Quarterly Review

Interest Rate Risk

2nd Quarter 1996

Office of Thrift Supervision • Risk Management Division

# EXECUTIVE SUMMARY

## Interest Rate Sensitivity Increases for Second Straight Quarter

Results of the **OTS Net Portfolio Value Model** showed a pronounced increase in the interest rate sensitivity of the thrift industry's net portfolio value (NPV) during the second quarter. At mid-year, the median **sensitivity measure** for the industry stood at 183 basis points, up 44 basis points from the prior quarter and 74 basis points from year-end. The upward pressure on interest rates, which was evident at the start of 1996 and continued throughout the second quarter, was the primary force behind the increased sensitivity of thrift balance sheets.

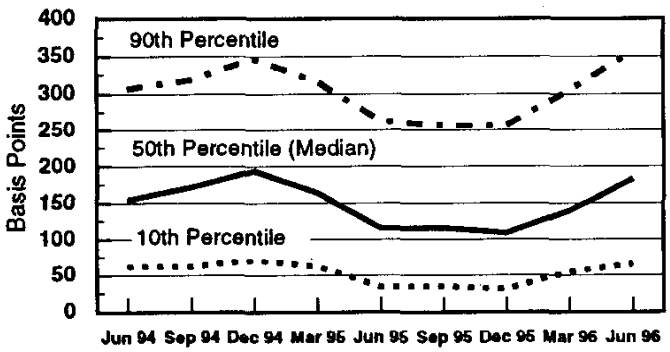
Modest deterioration in the industry's ability to absorb interest rate shocks was also evident in the second quarter. As measured by the Net Portfolio Value Model, **post-shock NPV capital ratios** turned down slightly during the second quarter, ending the uptrend that began in the fourth quarter of 1994.

While the overall financial condition of the industry remains strong, a significant segment of the industry remains vulnerable to potential interest rate shocks. Over 40 percent of OTS-regulated thrifts are likely to lose more than 20 percent of their net portfolio value under a 200 basis point interest rate increase. Further, about 3 percent of the thrifts have exposure ratios below 4 percent ■

## QUARTERLY TREND ANALYSIS

The median **sensitivity measure** for the industry surged to 183 basis points by mid-year, the highest level since December 1994 *(See Chart 1)*.

Chart 1
**Sensitivity Measure ***




* Difference between pre-shock NPV ratio and post-shock NPV ratio (expressed in basis points).

This increase in sensitivity, in large part, reflects the runup in interest rates that occurred during the first half of 1996. Between year-end 1995 and mid-year 1996, the Treasury yield curve shifted up and steepened *(See Chart 2)*. As explained below, this movement in rates resulted in an increase in the measured duration of assets and greater overall interest rate sensitivity of thrift portfolios.

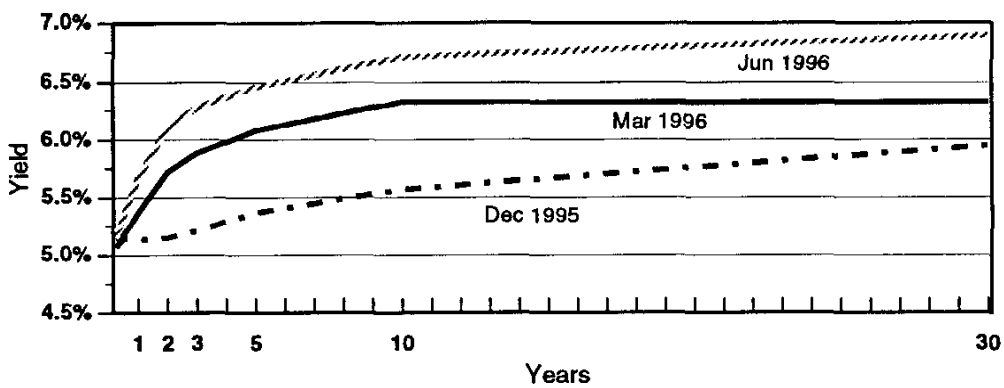
Although the thrift industry has become more rate sensitive, its ability to withstand adverse interest rate shocks has remained strong. Reported earnings in the thrift industry are at record levels and capital ratios of thrifts are at near-peak levels. However, the median pre-shock NPV ratio for the industry plateaued in the second quarter, while the median post-shock NPV ratio headed down. *(See Chart 3, on page 3)*.

The **post-shock NPV ratio** (or **exposure measure**) is the estimated equity-to-assets ratio following a hypothetical, adverse interest rate shock of 200 basis points. The higher the post-shock ratio the less interest rate risk the institution poses. The decline in the post-shock ratio reflects both the slippage in pre-shock capital ratios and the increase in the sensitivity of thrift balance sheets.

## Reasons for the Increased Sensitivity

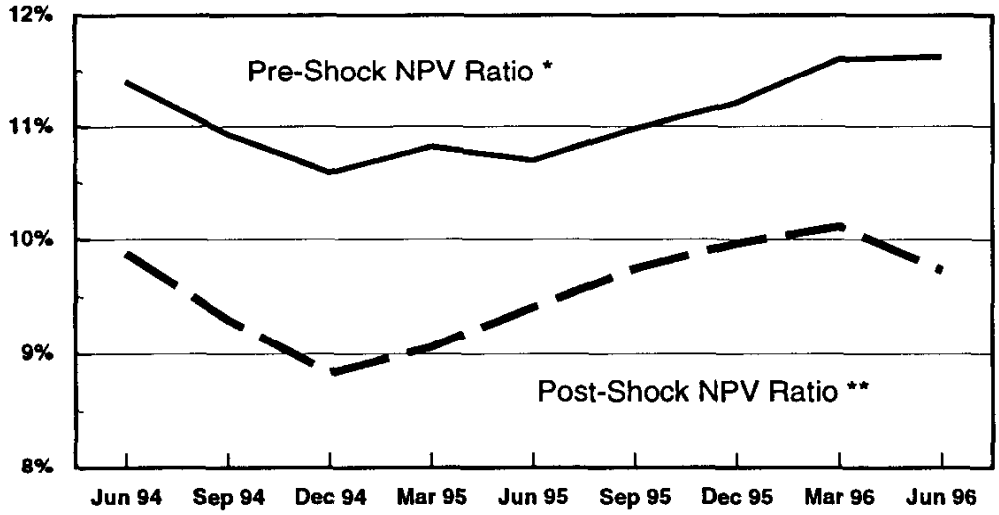
The effect of rising interest rates on existing assets and liabilities, rather than a change in the composition of assets and liabilities, was the primary cause of the hike in interest rate sensitivity of thrift balance sheets. In general, a rise in interest rates will cause the effective maturity of most mortgages to increase and become more rate sensitive. Because mortgages account for 76 percent of thrift assets, the

Chart 2
**Treasury Yield Curves**




Source: Bloomberg

Chart 3
**Median Pre-Shock and Post-Shock NPV Ratios**




* The pre-shock NPV ratio is an equity-to-assets ratio expressed in present value terms (i.e., base case NPV divided by the present value of assets).

** The post-shock NPV ratio is an equity-to-assets ratio expressed in present value terms following an adverse 200 basis point interest rate shock.

higher rates in the second quarter led to an increase in the overall duration of thrifts' assets. The median duration of thrift assets increased to 2.0, from 1.6 at year-end 1995 and 1.8 at the end of the first quarter.[1] By contrast, the median duration of thrift liabilities has remained fairly stable over the past nine quarters, ranging between 1.6 and 1.4 *(See Chart 4, on page 4).*

The increase in asset duration was primarily due to two factors. First, the duration of adjustable-rate mortgages (ARMs) increased to 1.4 (from 1.1 in the prior quarter).[2] Second, the duration of fixed-rate mortgages (FRMs) extended as rates rose and projected prepayments slowed. The duration of FRMs was 3.7, up from 3.6 at the end of the first quarter. *(See Chart 5, on page 5)* The increase in the duration of thrift assets would have been even greater had there not been a surge in originations of ARMs at thrifts. During the second quarter, about 55 percent of the mortgages originated by thrifts were ARMs, up from 35 percent in the first quarter.

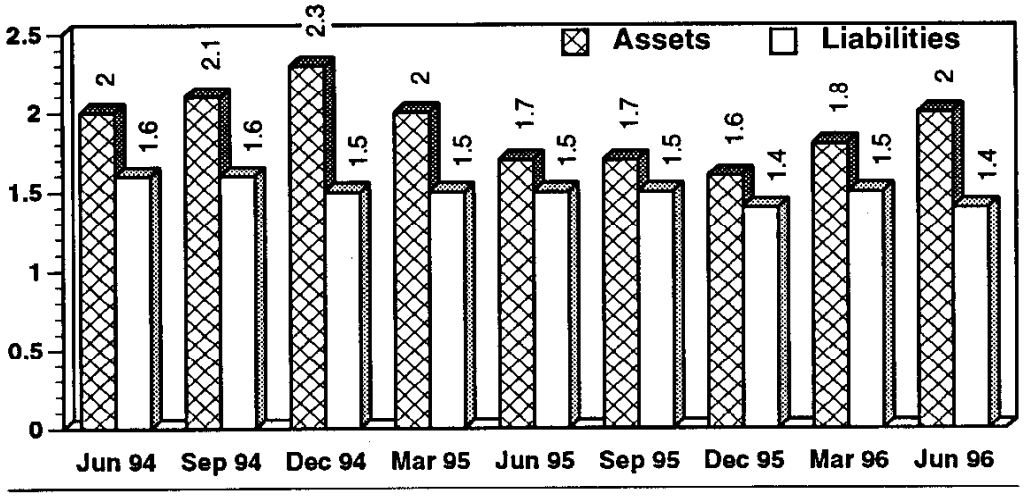
## Asymmetry of Gains and Losses

Table 1 *(on page 4)* shows the estimated percentage change in the industry's net portfolio value and in its NPV capital ratio under different interest rate scenarios for the last two quarters.

[1] Duration is a measure of the price sensitivity of an asset for small changes in yield. The higher the duration of an instrument, the greater is its price sensitivity. For example, an asset with a duration of 1.6 will appreciate in in value by about 1.6 percent for a one percentage point (100 basis points) decline in yield. The reverse would be true if yields rose by one percent.

[2] The increase in the duration of ARMs was in part attributable to a change in the NPV Model's lifetime cap assumptions for the valuation of ARMs. Certain assumptions were changed in June 1996 to incorporate additional data on lifetime caps. In addition, changes in the methodology for reporting CMO floaters resulted in a significant increase in the duration of those instruments at some thrifts.

Chart 4
**Duration of Assets and Liabilities ***




* Aggregate industry data. Asset durations have been adjusted to exclude deposit intangibles; liability durations have been adjusted to include deposit intangibles.

Table 1
**Interest Rate Risk Sensitivity**
(Industry aggregate data)

| Change in Interest Rates | Percentage Change in NPV | | Ratio of NPV-to-Assets | |
|---|---|---|---|---|
| | March 96 | June 96 | March 96 | June 96 |
| +400 | -38% | -48% | 6.8% | 5.6% |
| +300 | -26 | -34 | 7.9 | 7.0 |
| +200 | -15 | -20 | 8.9 | 8.2 |
| +100 | -6 | -9 | 9.7 | 9.2 |
| 0 | 0 | 0 | 10.2 | 10.0 |
| -100 | +4 | +5 | 10.5 | 10.4 |
| -200 | +4 | +7 | 10.5 | 10.5 |
| -300 | +5 | +10 | 10.5 | 10.7 |
| -400 | +8 | +14 | 10.7 | 11.0 |

For the industry as a whole, the loss in net portfolio value when rates rise is greater than the gain in net portfolio value when rates fall. For example, the industry would lose about 20 percent of its net portfolio value if rates rose by 200 basis points, but would gain only 7 percent in value if rates fell by 200 basis points as of mid-year. This asymmetry between gains and losses is largely a result of the embedded call option in mortgage loans and securities. As rates decline, the market value of most mortgages increases, but at a decelerating rate as falling rates make it more likely that the mortgages will be prepaid.

The asymmetrical response to changes in interest rates is even more pronounced at some institutions. Chart 6 *(on page 5)* shows the distribution of the projected percentage change in individual institution net portfolio values for a rate increase of 200 basis points. Of the 1,261 reporting institutions, 93.4 percent (1,164 thrifts) show a loss of net portfolio value in that scenario; 81 institutions would lose over 40 percent of their net portfolio value in that scenario; and another 125 would lose between 30 and 40 percent of their net portfolio value.

Chart 6 *also* shows the industry distribution under a 200 basis point drop in interest rates. Under this more favorable scenario, 75.3 percent of the reporting thrifts show gains in net portfolio value.

Chart 5
**Duration of Mortgages**

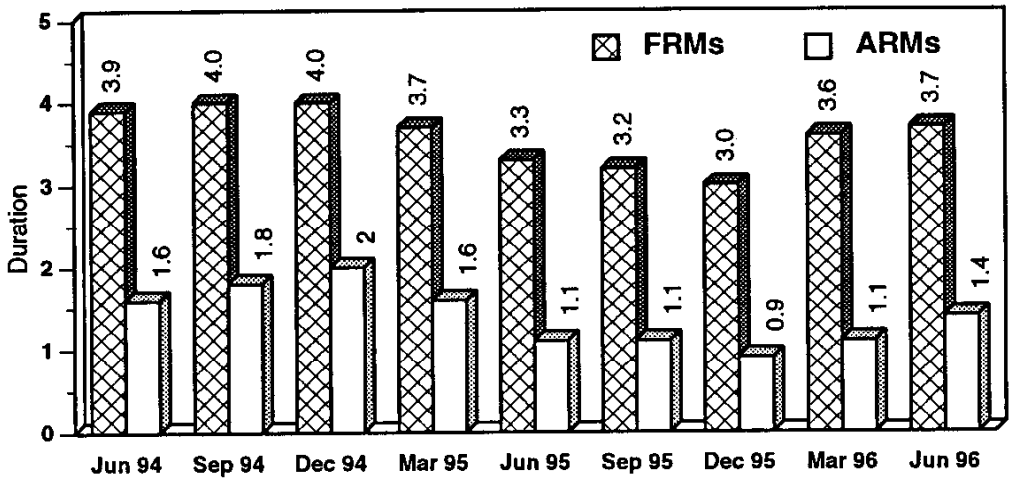
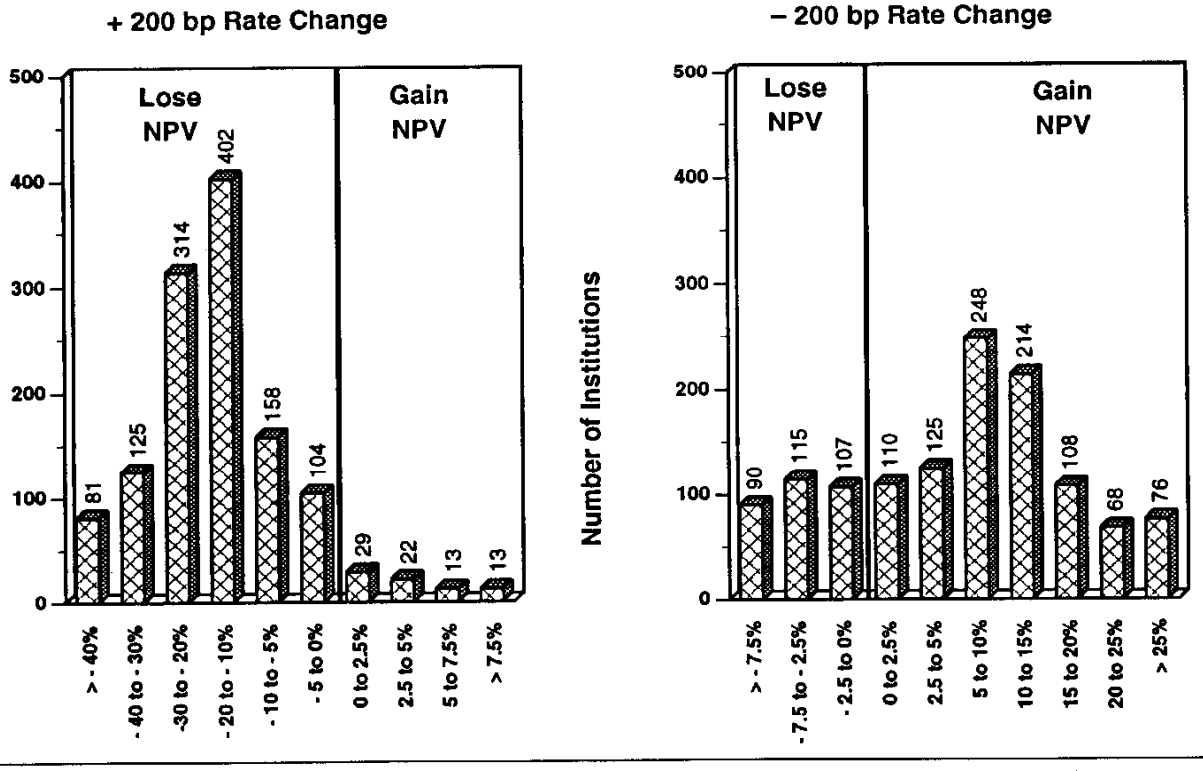



Chart 6
**Estimated Change in NPV ***
(Industry Distributions, Second Quarter 1996)




* The percentage change in the base-case NPV caused by an interest rate shock of either –200 or +200 basis points.

## Exposure Measures Under 4 Percent Raise Concerns

The number of thrifts with exposure measures under 4.0 percent increased slightly in the second quarter to 37, but remained well below the recent peak of 142 in December of 1994 *(See Chart 7)*. About 3 percent of all thrifts had exposure measures below the 4 percent level at the end of the quarter. Any institution with a post-shock NPV ratio below 4.0 percent gives cause for supervisory concern.

## Industry Profile

The pre- and post-shock NPV capital ratios of each thrift are plotted in Chart 8, the **NPV Sensitivity Chart**. The horizontal axis represents a firm's pre-shock NPV ratio and the vertical axis represents its post-shock NPV ratio. The line that bisects the horizontal and vertical axes at a 45 degree angle represents the "zero sensitivity line" where pre- and post-shock ratios are equal. Each dot depicts a different thrift.

The 37 institutions with post-shock NPV ratios of less than 4.0 appear in the area below the dotted line.

An institution whose exposure measure (post-shock NPV ratio) is below the 4 percent line either has a relatively low level of capital, a high degree of NPV sensitivity, or both. At mid-year 1996, most of the institutions with exposure measures below the 4 percent line were there as a result of high sensitivity rather than a low level of capital (i.e., very few thrifts had pre-shock NPV Ratios below 4 percent). Twenty-one of these 37 institutions had sensitivity measures in excess of the industry median of 183 basis points. Only 7 had a base-case NPV-to-assets ratios of 5 percent or less.

In general, institutions with exposure measures (post-shock NPV ratios) below 4 percent should either reduce their interest rate sensitivity or strengthen their capital position ■

Chart 7
**Number of Institutions with Exposure Ratios under 4 Percent**

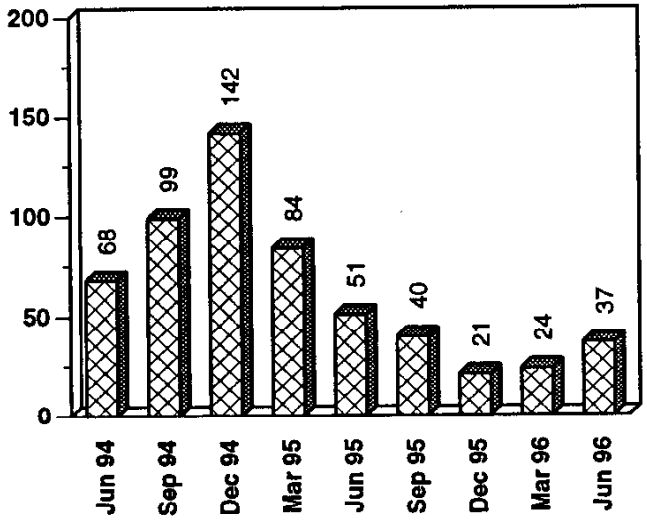



Chart 8
**Distribution of Pre-Shock and Post-Shock NPV Ratios**
(2nd Quarter, 1996)