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# New England Economic Review

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Richard E. Randall

*Safeguarding the Banking System in an  
Environment of Financial Cycles: An Overview*

Christopher J. Mayer  
and Katerina V. Simons

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## **Safeguarding the Banking System in an Environment of Financial Cycles: An Overview**

*Richard E. Randall*

Various proposals to enhance the safety and soundness of the banking system have been debated in recent years. But the debate has generally focused on limiting losses to the deposit insurance funds in order to protect taxpayers, rather than on the broader implications for the banking system and its role in financial markets and the economy. Furthermore, proposals have generally not been considered in the context of financial cycles, where changing economic circumstances may reveal risk exposures and the potential for widespread losses in important segments of the banking industry.

In the fall of 1993, the Federal Reserve Bank of Boston sponsored a symposium to consider various proposals to safeguard the banking system in the context of financial cycles. These proposals included one for timely supervisory intervention against excessive risk concentrations in banks, one for obtaining market discipline from acquirers of subordinated debt, another calling for coinsurance of deposits, and another for functional reorganization of banks to expose all but transaction accounts to market discipline. This article offers an overview of the papers that were presented and the discussion among the participants. 3

## **A New Look at Reverse Mortgages: Potential Market and Institutional Constraints**

*Christopher J. Mayer and  
Katerina V. Simons*

Most elderly hold a significant portion of their non-pension wealth in housing equity. Although they might prefer to use this housing equity to finance current consumption, to pay for an emergency, or to help out a relative in need, utilizing this wealth would force the sale of their home. Traditional home equity lines of credit require that principal and interest be paid back over a fixed time interval, yet many elderly want to avoid mortgage payments because they live on a limited income. Reverse mortgages hold the promise of helping elderly homeowners out of this bind by allowing them to borrow against their housing equity and receive monthly payments, while still living in their home until they die or choose to move.

Although reverse mortgages have been offered for more than a decade, the market has never gained significant size. This article demonstrates a large potential market for reverse mortgages and discusses demand and supply explanations as to why the current number of reverse mortgages is so small. 15

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## **International Capital Transactions: Should They Be Restricted?**

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## **A Decade of Boom and Bust in the Prices of Single-Family Homes: Boston and Los Angeles, 1983 to 1993**

*Karl E. Case and Robert J. Shiller*

Many countries have shifted toward freer markets in recent years. This shift is far from complete or free from backsliding, however. Moreover, a number of prominent economists contend that government restrictions should be maintained, or at least kept in reserve, for certain categories of transactions, such as international capital movements. In particular, it is sometimes argued that capital controls should be used to buttress the Exchange Rate Mechanism of the European Monetary System, which has been undermined by speculative attacks.

Following a capsule summary of the recent use of international capital restrictions, this article discusses their international acceptance, their theoretical justification, and their efficacy in attaining overall balance-of-payments or exchange rate goals. The author concludes that governments have had no more than fleeting and minor success in their use of capital controls in recent years. 27

The 1980s and 1990s have been turbulent times in the U.S. market for single-family homes. For most of the previous two decades, housing prices across states and metropolitan areas moved together and increased slowly in real terms while regional differences generally remained small. The 1980s and 1990s, in contrast, have seen increased price volatility and sharp differences in price behavior across regions with substantial housing price booms in some regions and major price declines in others.

These boom-bust cycles had serious consequences for regional economies and national mortgage markets, with the most dramatic cycles occurring in New England and in California. This article compares the boom-bust cycles in single-family home prices in the Boston metropolitan area and in Los Angeles County from 1983 to 1993. The authors analyze the reasons for the similarities and differences between the two areas, both on the way up and on the way down, focusing on speculative behavior on the part of buyers and sellers and the differing behavior of price tiers over the course of the cycle. 40

# *Safeguarding the Banking System in an Environment of Financial Cycles: An Overview*

**T**he theme of this Federal Reserve Bank of Boston symposium is captured in its title and in the following statement, distributed in advance to all participants:

Various proposals to enhance the safety and soundness of the banking system have been debated in recent years, and some of these proposals have been enacted into law. But the debate, and the legislative changes, have generally focused on limiting losses to the deposit insurance funds in order to protect taxpayers, rather than on the broader implications for the banking system and its role in financial markets and the economy. Furthermore, most proposals have not been considered in the context of financial cycles, where changing economic circumstances may reveal risk exposures and the potential for widespread losses in important segments of the banking industry. Examples include the money center banks' exposure to loans to less developed countries around 1980 and the commercial real estate boom and bust cycles in New England and parts of the Mid-Atlantic region in the late 1980s.

The focus of the symposium will be to examine the likely effectiveness of the various proposals for change in the context of financial cycles and the role of banking in the economy.

In the first paper, Richard Randall of the Boston Fed described the recent financial cycles that severely damaged the United States banking system. The pattern of these cycles made clear, he argued, that actions to limit the damage to the banking system and the economy must come when risk concentrations are being built and well before a boom turns sour. Tough responses after problems become evident tend to be procyclical and can increase the ultimate damage. Randall argued that timely supervisory intervention against excessive risk concentrations could avoid or substantially moderate the distress caused by financial cycles.

The other three papers advocated enhancing market discipline as the way to protect the banking system. George Benston called for more capital in banks, with a significant proportion in the form of subordinated debt. Arthur Rolnick advocated coinsurance, where losses are

*Richard E. Randall*

*Vice President, Federal Reserve Bank of Boston. This article summarizes the proceedings of a November 18, 1993 symposium sponsored by the Reserve Bank.*

shared between depositors and the insurance fund. James Pierce presented a proposal for functional banking akin to narrow bank and core bank proposals that had previously been made by others.

Both in the formal discussion of the four papers by Robert Litan and Alton Gilbert and in the general discussion that followed, sharp differences of opinion were apparent. Some attributed the banking problems primarily to euphoric overlending and lemming-like overconcentration in the same types of assets. Others stressed the moral hazard caused by the perverse incentives of deposit insurance, inadequate market discipline, and supervisors' forbearance with respect to failing institutions.

Many were skeptical that supervisors could be depended on to take unpopular actions against unwise risk-taking in a euphoric boom, but several felt that a combination of supervisory and market discipline responses to risk-taking was worth trying. Among the alternative market discipline proposals, none emerged as a clear winner. This overview summarizes the four papers and discussion, highlighting key themes and areas of controversy.

### *Safeguarding the Banking System from Financial Cycles*

The lead-off paper by Richard Randall of the Boston Fed describes financial cycles not as recurring phenomena but as cycles through various phases—as in boom and bust cycles. Typically, a number of banks developed abnormal risk concentrations during periods of rapid growth in a particular area of activity. As growth continued, the expansion became euphoric and credit standards deteriorated, although actual loan problems remained within normal bounds. Eventually the economic underpinnings of the activity weakened, as a result of external factors or overdevelopment. The market psychology turned negative, values collapsed, and losses developed that wiped out capital in numerous banks and seriously weakened others.

Randall catalogs the more destructive of the recent financial cycles, noting the timing and nature of successive phases, the economic forces responsible, and the resulting damage. He estimates that about three-quarters of U.S. bank failures in the past 20 years, as measured by assets rather than numbers of banks, relate to financial cycles, and only about one-quarter to isolated situations. This estimate does not include the money center banks, which were

severely damaged in the early 1980s by a financial cycle involving loans to less developed countries. Randall notes that those banks, with assets well in excess of the assets of all failed banks, eventually sustained losses on developing country credits nearly equal to their capital at the time when such loans peaked.

Randall argues that financial cycles have critical implications for policy options in safeguarding the banking system. Once risks have been built in and economic factors begin to weaken, little can be done to avoid future losses. But problems are not apparent

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before this point. Thus, to be effective, action to head off severe losses must be taken in response to excessive risk concentrations, and well before indicators such as nonperforming assets exceed normal levels. Capital ratios of banks weaken relatively late in the cycle, long after risk exposures have been built in and losses are inevitable.

Based on his earlier research, Randall contends that market forces have not reacted to excessive risk-taking, only to actual evidence of problem loans. He finds no basis for relying on market discipline to head off future financial cycles. He further argues that proposals to increase market discipline generally also increase the vulnerability of the banking system to systemic crisis. In a context of financial cycles that simultaneously expose numerous banks, often including the largest, to failure and near-failure conditions, it would be unwise to experiment with changes that would increase the vulnerability of the system, he contends.

Randall proposes, instead, a program of direct supervisory action against excessive risk-taking by individual banks. Such actions were once understood to be part of the supervisor's job, he notes, and that role has taken on new significance with the preva-

lence of major financial cycles. He suggests that heading off financial cycles is the most critical task of bank supervisors. Such a program need not add to the regulatory burden, and can be controlled to avoid credit allocation on any basis other than risk.

Randall's proposal is intended to act countercyclically with respect to financial cycles (but not the business cycle, *per se*). He contends that the forces of market discipline tend to come too late and have a procyclical effect, aggravating the depressed phase of the cycle. The same is true of "prompt corrective action" tied to deterioration in capital ratios, higher capital requirements and deposit insurance premiums for banks with weakened supervisory ratings, and market value accounting.

The current focus on protecting the taxpayers from bank failures is misdirected, Randall argues. The banking industry supports the deposit insurance fund, and only if the banking industry were overwhelmed with losses would the taxpayer be called upon. The preservation of the country's banking system is essential to the economy, the payments system, and the social fabric. The government must be prepared to do what is necessary to avoid chaotic failure of large segments of the banking system. This does not mean protecting individual banks from failure, but it does have implications for the way bank failures are handled and for avoiding unnecessary failures of marginal banks. According to Randall, "narrow" or "functional" bank reform proposals are designed to protect the deposit insurance funds and not the banking industry, and therefore do not address the real problem.

To summarize, Randall stresses the significance of financial cycles in recent banking problems and for bank reform. He advocates supervisory action against excessive risk concentrations as the only reform with a reasonable prospect for timely countercyclical action, while rejecting market discipline proposals as procyclical and potentially destabilizing.

### *Market Discipline: The Role of Uninsured Depositors and Other Market Participants*

George Benston of Emory University focuses on how to counteract the moral hazard engendered by the safety net of government-provided deposit insurance, and the relatively low equity capital ratios tolerated in the banking industry. He favors restricting deposit insurance as a means of generating market discipline and argues that objections to this ap-

proach are invalid. In particular, he takes issue with the following arguments:

1. Uninsured depositors are unlikely to be able to monitor banks or to do so in a timely fashion.
2. Even if they could do so, the additional interest that depositors would require on uninsured deposits would be insufficient to alter bank behavior.
3. Once weaknesses are noted, uninsured depositors are likely to withdraw their funds (run) rather than continue to monitor a bank.

In dismissing the first objection, Benston points out that much information on banks' performance is available. Banks must disclose considerable information, including nonperforming loans and loan loss provisions, and several private firms sell analyses and ratings of the condition of banks. The federal agencies examine banks in detail and summaries of their reports could be made available to the public. (They are not disclosed at present.) Benston also argues that most corporate financial statements are more difficult to analyze than those of banks, yet these corporations regularly issue debt that is not guaranteed by the government. Thus, depositors could assess the risk taken by their banks, at least to the extent that creditors of corporations generally can do so. Benston notes that while the large bank losses on loans to real estate developers and oil producers were not predicted by the market for bank stocks, apparently they were also not predicted by bank managers or by the regulatory authorities.

With regard to the second objection, Benston observes that most studies show at least some risk penalty in the rates required to issue large certificates of deposit and subordinated debt. This has been so even though most of the banks studied were large enough to be considered "too-big-to-fail," and most depositors have had good reason to assume that they would probably be paid in full, if the bank failed. Thus, Benston concludes that truly uninsured deposits would require risk premia sufficiently large to influence the risk choices of banks.

Regarding the likelihood of depositor runs, Benston does not appear to be concerned about runs on seriously damaged individual banks, but he carefully analyzes the potential for systemic bank runs. He argues that if depositors believe that their funds are at risk, market pressures will force banks to increase their capital and diversify their risks to provide assurance to their customers, just as nonbanks do. And under the provisions of the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA)

for prompt corrective action, discount window constraint, and on-site supervision, banks will be closed promptly when capital falls below the minimum level, thus reducing the supervisory caseload. Moreover, solvency evaluations will always be current for all banks with more than \$10 billion in assets.

Faced with a market test, banks would structure themselves to avoid runs, differentiating themselves from problem banks, raising additional capital or merging with stronger banks, even liquidating themselves to avoid progressive weakening. Benston also cites studies showing that there is little evidence that

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*With adequate bank capital and the market discipline imposed by the holders of banks' subordinated debt, deposits could be fully insured, Benston writes, and most banks relieved of close supervision and of almost all restrictions on assets and activities.*

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bank runs have been contagious, causing the failure of solvent banks. Nevertheless, he concludes that the scenario of likely runs on a number of large banks, as presented by Randall in an earlier article, is overstated but plausible. However, Benston sees this risk as stemming from banks' low capital ratios and the fact that some banks are considered too large to have their costs inflicted on uninsured depositors, both conditions that Benston has consistently proposed eliminating.

Benston reviews various methods of limiting deposit insurance coverage, noting that if deposit runs are of concern, coinsurance might be less desirable since depositors will wish to avoid losses on even a portion of their funds. He also cites various reasons why it may not be fully effective to limit insurance to demand or very short-term deposits, or to give preference to depositors over other creditors.

In sum, Benston finds that uninsured depositors can provide timely market discipline and that the danger of systemic runs on solvent banks, if it exists,

can be removed by actions taken by these banks. Nevertheless, he concludes that the incentives affecting bank regulatory authorities will cause them to continue to act in most cases to prevent losses to depositors of large banks. Consequently, he suggests turning to another source of market discipline—subordinated debt.

Benston calls for considering subordinated debt on a par with equity capital, as it serves to absorb losses that would be imposed on the Federal Deposit Insurance Corporation (FDIC). Such debt should have a remaining maturity of at least two years. Because the holders of such debt cannot run and do not benefit if the bank does well, they have every incentive to require a higher rate of interest if the bank takes more risks. Equity holders are less desirable sources of market discipline because they have upside as well as downside potential and, particularly in banks with low or declining capital, may have incentives to encourage greater risk-taking. Furthermore, subordinated debt can probably be sold at a cost lower than the issuance of additional equity.

Benston's earlier proposal (jointly with George Kaufman) for structured early intervention and resolution has been largely, but insufficiently in Benston's opinion, adopted in the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA). The Benston/Kaufman concept calls for capital to be measured after adjusting assets and liabilities to market values. Banks would attract supervisory concern when capital falls below 10 percent of assets, and the level of concern and stringency of supervisory constraint would increase as capital ratios fall. In the final category, capital below 3 percent of assets, quick recapitalization, merger, or liquidation would be the alternatives.

With adequate capital and the market discipline imposed by the holders of subordinated debt, deposits could be fully insured in order to avoid the inequity imposed on smaller banks by the "too-big-to-fail" practice. Furthermore, banks with adequate capital could be relieved of close supervision and of almost all restrictions on assets and on banking activities.

Thus, while Benston believes that depositor discipline, in conjunction with higher capital and early intervention in failing banks, could protect the banking system, he fears that the actions of regulatory authorities in handling large troubled banks will nullify depositor discipline. He therefore opts for subordinated debt holders to be the providers of market discipline, permitting full insurance for all depositors.

## *Market Discipline as a Regulator of Bank Risk*

Arthur Rolnick of the Minneapolis Fed traces the history of banking panics from the free banking era that began in 1837 up to the establishment of the FDIC in 1934. Deposit insurance brought stability to banking and an end to banking panics, but it created another problem—moral hazard.

This new problem did not clearly manifest itself until it was recognized that deposit insurance was in reality unlimited, particularly at the larger banks. The authorities' handling of the Continental Illinois failure in 1984, when all depositors were protected, made this clear, if it had not been earlier. Between 1985 and 1990, fully 99 percent of uninsured deposits at all failed banks were protected by the FDIC.

With full insurance, depositors have no reason to worry about the risks their banks take, and banks need not pay a risk premium on deposits. Assuming that riskier assets generally yield higher returns and that bank stockholders are so well diversified that they are risk neutral or can readily hedge their risk, it follows that banks best serve their shareholders by taking on the riskiest portfolio possible. This is the essence of moral hazard, the incentive to increase risk beyond what would otherwise be considered prudent limits.

Rolnick contends that the experiences of both the savings and loan and the banking industries in the 1980s provide evidence of moral hazard induced by deposit insurance, and of the failure of the regulators of both industries to contain that moral hazard. While regulation might be improved, regulators cannot control risk, because without a profit test they have no basis for determining the optimal amount of risk. Furthermore, when banks gamble in their risk-taking, regulators cannot monitor banks closely enough to close them in time to avoid losses to the insurance fund.

Rolnick goes back into history again to support his argument that, in the absence of full deposit protection, the market can discipline bank behavior. Depositor exposure reintroduces the possibility of bank runs, so a trade-off exists between moral hazard and bank panics. But Rolnick sees the Federal Reserve System as better able to contain panics than it was in the 1930s, so the trade-off today is less severe.

Nevertheless, Rolnick is concerned that regulatory authorities will consider it advisable to protect uninsured depositors when a large bank is failing, even though the appropriate long-term strategy calls

for introducing more depositor discipline by not protecting them. He therefore advocates coinsurance, because the commitment to impose losses on depositors can be made more credible where individual depositors lose only a fraction of their exposure.<sup>1</sup> The probability of widespread bank runs following the failure of a large bank would be reduced because far more of the funds of large depositors would be covered. Consequently, the authorities would have little rationale for protecting uninsured depositors.

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In sum, Rolnick seeks a means of limiting the moral hazard engendered by deposit insurance, while minimizing the risk of either banking panics or supervisory reluctance to force losses on depositors of large banks. He concludes that coinsurance is the best alternative.

## *The Functional Approach to Deposit Insurance and Regulation*

James Pierce of the University of California at Berkeley proposes a radical restructuring of the financial system in terms of deposit insurance, supervision, powers, and the federal safety net. The concept is similar to "narrow bank" and "core bank" proposals.

After a transition period, what are now called banks would be divided into two parts, monetary service companies and financial service companies. Monetary service companies could accept only transaction accounts, which would be guaranteed by the government and on which they could pay interest. Monetary service companies would be limited to holding high-quality, short-term assets and would be closely supervised. The financial service companies,

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<sup>1</sup> An example of coinsurance would be for depositors to be insured for 80 percent of their deposits. Because coinsurance can be phased in gradually, Rolnick notes that it would not be necessary to determine the optimal level in advance.

on the other hand, could accept any type of deposit, but without deposit insurance, and would be unrestricted in their lending activities.

These two "companies" could operate as integral parts of a broader financial entity engaged in any combination of financial services. No "fire-wall" requirements would be imposed, so that synergies need not be impaired.<sup>2</sup> But a monetary service company could not be the creditor of any other parts of the organization or be responsible for their debts, and it would have to be adequately and independently capitalized.

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*Pierce would create a mechanism so that today's banking functions could be carried on within any type of financial firm, with deposit insurance limited to transaction accounts and market discipline replacing supervision in safeguarding the riskier activities.*

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Thus, the functional approach is designed to isolate a unique and critical bank function that regulators believe must be protected to avoid payments system disruptions in a time of general bank distress. Pierce points out that the efficiency of the payments system would be significantly diminished if sellers of goods and services had to verify the soundness not only of buyers, but also of the buyers' banks, and therefore he proposes 100 percent insurance of transaction accounts. He sees no need to offer deposit insurance on time deposits, and accordingly no need to supervise the quality of credit or the adequacy of capital in the non-monetary portion of the organization.

Pierce envisions the Federal Reserve as the supervisor of the monetary service companies and the FDIC as its subsidiary to administer a federal insurance program for transaction accounts. The other bank and thrift regulators would be eliminated. While monetary service companies would have normal access to the discount window, financial service companies would have only emergency access in the event of a severe loss of liquidity. Insolvent institutions could not be bailed out.

Pierce argues that the functional approach probably would not adversely affect the supply or cost of business loans, but even if it did, he favors subsidizing such lending directly rather than financing it with insured deposits. He asserts that small banks would not be hurt by the loss of deposit insurance on the bulk of their liabilities.

Pierce also rejects arguments that the absence of prudential supervision would increase the danger of financial instability in the financial service companies. Deprived of deposit insurance and the protection of "too-big-to-fail," large creditors might be expected to withdraw funds at maturity if they perceive a problem. Monetarist economists should not be concerned because the central bank can maintain the money stock and bank monetary functions would be completely protected. Other economists might be concerned that a breakdown in the stock market or commercial paper market would result in a "flight to quality." Borrowers with asymmetric-information problems ("opaque" loans) would face higher rates or be rationed out of the market.<sup>3</sup> But Pierce argues that the Federal Reserve can soften these effects by providing liquidity. To the extent that financial service companies are unable to roll over maturing debt, or are forced to sell opaque assets at substantial losses, some may fail. But even during a panic, when creditors demand payment from a number of financial service companies, few will demand currency and a large part of the withdrawn funds will be invested in the securities of solvent financial service companies. Furthermore, the monetary service companies may use funds borrowed from the Federal Reserve to buy market instruments issued by sound financial service corporations.

Market discipline in financial service corporations will result in stronger capital positions, better control of failures, and avoidance of stampedes into risk concentrations such as those experienced in the 1980s. Pierce contends that occasional interventions by supervisors to protect creditors of large institutions, in extraordinary circumstances, would not nullify market discipline once functional banking is

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<sup>2</sup> For instance, the same employees could handle transactions in both companies.

<sup>3</sup> As financial intermediaries, banks make business loans that cannot be readily handled directly by markets. The business loan portfolio of a typical commercial bank consists of numerous loans of various types and in various industries, involving detailed financial information, non-standard terms, and often collateral handling and periodic on-site visits and inspections. Such loans are sometimes referred to as being "opaque," in contrast to more "transparent" credits that trade in the commercial paper market.

achieved. He hopes, however, that with money and payments safe, the authorities would be no more likely to bail out a financial service company than they would an auto company, a defense contractor, or a city.

Thus, Pierce would create a mechanism so that today's banking functions could be carried on within any type of financial firm, with deposit insurance limited to transaction accounts, and market discipline replacing supervision in safeguarding the riskier activities.

### *Comments of Discussants*

The first discussant, Robert Litan of the U.S. Department of Justice, was not convinced by Richard Randall that supervisors can forecast future problems better than bank depositors, shareholders, and creditors.<sup>4</sup> Although he saw no harm in supervisors doing their best to dissuade bank managements from overly risky concentrations, he also saw the possibility that politicians would pressure supervisors to back off. He agreed with Randall that warnings by supervisors are best conveyed on a case-by-case, judgmental basis.

Litan stressed the importance of higher capital ratios as a major benefit of greater market discipline. He rejected coinsurance because it entails the risk of runs, which policymakers would not tolerate in the case of large banks. Litan sees subordinated debt as clearly the superior source of market discipline. He would require all large banks to have outstanding a minimum amount of subordinated debt.

Litan, a long-time supporter of narrow (or functional) banking, regards this approach as the ultimate in market-based solutions because all opaque lending would be subject to a market test. Narrow banking would remove most of the need for supervision and what Litan calls political cycles from the lending process. But the possibility remains of a run in the commercial paper market, which would be largely funding the financial service companies. Litan believes that the danger of systemic runs could be handled by open market operations and the discount window, but the concerns of policymakers are likely to delay serious consideration of the concept.

Litan's ideas for the transition to functional banking differ somewhat from Pierce's, and he would not impose narrow banking on small banks. Rather, Litan

favors starting with a voluntary program tied to the acquisition of broader bank powers.

Litan also commented on a proposal being advanced by Bert Ely, consultant, and others for private deposit insurance through cross-guarantees. A serious problem with the concept is that while the risk will be assumed by various insurance syndicates, the government will be backstopping the system. It is inevitable, then, that government authorities would want to supervise the syndicates, and to do that they must have knowledge of the condition of the larger

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*Litan suggested a combination of mandatory subordinated debt and supervisory warnings of excessive risk concentrations and perhaps, in the future, a transition to narrow banks.*

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bank and nonbank syndicate members. So, what do we gain in the end? Litan related his personal experience in attempting to establish a company to insure pools of bank loans. Potential financial backers viewed banks as blind asset pools, and the attempt was unsuccessful.

In conclusion, Litan suggested a combination of mandatory subordinated debt and supervisory warnings of excessive risk concentrations and perhaps, in the future, a transition to narrow banks.

The other discussant, Alton Gilbert of the St. Louis Fed, expressed disappointment that the three papers proposing market discipline reforms did not discuss how their proposals would safeguard the banking system in an environment of financial cycles. He sees a potential for procyclical lending behavior associated with strict enforcement of higher capital requirements or steps being taken to obtain depositor discipline. He agrees with Randall that some FDICIA provisions are akin to "shooting the wounded."

Gilbert has reservations, however, about the ability of supervisors to measure risk concentrations and overcome political interference. But his more fundamental concern is Randall's view that the basic cause of bank risk problems is the irrational animal spirits of people caught up in boom-time euphoria, rather than moral hazard stemming from deposit

<sup>4</sup> Litan made clear that he was presenting his own views and not those of the Clinton Administration or the Justice Department.

insurance. This view, unique in the literature of banking risk, could have sweeping policy implications because it could be interpreted to mean that the danger is not confined to depository institutions. This could, in turn, suggest that the supervisors' role should be expanded to moderate financial cycles in all forms of financial intermediation. This possible interpretation disturbs Gilbert, given the abundant evidence worldwide that market participants allocate resources better than government agents.

With respect to Benston's proposals, Gilbert is skeptical that a modest increase in capital ratios would help much. He also questions the value of "prompt corrective action," noting that very few failing banks have taken on additional risk once they became seriously damaged.

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*Gilbert's choice among the proposals for bank reform is coinsurance, which would enhance market discipline by making it more palatable for supervisors to close the largest banks.*

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Gilbert devotes most of his remarks to one critical assumption underlying James Pierce's functional bank proposal: that the government can ensure the safe operation of the payments system by insuring only transaction accounts and supervising only the risks related to such accounts and the offsetting assets. Gilbert argues that monetary service companies will have to hold balances at other banks, including foreign banks, and thus will assume some credit risk. Monetary service companies will also need to extend intraday credit to customers, including financial service companies, to facilitate the smooth functioning of the payments system. In these areas ongoing credit analysis and corresponding supervisory overview will still be required. Thus, Pierce's proposal does not deliver what was promised: protection of the payments system and elimination of supervisory review of bank credit risk.

Gilbert's choice among the proposals for bank reform is coinsurance as proposed by Arthur Rolnick. Coinsurance would enhance market discipline by making it more palatable for supervisors to close the

largest banks. Closing a bank with a high percentage of deposits covered by insurance would be less disruptive to the banking system under a system of coinsurance than with the current limits on coverage.

### *General Discussion*

The symposium participants represented a wide range of views regarding bank reform. While many, if not most, of the participants support some form of expanded market discipline as the preferred ingredient for a safer banking system, they have long debated among themselves the merits of various proposals. Several were prominent advocates of the concept that the principal underlying cause of the extraordinary banking and thrift problems of the 1980s was moral hazard, induced by deposit insurance, low levels of bank capital, the idea of "too-big-to-fail," and regulatory forbearance toward failing banks. Their focus was protecting the taxpayer from future losses related to deposit insurance, and it was largely because of their success in pushing their ideas that Congress passed FDICIA.

With its characterization of recent financial cycles, the lead-off paper suggested a very different explanation for recent banking problems and made a case for drawing separate lessons from the banking and thrift crises. As discussant Alton Gilbert pointed out, Randall sees the problem as primarily one of excessive growth and concentration of risk in a euphoric boom, not moral hazard. In the general discussion, several people commented on the apparent herd mentality of bankers, which resulted in similar risk concentrations in many banks. Those who commented on financial cycles generally agreed that we should expect to see more cycles of this type in the future. The strongest supporters of the moral hazard theory advanced their positions forcefully, but generally did not respond directly to the implications of financial cycles.

Randall's proposal for supervisory action to head off dangerous risk concentrations drew only limited, qualified support as a substitute for market discipline, but somewhat broader support as an idea worth trying in conjunction with changes to enhance market discipline. Market discipline supporters dismissed the notion that supervisors could forecast better than markets, and they doubted that supervisors could stand up to political pressure when the time came to slow credit growth in a boom. The discussion featured interplay between those anxious

to enhance depositor-imposed market discipline and those concerned about the potentially destabilizing effects of increasing depositor exposure.

A sharp divergence of opinion also emerged concerning the relevance of the thrift experience in designing safeguards for the banking system. Some supported Randall's contention that the regulatory environment of the savings and loans was unique, and that the focus of inquiry should be on what went wrong with the FDIC-insured banks. Others put much of the blame on regulatory forbearance, which FDICIA was designed to combat, without distinguishing between bank and thrift experiences.

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*Several participants criticized the early intervention and prompt corrective action provisions of FDICIA, viewing them as procyclical; others defended the law and indicated that it is having its intended effect of forcing more losses on uninsured depositors.*

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Several participants criticized the early intervention and prompt corrective action provisions of FDICIA. They viewed them as procyclical, in that supervisory actions are tied to declines in capital ratios, a lagging indicator. These provisions were blamed for aggravating the "credit crunch" that accompanied the New England banking failures, and for making it more difficult for damaged banks to recover. Some complained that FDICIA represented overregulation and was unnecessarily inflexible.

George Kaufman of Loyola University and others defended the law and indicated that it is having its intended effect of forcing more losses on uninsured depositors. Capital ratios are improving rapidly, in part because of enhanced market discipline, and regulatory forbearance is less evident.

James Pierce's proposal for functional banking inspired considerable discussion. On the one hand, it was suggested that the proposal did not go far enough because it called for full insurance of transaction accounts. On the other, concern was expressed

about the effects of widespread failures of uninsured financial service companies and of possible runs on the commercial paper market, where these companies would obtain much of their funding.

Discussion also followed Alton Gilbert's comment about the risk to monetary service companies in maintaining clearing balances with foreign banks and allowing daylight overdrafts. A question remains as to whether monetary service companies can be protected from the risks in settling the myriad of transactions flowing through a major bank without seriously damaging the efficiency of the payments mechanism.

Disagreement also emerged on the likelihood and desirability of bank runs, and how much the discount window can moderate systemic liquidity problems in banks. One view holds that few bank runs have taken place in recent years, and that systemic runs on a broad scale are unlikely because depositors will not demand currency, much less gold. Also, bank runs are a desirable form of market discipline.

Participants arguing on the other side of the issue cited significant runs in New England in the recent banking crisis including some with systemic potential, at least on a regional basis. All appeared to agree that withdrawn deposits are likely to remain within the banking system. But deposit flights from regions and classes of banks could still occur in the loss recognition phase of financial cycles. With numerous banks in some degree of trouble, and uncertainty as to solvency, deposit churning could materially curtail credit availability, deepening economic problems and increasing the likelihood of unnecessary bank failures.

A similar divergence of views emerged on the level of reliance to be placed on the discount window. Some who considered bank runs a remote possibility assume that the Federal Reserve lending operations could handle any liquidity problems that might arise, and one participant suggested that this might be done through monetary policy alone, eliminating the need for the discount window.

The contrary view holds that discount window administrators would have difficulty distinguishing failing banks from other damaged banks in a major financial crisis. The task of providing liquidity to stabilize the system has been made more complicated by the discount window restrictions imposed by FDICIA.

Robert Litan had raised the issue of the private deposit insurance proposal advanced by Bert Ely. He

thinks the idea deserves public discussion because it substitutes the market judgments of insurance syndicates for that of the FDIC. Richard Aspinwall of Chase Manhattan Bank argued against the proposal on the ground that the system of insurance syndicates, made up essentially of banks, can be no stronger than the capital supporting the banking system. Incentive conflicts could also inhibit large banks, in their role as syndicate members, from criticizing each others' practices. Edward Kane of Boston College supported the concept, if used in conjunction with subordinated debt, because of concerns for the actions of federal regulators in "political cycles." His vision of the syndicates could include nonbanks and could take the form of bonding, reinsurance, or subordinated debt.

Several participants discussed the implications of structural changes in the financial services sector, including greater competition in traditional banking services from nonbanks and increasing concern for government guarantees relating to nonbanks. Edward Ettin of the Federal Reserve Board staff expressed concern that some of the factors that gave rise to the safety net for banks now apply to other providers of financial services, including a propensity for systemic risk. This suggests consideration of limited federal supervision and discount window access for some nonbanks. Concern was also expressed about disruption of financial intermediation by nonbanks in a crisis. Jane D'Arista of Boston University advocates a limited government guarantee for each individual against the failure of any type of financial institution, including banks. This would be in addition to a guarantee of all transaction balances in banks.

### *Commentary*

The United States has experienced extraordinary problems with depository institutions in the past 15 or so years. The debate has been vigorous over what changes should be made to prevent recurrences. Discussion of the causes of the various banking crises has been dominated by the view that most problems stemmed from moral hazard and inadequate market discipline, both consequences of the perverse incentives of deposit insurance, and from the supervisory practice of safeguarding uninsured depositors in large banks. As a consequence, much of the debate about reforms has revolved around alternative means of limiting depositor protections and otherwise enhancing market discipline.

One objective of the symposium was to force a careful examination of the nature and patterns of the several banking crises. The lead-off paper attempted to do this and concluded that most of the damage was done as a consequence of a few financial cycles. A characteristic of such cycles is that preventing losses requires curtailing risk-taking before economic forces

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*Widespread euphoria in boom periods was seen by some as an explanation for the series of recent banking problems, rather than the more familiar moral hazard view.*

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cause a turn in the cycle. In discussing this paper, several participants acknowledged that most recent cycles involved euphoric excesses by bankers and borrowers, although no consensus emerged as to the underlying reasons. It was suggested that widespread euphoria in boom periods was a competing explanation for the cause of recent banking problems, along with the more familiar moral hazard view.

Five alternative proposals to moderate future problems were discussed in some detail, of which four were designed to enhance market discipline. The remaining proposal was for direct supervisory action to avoid excessive risk concentration in banks during boom periods. A number of participants were skeptical that supervisors could stand up to political pressures during a euphoric boom, but few saw harm in supervisors trying to discourage overconcentration.

No evidence was cited that market forces have reacted against cyclical risk-taking before it peaked and problems emerged. But market discipline solutions generally intend to put bank creditors more at risk, in the expectation that they will then exert timely pressure on bank management to curtail unwise risk-taking. Proposals advanced at the symposium were intended to do this with the least potential for initiating systemic instability. But participants were divided on the potential for bank runs, undesirable failures of damaged but viable banks, and procyclical effects on credit availability and economic activity as a result of bank problems.

Some participants expressed concern that coin-

insurance would leave the system vulnerable to systemic problems if depositors at large banks were forced to take losses. Some feared that the functional banking proposal would weaken the efficiency of the payments system (by eliminating daylight overdrafts), while leaving the bulk of what we now call banks vulnerable to further financial cycles. Fewer commentators expressed negative views concerning reliance on subordinated debt, but questions were raised as to its applicability to smaller banks and the mechanics of achieving frequent market tests. Related issues include the potential for instability in a time of crisis if maturing

subordinated debt cannot be rolled over, and the fundamental question of whether the theory will work in practice and produce timely risk-avoidance.

While opinions expressed at the symposium varied widely as to whether FDICIA will have a positive or negative effect on bank soundness, there seemed to be a clear consensus that further changes are needed to safeguard the banking system. The symposium and these proceedings are intended to be useful in reframing the debate and keeping attention on the need for further action, even as the banking problems of the 1980s fade.

*Safeguarding the Banking System in an Environment of Financial Cycles—November 18, 1993*

*Presentation of Papers*

*Safeguarding the Banking System from Financial Cycles*

Richard E. Randall, Federal Reserve Bank of Boston

*Market Discipline: The Role of Uninsured Depositors and Other Market Participants*

George J. Benston, Emory University

*Market Discipline as a Regulator of Bank Risk*

Arthur J. Rolnick, Federal Reserve Bank of Minneapolis

*The Functional Approach to Deposit Insurance and Regulation*

James L. Pierce, University of California at Berkeley

*Prepared Comments*

Robert E. Litan, U.S. Department of Justice

R. Alton Gilbert, Federal Reserve Bank of St. Louis

*General Discussion*

Moderator: John P. LaWare, Board of Governors of the Federal Reserve System

*Other Symposium Participants*

RICHARD ASPINWALL, Chase Manhattan Bank

KENNETH BACON, *The Wall Street Journal*

PHILIP F. BARTHOLOMEW, Office of the Comptroller  
of the Currency

LYNN E. BROWNE, Federal Reserve Bank of Boston

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The proceedings, Conference Series No. 37, will be published later this year. Information about ordering will be included in a later issue of this *Review*.

## *A New Look at Reverse Mortgages: Potential Market and Institutional Constraints*

**M**ost elderly hold a significant portion of their non-pension wealth in housing equity. Over 70 percent of households over age 62 own their home, and 80 percent of those homeowners have no remaining mortgage. The median elderly homeowner has \$64,000 of housing equity and only \$15,000 of liquid assets. For many elderly homeowners this concentration of wealth in housing presents a problem. Although they might prefer to use their housing equity to finance current consumption, to pay for an emergency, or to help out a relative in need, utilizing this wealth would force the sale of their home. Traditional home equity lines of credit require that principal and interest be paid back over a fixed time interval, yet many elderly want to avoid mortgage payments because they live on a limited income.

Reverse mortgages hold the promise of helping elderly homeowners out of this bind. In the simplest form, a reverse mortgage would allow homeowners to borrow against their housing equity and receive monthly payments, while still living in their home until they die or choose to move. After moving, the homeowner would sell the home and use the proceeds to pay off the balance of the reverse mortgage. The holder of the reverse mortgage would provide insurance guaranteeing that the homeowner would never owe more than the future value of the house.

Although reverse mortgages have been offered for more than a decade, the market has never gained significant size. Some critics have argued that elderly homeowners really do not want to use reverse mortgages because they intend to give their house to their children, or save the equity to pay for future expenses such as long-term care. Others suggest that previous reverse mortgage contracts have not met the needs of most elderly homeowners, requiring repayment within a fixed 5- or 10-year term, or loss of all equity in the house even if the homeowner dies the next year. Financial institutions claim that reverse mortgages are very risky and that the housing and interest rate risks are

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not easily diversifiable. In addition, recent accounting changes require holders of reverse mortgages to report artificial losses until repayment. More recently, however, the U.S. Department of Housing and Urban Development (HUD) has begun a demonstration program to gauge elderly interest in reverse mortgages.

This article will explore the viability of the market for reverse mortgages. The first part will describe the various types of reverse mortgages. Next, the article will estimate the potential demand for reverse mortgages using data from the Survey of Income and

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*Most elderly hold a significant portion of their non-pension wealth in housing equity.*

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Program Participation (SIPP). Assumptions about future increases in house prices and various interest rates are shown to have a considerable effect on the estimated market size. The results show a large potential market, whether measured in terms of the increased income available from a reverse mortgage or the addition to liquid wealth. Given the market potential, the article then discusses demand and supply explanations as to why the current number of reverse mortgages is so small. The article concludes by looking at policy changes that might stimulate the growth of reverse mortgages.

### *I. Types of Reverse Mortgages*

A reverse mortgage is one specific type of a more general class of home equity conversion loans, that is, loans that allow homeowners to borrow against equity in their homes. The chief characteristic of such loans, setting them apart from conventional mortgages and home equity lines of credit, is that the borrower does not need to make periodic interest or principal payments during the life of the loan. Borrowers can receive regular monthly payments, a lump sum, or a line of credit. The interest and principal due keep accruing until the loan is repaid in a lump sum when the house is sold, which usually happens when the borrower moves out of the house or dies. Because of their repayment characteristics,

eligibility for home equity conversion programs, including reverse mortgages, is usually limited to elderly homeowners.

Perhaps the most common type of home equity conversion plan is a property tax deferral program, which a number of state and local governments administer. Under these programs, the government places a lien on the property in return for the deferral of the property tax. The tax is paid, with accumulated interest, when the house is sold. The interest rate is set by law, and is usually between 6 and 8 percent per year. In New England, these programs are available on a local basis in Connecticut, Massachusetts, and New Hampshire. Most programs have eligibility requirements that place limits on income or assets of participants.

Local government agencies sometimes make loans on a similar basis, known as deferred payment loans, to the elderly with limited means. Such loans are made for a specific purpose, most often home repair, at a fixed, usually below-market interest rate. A typical loan would be made for replacing or repairing a roof, plumbing, electrical wiring, or heating.<sup>1</sup>

### *Fixed-Term Reverse Mortgage*

The simplest type of a reverse mortgage is extended for a fixed term and becomes due on a specific date. In New England, such mortgages are available in Connecticut and Massachusetts. They are offered through nonprofit counseling agencies, which serve as initial points of contact between the lender and the prospective borrower. Since the lender might have to foreclose on the loan unless the borrower sells the house and moves or has other funds for repayment, the major function of the counseling agency is to make sure that the borrower has made adequate plans and living arrangements when repayment is due.

Some counseling agencies see their mission as much broader. For instance, H.O.M.E. (Home Options for Massachusetts Elders), the agency that serves as the referral point for all fixed-term reverse mortgages in Massachusetts, helps prospective borrowers identify options other than a reverse mortgage, such as government programs for which they may be eligible. Indeed, the agency considers this to be its priority and regards a reverse mortgage to be a "last resort" when no alternative sources of income are available to the client. Because of their nonprofit

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<sup>1</sup> Redecorating the house or making other cosmetic changes is normally not permitted under such programs.

status and emphasis on serving the elderly in need, independent counseling agencies usually impose income ceilings and other eligibility limits on their clients. Moreover, since the volume of fixed-term reverse mortgages is small, banks and thrifts that make them usually regard making such loans as "good corporate citizenship" rather than a line of business worth developing for its profit potential.

### *Home Equity Conversion Mortgage Insurance Demonstration*

In order to encourage the growth of the reverse mortgage market, in 1987 Congress authorized the Department of Housing and Urban Development (HUD) to administer a new reverse mortgage program, called the Home Equity Conversion Mortgage (HECM) Insurance Demonstration. The program allows borrowers to access equity in their single-family homes through a line of credit or regular monthly payments. The payments can continue as long as the borrower lives in the house, or for a fixed term. Even if the borrower elects to receive payments for a fixed term, the loan does not become due at the end of the term. Instead, interest accrues until the borrower moves out of the house or dies, when the house is sold and the loan is repaid. To insure lenders against the risk that the loan balance may, over time, grow larger than the value of the house, the Federal Housing Administration collects insurance premiums on all loans.

To guard against potential misuse of the program, HECM requires the borrower to undergo counseling from an independent, HUD-approved counseling agency. While the HECM program does not have income ceilings or other eligibility restrictions, it does impose limits on how much can be borrowed. Those limits vary by geographical area and currently range from \$67,500 to \$151,725 (AARP 1993). Even at the upper limit, however, the HECM-permitted loan amounts fall short of home values in some areas of the country, particularly in California and the Northeast, and thus do not allow many borrowers to take full advantage of their home equity.

### *Lender-Insured Reverse Mortgages*

Currently, three lenders—Providential Home Income, Freedom Home Equity Partners, and Transamerica HomeFirst—offer self-insured reverse mortgage programs (AARP 1993). Unlike the HECM program, these lenders do not restrict the size of the

loan, but instead vary the loan size in proportion to the amount of equity the borrower has in the house. This feature makes the programs particularly popular in California, where even the median house value exceeds the HECM limit in many metropolitan areas. The programs also allow borrowers the option of reserving some portion of their equity for their estate; this portion would not be accessible to lenders for the purpose of eventual loan repayment. The lender may also take an equity position in the property by claiming a share of the future price appreciation, in addition to repayment of the loan balance.

Insurance against the risk that the balance of the loan may eventually exceed the value of the house is financed through a risk premium charged on loans in addition to interest. Providential offers a reverse mortgage with three loan options: lump sum payments, lines of credit, and monthly payments for as long as the borrower lives in the house, while Freedom and Transamerica purchase an annuity for the borrower that pays monthly installments for life, regardless of whether the borrower continues to live in the house.

## *II. The Sample Data*

The data used in this study come from the Survey of Income and Program Participation (SIPP), a survey of about 20,000 households collected from a stratified random sample of all U.S. households by the U.S. Bureau of the Census. This data set is particularly appropriate for estimating potential demand for reverse mortgages because it provides detailed information on household income and balance sheets—including housing equity, other assets, and debt—as well as demographic data on the household.

This study uses the fourth wave of the 1984 and 1990 panels of the SIPP, which were conducted from January through April of the subsequent year.<sup>2</sup> The sample for this study includes only households consisting of single persons aged 62 or older or couples with both spouses aged 62 or older. The 1984 and the 1990 panels have 4,114 and 4,840 such households, respectively. Sixty-eight percent of the sample were homeowners in 1984; the homeownership rate increased to 70 percent in 1990.

Table 1 reports median values of the variables used in the analysis by homeownership status for the

<sup>2</sup> For example, respondents in the fourth wave of the 1984 SIPP were surveyed between January 1985 and April 1985.

Table 1  
*Descriptive Statistics for All Elderly Households in the Sample (Age 62 and Over)*

Item	Total Sample		Homeowners		Non-Homeowners	
	1984	1990	1984	1990	1984	1990
Sample Size	4,114	4,840	2,786	3,405	1,328	1,435
Median:						
Age (years)	72	72	71	71	73	73
Monthly Income (\$)	1,274	1,401	1,514	1,663	887	916
Monthly Income, after Debt Payments (\$)	1,259	1,340	1,488	1,570	872	906
Home Equity (\$)	36,452	39,347	57,108	61,420	0	0
Pension Wealth (\$)	92,377	98,994	106,860	113,661	70,889	73,179
Liquid Wealth (\$)	11,908	9,093	18,193	14,395	1,823	1,391
Total Wealth (\$)	176,305	191,322	225,424	246,064	90,030	91,146
Percent under Poverty Line	22.8	11.8	16.0	8.0	37.0	20.8
Percent with Total Debt Payments Greater than 25 Percent of Monthly Income	.5	3.8	.5	5.1	.5	.6

Note: Income and wealth data in 1990 dollars, deflated by the CPI.

Source: U.S. Bureau of the Census, Survey of Income and Program Participation, 1984 and 1990.

1984 and 1990 surveys. Two things are apparent from the table: First, elderly homeowners are much wealthier than non-homeowners: in 1990, total wealth of homeowners was almost three times that of non-homeowners, and their monthly income was almost twice as large. Second, both homeowners and non-homeowners in the 1990 sample are wealthier in real terms than those in the 1984 sample. Between 1984 and 1990, both monthly income and total wealth increased more than 9 percent in real terms for homeowners, while increasing only 3 percent or less for non-homeowners.

Despite their relatively high median income, however, 8 percent of homeowners had incomes below the poverty line in 1990, and 5 percent had debt burdens in excess of one-quarter of their monthly incomes. It is likely that members of either group could benefit from the income-enhancing features of a reverse mortgage.

### III. The Reverse Mortgage Model

This section simulates the effect of taking out a reverse mortgage on available income and liquid wealth for a sample of elderly households. Using assumptions about reverse mortgage contracts that closely mirror terms for contracts offered by private institutions, the simulations show that a significant number of households can substantially benefit from

a reverse mortgage. This section also tests the importance of some of these assumptions by varying the interest rates used in the analysis.

The monthly payment of a reverse mortgage depends on the prospective borrower's age, sex, and marital status and the amount of equity in the house—all information available directly from SIPP. In addition, loan payments vary according to the mortgage interest rate, the ratio of the loan amount to the home's value, the origination cost, and the projected rate of appreciation in the home's value.<sup>3</sup>

The simulations assume that a household's maximum loan-to-value ratio, including the reverse mortgage balance plus any existing mortgage debt, is 75 percent. Banks often use this ratio to limit the maximum amount of funds that a homeowner can obtain in a home equity loan, or a "cash-out" refinancing. The origination cost of the loan, set at 3 percent of the principal amount, is financed from the proceeds of the loan and is similar in amount to the closing costs and points paid on a conventional mortgage. Furthermore, the model assumes that borrowers receive reverse mortgage payments for life even if they move out of the house. Thus, the length of time the loan

<sup>3</sup> The model assumes that the lender has no equity stake in the house. The rate of home price appreciation is still important for the calculations, however, because the lender wants to make sure that the loan amount does not exceed the value of the house when the house is sold.

### Computing the Reverse Mortgage Payment

The lump sum reverse mortgage payment (LS) for a single borrower<sup>4</sup> is calculated as a sum, from the borrower's current age (a) to the maximum allowable age in the model (110), of the initial house equity (HEQ) compounded yearly at the house price appreciation rate (RG) discounted by the mortgage rate (RM) and weighted by the probability that the borrower dies in each year ( $p_t$ ).

$$LS = \sum_{t=a}^{110} \left[ (HEQ) * \frac{(1 + RG)^{(t-a)}}{(1 + RM)^{(t-a)}} * p_t \right].$$

If the borrower used the proceeds from the lump sum payment (LS) to purchase an annuity, the annuity payment (PMT) is computed such that the lump sum payment equals the present discounted value of the stream of annuity payments (discounted at the annuity rate, RA) multiplied by the probability that the borrower is still alive.

$$LS = \sum_{t=a}^{110} [(PMT) * (1 + RA)^{(t-a)} * (1 - p_t)].$$

Solving the above equation for the annual annuity payment (PMT) gives:

$$PMT = \frac{LS}{\sum_{t=a}^{110} [(1 + RA)^{(t-a)} * (1 - p_t)]}.$$

<sup>4</sup> In the case of married couples, the formula is modified to account for the combined probability of survival where the spouse continues to receive the benefit.

payments are expected to continue depends only on the borrower's life expectancy, and not on the length of time the borrower can be expected to stay in the house before moving, for example, to a nursing home.

Because women have longer life expectancy than men, they receive lower reverse mortgage payments in this model. Life expectancies were taken from the *Vital Statistics of the United States*.<sup>5</sup> Couples receive

lower payments than single borrowers of either sex, because the joint life expectancy of the household exceeds the individual life expectancies of each person in the household.

The simulation computes monthly reverse mortgage payments in two steps: First, the maximum amount that the elderly homeowner could borrow in a lump sum is determined on the basis of the amount of equity in the house, the borrower's life expectancy, the projected rate of house price appreciation, and the mortgage interest rate. Second, the lump sum determined in the first step is converted to an immediate lifetime annuity with monthly payments for the borrower. The size of the monthly payments from the annuity depends on the annuity interest rate. Calculation of monthly payments is also sensitive to assumptions regarding the rate of house price appreciation as well as the difference (if any) between the mortgage and annuity interest rates. Specifically, the monthly payment increases with the assumed rate of house price appreciation, and decreases with the difference between the mortgage and annuity interest rates. (See the Box for a more detailed explanation of how the reverse mortgage payments are computed.) The model assumes that the mortgage, annuity, and house appreciation rates remain fixed for the life of the loan.<sup>6</sup>

In order to gauge the sensitivity of the model to these assumptions, and to identify a reasonable range of possible monthly payments, calculations were made using nine different combinations of the mortgage, annuity, and house price appreciation rates. Figure 1 shows the resulting monthly payments for a single female 71 years of age with \$64,000 in home equity (the median age and equity for the homeowners in the sample in 1990). The calculations assume that the mortgage interest rate is 7 percent in all cases, while the annuity rate takes the values of 7, 5,

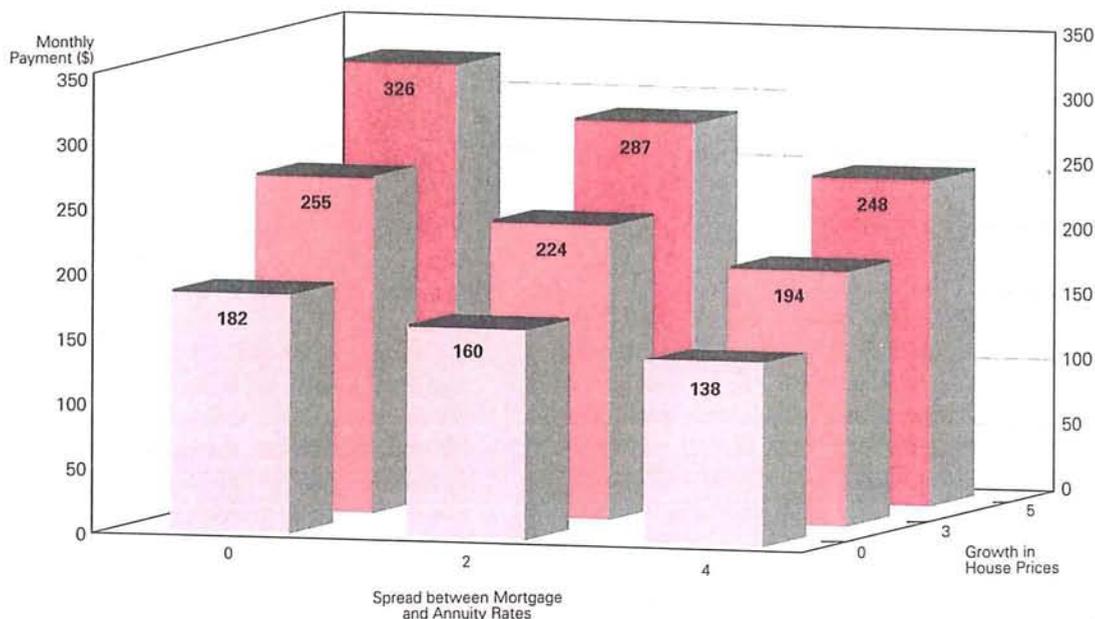
<sup>5</sup> No attempt was made in this study to correct for any self-selection that may cause the life expectancy of reverse mortgage borrowers to differ from that of the general population. The direction of such bias is not obvious. On the one hand, the annuity feature should attract people with longer than average life expectancies. On the other hand, if borrowers use reverse mortgages to help pay for unusually high medical expenses or long-term care, then they may be in poorer health and have lower life expectancy than the general population.

<sup>6</sup> As discussed in Section V, these fixed assumptions expose the lender to some risk. In particular, if an elderly homeowner lives longer than expected and the house appreciates more slowly, the lender may find that the loan balance exceeds the available collateral—the house. For this reason, lenders may be conservative in assuming housing appreciation rates and attempt to hedge this risk.

Figure 1

### *Income from a Reverse Mortgage*

Single Female, Age 71, \$64,000 Equity in Home



and 3 percent, resulting in spreads between the mortgage and annuity rates of 0, 2, and 4 percent, respectively. The spread is shown on the horizontal axis in Figure 1, while the house price appreciation rates of 0, 3, and 5 percent are shown on the axis running from the front of the chart to the back.

The figure shows that the most "optimistic" assumption (from the perspective of the borrower) of a zero spread between the mortgage and annuity rates and a 5 percent house appreciation rate results in a monthly payment of \$326 for the median borrower. The most "pessimistic" assumption of a 4 percent spread between the mortgage and annuity rates and zero growth in housing prices results in a monthly payment of only \$138. More realistically, the "neutral" assumption of a 2 percent spread between the mortgage and the annuity rates and a 3 percent rate of growth in house prices results in a monthly payment of \$224.<sup>7</sup> The figure also shows that the monthly payment is more sensitive to the assumed rate of house price appreciation than to the spread between the mortgage and the annuity rates.

Table 2 further illustrates the sensitivity of the reverse mortgage monthly payments to the interest rate and growth rate assumptions, by the age of the borrower. It shows that the reverse mortgage payment is much more sensitive to interest and growth rate assumptions for younger borrowers than for older ones. For example, a 65-year-old receives monthly payments that are almost three times greater under the most optimistic assumptions than under the pessimistic ones. By contrast, for an 85-year-old, the most optimistic assumptions produce monthly payments only one and one-half times greater than the most pessimistic assumptions, although the dollar difference is greater for the older households than their younger counterparts.

<sup>7</sup> In practice, private programs assume that house price appreciation is equal to expected inflation. A previous study of annuities (Friedman and Warshawsky 1985) found that the spread between investments and payouts averaged 2.5 to 4.5 percent. The spread in that study, however, is probably high compared to what would result from a competitive market in reverse mortgages.

Table 2  
*Monthly Reverse Mortgage Payment to a Single Female with \$64,000 Equity*  
 Dollars

Age	Assumptions <sup>a</sup>		
	Pessimistic	Neutral	Optimistic
65	90	164	263
75	187	280	383
85	420	529	633

<sup>a</sup>Mortgage Rate = 7%.  
 Pessimistic: Annuity Rate = 3%, House Appreciation Rate = 0%.  
 Neutral: Annuity Rate = 5%, House Appreciation Rate = 3%.  
 Optimistic: Annuity Rate = 7%, House Appreciation Rate = 5%.  
 Source: Authors' calculations.

Table 4  
*Ratio of Monthly Reverse Mortgage Payments to Monthly Income, 1990*  
 Percentage Distribution for All Elderly Homeowners

Ratio	Assumptions <sup>a</sup>		
	Pessimistic	Neutral	Optimistic
Under .1	72	61	51
.1 to .19	13	16	16
.2 to .29	5	7	11
.3 to .39	3	5	6
.4 to .5	2	3	4
Over .5	5	8	12
	100	100	100

<sup>a</sup> See Table 2.  
 Source: Authors' calculations based on Survey of Income and Program Participation, 1990.

#### IV. Benefits of the Reverse Mortgage

One way to assess the potential importance of reverse mortgages is to compare the size of the lump sum payment available to an elderly homeowner to the size of the homeowner's liquid wealth, using the current sample. A lump sum disbursement provides a cushion of liquidity that allows the homeowner to deal with financial emergencies such as medical bills or major house repairs. It also allows consolidation of all the homeowner's outstanding debts. Table 3 shows the distribution of the ratio of lump sum mortgage payment to liquid wealth under the three sets of assumptions discussed in the previous sec-

tion. Note that even under the most pessimistic assumptions, the lump sum mortgage payment is equal to about half of liquid wealth for the median homeowner. Moreover, using neutral assumptions, 14 percent of the elderly homeowners in the sample would receive a lump sum that is at least 10 times greater than their liquid wealth.

Table 4 reports a second measure of the importance of reverse mortgages, the ratio of reverse mortgage monthly payments to monthly income. Clearly, the reverse mortgage taken in monthly payments has, on average, a smaller effect on the borrower's monthly income than a lump sum disbursement has on liquid wealth. Even under the most optimistic assumption, slightly more than one-half of all borrowers have a reverse mortgage payment that is less than 10 percent of their monthly income. However, a significant minority can boost their incomes by a relatively large amount: under the neutral assumption, 23 percent of reverse mortgage borrowers could boost their monthly incomes by more than 20 percent, while 8 percent of borrowers could boost their incomes by 50 percent or more.

Table 3  
*Ratio of Reverse Mortgage Lump-Sum Payment to Liquid Wealth, 1990*  
 Percentage Distribution for All Elderly Homeowners

Ratio	Assumptions <sup>a</sup>		
	Pessimistic	Neutral	Optimistic
Under .5	50	43	38
.5 to .9	12	13	13
1.0 to 1.9	11	12	13
2.0 to 4.9	10	11	13
5.0 to 10	6	7	7
Over 10	12	14	17
	100	100	100

<sup>a</sup> See Table 2.  
 Note: Columns may not sum to 100 because of rounding.  
 Source: Authors' calculations based on U.S. Bureau of the Census, Survey of Income and Program Participation, 1990.

#### The Reverse Mortgage Group

Table 5 examines in more detail the characteristics of those who are most likely to benefit from a reverse mortgage. "The Reverse Mortgage Group" is defined here to include those homeowners aged 62 and older whose simulated monthly reverse mortgage payments, using the "neutral" assumption, equal 25 percent or more of their monthly income.

Table 5  
*Comparison of Reverse Mortgage Group<sup>a</sup>  
 to All Elderly Homeowners, 1990*

Item	Reverse Mortgage Group <sup>a</sup>	All Elderly Homeowners
Number in Sample	893	3,405
Median:		
Age (years)	77	71
Monthly Income (\$)	914	1,733
Home Equity (\$)	90,000	64,000
Liquid Wealth (\$)	10,248	15,000
Total Wealth (\$)	198,999	256,398
Monthly Reverse Mortgage Payment (\$)	464	211
Remaining Life Expectancy (years)	10	13
Percent:		
No Children	27	21
Liquid Wealth under \$5,000	41	37
Incomes below:		
33rd Percentile of All Incomes	55	25
Poverty Line	20	8
Poverty Line after Reverse Mortgage	5	3
Geographic Profile:		
Northeast	27	22
Midwest	22	27
South	30	35
West	22	16
Marital Status:		
Married	16	46
Single Male	20	12
Single Female	64	42

<sup>a</sup>The Reverse Mortgage Group includes all elderly homeowners whose simulated reverse mortgage monthly payments would augment their monthly incomes by 25 percent or more as calculated under the "neutral" assumption of a 2 percent spread between mortgage and annuity rates and a 3 percent rate of growth in house prices.

Source: U.S. Bureau of the Census, Survey of Income and Program Participation, 1990; U.S. Department of Health and Human Services, *Vital Statistics of the United States*, 1988, Volume II, Part A, Table 6-3.

This definition is not meant to imply that all such households would necessarily be interested in a reverse mortgage, but rather to investigate the characteristics of those most likely to benefit from it.

Table 5 shows that the reverse mortgage group comprises about one-quarter of all elderly homeowners. Single women represent almost two-thirds of the reverse mortgage group, married couples only 16 percent. Members of the reverse mortgage group can be found in all regions of the country in roughly similar proportions. The largest

concentration (30 percent) is in the South, followed by the Northeast (27 percent).

Persons in the reverse mortgage group typically are older than other elderly homeowners. Their greater age implies shorter life expectancies, so they receive higher monthly reverse mortgage payments than all elderly homeowners. The median monthly income, liquid wealth, and total wealth of the reverse mortgage group are all significantly lower than those of all elderly homeowners; nonetheless, their home equity is greater. The median monthly reverse mortgage payment in the reverse mortgage group is \$464, which would increase median monthly income (\$914) by over 50 percent.

Reverse mortgages can be particularly helpful to low-income elderly. Twenty percent of the reverse mortgage group are below the poverty line; income from a reverse mortgage would reduce the poverty rate in this group by three-quarters (to 5 percent).

More than one-third of all elderly homeowners and 41 percent of the reverse mortgage group have liquid wealth below \$5,000. Without a cushion of liquid assets, these households are at risk of being forced to sell their homes when they incur unforeseen expenses. A reverse mortgage in the form of a lump sum payment or a line of credit can help an elderly homeowner through a financial emergency.

### *V. Difficulties in Developing the Reverse Mortgage Market*

Although reverse mortgages may at first seem to be a logical financial product for many elderly persons, questions remain as to the number of consumers who would actually purchase the product if it were available. A number of barriers also limit the willingness of lenders to offer reverse mortgages.

#### *Limits on the Demand for Reverse Mortgages*

Barriers to consumer acceptance of reverse mortgages include product design, information availability, bequest motives, and the view of home equity as "savings of last resort" (precautionary savings). Possibly for the above reasons, Venti and Wise (1989, 1990) argue that most elderly really do not want to use the savings in their home to finance current consumption. In support of their view, Venti and Wise present evidence that elderly who had moved recently did not decrease the amount of home equity, despite the opportunity to do so at relatively little cost.

The difficulty with such evidence is that it confuses housing consumption with housing equity. Many elderly movers might prefer not to reduce overall housing consumption, but instead to substitute different types of housing. For example, a couple might choose a Florida condominium overlooking the ocean instead of their four-bedroom family home in New England, even though both cost the same amount of money. They might also prefer to cash out some of their housing equity, while maintaining the same level of housing consumption. Such households would be prime candidates for a reverse mortgage, which would allow them to maintain their level of housing consumption, while providing a fixed monthly payment.

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*Questions remain as to the number of consumers who would actually purchase a reverse mortgage, and barriers limit the willingness of lenders to offer them.*

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*Product Design.* Most reverse mortgage products offered to date have not been very flexible. The features that can make them unattractive to many borrowers include the low equity caps of the HECM program and the requirement of some private programs that the proceeds of the reverse mortgage be placed in an annuity without the option of a lump sum or credit line.

In this regard, private reverse mortgages could copy the myriad of different annuities and life insurance plans available in the private market. Like the HECM plan, consumers could have the option of having any combination of a credit line, a lump sum payment, and a regular monthly payment (a fixed annuity). Unlike the HECM plan, however, many potential purchasers may want a reverse mortgage that pledges more than \$151,000 in equity. (The median price of a single-family house sold in the Boston area, for example, is over \$170,000.) Some consumers may find it attractive to get a higher reverse mortgage payment in return for sharing the gains from possible future house price appreciation.<sup>8</sup>

*Bequest Motives.* Even with flexible programs, many elderly homeowners still might not use a

reverse mortgage because they intend to give their housing wealth as a bequest. Over three-quarters of all HECM borrowers have no children, compared with 21 percent of all elderly homeowners sampled in the 1990 SIPP (HUD 1992). Kotlikoff and Summers (1981) estimate that about 80 percent of household wealth is inherited, indicating that bequests are an important component in aggregate wealth accumulation.

Further evidence regarding bequests comes from several studies (Auerbach and Kotlikoff 1987; Hubbard, Skinner and Zeldes 1993) that argue that elderly households dissave "too slowly" relative to dissaving that is predicted by standard life-cycle models. Other papers (Mirer 1979; Menchick and David 1983) show that elderly wealth accumulation continues after retirement, when households should be reducing their savings. The conclusion from much of this literature, that the elderly have "too much" savings, is attributed to the desire of the elderly to leave bequests.

Several papers dispute the conclusion that elderly households have significant bequest motives that can explain their savings patterns. Using panel data, Hurd (1990) shows that changes in wealth (net saving) over time are similar for individual elderly households, both with and without children, and thus he rejects the bequest hypothesis. More recently, several researchers have argued that the standard life-cycle model's inability to predict individual and aggregate savings patterns can be explained by its failure to account for uncertainty regarding length of life, earnings, out-of-pocket medical expenditures, and imperfect insurance and lending markets (Skinner 1988; Zeldes 1989; Hubbard and Judd 1987). Hubbard, Skinner and Zeldes (1993) develop a model that incorporates all of these uncertainties and show that this model explains many of the empirical findings showing that the elderly save "too much."

Regardless of the appropriate level of saving by the elderly, the bequest motive is a peculiar explanation of the fact that most elderly households have a large concentration of wealth in housing relative to other assets. The Kotlikoff and Summers estimates regarding aggregate wealth transfers might not reflect the desired behavior of most elderly, because of the skewed distribution of wealth and unintended bequests due to early death. If elderly households were truly unconstrained by current housing finance requirements, one might expect older households to

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<sup>8</sup> See Scholen (1993) for more detail about the appeal of reverse mortgages to consumers.

hold a more diversified portfolio to give to their heirs. Also, if wealthy households wanted to maintain high housing consumption, they could reduce their total taxes by slowly liquidating their wealth and giving their heirs a constant sum of money each year with a reverse mortgage.<sup>9</sup>

*Precautionary Savings.* Many elderly households look at their house as insurance in case of an emergency such as a serious accident to themselves or a relative or the need to purchase long-term care. Without a reverse mortgage, however, the house must be sold or a mortgage obtained in order to tap into existing home equity. Reverse mortgages would also make it easier for households to address emergency problems when two or more people live in the same house. A clear example is that of a household whose car breaks down, or a person who needs assisted care, but whose spouse would prefer to remain in their lifelong home. Given the asset distribution presented earlier, many couples would not have enough liquid wealth to pay for a new car or specialized care without selling their house or going on public assistance. Yet a reverse mortgage would provide an intermediate solution.

Overall, none of the demand issues mentioned above seem to provide significant deterrents to consumer acceptance of reverse mortgages. If anything, the growth of such a market will likely depend on consumer perceptions and the availability of good information about types of reverse mortgages, to convince the elderly that these instruments are both viable and safe. Some senior advocates oppose reverse mortgages out of the fear that households might be persuaded to spend the proceeds unwisely, with many elderly eventually being forced out of their homes. The problem of fraud perpetrated against the elderly applies to all financial assets, not just reverse mortgages, and is mitigated by terms in most reverse mortgage contracts that allow borrowers to remain in their house as long as they live.

*Real Housing Equity and the Aging Population.* Recently, some economists have argued that the aging of the baby boomers will lead to declining real house prices. Therefore, future generations may have less real equity than this study suggests. Two offsetting factors affect the future stock of real housing equity and, thus, the future demand for reverse mortgages: (1) a tendency for housing demand to fall with age, combined with the fact that the baby-boom generation will pass the age of peak housing consumption within a decade or two; (2) the tendency for housing consumption to rise with wealth, com-

bined with a pattern of increasing wealth of successive cohorts.

Demand for housing generally declines with age. Mankiw and Weil (1989) used a model of age-specific housing demand to show that housing demand declines after age 40. They concluded that aging of the baby-boom population bulge would lead to a future decline in demand for housing in the United States. Their finding implies that housing prices will fall in the future and that the market for reverse mortgages might be smaller than estimated earlier in this study.

On the other hand, each succeeding generation reportedly has been wealthier than its predecessor. If so, the wealthier succeeding generations will want to consume more housing (along with everything else) and thus future levels of real housing equity will increase over time. This implies that the future demand for reverse mortgages might be greater than estimated earlier in this study. Pitkin and Myers (1992) argue that housing demand declines with age at any particular time only because older generations are poorer than their younger cohorts. Using Census data, they follow several cohorts through 60 years, showing that homeownership rates for each cohort actually increase up to age 70 to 74. (In individual Census years' cross-sections, however, homeownership rates peak between ages 45 and 60.)

On balance, evidence is mixed as to whether estimates based on current demographics underestimate or overestimate the future stock of real housing equity and, thus, potential demand for reverse mortgages. Furthermore, whether any projected decline in housing demand as the population ages will lead to a decline in real housing prices is open to debate. In particular, the response of house prices will depend on potential changes in the supply of housing. On net, most economists are still skeptical of the prediction that real housing prices will fall substantially as a result of changes in demographics.

Moreover, if reverse mortgages become widely available in the future, this in itself could change desired housing consumption. Specifically, some elderly consumers would no longer be forced to sell their homes and move into smaller quarters because of lack of liquidity. They could, instead, continue to live in their original (larger) house for a longer time. If so, demand by the elderly for housing would increase

<sup>9</sup> Under current federal tax laws, an adult can receive up to \$10,000 per year from each giver without paying income taxes. These gifts reduce future estate taxes for wealthy givers whose estate exceeds \$600,000.

relative to the current situation, in which reverse mortgages are not widely available. Greater demand would cause an increase in real housing prices and this, in turn, could make reverse mortgages even more attractive.

### *Limits on the Supply of Reverse Mortgages*

Reverse mortgages face a number of accounting and regulatory uncertainties, as well as risks that are difficult to manage in the early stages of a reverse mortgage program. Until recently, lenders reported accrued interest as income during the term of the loan. The Securities and Exchange Commission (SEC) ruled in July 1992, however, that lenders must either report interest only when it is received (that is, when the house is sold and the loan is repaid) or assume no price appreciation on the house.<sup>10</sup> Because reverse mortgages are new and few of them are currently being paid off, both of these accounting methods result in lenders reporting artificial losses until the reverse mortgages start to be repaid in significant numbers. While SEC rulings apply only to publicly traded companies, auditors are expected to adopt the same standard for privately held firms, discouraging the development of the reverse mortgage market.

Lenders may have difficulty achieving adequate diversification in their reverse mortgage portfolio if initial demand is low. Specifically, tenure risk, or risk that certain borrowers would live in their homes and receive payments for longer than the lender assumed in its pricing model, can be reduced only through a large portfolio, so that long-lived loans are balanced by short-lived ones.

Lenders also face the possibility that when the house is sold, the price will not be high enough to pay off the loan balance. The risk of adverse regional shocks in the real estate market could be mitigated through geographic diversification. However, such diversification can be difficult to achieve for a lender with limited geographical presence and without a sufficiently high volume of loan origination.

Conversations with lenders reveal that originating reverse mortgages is at present an expensive and very time-consuming process. The application process is long because consumers require extensive education about the complex features of reverse mortgage products. In one lender's experience, as many as half of the original applicants change their minds and withdraw their applications before the loans are originated, often at the last moment. In addition, houses often require extensive maintenance

and repair work before the loan can be granted, which necessitates multiple appraisals. One lender estimates that originating reverse mortgages now costs \$6,000 to \$8,000 per loan, though the high cost would presumably be reduced to more acceptable levels with a higher volume of originations.

Among financial institutions, life insurance companies should find issuing reverse mortgages most attractive. The characteristic cash flows of the tenure reverse mortgage—fixed monthly outlays by the lender followed by a lump-sum repayment at an uncertain future date—are difficult for banks and thrifts to hedge. Life insurance policies, however, have cash flows that closely mirror the reverse mortgage, with regular premium payments that are followed by the death benefit payout. This complementarity makes reverse mortgages more suitable for life insurance companies than for banks and thrifts, which do not have a matching liability. In addition, life insurance companies are well-suited for the actuarial work involved in issuing and pricing a reverse mortgage.

Banks and thrifts might prefer to sell off their reverse mortgages, but the cash flow pattern makes the instrument difficult to securitize. If reverse mortgages were pooled and sold to investors, those investors would be obliged to make monthly payments into the pool until the mortgages paid off. The necessity of conducting credit evaluations of the investors and difficulty in administering and servicing such pools would probably make securitization impractical or prohibitively expensive, unless these pools were sold directly to a large institution such as an insurance company.

The problem of credit risk can be avoided if the reverse mortgage is coupled with an annuity, as in the model presented here and as two lenders currently do. In this case, the lender makes a one-time disbursement of the full loan balance which is used to purchase an annuity for the borrower. The loan balance will be repaid with interest when the house is sold or the borrower dies. Since there are no periodic payments for the lender to make, the loan balances could be pooled and resold to investors. These pools would have the cash flow characteristics of a pool of zero-coupon bonds with an uncertain repayment date.

Participation of government-sponsored mortgage agencies would greatly facilitate the develop-

<sup>10</sup> Reported in *The Wall Street Journal*, page B1, August 21, 1992. Industry sources confirm that current accounting rules provide a significant disincentive to offering reverse mortgages.

ment of a secondary market for reverse mortgages. At present, the Federal National Mortgage Association (Fannie Mae) is working on the development of a standardized conventional reverse mortgage that it would purchase.

## VI. Conclusion

In 1990, an estimated one-quarter of all elderly households who owned their homes could have increased their income at least 25 percent from a reverse mortgage, making the potential market very large. And the number of elderly can only increase over time. Over 37 million persons are elderly today. According to the Census Bureau, that number is expected to increase to 41 million by the year 2000, and to almost 66 million by the year 2020. The availability of reverse mortgages may also increase demand for housing among the elderly, because fewer elderly homeowners will need to sell their homes to get access to housing equity to finance other consumption. This might offset some of the effects foreseen by the Mankiw and Weil hypothesis that aggregate demand for housing will fall over time.

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Difficulties on the supply side must first be addressed, however. Regulatory and accounting uncertainties would have to be resolved. If properly structured, reverse mortgage loans could be packaged and securitized, giving rise to a secondary market. This would result in reduced risk and greater liquidity for lenders.

The widespread use of reverse mortgages by elderly homeowners could have important consequences for the future magnitudes of intergenerational transfers, though the net effect on such transfers is not obvious. On the one hand, consumption by some elderly households could increase, while the future consumption of those among the younger generation who would have otherwise received larger bequests could be reduced. At the same time, widespread use of reverse mortgages could reduce the pressure on the welfare system, thereby reducing transfers from the younger to the older generation and at least partially offsetting the first effect. Whether intergenerational transfers ultimately rise or fall, however, reverse mortgages will improve the welfare of elderly households that are now unable to gain access to most of their wealth without selling their home.

# *International Capital Transactions: Should They Be Restricted?*

**M**any countries have shifted toward freer markets in recent years. Thus, the question posed in the title may seem rather anachronistic. The shift to competitive markets is far from complete or free from backsliding, however. Moreover, a number of prominent economists contend that government restrictions should be maintained, or at least kept in reserve, for certain categories of transactions, not least international capital movements. In particular, it is sometimes argued that capital controls should be used to buttress the Exchange Rate Mechanism of the European Monetary System, which has been undermined by speculative attacks.<sup>1</sup> It seems timely, then, to consider the desirability of such controls in the light of modern experience. Following a capsule summary of the recent use of international capital restrictions, this article discusses their international acceptance, their theoretical justification, and their efficacy in attaining overall balance-of-payments or exchange rate goals.

## *I. Recent Use and Acceptance of Restrictions*

Notwithstanding the much publicized transition toward freer markets, restrictions over international capital flows have been widespread in recent years. Typically, such restrictions take the form of multiple exchange rate arrangements, or taxes or quantitative limits on international capital movements. These or similar controls were employed at the end of 1992 by no fewer than 140 of the 178 territories and member countries examined by the International Monetary Fund.

Nor is the use of such restrictions confined to developing or formerly communist countries. Of the 22 countries classified as "industrial" by the IMF in 1990, only nine allowed free capital movements, that is, capital account convertibility (Mathieson and Rojas-Suárez 1993, p. 4). Indeed, little more than a year before this writing, during the 1992

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turbulence within the European Monetary System, several members of the EMS employed capital account restrictions in an attempt to avert devaluations of their currencies (Goldstein and others 1993, p. 57).

Under prevailing codes of international financial behavior, greater tolerance is extended to restrictions over international capital transactions than to restrictions over international transactions in goods and services. The best known of these financial codes, the *Articles of Agreement* of the International Monetary Fund, declares:

Members may exercise such controls as are necessary to regulate international capital movements, but no member may exercise these controls in a manner which will restrict payments for *current* transactions or which will unduly delay transfers of funds in settlement of commitments, except as provided in Article VII, Section 3(b) and in Article XIV, Section 2 (Article VI, Section 3; emphasis supplied).

Tolerance does not imply enthusiasm, however. As early as 1961, the Organisation for Economic Cooperation and Development promulgated its *Code of Liberalization of Capital Movements*, which directs that countries subscribing to the code should "progressively abolish between one another . . . restrictions on movements of capital to the extent necessary for effective economic cooperation" (Argy 1987, p. 109). And in 1988 the European Community (EC) Council of Ministers adopted a directive stipulating for most EC countries the complete liberalization of capital movements by July 1, 1990—although restrictions are authorized for periods as long as six months to combat capital surges that seriously disturb a member's foreign exchange market and monetary policy (Ungerer and others 1990, p. 34). Moreover, despite the seemingly greater tolerance for capital than for current account restrictions, the latter, if defined to include all government barriers to trade, may actually constitute the greater obstacle to international economic integration, for national capital markets now seem to be more closely connected than the goods markets (Gutián 1993, p. 3).

## II. Theoretical Justification

To justify the use of capital controls, a number of arguments have been advanced. Currently, the most fashionable maintain that such controls can assist a country to attain the following goals: (1) insure that

domestic saving is used to fund domestic investment rather than investment abroad (one motivation being that the government can more easily tax the income from investment if such income is earned within the country); (2) limit foreign ownership and control of domestic production facilities; and (3) prevent capital flows from destabilizing the domestic economy or disrupting structural reform efforts (Mathieson and Rojas-Suárez 1993, pp. 4–7).

Conspicuous by its absence from this list is the goal of influencing the international terms of trade—the overall prices (including interest rates among those prices) at which the residents of a country carry out transactions with foreigners. Yet a country with enough economic weight to exercise some monopolistic power could swing the terms of trade in its favor

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*A destabilizing capital movement is one that is motivated by an erroneous forecast of a foreign exchange rate.*

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through the judicious use of capital controls. (To put the point in more precise but technical language: from the standpoint of national rather than world welfare, controls over capital movements can be justified by the same optimum tariff argument used to justify controls over commodity movements.) No doubt this terms of trade argument is omitted from the popular justifications partly because publicizing such a stratagem would be impolitic for any country, especially for one that possessed the market power to reap appreciable gains from it, and would invite retaliatory measures from countries that were affected adversely. But governments that adopt controls probably do so primarily for purposes other than manipulating the terms of trade.

The argument that controls should be used to prevent capital flows from destabilizing the domestic economy is the one on which this article focuses. The argument has merit only if destabilizing flows can be identified. To begin with, then, a definition of "destabilizing" is needed. Any definition is likely to be highly controversial, in view of the debates that have swirled about the issue of speculation.

At least for purposes of this article, we define a destabilizing capital movement to be one that is

<sup>1</sup> See, for example, Eichengreen and Wyplosz (1993).

motivated by an erroneous forecast of a foreign exchange rate—one that tends to drive the exchange rate away from the equilibrium level that would be supported by the transactions of rational speculators whose foresight was correct (and whose own transactions had no influence on the long-run exchange rate). For example, if the equilibrium exchange rate during the next month would be the same as today's rate, but speculators were to sell the domestic currency on the mistaken belief that it should decline in value, those sales would comprise a destabilizing outflow of capital. By contrast, a speculator who bought the domestic currency upon observing a decline in its value would be engaging in a stabilizing inward capital transaction.<sup>2</sup>

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*If destabilizing flows could be readily identified, monetary authorities could engage in offsetting capital movements and generally reap a profit while negating the influence of the destabilizing flows.*

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Even if this definition is accepted as conceptually defensible, it is not readily operational, not easily usable for singling out destabilizing capital flows in actual experience. Indeed, the difficulty of crafting an operational definition constitutes a major, perhaps overwhelming, objection to the use of capital controls. In particular, how are regulators to discern when the expectations of speculators, or the prevailing exchange rates, are wide of the mark, since the future is inherently uncertain? No one has yet constructed a generally accepted econometric model on which a regulator could rely to explain even the *past* behavior of exchange rates, let alone to forecast future equilibrium rates and the influence, for good or ill, of speculative flows.

Moreover, if destabilizing flows could be truly and readily identified, the monetary authorities could engage in offsetting capital movements, or counter-speculation, and generally reap a profit while negating the influence of the destabilizing flows, without having to alter the course of macroeconomic policy. It is not clear why controls should be preferred to such

(sterilized) foreign exchange market intervention in these circumstances.

For example, suppose once again that the equilibrium exchange rate would remain constant but that private speculators have been selling the domestic currency in the mistaken belief that it should depreciate. In this case the domestic monetary authorities could sell foreign currency in exchange for the now undervalued domestic currency, thereby limiting the depreciation of the domestic currency.<sup>3</sup> To prevent their purchases of domestic currency from reducing the domestic money supply, the authorities could buy government securities from domestic residents in exchange for domestic currency. Once the domestic currency had returned to its equilibrium level, they could sell their previous purchases of it in exchange for foreign currency at a profit. This procedure would be much simpler and more efficient than drafting, explaining, and enforcing direct controls over a range of foreign exchange transactions.

However, some advocates of controls surely have in mind a broader definition of “destabilizing” than the one advanced here. Indeed, for many officials, any capital movement that tended to shift the exchange rate away from the *officially preferred* level would be considered destabilizing, or at least undesirable, even if the preferred exchange rate were inconsistent with the course of macroeconomic policy and differed from the equilibrium rate. What is sought is not only the power to employ monetary policy to attain a domestic macroeconomic goal but also the power to influence the exchange rate toward a level not necessarily supported by that monetary policy. If controls over international transactions could be used to regulate the exchange rate, monetary policy could be largely freed from exchange rate considerations and directed toward domestic targets. Economists have long known that policymakers must have as many independent policy tools as independent goals if the goals are to be attained under varying conditions.

The issue then becomes primarily an empirical one. Can controls accomplish the task? And if they can, at what cost? These two seemingly distinct

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<sup>2</sup> Strictly speaking, the transactions would have to be between domestic speculators and foreign residents to qualify as international capital movements. International capital movements are commonly associated, directly or indirectly, with speculative dealings of the sort described in the text.

<sup>3</sup> If the authorities lacked foreign currency, they would be justified in borrowing it if their evaluation of the equilibrium exchange rate were correct.

questions are so closely interconnected from the policy standpoint that any rational official would consider them jointly. Certainly in a highly totalitarian regime controls could be fairly effectively enforced,<sup>4</sup> but few societies are prepared to incur the costs of such a regime. Aside from the administrative costs of the bureaucracy required to enforce extensive capital controls, and the associated curtailment of individual freedom, controls that happen to interfere with efficient capital movements impose the added cost of reducing the overall contribution made by capital to total output. The following sections review some instructive experience with capital controls in less authoritarian states.

### III. Recent Empirical Studies

A number of studies have examined the efficacy of capital controls in recent years. Nearly all of these studies yield highly similar results. Thus, it may be said of capital controls—unlike many other important issues in economics—that a standard view of their effects is readily discernible: the controls that have been imposed over international capital flows in recent years have generally failed to gain significantly greater independence for domestic monetary policy except, in some cases, for brief periods. In other words, the verdict from recent experience is that controls can sometimes buy time, but not much.

This conclusion clearly emerges from the most comprehensive, up-to-date (at this writing) survey of the use of capital controls. In *Liberalization of the Capital Account: Experiences and Issues*, Mathieson and Rojas-Suárez (1993) issue the following appraisal (pp. 1–2):

... the collapse of the Bretton Woods System in the early 1970s created the expectation of large exchange rate adjustments and was accompanied by large-scale (often illegal) capital flows that overwhelmed even the most comprehensive capital control systems. . . . when macroeconomic and financial conditions created substantial incentives for moving funds abroad, capital controls in many developing countries were often of limited effectiveness in stemming capital flight during the 1970s and 1980s. . . . recent studies suggest that the effectiveness of capital controls eroded more rapidly during the 1980s than during the 1960s and 1970s.

Detailed published examinations of some individual cases shed further light on these issues. Exchange controls imposed by Ireland in December 1978 had only small and transitory success in insulat-

ing the key domestic interest rates from rates abroad, according to an analysis by Browne and McNelis (1990, p. 57). In Japan, capital controls used during the 1978–80 period were found by Otani to have only a very minor impact on the exchange rate (1983, p. 330). A singular contrast to this standard view, however, is offered by Galy, who argues that “capital controls were instrumental in reconciling the domestic and external objectives of monetary policy in Spain over the 1980s” (1993, p. 23).

The reason that capital controls so commonly fail becomes obvious upon reflection: capital can flow through channels that are extremely difficult to monitor, and the profits from exploiting these channels

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*Controls over international capital flows have generally failed to gain significantly greater independence for domestic monetary policy except for brief periods.*

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can be sizable. Aside from concealed transactions that, if detected, would readily be identified as pure capital movements, evasive capital movements can occur as counterparts to current account transactions through such artifices as paying for imports before or after the customary or scheduled dates (“leading” or “lagging”), or misstating on invoices the payments that are actually made (under- or over-invoicing). For example, an importer might pay for foreign goods more quickly than usual (or “lead”), out of concern that the domestic currency was about to depreciate and then require a larger (domestic currency) payment than one made immediately. Or the importer might arrange to overstate the true price of the foreign merchandise (or over-invoice) and invest the amount of the overstatement abroad in foreign currency expected to rise in value, an investment that would be disallowed if made known to the foreign-exchange control authorities. Both maneuvers would involve an increase in the current volume of capital outflows and would tend to undermine the foreign exchange value of the domestic currency.

Many other illustrations could be given of how

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<sup>4</sup> As, indeed, they were in Nazi Germany and in some communist countries.

capital controls are commonly evaded. To prevent all such circumvention would require a vast, intrusive, and costly enforcement mechanism akin to that found in police states. Thus, it is not surprising that most evaluations of capital controls find them to be largely ineffectual in nontotalitarian societies.

To this general or standard view some fairly sophisticated partial dissents have been registered, however. In particular, it is argued that even though the effectiveness of controls commonly erodes with the passage of time, such an interval is all that should be needed to reverse a speculative assault on a currency. Presumably, by relieving downward pressure on the domestic currency in the foreign exchange markets for even a brief period, capital controls can induce speculators to reconsider underlying conditions (including monetary policy) and to regain their confidence in the domestic currency. Does this argument square with the facts? Something can be learned from some recent experience with capital controls employed by participants in the Exchange Rate Mechanism (ERM).

#### *IV. Recent Episodes in Ireland, Portugal, and Spain*

To avert devaluations of their currencies within the ERM, Ireland, Portugal, and Spain imposed or intensified restrictions over capital flows during the latter part of 1992. While they differed in content, all of the restrictions sought to restrain net outflows.<sup>5</sup> Following a very brief description of the controls, this section examines their impact on some major financial markets in an effort to shed some light on their effectiveness.

##### *The Nature of the Controls*

On September 23 the Bank of Spain introduced three new restrictions on the foreign exchange transactions of domestic banks. To inhibit their speculation against the peseta, the regulations required the banks to deposit at the Bank of Spain for one year *without interest* an amount equal to the peseta value of any new long positions in foreign currencies (with maturities at or before the spot value date). To discourage speculation by foreign banks, the regula-

<sup>5</sup> Descriptions of these measures can be found in Goldstein and others (1993, p. 57), and IMF, *World Economic Outlook: Interim Assessment* (1993, pp. 2-3).

tions required that the domestic banks deposit an amount equal to the value of new peseta-denominated loans to nonresidents, except for loans related to commercial activities. Finally, the domestic banks were directed to hold a cash reserve equal to the full amount of new peseta liabilities in branches and subsidiaries of Spanish banks abroad or in domestic branches of foreign banks.

On October 5 these restrictions were rescinded and replaced by a new requirement for non-interest-bearing deposits at the Bank of Spain for the peseta counterpart of (1) same-day or next-day peseta sales to nonresidents and also of (2) new forward short positions in foreign currency contracted with nonresidents. These new restrictions were abolished on November 22.

In Ireland on September 24 the Central Bank began much stricter enforcement of existing capital controls. Non-trade-related credits to nonresident Irish pound-denominated accounts exceeding 250,000 Irish pounds had to be reported to the Central Bank of Ireland. Loans and swaps to nonresidents for periods of less than one year were permitted only with Central Bank permission, and forward foreign exchange transactions of less than 21 days and all non-trade-related forward transactions were prohibited altogether. Capital controls were abolished altogether on January 1, 1993.

As in Ireland, the Central Bank of Portugal introduced no new controls, but intensified those already at its disposal. On September 24 it began strict enforcement of limits on open foreign exchange positions. In addition, it enforced prohibitions against short-term escudo lending to nonresidents and nonresident purchases of domestic money market instruments. On December 16 these controls were eliminated.

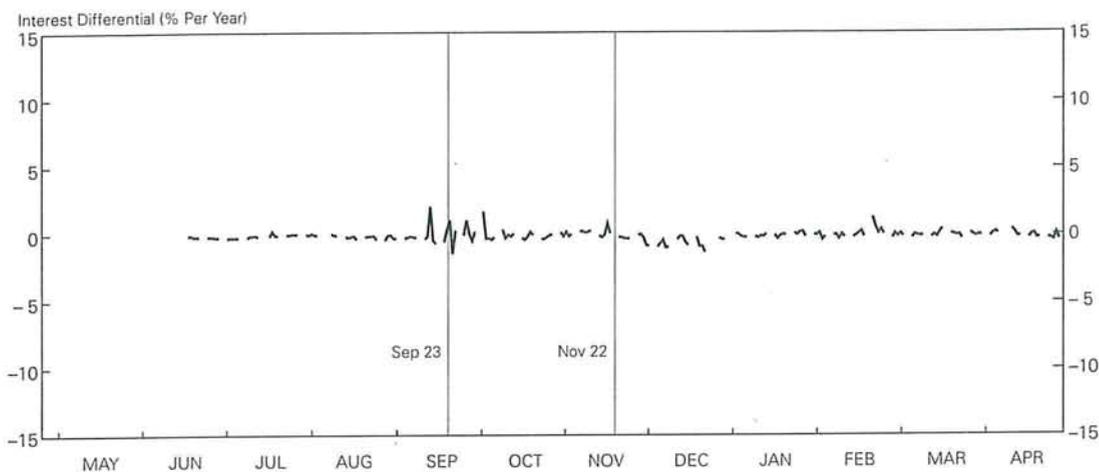
##### *The Impact of the Controls*

In none of these countries were the controls adequate to prevent devaluations within the ERM. The Spanish peseta and the Portuguese escudo were devalued by 6 percent on November 23, and the Irish pound by 10 percent on January 30, 1993.

Were the controls simply otiose, or did they at least buy a little time? A tentative answer can be gleaned by examining the behavior of differentials between interest rates in the Eurocurrency markets and comparable rates in the domestic money markets of the three countries. This analytical approach is useful because of the nature of the Eurocurrency market.

Figure 1

*Spanish Peseta: 3-Month Eurodeposit Rate minus 3-Month Domestic Interbank Rate, May 1992 to April 1993, Daily*



Note: Rates are closing bids.  
Source: DRIFACS data bank.

A Eurocurrency market is one in which depositors hold and trade balances denominated in currencies that are issued in countries other than the country where the balance (or Eurocurrency deposit) and the market are located. The largest such market is in London. One reason such markets attract deposits is that they are generally free of exchange controls and other regulations applied within the countries that issue the currencies concerned, so the interest rates paid in these markets are basically free market rates.

If markets are also free in the countries issuing the currencies, little difference will normally be observed between interest rates in those countries and the Euromarkets (for deposits of the same currency and maturity), because arbitragers will quickly shift funds to take advantage of any appreciable differentials. Consequently, a significant and sustained jump in such a differential upon the imposition of a capital control program would suggest that the controls were at least somewhat successful in impeding net capital movements.

In Figures 1 and 2 the excess of the 3-month Eurocurrency deposit rate over the corresponding domestic interbank rate is plotted for the Spanish peseta and for the Irish pound (insofar as the avail-

ability of data would permit) on a daily basis for May, 1992, through April, 1993. As data on the Portuguese escudo were not available for 3-month maturities, Figure 3 relates to overnight transactions.

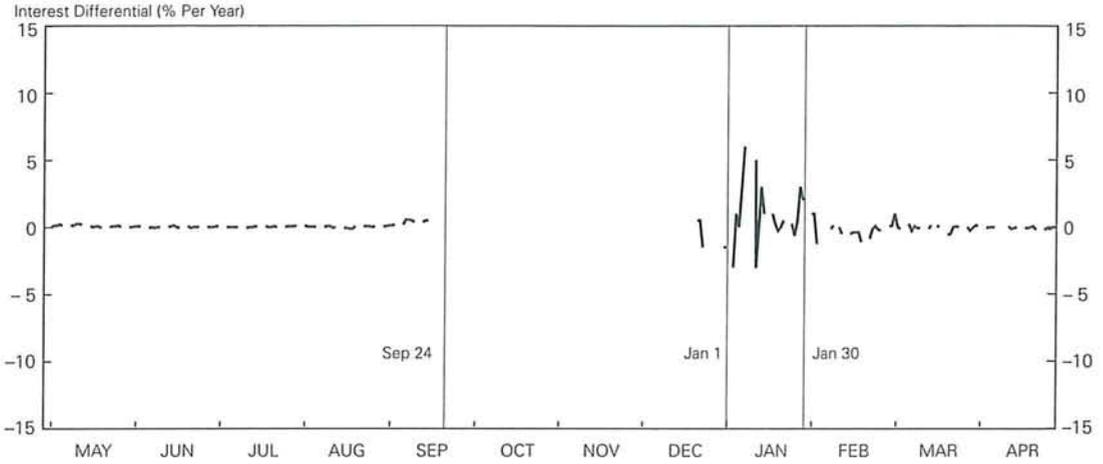
In all three countries controls were used—to some degree in lieu of further tightening of domestic monetary policy—as a means of defending the foreign exchange value of the domestic currency. Thus, if the controls were effective in insulating the domestic money market, while in force they should have permitted domestic interest rates to hover below the comparable (but free-market) Eurorates. By this criterion, the controls were unimpressive, as can be seen in the charts.

This conclusion must be qualified, however. In the case of Ireland, reliable data on which a detailed opinion might be based are not available. Once the pound sterling was withdrawn from the ERM on September 16, 1992, it became virtually impossible to obtain representative quotes for domestic interbank rates in Ireland.<sup>6</sup> This data drought continued throughout the Irish experiment with intensified ex-

<sup>6</sup> DRI, for example, could no longer get what it considered reliable quotations.

Figure 2

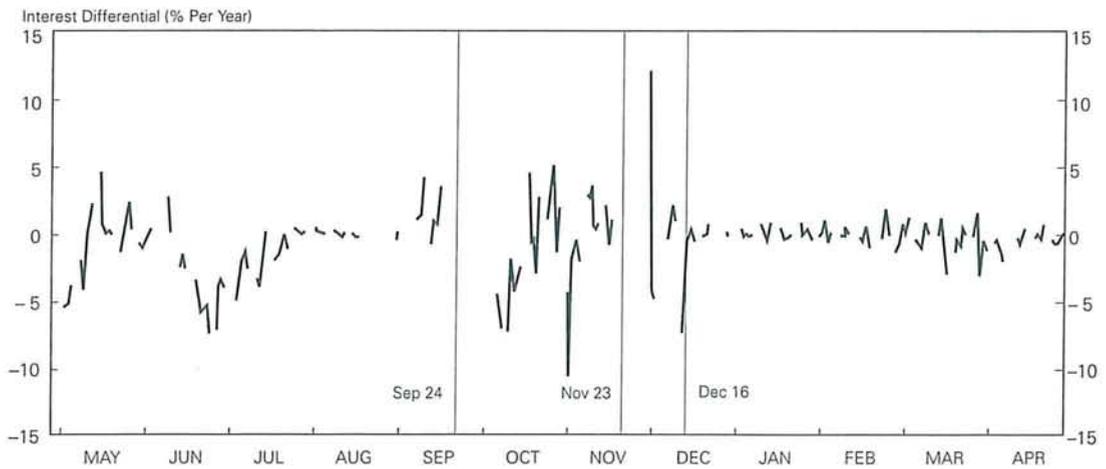
*Irish Pound: 3-Month Eurodeposit Rate minus 3-Month Domestic Interbank Rate, May 1992 to April 1993, Daily*



Note: Rates are closing bids.  
Source: DRIFACS data bank.

Figure 3

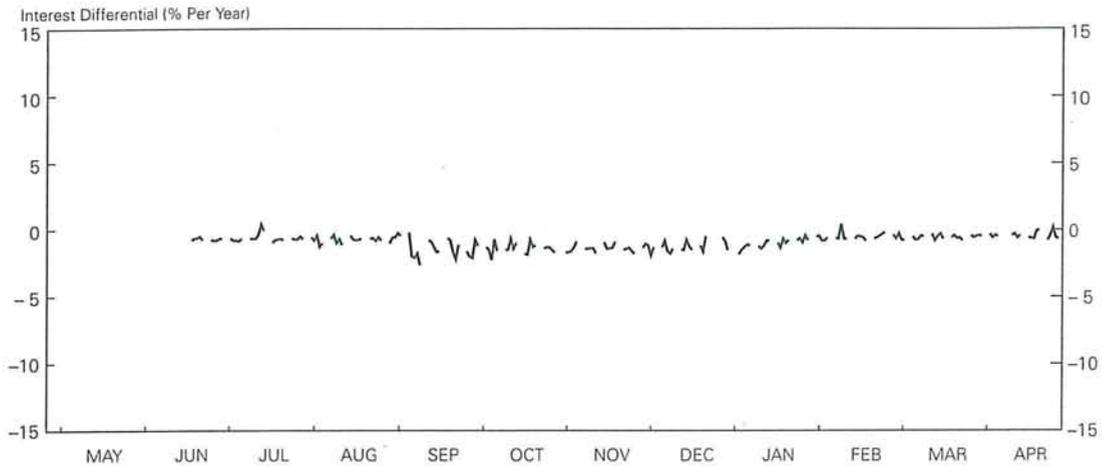
*Portuguese Escudo: 3-Month Eurodeposit Rate minus 3-Month Domestic Interbank Rate, May 1992 to April 1993, Daily*



Note: Rates are closing bids.  
Source: DRIFACS data bank and Bank of Portugal,  
*Monthly Bulletin*, various issues.

Figure 4

*Finnish Markka: 3-Month Eurodeposit Rate minus 3-Month Domestic Interbank Rate, May 1992 to April 1993, Daily*



Note: Rates are closing bids.  
Source: DRIFACS data bank.

change controls. While the absence of data makes it hard to form a judgment about the *degree* to which financial market stringency in Ireland might have differed from that in the Euromarket, it seems most unlikely that the unavailability of readily obtainable interest rate quotations would signify greater ease in the Irish market than in the Euromarket, where rates were readily quoted.<sup>7</sup>

But perhaps the negative conclusion on the efficacy of the controls must be qualified on another ground. As can be seen in Figures 4 to 6, the domestic interest rate often exceeded, sometimes significantly, the comparable Eurodeposit rate for certain other European currencies—specifically, those of Finland, Norway, and Sweden—that came under intense downward pressure in the foreign exchanges during this period. The governments of these countries strove to defend their currencies without the aid of exchange controls, although the Finnish markka was allowed to float relatively freely on September 8, the Swedish krona on November 19, and the Norwegian krone on December 10. (Again, the U.K. pound, to which Figure 7 applies, was withdrawn from the ERM on September 16.)

The fact that domestic interest rates frequently

exceeded the Eurorates for these three Scandinavian currencies during this tumultuous period inspires the question whether controls might, at least temporarily, have permitted greater ease in the domestic markets relative to the Euromarkets. In other words, since the same phenomenon was not observed, at least to the same degree, for the peseta and the escudo, should the restrictions in Spain and Portugal be given good marks? Another, related, question also arises: if controls were not being employed in the Scandinavian countries, why were significant interest differentials observed between the domestic markets and the Euromarkets?

In response, it may be that Spain and Portugal did acquire some temporary insulation. Indeed, the interest differentials observed for the three Scandinavian currencies may be attributable largely to the marked increases in interest rates required to maintain the foreign exchange values of these currencies during this period, for those increases may have exacerbated concerns about the creditworthiness of the domestic banks (that is, about their ability to pay

<sup>7</sup> This judgment is shared by analysts of both the Euromarket and the Irish market who were contacted by the author.

Figure 5

*Norwegian Krone: 3-Month Eurodeposit Rate minus 3-Month Domestic Interbank Rate, May 1992 to April 1993, Daily*

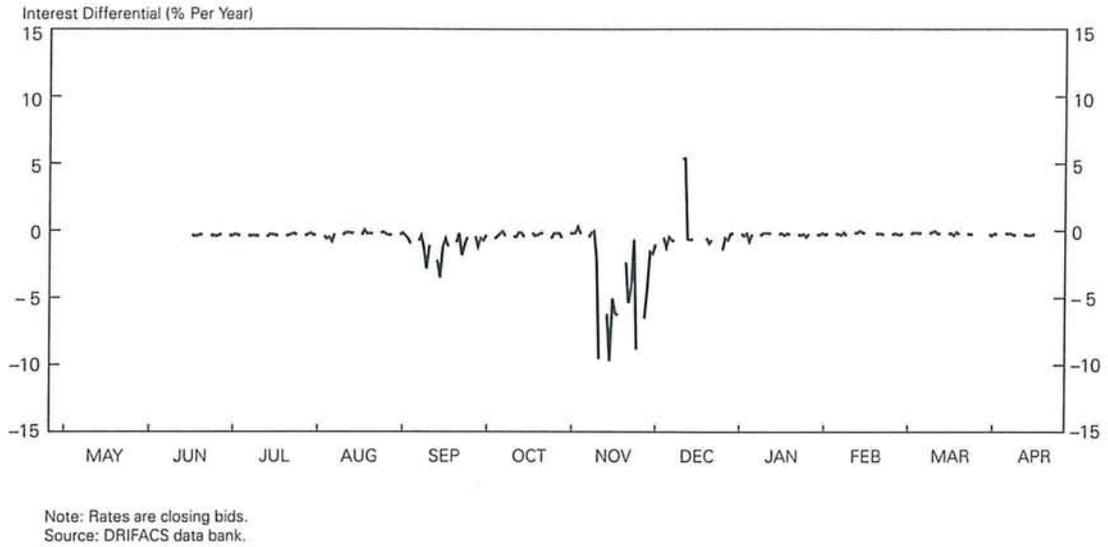


Figure 6

*Swedish Krona: 3-Month Eurodeposit Rate minus 3-Month Domestic Interbank Rate, May 1992 to April 1993, Daily*

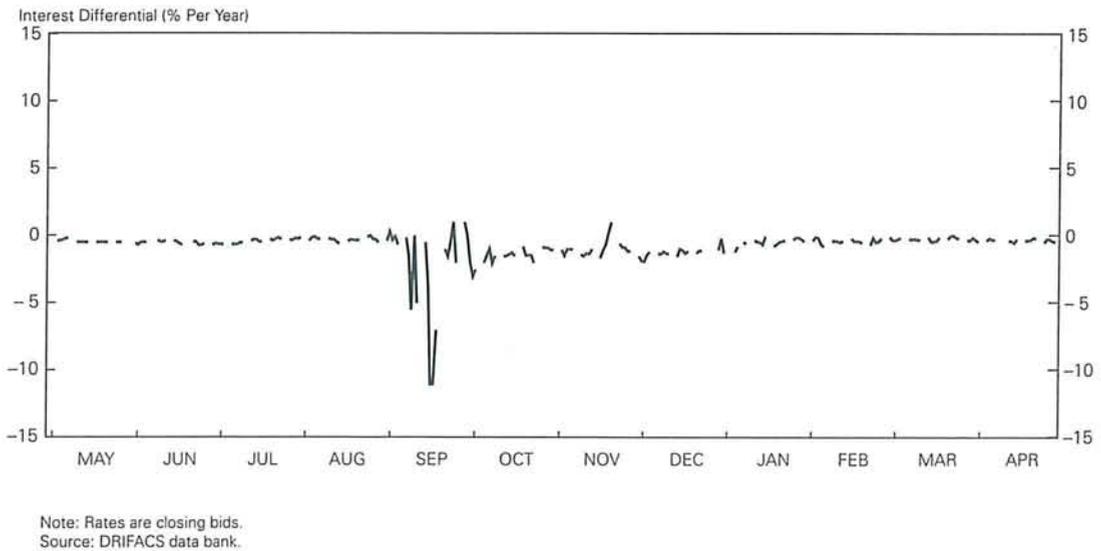
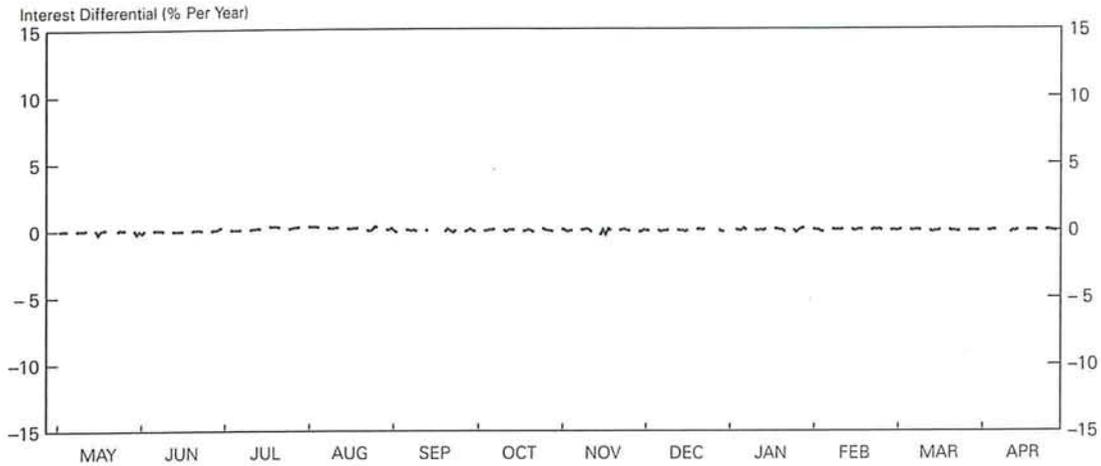


Figure 7

*British Pound: 3-Month Eurodeposit Rate minus 3-Month Domestic Interbank Rate, May 1992 to April 1993, Daily*



Note: Rates are closing bids.  
Source: DRIFACS data bank.

such increases)<sup>8</sup> and thus may have generated a credit risk premium within the domestic interest rates that was absent from the Eurorates prevailing among foreign transactors deemed more creditworthy. Insofar as controls can substitute for higher interest rates, they reduce the likelihood of such differentials. Whatever success the controls may have had in this respect seems to have eluded Ireland, however. And even in Spain and Portugal any such success seems to have been very limited, since domestic interest rates did not remain consistently or appreciably below the comparable Eurodeposit rates while the controls were in effect, and both nations devalued their currencies only two months after imposing or intensifying controls.

### V. Some Further Evidence for Portugal

Another perspective from which to evaluate capital controls is the response of the equity markets. Just before controls are introduced, market participants, as evidenced by their behavior, typically expect a depreciation of the domestic currency in the foreign exchange markets. Other things equal, such a depreciation would foster an improvement in the

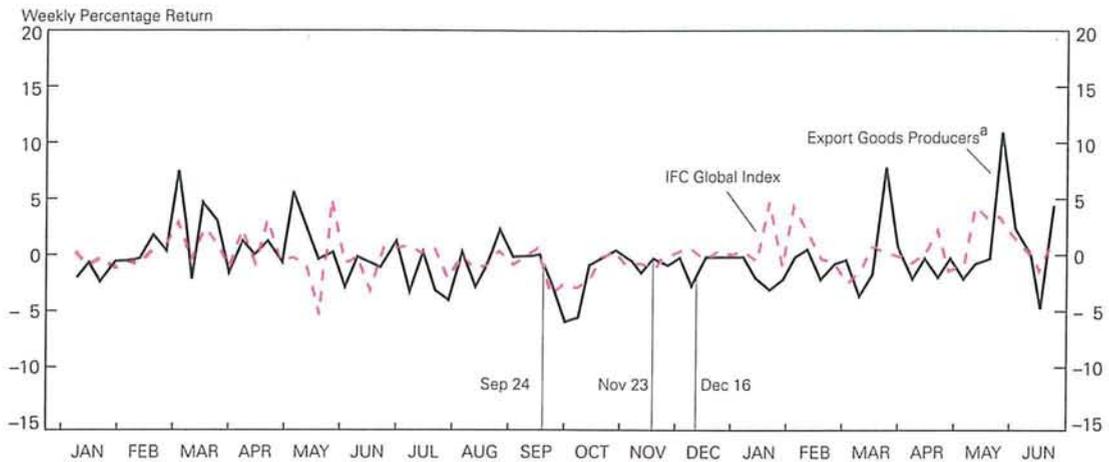
relative profitability of firms dealing in internationally traded goods, since depreciation tends to raise the relative prices (in domestic currency) of export goods and of goods that compete with imports. Therefore, disregarding other influences, if market participants believe that the controls will *avert* the depreciation, the advent of the controls should raise the relative valuation of the equities of firms dealing chiefly in *non-traded* goods.

The evaluation of any such effect on the equities markets is hampered by the lack of suitable data, but enough data may be available for Portugal to permit at least a rough, preliminary evaluation for that country. In Figures 8 to 10 are plotted the weekly percentage returns (including market price changes) for the stocks of Portuguese firms that could be identified as concentrating in the production of exports, of import-competing goods, and of non-traded goods, along with the total return to all stocks included in the market index compiled for Portugal by the International Finance Corporation.

<sup>8</sup> Some of these banks had experienced some diminution in their perceived creditworthiness even before the sharp increases in interest rates.

Figure 8

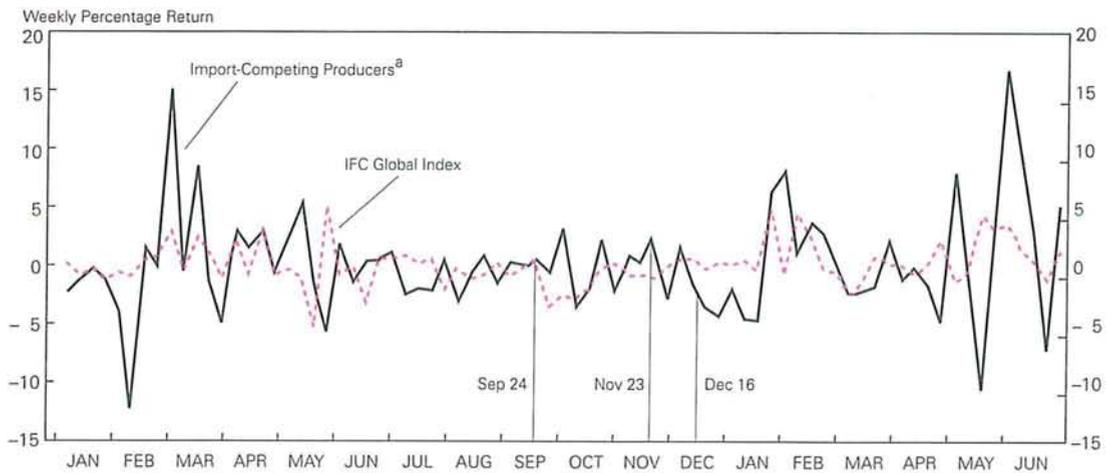
*Weekly Percentage Returns on Stocks of Selected Portuguese Firms  
January 1992 to June 1993*



<sup>a</sup>Median for 5 firms.  
Source: International Finance Corporation.

Figure 9

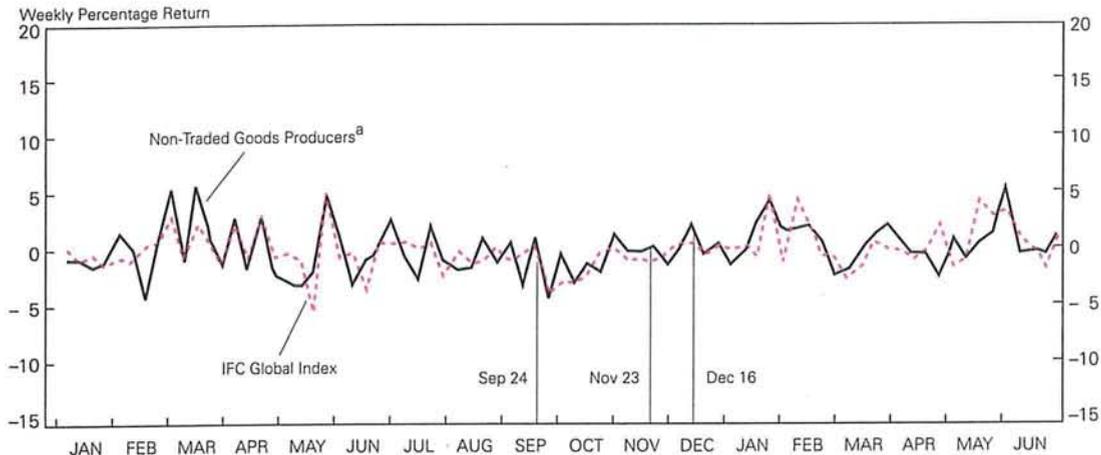
*Weekly Percentage Returns on Stocks of Selected Portuguese Firms  
January 1992 to June 1993*



<sup>a</sup>Mean for 2 firms.  
Source: International Finance Corporation.

Figure 10

*Weekly Percentage Returns on Stocks of Selected Portuguese Firms  
January 1992 to June 1993*



<sup>a</sup>Median for 4 firms.  
Source: International Finance Corporation.

As can be seen, immediately after the enforcement of controls on September 24 the returns on the equities of export-goods producers did decline relative to the overall market return, and relative to the return for non-traded-goods producers. But for the equities of import-competing firms, the weekly percentage returns rose, rather than declined, in relation to returns both for the overall market and for the non-traded-goods producers. Finally, returns on the equities of non-traded-goods producers did not rise appreciably relative to returns for the overall market. While hardly conclusive—partly because of the small sample size—these statistics in and of themselves would lend little support to any claim that market participants had much confidence in the efficacy of the controls.

## VI. Summary and Conclusion

Despite the heralded progress toward freer markets, controls over international capital movements remain the rule rather than the exception, even among the industrial countries, and such controls are tolerated, although not welcomed, by the prevailing

codes of international financial behavior, not least the *Articles of Agreement* of the International Monetary Fund. Among the various justifications offered for the controls, the claim that they can be used to prevent capital flows from destabilizing the domestic economy is perhaps of greatest interest to policymakers at this time.

The successful use of capital controls encounters major obstacles. “Destabilizing” capital flows must be defined and then identified, and efficacious enforcement mechanisms must be deployed. Empirical studies typically find that governments have had no more than fleeting and minor success in overcoming these obstacles in recent years.

The conclusion of this paper is similar. Controls employed by Ireland, Portugal, and Spain during the autumn of 1992 did not allow those countries to enjoy lower interest rates domestically than the rates prevailing for Eurodeposits in their currencies. Nor did the relative returns to the equities of traded and non-traded goods producers in Portugal clearly respond to that country’s controls in a manner implying confidence that the controls would avert a depreciation of the escudo. Spain and Portugal may have achieved some temporary insulation, but the effect

was limited and short-lived. All three countries were obliged to devalue within months after imposing or intensifying controls.

It is unlikely that capital controls can rigorously monitor the many channels through which capital can flow without the aid of techniques approaching those of the police state. At least in principle, a more

acceptable alternative might be to engage in sterilized intervention, which should succeed—and reap profits for the intervenors—if undertaken in sufficient volume to offset truly destabilizing capital movements. The continued resort to controls despite their inadequacy poses a long-standing challenge to the educational role of economists.

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# *A Decade of Boom and Bust in the Prices of Single-Family Homes: Boston and Los Angeles, 1983 to 1993*

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**T**he 1980s and 1990s have been turbulent times in the U.S. market for single-family homes. For most of the previous two decades, housing prices across states and metropolitan areas moved together and increased slowly in real terms (Case 1994). Prior to the 1970s, house prices moved at about the rate of inflation, and regional differences were relatively modest. During the 1970s, house prices grew significantly faster than the rate of inflation; homeowners earned tax-sheltered imputed rents and capital gains on their leveraged assets, producing excess returns and very low user costs of capital (Case and Shiller 1990). Regional differences, except for the California boom of 1976 to 1980, remained small, however.

The 1980s and 1990s, in contrast, have seen increased price volatility and sharp differences in price behavior across regions. Substantial housing price booms have occurred in the Northeast, California, Hawaii, Seattle, and Washington, D.C., while major price declines took place in Alaska and in many parts of the Southwest. During the 1990s, the booms of the 1980s in California and the Northeast turned to busts.

Previous papers (Case 1991; Case and Cook 1989; Case and Shiller 1993) showed that these cycles had dramatic consequences for regional economies and national mortgage markets. Boom periods lead to increased spending, rising costs of doing business, and a deterioration in the distribution of income. In bust periods, falling home prices interact with contracting regional economies and serve to exacerbate the extent of declines. Housing price declines explain a significant part of the foreclosure risk borne by owners of mortgages and mortgage-backed securities. The extent of this risk has been of increasing concern as house prices continue to drop in California, where in excess of 25 percent of the nation's single-family mortgage collateral is located.

The most dramatic of the boom-bust cycles occurred in New England and in California. Public attention has focused on the fluctuations in Boston and Los Angeles, especially. The first part of this article

describes in some detail what has happened to prices of single-family homes in the Boston metropolitan area and in Los Angeles County since 1983. The second part of the article analyzes the reasons for the similarities and differences between the two areas, both on the way up and on the way down.

### *WRS Price Indexes by Submarket: Boston and Los Angeles*

The indexes presented in this section were estimated using a variation on the Weighted Repeat Sales methodology first presented in Case and Shiller (1987). The method, described in some detail in the Appendix, uses arithmetic weighting (Shiller 1991) and is based on data on recorded sales of all properties that passed through the market more than once during the period under study. The Greater Boston file contains 102,674 pairs of sales between 1981 and June 1993, drawn from the five eastern counties of Massachusetts. The Los Angeles file contains 753,295 pairs of sales drawn from Los Angeles County during the period 1970 through June 1993.

First, an aggregate index is calculated based on all recorded sale pairs for each metro area. Submarket indexes are then calculated two different ways. First, the sale pairs are broken into "high," "middle," and "low" tiers and separate indexes are calculated for each. To calculate the tier indexes, all sales (not just repeat sales) in each quarter are broken into three equal groups ranked by price.

Next, indexes are calculated (one tier only) for separate Post Office zip codes or, where the number of transactions is insufficient to obtain accurate individual indexes, clusters of zip codes. Indexes were estimated for 75 separate geographical areas in Los Angeles County and 64 separate areas in Greater Boston.

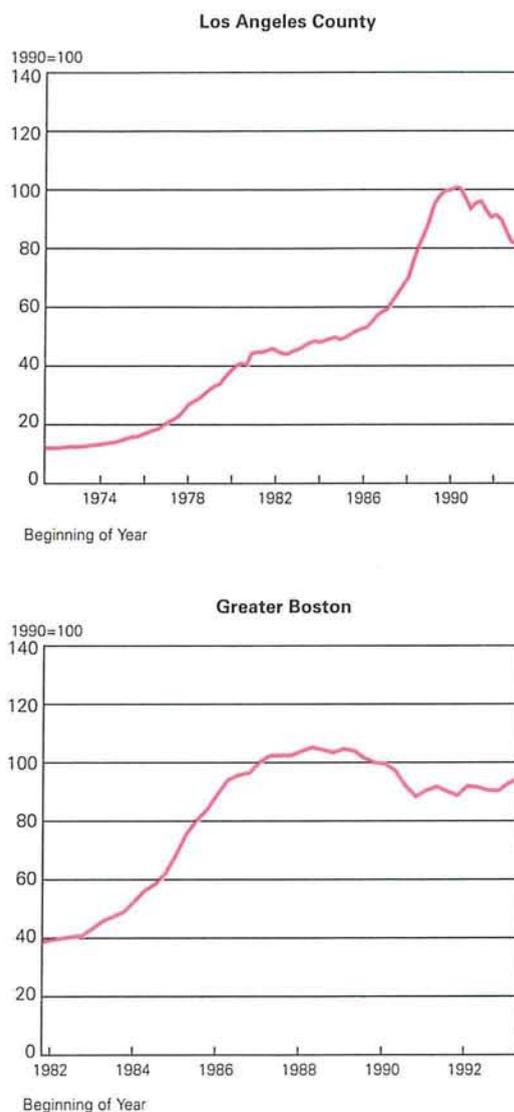
### *Aggregate Indexes*

Aggregate indexes for Los Angeles and Greater Boston are presented in Figure 1. Both the 1976-80 boom and the 1985-90 boom can be seen in the Los Angeles panel. This paper will focus on the period after 1985 in Los Angeles and the period after 1983 in Boston.

Table 1 summarizes the movements of the indexes charted in Figure 1. Between the first quarter of 1982 and the first quarter of 1983, house prices rose by 5.7 percent in both Boston and Los Angeles.

Figure 1

### *Aggregate Price Indexes for Single-Family Homes*



Consumer prices were rising at about the same rate, making real home prices flat. Real prices stayed flat and nominal price increases slowed in Los Angeles through the first quarter of 1985. But Boston prices had already begun to accelerate rapidly and were up 20 percent by the first quarter of 1984.

Table 1  
*Changes in Prices of Single-Family Homes:  
 Boston and Los Angeles*

Percent		
Period	Boston	Los Angeles
82:I-83:I	+5.7	+5.7
83:I-84:I	+20.0	+4.0
84:I-85:I	+27.2	+2.3
85:I-86:I	+35.3	+6.8
86:I-87:I	+14.8	+11.9
87:I-88:I	+6.2	+17.7
88:I-89:I	+1.0	+27.9
89:I-90:I	-3.3	+11.5
90:I-91:I	-8.8	-6.3
91:I-92:I	+3	-3.1
92:I-93:I	+1.9	-9.3
<b>Overall Increase</b>		
Boston		
83:I-88:III	+158.8	
Los Angeles		
85:I-90:II		+102.4
<b>Overall Decrease</b>		
Boston		
88:III-91:I	-15.9	
88:III-93:II	-12.6	
Los Angeles		
90:II-93:II		-19.0

Prices in Boston continued to accelerate for three full years. The highest rate of increase occurred between 1985:I and 1986:I. Three years of acceleration were then followed by three years of deceleration, with inertia keeping sales prices rising (but at a far slower pace) to a peak in the third quarter of 1988. The overall increase during the boom was 158.8 percent.

Prices in Los Angeles began accelerating two years after the boom began in Boston. The pattern was similar, with a steady four-year acceleration of prices followed by deceleration. The peak in Los Angeles occurred during the second quarter of 1990, with prices up 102.4 percent over the first quarter of 1985.

One significant difference between the Los Angeles and Boston booms was the length of the peak period. In Boston, prices remained essentially unchanged at or near the peak from the second quarter of 1987 through first quarter 1990, nearly three years.

In Los Angeles, prices peaked sharply in the second quarter of 1990 and almost immediately began to fall, dropping over 7 percent within three quarters of the peak.

Prices in both cities dropped significantly between 1990:I and 1991:I. At the same time a pattern of seasonality, not at all visible during the boom, appeared in house prices. Boston prices hit a first trough in the first quarter of 1991, rebounded during the second and third quarters and then dropped again to the same level by the first quarter of 1992. Another rebound during the second and third quarters of 1992 was followed by a slight dip to the first quarter of 1993. Again, the second quarter saw a bit of a rebound, and preliminary data for the third quarter show the rebound continuing.

A similar pattern of seasonality can be seen in the index for Los Angeles shown in Figure 1, but the trend is still sharply down through the second quarter of 1993. A slight uptick appears in the second quarter of both 1991 and 1992, but the second quarter of 1993 saw a continued slide.

Overall, the peak-to-trough decline in Boston was just under 16 percent, with a slight rebound to 12.6 percent below peak by 1993:II. Los Angeles is now down 19 percent and falling, as of 1993:II. Preliminary figures put the third quarter of 1993 down another 3.5 percent, making the overall drop in Los Angeles 21.9 percent.

Before turning to the three-tier indexes, Table 2 presents data on the *level* of prices in Boston and Los Angeles, relative to prices for the United States as a whole. In 1983, the Los Angeles median sales price was 60 percent above the U.S. median, while Boston's was only 17 percent above. Within three years, however, Boston's median sales price was nearly twice as high as the U.S. median and 18 percent above the median in Los Angeles. The second California boom propelled Los Angeles prices to more than 131 percent above the U.S. median and 18 percent above the Boston median. As of the second quarter of 1993, both the Boston and Los Angeles medians were far above the U.S. median.

### *Three-Tier Price Indexes*

Figure 2 presents indexes for three housing price tiers for the Greater Boston area since 1982; Figure 3 presents indexes for three price tiers for Los Angeles County since 1971. The data from Figures 2 and 3 are summarized in Table 3.

Starting from a lower level during the first quar-

Table 2  
*Median Sales Price of Existing Single-Family Homes*  
 Thousands of Dollars

Year	Boston	Los Angeles	United States	Boston/ U.S.	L.A./ U.S.	L.A./ Boston
1983	82.3	112.6	70.3	1.17	1.60	1.37
1986	158.1	133.6	80.3	1.97	1.66	.85
1989	181.9	214.8	93.1	1.95	2.31	1.18
1992	171.1	213.2	103.7	1.65	2.06	1.24
1993:II	175.6	202.3	109.3	1.61	1.85	1.15

Source: National Association of Realtors, *Home Sales*, monthly, various issues.

ter of 1983, the lowest price tier in Boston appreciated at about the same rate as the higher tiers until 1987.<sup>1</sup> As the middle and upper tiers begin to flatten in 1987, the lower tier continued to increase. The lower tier increased for more than a year after the upper tiers peaked in the third quarter of 1988. The prices of single-family homes in the bottom tier had tripled by the peak at the end of 1989, while middle- and upper-tier properties went up about 2.5 times.

Prices in Boston's highest tier initially fell more rapidly than prices in the lower tiers, but they bottomed out earlier. After dropping 18.5 percent to a trough in the first quarter of 1991, upper-tier properties have recovered 8.5 percent of their lost value, and as of 1993:II they stood only 11.5 percent below peak. Middle-tier properties did not bottom until 1992:I and have recovered only 1.9 percent of their lost value, standing 12.7 percent below peak as of 1993:II. Lower-tier prices continued to fall through the first quarter of 1993, flattening at 17.8 percent below peak in the second quarter of 1993.

The behavior of the price tiers was different in California. All three tiers appreciated at virtually identical rates, doubling between the first quarter of 1985 and the peak (Figure 3). As in Boston, the lower tier peaked later, but only by two quarters. Despite the uniform increases in price across the tiers on the way up, the price tiers behaved very differently on the way down. The highest tier has declined the most; as of the third quarter of 1993, the top tier was down 25.3 percent and still falling. The lower and middle tiers were also falling, the middle tier down 18.2 percent and the lowest tier down only 9.3 percent.

<sup>1</sup> The fact that the lower tier index begins at a lower level in 1983 is an artifact of the choice of 1990 as the base year for all indexes.

### Zip-Code Clusters

The patterns of price increases and decreases by price tier in both Boston and Los Angeles show that prices seem to stay closer together as they move up than when they move down. The pattern of price "spreading" on the way down can be seen most clearly in Figure 3.

When increases and decreases are calculated for separate geographical areas, a similar pattern emerges.

Figure 2

### *Index of Prices of Single-Family Homes in Greater Boston*

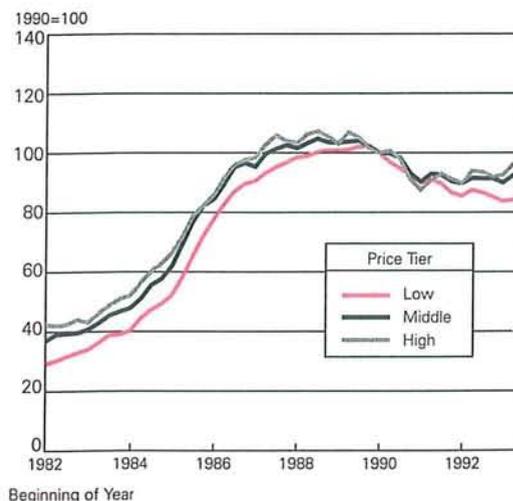


Table 3

*Changes in Prices of Single-Family Homes by Price Tier: Boston and Los Angeles*

Percent

Tier	Peak	Change 1983:I to Peak	Trough	Change Peak to Trough	Change Trough to 1993:II	Change Peak to 1993:II
<b>Boston</b>						
Low	89:IV	+201.6	93:I	-17.9	+.1	-17.8
Mid	88:III	+157.0	92:I	-14.3	+1.9	-12.7
High	88:III	+148.8	91:I	-18.5	+8.5	-11.5
Tier	Peak	Change 1985:I to Peak	Trough	Change Peak to 1993:III		
<b>Los Angeles</b>						
Low	90:IV	+103.2	93:III	-9.3		
Mid	90:II	+97.8	93:III	-18.2		
High	90:II	+105.7	93:III	-25.3		

Table 4 presents descriptive statistics on Weighted Repeat Sales (WRS) indexes for 139 separate areas within the two cities. In Boston, the average index increased 170 percent from 1983:I to the peak, with a standard deviation of 21 percent; the coefficient of variation was 0.12. On the way down, the average index dropped 17 percent with a standard deviation

of 8 percent; the coefficient of variation was 0.50.

In Los Angeles, the average index increased 100 percent from 1985:I to the peak, with a standard deviation of 14 percent; the coefficient of variation was 0.15. On the way down, the average index dropped 18 percent with a standard deviation of 7 percent; the coefficient of variation was 0.40.

Figure 3

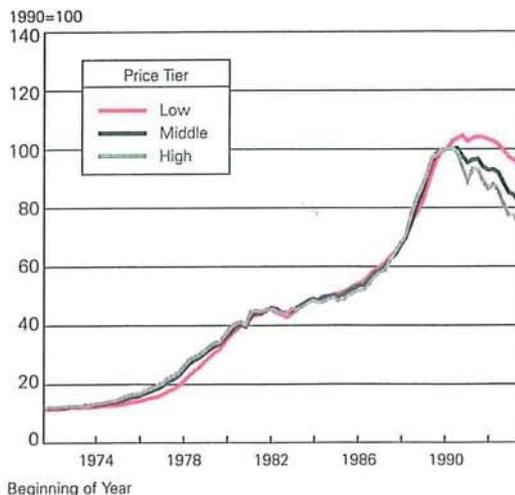
*Index of Prices of Single-Family Homes in Los Angeles County*

Table 4

*Changes in Prices of Single-Family Homes by Zip-Code Clusters: Boston and Los Angeles*

Percent (except for Coefficients of Variation)

	1983:I-Peak	Peak-1993:II
<b>BOSTON: 64 Areas</b>		
Minimum	136	-2
Maximum	235	-56
Mean	170	-17
Standard Deviation	21	8
Coefficient of Variation	.12	.50
1st Quartile	156	-.13
3rd Quartile	182	-.19
	1985:I-Peak	Peak-1993:II
<b>LOS ANGELES: 75 Areas</b>		
Minimum	51	-3
Maximum	133	-34
Mean	100	-18
Standard Deviation	14	7
Coefficient of Variation	.15	.40
1st Quartile	92	-.13
3rd Quartile	109	-.24

## The Nature of the Cycle: The Booms

When housing prices rise as rapidly as they did during the booms described above, the first place economists turn for an explanation is to the fundamentals of supply and demand. It is highly unlikely that such booms could have occurred without strong basic economic forces driving the demand for housing. It is equally unlikely that such booms could have occurred with a highly elastic supply of housing. For example, Phoenix, Arizona, has experienced the fastest growth in population of any major American metropolitan area for more than two decades, yet a rapidly expanding supply of housing has held real housing prices to only modest increases over the period.

Table 5 presents data on three fundamental economic variables for Massachusetts, California, and the United States for the years between 1985 and 1993. As measured by these variables, the economies of both states were significantly stronger than the U.S. economy as a whole prior to 1989. For the four years 1985 through 1988, nominal personal income rose an average of 8.7 percent annually in Massachusetts and 8.2 percent annually in California, compared to 6.5 percent in the United States. Employment growth in California averaged 3.3 percent during the same period compared to 2.8 percent for the nation. In Massachusetts, employment growth was slower than in the nation as a whole, but since

the state's labor force was growing slowly, the effect on its unemployment rate was dramatic. The Massachusetts unemployment rate hit 3.2 percent in 1987 (2.4 percent in July), nearly 50 percent below the national rate of 6.2 percent.

Both California and Massachusetts had strict zoning rules that made the supply of housing less responsive to demand shifts than might otherwise have been the case. Fischel (1993) presents compelling evidence that "growth control zoning" played a big role in the California experience. While no studies have isolated the effect in Massachusetts, anyone who lives in the state knows that zoning rules are controlled by 351 fiercely independent cities and towns, and that during the early years of the boom, the housing supply was relatively inelastic.

While fundamentals played a role in both housing booms, increasing evidence suggests that expectations and implicit "speculation" played a role as well. The argument is that fundamentals were insufficient to explain the extent of the price increases and that inertia, driven by adaptive expectations, pushed prices well above what could be justified by fundamentals. Greedy land speculators did not rush in, buying property to roll over into short-term gains. Rather, most home buyers, in anticipation of capital gains in the future, were willing to pay significantly higher prices as a result of those expectations.

Abraham and Hendershott show that fundamentals are insufficient to explain observed changes in

Table 5  
*Growth in Income and Employment: Massachusetts, California, and United States, 1985 to 1993*  
Percent

Year	Employment Growth			Unemployment Rate			Nominal Personal Income Growth		
	Mass.	Calif.	U.S.	Mass.	Calif.	U.S.	Mass.	Calif.	U.S.
1985	2.6	3.8	3.2	4.0	7.2	7.2	7.6	8.6	7.2
1986	2.0	2.5	2.1	3.9	6.7	7.0	8.3	7.2	7.0
1987	2.6	3.7	2.7	3.2	5.8	6.2	9.1	8.2	6.2
1988	2.1	3.6	3.3	3.3	5.3	5.5	9.9	8.6	5.5
1989	-.7	3.9	2.6	4.0	5.1	5.3	6.7	8.3	5.3
1990	-4.0	2.1	1.3	6.0	5.6	5.5	3.3	5.4	5.5
1991	-5.4	-3.4	-1.3	9.0	7.6	6.8	1.0	-.5	6.8
1992	-1.5	-1.9	.1	8.5	9.2	7.4	4.4	1.5	7.4
Sept. 1993	—	—	—	7.2	9.4	6.7	—	—	—

Source: Federal Reserve Bank of Boston, *New England Economic Indicators*, various issues; John E. Anderson Graduate School of Management at UCLA, *The UCLA Business Forecast for California*, Sept. 1992; U.S. Bureau of Labor Statistics, "The Employment Situation," Release, various dates.

Freddie Mac price indexes for the Northeast in the mid-1980s and for California in the late 1980s (1992, pp. 39-40):

The equations also pick up the mid 1980s bounce in California, but miss totally the surge in the late 1980s. . . . The inability to explain the sharp price movements in the Northeast . . . is especially troublesome. Only one-third of the extraordinary run-up in the Northeast in the middle 1980s is explained. . . . Part of this seems to be a speculative bubble; using the observed, rather than the simulated, lagged appreciation rate explains another quarter of the increase.

Case has a similar result for Boston (1986, p. 47):

While the economy is healthy and income is growing, market "fundamentals" do not seem to offer an adequate explanation for the very rapid increase in home prices in the Boston area since 1983. Recent economic theories of asset price behavior previously used to explain price "bubbles" in financial markets and foreign exchange markets seem to fit the housing market very well.

Case and Shiller (1988) surveyed those who purchased homes in four cities during May of 1988: Anaheim, Boston, Milwaukee, and San Francisco. Extensive questionnaires completed by nearly 1,000 respondents leave little doubt that expectations of continued price increases in California and Boston played a significant role in driving the demand for housing.

The patterns of the price movements in California and Boston themselves present significant evidence of an expectations-driven run-up (Figure 1). An efficient asset market should behave like a random walk, reacting instantaneously to new information. The picture of asset prices smoothly accelerating and decelerating over a four-year period is exactly the opposite of what efficient markets theory suggests. When prices were rising rapidly, everyone "knew" that owning was a smart move; and all homeowners earned extraordinary returns except, of course, those who bought at or near the peak.

The fact that prices have since collapsed in both Boston and Los Angeles adds weight to the argument that part of the explanation for the booms lies outside the fundamentals. It is true that the fundamentals deteriorated after 1988 in both cities. This can be seen in Table 5. Employment declines in Massachusetts began in 1989 and became severe in 1990 and 1991. Serious employment decline began in California two years later. But notice that the economic fundamentals deteriorated *after* the housing market had turned, not before. Case (1991) presents evidence that the

economy of Massachusetts was driven on the way up and on the way down by the real estate cycle itself, not vice versa.

Finally, the fact that the price increases across jurisdictions were similar on the way up but the declines were uneven on the way down in both cities (Table 4 and Figures 2 and 3) provides additional

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*The economic fundamentals  
deteriorated after the housing  
market had turned in  
Massachusetts and California,  
not before.*

---

evidence that fundamentals were not the only forces driving the market on the way up. As long as those seeking housing shop across sub-markets, a regional gain in employment and income combined with a sluggish supply response would likely lead to broad-based price increases, even in housing sub-markets with less favorable characteristics. But price increases during the boom periods in both states were virtually identical in areas that were very different in terms of their fundamentals. For example, when unemployment hit its lowest point in Massachusetts in 1987, the unemployment rate in Fitchburg and Lawrence was 30 percent higher than the statewide average, and in New Bedford and Fall River it was more than 60 percent higher. Yet, during the housing price boom, all these areas experienced nearly identical increases. On the way down, however, it was precisely the areas with high unemployment and low income growth that experienced the biggest drops in housing prices.<sup>2</sup>

If demand were driven largely by anticipated capital gains, however, and expectations were similar across the region, one would predict uniformity on the way up and dispersion on the way down; those areas where home prices departed most from fundamentals would experience the biggest declines. This is precisely what happened in both California and Massachusetts.

A similar pattern has been observed by technical analysts of stock prices after a boom. That is, during

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<sup>2</sup> The pattern of decline will be discussed later in more detail. See Table 7.

boom periods, stock prices tend to rise together, but on the way down in bear markets, price decreases are largest in stocks with weak underlying fundamentals.<sup>3</sup>

### *The Pattern of Decline: A Return to Fundamentals*

Regardless of the extent to which the economies of Massachusetts and California were driven by the real estate cycle, the dramatic economic decline in the two states has hurt their housing markets. While the nation as a whole lost less than 2 percent of its jobs during the 1990–91 recession, Massachusetts lost an incredible 11.6 percent of payroll employment and California lost 5.3 percent. The unemployment rate has dropped recently in Massachusetts, but it continues to rise in California.

While economic decline and the speculative nature of the housing boom together explain why house prices as a whole have fallen in both metropolitan areas, they do not explain the pattern of those declines. Recall that in Los Angeles, the upper tier of property values has fallen over 25 percent and continues to fall, while the lower tier has fallen less than 10 percent. The opposite is true in Boston. While all three tiers initially fell at about the same rates, the bottom tier is currently down 17.8 percent while the top tier has fallen only 11.5 percent (Table 3).

Smith and Tesarek (1991) show that the pattern of declines in Houston during the 1985–87 bust was very similar to the declines in California. In Houston, “high-quality” houses lost nearly 30 percent of their value. Houses in the middle-quality tier lost 24 percent of their value, and houses in the lower tier lost only 18 percent of their value. Smith and Tesarek suggest several reasons for the pattern in Houston. First, the upper end of the market experienced the greatest appreciation during the boom. Second, building was concentrated at the upper end of the quality range, glutting the market. Third, sharp reductions in “entrepreneurial and professional income” led to steeper declines in demand at the top (p. 412). Smith and Tesarek also find that “shifts in demand toward the upper-scale market led to a faster recovery in this portion of the residential market” (p. 413); this also appears to be happening in Boston.

Poterba (1991) and Mayer (1993) also analyze the behavior of home prices by price tier. Using data from 1970 to 1986 on four cities (Atlanta, Chicago, Dallas, and Oakland) taken from Case and Shiller (1989),

Poterba shows that properties in the upper tier appreciated faster than properties in the lower tier. He attributes the pattern to high marginal tax rates and expectations of rising inflation. Mayer, using the same data, argues that Poterba’s focus is too narrow and looks at several other explanations for the observed patterns. Finding that prices in the upper tier in the four cities are more volatile than prices in the lower tier, he focuses on changes in user costs and other cyclical factors.

In Los Angeles and Boston, however, the pattern of change across tiers is reversed. What explains the differences? The data below suggest several explanations: (1) Prices in the lower tier of housing in Boston rose more rapidly during the boom because housing prices initially were lower than in California. In addition, the economic boom reached farther down into the income distribution as unemployment dropped much more sharply in Boston than in California. As a result, first-time home buyers entered the market, driving up ownership rates among lower-income households in Boston. (2) Lower-tier prices have since fallen more sharply in Boston because this sector experienced the greatest increase during the boom and because lower-income areas in Boston have experienced the greatest economic problems. (3) In addition, the lower end of the housing market in Boston was glutted with condominium conversions while the bulk of the building in Los Angeles was in the upper tier of housing. (4) The demand side for the lower tier in California has been supported by pent-up demand for ownership and very high levels of immigration.

Between 1983 and the peak in 1989, the lower tier in Boston experienced a 200 percent increase in value, while the lower and middle tiers together increased about 150 percent (Table 3). Recall that in 1983, housing prices in Boston were only 17 percent above the U.S. median. With rising incomes and low unemployment, the bottom tier of properties was affordable to many. This was not the case in California where, even at the beginning of the boom, housing prices were nearly 70 percent above the U.S. median (Table 2). Moreover, the unemployment rate in Boston dropped to much lower levels than it did in California (Table 5). As first-time buyers came into the market, the ownership rate increased.

As Table 6 shows, in 1980, 55.4 percent of house-

<sup>1</sup> Wall Street technical analysts describe this phenomenon as a “well-known fact” among traders. We could, however, find no published empirical research either to document it or to refute it.

Table 6  
*Ownership Rates by Income: Boston and Los Angeles, 1985 and 1989*  
 Percent

Income	1980		1985		1989	
	Boston	Los Angeles	Boston	Los Angeles	Boston	Los Angeles
0-\$19,999			34.9	29.5	33.6	29.7
\$20,000-\$49,999			61.0	50.3	54.9	44.1
\$50,000 +			85.9	78.5	82.3	74.4
All Households	55.4	53.8	58.1	47.9	59.4	48.9

Source: U.S. Bureau of the Census, *State and Metropolitan Area Data Book*, 1991, Table A, pp. 5 and 33; *American Housing Survey*, Volumes H170-85-3, 85-7, 89-3 and 89-7, Tables 2-1 and 2-12.

holds owned their units in Boston while 53.8 percent owned in Los Angeles. By 1985, the second year of the Boston boom, home ownership rates had jumped to 58.1 percent in Boston while the rate had dropped to 47.9 percent in Los Angeles. More importantly, the ownership rates jumped most significantly in the middle-income category. In 1985, homeownership among households with incomes between \$20,000 and \$50,000 reached 61 percent in Boston while remaining at 50.3 percent in Los Angeles.

On the way down, housing prices in the lower category fell the most in Boston and the least in Los Angeles. In Boston, the economic downturn hit the lowest-income areas the hardest. Table 7 shows the unemployment rate and declines in house prices in six labor market areas in and around metropolitan Boston. These are among the lowest-income areas in

Massachusetts, and they have experienced the highest incidence of unemployment. It is precisely in these areas that property values have fallen most. Single-family homes are down in value more than 50 percent in Lowell and 44 percent in Brockton, while for the Boston metropolitan area as a whole, values are down only 16 percent. To the extent that implicit speculation by home buyers during the boom drove prices substantially above their fundamental values, the downward spiral has been exacerbated for the lower tier.

Another explanation for the different behavior of prices by tier in Los Angeles and Boston can be found on the supply side of the market. Specifically, the Boston market became glutted with condominiums between 1985 and 1989. Many condos were conversions of low-end properties in places like West Roxbury, Brighton/Allston, South Boston, and East Boston, as owners moved to take advantage of very low rent-price ratios. Condominium conversions were not an important factor in the Los Angeles market, and condominiums in California are more upscale, on average.

Table 8 compares the *American Housing Survey* inventories of housing units and condominiums for both cities in 1985 and again in 1989. Boston experienced a net increase of 73,800 housing units between 1985 and 1989. During the same period, condominium units increased by 52,100, accounting for 70.6 percent of the total. In Los Angeles, condominium units increased by only 20,600 while total units increased by 148,900; condominiums accounted for only 13.8 percent of the total.

The vacancy rate for condominium units shot up from 12.7 percent to 15.6 percent in Boston while in Los Angeles it was cut to 5.9 percent, lower than the overall vacancy rate. Condominiums were a smaller

Table 7  
*Unemployment Rates and House Prices:  
 Selected Labor Market Areas in  
 Massachusetts*

Labor Market Area	1992 Unemployment Rate <sup>a</sup>	Single-Family Home Price Decline since Peak <sup>b</sup> (Percent)
Brockton	10.2	-44
Fitchburg	9.7	-24
Lawrence/Haverhill	9.9	-33
Lowell	8.9	-56
Worcester	8.9	-23
Boston Metropolitan	8.5	-16

Source: <sup>a</sup>Unemployment rate is the yearly average for 1992. Federal Reserve Bank of Boston, *New England Economic Indicators*, May 1993, p. 13. <sup>b</sup>WRS indexes: see the Appendix.

Table 8

*Housing Units and Condominiums in Boston and Los Angeles, 1985 and 1989*

Thousands of Units

	Boston			Los Angeles		
	1985	1989	Change	1985	1989	Change
Housing Units	1594.6	1668.4	73.8	3030.8	3179.7	148.9
Vacant	106.7	129.0	22.3	172.6	201.0	28.4
Vacancy Rate (%)	6.7%	7.7%		5.7%	6.3%	
Condominium Units	66.1	118.2	52.1	155.9	176.5	20.6
Vacant	8.4	18.4	10.0	16.4	10.5	-5.9
Vacancy Rate (%)	12.7%	15.6%		10.5%	5.9%	
Condominium as % of Total Units	4.1%	7.1%	70.6%	5.1%	5.6%	13.8%

Source: U.S. Bureau of the Census, *American Housing Survey*, Volumes H170-85-1, 85-7, 89-3 and 89-7, Tables 1-1 and 2-1.

proportion of total units in Boston than in Los Angeles before the boom; by the end, however, condominiums as a fraction of total units was 27 percent higher in Boston.

In all cities, condominiums on average serve a lower-income population of owners than single-family detached units. As Table 9 shows, the differences between Boston and Los Angeles were dramatic. In 1985 the median condominium in Boston was worth less than \$100,000, which was 74 percent of the value of the median detached house. In Los Angeles, the median condominium was worth \$116,000, which was 92 percent of the value of the median detached house. By 1989, the median condominium in Los Angeles was selling for \$173,700, or 30 percent more than the average condominium in Boston.

On the supply side, the size of the new units provides another indicator that new supply in Boston was concentrated more than in Los Angeles on the lower end of the market (Table 10). In Boston, 46 percent of the net new units had six rooms or fewer, while in Los Angeles the corresponding figure was only 32 percent.

Yet another explanation of why the lower end of the housing market in California has fared better than the middle and upper segments lies on the demand side of the market. Table 11 presents population and immigration statistics for the Greater Los Angeles area and for Greater Boston, compiled by the Joint Center for Housing Studies at Harvard.

First of all, the population of Los Angeles grew by more than 25 percent between 1980 and 1990 while Boston's population grew by only 5 percent. Second,

Los Angeles experienced an inflow of over 2 million immigrants while the flow into the Boston area was only one-tenth as large. Not all immigrants are poor, but a lot of them are. Immigration clearly puts pressure on the lower end of the housing market.

Finally, look back at Table 6. Recall that some of the strength in the lower end of the Boston market during the boom was attributed to lower- and middle-income households that were able to become homeowners. Boston was an affordable city when the boom began, and economic growth pushed benefits

Table 9

*Median Value of Occupied Housing Units: Boston and Los Angeles, 1985 and 1989*

Thousands of Dollars

	1985	1989
<u>Los Angeles</u>		
Single-Family Detached	126.6	234.6
Condominium	116.4	173.7
Condo./Single-Family	.92	.74
<u>Boston</u>		
Single-Family Detached	133.6	197.2
Condominium	98.9	133.6
Condo./Single-Family	.74	.68
<u>Los Angeles/Boston</u>		
Single-Family	.94	1.19
Condominium	1.18	1.30

Source: U.S. Bureau of the Census, *American Housing Survey*, Volumes H170-85-3, 85-7, 89-3, and 89-7, Table 2-19.

Table 10  
*Net New Housing Units by Number of Rooms: Boston and Los Angeles, 1985 to 1989*

	Boston	Los Angeles
6 or Fewer Rooms	34.0	48.3
Percent of Total Units	46	32
More than 6 Rooms	39.9	100.5
Percent of Total Units	54	68

Source: U.S. Bureau of the Census, *American Housing Survey*, Volumes H170-85-3, 85-7, 89-3, and 89-7, Table 1-2.

Table 11  
*Total Population and Immigration: Boston and Los Angeles*

	Total Population	New Immigrants 1980-1990	Percent of 1980 Total
<b>Boston</b>			
1980	3,974		
		187	4.7
1990	4,172		
Change 1980 to 1990	198		
Percent Change	+5.0		
<b>Los Angeles</b>			
1980	11,498		
		2,061	17.9
1990	14,531		
Change 1980 to 1990	3,033		
Percent 1980-90	+26.3		

Source: Joint Center for Housing Studies of Harvard University, *The State of the Nation's Housing, 1993*, Table A-9, pg. 30.

to lower economic levels than was the case in California. Homeownership rates jumped in Boston but did not in California. In fact, homeownership rates remained low in Los Angeles right through 1989 when, in the \$20,000 to \$50,000 income range, the rate was 44.1 percent compared to 54.9 percent for Boston. This suggests that more pent-up demand existed in Los Angeles, and as prices and interest rates dropped after 1990, a population of potential buyers was ready to move. Once again, this segment of first-time buyers is concentrated at the middle and the lower end of the income spectrum.

## Conclusion

This article has compared two dramatic boom/bust cycles in single-family home prices: Boston and Los Angeles. Overall, between the end of 1982 and the peak of the cycle in 1988 and 1989, home prices in Boston increased more than 150 percent. The overall price increase in Los Angeles was just over 100 percent and occurred between 1985 and 1989. All three price tiers in Los Angeles rose at very similar rates during the boom. In Boston, while the price tiers initially rose together, the lowest tier continued to increase for a year after prices in the upper tiers had stalled.

On the way down, the price tiers behaved quite differently in the two cities. In Boston, the three tiers fell together until the spring of 1991. Since then, the upper tier in Boston has recovered somewhat and as of the second quarter of 1993 was down only 11.5 percent. Preliminary data for 1993:III put the decline from peak at only 9.1 percent. The lowest tier has fallen the most, down nearly 18 percent as of the second quarter of 1993 and 15 percent as of the third quarter.

One cannot explain the pattern and extent of the Boston and Los Angeles booms solely with fundamental economic variables. While prices do not boom as they did in these cities unless market fundamentals are positive, evidence is mounting that at least part of the increase in both metro areas can be attributed to speculative behavior on the part of buyers and sellers.

Finally, the article set out to explain why the price tiers in Boston and Los Angeles behaved differently over the cycle. Evidence was presented that suggests several explanations: (1) The lowest tier in Boston rose more rapidly during the boom because housing prices were initially lower; the economic boom reached farther down into the income distribution as unemployment dropped more sharply than in California; and first-time home buyers entered the market, driving up ownership rates among lower-income households. (2) The lowest tier has fallen more sharply in Boston because this sector experienced the greatest increase during the boom and because lower-income areas in Boston have experienced the greatest economic problems. (3) In addition, the lower end of the housing market in Boston was glutted with condominium conversions, while the bulk of the building in Los Angeles was in the upper tier. (4) The demand side of the lower tier in California has been supported by pent-up demand for ownership and dramatic levels of immigration.

## Appendix A

### The WRS Index

The biggest problem faced by analysts of the residential real estate market is the lack of good time series on house prices. The most commonly used series is the National Association of Realtors' "median price of existing single-family homes." The NAR generates this series for a large number of metropolitan areas quarterly and for the United States as a whole monthly, but they were not useful for this study. First, they are available only since 1981. Second, changes in the median home price in an area depend both on changes in house prices and on changes in the mix of homes that happen to sell.

An earlier study (Case and Shiller 1987) discussed the problems associated with the NAR data and constructed an alternative based on microdata using a technique called the Weighted Repeat Sales (WRS) method, a modification of one first proposed by Bailey, Muth, and Nourse (1963). The method uses observations on individual houses that sold more than once during the sample period. Specifically, the change in log price for each observation is regressed on a set of simple dummy variables. The dummies are set to  $-1$  for the period of the first sale and to  $+1$  for the period of the second sale and to  $0$  otherwise. The resulting coefficients are the values of the log price index (WRS<sub>*t*</sub>). Bailey, Muth, and Nourse argued that if individual house log price changes differed from the citywide house log price changes by an independent, identically distributed noise term, their method produces the best linear unbiased estimate of the citywide log price index.

In the earlier study (Case and Shiller 1987) it was argued that the house-specific component of the change in

log price is not likely to be homoscedastic, but that the variance of the error is likely to increase with the interval between sales. Specifically, it was assumed that the log price  $P_{it}$  of the  $i$ th house at time  $t$  is:

$$(1) \quad P_{it} = C_t + H_{it} + N_{it}$$

where  $C_t$  is the log of the citywide level of housing prices at time  $t$ ,  $H_{it}$  is a Gaussian random walk (where  $\Delta H_{it}$  has zero mean and variance  $\sigma_H^2$ ) that is uncorrelated with  $C_T$  and  $H_{jT}$  for all  $T$  and  $i \neq j$ , and  $N_{it}$  is an identically distributed normal noise term (which has zero mean and variance  $\sigma_N^2$ ) and is uncorrelated with  $C_T$  and  $H_{jT}$  for all  $j$  and  $T$  and with  $N_{jT}$  unless  $i = j$  and  $t = T$ .

In equation (1)  $N_{it}$  represents the truly random component of sales prices around true value resulting from random events in the search process, the behavior of real estate agents, and other imperfections.  $H_{it}$  represents the individual drift in house value through time.

These assumptions led to a three-step weighted (generalized) least squares procedure. The Weighted Repeat Sales (WRS) method effectively downweights observations whose error variance is larger, and the error variance is assumed to be linear in the time interval between sales. The linear function has an intercept equal to twice the estimate of  $\sigma_N^2$ , and a slope equal to an estimate of  $\sigma_N^2$ . The intercept is very important; otherwise, houses that turned around very quickly would be given substantially more weight than other houses, and this would add noise to the resulting index.

The original WRS method was modified to make the index linear rather than loglinear in price (Shiller 1991). The linear formulation results in an index that is more closely analogous to the value of a portfolio of real estate.

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