THE TRANSFORMATION OF AN INDUSTRY: AN INTEREST RATE RISK MANAGEMENT PERSPECTIVE ON THE SAVINGS AND LOAN INDUSTRY

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ABSTRACT

This paper traces the transformation of the savings and loan industry as is has adapted to changes in regulatory and economic changes. In particular, this paper will examine the response by the industry in attempting to mitigate interest rate risk. This paper also presents gap and duration measures of interest rate risk, by focusing on savings institutions. It also offers examples of using futures, options, and swaps to hedge a savings institution's portfolio, as was done in the 1980s and 1990s, using gap and duration measures to achieve hedging strategies. Finally, this paper offers a look at risks the industry may face today.

INTRODUCTION

This paper traces the transformation of the savings and loan industry as is has adapted to changes in regulatory and economic changes. In particular, this paper will examine the response by the industry in attempting to mitigate interest rate risk.

A BRIEF HISTORY OF AN INDUSTRY

Savings and loan institutions were organized originally as financial institutions designed to promote thrift and home ownership. The original principle was simple—encourage people to place their surplus capital into a savings account that paid some interest and then pool those savings and lend them to those wishing to buy a home at a little higher interest. Initially loans had relatively low risk of default since the standard lending practice was to lend no more than 50% of the value of the property. This practice was sound until the collapse of many of the banks during the stock market crash of the late 1920s and the run on the banks. The run on the banks transferred over to the savings and loans as was popularized by the classic Christmas movie, *It's a Wonderful Life*.

Changes in the banking regulations[1] in the 1930s added much needed stability to the banking system and restored public confidence. Following WWII, the Savings and Loan industry enjoyed a prolonged period of financial stability and prosperity. Regulatory restrictions (Regulation Q) limited the maximum interest that could be paid on a savings account. As a result, even if market rates on open market instruments exceeded the maximum rate that could be paid by the savings and loan, few investors had access to those higher rates because of the large capital requirements for open market instruments. Consequently, relatively little disintermediation occurred.

In the early 1970s, inflationary pressures once again pushed market rates above the maximum rates that could be paid by the savings and loan associations. This time, however, they were not protected against disintermediation due to increasing use of bond mutual funds that allowed smaller investors access to higher interest rates. To mitigate the decrease in loan funds the government created the Federal Home Loan Mortgage Corporation to provide access to additional funds through the sale of some of their mortgage assets. This step was not enough to counter serious outflow of funds from the institutions. Significant disintermediation continued and political pressure to remove the cap on the maximum interest rate succeeded in its removal[2] in 1980.

While the DIDMCA reduced the pressure from disintermediation, it created a new problem for the institutions by exposing them to significantly more interest rate risk. This interest rate risk was two-fold for the institutions. First, the removal of the interest cap on the interest rate paid on savings and the threat of disintermediation if the institution did not adjust its rates to market, eliminated an inexpensive source of loan funds, this squeezing the profit margin on loans. To further complicate the situation, loans funded prior to the mid 70s were able to be taken over by subsequent buyers of the property[3]. Because of the rising interest rate environment of the period, the average effective term

on the loans increased. This placed the institutions in the difficult position of having their assets (loans) earning less than the liabilities (savings accounts), thus creating a negative profit margin. This problem peaked during the early 1980s when mortgage interest rates on new loans topped 18%. While the problem with the assumption of conventional mortgages ended with the passage of the Garn-St. Germain Depository Institutions Act of 1982, VA loans were still assumable until 1988 and FHA loans were assumable until late in 1989. However, because loan rates were declining from their peak in 1981, the problem began to subside. Likewise, new mortgages funded after the peak in 1981 have not posed a problem with negative profit margins over the last 24 years since interest rates have continually fallen.

The second problem the institutions faced was the problem of unmatched maturities between the long-term assets and the short-term liabilities. While this problem was not new, prior to this period, it was of little concern because the interest cost of the liabilities was held artificially low because of the interest rate cap, even when short term rates rose. After the caps were removed, this problem of unmatched maturities became problematic during the decade of the seventies. Interest paid on savings rose from 2-3% early in the decade to upwards of 12% by the end of the decade. During that period, mortgage interest rates rose from 6% to 18%[4]. The problem late in the decade was that those loans created early in the decade were paying less interest late in the decade to pay the higher rates on the savings as described in the preceding paragraph.

During the decade of the 1970s and moving into the 1980s, two other significant transitions in the industry occurred. First, in an effort to reduce interest rate exposure on new loans, the institutions began to take advantage of selling their loans into the secondary market. The secondary market had both opportunities and challenges. On the positive side, the use of the secondary market reduced the problem of unmatched maturities since the institution had the loans in portfolio only for a short period of time. It also allowed the institutions access for more capital for funding loans, since the institution was no longer limited to lending from its own deposit base. On the negative side, institutions gave up between 1-2% of its origination fee as transactions costs. Also, the institutions no longer had long-term assets earning profits on those loans.

A second transition that occurred during the period of the 1970s and 1980s was the massive conversion of the institutions from mutual ownership to stock ownership. Fundamentally this led to a difference in the management philosophy of the institutions. Stock ownership of the institutions fueled an increased concern with strategies that promoted an increase in shareholder wealth rather than promoting the security and interest return for the depositors.

A third transition that occurred during the 1980s was a fundamental change in competition from all types of financial institutions. Due to regulatory changes from the 1980 Depository Institutions Deregulation and Monetary Control Act and the 1982 Garn-St. Germain Depository Institutions Act and subsequent acts, business barriers between financial institutions were phased out. This allowed the Savings and Loans to enter into the consumer credit business and other business lines formally exclusive to the realm of commercial banks.

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After the economic recovery from the Great Depression and before the 1970s, commercial banks and savings and loans had little concern with interest rate risk.. These financial institutions had well delineated roles in the financial markets and fixed interest rate margins between their assets and liabilities. In other words, there was little risk in their portfolios. Strict government laws and regulations helped hold this almost certain world in tack.

However, changes in the economy caused by changes in government spending and Federal Reserve monetary policy during the 1970s, as well as oil price shocks, led to inflationary pressures and the corresponding stresses on interest rates. Volatility in interest rates, or interest rate risk, became the new threat to financial institutions. They had to learn new methods of operations to avoid financial distress. Over the next 15 or so years, thousands of financial institutions, primarily savings and loans, failed or were taken over by other financial institutions that were able to adapt faster. The federal government had to set a course of deregulating interest rates, and changing the well-delineated roles of these institutions. As a consequence, events have forced continual change in financial markets since that time.

Concurrent with these operational changes and in response to market needs, new financial products developed. Financial options and futures began trading in the 1970s. Futures and options had traded for years in commodity markets, but were newly developed for financial markets in response to primarily interest rate risk. Problems arose, however, as financial institutions lacked expertise in trading in these contracts. Their experience and expertise

lagged growth in these markets. Some financial institutions failed as a result of costly trading decisions, and even misuse of the contracts.[5]

Savings and loans (S&Ls) suffered the most in this environment.[6] They were restricted by law to originating and holding almost 100 percent of their portfolio in long-term mortgages. Most were at fixed rates. At the time variable rate loans were not well accepted by the public. Almost all of their funding came by way of small deposits that also had fixed interest rates. As interest rates rose and became more erratic, S&Ls scrambled to adjust their portfolios. The federal government then decided, in 1980, to deregulate the liability side of the S&L balance sheet, rather than the asset side. As a result, interest rates rose on deposits, but existing fixed-rate mortgages returned the same amounts. Few people originated new mortgages, as interest rates were too high at that time, in the range of 12 to 16 percent. Margins were squeezed and even turned negative[7].

S&Ls had four options available to them to survive. They could:

1) try to originate higher interest long-term mortgages, which they did. However, consumers had the choice not to originate. By this point interest rates were falling and people were reluctant to lock themselves into long-term, high interest rate loans. Also, as rates fell these profitable loans were refinanced eliminating the excess profit.
2) buy assets to restructure their portfolios, which was too expensive. In addition, only in 1980 did the industry have any significant increase in new deposits[8].
3) learn to hedge in the financial markets using the new financial derivative contracts developed for this purpose.
4) Sell their assets (mortgages) in the secondary market. While this strategy reduced the risk exposure on newly created mortgages[9], it did little to eliminate the losses the remaining low-interest earning assets. Given the falling interest rate environment subsequent to 1981, selling existing loans would not reduce the portfolio losses.

Option 3 was the only truly viable alternative to reduce the risk of the entire portfolio, including older fixed-rate mortgages already in the portfolio.

Over time, federal and state governments relaxed laws and regulations to allow assets to be from a broader base than mortgages only. However, even to this day, savings institutions and other mortgage banks must hold 65 percent of their assets in mortgages or mortgage-backed securities. Changes were too late to help many institutions survive. Over time, in response to increased investment capabilities, regulators issued strict guidelines concerning management of interest rate risk.[10]

LITERATURE REVIEW

Derivatives come in many varieties, including forwards, futures, option, swaps, structured notes, interest-only strips, principal-only strips, inverse floaters, and more. They are "derived" from other underlying securities, such as Treasury securities, mortgages, and bonds with embedded options. "Used in support of a carefully constructed and appropriate investment strategy, derivatives serve a valuable and necessary role in modern financial markets where interest-rate volatility has become a fact of life." (Green, 1996)

This portfolio support is important given evidence from Kwan (1991). He finds that commercial bank stock returns are negatively correlated with surprise interest rate changes. ". . . the effect of unanticipated interest rate changes on bank stock returns is found to be significantly related to the maturity mismatch between the bank's assets and liabilities. "[11] These findings seem intuitive, and also relate to S&Ls.

Schrand (1997) finds use of derivatives by savings and loans (S&Ls) is positively related to lower stock price interest rate sensitivity. Using derivatives to stabilize profits or portfolio values help stabilize stock prices. Similar research was done using commercial banks. Using data on large community banks, Carter and Sinkey (1998) found that primarily the largest community banks use derivatives, but only approximately ten percent of those. They also found that these banks used derivatives "in response to exposure to interest-rate risk." In addition, they found positive evidence of swaps use related to capital requirements.

However, another study found that primarily the largest financial institutions use hedging to offset interest rate risk, as a part of all risk management, as discussed by Gunther and Siems (1995). They found that "the likelihood of participation in derivatives activities depends directly on asset size, liquidity, subordinated debt, and dividends, but indirectly on asset growth and mismatches in the pricing of assets and liabilities. In contrast, the extent of derivatives participation depends indirectly on maturity mismatches and directly on asset size, subordinated debt, and capital. The finding of a positive capital-

derivative relationship supports the view that market discipline, regulatory constraints, or both generally offset any potential moral hazard incentives to speculate using derivatives."

Research that demonstrates that most financial institutions do not hedge interest rate risk is important to financial safety and soundness of the system. Given the maturity gap inherent in S&Ls and commercial banks, and given the large number of small-sized financial institutions, regulators began requiring them to pay attention to interest-rate sensitivity, and added an "S" to the CAMEL rating, in the 1980s.[12] The end result is that if an institution is not hedging interest rate risk, or managing the gap in some way, then financial statements will reflect the risk inherent in market conditions and management decisions. That institution must "self insure" by holding higher levels of capital against measured interest rate risk. This article focuses on S&Ls, but is also relevant to commercial banks.

INTEREST RATE RISK MEASURES

Maturity Gap Measure

The first measure of interest rate risk used by S&L regulators was the simple maturity "gap" measure. Gap analysis involved isolating and quantifying the maturity imbalances of assets and liabilities. Assets and liabilities were evaluated based on time to maturity and interest rate return to determine profitability in various time frames, or buckets. Since S&Ls were heavily weighted with interest rate sensitive, long-term assets and short-term liabilities, they were said to have a "negative gap" and high interest rate risk. Liabilities would mature and reprice before assets, leading to a declining (an increasing) margin as interest rates rose (fell).

The Gap Problem: Assume that an S&L has a portfolio as shown:

Assets	Liabilities
Mortgages $10M (7% fixed rate, monthly, 20 years to maturity)	(CDs) $9M (4% monthly, one year to maturity)
	Equity $1M

As discussed above, if interest rates fell at the end of the year, this S&L could attract new deposits at a lower interest rate, increasing its margin. However, since liabilities reprice before assets (a negative gap), increases in interest rates will narrow the profitability margin of this S&L. If interest rates rise by 1 percent, the profit margin drops from 3 percent to 2 percent.

Using simple interest, and assuming no new mortgages and no payoffs, asset interest return is still at 7 percent, at $58,333.33 per month. CDs cost $30,000 per month, for a net profit of $28,333.33. If interest rates increase to 5 percent, CDs will cost $37,500 per month, lowering profit to $20,833.33. The S&L makes business decisions based on projected levels of profits. It cannot afford to have severe swings in profits from one period to the next.

Gap analysis has its drawbacks, however. It does not mark to market the assets and liabilities, so that the impact of changes in interest rates on the value of the portfolio is ignored. Gap analysis focuses on stabilizing the near-term interest margin rather than economic value. This has led to use of a different measure of interest rate risk, duration.

Duration

The second way of measuring the effects of interest rates is to use portfolio values, which duration allows, since it marks the portfolio to market. As interest rates rise, the market value of the mortgages changes, along with the changing value of the CDs. Duration is a measure of an asset's or liability's price sensitivity to changes in interest rates, effectively allowing a financial institution to mark its portfolio to market. By definition, duration is a time measure of interest rate risk, as it shows that not all cash flows from a typical security occur at its maturity. It is the weighted average of the times in the future when interest and principle payments are to be received. For a zero coupon bond, duration equals maturity. For coupon bonds, duration is shorter than maturity because some of the benefits of owning the security are obtained before maturity in the form of interest payments. Similar to bonds, duration of mortgages is shorter than time to maturity, since both interest and principal are repaid prior to maturity. Developed by Macaulay in 1934, duration gained in usage, as interest rate risk became a problem.

$$\text{Macauley } D = \sum_{t=1}^{n} \frac{C_t(t)}{(1+r)^t} \Big/ \sum_{t=1}^{n} \frac{C_t}{(1+r)^t},$$

where c = cash flows and r = interest rates.

There are many reasons duration is superior to gap analysis. Whereas gap analysis gives a

measure of absolute differences in maturities of assets and liabilities, duration:

- is additive across all assets and liabilities;
- provides a single measure of the interest rate risk contained in the balance sheet;
- answers the question as to when we will at least get our initial investment back;
- is based on cash flow rather than maturity; and
- allows focus on total assets and liabilities rather than specific sources and uses of funds.

(For examples of calculating duration of some simple bonds, see Appendix A.)

A hybrid measure was developed that combined the best of both methods of interest rate analysis. This was duration gap, which could be used to match the relative interest-rate sensitivity of assets with liabilities, as a measure of interest-rate risk. This allowed determination of how balanced a portfolio was, while marking the portfolio to market. Regulators have required financial institution to use this measure.

Duration GAP = RSA (1 - DRSA)
- RSL (1 - DRSL)

where: RSA and RSL are rate sensitive assets and liabilities, respectively
DRSA = duration of rate sensitive assets
DRSL = duration of rate sensitive liabilities.

Modified Duration

Analysts and theoreticians in financial markets continually look for ways to improve analysis. As a result, the next step in measurement development was modified duration, defined as the approximate change in price for a small change in interest rates. The larger the change in interest rates, the less accurate duration becomes, since the duration measure is a linear function, and asset or liability prices are curvilinear. Therefore, modified duration is fairly accurate only within small changes in interest rates. Otherwise, differences between estimated values based on duration and true values increase as interest rate changes get larger.

$$\text{Modified duration} = \frac{\text{Macaulay duration}}{(1 + r)}$$

or

Percentage price change = - modified duration * yield change

$$= \%\Delta P = - MD * \Delta r$$

For example:

Using our S&L example above, the new market interest rate on mortgages is assumed to increase to 8 percent, while CD rates rise to 5 percent.[13] The S&L's mortgages do not change at 7 percent, but the market value will decline based on the higher market rate. Duration of the mortgage assets is assumed to be 9 years. Then as interest rates rise by 1 percent, mortgage values go down by:

$$\begin{aligned} \%\Delta P \text{ (Mortgages)} &= - MD * \Delta r \\ &= - 9 / (1 + .08) * .01 \\ &= - 8.33 * .01 \\ &= - .0833\% \end{aligned}$$

or a loss of $833,333.33 on $10,000,000.

The duration of the one-year CD is assumed at 9 months, or .75 years.

$$\begin{aligned} \%\Delta P \text{ (Deposits)} &= - MD * \Delta r \\ &= - .75 / (1 + .05) * .01 \\ &= - .714 * .01 \\ &= - .00714\% \end{aligned}$$

or a loss of $64,285.71 on $9,000,000.

The value of the S&L's portfolio falls by $833,333.33 + 64,285.71 = $897,619.04.

In this example, portfolio effects are much greater on the asset side, since duration is much longer. However, there are losses on both sides. Managers cannot prevent assets and liabilities from changing values, when interest rates change. They can, however, guard against changes by using hedging techniques. Therefore, the S&L can hedge this possibility by using derivatives, futures, forwards, options, or swaps.

Hedging Strategies Using Gap and Duration Measures of Interest Rate Risk

The goal of all hedging is such that any loss (profit) in the cash market position is exactly offset by a gain (loss) in the futures market. The S&L can elect to micro hedge, which is hedging a specific asset or liability, as in the gap example above, or macro hedge, which is hedging the value of the portfolio, as in the duration example.

Futures Contracts

A futures contract is an obligation to make or take delivery of a financial asset or commodity at a certain price on a certain date, and is traded on an organized exchange. The contract also specifies the commodity, grade or quality, and delivery location.

There are two types of futures transactions:

- Short hedge: sell a futures contract as a temporary substitute for the actual sale of the securities in the future. Institutions use this hedge when they have concern about rising rates, falling securities prices.
- Long hedge: buy a futures contract as temporary substitute for the actual purchase of the securities in the future. Institutions use this hedge when they have concern about falling rates and rising securities prices.

If the S&L is concerned about rising interest rates, then it must use the short hedge. If it were to use the long hedge, the S&L would be speculating that rates would fall, so that there would be no interest rate risk protection.

To make a good hedge, there must be a strong correlation between the cash market and the futures market to get as close as possible to a "perfect hedge." The more stable the basis, the better the hedge.

- Basis:

cash price	cash rate
-futures price	-futures rate
basis	basis

Assume our S&L wants to hedge a rise in interest rates using Treasury bills or Treasury bond futures contracts. There may be some basis risk, since the cash market in certificates of deposit will more closely match the futures market in Treasury bills in terms of price movements as a result of changes in interest rates than it will in Treasury bonds. Using the gap measure of interest rate risk, the S&L would be concerned about deposit interest rates rising. Therefore, it would most likely use Treasury bills futures contracts, since they can most closely match maturities and hence achieve parallel movements in interest rates at the short end of the yield curve.

Treasury bills futures contracts are denominated in $1 million increments, and sell at a discount from 100. The S&L would want to take a short position in the futures market and sell nine $1 million, 3-month Treasury bill futures contract forward over 12 months to match interest payment changes on the $9 million of CDs. That means that the S&L would sell them today before interest rates rose. After rates rose, the S&L would buy back the contracts for a profit, less any broker fees. The profit on the Treasury bill futures contracts would help offset the loss on deposit interest payments. The S&L could sell forward for each of the contract periods over the next year or even two, if it wanted continued protection.

Using the duration measure, the S&L has the majority of loss from its mortgage portfolio value, so hedging with the longer-term Treasury bond is more prudent. In addition, mortgages are usually priced from the 10-year Treasury bond, so the basis risk will be reduced. Interest rate shifts on the market value of the mortgage portfolio will closely match the values of the Treasury bond futures contracts. This will not be a perfect hedge, however, if for no other reason than part of the portfolio value comes from the liability (deposits) side of the balance sheet.

Matching maturities as closely as possible reduces basis risk. Since Treasury bond futures contracts are denominated in $100,000 increments, and contract values change by $3,200 for every 1 percent change in interest rates, the S&L would need to buy 281 contracts to offset the portfolio effects. This many contracts would be costly, but would provide insurance protection against its portfolio changing value with changes in rates.

Forward Contracts

Forward contracts behave much like futures contracts, but are negotiated between two parties, usually using a broker. Advantages are that many of the fixed attributes of futures contracts are negotiable, such as time to expiration, dollar amounts, quality, quantity, etc. Disadvantages are that there is no exchange to serve as a go-between or as a guarantor of the contract. Agreeing parties can not easily get out of their obligation to fulfill their sides of the contract. In the futures markets, one can take the opposite side of the contract, thereby effectively removing themselves from further obligation.

Financial Options

An option is a contract that conveys the right, but not the obligation, to the buyer of the option to buy (a call) or sell (a put) a security for a specified price before a specified date. Options generally can have maturities of up to 18 months or even longer, however, it may be difficult to find them

beyond 9 months to maturity. Also, premiums tend to be expensive - at a higher cost than futures.

If one is concerned about falling interest rates, or rising prices on securities, one should buy a call (make profit as asset prices rise) or sell a put (make the premium). If one is concerned about rising interest rates, falling prices on securities, one should sell a call (make the premium) or buy a put (make profit).

Options Pricing Factors

Premiums are a function of six factors, all of which are used in option price determination.[14]

1) Time
2) The market price
3) The exercise price
4) Volatility of the price of the underlying asset
5) The level of interest rates
6) Dividends or interest payments made on the underlying asset

The S&L can use the options market to hedge its interest rate risk, as well. However, most financial institutions use swaps more than futures or options.

Interest Rate Swaps

By definition, an interest rate swap is an agreement between two parties to exchange interest rate payments. The firms involved want to change their exposure to interest rate fluctuations in the opposite direction. A swap, however, does not involve a transfer of principal dollars and, therefore, does not appear on the firms' balance sheets.

Since swap agreements are negotiated between parties, there are many types available. Two basic kinds of interest rate swaps are:

- Fixed-rate to floating-rate: a firm with floating-rate assets and fixed-rate liabilities exchanges interest payments with a firm that has fixed-rate assets and floating-rate liabilities (the S&L in the example).
- Floating-rate to floating-rate: a firm with floating-rate liabilities based on one type of rate (e.g. T-bill) exchanges interest payments with a firm whose floating-rate liabilities are based on a different rate (e.g. LIBOR).

Using our example above, the S&L could swap fixed-rate mortgage payments to another financial institution for adjustable-rate deposit payments. In that way, as interest rates rose, the other financial institution would have to make the increased CD interest payments, not the S&L. However, if interest rates declined, the S&L would not experience higher profits, either, as the other financial institution would make the lower CD interest payments.

INDICATIONS OF CURRENT INDUSTRY RISK STRATEGIES

To examine indications of a change in the industry practices toward interest risk management, quarterly data from the Office of Thrift Supervision was examined from March 1995 through March 2005. To facilitate the analysis, the data were divided into three time periods. These time periods were chosen to reflect changes in federal government approaches to economic policy with some minor adjustment to maintain a statistically useful sample size. The three time periods chosen were March 1995-June 1998, September 1998-December 2001, and March 2002 – March 2005. During the first time period (P1), Bill Clinton was President. The country had achieved a balanced budget; the Republican Party had taken over the legislative branch of government; and had pursued a plan of fiscal restraint. During the second time period (P2), there was a change from a Democratic Party president in Clinton to a Republican Party president in Bush. At the time Bush took office, the country was deeply divided and there was a significant reduction in consumer confidence that lead to a mild recession. To further complicate matters, on September 11, 2001, the United States economy was shocked by the terrorist attack on our country. The third time period (P3) begins in January 2002 with a significant shift of economic resources throughout the economy as the country moved from a peace-time economy to a war-time economy. Because of the war against terrorism in Iraq and Afghanistan, this period has experienced deficit spending and slowly raising interest rates.

This section of the paper will examine different indications of interest rate risk within the Savings and Loan industry. Specifically, the paper will examine shifts in asset allocation, liability allocation, and use of risk management techniques.

Indications of Mortgage Asset Changes

One method a savings and loan has to reduce potential portfolio risk is to sell their mortgage loans thus eliminating the interest rate risk on those loans. Thus an indication that the portfolios might be exposed to more risk is an increasing percentage of the institutions assets held in mortgage loans. In the first period (P1) the mortgage loans

averaged 61.31% of their assets. During the second period (P2) the percentage fell to 59.16%. This drop was found to be statically significant at the 95% level with a T-score of 7.14. This asset shift would be expected as institutions moved to reduce their risk as the economy moved into a mild recession. Surprisingly, more recently in the third period (P3) the percentage has increased sharply to 64.87% potentially exposing the portfolio to more risk. In fact, in the first quarter of 2005, this percentage had increased to 73.10%. The increase from P2 to P3 was also statistically significant at the 95% confidence level with a T-Score of 3.79.

Mortgage Backed Securities Usage

Over the ten year period studied, there has been a steady decline in the amount of mortgage backed securities in the institutions' portfolios. This decline has been about .23% per quarter with an r^2 of 95.93%. This decline is somewhat surprising with the availability of GNMA IIs that offer the ability to more closely match maturities with the institutions liabilities.

Derivatives Usages

Another indication of interest rate risk management is the use of derivatives. Derivatives increased from P1 to P2 from 5.31% to 7.77%. Derivatives decreased from P2 to P3 from 7.77% down to 4.89%. Both changes were statistically significant with t-scores of 7.28 and 2.06 respectively. The decline in derivative positions in P3 suggests a reduction in the use of derivatives for interest rate hedging.

OTHER RISK FACTORS

Loan Collateral Quality

With the recent rises in interest rates, there is evidence of weakness in some real estate markets. More and more analysts are concerned with the possibility of a real estate market bubble. In addition, there has been a troubling trend in some markets for very high loan-to-value lending. In some markets such as the Washington DC market and the Florida market, speculators have become significant purchasers of property. Sjuggerud (2005) points out that housing sales from 1983 to 1998 comprised about 8 to 10 percent of the Gross Domestic Product. This year the data suggest that they now account for 17 percent. Sjuggerud offers this statistic as evidence of significant speculation in the market.

Uninsured Deposits Increase

The percentage of insured deposits relative to total liabilities has steadily declined by .68% every quarter during the ten year period of this study (r^2=95%) from 62.85% in March 1995 to a low of 35.43% in March 2005. Concurrent with this decline was an increase in the percentage of uninsured deposits by .38% per quarter over the same period (r^2=93%) from 8.04% in March 1995 to 23.09% in March 2005. Clearly, this substantial increase in uninsured deposits increases the risk of significant disintermediation should the public confidence in the industry wane.

CONCLUSIONS

From the above analysis, it is clear that the savings and loan industry has significantly increased their asset portfolio weights to include more mortgage loans in portfolio. By adding additional mortgage loans to their portfolio the institutions are exposing themselves to additional interest rate risk.

At the same time, there is evidence of decreased use of hedging of interest rate risk using derivatives, decrease sales of loans into the secondary market thus transferring the interest rate risk to investors, , and decreased use of mortgage backed securities to assist with matching maturities of assets and liabilities.

Before concluding that the institutions are riskier, however, more data will be needed. It could be that the industry has become complacent with a relatively stable interest rate environment and has chosen to simply absorb the risk by discontinuing interest rate management procedures. It is also possible, however that the industry is simply choosing to shift interest rate risk management techniques by using off balance sheet interest rate swaps. Data on swap usage is not readily available.

If, however, the institutions have become complacent regarding interest rate management techniques, there may be significant problems ahead. With the upward pressure on interest rates potentially squeezing institutions portfolio profits, the possibility of a real estate bubble bursting, and the substantial growth in uninsured deposits, there could be a sharp increase in troubled savings and loan institutions.

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ENDNOTES

[1] The Banking Act of 1933 (Glass-Steagall) that created the FDIC, Regulation Q that limited the interest rate that could be paid on savings accounts, and separated investment and commercial banking. Also the 1934 National Housing Act that created FSLIC, created the FHLBB, and provided state and federal chartering of Savings and Loans. FNMA was created in 1938 to provide a secondary market for FMA loans to replenish loan funds.

[2] The 1980 Depository Institutions Deregulation and Monetary Control Act (DIDMCA) initiated the phase-out of Regulation Q.

[3] While many mortgages originated during the 1970s contained a due-on-sale (non-assumption) clause, lenders did not enforce the clause because courts generally ruled that the clause was unenforceable unless the assumption would impair the lender's security [*Tucker v. Lassen Savings & Loan Association* (12 Cal. 3d 629, 1974) and *Wellenkamp* (*Wellenkamp v. Bank of America*, 21 Cal 3d 943, 8/25/78)]. This problem was not resolved until the *Garn-St. Germain Depository Institutions Act of 1982* superseded the ruling of the state courts. For an interesting discussion on this history, see http://www.johntreed.com/dueonsale.html.

[4] Interest rates steadily climbed during this period for several reasons. Most prominent was the upward pressure due to the general inflation of the economy. Also increasing upward pressure on interest rates was the increase in the demand for mortgages due to the rise of the rate of home ownership in the country of almost 4% between 1995 and 1981. See http://www.freddiemac.com/news/finance/commentary/070703_homeown_rate.htm.

[5] Financial theory and training lagged markets developments, as well.

[6] Commercial banks were allowed by law to hold more diversified portfolios, and thus did not experience as much of the effects of interest rate risk.

[7] There were other reasons that contributed to the failure of some of the savings and loans. One was the loan losses from foreclosure of real estate loans. These losses were due to several factors. Among these included a collapse in values in some markets due to declines in the economic base of the community such as weakness in the oil industry in Houston and Denver. Other losses were due to the loss in the values of income-producing properties due to the Tax Simplification Act of 1986 (see Belloit and Grenci, APUBEF Jounal _____).

[8] In an attempt to relieve the upward pressure on interest rates, the federal government developed a one-year program were the industry could offer one-year certificate of deposits were their interest paid was tax-free. This did result in a significant temporary increase in the flow of funds into the institutions. However, because the benefit was only temporary, the financial institutions were unable to sustain the funds and lend them on a long-term basis.

[9] Hedging interest rate risk on new loans can be effectively accomplished though the use of the secondary market by the use of mandatory and optional delivery contracts with Fannie Mae, Ginny Mae, or Freddie Mac. Such contracts hedge marketing losses on loans to be sold in the secondary markets from rising interest rates. This risk reduction technique is not without cost, however—costing between 1-2 points. Also, using the secondary market allows the institution to "match maturities" with asset/liability balance since the "pipeline" is usually less than six months.

[10] See Thrift Bulletin, TB 13a. First adopted in the early 1980s, TB 13, later revised to TB 13a, describes the definitions, sources, and limits of interest rate risk, stress testing, board of director obligations, and S&L examiner judgements and potential actions.

[11] Kwan (1991), p. 74.

[12] CAMELS stands for capital, assets, management, equity, liquidity, and sensitivity to changes in interest rates. This rating system is used by bank regulators to assess the amount of capital that financial institutions need to hold. Regulatory requirements are spelled out in Treasury Bulletin 13a.

[13] However this signals a parallel shift in the yield curve, which is only one possibility.

[14] See a discussion of the Black-Scholes model for option pricing in many finance textbooks.