



The Quarterly Review

of Interest Rate Risk

Volume 2, Number 4

Fourth Quarter 1997

EXECUTIVE SUMMARY

Interest Rate Sensitivity Continues Declining in the Fourth Quarter

Interest rate sensitivity for the thrift industry continued to fall during the fourth quarter of 1997. At the end of the fourth quarter, the median sensitivity measure as measured by the OTS Net Portfolio (NPV) Model was 153 basis points, a decrease of 15 basis points from the previous quarter. The decline in interest rates during the fourth quarter accounted for most of the decrease. The industry's ability to absorb interest rate shocks did not change, as the median post-shock NPV ratio remained at 10.4 percent. Approximately 35 percent of OTS-regulated thrifts would lose more than 20 percent of their net portfolio value with a 200 basis point rise in interest rates.

QUARTERLY TREND ANALYSIS

The median sensitivity measure declined to 153 basis points at the end of the fourth quarter, falling 15 basis points from the end of the third quarter (Chart 1, page 4). A downward shift in the yield curve accounted for most of the decrease in sensitivity over the period. The yield curve at the end of December was lower and flatter than the yield curve at the end of September (Chart 2, page 4). As a result, the effective durations of the industry's assets decreased slightly, while the effective durations of liabilities remained constant (Chart 3, page 5).¹

The median pre-shock NPV ratio for the industry decreased to 11.9 percent in December, and the median post-shock NPV ratio remained at 10.4 percent (Chart

4, page 5). Post-shock NPV ratios measure a thrift's ability to withstand interest rate shocks.

ASYMMETRY OF GAINS AND LOSSES

Table 1 (page 8) reports the percentage change in both the aggregate net portfolio value and NPV ratio for the industry under different interest rate scenarios. For the thrift industry, the loss in net portfolio value when interest rates increase is greater than the gain in aggregate net portfolio value when interest rates decrease. For example, in the fourth quarter of 1997, the thrift industry would lose 16.5 percent of its net portfolio value if rates rose by 200 basis points, but would gain only 4.9 percent in value if rates fell by 200 basis points. This asymmetry between gains and

losses is largely a result of the embedded call option in mortgage loans and mortgage-backed securities. As interest rates fall, the market value of most mortgages increases, but at a diminishing rate, because declining interest rates make it more likely that mortgages will be prepaid.

As in past quarters, exposure to changes in interest rates was particularly pronounced at some thrifts. The right panel of Chart 5 (page 6) shows the distribution of the percentage change for an increase in interest rates of 200 basis points. Of the 1,099 reporting thrifts, 90 percent would experience a loss of net portfolio value in that scenario. Moreover, about 32 percent of the industry (351 thrifts) would lose more than 20 percent of their economic value if interest rates rose by 200 basis points. The left panel of Chart 5 shows the industry distribution of gains and losses in net portfolio value for a decrease of 200 basis points in interest rates. Under this usually favorable scenario, approximately 75 percent of reporting thrifts would experience increases in their net portfolio values.

Chart 6 (page 6) compares the distributions of gains and losses for the fourth quarter of 1997 with those for the fourth quarter of 1996 given both a 200 basis point decrease and increase in interest rates.

INDUSTRY PROFILE

The pre- and post-shock NPV ratios of each reporting thrift are plotted in the NPV Sensitivity Chart (Chart 8, page 7). In this chart, the horizontal axis represents a thrift's pre-shock NPV ratio and the vertical axis represents its post-shock NPV

ratio. The 45 degree line represents the "zero sensitivity line," where pre- and post-shock NPV ratios are equal. Each dot denotes the pre- and post-shock NPV capital ratios for a thrift. The six thrifts with post-shock NPV ratios of less than 4 percent appear in the area below the dotted horizontal line. A thrift whose 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. Thrifts with exposure ratios below 4 percent should strengthen their capital position or reduce their interest rate sensitivity.

The number of thrifts with exposure measures below 4 percent increased in the fourth quarter to eight (see Chart 7, page 7). The low number of thrifts with exposure ratios below 4 percent is consistent with both the historically high equity capital ratios in the industry and the percent of individual thrifts that are "well capitalized."

THRIFT SIZE AND INTEREST RATE RISK

Not surprisingly, the pre-shock and post-shock NPV ratios vary inversely with thrift size. As thrift size increases, both ratios fall. It is well-known that smaller thrifts have larger capital ratios than bigger thrifts (See Table 2, page 9).

The relation between thrift size and the sensitivity measure, however, displays a different pattern. As noted in previous issues of this publication, an upside down U-shape characterizes the relation between thrift size and sensitivity. This result seems counterintuitive, since bigger thrifts might be expected to have lower interest rate sensitivity due to their greater use of

financial derivatives for hedging purposes. Differences in the percentages of fixed- and adjustable-rate mortgages (ARMs) held by small and medium sized thrifts appears to account for the U-shape pattern. Thrifts with assets below \$500 million hold fewer COFI ARMs and more 15-year fixed-rate mortgages in their portfolios than thrifts with assets between \$500 million and \$1 billion. Holding the number of adjustable- and fixed-rate mortgages in a thrift's loan portfolio constant, sensitivity rises as the number of COFI ARMs increases, but falls as the number of 15-year fixed rate mortgages increases. Consequently, interest rate sensitivity for small thrifts is lower than for medium sized thrifts. The greater use of derivatives for hedging interest rate risk accounts for the lower sensitivity of the large thrifts, those with assets over \$1 billion.

All three asset size groups increased their median post-shock NPV ratios over the last year. In addition, the median sensitivity measures fell for all three groups compared with the levels a year ago.

INTEREST RATE RISK AND THRIFT PORTFOLIO COMPOSITION

Table 3 (page 9) compares the composition of mortgage loan portfolios for thrifts in the top and bottom deciles when thrifts are ranked by the size of their sensitivity measure in the fourth quarter 1997. As shown in the table, thrifts in the top decile (the most sensitive thrifts) of the sensitivity measure distribution hold a

smaller percentage of ARMs and a larger percentage of fixed-rate mortgages (FRMs) than those thrifts with sensitivity measures in the bottom decile (the least sensitive thrifts). The results in Table 3 suggest that thrifts use ARMs to lower their exposure to interest rate shocks.

REGIONAL PROFILE

The top panel of Chart 9 (page 8) presents the median sensitivity measures for the entire industry and each OTS region for the fourth quarter of 1996 and 1997. The Northeast Region had the largest median sensitivity measure in the fourth quarter of 1997, while the Midwest Region had the smallest. In comparing the fourth quarter of 1996 and 1997, the Midwest Region experienced the largest decrease in median interest rate sensitivity. Over the same period, the Northeast Region had the smallest decrease in the median sensitivity measure.

The lower panel of Chart 9 shows the median post-shock NPV ratio for the thrift industry and each OTS region. The increase in post-shock NPV ratios between the fourth quarter of 1996 and 1997 for the entire industry and each region suggests the decrease in interest rate risk exposure was widespread. The Central Region had the highest post-shock NPV ratio, while the West Region had the lowest post-shock NPV ratio.

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Jonathan Jones, Ph.D.

Chart 1
Sensitivity Measure

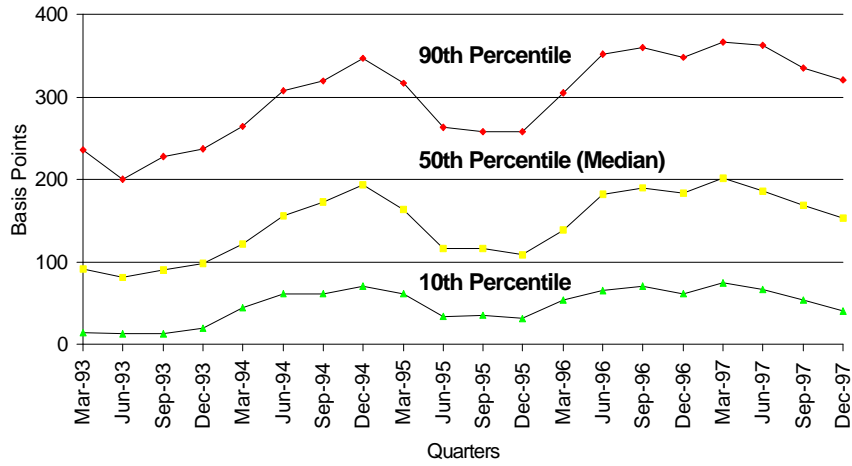
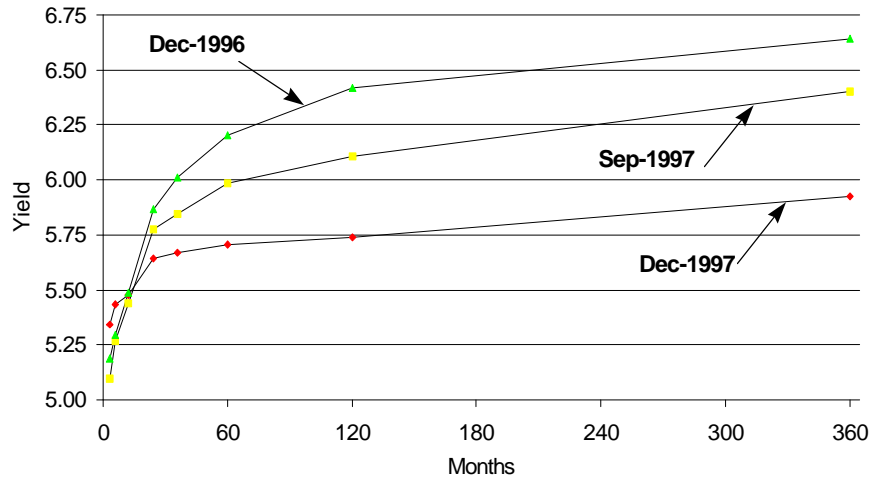
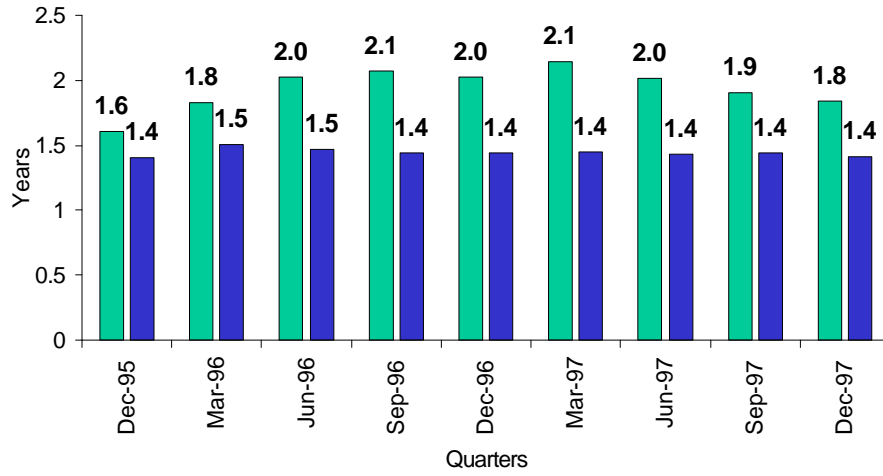


Chart 2
Treasury Yield Curves



Source: Bloomberg

Chart 3
Duration of Assets and Liabilities



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

Chart 4
Median Pre-Shock and Post-Shock NPV Ratios

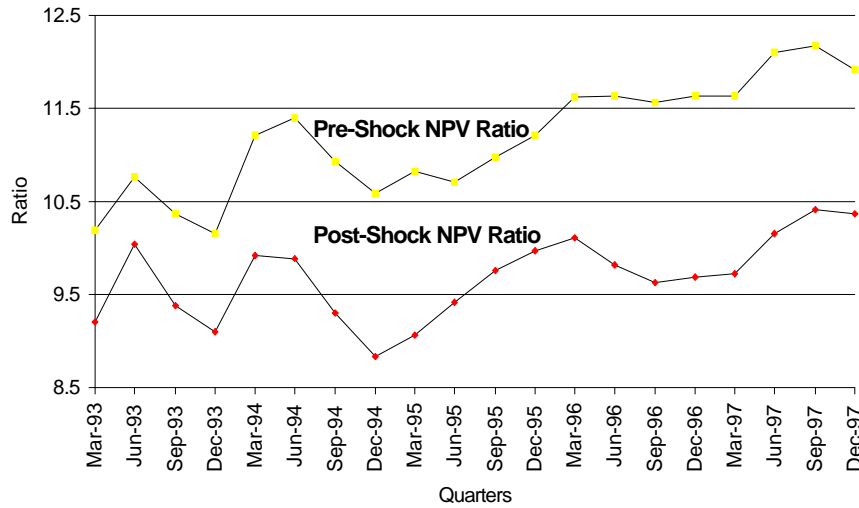


Chart 5
Estimated Change in NPV
(Industry Distributions, Fourth Quarter 1997)

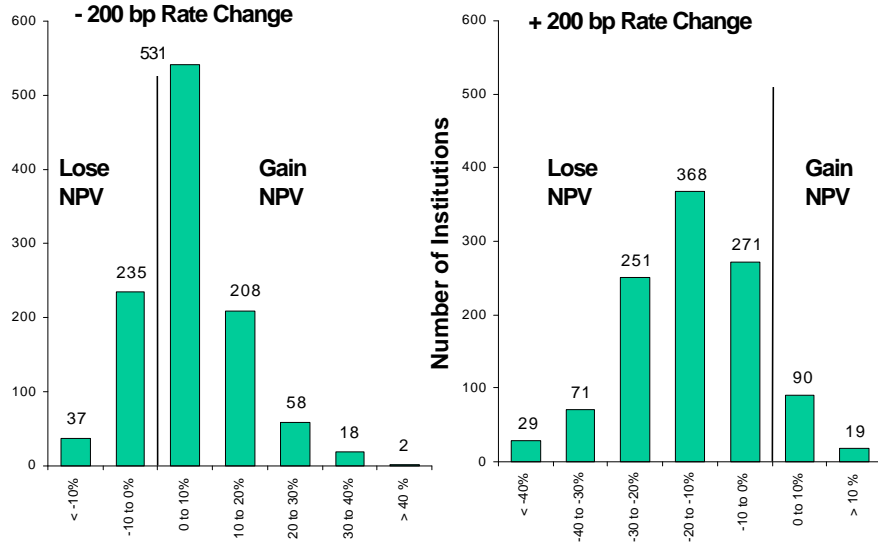


Chart 6
Estimated Change in NPV
(Industry Distributions - Percentage of Total)

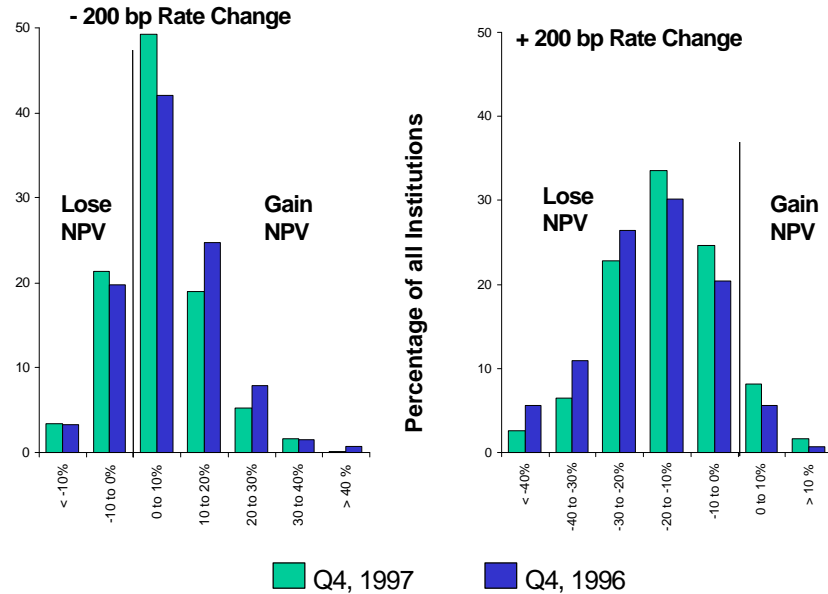


Chart 7
Institutions with Exposure Ratios Under 4.0 Percent

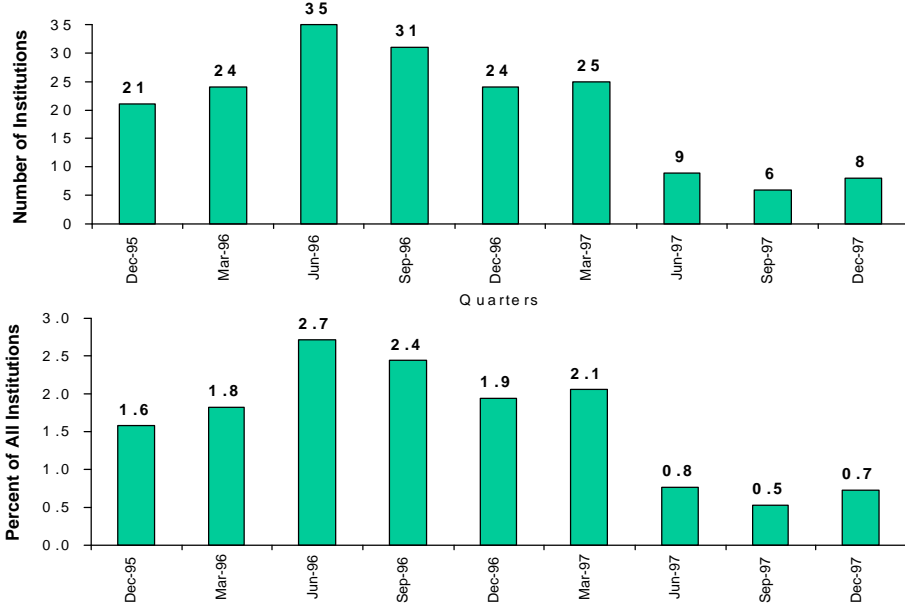
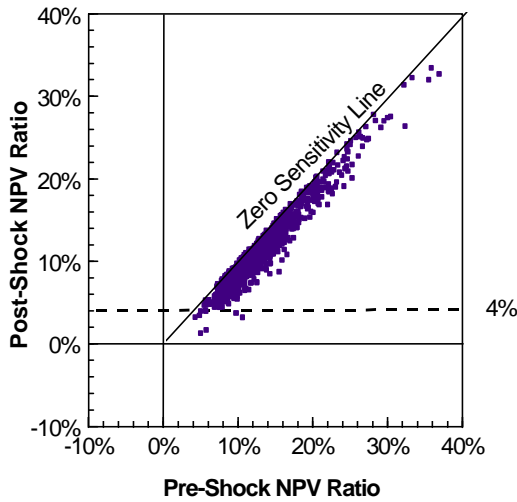


Chart 8
Sensitivity Chart
(Fourth Quarter 1997)



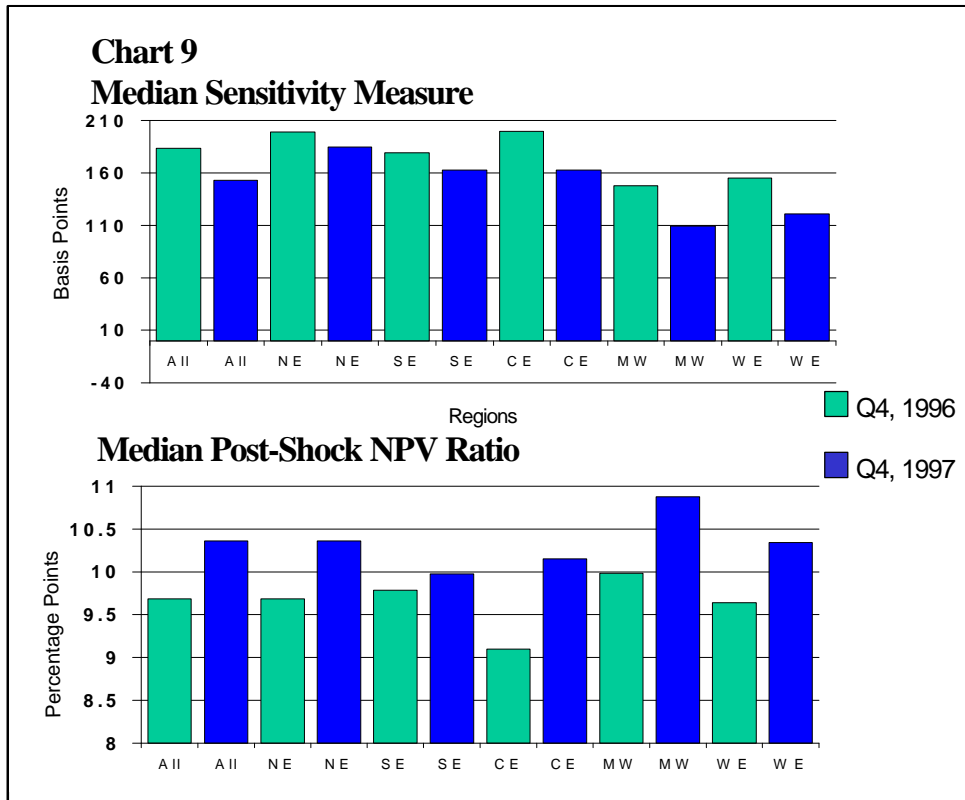


Table 1
Interest Rate Risk Measures
(Industry Aggregate Data)

Change in Interest Rates (basis Points)	Percentage Change in NPV			Ratio of NPV to Assets		
	Dec-96	Sep-97	Dec-97	Dec-96	Sep-97	Dec-97
+300	-32.7	-30.3	-28.5	7.0	7.5	7.7
+200	-19.6	-18.1	-16.5	8.2	8.7	8.8
+100	-8.4	-7.6	-6.7	9.2	9.6	9.7
Base Case	0.0	0.0	0.0	9.9	10.3	10.3
-100	4.8	3.8	3.3	10.3	10.6	10.5
-200	6.4	5.6	4.9	10.4	10.7	10.6
-300	7.7	8.3	7.8	10.5	10.8	10.8

Table 2
Thrift Size and Interest Rate Risk Measures
(Industry Medians)

Base Case	Number of Institutions	NPV Ratios		Sensitivity Measure
		Pre-Shock	Post Shock	
		December 1997		
Under \$500 Million	909	12.240 %	10.720 %	150.0
\$500 to \$1 Billion	83	11.030 %	9.350 %	183.0
Over \$1 Billion	107	9.460 %	7.900 %	159.0

Table 3
Sensitivity and Thrift Portfolio Composition
(Fourth Quarter 1997)

Sensitivity Ranking

	Most Sensitive	Least Sensitive
Mortgage Loan Portfolio Percentage:		
% ARMs	20%	74%
% FRMs	80	26

Note: Most sensitive refers to the 90th percentile, while the least sensitive refers to the 10th percentile of the sensitivity measure distribution.

GLOSSARY

Pre-Shock NPV Ratio	Equity-to-assets expressed in present value terms (i.e., base case NPV divided by present value of assets).
Post-Shock NPV Ratio	Equity-to-assets ratio expressed in present value terms following an adverse 200 basis point interest rate shock. Also referred to as the exposure ratio.
Sensitivity Measure	Difference between Pre-shock and Post-shock NPV Ratios (expressed in basis points).
Estimated Change in NPV	The percentage change in base case NPV caused by an interest rate shock.

This publication is available from the OTS PubliFax by calling (202) 906-5660 and requesting document 11740. Additional interest rate risk publications from the Risk Management Division may be obtained from:

** The OTS web site at <http://www.ots.treas.gov/quarter.html>*

End Notes:

¹ Duration is a measure of the price sensitivity of a financial instrument 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 value by about 1.6 percent for a one percentage point (100 basis points) decline in yield. The reverse would hold if yields rose by one percent.