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George G. Kaufman

FEDERAL RESERVE BANK OF CHICAGO

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One of the major concerns in current housing finance is what role will the traditional mortgage lending institutions, in particular the thrift institutions, have in future residential mortgage financing. This concern is real because, until the late 1970s, savings and loan associations and mutual savings banks together generally accounted for at least one-half of the new mortgages made directly to home buyers in any year. In contrast, in 1980, they accounted for only 29 percent of such mortgage lending, in 1981 for only 22 percent, and in 1982, they actually decreased their direct residential mortgage commitments before bouncing back to 25 percent in 1983 (Table 1).

However, as may also be seen from Table 1, these figures overstate the decline in mortgage lending by these institutions because they have in part replaced their direct mortgage lending to home buyers with indirect mortgage lending by purchasing participations in mortgage pools put together by themselves or others. That is, for reasons that will be analyzed later, thrift institutions have shifted some of their home mortgage lending activities from primary securities made directly to home buyers to secondary securities made indirectly to home buyers. Thus, their market share of total new mortgage investment did not fall as sharply. However, until 1983, the increase in mortgage pool investments did not offset totally the decline in direct mortgage loans, although the purchases of such investments in 1982 did prevent an overall net disinvestment in mortgages. In 1983, thrift acquisitions

of mortgage pools increased their total mortgage investments to near their market share figures of better years. And 1984 appears to be starting off well, at least in terms of the volume of mortgage acquisitions. Thus, the decline in mortgage lending by thrift institutions from 1978 to 1982, while substantial and long, may primarily have reflected transition problems as the institutions got out from under restrictive regulations and the market developed new instruments and techniques to deal with the new economic environment.

This paper will discuss 1) the reasons for the relative decline in the importance of thrift institutions as direct mortgage lenders to households in the early 1980s, 2) the implications of deregulation in the financial sector for thrift institutions and their mortgage lending, 3) the problems confronting thrift institutions, in particular, interest rate risk management, 4) innovations in mortgage financing on both the primary and secondary markets, and 5) the prospects for thrift institutions as important direct and indirect home mortgage lenders for the remainder of the 1980s.

Reasons for the Decline in Mortgage Lending by Thrifts

The reasons for the decline in the relative importance of savings and loan associations and savings banks as mortgage lenders in the late 1970s and early 1980s are well known and need only be summarized here. Their difficulties stemmed primarily from the prolonged and mostly unexpected rise in interest rates since the mid-1960s. This had a number of unfavorable effects. Most directly, it increased the cost of short-term funds, the traditional source of funding for these institutions, relative to revenues from long-term fixed-rate mortgage loans, the traditional use of funds. To mitigate the impact of this effect on the institutions, legislators and bank regulators imposed two regulations that, although well intentioned, proved very costly in the long-run and served importantly to emphasize the short-term

horizon and political nature of most regulatory actions. In the mid-1960s, the regulators extended deposit rate ceilings from commercial banks to thrift institutions to hold down their interest costs and maintain their profitability. The ceilings acted much like a maximum wage law would have in, say, the automobile industry to protect it from competition, with just as predictable results. Although the ceilings may have succeeded in holding down the interest costs of the affected institutions, they caused difficulties every time market rates rose above the ceiling rates, which, as may be seen from Figure 1, was often. Just as labor would drift from the automobile firms to firms not subject to a maximum wage ceiling, savers redirected their new and occasionally even their old funds to institutions not subject to these ceilings. These shifts were made easier by dramatic technical advances in transferring funds quickly and cheaply. In periods of disintermediation, the thrift institutions expanded more slowly and their mortgage lending slowed despite more generous advances from the Federal Home Loan Banks. To the extent the latter offsets private disintermediation, it represented a shell game with the losers being the small savers who could not afford the transactions costs of shifting their funds elsewhere.

In an attempt to reduce disintermediation from these institutions, the regulators raised the ceilings on six month deposits (MMCs) in 1978 by tying the ceiling rate to the six month Treasury bill rate. This succeeded in stimulating a large inflow of such funds, but significantly increased the interest rate risk exposure of the institutions by shortening the maturity (duration) of their deposits and enlarging the mismatch relative to the maturity (duration) of their primarily long-term fixed-rate mortgages.

However, the legislators and regulators were concerned not only with the impact of the higher interest rates on mortgage lending institutions, but also on mortgage borrowers. Residential housing has traditionally been the beneficiary of special government concern.¹ Thus, they prevented most institutions from offering variable or adjustable rate mortgages (VRMs or ARMs), which would

shift the risk of future interest rate increases from the institutions to the borrowers and may reduce demand. This, too, had desired immediate effects, but undesirable longer-term effects as the weakened thrifts were increasingly unable to extend additional mortgage loans of any type.

Of course, the unfortunate state of the thrift institutions in this period was not the fault of the government alone. The institutions themselves must accept a good share of the blame. They, on the whole, supported the extension of the deposit rate ceilings to them in 1966 and fought vigorously to maintain them -- most visibly during the so-called "Wildcard Experiment" in 1973 -- and, with the major exception of California associations, fought only half-heartedly for ARM authorization and additional lending powers.² Until the very end, they opposed any major liberalization of the system of deposit rate ceilings. The industry was no more farsighted than the regulators or Congress.

Deregulation

Finally in 1980 it became evident to even the most pro-regulation legislator and regulator that the housing finance system not only was not working efficiently but was both producing increasingly unfair results in that income was being redistributed from lower to middle and upper income households and in imminent danger of financial collapse. In that year, Congress enacted the Depository Institutions Deregulation and Monetary Control Act (DIDMCA) which provided 1) the thrifts with additional lending powers and 2) for the scheduled removal of deposit ceilings. Also in 1980, the Federal Home Loan Bank Board authorized adjustable rate-type mortgages for federal associations, and most states followed suit. Two years later, in response to further deterioration in the financial condition of the thrift institutions, Congress accelerated the process of deregulation in the Depository Institutions (Garn-St. Germain) Act to provide 1) the thrifts with still further new lending powers and 2) all depository institutions with greater ability to compete for funds with money

market funds.³ In addition, after a belated start, the bank regulators, operating as the Depository Institutions Deregulation Committee established by DIDMCA, began to remove the last vestiges of Regulation Q and permitted new types of deposits, including the payment of interest on most household checking accounts.

Arguments Against Deregulation

Thus, by 1984 the regulations that were the major constraints to thrift institution operations were pretty well removed. The thrifts were more or less free to operate as they pleased. But all were not happy. Voices were raised that deregulation would reduce, not increase, either thrift institution participation in the mortgage market or total sources of housing finance. This argument was not too surprising. It has been heard in other industries that have undergone deregulation, such as the airlines, telephone, and trucking. While regulation hampered economically efficient operation in these industries and maintained average prices higher than otherwise, it did protect management from interindustry competition and provided all consumers with greater price stability and uniformity among sellers and some consumers with lower prices than otherwise.⁴ Regulation had permitted many types of cross-subsidizations. Long-haul air passengers and cargo subsidized short-haul passengers and cargo, particularly on less frequently traveled routes; long-distance telephone users subsidized local calls; users of rental telephone equipment (the only equipment permissible) subsidized other telephone operations; medium-size checking account users subsidized small checking account users; and small savers subsidized mortgage borrowers. The beneficiaries of the quieter management, the reduced search time associated with the more uniform prices among sellers, and the lower, subsidized prices are harmed by deregulation and, not unexpectedly, cried out, shouting unfair. The recent experiences in restructuring prices in wake of the AT&T breakup illustrate this dramatically.

Implications of Deregulation

Their arguments are not entirely without merit. Deregulation produces structural change, at times quite abruptly, that tends to be accompanied by uncertainty. Most of us operate more comfortably, if not better, in an environment of structural stability and certainty. Change and uncertainty require greater effort and, while they may also produce greater gains for some, they produce losses for others. Losers, who experience actual out-of-pocket reductions in wealth, are pained more and are more vocal than are winners, who experience a windfall and would not suffer an out-of-pocket loss if they lost increases in wealth they never had. Moreover, the regulations benefited most noticeably those in place when they were first imposed; the benefits are capitalized in the value of the activity at that time. Subsequent beneficiaries paid a higher price than otherwise for the activity and operated as if the subsidy was an ongoing state of affairs. Removal of the subsidy at a later date, as some aspects of deregulation would bring about, is unlikely to affect those who benefited, but it is likely to harm current operators.⁵

Another reason for the dissatisfaction expressed by some is that the deregulation catches the thrifts at a time of financial weakness, not strength. Thus, even with the additional powers, many will not be in a good position to use them vigorously and compete effectively, and the higher interest cost of their deposits will only weaken them further.

A third argument is that, although the new adjustable rate mortgage instruments reduce the interest rate risk exposure of thrift institutions, they will also reduce the demand for mortgages as they shift the risk to the borrower who is less able to assume it. As we will discuss later in this paper, the validity of this prediction depends on the pricing policies used by the thrifts and their abilities to manage interest rate risk. Risk must be viewed together with its price or expected return; the higher the risk, the

higher the expected return. Thus, to shift the risk to borrowers, the institutions must offer a rate concession, and at the proper concession, they will find customers. Of course, the institution must be careful not to offer too large a concession so that its own income declines by more than the value of the reduced risk. The proper determination of the size of this concession is not easy. Recent surveys indicate that ARMs have become a major mortgage instrument for many thrifts. In December 1983, more than 50 percent of new mortgage loans extended were ARMs and were being made by some 80 percent of all savings and loan associations.⁶ Most institutions indicated that they made these loans at some concession from fixed rate mortgages and that there were constraints on the magnitude and timing of the rate adjustments. As will be discussed later, how profitable these instruments are to the thrifts awaits observation over a longer time span.

Lastly, many believe that the broader lending powers authorized thrifts will encourage them to cut back on their mortgage lending, and the higher costs of deposits will force them to raise their mortgage rates to compensate. Thus, housing finance is hit with a double whammy. Although appealing intuitively, neither of these arguments stands up well to analytical examination and is unlikely to be true. Market segmentation is one of the oldest and more misused theories in financial markets. Indeed, this theory underlies all attempts at credit allocation and controls. Unless prevented by barriers, investors will place their funds where they expect the returns to be highest for a given level of risk. Barriers can interfere with such an allocation to varying degrees of success. Restricting thrift lending primarily to residential real estate did not prevent a slowdown in mortgage lending when they were unable to attract deposits because of deposit rate ceilings or considered the expected return not worth the risk. The attempts at credit controls, including

the most recent experience in 1980, were widely considered ineffective and counterproductive after a brief initial period before ways of circumventing the regulations were discovered.

Moreover, even when apparently effective in directing credit to the targeted sectors, there is little guaranty that the funds will be used by the recipients in the desired way. The rapid rise in the ratio of mortgage debt to new home values in the late 1970s is shown in Table 2. It is evident that much of the mortgage credit was not used to finance the purchase of new housing. Rather, it was used to finance other expenditures, such as education, stocks, consumer durables, etc.⁷ Recent history has made amply clear, particularly to the thrift institutions, that money is fungible; if blocked one way from finding the highest return, it will find other, somewhat less efficient paths. As long as the barriers remain in place, the new paths will be made more efficient and reduce the incentive to return to the old paths when the barriers are finally lifted. The most effective barriers are those that explicitly alter the price or interest rate structure, such as explicit subsidies or penalties as the qualification of assets for the maximum bad debt reserve at thrift institutions. Of course, even the latter barrier is ineffective when the thrifts have little, if any, taxable income.

But the financial system was not always as heavily regulated as it has been in recent years. Many of the regulations were imposed after the financial debacle of the 1930s, when concern for safety was the highest and concern for efficiency was substantially lower.⁸ This is not to argue that there were no regulations or constraints whatsoever. The charters of thrift institutions generally emphasized mortgage lending, and commercial banks, particularly national banks, were restricted in their mortgage lending. Nevertheless, how did housing finance and the thrifts do in this relatively unregulated period?

The proportion of residential mortgage loans held by major types of lending institutions every 10 years since 1900 is shown in Table 3. Through 1930, savings and loan associations and mutual savings banks held between 65 and 75 percent of total residential mortgages made by institutions, although a very large percentage was made by noninstitutional lenders. Commercial banks and life insurance companies evenly split most of the institutional remainder. From 1930 to 1950, the institutional market share of thrifts declined below 50 percent, but part of this falloff reflected a pickup by the newly created Home Owners Loan Corporation which assumed mortgages in default. Thereafter it increased again to its previous levels through 1976. Thus, history suggests that thrifts have provided the major share of housing finance in relatively deregulated as well as relatively regulated environments. Despite the new problems, I see no reason why thrifts cannot and will not continue to perform the same role in the 1980s. Thus, housing overall should not be disadvantaged by deregulation once the transition problems pass, as may already have occurred.

Impact on Mortgage Rates of Removing Deposit Ceilings

The impact on mortgage rates of freeing deposit rates may be analyzed with the help of Figure 2. Interest rates are measured on the vertical axis and the dollar amount of savings and mortgage lending on the horizontal axis. The amount of funds supplied to all mortgage lending institutions and individuals at each nominal interest rate (including thrift institution operating costs and a competitive profit markup) is shown along schedule S. It slopes up to the right. The amount of funds demanded by these institutions and individuals for mortgage lending is shown along schedule D. It slopes down to the right. Assuming no restrictions, the equilibrium mortgage rate is i_0 and volume of lending is OA. Now impose a ceiling on deposit rates at thrift institutions only at i_c . They are now able to attract only OB amount of

savings and supply the same quantity of mortgage loans. (In reality, it is likely that the institutions will find ways of paying implicit interest payments that will raise the effective rates offered and mitigate the cutbacks.) Because at OB the demand for mortgage funds is greater than the supply of savings, there is excess demand and the mortgage rate (i_h) will exceed both the deposit rate (i_c) and the unconstrained equilibrium rate (i_o). How will thrift institutions price their mortgage loans in such an environment?

A number of scenarios are possible. The thrifts could maximize their profits and charge i_h . But some existing or potential mortgage lenders not covered by the deposit ceilings would be willing to offer a higher deposit rate than i_c and thereby attract additional funds that they are willing to lend at less than i_h . (In the short-run, after the initial imposition of the deposit rate ceilings, there are likely to be some delays in the appearance of relatively efficient alternative mortgage lenders, but the experience of the 1970s suggested that sooner or later they appear.) Either the thrifts are forced to reduce their mortgage rates or they will be restricted to lending to the least creditworthy borrowers. Alternatively, the thrifts could charge i_c . This would be below the equilibrium rate i_o and create an excess demand for mortgage loans. The thrifts would either raise their rates to i_o or accommodate only their own customers or the most creditworthy borrowers through nonprice credit rationing. The unsatisfied demand would be shifted to the nonthrift lenders who would charge a higher rate. Lastly, the thrifts could charge the estimated equilibrium rate, i_o .

In the first two scenarios -- where thrifts charge i_h or i_c -- different borrowers may be charged different interest rates. In the second scenario, those borrowers fortunate enough to obtain mortgage loans at below the equilibrium interest rate would be harmed by removal of the deposit ceilings.

Nevertheless, it is evident that, given time, the removal of the ceilings will neither raise either the average or marginal mortgage rate nor reduce the overall quantity of mortgage lending. The existence and level of the deposit ceiling will affect primarily the market share of the thrifts -- the lower the ceiling rate, the smaller the thrift's market share, *ceteris paribus*.

Similarly, as the thrifts receive additional lending powers, any reductions in their mortgage lending without an offsetting reduction in mortgage demand will generate initially higher mortgage rates that, in turn, will induce other lenders to shift from other loans to mortgage loans, unless the initial mortgage rates were lower than their long-term equilibrium rate, which is an unlikely scenario for any length of time. Moreover, as is argued in the next section, the primary reason for the new thrift powers was to provide them with shorter maturity assets in order to permit them to reduce their maturity (duration) mismatch. But, as noted, the concurrent authorization to make adjustable rate mortgage achieves the same objective of reducing the mismatch and interest rate risk exposure without incurring startup costs in new areas or accepting the credits traditional lenders in the new areas reject. Thrifts have a comparative advantage in continuing to do what they do best -- make home mortgage loans.

But will they? Perhaps the most important implication of deregulation is that it shifts and greatly complicates the functions of management. In a regulated environment, government pretty well delineated the product lines, geographical market areas, and prices charged and paid. Management's degrees of freedom and independence were small. The rewards for innovativeness and aggressiveness in marketing were relatively small, but so also were the penalties for failure. The battlefield was not economic, but political. Management spent much of its energies lobbying legislators, regulators and the public rather than on economic decisions. Donald Rumsfeld noted, when he was

president of Searle in the regulated drug industry, that "when I get up in the morning as a businessman, I think a lot more about government than I do about our competitors, because government is that much involved."⁹

In 1984, management of thrift institutions, similar to management of airlines, telephone companies, and trucking firms, must choose their product lines, geographical market areas, and prices without government assistance. In addition, the barriers to entry for both new thrifts and nonthrifts are greatly reduced, intensifying competition. Wrong decisions or bad luck are more painful, although public concern for safety is unlikely to produce overnight Braniff Airlines. Probably as a result, thrifts appear to have been cautious in using their new lending powers.¹⁰ Even in states in which state chartered institutions were able to make limited consumer and/or commercial loans for some time, they have remained primarily residential mortgage lenders. Some may have observed the unfortunate results of a few large East Coast mutual savings banks that diversified by shifting out of mortgage loans to longer-term corporate bonds in the 1970s only to suffer worse losses as interest rates increased than their less adventurous neighbors. Others may have been deterred by the high startup costs of developing a commercial lending group and fears of getting stuck with the credits no one else wanted. At the same time, the return on mortgages has improved. According to Salomon Brothers, mortgage securities had the highest return of any type of debt security in 1983, and Table 4 shows that mortgage yields appear to have favorable spreads over 10 year Treasury securities even after adjustment for call (prepayment) premiums, which, of course, vary directly with the level of interest rates.¹¹

In 1983, thrift institutions sharply increased their overall home mortgage lending to near their 1970s market share. Projections for 1984 differ slightly. Bankers Trust sees a continuation of the regained high level, while Salomon Brothers sees a small decrease in market share. Neither, however, expects a significant increase in the allocation of thrift funds to consumer lending relative to the period just before deregulation.¹² If I am

correct in my argument that most thrift institutions will not expand greatly into new nonmortgage powers and will remain primarily home mortgage lenders and if deregulation results in a larger proportion of funds raised through short-term interest sensitive deposits, such as MMDAs, interest rate risk management will be among the most important problems confronting management in the next decade.¹³

Managing Interest Rate Risk

As noted, an institution exposes itself to interest rate risk in the process of engaging in interest rate intermediation when it mismatches the interest and price sensitivities of its assets and deposits. To manage risk accurately, it is first necessary to measure it accurately. Recent advances in economic and finance theory have demonstrated that the degree of interest rate risk exposure is proportionate to and can be reasonably accurately measured by a one number (single factor) duration "gap", or the difference between the weighted duration of the institution's assets and the weighted duration of its deposits, where the weights depend on the account on the thrift institution's balance sheet or income statement that is of major concern to management. Such "target" accounts can include capital, the capital-asset ratio, or net income. Different target accounts are associated with different measures of duration gap. Durations have the pleasant property that the prices of any security or portfolio of securities having the same duration are equally sensitive to interest rate changes. Although duration is a relatively simple concept in theory, it is more difficult to apply. However, although strenuous, the information required is no more strenuous than that required by any other procedure that purports to measure interest rate risk accurately, e.g., maturity gapping. The details of duration and the advantages and disadvantages of using duration gaps over alternative techniques have been discussed at length

in the recent literature and will not be repeated in this paper.¹⁴ But it is important to emphasize some of the implications for management.

Interest rate risk management does not imply eliminating interest rate risk or "immunizing," so that changes in interest rates do not have any effect on the target account selected. Rather, it implies controlling risk so that the expected rewards in the target account are at least sufficient to compensate for any losses consistent with the assumed degree of risk exposure. Thrift institutions receive a return on their successful interest rate intermediation activities, and this return would be lost if they discontinued this activity and became pure brokers. On the other hand, as most thrifts have learned the hard way in recent years, unexpected increases in the degree of risk assumed from unexpected increases in the level and volatility of interest rates can turn expected rewards into realized losses. Having been badly burned, many believe that thrifts should withdraw from this activity altogether and concentrate on credit quality intermediation and nonintermediation or brokerage services. It is unlikely that many thrifts could in the near future restructure their balance sheets to be able to eliminate the large duration gaps or mismatches they currently have from much longer duration assets than deposits, even if they wanted to do so. Thus, they must live with interest rate risk and learn to manage it successfully.

It is frequently argued that as long as the yield curve is upward sloping so that long-term rates are higher than short-term rates, lending long at fixed rates and funding short-term is profitable. Conversely, such a strategy is not considered profitable when yield curves are downward sloping. Both statements are not only incorrect, but are dangerous to the health and welfare of thrift institutions. Economic theory and much empirical research has clearly demonstrated that the yield curve contains important information on the consensus of market opinion about the future course of interest rates. In the absence of any persuasive evidence that one can consistently predict

interest rates better than the market can, an upward sloping yield curve indicates that short-term interest rates are expected to increase above current long-term rates. Thus, the positive spread from borrowing short today and lending long may be expected to narrow and, in time, turn negative.¹⁵ And the steeper the yield curve, the larger will be the expected losses in the future. Today's revenues from such a strategy are not really net income but reserves to be used to offset tomorrow's expected losses. The relevant period for evaluating the success of a borrow short-lend long strategy is the overall life of the long asset. The use of any shorter accounting period is misleading and borders on fraud. (Similar myopia may exist for upfront loan fees.) Indeed, it is precisely the failure to use the long period in the 1960s and 1970s that contributed greatly to the current financial difficulties of the thrifts.

But human nature being what it is, it is tempting to view the current spread under upward sloping yield curves as permanent income and to take the credit and rewards. This is particularly true for thrift institutions, as noted by Edward Kane, as long as federal deposit insurance is not priced on the basis of risk to discourage such behavior.¹⁶ Many a reputation for profitable management in the "golden years" of the thrift industry were based on this confusion. And many of today's next generation managers are picking up the pieces of this strategy and bearing the burden of the penalties, while their predecessors bask in the warm glow of their promotions or higher incomes and bonuses derived from their earlier "successes." The latter may even wonder aloud why their successors are not as successful as they were. And it is likely that history will repeat. There is a great deal of truth in the adage that the spread a thrift institution will charge between the rate on a 30 year fixed-rate mortgage and the rate it pays on short deposits is proportionately

related to the number of years to retirement of the chief executive officer. The nearer to retirement, the smaller is the spread as he or she will not be in the saddle when the negative spread occurs. The longer to retirement, the larger is the spread as the CEO expects to be around when the bad news hits.

This analysis also demonstrates that it may be profitable to borrow at a higher rate than one lends, if the higher rate is short-term and the lower rate is long-term. The yield curve is thus downward sloping, and the short-term rate is expected to decline below the current long-term rate so that today's losses will be offset by tomorrow's gains. Thus, ARMs, whose rates are tied to short-term rates, should not always be priced at the same discount yield or concession from fixed rate mortgages and, at times, may even need to be priced at a premium yield. (Holding the yield curve constant, ARMs should be priced to yield somewhat less than comparable FRMs to reflect the smaller degree of interest rate risk assumed by the issuer and the better call protection.) Otherwise, if short-term interest rates decline below current long-term rates, as expected in a downward-sloping yield curve, the rate on the ARM will only decline further and the mortgage will not only yield less than a FRM but may lock-in a loss. Yet, surveys of ARM yields indicate little, if any, awareness of this and other long-term pricing implications on the part of ARM lenders.¹⁷ Regardless of how it may appear at the time, the shape of the yield curve does not permit a thrift institution to escape interest rate risk when it temporally mismatches the interest sensitivity of its borrowing and lending.

Unfortunately, when thrift institution managers and regulators belatedly became sensitive to interest rate intermediation and risk in the late 1970s, they found little help from academics and other researchers. The latter also had been caught napping. As late as the early 1970s, popular models of thrift

institutions tended to specify the long-term fixed mortgage rate as a markup on the short-term deposit rate so that they effectively excluded interest rate intermediation.¹⁸ The earliest interest rate risk models were based more on intuition and casual theorizing than on rigorous development on theoretical constructs. These models divided the institution's assets and liabilities into maturity buckets or gaps according to the maturity or first date of repricing of each item. This provided the institution with a rough picture of their balance sheet imbalance and interest rate exposure. Although simple to understand and almost as simple to implement, maturity gap models were only a first step and possess serious limitations relative to duration models. They do not consider all the cash flows, they equate different interest sensitive securities, they cannot aggregate the imbalance into a single number, they require simultaneous management of numerous maturity sectors, and many more limitations that I have described elsewhere.¹⁹ Whatever the technique used to measure risk exposure, a tremendous amount of information about every account on the balance sheet is required. Interest rate risk management, in effect, requires a new generation of management information systems. Because changes in any management information system are costly, it is important that institutions do not commit major resources to developing systems that will quickly be outmoded. This is equally true for the regulators. While the new bank (Schedule J) and thrift (Section H) reporting forms requiring maturity breakdowns are a major step forward, they are insufficient for accurate measurement or management of interest rate risk. Regulators could make an important contribution to the industry by being in the forefront in developing accurate interest rate measurement techniques.

Duration Analysis

One significant advantage of using duration gap analysis for managing interest rate risk is that it permits an institution to assume almost any

degree of interest risk it wishes without sacrificing the large variety of different maturity products demanded by its customers. The duration of a portfolio is the weighted average of the durations of the individual composite securities. Thus, any value of duration for a portfolio is consistent with an almost infinite combination of securities with differing durations. Likewise, any value of a particular duration gap is consistent with an almost infinite combination of asset and deposit accounts with different securities. For example, in today's interest rate environment, a zero duration gap using the dollar value of net worth as the target account can be structured using fixed-rate 30 year mortgages and a fixed-rate seven and one-half year zero coupon CD. If not prepaid, this mortgage has a duration of about seven years. The duration of any zero coupon, single payment instrument is its term to maturity. The duration gap equation for capital as the target account is:²⁰

$$DGAP_K = (D_A - wD_P),$$

where:

D_A = duration of assets

D_P = duration of deposits

P = market value of deposits

A = market value of assets

w = P/A

K = capital

If the institution's capital-asset ratio is 5 percent, the duration gap will be approximately zero ($7 - .95 \times 7.5$), the durations are "matched" and the institution will be protected or "immunized" against changes in interest rates. The market value of its capital will remain constant regardless of changes in interest rates. Of course, in actuality, some prepayment will be assigned to the mortgage, and its duration will be shorter and can be funded without interest rate risk by even shorter-term CDs.

If an institution believed that interest rates were going to decline by more than the market consensus, it may wish to gamble and assume some risk. It can do so by structuring its balance sheet to produce a positive duration gap of, say, one year. This may be achieved by funding the 30 year maturity, seven year duration mortgage with a six and one-third year zero coupon CD. For purposes of price sensitivity, the institution effectively behaves like a one-year bond. For every 100 basis point decline in interest rates, the market value of the institution's capital account will increase by an amount equal to some 1 percent of its assets. Of course, if it predicts incorrectly and interest rates rise, its capital account will decline by about 1 percent of assets for every 100 basis point increase in rates. It is important to note that if an institution wishes to assume interest rate risk, it must predict at least the direction of interest rate changes, and for it to win its gamble, it must be right on its prediction. The relationship among duration gap, interest rate change, and the market value of capital is, at first approximation, shown by the following equations:

$$\frac{\Delta K}{A} = -DGAP_K (\Delta i)$$

and

$$\frac{\Delta K}{K} = -DGAP_K \left(\frac{A}{K} \right) \Delta i$$

where:

- A = market value of assets
- K = market value of capital (net worth)
- Δ = change from previous value
- i = yield to maturity
- $DGAP_K$ = duration gap for capital

Similar equations exist for other target accounts. Thus, the institution can predict the change in the target account for any expected change in interest rates. The more certain it is of that interest rates will decline or the

greater the degree of interest rate risk it wishes to assume, the greater will be the value of the duration gap it selects.

If the institution believes interest rates are going to rise more than the consensus of the market expects, it would produce a negative duration gap by, say, funding the 30 year maturity, seven year duration mortgage with an eight and one-half year zero coupon CD. It would then expect capital to increase by 1 percent of assets for every 100 basis point increase in interest rates. Of course, if rates change in the direction opposite to that expected, net worth will decline.

It can be seen in the above examples that, because duration is a single number, the institution can achieve its desired macro risk exposure levels, including immunization, without sacrificing its abilities to accommodate a wide range of the maturity preferences of its customers on the micro level. This flexibility in meeting customer demand is considerably smaller when using maturity gaps to measure risk exposure as the institution is then constrained to cash flow matching or mismatching in each of the many gaps.

It is worthwhile to devote additional attention to some of the complexities of measuring risk exposure under any fairly accurate technique. It has already been noted that the institution must predict mortgage prepayments. But it must also estimate the use of all other option features on its assets and deposits, such as repricing of variable or floating rate securities and due-on-sale, early deposit withdrawals, and other put provisions. Even more troublesome is the correct classification of deposit accounts that are always and immediately available at their par value, such as demand deposits, MMDAs, NOWs, SNOWs, and passbooks. Deregulation has increased the importance of these accounts to the total deposit base of most thrifts. Duration analysis, as well as any other procedure that attempts to derive an economically accurate

measure of the financial condition, requires mark to market or present value accounting, even for hard to market and nonmarketable securities. Thus, as interest rates rise, the market value of securities declines, and the longer is the duration, the larger the decline. If deposits are available at par at all times, both their maturity and duration are one day and an increase in interest rates will not lower their market value.

But what if all deposits are not withdrawn if, when market rates of interest rise, a particular thrift institution does not increase its deposit rate commensurately, either in cash or in services? Some deposits remain as "core" deposits. It is likely that the amount of core deposits will vary according to the size of the gap between the interest rate paid on the particular type of deposit by the thrift and that paid by its competitors and to the length of time the gap exists. Nevertheless, it is possible to statistically estimate the average amount and length of core deposits and treat them as an equivalent CD whose market value does fluctuate with interest rates. Thus, as market rates rise above the deposit rate offered by the thrift institution, the market value of its core deposits declines below their par value. Nevertheless, deposits are likely to remain short duration securities that are unlikely to reduce the positive gap produced by longer duration assets significantly. To assist thrifts in doing so and reducing their interest rate risk exposure, the financial markets have developed new securities.

Innovation of New Mortgage Securities

Financial intermediaries are like tailors. They take financial instruments that do not fit the characteristics of investors or borrowers and reshape them, in terms of denomination, maturity, repricing periods, credit quality risk, cash flow characteristics, and so on, so that they do. Of

course, banker sounds much classier than tailor. Because the number of investors and borrowers is large and their needs vary and change as both the economic and financial environment and the regulations and legislation change, the number of securities custom tailored to supplement the standard securities available on the rack is large. Because of the unusually rapid pace of change in the financial sector over the past 10 years, financial tailors have been particularly busy designing and redesigning new instruments. Like clothing designers, however, the imaginations of financial designers tend to outrun the permanent or mass demand, and more new instruments are designed than eventually survive. Again like clothing designers, financial designers appear to have little trouble finding customers who are willing to be the first to try a new design before all the advantages or disadvantages of the material, cut, color, etc. are fully known. There appears to be a certain prestige in being the first in the world, country, or community to be seen using a new financial security, just as there is in being the first to be seen wearing a new outfit. Moreover, the price of the first-of-a-kind security like that of a first-of-a-kind outfit is high. But many of the financial designs, like clothing designs, do not last long enough to move into mass production, even at much lower prices. The December 1981 issue of the Institutional Investor features its choices for the leading new financial security innovations of 1981.²¹ Not all have survived. Nineteen eighty-one was the year of the low and zero coupon original issue discount bonds. It was also the year of the more forgettable, original issue discount convertible bonds and commodity linked Eurodollar bonds. The moral of this analogy is that, although flashy, all new financial instruments are not necessarily successful in solving the problem they were designed to solve, and they must be examined and priced carefully.

We have already discussed the variable rate mortgage instruments that were designed in recent years to reduce the durations of thrift institution

assets. (The maturity of an unconstrained variable rate instrument is only to the first estimated date of repricing back to par value.) Over these years, a large number of alternative VRMs were designed differing in length of time between permissible changes in contract interest rates, the maximum permissible interest rate change per time and/or over the life of the mortgage, the market index to which the rate changes are tied, the maximum amount of negative amortization if any, prepayment provisions, and due-on-sale provisions.²² Although many were introduced, the high degree of confusion sown among both lenders and borrowers suggests that only some will survive.²³

But even this large number of VRMs did not satisfy every thrift institution's or other mortgage lender's need. While VRMs reduced durations, they did not change the high costs of credit evaluation, the odd and small denominations, the unique tailoring to the particular needs of the home buyer -- all of which reduced the marketability of the mortgage and increased the operating costs -- or the reluctance of potential borrowers to use VRMs. Indeed, VRMs increased servicing costs. Where there is a perceived need, financial tailors will attempt to design a newer, if not a better, security. The first new securities were the pass-throughs and mortgage bonds designed by GNMA and FNMA in the early 1970s. While these securities reduced many of the problems -- such as the odd denominations, high credit evaluation costs and servicing costs -- except for mortgage bonds, they did not alter the cash flow pattern of the underlying individual mortgages. And mortgage bonds were tailored more for life insurance companies and pension funds by lengthening the duration. Thrifts wanted shorter durations.

In 1983, FHLMC tailored a new instrument to satisfy the needs of investors with different maturity preferences. The first issue of its collateralized mortgage obligations (CMOs) basically divided the overall cash flow from a pool of mortgages, which collateralize the securities, into three maturity classes or series of securities. The first (short-term) group receives all

principal payments until the total principal amount of this series is repaid. The second (intermediate term) group receives all subsequent principal payments until its principal amount is repaid, and the third (long-term) group receives all remaining principal payments. All three series receive regular semi-annual coupon interest payments, but not necessarily at the same rate. The FHLMC guaranteed a minimum cash flow in each period based on historical prepayment experience. Larger than historical prepayments are passed-through. The protection from reduced prepayments increases the certainty of the instrument, particularly for the first two tranches which do not have a call provision. The risk has been assumed by the FHLMC. Later issues modified these characteristics somewhat to custom-tailor the cash flow patterns even further. Similar securities have also been developed by private firms, differing slightly in the types of mortgages included in the pools, the guaranty or insurance against default losses, the number of maturity classes -- for example, four classes have become popular -- and the guaranty in minimum and maximum cash flow patterns. The securities made it easier for investors, who found the cash flow characteristics of the previous mortgage-backed securities undesirable, to invest in mortgages. From the sale of the first CMO by FHLMC in June 1983 through year-end 1983, 12 issues totaling almost \$5 billion had been sold by eight different issuers. Freddie Mac accounted for 36 percent of the dollar volume. The 1984 volume promises to be far in excess of this amount. Some \$4 billion of CMOs were issued in the first two months alone.

Data from the first two Freddie Mac CMO sales indicate that thrift institutions were the largest buyers of the short-term series, purchasing almost one-third of the dollar amount, followed by commercial banks and, surprisingly, life insurance firms. Pension funds were the largest single buyers of both the intermediate and long-term series. Surprisingly, commercial banks purchased only slightly smaller proportions of the intermediate and long-term

series than the short, and, although thrifts purchased only 13 percent of the long-term series, these purchases amounted to almost the same dollar total as their short-term series purchases. A more recent survey by Salomon Brothers, shown in Figure 3, reported that thrifts purchased 27 percent of the shortest-term class -- which had an average maturity of under four years -- and only 3 percent of the longest -- which had a maturity of over 10 years. Commercial banks followed a similar strategy. Insurance companies were the heaviest purchasers of intermediate-term CMOs and pension funds by far the largest purchasers of longer-term maturities, accounting for almost one-half of the purchases of seven to ten year issues and two-thirds of those with average maturities longer than 10 years.²⁴

To date, CMOs have been highly successful judging both from the volume and from the lower interest yield on the average of the three series than on a comparable GNMA pass-through security. The first CMOs sold by FHLMC in 1983 yielded almost 100 basis points less than comparable GNMA's.²⁵ Although the spread has narrowed with subsequent sales, it still exists currently. Some, but far from all, of the spread must be attributed to the reduced call risk and increased stability in the cash flows.

One may ask why, after adjusting for structural differences, the average of the parts of a CMO should yield more or less than a comparable whole security. Why did investors not find it profitable previously to buy the entire issue and sell off the higher priced subparts or for issuers to sell only securities with cash flows limited to the higher priced maturity sectors? Of course, something comparable has been tailored for Treasury securities, where a number of major security dealers were effectively able to strip the coupons off Treasury bonds and to repackage and sell off each cash flow (coupon as well as principal at maturity) in zero coupon security form at a lower average yield than the yield on the Treasury bond used as collateral.²⁶ With respect to the last, one can

legitimately question why the Treasury itself has not taken advantage of the lower yields possible. After all, it supposedly is operating in the public interest in a period of extraordinarily high and controversial deficits. The evidence does appear to suggest that, at least for now, there are some yield differentials in segmenting -- an apparently unsatisfied demand has been located.

The above instruments are all on the cash market, but as everyone except those living on Mars for the last decade know full well, there has been a literal explosion of innovation on the futures and options markets. These have greatly increased the menu available to thrifts for structuring their balance sheets to obtain the desired interest rate risk exposure. Although instruments on these markets were developed primarily to ease interest rate hedging, they involve considerable risk. They are also considerably more complex to understand and use correctly than are cash securities. Errors in use or judgment can cause much larger losses than on the cash market.²⁷ They are also tempting instruments to use to increase interest rate risk at little if any current cash outlays -- bet-the-bank at times current income is low -- and their use must be monitored carefully.

Futures and options are quite different securities. Futures permit one to offset the interest rate implications of a cash position by mirroring it on the futures market. If one buys on the cash market, one sells on the futures market and conversely. It follows that the closer the instruments used on both markets, the better is the offset or hedge. But one need not hedge. Futures contracts can be mixed with cash positions to obtain any desired duration gap and interest rate exposure.²⁸ Their primary advantage here is that they are relatively cheap and give a big duration bang for the out-of-pocket buck. Their primary disadvantage is that they introduce other types of risk -- cash flow (liquidity) risk from daily mark-to-market and basis risk from dissimilar securities.²⁹ In addition, particularly with non-duration analysis

based systems, there is a tendency to use futures to hedge individual operations or gaps (microhedging) rather than only the overall bank or gap (macrohedging). This introduces excess costs.

Options permit the hedging of option features on outstanding cash securities, such as prepayment (call) provisions on mortgages, upside or downside caps on variable rate loans, and early withdrawal (put) provisions on deposits. In contrast to futures, option hedges are placed by mimicking the exposed option, so that if there are prepayment (call) provisions on outstanding mortgages, the thrift buys call options. If interest rates decline and mortgage borrowers exercise their options to call or prepay all or part of their loans, the thrift can exercise or sell its call option on similar securities and offset losses. Generally, the liquidity risks are somewhat smaller than for futures, but it is possible to lever up to higher risk levels. Similar to futures contracts, the hedge is better the more similar the securities to which the options apply. Also similar to futures contracts, options are more complex than most cash instruments and require greater skills on the part of the users and are tempting to use for hedging individual transactions. Indeed, centralization of all futures and options trading with overall asset and liability management is a prerequisite for efficient interest rate risk management. The institution needs one interest rate risk manager, not many, to manage one interest rate gap, not many.

More recently, financial tailors have designed even more complex instruments, such as options on futures contracts. While dazzling in their design, their staying power and usefulness to thrift institutions are still in question. Thrift managers should be cautious about accepting these new-fangled securities too quickly, particularly at the very high prices at which they are currently marketed. They may be trading a reduction in a known risk for an increase in an unknown risk.³⁰

One cannot help but be somewhat disturbed by the reported extraordinarily high fees that appear to be earned by both private and quasi-public creators of the new mortgage instruments, as well as of interest rate swaps and other innovations which are not discussed in this paper. The "Street" is awash with stories of investment bankers selling thrifths a package of new mortgage securities for their old securities to reduce their interest rate risk and then reselling the securities within the next few days at substantial markups. The American Banker of February 13, 1984 reported that some 40 percent of Salomon Brothers' 1983 profits were derived from mortgage-related securities activities.

³¹ Freddie Mac has sponsored numerous full-page advertisements in the Wall Street Journal and other major newspapers publicizing their operations or most recent sale in particular, as has Fannie May. These appear to be designed to drum up business. In this they are competing vigorously with private firms.³² Although it is likely, as in clothing design, that the prices and profits from these innovative tailoring activities will decline if the products find a lasting demand, as I suspect many will, and are produced in mass quantities in a limited number of styles for sale off the rack, why were profits so high to start with?

At least part of the reason may be the asymmetry in financial sophistication between the financial tailors at investment banking firms and government-sponsored mortgage agencies, many of whom are not long out of school with their MBAs and Ph.D.'s in financial design, and the financial officers at most thrift institutions, whose professional training has been largely in direct mortgage lending. The latter are relatively unschooled in the high-powered financial mathematics that are required to understand many of the newer securities, such as stochastic calculus, matrix algebra, linear programming, option pricing theory, and optimization theory. We appear to have moved into an era of super-finance, which requires super-math to understand. Charged with the

objective to reduce interest rate risk almost without regard to cost, finance officers at thrifts are literally at the mercies of the investment bankers for quantifying costs. And many investment bankers appear to take the phrase "without regard to cost" quite literally. Thrift institutions have jumped almost overnight from the world of ordinary finance to the world of high finance with its heavy hitters, sophisticated dressers, and fast operators. They were not prepared for the change. To play winning ball, if not just remain afloat, in the big leagues of high finance, thrifts need to quickly acquire the necessary expertise to put them on an even footing with their "advisors." Although there are many advantages to training one's own personnel, time may be so short that many institutions may be best off by raiding the advisors.

The Secondary Market

The great emphasis in current housing finance is on the secondary market. Indeed, the Federal Home Loan Mortgage Corporation has just published the first issue of a journal devoted solely to this market -- Secondary Mortgage Markets. The reason for the emphasis on the secondary market is simple; it increases the breadth and liquidity of the entire housing finance system. It permits both nontraditional mortgage lenders, who are not positioned to originate new mortgages themselves, and traditional mortgage lenders, who are positioned to originate mortgages but are in capital surplus areas and thus do not have sufficient opportunities to do so, to participate in the mortgage market. That is, secondary markets expedite mortgage fund transfers across both industry and geographical boundaries. Moreover, the secondary market encourages mortgage originators to originate more such loans in the knowledge that they can sell off any "surplus" loans quickly and without great cost. But, unlike many other types of securities, individual residential mortgage loans do not readily lend themselves to trading after origination. As noted

earlier, they have small and odd denominations, unique and optional cash flow patterns, costly credit valuations, and so on. Thus, the financial tailors tailored new instruments that attempt to overcome these barriers.

As noted, the first secondary securities -- securities issued by someone other than the ultimate borrower who uses the funds to purchase housing or some other nonfinancial asset -- were participation certificates pioneered by GNMA that standardized the denominations by pooling individual mortgages, reduced the credit checks and risk by using first FHA-VA and then privately insured mortgages as collateral, and increased cash flow certainty through the law of large numbers. They did not restyle the cash flows, however. The first attempt at this was the mortgage bond pioneered by FHLMC and more recently and on a much larger scale the CMOs, again pioneered by FHLMC. By year-end 1983, tailored mortgage-related securities (MRSs) outstanding totaled about \$245 billion and accounted for about 15 percent of total mortgage debt outstanding and 20 percent of all home mortgage debt. In 1983 alone, more than \$85 billion of these securities were issued, up from \$50 billion in 1982. (There appear to be rather significant inconsistencies among the data sources on MRSs. I believe that Freddie Mac can make a major contribution by collecting and publishing accurate primary data as well as secondary data in its Secondary Mortgage Markets journal.)

By their very creation, these secondary securities increase the size of the mortgage market, just as the introduction of financial intermediaries such as commercial banks and thrift institutions and their secondary securities -- deposits -- increased the size of the overall financial market. Of course, the dollar amount of mortgage-related securities issued greatly overstates the net contribution to housing finance. Even if the securities were all purchased by nontraditional mortgage lenders, which as was shown in Table 1 is not the case, some of the purchases are likely to be at the expense of traditional lenders who found that the increased competition had reduced risk-adjusted

yields below their minimum acceptable levels and invested in other securities. But MRSs would increase the market even more if they traded after their initial placement on a true secondary market.

Preliminary evidence from the new data published in Secondary Mortgage Markets and elsewhere indicates that these instruments have in their short lifespans become relatively major trading vehicles.³³ MRS daily average trading volume in 1983 was estimated to be \$2.1 billion, up from \$0.9 billion in 1982. (Indeed, there is some evidence that MRSs are traded proportionately more heavily than other securities by regional dealers who do not report to the Federal Reserve, which collects the trading data, so that their activity is likely to be underestimated. This is another area in which Freddie Mac can make a major contribution by improving data quality.) As can be seen from Table 5, which lists the reported trading volume of major marketable securities, MRS trading volume is beginning to look respectable relative to other securities. In terms of turnover, MRSs are already 40 percent as active as federal agency securities and 25 percent as active as intermediate-term Treasury securities, both veteran trading vehicles. The heavy trading volume is particularly remarkable in light of the widespread belief of only a few years back that once placed, these instruments did not trade again. This bodes well for the future efficiency of the mortgage market and the continued ability of the market both to shift mortgage funds from surplus to deficit areas and to attract nontraditional mortgage lenders at low interest rates.

Conclusions

Deregulation has and will continue to change the structure of the residential mortgage market. But deregulation is only the surface reason. The real forces directing the changes are the higher levels and increased volatility in interest rates that both decreased the profits of traditional

mortgage lending institutions and increased uncertainty and risk and the advances in telecommunication technology that caused the deregulation. If these forces had not developed, the regulations in force would have continued to work or not work as before and deregulation would most likely not have occurred, certainly to the extent that it has.

Although deregulation has caused transition problems, it has appeared to solve the more severe problems caused by the old regulations. The cure was not worse than the disease, and the patient has survived with the help of sizable blood transfusions in the form of paper capital and deposit insurance subsidies. This is not to say that the thrifts are permanently out of the woods, but any future problems are more likely to be caused by their old activities or the low coupon, fixed-rate mortgages on their books rather than their "legitimate" (nonfraudulent) current activities.³⁴ Public policy to deal with this problem if interest rates again rise sharply should be separated from public policy to strengthen the housing finance system. This system should now be in pretty good shape.

Traditional residential mortgage lenders, particularly the thrift institutions, may be expected to remain the primary source of funding in the market, but the type of financing they will provide will change, and there is likely to be some decrease in the importance of their commitment. Direct lending, particularly through fixed rate loans, will decline but will in large part be offset by increases in indirect lending and the development of new mortgage securities that will come closer to being just what the doctor ordered for most parties. Any decrease in the commitment of thrifts to the mortgage market will be offset by the entry of nontraditional lenders.

The housing finance delivery system will become more complex, and losses stemming from errors will be larger in magnitude and more serious in consequence. Thrift institution management will have to increase its abilities to

deal with this new environment. Financial tailors can be counted on to make managers' jobs both easier by permitting them to be able to incur only the degree of risk they wish and more difficult by making the instruments that produce these results more complex. A return to the old simpler ways of financing housing can only occur with a return to greater financial stability. This is in the hands of the government. The private sector can only make the best of any given environment, and, if history is a guide, in case of problems, regulators are likely to provide short-term gains at the expense of later, larger losses. As Henry Sidgwick noted in his Principles of Political Economy nearly 100 years ago:

It does not follow that whenever laissez faire falls short government interference is expedient; since the drawbacks of the latter may, in any particular case, be worse than the shortcomings of private enterprise.³⁵

Thus, it is better for the industry to work out problems as efficiently and fairly as possible rather than to invite in the government either directly or indirectly through its failure to solve its problems adequately.

Footnotes

*I am indebted to David Andrakonis, Gillian Garcia, Edward Kane, Alden Toevs, James Van Horne, Robert Van Order, and Kevin Villani for helpful comments and suggestions on an earlier draft.

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28. G. O. Bierwag, et al, "Duration: Its Development and Use."
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Footnotes (continued)

30. Thrift managers must also be careful to distinguish the effects of the new instruments on economic income from those on accounting income. While some of the instruments may increase accounting income, particularly in the short-term, and satisfy regulatory considerations, they may have no, unfavorable, or hidden effects on economic income, the ultimate test of an institution's success or failure.
31. The same figure and profit data for other firms are reported in Linda Sandler, "The Mortgage-Backed Securities Bonanza," Institutional Investor, March 1984, pp. 84-92.
32. David LaGesse, "Battle Is on for Mortgage Securities," American Banker, January 26, 1984, pp. 1, 23.
33. Kevin E. Villani, "The Secondary Mortgage Markets: What They Are, What They Do, and How to Measure Them," Secondary Mortgage Markets, February 1984, pp. 24-44; Federal Home Loan Mortgage Corporation, The Secondary Market in Residential Real Estate (Washington, D.C.), August 1983.
34. See footnote 13 and the importance of proper pricing of federal deposit insurance and monitoring of risky activities.
35. Henry Sidgwick, Principals of Political Economy (London; Macmillan Publishing Co.), 1887, p. 414.

TABLE 1
NET FINANCING OF HOME MORTGAGES BY LENDER
1950 - 1983

Market Share by Lender (Percent)

Year	Total (Bill \$)	Savings and Loan Assoc.'s					Life Ins. Co.'s	U. S. Gov't. and Agencies	Mortgage Pools		Other
		Commercial Banks	Direct	Including Ownership of Pools	Mutual Savings Banks	Mortgage Pools Except SLA Owned			Total		
1950	7.6	20.19	26.46	26.46	12.55	31.57	3.87	-	-	5.36	
1955	12.6	14.12	39.75	39.75	18.70	19.95	1.95	-	-	5.53	
1960	11.1	0.38	52.78	52.78	15.42	11.69	7.94	-	-	11.79	
1965	17.1	18.58	41.20	41.20	17.67	6.21	2.34	0.66	0.66	13.34	
1970	15.0	5.77	45.34	47.55	7.21	(5.91)	29.94	8.10	5.89	9.55	
1975	42.0	5.00	50.71	58.08	1.90	(3.33)	15.71	17.38	10.01	12.63	
1976	63.9	14.40	55.09	57.61	4.85	(2.35)	(0.31)	18.62	16.10	9.70	
1977	94.0	20.11	49.79	52.67	5.21	(1.49)	3.19	16.70	13.82	6.49	
1978	112.2	21.48	40.20	43.36	4.37	(0.27)	9.71	11.05	7.89	13.46	
1979	120.0	16.67	32.92	36.22	2.33	1.50	9.58	18.17	14.87	18.83	
1980	96.7	11.27	27.40	34.46	1.14	1.86	10.65	19.34	12.28	28.34	
1981	75.9	12.78	21.21	29.02	0.40	(0.92)	9.75	18.58	10.77	38.20	
1982	56.6	11.13	(46.29)	8.81	(3.18)	(0.88)	20.85	87.10	32.00	31.27	
1983	111.4	8.53	21.18	45.80	3.86	(1.08)	8.89	58.35	33.73	0.27	

Note: Figures in parentheses are negative. For institutions other than SLAs, figures report only direct mortgage investments.

Sources: 1950-1970: Board of Governors of the Federal Reserve System, Flow of Funds Accounts, 1949-1978, December 1979, pp. 55-57.

1975-1983: _____, Flow of Funds Accounts, Fourth Quarter 1983, February 1984, pp. 36-37.

TABLE 2

MORTGAGE FUNDS AND RESIDENTIAL CONSTRUCTION

<u>Year</u>	<u>Value of Private Residential Construction</u> (Billion Dollars)	<u>Net New Home Mortgage Loans</u>	<u>Mortgage Loans ÷ Construction Activity</u> (Percent)
1950	18.1	7.5	41
1955	21.9	12.6	58
1960	23.0	11.1	48
1965	27.9	17.1	61
1970	31.9	15.0	47
1975	46.5	42.0	90
1979	99.0	120.0	121
1980	87.3	96.7	111
1981	86.6	75.9	88
1982	74.8	56.6	76
1983p	112.8	111.4	99

Sources: Board of Governors of the Federal Reserve System and Economic Report of the President, 1984.

TABLE 3

OUTSTANDING HOME MORTGAGE DEBT HELD BY LENDERS
1900 - 1983

Market Share by Lender (Percent)

Year	Total (Bill \$)	Savings and Loan Assoc.'s			Mutual Savings Banks	Life Ins. Co.'s	U. S. Gov't. and Agencies	Mortgage Pools		Other
		Commercial Banks	Direct	Including Ownership of Pools				Except SLA Owned	Total	
1900	2.7	5.87	13.95	13.95	16.73	5.75	-	-	57.70	
1910	3.9	9.96	17.86	17.86	18.43	7.89	-	-	45.86	
1920	7.2	8.25	25.71	25.71	14.18	5.21	-	-	46.65	
1930	18.9	11.71	32.55	32.55	12.39	9.17	-	-	34.18	
1940	17.3	13.76	23.48	23.48	12.46	10.13	12.30	-	27.87	
1950	45.2	20.99	29.03	29.03	9.55	18.77	3.25	-	18.41	
1955	88.2	17.08	34.00	34.00	13.41	20.01	3.42	-	12.08	
1960	141.9	13.56	39.02	39.02	14.50	17.53	5.03	-	10.36	
1965	220.5	13.79	42.74	42.74	15.34	13.42	2.91	-	11.73	
1970	297.7	14.22	41.84	42.02	14.16	8.99	7.31	0.07	12.46	
1975	495.1	15.55	45.22	47.00	10.10	3.55	8.22	5.11	12.25	
1976	560.7	15.37	46.51	48.37	9.47	2.87	7.19	6.65	11.94	
1977	657.8	15.98	47.23	49.23	8.82	2.23	6.58	8.06	11.10	
1978	770.7	16.76	46.20	48.37	8.21	1.87	7.03	8.49	11.44	
1979	891.1	16.78	44.25	46.57	7.42	1.82	7.37	9.92	12.44	
1980	987.3	16.24	42.52	45.31	6.84	1.81	7.70	10.85	14.04	
1981	1063.2	16.22	40.73	43.87	6.41	1.64	7.85	11.40	15.75	
1982	1109.7	15.96	35.72	41.35	5.75	1.51	8.69	15.69	16.68	
1983	1213.5	15.05	34.26	41.67	5.65	1.28	8.76	19.70	15.30	

Note: Except for SLAs, figures report only direct mortgage investments.

- Sources: 1900-1920: Raymond W. Goldsmith, A Study of Savings in the United States (Princeton, NJ; Princeton University Press), 1955, Table M5, p. 725.
- 1930-1940: Leo Grebler, David M. Blank, and Louis Winnick, Capital Formation in Residential Real Estate: Trends and Prospects (Princeton, NJ; Princeton University Press), 1956, Table N-4, pp. 475-76.
- 1950-1970: Board of Governors of the Federal Reserve System, Flow of Funds Accounts, 1949-1978, December 1979, pp. 144-146.
- 1975-1981: _____, Flow of Funds Accounts, Year-End Outstandings, 1971-82, May 31, 1983, p. 44.
- 1982-1983: _____ (special run)

TABLE 4MORTGAGE YIELDS
1955 - 1983

<u>Year</u>	<u>FHA Mortgage</u> (Percent)	<u>FHA Mortgage</u> <u>Less 10 Year Treasury</u>
1955	4.25	1.47
1960	5.77	1.64
1965	5.05	0.80
1970	8.77	1.56
1975	9.05	1.63
1976	8.74	1.21
1977	8.41	1.05
1978	9.44	1.11
1979	10.69	1.33
1980	13.63	2.26
1981	16.66	2.74
1982	16.11	2.93
1983	13.44	2.44

Source: Salomon Brothers, Analytical Record of Yields and Yield Spreads, 1983.

TABLE 5

TRADING ACTIVITY OF MAJOR SECURITIES
1982

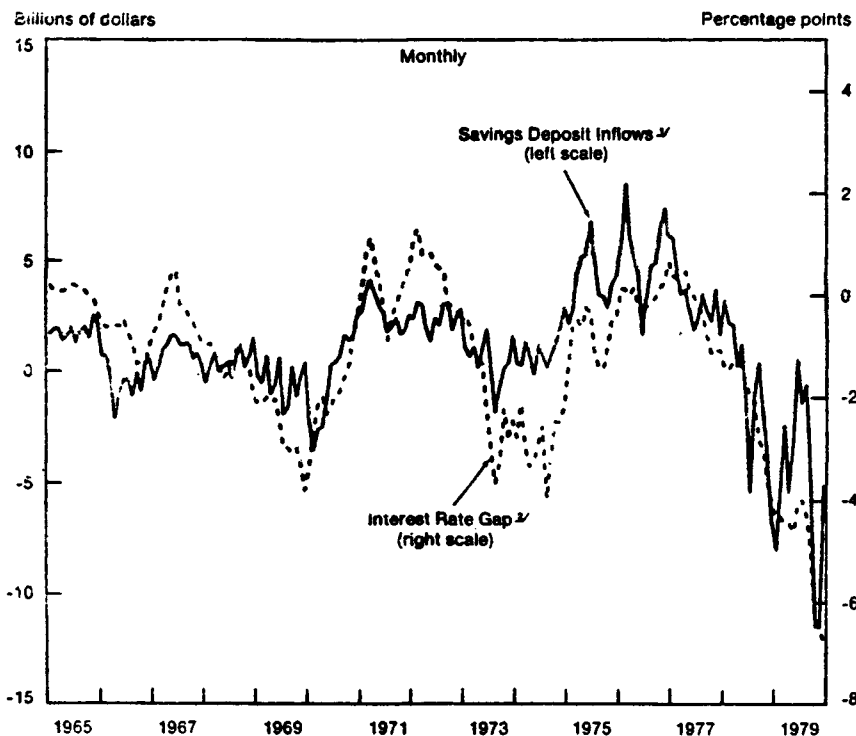
<u>Security</u>	<u>Amount Outstanding</u> ²		<u>Trading Volume (Daily Average)</u>		<u>Turnover (Percent)</u>	
	(Billion Dollars)		<u>1983</u>	<u>1982</u>	<u>1983</u>	<u>1982</u>
	<u>12/31/83</u>	<u>12/31/82</u>				
Marketable Treasury Security	1051	882	42.1	32.3	4.0	3.7
Bills	289	257	22.4	18.4	7.8	7.2
Other <1 yr.	105	89	0.7	0.8	0.7	0.9
1-5 yr.	298	239	8.7	6.3	2.9	2.6
5-10 yr.	106	78	5.3	3.6	5.0	4.6
<10 yr.	96	73	5.0	3.2	5.2	4.4
Federal Agencies ¹	240	237	5.5	4.1	2.3	1.7
Certificates of Deposits	92	132	4.3	5.0	4.7	3.8
Bankers Acceptances	78	80	2.7	2.5	3.4	3.1
Commercial Paper	185	166	8.0	7.6	4.3	4.6
Mortgage-Related Securities	245	179	2.1	0.9	0.9	0.5

¹Debt only

²Held by private investors

Sources: Federal Reserve System, U.S. Treasury Department.

FIGURE 1
SAVINGS INFLOWS TO DEPOSITORY INSTITUTIONS
AND THE SPREAD BETWEEN MARKET
AND CEILING DEPOSIT RATES



↗ Change in savings deposits at commercial banks and thrift institutions (seasonally adjusted averages of daily figures)
 ↘ Ceiling on passbook savings accounts at commercial banks less rate on 3-month Treasury bills (both measured in percent per annum).

Source: Economic Report of the President, 1984, p. 152.

Figure 2

Regulation Q Deposit Rate Ceilings Reduce Savings Flow
and May or May Not Reduce Mortgage Rate

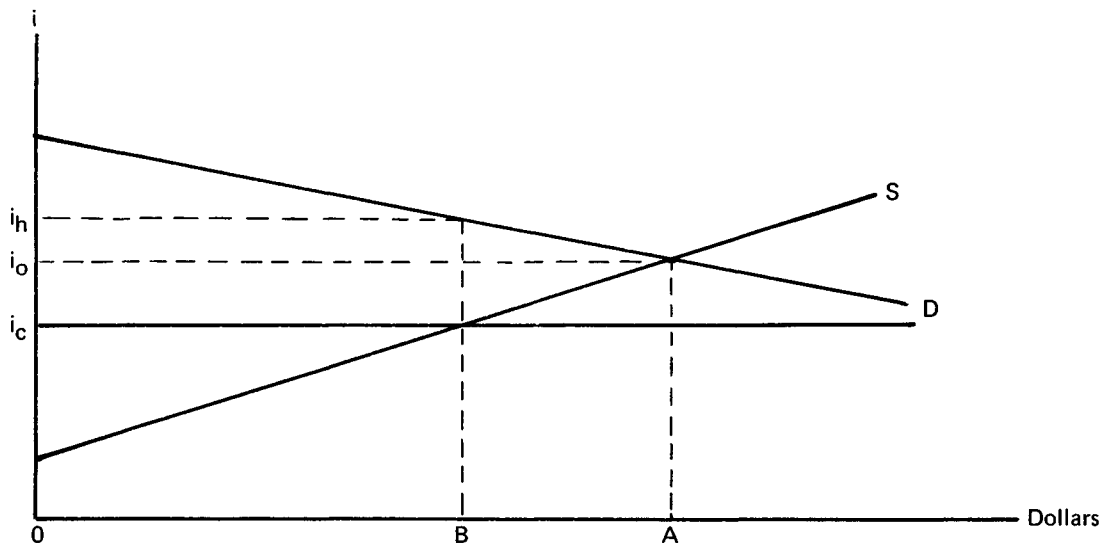
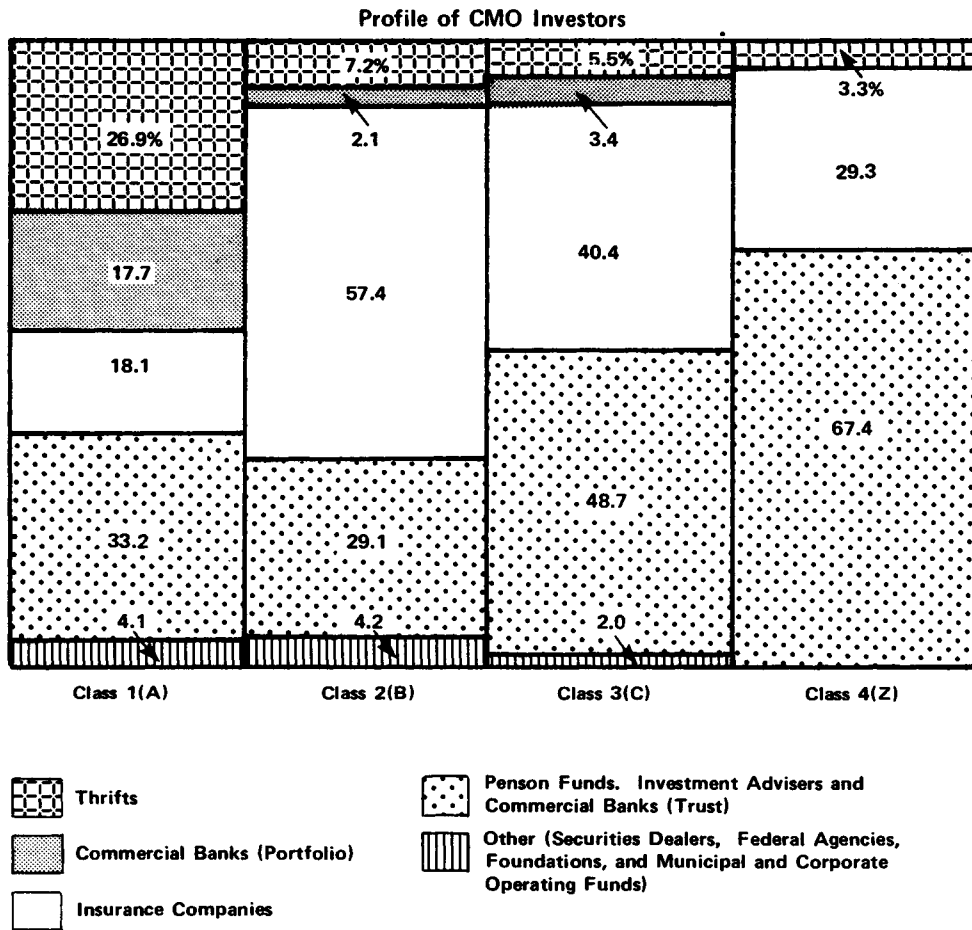


Figure 3



Note: Weighted-average life of Class 1 or A is 4 years and less, Class 2 or B is 4.1-7 years; Class 3 or C is 7.1-10 years, and Class 4 or Z is more than 10 years.

Source: Salomon Brothers, Inc. *Comments on Credit*, March 9, 1984.