting shares increased relative to the value of outstanding nonvoting shares by as much as 20 percent. While there may be other explanations of this increase, allowing foreign purchases of voting shares may have increased the likelihood of an acquirer buying shares in order to obtain control.

Takeovers and the Value of Control

When the control of a corporation changes hands, the value of control is often transferred as well. The way in which a change in control takes place determines how the value of control is transferred and how the financial claims on the corporation are affected. One form of change in control is, of course, internal succession to the top management positions. When a vacancy at the top is filled by promotion from within, the value of control need not be "purchased" from shareholders. The internal transfer of

control might represent an implicit contract between generations of managers; new managers may have "paid for" control through a period of apprenticeship. Alternatively, one might view the value of control as accruing to a coalition or team of managers (such as the CEO, the board of directors, and other top executives). Internal succession then amounts to keeping control in the hands of the same coalition. Similarly, the board of directors hiring a CEO from outside the firm, for instance, is a transaction between the controlling coalition and an individual who is joining the coalition.

In the cases of internal succession and external hiring discussed above, there is no change in the designation of the delegated decision-making authority. There is, therefore, no need for those engaged in the change of control to purchase control through the acquisition of shares. However, sometimes a change in the delegation of control becomes desirable to at least some shareholders. They may feel that incumbent management has not responded well to a change in the economic environment or that an alternative management would perform better. In such cases, the shareholders' voting rights become important.

The various ways in which a change in the delegation of control might be brought about were discussed by Manne (1965) in an effort to outline the economic role of corporate takeovers. Manne views all changes in control as attempts to replace less efficient with more efficient management. The nature of the equity claim gives an unsatisfied shareholder a number of options. First, one could try to unseat the incumbent board of directors through a proxy contest. Proxy contests, however, are relatively infrequent. This may be because of the costs involved in soliciting votes; incumbent management can use corporate resources to fight its battle, but dissidents must use their own resources. Having incurred the expense, the outcome of the contest remains uncertain until the actual vote is held. One way in which a challenger for control can reduce the uncertainty is through his or her own ownership of shares. This, of course, suggests an alternative route to obtaining control. By acquiring enough shares, one can dispense with the need for a prolonged and potentially unsuccessful proxy contest.

Faced with a challenge to its (valuable) control, incumbent management can be expected to spend resources resisting the change. This is true in the case of a proxy contest or an acquisition of shares. When a challenger attempts to gain control through

the acquisition of shares, or when an incumbent seeks to protect control through the acquisition of shares, the share price is bid up to reflect all or part of the private value of control. In a friendly merger as opposed to a hostile takeover, shareholders may realize a smaller part of the value of control; this would be so if the acquiring management obtained the incumbent management's consent through some form of implicit or explicit payment. In short, the extent to which a change in control results in value accruing to shareholders depends on the extent to which there is competition for control.

In the absence of frictions or barriers to open competition in the market for control, the market price of equity would always fully reflect the value of control. There are, however, some important frictions built into the market for control. Many of these derive from the very nature of the relationship between corporate ownership and management. An unrestricted market for control could expose managers to too much employment risk; managers might then have an insufficient incentive to accumulate firm-specific human capital. Shareholders have an interest in giving their delegated decision makers an incentive to make themselves well matched to the particular firm they are managing. On the other hand, complete protection from the market for control is not good from the shareholders' point of view. Entrenched management can receive the private benefits of control with no concern for the firm's performance on shareholders' behalf. These opposing forces suggest an optimal intermediate degree of protection for incumbent managers. Such protection may take the form of golden parachutes, or provisions in the corporate charter giving the manager the right to take certain defensive actions in the event of a takeover attempt.

In addition to the frictions built into the form of corporate governance, government regulations can create barriers to takeover activity. A variety of federal and state regulations restrict the actions of a raider in a contest for control. A prime example at the Federal level is the 1968 Williams Amendment, which restricts the actions of bidding firms by, for instance, requiring that tender offers be outstanding for a minimum number of days. Such restrictions can add to the cost of attempts to acquire control, thereby making such attempts less frequent.

One might label barriers to takeovers that arise from legal restrictions or the contractual relationship between ownership and management "artificial" barriers. There may also be important "natural" barriers

in the market for control. Both the private value and the public profitability that a manager can achieve with a firm may depend on how well-matched that manager is to the firm's organization, array of activities, and "corporate culture." Time and resources may be required to investigate the quality of such a match. Hence, the potential acquirer's behavior may best be viewed as a process of costly search. Both the costs of search and the likely costs of making an acquisition (once a match is found) affect the raider's willingness to search for targets.

Viewing the market for control as a market in which buyers or raiders search for targets has implications for the effects of the value of control on stock prices. The extent to which a share price reflects the value of control depends on the probability that a potential raider finds the firm to be worth challenging for control. This probability, in turn, depends on the overall level of ongoing search activity. In addition to the artificial and natural frictions suggested above, the level of search activity is likely to depend on what might be called the "infrastructure" of the market for corporate control. By this we mean, for instance, the conditions under which a raider could obtain financing for a deal. Casual observation suggests that the takeover boom of the 1980s was fed, in part, by innovations in the market for below-investment-grade corporate debt (junk bonds). In short, the availability of a full array of financial and legal services facilitates the search process. Variation over time in these infrastructure services might contribute to variation in the level of search and takeover activity, and thus to variations in stock price volatility over time.

We are not aware of a theoretical explanation of the variations in aggregate takeover activity, although it has been suggested (e.g., by Gort (1969)) that waves of mergers are driven by large disturbances to the economic environment. For our purposes, it is enough to take as given that takeover activity varies over time according to a random process which can reasonably be described by a random walk. With this assumption, in periods of high takeover activity, such activity is expected to remain high. Hence, the perceived probability that a randomly selected firm faces a challenge for control in the near future is high, and the value of a stock price index significantly exceeds the expected value of the underlying stream of dividends. By similar reasoning, in periods of low takeover activity, stock prices are closer to the value of future dividends. These arguments lead directly to our excess volatility results.

Takeovers and Stock Prices

The descriptive analysis above can be made quite rigorous. To be specific, one can formally specify an artificial economy that displays the forces described above, albeit in relatively stark and simple form. We have done this in a forthcoming paper (Lacker, Levy and Weinberg 1990), where we specify agents' preferences, their production and investment technologies, and, most crucially, the informational opportunities available to them. The critical feature of the economy is that the agent that manages an asset also has the ability to manipulate the observed return on the asset. The appendix of this paper describes a similar economy in more detail. Here we present the main implications.

For our economy, we can derive the equilibrium price of shares of stock in any given asset. Let p_t now be the price of a share *if no takeover occurs during period t*, and let q_t be the price paid if there is a takeover in period t. Both p_t and q_t are determined by general equilibrium conditions in our economy: p_t by the value investors place on a share knowing no takeover will occur until next period at the earliest, and q_t by the value to a new manager of acquiring and subsequently controlling the firm. In equilibrium $q_t > p_t$, meaning that a new manager is willing to pay a premium to acquire control of the firm. This is the value of control in our economy, and we denote it $\eta_t \equiv q_t - p_t$. We can find an expression for the equilibrium value of p_t, the current stock price, that is analogous to equation (1). The result, derived in the appendix, is that the current stock price depends on the expected value of control in a takeover as well as on expected dividends and expected price as before:

$$(11) \quad p_t = (1 + r)^{-1} E_t[p_{t+1} + d_{t+1} + \pi_{t+1}^t \eta_{t+1}].$$

The variable π_{t+1}^t is the probability that a takeover occurs during period $t+1$, given information available during period t. Equation (11) states that the current price of a share equals the expected discounted value of the sum of the price, dividends and the value of control, with the latter weighted by the probability of a takeover.

As in the Martingale Model, we can use this equation to derive an expression for the current stock price in terms of the entire stream of future dividends. As before, the derivation requires repeated substitution for p_{t+1}, p_{t+2}, and so on. The result is

$$(12) \quad p_t = v_t^d + v_t^\eta$$

$$\text{where } v_t^\eta = \sum_{s=1}^{\infty} (1 + r)^{-s} E_t[\pi_{t+s}^t \eta_{t+s}]$$

and v_t^d is defined as before. Comparing equation (12) to equation (4) reveals that the present value relation is now augmented by a term related to the value of control. The current stock price is equal to the expected present value of dividends plus the expected present value of the premium associated with control, adjusted by the probability that shareholders realize that premium. One immediate implication of (12) is that the variance of p_t can be written in terms of the variances and covariance of v_t^d and v_t^η:

$$(13) \quad \text{var}(p_t) = \text{var}(v_t^d) + \text{var}(v_t^\eta) + 2\text{cov}(v_t^d, v_t^\eta).$$

The possibility of excess volatility in stock prices is now easily demonstrated:

Proposition 1: If $\text{var}(v_t^\eta) + 2\text{cov}(v_t^d, v_t^\eta) > 0$, then $\text{var}(p_t) > \text{var}(v_t^d)$, and the variance of the stock price is greater than the variance of the present value of expected dividends. For example, if v_t^d is not negatively correlated with v_t^η, then $\text{var}(p_t) > \text{var}(v_t^d)$.

Therefore, the price of a stock can vary by more than is justified by variations in expected future dividends. The condition that v_t^d and v_t^η are positively correlated is stronger than required; all that is needed is for the correlation between v_t^d and v_t^η to be not too large a negative number. This condition seems reasonable. If the actual *realized* value of control is positively correlated with *realized* dividends, this assumption is satisfied. One would think that the expected value of controlling a firm would be larger if the firm is expected to do better.

We have not yet shown how the variance in stock prices compares with the variance of d_t^*, the ex post rational price. The Martingale Model predicts that $\text{var}(p_t) \leq \text{var}(d_t^*)$, but this inequality is violated empirically. Can our economy display violations of this inequality? To find out, first recall that because $d_t^* = v_t^d + x_t^d$, and $\text{cov}(v_t^d, x_t^d) = 0$ because of the optimality of forecasts of d_t^*, we know that

$$(14) \quad \text{var}(d_t^*) = \text{var}(v_t^d) + \text{var}(x_t^d).$$

The variance of p_t can be written as follows:

$$(15) \quad \text{var}(p_t) = \text{var}(v_t^d) + \text{var}(v_t^\eta) + 2\text{cov}(v_t^d, v_t^\eta)$$
$$= \text{var}(d_t^*) - \text{var}(x_t^d) + \text{var}(v_t^\eta)$$
$$+ 2\text{cov}(v_t^d, v_t^\eta).$$

This expression gives us a condition under which the variance bounds condition in the Martingale Model is violated.

Proposition 2: If $\text{var}(v_t^{\eta}) + 2\text{cov}(v_t^d, v_t^{\eta}) > \text{var}(x_t^d)$, then $\text{var}(p_t) > \text{var}(d_t^*)$, and the variance of the stock price is greater than the variance of the present value of actual dividends.

The condition in Proposition 2 states that the variance of the expected value of control plus the covariance of the expected value of control and the expected value of dividends must exceed the variance of the error in forecasting the present value of dividends. This condition can be understood by comparing $\text{var}(p_t)$ in our model, equation (15), with $\text{var}(p_t) = \text{var}(d_t^*) - \text{var}(x_t^d)$ from equation (9) in the Martingale Model. In the latter, $\text{var}(p_t)$ is equal to $\text{var}(v_t^d)$, which is less than $\text{var}(d_t^*)$ by the amount $\text{var}(x_t^d)$. In our model, $\text{var}(p_t)$ is greater than $\text{var}(v_t^d)$ by the amount $\text{var}(v_t^{\eta}) + 2\text{cov}(v_t^d, v_t^{\eta})$. For this effect to dominate, making $\text{var}(p_t) > \text{var}(d_t^*)$, $\text{var}(v_t^{\eta}) + 2\text{cov}(v_t^d, v_t^{\eta})$ must be larger than $\text{var}(x_t^d)$.

More intuitively, a share of stock in our model is a bundled claim, consisting of the right to a stream of dividends plus a share of the right to control the firm. The latter is a value that can be realized by the shareholder in the event of a takeover, and it adds a variance to the stock price above and beyond the variance in expected dividends. It contributes a variance of its own to the price of the stock, and in addition could well be correlated with the expected present value of dividends. These two effects could add enough to the variance of the stock price to make it larger than the variance in the present value of *actual* dividends, consistent with the empirical violations of the Martingale Model's variance bounds condition.

This explanation of excess stock price volatility does *not* rely on some other explanations that have recently been advanced. Some economists have suggested that fads or irrational "noise traders" are responsible for observed anamolies in stock prices (see Shiller (1984), Black (1986), DeLong et al., (1987), and Campbell and Kyle (1988)). In our economy, all agents are fully forward-looking and expectations are rational. There are no unexploited arbitrage opportunities because the future control premia are rationally anticipated and incorporated into the current price of the stock. There are no externalities, and no restrictions on the contracts agents can write except those that follow from the technological and informational constraints agents

face. In fact, our equilibrium is Pareto optimal, meaning that no agents can be made better off without making some other agents worse off. The key feature of the economy that gives rise to excess volatility is the friction affecting the contractual arrangements between managers and claimholders; managers' privileged position in control of the asset implies a positive value of control.

The evidence from event studies of tender offers and mergers, described in Section III, subheading "Takeovers and Individual Stock Prices" above, is consistent with the model presented here. The large abnormal increase in the stock price of the target firm represents the control premium η_t. The fact that the stock price of the bidding firm changes very little suggests that a substantial part of the increased productivity or private value of control associated with the acquisition is captured internally by the acquiring firm and is not passed on to the acquiring firm's shareholders.

Our model is also consistent with one of the most striking features of the empirical variance bounds literature. Shiller's first paper contained graphs plotting d_t^*, the present value of actual dividends (he called it p_t^*), against p_t, actual stock prices, for the Standard and Poor's Composite Price Index and for the Dow Jones Industrial Average. The path of p_t^* is fairly smooth, while the path of p_t takes large persistent swings away from p_t^*. An analogous graph, using more sophisticated techniques for removing trends, appears in a recent paper by Campbell and Shiller (1987, Figure 2, p. 1083). Both Shiller's and Campbell and Shiller's plots show that the difference $p_t - p_t^*$ was largest during four time periods: the first decade of this century, the late 1920s, the mid-1960s, and the early 1980s. The peak in the mid-1960s is particulary large. All four of these periods correspond to merger waves, periods in which changes in corporate control were particularly frequent. This suggests that the economy might experience periods in which the probabilities of takeover for a broad range of stocks move together and exhibit long persistent swings. These swings might be caused by accelerations of technological shifts as some have argued (Gort 1969), periodic shifts in the regulatory environment affecting changes in corporate control, or innovations in the infrastructure of financial markets.

V.
SOME IMPLICATIONS OF OUR THEORY

In this section we briefly discuss some of the implications of our theory, first for recent events and

trends in financial markets, and then for proposals to alter the regulations governing takeovers and markets for traded financial claims.

Recent Developments in Financial Markets

Dramatic changes have occured in the markets for corporate financial claims in the last decade. Stock prices displayed a broad upward trend through the 1980s, albeit with setbacks in the fall of 1987 and the fall of 1989. It is a widely held perception that volatility has increased. An entirely new market has emerged for below-investment-grade, tradeable corporate debt, or "junk bonds." And the pace of changes in corporate control via acquisition of outstanding shares has increased dramatically.

Simultaneously explaining all of these trends is far beyond the scope of the present paper. However, our theory is able to cast a new light on many of these developments and their interrelations.[5] One plausible interpretation is that, for some reason, perhaps linked to technological improvements in the ability of investors to monitor firm performance, investors are now much more willing to hold risky, high-yield corporate debt such as junk bonds. While not all of these securities have been associated with corporate takeovers, it seems clear that they were essential to many of the control transactions of the 1980s. The shift in investor demand for these securities facilitated takeovers that would not have been possible without the market for these securities. This improvement in the ability of acquirers to finance takeovers led in turn to a secular rise in the probability of a takeover for a broad range of stocks, π_{t+1}^t in our setup, and so led to a broad upswing in stock prices.

The theory might also illuminate some recent short-run swings in stock prices. In recently published research, Mitchell and Netter implicate Congressional consideration of antitakeover legislation in the October 19, 1987 crash in stock prices. They argue that "a tax bill containing antitakeover provisions proposed by the U.S. House Ways and Means Committee on October 13, 1987, and approved by the Committee on October 15 was the fundamental economic event causing the greater than 10% decline in the stock market on October 14-16, which arguably triggered the October 19 crash." By making takeovers more costly, such a bill would reduce the probability of future takeovers and thus depress current stock prices, consistent with our theory.

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[5] There may be plausible alternative explanations, of course.

Analogously, the role of the junk bond market in facilitating changes in corporate control might explain why information about the willingness of investors to hold below-investment-grade securities would affect stock prices so strongly, as they seemed to in 1989. At many times during that year, particularly during the late summer and early fall, reports of broad stock price declines cited sharp declines in junk bond prices as the proximate cause. Similarly, the collapse of one well-publicized deal, the bid for UAL, was cited often for the broad decline in stock prices in the fall. Finally, we note that the fall of broad measures of stock prices since Summer 1989 has coincided with a rise in the use of proxy fights in corporate control contests, a method of control change that does not provide shareholders with an immediate monetary payment.

Regulations to Curb Takeovers and Reduce Stock Price Volatility

The finding of excess volatility of stock prices is often taken as evidence of capital market imperfections or the presence of irrationality in the determination of asset prices (see Shiller (1984), Black (1986), DeLong et al., (1987), and Campbell and Kyle (1988)). Such imperfections, in turn, are often adduced in support of various policy proposals that would legislatively alter the way financial markets currently operate. For example, some advocate that "circuit breakers" or "collars" be imposed on the stock market to halt or restrict trading in the event that prices change by more than some prespecified amount (see, for example, Greenwald and Stein (1988)). The argument is that such restrictions would reduce price volatility and improve the efficiency of financial markets. Similarly, some have suggested policy changes to discourage takeovers, either by making the financing of takeovers more difficult or costly, or by erecting barriers to changes in control via acquisition of shares (Scherer (1988), for example).

A complete evaluation of these many proposals is beyond the scope of this paper. We can point out, however, that in our model takeovers regularly occur, and are responsible for excess stock price volatility. Excess volatility arises because of the mechanisms by which the complex agency problems inherent in the management and financing of the modern corporation are resolved. These mechanisms thus have a positive allocation role. In fact, excess volatility is consistent with full market efficiency in our model, and there is no constructive role for government intervention. The lesson, then, is that

the empirical finding that stock price volatility is larger than can be explained by the Martingale Model does not by itself justify regulatory intervention in financial markets.

Of course, a wide range of government policies already in place have important effects on the phenomena our model attempts to describe. The requirements imposed on corporate charters constrain the legal forms that corporate governance can take. The Securities and Exchange Commission significantly constrains the financial structure and conduct of publicly held firms, requiring, for example, that votes be strictly proportional to shareholdings. SEC regulations also impose severe restrictions on tender offers. Underlying all financial claims, of course, the structure of bankruptcy law has an important and sometimes neglected influence on financial arrangements.

Our model is not rich enough, as yet, to be able to fully assess the role of these and other regulations affecting the market for control. We suspect that they have important effects on the way various legal rights are allocated among the claimants of a firm, and

thereby have important effects on the market for corporate control. Altering these regulations may well reduce stock price volatility, but would most likely alter the efficiency with which the control of assets is allocated. Any assessment of the impact of altering such regulations must look far beyond the effect on stock price volatility.

VI.
CONCLUDING REMARKS

Our analysis contains a broader message for the understanding of financial markets. Traditional approaches to asset pricing treat an asset as nothing more than a claim to a stream of payments. The starting point of our analysis is the view that a financial asset is a contractual relation between various parties. A direct implication of this view, as our model illustrates, is that financial assets in general, and traded stock shares in particular, are bundled claims tying together fragments of governance rights with titles to streams of payments. Building upon this view may provide us with new insights into the diverse financial arrangements characteristic of developed economies.

APPENDIX

In this appendix, we develop a simple model that delivers an equilibrium pricing equation of the form of equation (11). The model is similar in spirit to the one in Lacker, Levy and Weinberg (1990). That paper was concerned with demonstrating that excess volatility was possible in principle. The model described here is somewhat more general in that it allows for periodic swings in takeover activity and shows how these might lead to coincident swings in stock prices.

In this economy there is a large number of durable productive assets (projects) and an even larger number of people (agents). Some people are claimholders, and others are managers. Together with the services of a manager, a project can produce a stream of output $\{z_t\}$, $t = 1, 2, \ldots$, where $z_t = d_t + y_t^i$. The portion d_t of the project's output is publicly observed. A manager can commit to paying out (all or a part of) d_t to claimholders. The remainder of the project's output, y_t^i, is privately observed by the manager and is not verifiable by any outsider. Hence, y_t^i is simply consumed by the

person who controls the firm, and cannot be contractually transferred to claimholders. These are the rents that accrue to managers and correspond to the private value of control posited by Harris and Raviv (1989).

The per period value of control, y_t^i, and dividends, d_t, are assumed to follow stochastic processes given by

(A.1) $\quad y_t^i = a_0 y_{t-1}^i + e_t^i$, and

$\qquad d_t = a_1 d_{t-1} + u_t^i$,

where a_0, $a_1 \leq 1$, and e_t^i and u_t^i are independent, mean-zero random variables, independently and identically distributed over time.[6]

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[6] One could assume a more general joint process for $\{y_t^i, d_t\}$ without altering the results. Under more general assumptions, claimholders would need to be able to form expectations about future values of unobservables, y, based only on publicly observed variables. Our assumptions allow us to avoid the filtering problem which arise with a more general specification.

Claimholders hold claims to the dividend stream $\{d_t\}$, and these claims are attached to voting rights allowing claimholders, collectively, to delegate control of the productive project. For simplicity, we assume that a change in control requires a unanimous vote. Hence, a raider can acquire control by purchasing all claims to a particular project. We assume, however, that there are agents engaged in search activity to obtain information about the value of controlling projects. We do not model this search behavior explicitly. Rather, we simply assume that at any point in time there is a probability ϕ_t, that a raider arrives on the scene and obtains information about the value of control. We assume that ϕ_t follows a first-order stationary markov process, that is, that the probability distribution of ϕ_{t+1}, given the entire history of realizations up to and including period t (ϕ_{t-j} for $j = 0,1,2,...$), depends only on ϕ_t. The raider observes the incumbent's current value, y_t^i, and also learns what his own value would be if he took control; call this y_t^r. We assume that if a raider arrives in period t, then $y_t^r = y_{t-1}^i + e_t^r$, where e_t^r satisfies the same assumptions as does e_t^i, but is drawn independently of e_t^i. Thus the raider's current-period value of control could be different from the incumbent manager's current-period value of control.

The value of control is the present discounted value of the stream of per period values of control, weighted, for each future period, by the probability that the manager will still be incumbent in that period. The value of control is calculated by the incumbent manager, yielding the amount the incumbent manager would accept to forego continued control of the asset. The value of control is also calculated by the raider; it is the amount the raider would pay to acquire control of the asset. Both quantities are influenced by the past experience of the project through the influence of y_{t-1}^i, and for both the incumbent manager and the raider the future of the value of control evolves according to (A.1). But because y_t^r can differ from y_t^i, and because these influence the expected values of y_{t+s}^r and y_{t+s}^i, there can be a discrepancy between the value of control to the incumbent and the value of control to the raider.

Once y_t^i and y_t^r are observed, the raider can choose to initiate a bid for control through the acquisition of shares. We assume that there is an arbitrarily small but nonzero cost of initiating a challenge for control. Hence, the raider only does so if his own value of control is greater than the incumbent's.[7] Define Φ_t as the probability that a raider appears in period t *and* has a greater value of control than the incumbent. The value of Φ_t depends on the raider's expectations of future per period values of the control, y_{t+s}^i, and the probability that some other raider will come along and acquire the asset in the future. We take the series Φ_t as given for now. Let η^0 be the value of losing control: the expected present value of the manager's earnings from the next-best alternative occupation in the event of losing control of the asset. Then the value of control of an asset can be written as

$$(A.2) \quad \eta_t^i = (1 + r)^{-1} E_t \{ \Phi_{t+1} \eta^0 + (1 - \Phi_{t+1})(y_{t+1}^i + \eta_{t+1}^i) \}.$$

η_{t+1}^i is the value of being in control at the end of period $t+1$. Equation (A.2) states that the value of control is the present value of the value of losing control, multiplied by the probability of losing control next period, plus the value of remaning in control at the end of next period, multiplied by the probability of remaining in control. An identical expression determines the value of control for a raider, η_t^r. Note that if a raider assumes control this period, at the end of the next period he is an incumbent, so η_{t+1}^i appears on the right side of the expression for η_t^r:

$$(A.3) \quad \eta_t^r = (1+r)^{-1} E_t \{ \Phi_{t+1} \eta^0 + (1 - \Phi_{t+1})(y_{t+1}^i + \eta_{t+1}^i) \}.$$

If a raider arrives in period t, a change of control takes place only if $\eta_t^r > \eta_t^i$, the value of control to the raider exceeds the value of control to the incumbent. Because y_{t+s}^i evolves according to a stationary process, one can show that $\eta_t^r > \eta_t^i$ if and only if $e_t^r > e_t^i$, the current-period value of control is larger for the raider than for the incumbent. Therefore, the probability that a change in control occurs *if* a raider arrives in period t is $\Pr[e_t^r > e_t^i]$. The probability that a change in control actually occurs in period t is then $\Phi_t = \phi_t \Pr[e_t^r > e_t^i]$, the probability that a raider arrives times the probability that a change occurs given that a raider has arrived. Given our assumptions about ϕ_t, e_t^r, and e_t^i, the expected future rate of change in control depends only on the current value of Φ_t.

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[7] Relaxing this assumption, so that there is a contest for control whenever a raider "arrives," would not change the nature of the results but would complicate the computation of the present discounted value of control.

We define π_{t+s}^t to be the probability, given that the firm does not face a challenge to control before or during period t, of the first such challenge occurring in period $t+s$. For $s = 1$, $\pi_{t+s}^t = \Phi_{t+1}$. For $s \geq 2$, π_{t+s}^t is given by

$$\pi_{t+s}^t = \Phi_{t+s} \prod_{j=1}^{s-1} (1 - \Phi_{t+j}).$$

Equation (A.2) can now be solved forward to yield

$$\eta_t^i = E_t \left\{ \sum_{s=1}^{\infty} (1+r)^{-s} [\pi_{t+s}^t \eta^0 \right.$$

$$\left. + (\pi_{t+s}^t (1 - \Phi_{t+s})/\Phi_{t+s}) y_{t+s}^i \right\}$$

Notice that η_t^i depends on the expected future rate of takeover activity, as well as on the expected future values of y_t^i.

If a raider arrives in period t and draws a current value of control, e_t^r, that is larger than the incumbent's, then the raider outbids the incumbent by paying a premium of η_t^r for the equity shares of the firm. In the event of a takeover, the purchase price (ex dividend) of the shares is

$$(A.4) \quad q_t = v_t^d + \eta_t^i.$$

In the event that there is no takeover attempt in period t, the (ex dividend) stock price is

$$p_t = (1+r)^{-1} E_t [d_{t+1} + \pi_{t+1}^t q_{t+1}$$

$$+ (1 - \pi_{t+1}^t) p_{t+1}].$$

Using equation (A.4) and solving forward, we have

$$p_t = v_t^d + v_t^\eta,$$

where

$$\theta_t^\eta = E_t \left\{ \sum_{s=1}^{\infty} (1+r)^{-s} \pi_{t+s}^t \eta_{t+s}^i \right\}.$$

For convenience, η_{t+s}^i is written as η_{t+s} in Section IV, subheading "Takeovers and Stock Prices."

Suppose that there are a large number of identical versions of the asset that we have just described. The stochastic processes governing d_t, e_t^i, e_t^r, and ϕ_t are the same, although the realizations of these random processes are independent across assets. If the number of these assets is quite large, then the fraction that experience a change in control is very close to the population probability that a change in control occurs (by the Law of Large Numbers). Now define π_{t+s}^t as the probability that a takeover occurs in period $t+s$ to any given firm selected at random, given the information known in period t. Imagine calculating a stock price index as a weighted average of individual stock prices; the weights are not important—any arbitrary weights will do. Then the formula derived above will also apply to the stock index, where p_t is the value of the stock price index, and η_t^i, v_t^η, and v_t^d are interpreted as weighted averages across stocks.

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A Mandate for Price Stability

*Robert L. Hetzel**

I.
INTRODUCTION

Stephen Neal, Chairman of the House Banking Subcommittee on Domestic Monetary Policy, has introduced legislation (H. J. Res. 409) requiring

> that the Federal Open Market Committee of the Federal Reserve System shall adopt and pursue monetary policies to reduce inflation gradually in order to eliminate inflation by not later than 5 years from the date of this enactment of this legislation and shall then adopt and pursue monetary policies to maintain price stability.

This paper argues for passage of the Neal Resolution, which would make price level stability the dominant goal of monetary policy. The alternative to a rule that mandates price stability is the exercise of ongoing discretion over the desired price level. This discretion, it is argued, encourages groups that benefit from high and variable inflation to lobby the political system. A rule is desirable primarily because it limits the incentives for special-interest politics.

An earlier experience with discretionary monetary policy occurred under the Articles of Confederation (1781-1789). On the basis of this experience, James Madison concluded that discretion creates political pressures from special interest constituencies. Madison and the other authors of the Constitution, therefore, took discretionary control over the price level away from government. Article I, Section 8 of the Constitution empowered Congress to "coin money" and "regulate the value thereof." Today, this language appears general. At the time, however, it was clearly understood as restricting Congress to specifying the metallic content of coins. [See Timberlake (1989) and Christainsen (1988), especially the references in footnote 2 of the latter paper.]

The first part of the paper reviews the importance the authors of the Constitution placed on constraining discretionary issue of paper money. The second part of the paper argues that the recent experience with discretion vindicates Madison's judgment that discretion nurtures special-interest politics. In replacing discretion with a rule, the Neal Resolution would

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reestablish the original intent of the authors of the Constitution and return price level determination to a constitutional framework.

II.
PRICE LEVEL DETERMINATION WITHIN A CONSTITUTIONAL FRAMEWORK

By 1787, James Madison and his correspondents, including James Monroe, George Washington, and Edmund Randolph, had concluded that the ascendancy of parochial political interests over the national interest was spreading disorder and leading to a disintegration of the Union. A primary manifestation of these parochial interests was overissue of paper money. State legislatures were pressured by debtors to pass laws making paper money legal tender and then to issue large amounts of it. By 1786, seven states had adopted paper money as legal tender. Madison wrote to his brother on August 7, 1786 (Madison 1975, p. 89):

> . . . the States are running mad after paper money, which among other evils disables them from all contributions of specie for paying the public debts, particularly the foreign one. In Rhode Island a large sum has been struck and made a tender, and a severe penalty imposed on any attempt to discriminate between it and coin. The consequence is that provisions are withheld from the Market, the Shops shut up—a general distress and tumultuous meetings.

Shortly thereafter, he wrote to Thomas Jefferson complaining of the "warfare & retaliation" among states that were passing laws enabling their citizens to pay out-of-state debts in depreciated paper money (Madison 1975, pp. 94-5).

In Spring 1787, Madison wrote the memorandum "Vices of the Political System of the United States" in preparation for the Federal Convention to be held at Philadelphia in May. In "Vices" Madison addressed the problem of how to prevent a national legislature from following the examples set by state legislatures, where majorities had violated the rights of individuals and minorities. Madison first described how unrestrained majority rule encouraged majorities to exploit minorities (Madison 1975, pp. 354-5):

> These causes lie 1. in the Representative bodies. 2. in the people themselves.

1. Representative appointments are sought from 3 motives. 1. ambition. 2. personal interest. 3. public good. Unhappily the two first are proved by experience to be most prevalent.

2. A still more fatal if not more frequent cause lies among the people themselves. All civilized societies are divided into different interests and factions, as they happen to be creditors or debtors—rich or poor—husbandmen, merchants or manufacturers—members of different religious sects—followers of different political leaders—inhabitants of different districts—owners of different kinds of property &c &c. In republican Government the majority, however composed, ultimately give the law.

Madison argued that appeals made on the basis of the "general and permanent good of the Community," "character," or "religion" would do little to prevent majorities formed out of these special interest groups from exploiting minorities (Madison 1975, pp. 355-6):

Is it to be imagined that an ordinary citizen or even an assembly-man of R. Island in estimating the policy of paper money, ever considered or cared in what light the measure would be viewed in France or Holland; or even Massts or Connect.? It was a sufficient temptation to both that it was popular in the State; to the former that it was so in the neighbourhood. . . . Place three individuals in a situation wherein the interest of each depends on the voice of the others, and give to two of them an interest opposed to the rights of the third. Will the latter be secure? The prudence of every man would shun the danger. The rules & forms of justice suppose and guard against it. Will two thousand in a like situation be less likely to encroach on the rights of one thousand? The contrary is witnessed by the notorious factions & oppressions which take place in corporate towns limited as the opportunities are, and in little republics when uncontrouled by apprehensions of external danger.

Madison concludes by expounding the famous idea of Essays No. 10 and No. 51 in *The Federalist*. In a national legislature in a large country, the general interest is protected because the large numbers of disparate groups make it difficult to form exploitive majority coalitions (Madison 1975, p. 357):

The Society becomes broken into a greater variety of interests, of pursuits, of passions, which check each other, whilst those who may feel a common sentiment have less opportunity of communication and concert.

Inevitably, citizens will form political groups in an attempt to use the coercive power of the state to further their own self-interests, rather than the general interest. In *The Federalist* No. 10, Madison accepts the reality of factionalism in government promoted by self-interest. The separation of powers, checks and balances, and the federal system embodied in the Constitution were designed to restrain self-interest through "supplying by opposite and rival

interests the defect of better motives" (*The Federalist* No. 51).

The Constitutional Convention ended the discretion of state legislatures over the price level and the issue of paper money. Article I, Sec. 10 of the Constitution states that "No state shall . . . coin money; emit bills of credit [paper money]; make anything but gold and silver coin a tender in payment of debts." Article I, Sec. 8 gave the Federal government the power "to coin money, regulate the value thereof, and of foreign coin, and fix the standard of weights and measures." To the framers of the Constitution, this language clearly committed the United States to a specie standard.[1]

In many states during the Confederation period, state legislatures had arbitrarily set aside commercial contracts. Through inflation caused by printing paper money, states had abrogated contracts in favor of debtors. Article I, Sec. 10 of the Constitution prohibits states from "impairing the obligation of contracts." (Later, in the same spirit, the Fourteenth Amendment stated "nor shall any State deprive any person of life, liberty, or property without due process of law.") Removing discretionary control over the price level from government was a key device for enforcing the principle that government should not impair contractual obligations.

The authors of the Constitution carefully compromised between the need to give government the power to raise revenue and the need to protect private property from arbitrary seizure. The Constitution separates the branch of government that spends public monies from the branch that levies taxes. It safeguards this separation by giving Congress exclusive rights "to borrow money on the credit of the United States." The Executive Branch cannot spend money "but in consequence of appropriations made by law." By reserving to Congress the power to tax, the authors of the Constitution ensured that the exercise of this power would be accompanied by public discussion. Furthermore, "bills for raising revenue shall originate in the House," whose

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[1] Christainsen (1988, p. 427) writes: The first draft of the Constitution gave the legislature of the United States the power to "emit bills" [paper money]. On August 16, 1787, however, the convention moved to strike this power from the Constitution, and in Madison's account, "striking out the words . . . cut off the pretext for a paper currency, and particularly for making the bills a tender either for public or private debt." Of the eleven delegates whose remarks Madison reported, ten clearly put forth the view . . . that striking the phrase in question would deny Congress any power, under any circumstances, to create paper money.

members were subject to elections every two years. A specie standard was one of the checks imposed to assure that taxes were imposed only through explicit legislation. Congressional responsibility "to coin money" was designed to prevent the Executive Branch from copying the behavior of sovereigns who levied taxes through debasement of the coinage.

III.
THE RECENT EXPERIMENT IN DISCRETION

Although the specie standard lapsed under the pressure to finance the Civil War with greenbacks, it was reestablished in 1878. When the Federal Reserve System was established in 1913, it was subjected to the discipline of the gold standard. Federal Reserve notes were subject to a 40 percent gold reserve. Battered by the Depression and two world wars, the gold standard metamorphosed into the Bretton Woods system, under which the Federal Reserve felt constrained to raise interest rates in response to gold outflows. Because domestic inflation was viewed as the major cause of gold outflows, the Federal Reserve kept inflation at a low level. To a considerable degree, the Bretton Woods system limited government discretion over the price level.

This limitation on discretion began to break down in the 1960s, however, when the Federal Reserve System stopped raising interest rates to prevent gold outflows. In 1963, Allan Sproul (1980, pp. 121, 126), president of the Federal Reserve Bank of New York, made an early, eloquent plea for discretion:

[The Federal Reserve Act] was a determination that there was to be a degree of monetary management in the United States. But because of ancient prejudices and still lively suspicions . . . it was thought that this power could be substantially divorced from acts of discretion. . . . Changes in the production of gold, the international balance of payments, and the rise and fall of the self-generated credit needs of agriculture, commerce, and industry were to determine, pretty largely, the amounts of Reserve Bank credit which would come into being or go out of existence. . . . It seems to me patent that the uncertain hand of man is needed in a world of uncertainties and change and human beings, to try to accommodate the performance of the monetary system to the needs of particular times and circumstances and people. I here agree with Professor Samuelson, of the Massachusetts Institute of Technology, who has written that "a definitive mechanism, which is to run forever after, by itself, involves a single act of discretion which transcends, in both its arrogance and its capacity for potential harm, any repeated acts of foolish discretion that can be imagined."

Later, discretion came to be defended primarily as allowing the Federal Reserve to vary the money stock in line with changes in money demand. In

actual fact, changes in the money stock far exceeded changes in money demand.[2] Discretion was exercised primarily in trading off the goal of price stability against other goals.

IV.
THE INFLATION TAX

Inflation generates revenue directly through the increase in fiat money that creates the inflation. More important, inflation interacts with the lack of indexing in the tax code to increase tax revenue. Finally, unanticipated inflation reduces the real value of the taxes the government must impose to pay holders of existing government debt.

After 1964, the political system was under constant pressure to increase revenue. The 1964 general election provided the congressional votes to undertake a broad expansion of income redistribution programs.[3] Two years later, the Vietnam War defense buildup began. After the mid-1960s, a rapidly growing economy that would generate continuous increases in revenue for defense and domestic spending programs became a dominant political concern. Initially, the political system accepted inflation as the cost of high real growth and the government revenue generated by that real growth. Later, the political system came to depend directly upon inflation for revenue.

Before indexation in 1985, inflation increased the real revenue raised by the personal income tax. Inflation pushed individuals with unchanged real income out of tax-exempt into taxable status. It eroded the real value of the standard deduction. Most important, due to the progressive rate structure of the personal income tax, inflation increased real revenue by moving individuals with unchanged real income into higher marginal tax brackets. Inflation still

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[2] From 1965 to 1989, real GNP doubled. Because the public's demand for the purchasing power represented by M2 rises in line with real GNP, the demand for real M2 also doubled. In contrast, the stock of M2 rose sevenfold. According to the quantity theory, the excess supply of M2 should cause the price level to rise by a factor of 3.5 ($7/2 = 3.5$). Over the period 1965 to 1989, the implicit price deflator increased by almost exactly that factor.

[3] In the election, Democrats had campaigned for a national medical care program (Medicare) and a Social Security program with universal coverage. In contrast, Republicans had campaigned for Social Security coverage limited to the needy elderly and financed out of general revenues. The elections gave the Democrats a 295-140 majority in the House and a net increase of 42 Northern Democrats. The conservative coalition of Republicans and Southern Democrats that had blocked social legislation in the 1950s crumbled.

increases revenue through the absence of indexation in other parts of the tax code. The capital gains tax is levied not only on real gains, but also on paper gains that only compensate for inflation. Revenue from estate taxes rises as inflation lowers the real value of the estate tax exemption. Inflation raises corporate taxes by eroding the real value of depreciation allowances, which are based on historical cost, rather than replacement cost. It also raises corporate taxes through increases in the dollar value of inventories that augment measured profits, but not real profits.

Studies done for the year 1974, when the inflation rate was 11 percent, yield the conclusion that inflation increased federal tax revenue in that year by 17 percent. (See Appendix. Because of the complexity of the federal tax code, construction of an annual series on revenue increases produced by inflation would require considerable work.) Although the revenue raised by inflation varied over time with the inflation rate, this revenue contributed significantly to total revenue until the reduction in the inflation rate in the 1980s and the indexing of the personal income tax in 1985.

V.
INCOME TRANSFERS AND INFLATION

The combination of inflation and government price fixing allows the political system to circumvent legal prohibitions against arbitrary confiscation of private property. Revenue transfers imposed by this combination are not subject to the checks and balances and public discussion that constrain the enactment of explicit tax legislation. By reducing public discussion, such transfers avoid criticism for providing benefits to groups that are well-off. The relative ease of effecting income transfers through government price fixing in an inflationary environment encourages the formation of special-interest lobbies. Inflation thus increases the incentive to use government-regulated prices to redistribute income.

After the mid-1960s, in response to pressure from the politically potent housing lobby, Congress increasingly subsidized credit to the housing industry. In September 1966, Congress passed legislation extending interest rate ceilings to S&Ls. These Regulation Q ceilings, administered jointly by the Fed, the FDIC, and the FHLBB, were set at a higher level for S&Ls than for banks. The original intention was to allocate credit directly to housing by making deposits more attractive at S&Ls than at banks.

Because Reg Q ceilings were not raised with the rise in inflation and market rates after 1966, Reg Q became an instrument for transferring income from holders of small deposits to the housing industry.[4] Holders of small deposits, who did not have access to money market instruments paying a competitive rate of return, were in effect taxed at a rate equal to the difference between the market interest rate and the Reg Q ceiling rate.

Reg Q ceilings subsidized credit to housing by keeping interest rates on thrift deposits below market rates. In combination with the prohibition of adjustable-rate mortgages, these ceilings constrained thrifts to borrow short-term through passbook savings accounts, while making them lend long-term. The rise in inflation in the late 1970s and early 1980s produced a rise in market rates and in the rates at which thrifts borrowed. Their old mortgages, however, continued to pay the lower rates offered in the less inflationary past. Consequently, a majority of thrifts became insolvent. In the absence of inflation, there would have been no thrift crisis.[5]

The Nixon wage and price controls, imposed in August 1971 in response to 4 percent inflation, created extensive new opportunities for the political system to redistribute income among different groups without explicit legislation. Inevitably, administration and enforcement of wage and price controls require considerable discretion. Wage and price controls create a shadow fiscal system of implicit taxes and transfers.

The controls on the energy industry were a good example of how the political system combined inflation with legislated price fixing to redistribute income. Price controls on oil were kept after other price controls were eliminated. In his book review of *The Economics and Politics of Oil Price Regulation*, Henry Jacoby (1984, p. 1176) comments:

> When the first oil shock occurred there was a system of oil price controls already in place—a hangover from the Nixon anti-inflation scheme of 1971. They were modified and

[4] The ceiling rate on commercial bank savings deposits was set at 4 percent in 1966, 4.5 percent in 1970, 5 percent in 1973, and 5.25 percent in 1979. In contrast to this 1.25 percentage point rise from 1966 to 1979, over the same period, the three-month Treasury bill rate rose almost 5 percentage points, from about 5 percent to 10 percent. In May 1970, this inflation tax was effectively restricted to holders of small deposits as a result of the exemption from Reg Q ceilings of certificates of deposit in denominations of $100,000 or greater.

[5] Because deposit insurance allowed insolvent thrifts to continue to attract deposits, the decision whether to close an insolvent thrift became a political decision rather than a market decision.

extended and used to hold down the price of domestic crude oil so that people downstream (oil refiners, distributors, and the ultimate consumers) got a lower average price of domestic-plus-imported supplies. . . . A shadow system of public finance, unique to the oil sector, was created—complete with taxes, transfers, and (no surprise) deadweight loss. In practice the system grew to mind-bending complexity as the various players (regions, consumers, refiners, and producers holding various classes of oil reserves) fought over the goodies.[6]

A very contentious issue at the time . . . was the question who actually benefited from the $15-$45 billion (depending on the year) producers were denied. In the mid-1970s there was a group of analysts who held that the oil price controls were a fraud to the consumer: U. S. product prices were set in world product markets . . . and there was no way for controls on crude oil to affect prices at the pump. The rents were being transferred to refiners in the form of increased margins.

Rent control laws furnish another example of the way inflation combines with government-regulated prices to redistribute income, in this case, from the owners of the housing stock to renters. Consider also automobile insurance: in California, Proposition 103, which was passed in a 1988 referendum, called for a rollback in automobile insurance rates of 20 percent. The constitutionality of the rollback is now being litigated in the courts. Proposition 103 also mandated that the state's insurance commissioner be elected in the future. Given the extensive criticism of the cost of car insurance in California, it is unlikely that the next commissioner will raise rates after taking office. Inflation will then lower the real value of insurance rates, regardless of whether the courts sanction a rollback.

VI.
EROSION OF SUPPORT FOR THE PRICE SYSTEM

Inevitably, in an inflationary environment, government officials blame inflation on the special factors that change individual prices. In an environment where no one accepts responsibility for inflation, competition for political power encourages inflation scapegoating, which plays on public confusion over "high" and "rising" prices by attributing inflation to monopoly power. This scapegoating in turn erodes public support for resource allocation through the price system.

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[6] Ironically, when the extent of pollution in Communist countries appeared in 1989, the price system of western countries was praised for having produced efficient use of energy. An article in the New York Times (1/23/90, p. 17) commented, "The lack of market forces kept these [Communist] countries from realizing the impressive gains in energy efficiency registered in the West after the oil shocks of the Seventies. . . ."

Erosion of support for resource allocation through the price system was especially strong in the market for home construction. The cycle of inflation and recession that began in the mid-1960s induced cyclical boom and bust conditions in the home construction market. (Housing construction, like other forms of investment, falls more sharply than aggregate output in a recession.) Cyclical downturns in the housing and construction industry created the impression that the free-market allocation of credit discriminated against specific classes of users. In particular, the concentration of unemployment in the construction industry created the impression that construction workers had to bear a disproportionate share of the burden of reducing inflation.

Because downturns in housing construction were attributed to "high" interest rates, they created pressure for "cheap" credit.[7] Many believed that lower interest rates for housing would follow from an increase in the supply of credit to housing made possible by higher money growth. In response to constituent pressure, some congressmen pressured the Fed for higher money growth and lower interest rates. These congressmen blamed financial monopolies for "high" interest rates. "High" interest rates, they argued, exacerbated inflation by raising the cost of doing business. In 1975, the cyclical downturn in housing produced House bills that would have required the Fed to set a floor of 6 percent under M1 growth and "to allocate credit away from inflationary uses, and toward national priority uses, including . . . low- and middle-income housing" (HR 3161).[8] Rep. Jim Wright (US Cong., 2/4/75, p. 7) made the case for one such bill, HR 212, produced by the Democratic Steering and Policy Committee.

REP. WRIGHT: With any given supply of new money overall, a credit allocation program is needed to channel credit away from nonproductive speculative and inflationary uses, such as corporate takeovers, excessive inventory accumulation, and speculation in land and commodities, and toward credit-starved priority areas of the economy. . . . HR 212 requests the Federal Reserve to allocate credit toward priority uses and away from nonpriority speculative and inflationary uses.

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[7] Congress was especially sensitive to this pressure because increases in deficits during recessions created the appearance that government was the main competitor for housing credit.

[8] Treasury Secretary Simon, along with influential members of the Senate Banking Committee, opposed these bills. As a consequence, they emerged in amended form as House Concurrent Resolution 133, which required only that the Fed periodically consult with Congress "over ranges of growth or diminution of monetary and credit aggregates."

Fed chairman Arthur Burns countered these assertions with arguments that inflation arises from government deficits and monopoly power in labor markets. Under pressure to lower interest rates, he defended money markets as highly competitive:

SEN. BIDEN: Doctor, on occasion you have also indicated that with regard to interest rates, either the Fed can't or shouldn't concentrate on lowering interest rates. Yet we are faced with that question all the time here in the Congress. . . . If the Fed can't or shouldn't be the outfit that concentrates on that, who should?

DR. BURNS: You know, you could leave interest rates alone. After all, we have highly competitive money and capital markets. If you are going to engage in price control exercises, you ought to turn to those sectors of the economy where there are pockets of monopoly. . . . We have pockets of monopoly in the field of labor, but we don't talk about that. (US Cong., 4/29/75, p. 18)

As inflation created public distrust of the price system, it also created opportunities to subsidize users of credit. Rising rates of inflation that pushed market rates above usury ceilings provided a subsidy to homeowners who obtained mortgages at below-market rates. Homeowners with existing mortgages, like other debtors, benefited from unexpectedly high inflation. Furthermore, inflation turned existing federal credit programs into subsidies for the home construction industry. These programs had existed before the inflation of the mid-1960s. The rationale for them was that they made "it possible for home owners and rental project owners to finance the construction or acquisition of housing properties at *reasonable* (italics supplied) levels of interest rates" (US Cong., 2/28/64, p. 22). The credit extended by these programs before 1965 was relatively small, and it was largely extended at market rates. [See US Cong., 2/28/64, Table 3-2.] With inflation, "reasonable" levels of interest rates became historical levels of interest rates, and "reasonable" rates became subsidized rates.

By lessening public acceptance of credit allocation by the marketplace and by increasing the ease of hiding subsidies, inflation encouraged myriad government interventions in the market for housing credit. These interventions disguised the social cost of housing, which led to a misallocation of the capital stock. Government intervention also produced the HUD scandals and the S&L bailout of the 1980s.

VII.
POLITICAL SELF-INTEREST AND THE COMMON INTEREST

Revenue generated by inflation financed an increase in government spending relative to GNP after the mid-1960s. Because this increase in revenue did not have to be explicitly legislated, it allowed postponement of a political consensus over the acceptability of the increased spending. Prior to indexation of the personal income tax in 1985, inflation continuously increased tax revenue as a percent of GNP. Periodic "tax cuts" would return revenue as a percent of GNP to its original base value. The practice of imposing continuous tax increases through inflation, while legislating offsetting reductions only occasionally, raised the average tax rate imposed over time. The increase in the average tax rate allowed Congress to raise taxes sufficiently to finance the expansion of income transfer programs, while postponing a decision on whether to legislate permanently taxes sufficient to pay for them. Inflation allowed Congress to postpone continually its constitutional responsibility to make explicit, publicly debated decisions on the share of resources to appropriate to the public sector.

The distortions produced by continual inflation and the absence of indexing in the tax code gave Congress an incentive to rewrite the tax code periodically. Individuals and corporations necessarily lobbied Congress on an ongoing basis to protect their own interests. The uncertainty over the long-run incidence of taxes acted to discourage investment.

VIII.
CAN WE LEARN TO LIVE WITH INFLATION?

Is "high" inflation bad and "moderate" inflation all right? Why not learn to live with the current 5 percent inflation? Historical experience offers no example where positive inflation was maintained at a steady rate over any significant period of time. Sustained inflation is always associated with a fluctuating rate of inflation. The reason is that, in an inflationary environment, the incentive for the political system to inflate changes continually. First, the revenue raised with a given rate of inflation tends to fall because the public finds ways to reduce the base of the inflation tax. For example, the revenue generated in the 1970s by inflation and the lack of indexing in the corporate income tax fell as firms shifted from long-term to short-term investments, which could be depreciated over a short time period. Second, the income transfers to politically influential constituencies produced by the combination of inflation and price controls tend to fall as the public finds ways to circumvent the price controls. For example, in the 1970s, money funds allowed individuals to bypass Reg Q by holding money market instruments

indirectly. With a given rate of inflation, therefore, the revenue raised and the income transfers effected by inflation fall over time. Political pressures to off-set this fall through an increase in the inflation rate create instability in inflation.

Finally, because the size of the federal government deficit varies with changes in the rate of growth of output, a concern over government deficits produces pressure for expansionary monetary policy. In the absence of a clear mandate to stabilize the price level, large government deficits will continue to create political pressures for the inflationary monetary policy that has characterized the last three decades.

IX.
CONCLUSION

The only way to assure a stable monetary environment is to replace the exercise of ongoing discretion over the desired price level with a rule that makes price level determination part of the constitutional framework of government. In a recent editorial, *The Financial Times* of London (1/23/90, p. 16) stated,

> The notion that money must fall within the domain of day-to-day politics is a 20th-century heresy. . . . Painful experience with the modern manipulation of monetary policy suggests that money is more appropriately an element of the constitutional framework of democracy than an object of the political struggle. Monetary stability is a necessary condition for a working market economy, which is itself a basis for a stable democracy.

The purpose of a rule is to reduce the incentive for special-interest constituencies to form with the goal of either redistributing income through the political system in a way that does not reflect a social consensus explicitly ratified through the legislative process or of redistributing income in an arbitrary way away from minority groups. This rationale for a rule means that a rule must be exactly what its name implies—a guiding principle with no exceptions. The central bank cannot condition the political system to respect its independence if politicians know that the central bank makes exceptions to its rules.

This argument has wider application than just to a rule for price level stability. For example, unlike most other central banks, the Federal Reserve System has never interfered in the foreign exchange market by allocating foreign exchange at favorable rates to politically influential importers. This rule has worked well. Similarly, the Federal Reserve System

has avoided allocating credit among competing private uses. The primary manifestation of the rule not to allocate credit is an unwillingness to allow insolvent financial institutions to use the discount window. Use of the discount window by insolvent financial institutions would move credit allocation away from its free market allocation. Again, this rule has worked well. It is evident that if either rule were made subject to exceptions, the Federal Reserve System would come under regular political pressure to make exceptions. Hopefully, passage of the Neal Resolution will make price level stability a rule that is followed with no exceptions.

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Appendix on Revenue from Inflation

This appendix reviews quantitative estimates of five separate increases in federal revenue in 1974 due to the inflation that year of 11 percent.

Added Seigniorage: The outstanding stock of base money (currency in circulation, foreign and other deposits at the Fed, and member bank reserves) in 1974 was $111 billion. With inflation at 11 percent in 1974, the public had to add an additional 11 percent to holdings of base money in order to maintain its real value. (This addition to base money is equivalent to a tax collected by the government in that it allows the government to finance additional expenditures.) Seigniorage in 1974, therefore, can be put at about $12.2 billion ($111 x .11).

Lower Real Interest on Outstanding Treasury Debt: As of June 1974, the Treasury paid an average rate of interest of 6.56 percent on its outstanding debt. At this time, the average maturity of this debt was 3 years. The market rate of interest on a 3-year Treasury note was 8.33 percent. The difference in the market rate and the average rate paid (1.77) is an estimate of the extent to which past issues of federal debt failed to incorporate adequately a premium for future inflation. With $254.5 billion of debt held by private investors, the gain to the government from unanticipated inflation in 1974 was $4.5 billion (.0177 x $254.56).

Income Tax Bracket Creep: Before the indexing that took effect in 1985, inflation increased the real revenue raised by the personal income tax. Inflation eroded the real value of the standard deduction, the personal exemption, and the low-income allowance. Because the rate structure of the personal income tax was progressive before 1985 with respect to *nominal* income, inflation increased *real* revenue by increasing individuals' *nominal* income. Fellner, Clarkson and Moore (1975) use a stratified sample of tax returns from the Internal Revenue Service in order to calculate the increase in revenue in 1974 due to inflation. They apply the actual tax code in 1974 to these returns and also a hypothetical tax code whose nominal provisions are adjusted upward by the rate of inflation in 1974. They conclude that inflation in 1974 increased revenue from the personal income tax by $6.7 billion.

This figure is fairly close to a rough estimate from aggregate figures. Between 1973 and 1974, nominal personal income increased 9.7 percent. Inflation

(measured by both the CPI and the consumption expenditures deflator), however, rose by 11 percent, so real income declined by about 1 percent. An indexed tax code that caused changes in real revenue to reflect only changes in real personal income, then, would have produced an increase in nominal personal tax receipts of about 8.7 percent (9.7 percent − 1 percent). In fact, personal tax receipts rose by 14.3 percent. These figures suggest an elasticity of real revenue from the personal income tax with respect to inflation of .64 [(14.3 − 8.7)/8.7]. In 1973, personal tax receipts were $107.3 billion. The real tax increase due to inflation, then, was about $6 billion ($107.36 x .087 x .64), which is close to the Fellner *et al.* figure.

Nominal Capital Gains Taxation: Inflation increases the real revenue raised by the capital gains tax because increases in the dollar value of assets due to inflation are taxed as real rather than nominal gains. Feldstein and Slemrod (1978) estimate that inflation caused the tax on capital gains to generate an additional revenue of $.5 billion in 1973. (This figure is a lower estimate of the revenue gain for 1974, when the inflation rate was higher than in 1973.)

Corporate Income Tax: Inflation raises the real revenue from the corporate income tax. Fellner, Clarkson and Moore (1975) also calculate the increase in corporate taxes in 1974 due to inflation. In these calculations, they adjust corporate depreciation allowances for inflation, so that depreciation is at replacement cost, rather than historical cost. They also reduce profits due to the nominal gain in the dollar value of inventories caused by inflation. They estimate that inflation increased corporate taxes in 1974 by $10 billion. [This figure may be an underestimate. Feldstein and Summers (1979) estimate that inflation in 1977 of only 6.8 percent increased the taxes of nonfinancial corporations by $32 billion. That is, in 1977, inflation raised the effective corporate tax rate from 41 percent to 66 percent.]

Totals: The shares of the inflation tax contributed by the separate parts of the tax code in 1974 were seigniorage 36.0 percent, depreciation of existing government debt 13.3 percent, personal income tax excluding capital gains 19.8 percent, capital gains 1.5 percent, and corporate tax 29.5 percent. These relative shares, however, underestimate the importance of the personal income tax component of the

inflation tax. A constant inflation rate would generate the same amount of revenue each year from the other components (abstracting from reductions that occur as the public learns how to evade the inflation tax). In contrast, revenue increases from the personal income tax were cumulative because each year taxpayers were forced into higher tax brackets. The cumulative increase in revenue was only limited because taxpayers could not be forced into a marginal tax bracket higher than 70 percent.

The figures listed above for the separate components of the inflation tax add to $33.9 billion. That is, if the tax code had been indexed for inflation in 1974, federal revenue would have been lower by $33.9 billion. In 1974, federal government revenue, exclusive of social security taxes, was $198 billion. In 1974, therefore, 17 percent of revenue was derived from inflation. Of course, Congress reduced tax rates on an ad hoc basis to keep the overall tax burden relative to GNP fairly constant. These reductions,

however, occurred only sporadically. The steady increase in real revenue produced by inflation combined with occasional reductions in tax rates raised the average tax rate over time.

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Maintaining Price Stability: A Proposal

Robert L. Hetzel

The Neal Resolution would make price stability the dominant goal of monetary policy. This paper proposes giving the Fed and Fed-watchers a measure of whether ongoing policy is consistent with this goal. This measure would require the Treasury to issue two kinds of bonds at each maturity:

A Standard Bond: As presently issued, interest and principal are paid in current dollars. The yield equals a real (inflation-adjusted) yield plus the inflation expected by the market.

An Indexed Bond: On this new bond, interest and principal payments would be adjusted by changes in a price index; thus payments would be of constant purchasing power. Because of this indexing, the yield would be a straight real yield, incorporating no inflation premium.

The difference in yields on the two kinds of bonds would offer a measure of expected inflation over the life of the bonds.[1]

Investors holding fixed-income securities have an incentive to forecast inflation accurately; their

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[1] This proposal is similar in spirit to one made by Alan Greenspan (1981), who advocated issuance of a five-year Treasury note with interest and principal payable in gold. Milton Friedman (1974) has long advocated indexing of all government bonds on ethical grounds. He objected to the experience of the 1960s and 1970s in which the government issued bonds that promised to pay dollars in the future and then inflated away the real value of the promised dollars. Assar Lindbeck (1989, p. 498, fn. 4) has proposed the issuance of indexed bonds in order to permit observation of changes in money growth on ex ante, as opposed to realized, real rates of interest. Humphrey (1974) discusses earlier proposals for indexed bonds, for example, proposals made by Keynes in 1924, Bach and Musgrave in 1941, and Friedman in 1951.

consensus forecast, however, is not signalled clearly by market rates because these rates embody a changing estimate of the expected real yield. Comparing the yields on standard and indexed bonds would costlessly and continuously indicate the inflation expected by investors.

The market's reaction to monetary policy actions would be reflected in the yield spread between standard and indexed bonds. The advantage of such a measure can be seen in the publicity accorded the exchange rate in relatively small, open economy countries. Headlines in a recent edition of the *Financial Times* of London (1/31/90, p. 3) read: "Canada Puts Brakes on Interest Rates Fall: dollar plunge brings caution to easing up on inflation fight." The article states:

> An unexpected plunge in the Canadian dollar has strengthened the view that an abrupt fall in domestic interest rates earlier this month will not be sustained. . . . The tumble in the Canadian dollar caused by the relatively small fall in interest rates reinforces a widely-held view that the Bank of Canada's watchword is likely to be caution. The central bank responded to the sudden weakness in the currency by pushing short-term rates up. By Tuesday this week, the yield on three-month Treasury bills had climbed back at 12.3 percent, compared with 11.9 percent when the bank sent its initial signal that it was ready to relax its interest-rate policy.

As this article shows, the Canadian central bank is constrained by the behavior of the exchange rate. Investors holding fixed-income assets denominated both in U. S. dollars and in Canadian dollars make portfolio decisions based in part on the expected difference in inflation between the U. S. and Canada. If these investors believe that a reduction in the Bank of Canada's discount rate will raise Canadian inflation (relative to U. S. inflation), given the prevailing interest rate differential, they will attempt to move out of Canadian assets and into U. S. assets—the Canadian dollar will fall immediately against the dollar. Moreover, because imports comprise about a third of the basket of commodities in the Canadian consumer price index, the fall in the exchange rate will appear quickly in inflation figures. This swift association between the actions of the Bank of Canada and price indices thus acts as a check on inflationary policy actions.

Because imports are still only a relatively small fraction of U. S. consumption, the U. S. public is not sensitive to the foreign exchange value of the dollar. Also, changes in the foreign exchange value of the dollar do not solely measure changes in expected domestic inflation. Particularly over the

1980s, the preponderance of changes in the foreign exchange value of the dollar have reflected changes in the real terms of trade caused by capital flows. For these reasons, the exchange rate does not exercise the kind of constraint in the U. S. that it exercises in smaller, more open economies. The role the exchange rate plays in these countries, however, does indicate the advantages of creating a measure of expected inflation.

First of all, a ready measure of the real (inflation-adjusted) rate offered by the indexed bond would lessen pressure for inflationary monetary policy by eliminating public confusion over market rates and real rates. Public perception that increases in market rates necessarily indicate increases in real rates creates pressures for stimulative monetary policy. If, for example, new statistics indicated higher expected inflation than previously forecast, a higher funds rate would be necessary to keep real interest rates unchanged. Such an increase in the funds rate, however, has often been seen by the public as causing an increase in real rates and, thus, as a "tightening" of policy. With the yield on indexed bonds measuring the real rate, the Fed can easily dispel the perception that all increases in the funds rate are increases in real rates. Furthermore, the public will easily be able to see how little leverage the Fed can exert over real rates through allowing monetary acceleration.[2]

A measure of expected inflation would also provide a direct check to monetary policy actions (or inactions) judged inflationary by the market—such actions would produce an immediate rise in the yield on standard bonds and in the differential yield between standard and indexed bonds. The rise in the yield on standard bonds would impose a capital loss on the holders of these bonds. Holders of variable-rate mortgages with yields tied to the yield on standard bonds would incur higher interest payments. Indeed, all creditors receiving payment in dollars in the future would feel their financial interests threatened. A readily available measure of expected inflation that rose in response to monetary policy actions judged inflationary by the market would make it easier for creditors to counteract pressure on the Fed to trade off price stability for short-term output gains.

In the U. S., the long lag between monetary policy actions and changes in prices means that it is difficult to associate particular policy actions with inflation.

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[2] Numerous economists have documented the virtual end of the liquidity effect whereby an increased rate of growth of money is associated with a fall in the real rate of interest. See, for example, Mehra (1985).

As a result, inflation does not provide an adequate check to pressures by government officials to keep rates "low." If an exhortation by a government official to lower the funds rate produced an immediate rise in the yield differential between standard and indexed bonds, however, this rise would embarrass the official. Officials would also realize that such pressures are counterproductive. The Fed, concerned about an adverse reaction in the expected inflation measure, would be very reluctant to lower the funds rate after an exhortation for easy money.

Finally, the coexistence of standard and indexed bonds would encourage the Fed to find ways of committing itself to a noninflationary policy in order to eliminate a yield differential arising from a risk premium. Even with a return to price stability, a positive yield differential would appear in the two kinds of long-term bonds if the public feared a future lapse in the commitment to price stability. The Fed would have an incentive to find ways to commit itself to a monetary policy of price stability.

There is a lack of agreement over specific ways to constrain decision-making by the Federal Reserve in order to achieve price stability. The proposal made here leaves the operational details of achieving price stability to the Fed. It provides, however, for a continuously available assessment of the consequences

for inflation of Fed actions. The assessment would be provided by individuals who have a financial interest in monitoring Fed success in achieving price level stability. The resulting constraint placed on inflationary monetary policy would rest on the most effective check available in a democracy—public awareness.

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Macroeconomic Data: A User's Guide

Roy H. Webb, Editor

The Federal Reserve Bank of Richmond is pleased to announce the publication of *Macroeconomic Data: A User's Guide*. This 48-page book will help a user of macroeconomic data to understand the most important data series well enough to effectively interpret them. Chapters include:

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