



# The Quarterly Review of Interest Rate Risk

Volume 3, Number 4

Fourth Quarter, 1998

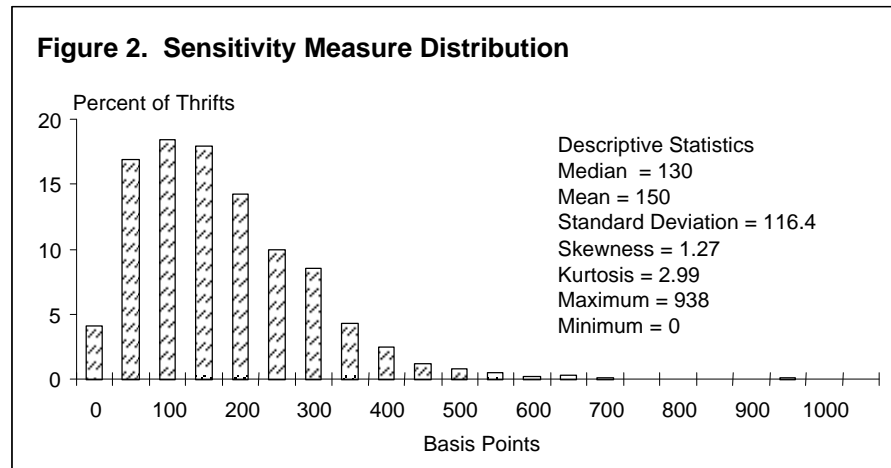
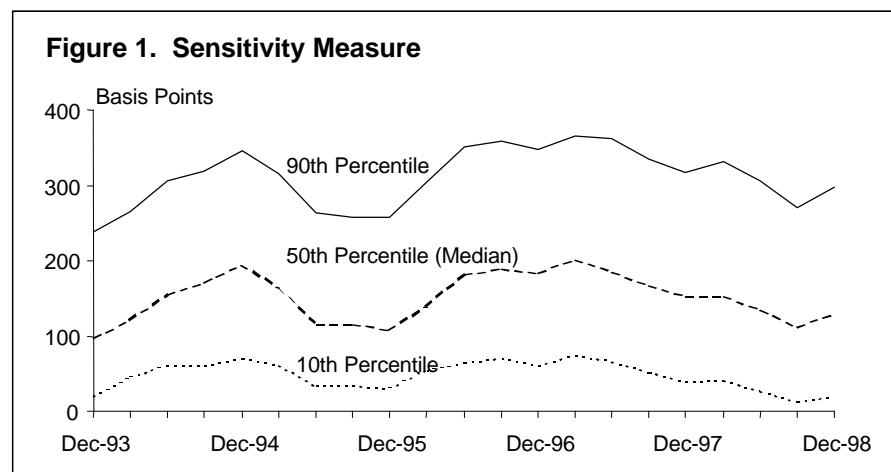
## Thrifts' Interest Rate Sensitivity Increases in the Fourth Quarter

### INDUSTRY TRENDS

The thrift industry's median sensitivity measure rose to 130 by the end of the fourth quarter. As shown in Figure 1, this represents the first increase in sensitivity during the past seven quarters. Median sensitivity peaked at 201 in March 1997.

Figure 2 shows the distribution of the sensitivity measure for the entire industry for the fourth quarter of 1998. Also reported are descriptive statistics that provide information on key characteristics of the distribution. Included among these are the median, mean, standard deviation, skewness, kurtosis, and maximum and minimum values. The median and mean values provide information on the central location of a distribution. Standard deviation is a measure of dispersion of the values in a distribution. Skewness measures distribution asymmetry, while kurtosis measures the fatness of the tails of a distribution.

As Figure 2 shows, the sensitivity measure distribution has a



long right tail. This characteristic is indicated by the positive skewness coefficient. The kurtosis coefficient is also positive indicating that the sensitivity measure distribution has fatter

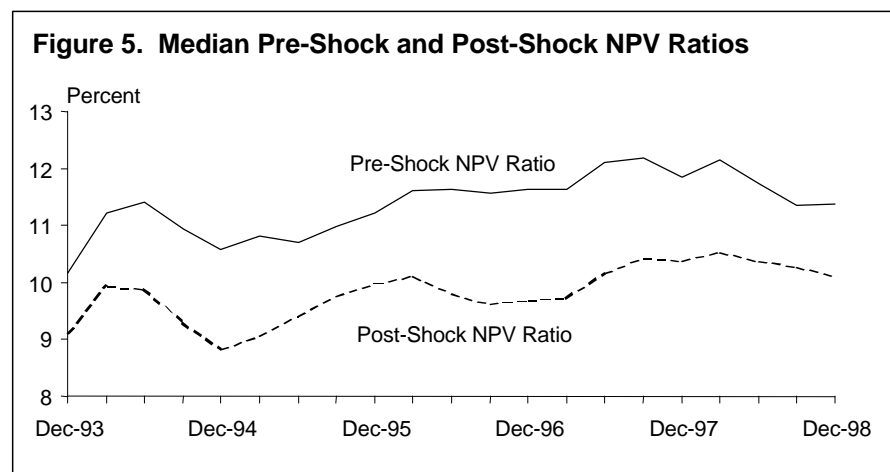
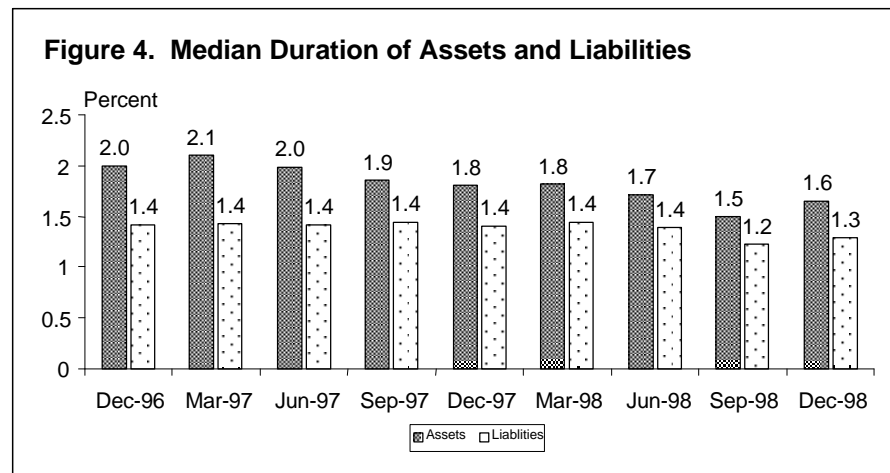
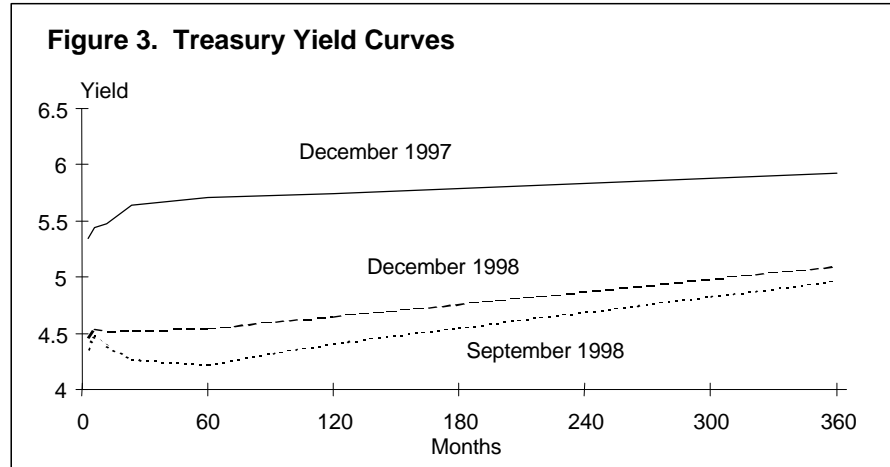
tails (i.e., a greater likelihood of observing a large or small value) than the normal distribution.

The increase in thrifts' median sensitivity was attributable to a rise in interest rates during

the fourth quarter and an increase in asset duration associated with substantially larger portfolio holdings of 30-year fixed rate mortgages caused by the recent refinancing boom. During the fourth quarter, the Treasury yield curve rose and became flatter than it was in the third quarter. As Figure 3 illustrates, the Treasury yield curve, which was inverted for one- to five-year notes during the third quarter, flattened over that maturity period in the fourth quarter.

Figure 4 displays the median effective durations of the industry's assets and liabilities since December 1996. Both assets and liabilities experienced an increase in their median duration in the fourth quarter of 1998. The median effective duration for assets rose from 1.5 in the third quarter to 1.6 in the fourth quarter, while the median effective duration for liabilities rose from 1.2 to 1.3 over the same period. This increase in asset duration represents a change from the recent downward trend since March 1997. Mortgage durations have increased as a result of recent refinancing activity and the very strong demand for fixed long-term mortgages. The increase in liabilities duration appears due to thrifts having increased their use of FHLB advances as a source of funding.

Figure 5 plots the median pre- and post-shock NPV ratios for the industry from December 1993 to December 1998. The



industry's median post-shock NPV ratio fell slightly to 10.1 percent in the fourth quarter, the third consecutive quarterly decline in this aggregate measure of the industry's ability to absorb

additional interest rate shocks. The continued decline is understandable given the recent increase in the median sensitivity measure, probably due to longer mortgage durations. The slightly

higher level of the median pre-shock NPV ratio in the fourth quarter reverses its downward direction during the past two quarters. Appendix A presents distributions for pre- and post-shock NPV ratios, and assets and liabilities durations for the industry in the fourth quarter of 1998.

**NPV Gains and Losses**

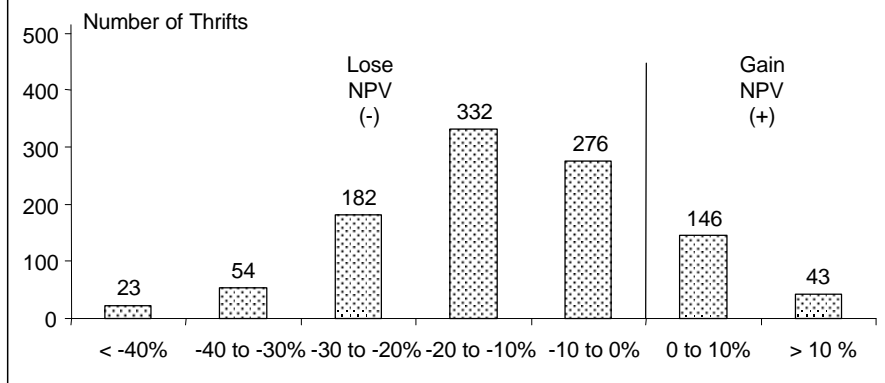
Table 1 reports the percentage change in the aggregate NPV level and NPV ratio for the industry under different interest rate scenarios. In the fourth quarter of 1998, the thrift industry would be expected to lose 16.3 percent of its net portfolio value if rates rose by 200 basis points, and would be expected to gain only 4.5 percent in value if rates fell by 200 basis points. The numbers in the table illustrate the continued high sensitivity of thrifts to increases in interest rates. They also show that most institutions would be adversely affected by rising interest rates.

Figure 6 displays the number of institutions distributed across percentage changes in NPV for an increase in interest rates of 200 basis points. Of the 1,056 reporting thrifts in the fourth quarter of 1998, 82 percent would experience a loss of net portfolio value in this scenario, up from 80 percent in the third quarter of this year. More specifically, 259 thrifts, about 25 percent of the industry, would

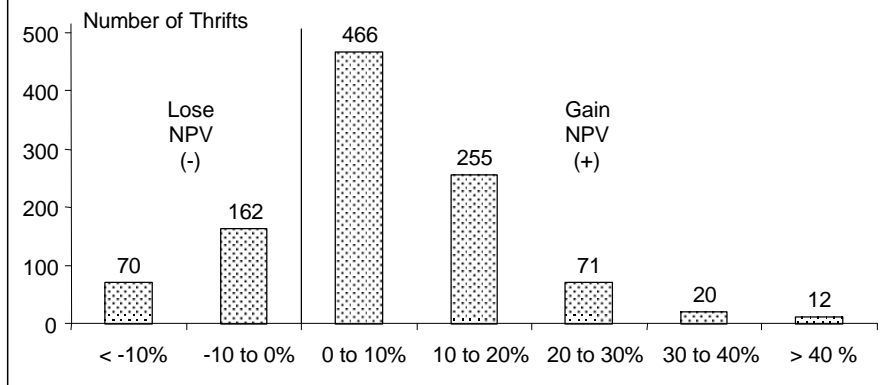
**Table 1. Interest Rate Risk Measures**  
(Industry Aggregate Data)

Change in Interest Rates (Basis Points)	Percentage Change in NPV			Ratio of NPV to Assets		
	Dec-97	Sep-98	Dec-98	Dec-97	Sep-98	Dec-98
+300	-28.9	-23.0	-28.4	7.6	7.7	7.3
+200	-16.7	-12.3	-16.3	8.8	8.7	8.3
+100	-6.8	-4.5	-6.5	9.7	9.3	9.1
Base Case	0.0	0.0	0.0	10.2	9.6	9.6
-100	3.4	1.7	2.2	10.5	9.7	9.7
-200	5.0	5.3	4.5	10.6	9.9	9.9
-300	7.8	11.0	9.5	10.8	10.3	10.2

**Figure 6. Estimated Change in NPV: +200bp Rate Change**  
(Fourth Quarter 1998)



**Figure 7. Estimated Change in NPV: -200bp Rate Change**  
(Fourth Quarter 1998)

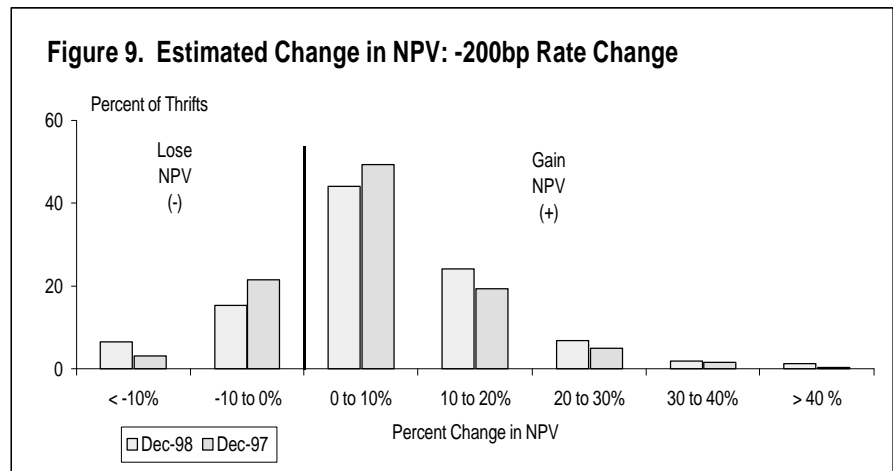
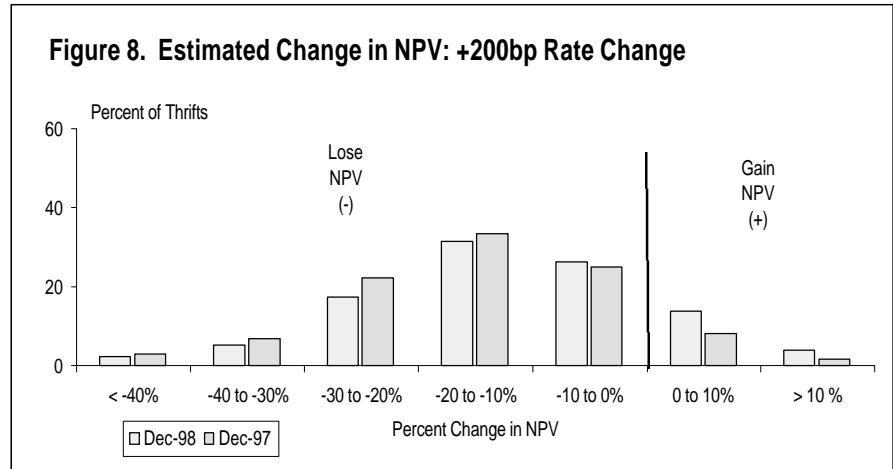


lose more than 20 percent of their economic value, if interest rates rose by 200 basis points. This was an increase of 5 percentage points over the previous

quarter. Figure 7 displays the industry's distribution of gains and losses in net portfolio value for a decrease of 200 basis points in interest rates. Under

this scenario, approximately 78 percent of reporting thrifts would experience increases in their net portfolio values, representing a 1 percentage point improvement over third quarter results.

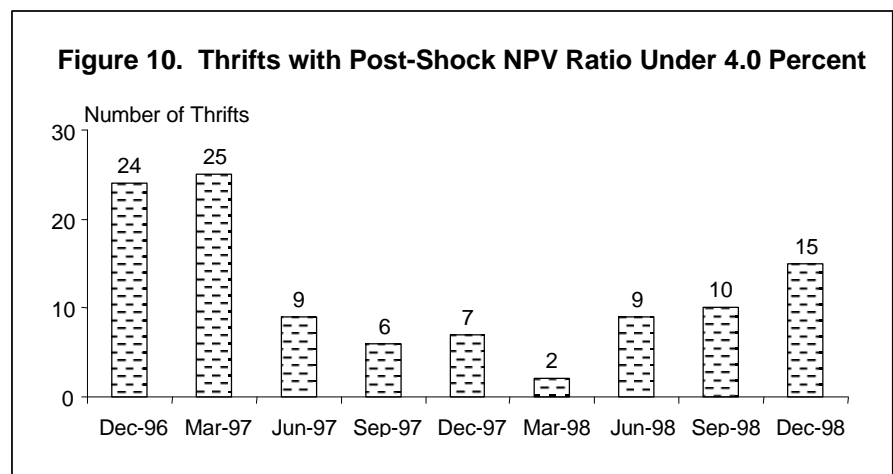
Figure 8 compares the distributions of gains and losses for the fourth quarter of 1997 with those for the fourth quarter of 1998 for a 200 basis points increase in interest rates. For the fourth quarter of 1998, 25.5 percent of thrifts would lose 20 percent or more of their NPV. This represents a substantial decline from the 31.9 percent of thrifts that had a similar degree of interest rate sensitivity one year earlier. Figure 9 compares the distributions of gains and losses for the fourth quarter of 1997 with those for the fourth quarter of 1998 for a decrease of 200 basis points.



**Financially Troubled Thrifts**

As Figure 10 shows, the number of thrifts with post-shock NPV ratios below 4 percent increased sharply in the fourth quarter. The number of financially troubled thrifts rose to fifteen, up from ten in the third quarter and nine in the second quarter of this year. This increase most likely reflects the continued decline in post-shock NPV ratios caused by the longer mortgage durations associated with recent refinancing activity.

Figure 11 shows that the percent of thrifts with post-shock



NPV ratios below 4 percent also increased to 1.42 percent of the industry. A thrift with a post-shock NPV ratio below 4 percent either has a relatively low

level of capital, a high degree of NPV sensitivity, or both. These thrifts are subject to heightened OTS supervision.

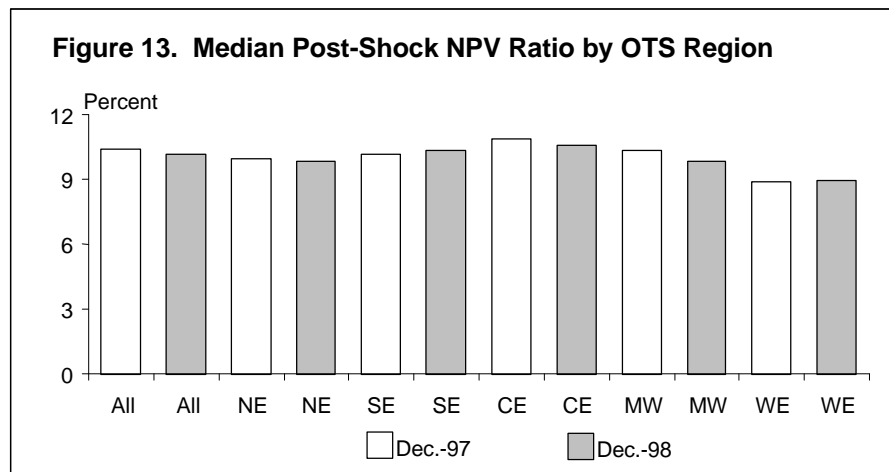
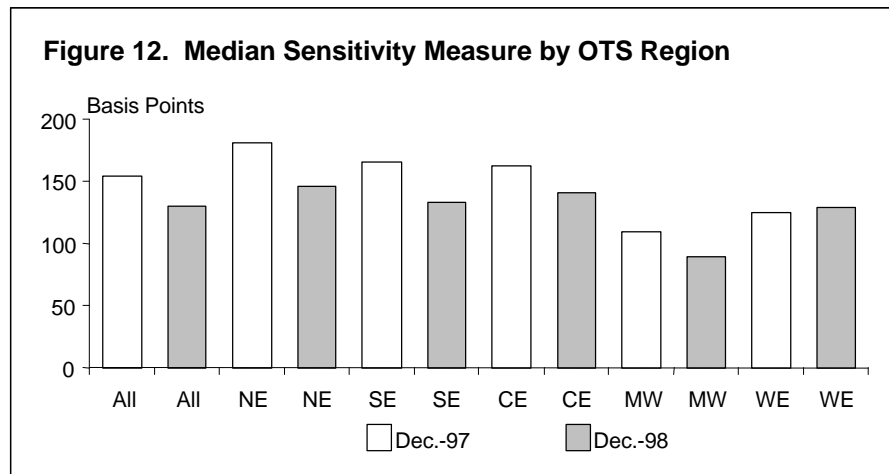
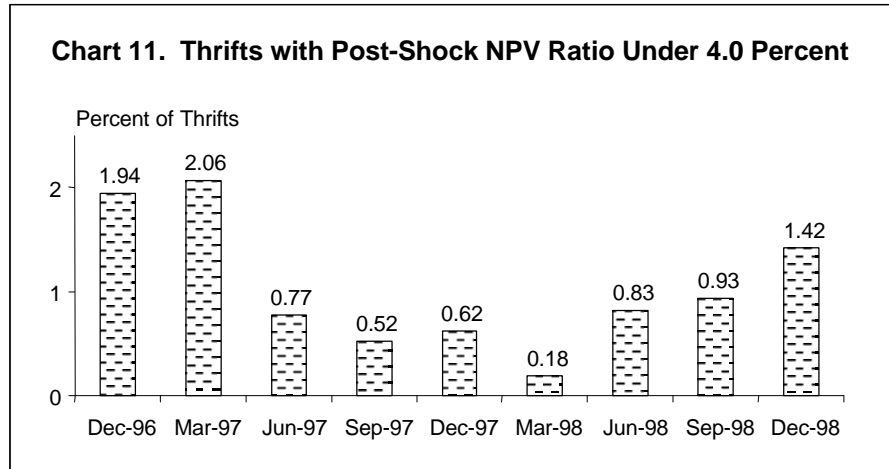
**Regional Trends**

Figure 12 shows the median sensitivity measures for the entire industry and for each OTS region for the fourth quarters of 1997 and 1998. The Northeast Region had the largest median sensitivity measure in the fourth quarter of 1998, while the Midwest Region had the smallest. In comparing the fourth quarters of 1997 and 1998, the Northeast Region experienced the largest decrease (35.5 percent) in median interest rate sensitivity, while the West Region had a slight increase.

Figure 13 shows the median post-shock NPV ratio for the thrift industry and for each OTS region. For the industry, there was a decrease of 25 basis points in the post-shock NPV ratio between the fourth quarters of 1997 and 1998. The Central and Midwest Regions' post-shock NPV ratios declined over this period, while those for the Northeast, Southeast, and West Regions remained largely the same. Appendices B1 to B5 present distributions for the sensitivity measure, pre- and post-shock NPV ratios, and assets and liabilities durations for each OTS region.

**STOCK AND MUTUAL THRIFTS**

This section examines several important characteristics of stock-form and mutual thrifts in order to assess whether or not



these two different organizational structures display different responses to movements in interest rates. Currently, mutual thrifts account for 40 percent of

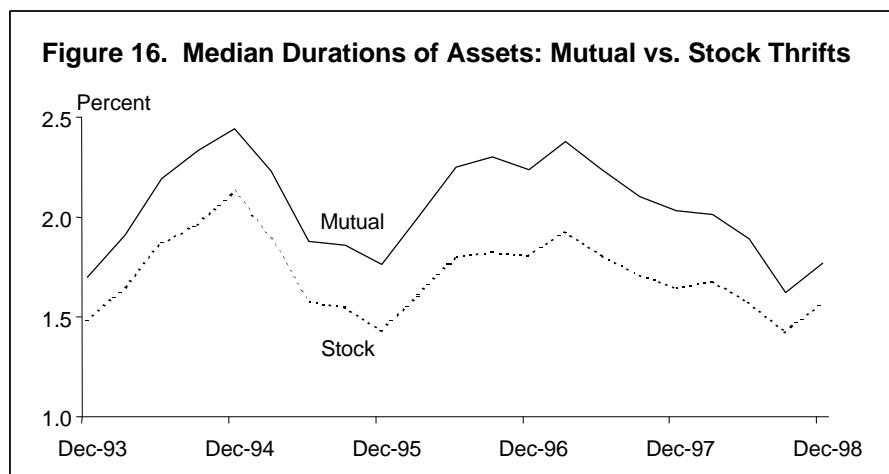
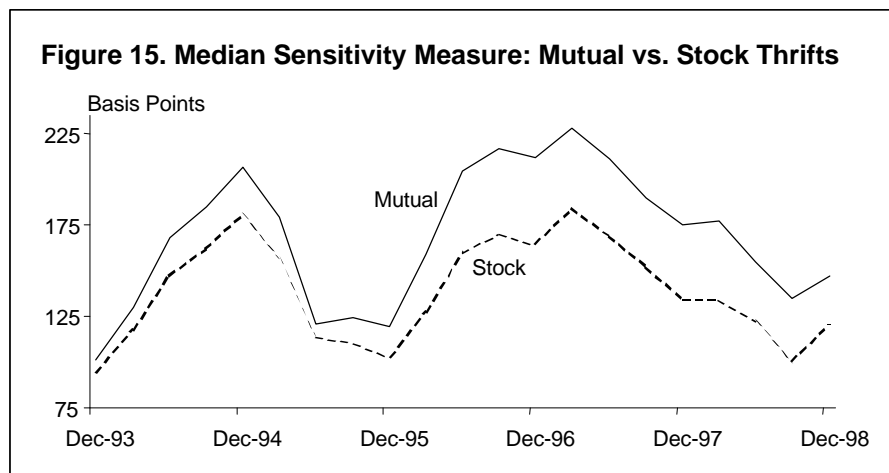
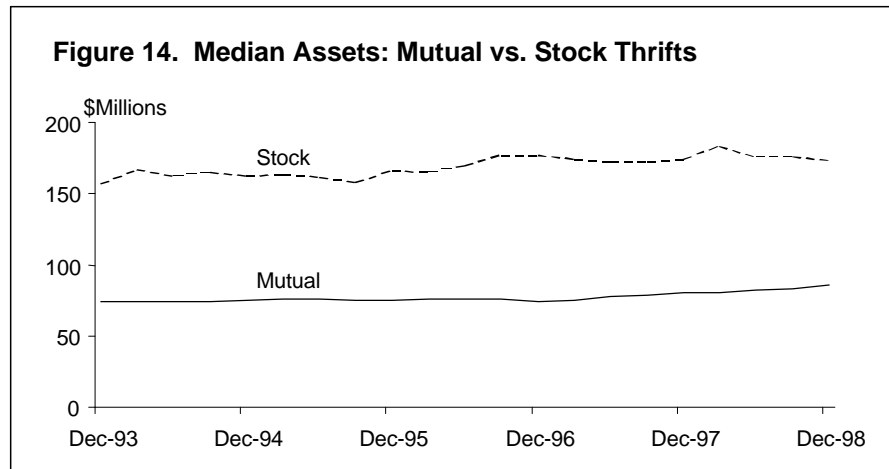
OTS-regulated thrifts. After peaking and then falling dramatically in the late 1980s, the pace of mutual-to-stock conversions has picked up considerably in the

1990s due to the persistently bullish stock market and continued robust economic growth.

The primary feature of the mutual form of thrift organization is that depositors legally own the institution. If the interest-rate-risk characteristics of stock and mutual thrifts differ, these differences can affect the industry's interest-rate-risk trends, as more mutual thrifts convert to stock-form thrifts.

Figure 14 presents plots of the median asset size of stock and mutual thrifts over the period December 1993 to December 1998. Historically, stock-form thrifts have been more than twice as large as mutual thrifts. At fourth quarter-end 1998, the median asset size of stock thrifts was \$174 million compared to \$85.9 million for mutual thrifts.

Median interest rate sensitivity for stock and mutual thrifts is displayed in Figure 15. At the end of December 1998, median sensitivity for stock thrifts was 121 basis points, while that for mutual thrifts was 147 basis points. Since December 1993, the median sensitivity of mutuals has exceeded that of stock-form thrifts. However, as Figure 15 shows, there have been periods when the gap between the two sensitivities has narrowed and then widened. For example, the difference between the median sensitivities narrowed to 7 basis points in June 1995. After that, the gap widened, although it appears to have narrowed



slightly during the past several quarters.

Figures 16 and 17 display the median durations of assets and liabilities for mutual and stock-

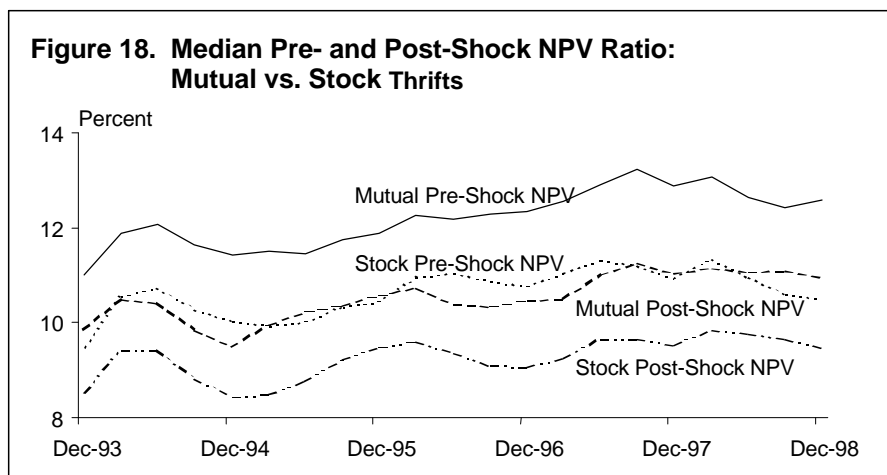
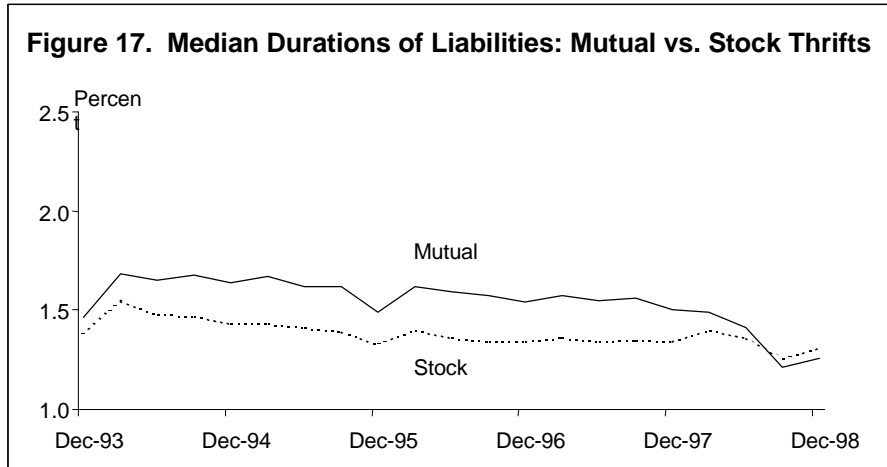
form thrifts. As Figure 16 shows, over the period December 1993 to December 1998, the median duration of assets for mutuals has exceeded that for stock-form

thrifts. During the past several quarters, the difference appears to have narrowed slightly. Although the median duration of liabilities for mutuals had been greater than that for stock-form thrifts, Figure 17 shows that the difference started to narrow dramatically in March 1998. In fact, the median liabilities duration for stock thrifts exceeded that for mutuals in September 1998, and the gap has continued to grow. This reversal in liabilities duration between mutual and stock thrifts can be explained by stock thrifts acquiring more FHLB advances to make up for a recent decline in their deposit base.

Figure 18 shows both median pre-shock and post-shock NPV ratios for mutuals and stock thrifts. Historically, mutual thrifts have pre- and post-shock NPV ratios that have exceeded those for stock-form thrifts. This difference in capital levels is probably related to the substantial difference in asset size between the two groups.

### THRIFT BULLETIN 13a AND THE "S" RATING

In 1998, OTS issued Thrift Bulletin 13a (TB 13a). This Thrift Bulletin provides guidance to management and boards of directors of thrifts on the management of interest rate risk, including the management of investment and derivatives activities. In addition, it describes the framework that examiners will



**Table 2. Post-Shock NPV Ratio and Sensitivity Measure Matrix**

December 1998	Sensitivity Measure				Total
	Under 100bp	101-200bp	201-400bp	Above 400bp	
Post-Shock NPV	# of Thrifts (% of Total)	# of Thrifts (% of Total)	# of Thrifts (% of Total)	# of Thrifts (% of Total)	
Over 10%	226 21.4%	172 16.3%	128 12.1%	17 1.6%	543 51.4%
6% to 10%	182 17.2%	138 13.1%	103 9.8%	11 1.0%	434 41.1%
4% to 6%	9 0.9%	25 2.4%	27 2.6%	3 0.3%	64 6.1%
Below 4%	0 0.0%	2 0.2%	11 1.0%	2 0.2%	15 1.4%
Total	417 39.5%	337 31.9%	269 25.5%	33 3.1%	1056 100.0%

use in assigning the "Sensitivity to Market Risk," or "S," component of the CAMELS rating. The actual S rating depends on an assessment of both an institution's current exposure and sen-

sitivity to interest rate risk and the effectiveness of its risk management practices. Appendix C reproduces the tables from TB 13a showing the Summary of Guidelines for the "Level of In-

terest Rate Risk” and the “S” Component-Rating Guidelines in Matrix Form.

Table 2 shows the Summary of Guidelines for the “Level of Interest Rate Risk” using post-shock NPV ratios and sensitivities produced by the NPV Model for the fourth quarter of 1998. For comparison, Table 3 presents results using the NPV Model for the third quarter of 1998. Each cell of the tables shows both the number of thrifts and the corresponding percent of thrifts with the various combinations of post-shock NPV ratio and sensitivity specified in the Thrift Bulletin.

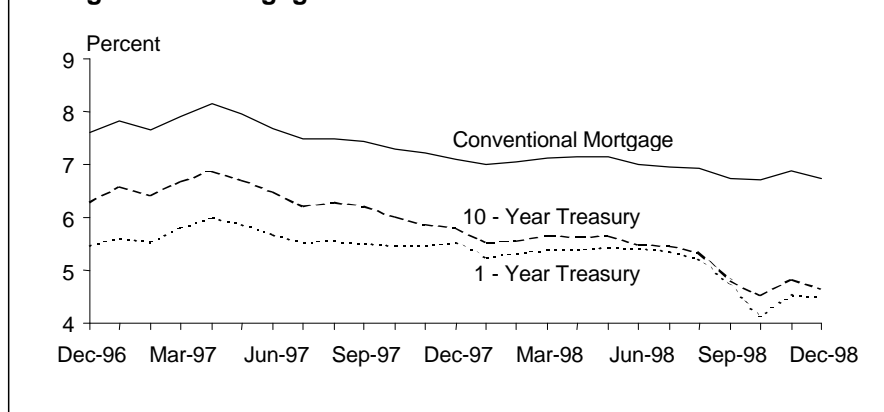
Of the 1,056 reporting thrifts in the fourth quarter of 1998, 51.4 percent had post-shock NPV ratios that exceeded 10 percent. With regard to interest rate sensitivity, 71.4 percent of thrifts had sensitivity measures of 200 basis points or less. Based on the “Level of Interest Rate Risk” guidance provided in TB 13a, 81 percent of thrifts would be assigned a “1” risk rating, 13.8 percent a “2” rating, 5.4 percent a “3” rating, and 1.5 percent a “4” rating.

Comparison of Tables 2 and 3 reveals some significant differences between the third and fourth quarters of 1998. First, there was a substantial increase in the number of thrifts with post-shock NPV ratios below 4 percent in the fourth quarter. This point was discussed earlier. Second, there was a substantial decrease in the number of thrifts

**Table 3. Post-Shock NPV Ratio and Sensitivity Measure Matrix**

September 1998	Sensitivity Measure				Total
	Under 100bp	101-200bp	201-400bp	Above 400bp	
Post-Shock NPV	# of Thrifts (% of Total)	# of Thrifts (% of Total)	# of Thrifts (% of Total)	# of Thrifts (% of Total)	
Over 10%	266 24.8%	176 16.4%	118 11.0%	12 1.1%	572 53.3%
6% to 10%	215 20.0%	143 13.3%	74 6.9%	4 0.4%	436 40.6%
4% to 6%	16 1.5%	20 1.9%	18 1.7%	2 0.2%	56 5.2%
Below 4%	0 0.0%	4 0.4%	5 0.5%	1 0.1%	10 0.9%
Total	497 46.3%	343 31.9%	215 20.0%	19 1.8%	1074 100.0%

**Figure 19. Mortgage-Related Interest Rate Indices**



with sensitivity under 100 basis points in December 1998 (39.5 percent) compared to the previous quarter (46.3 percent).

Finally, there were noticeable increases in the number of thrifts with sensitivities in the 201 to 400 basis points and over 400 basis points categories by fourth quarter-end 1998. These results are consistent with the increase in median sensitivity and a decrease in the post-shock NPV ratio for the thrift industry in the fourth quarter.

## MORTGAGE-RELATED INTEREST INDICES

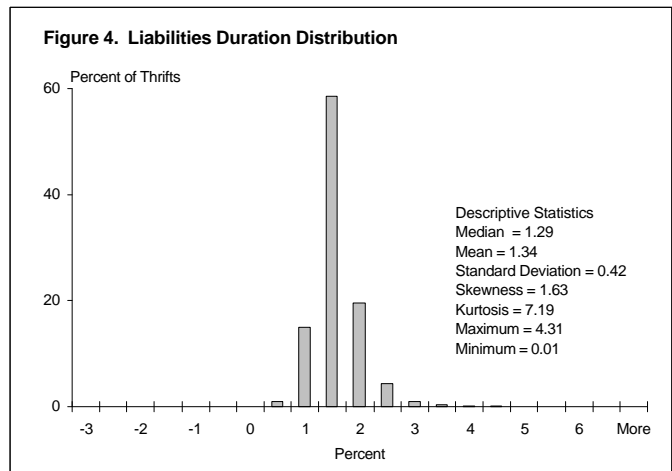
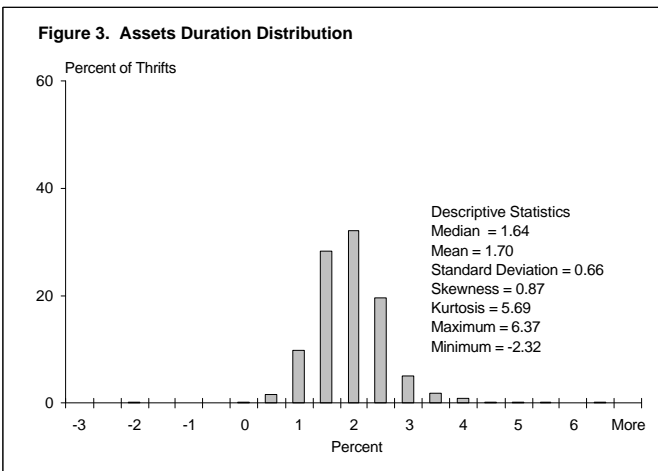
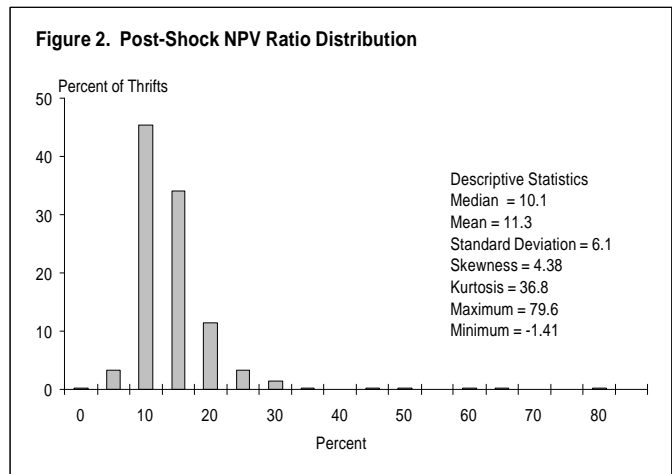
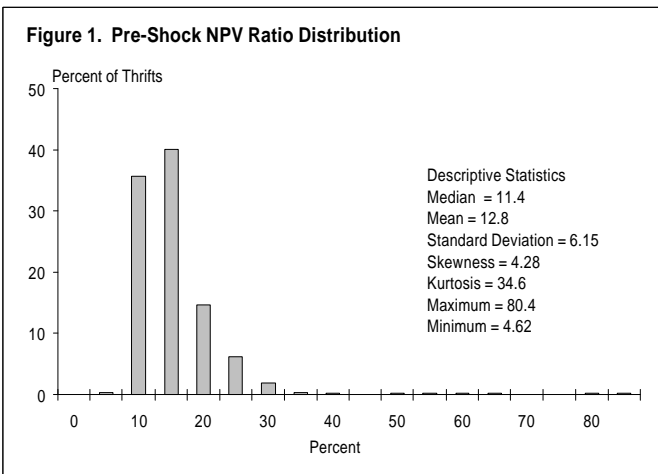
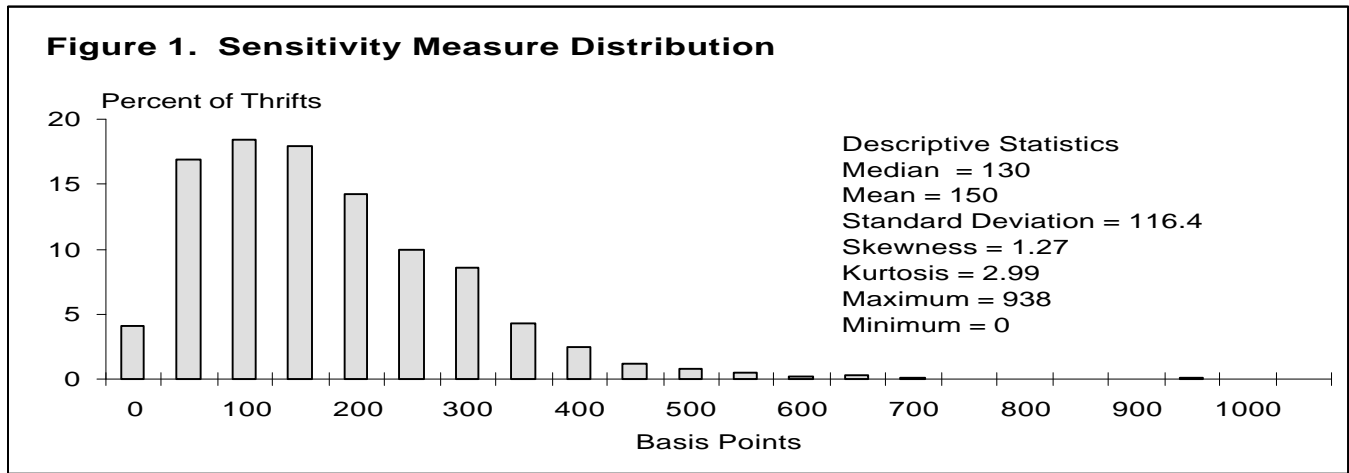
Figure 19 displays plots of two mortgage-related interest indices and the Freddie Mac commitment rate for 30-year fixed-rate mortgages, as reported by the Federal Reserve Board. The two interest indices are the one-year constant maturity Treasury (one-year CMT), which is representative of the various indices used to set one-year adjustable-rate mortgages (ARMs), and the ten-year constant maturity Treasury (ten-year CMT). The plots show that the ten-year



CMT index tracks the commitment rate for thirty-year fixed-rate mortgages (FRMs) well. Despite upward and downward movements in all three series during the past three months, the levels of the three series are about the same at the end of the fourth quarter as they were at third quarter-end 1998.

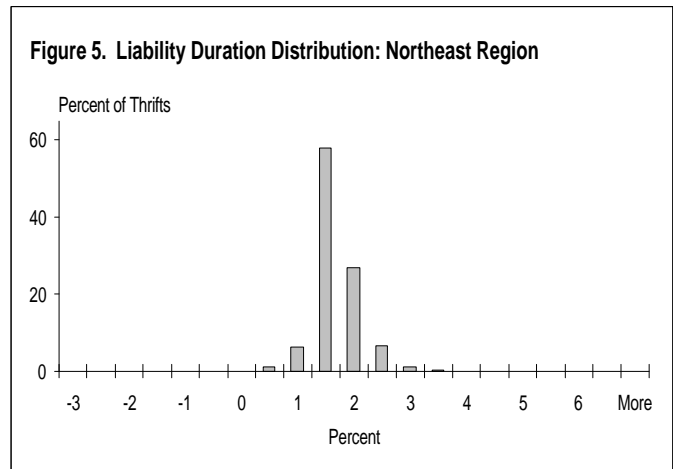
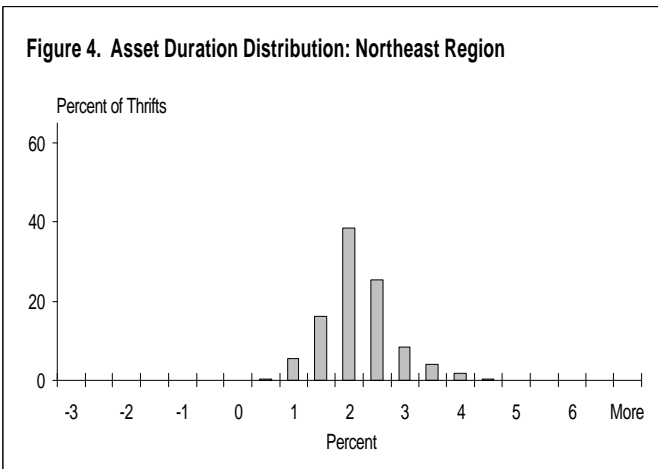
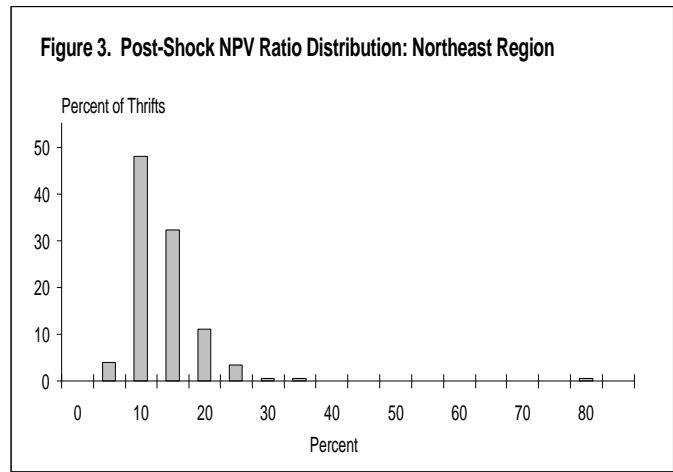
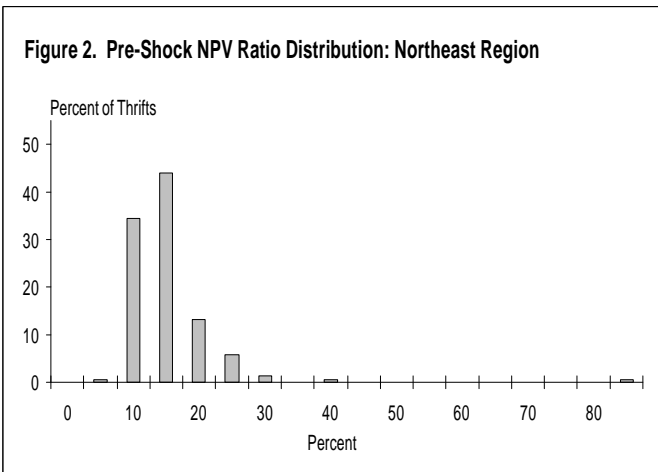
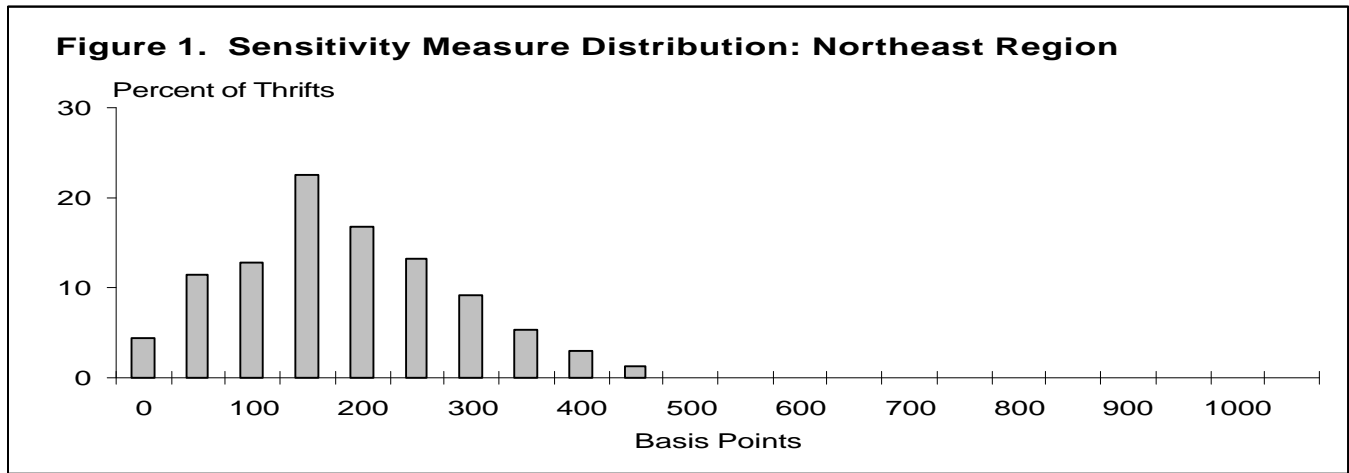
## Appendix A (All Thrifts)

This appendix presents distributions for sensitivity, pre-shock and post-shock NPV ratios, and assets and liabilities durations for all reporting thrifts at fourth quarter end 1998. Also included in each figure are descriptive statistics.



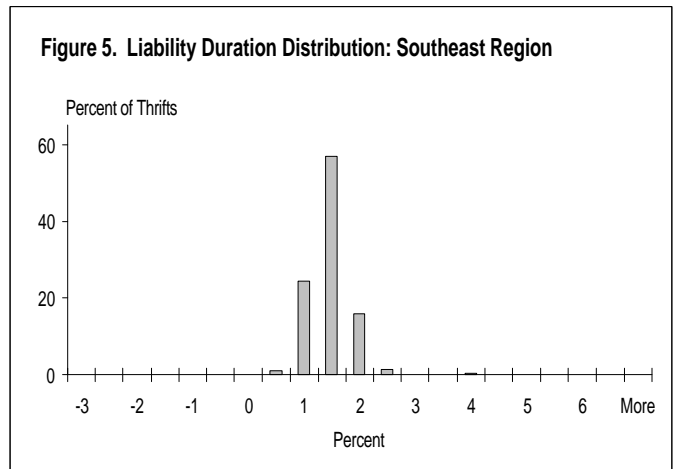
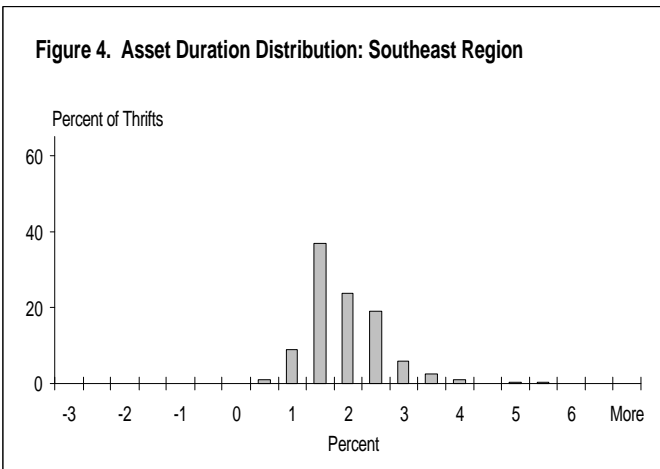
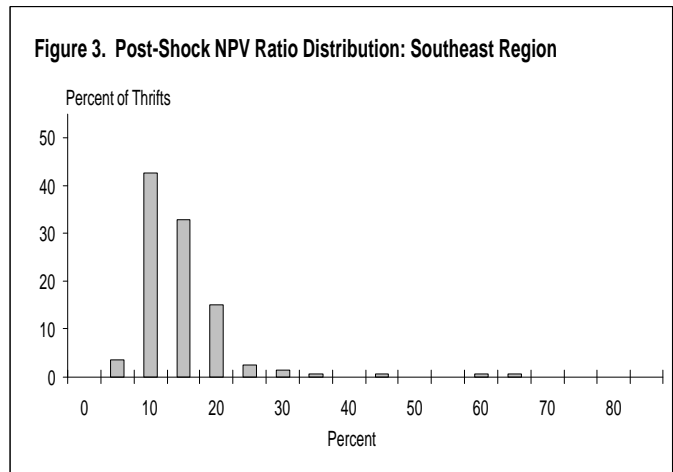
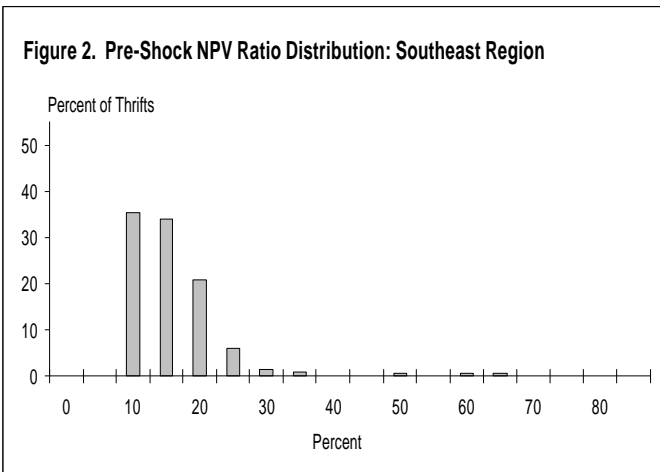
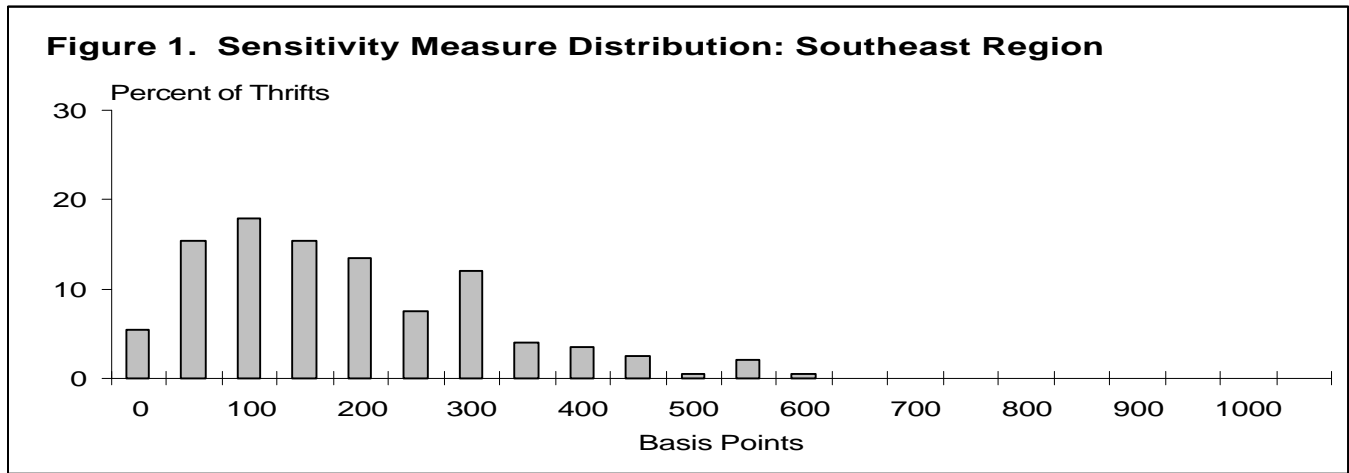
## Appendix B 1 (Northeast Region)

This appendix presents distributions for sensitivity, pre-shock and post-shock NPV ratios, and assets and liabilities durations for reporting thrifts in the Northeast Region at fourth quarter end 1998.



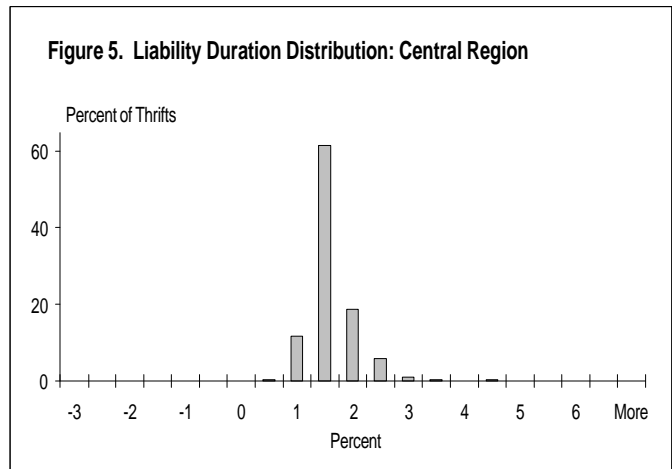
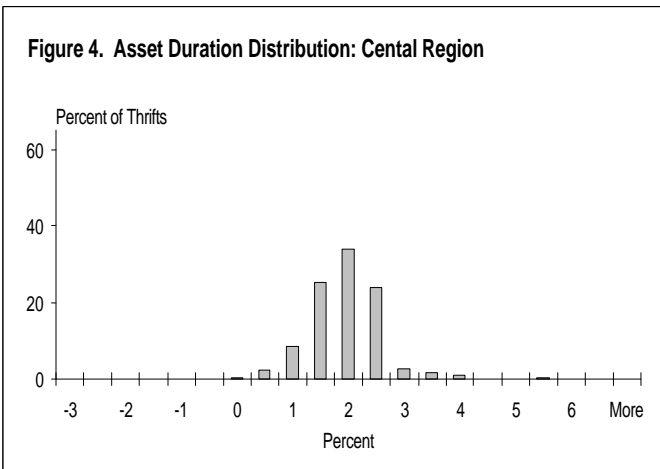
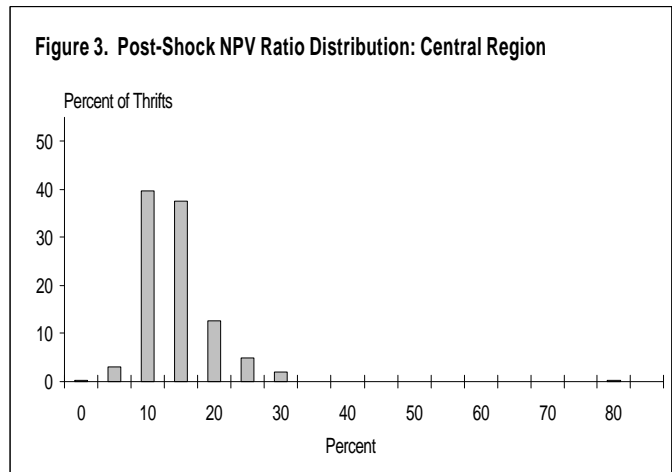
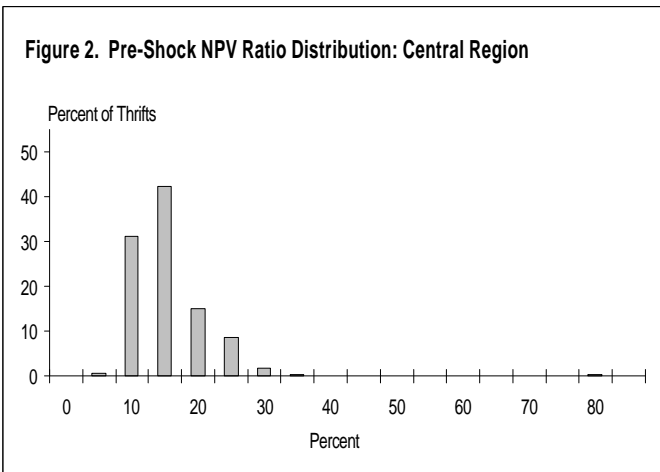
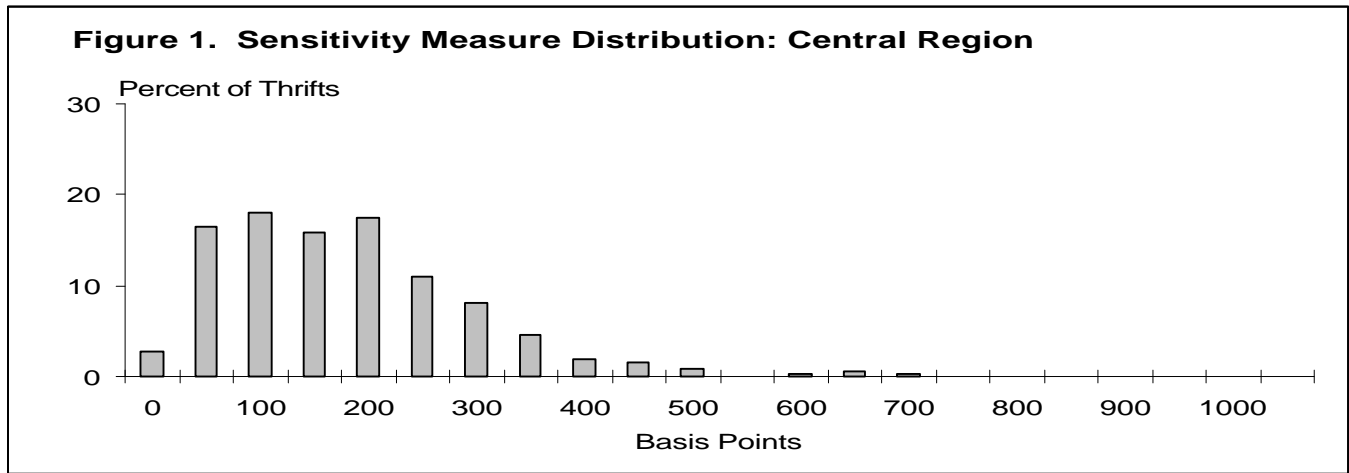
## Appendix B 2 (Southeast Region)

This appendix presents distributions for sensitivity, pre-shock and post-shock NPV ratios, and assets and liabilities durations for reporting thrifts in the Southeast Region at fourth quarter end 1998.



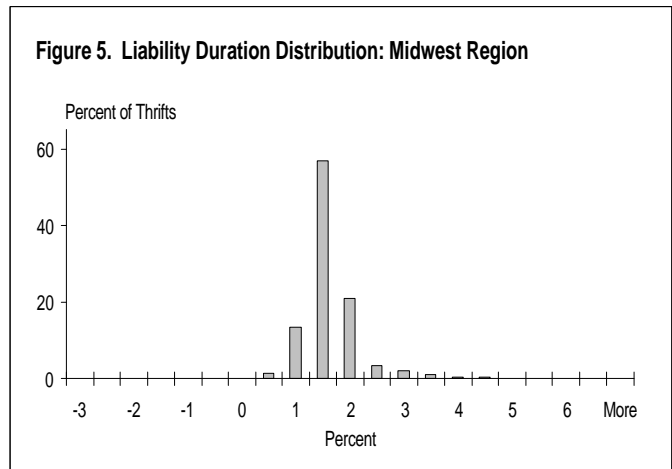
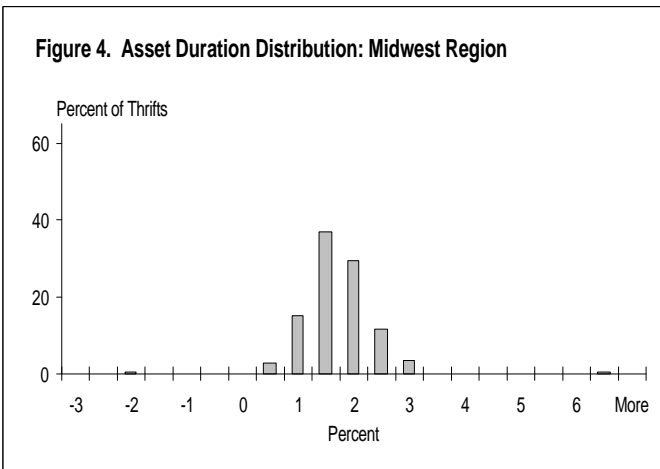
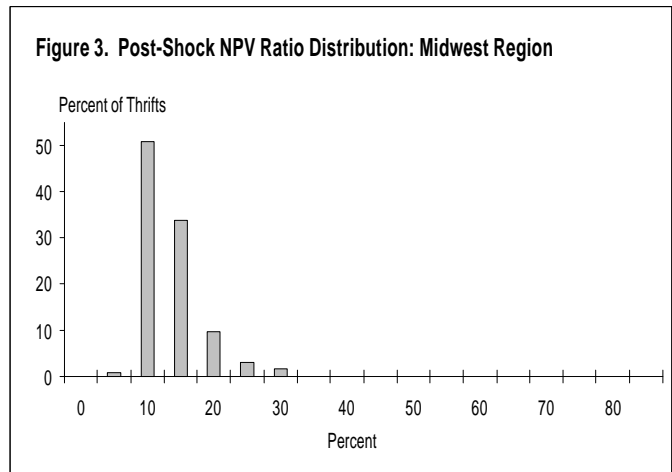
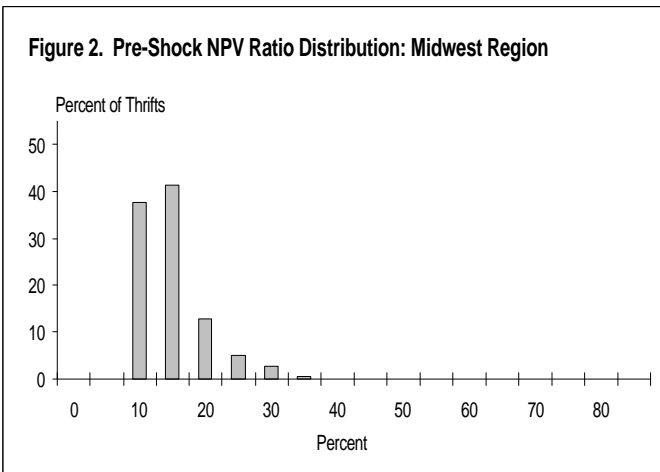
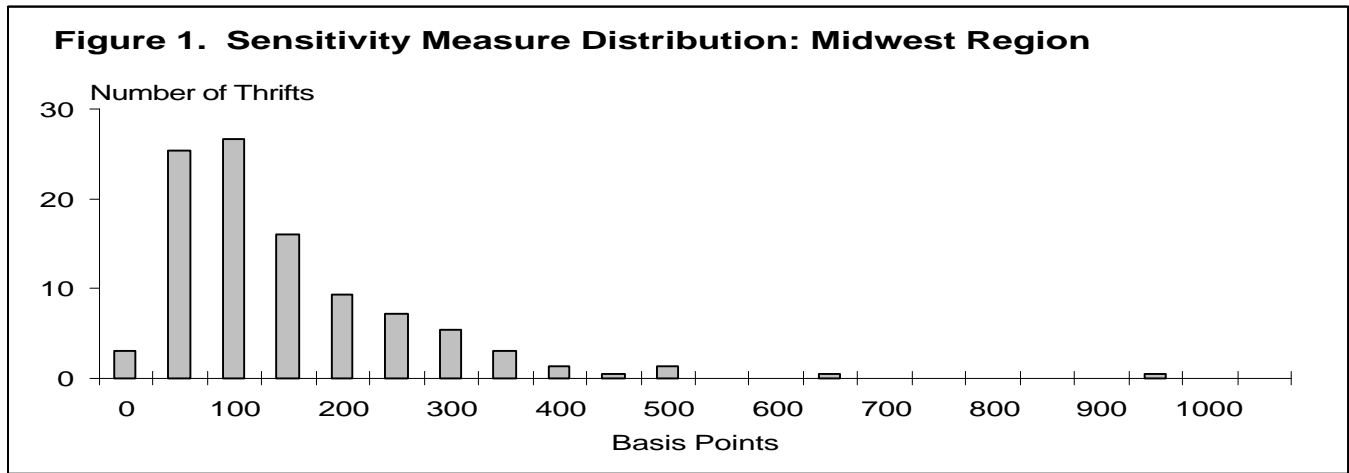
## Appendix B 3 (Central Region)

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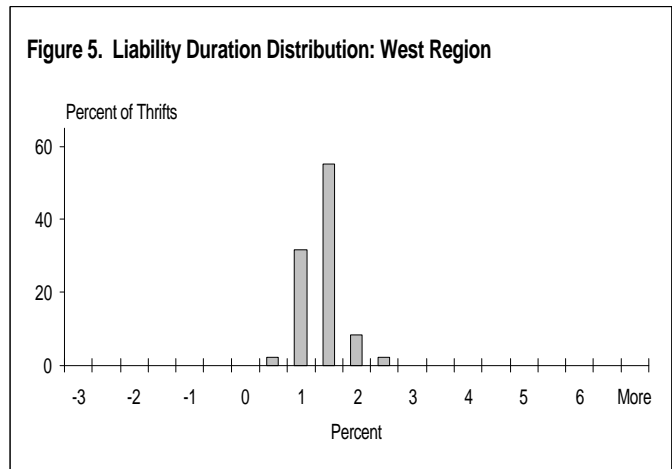
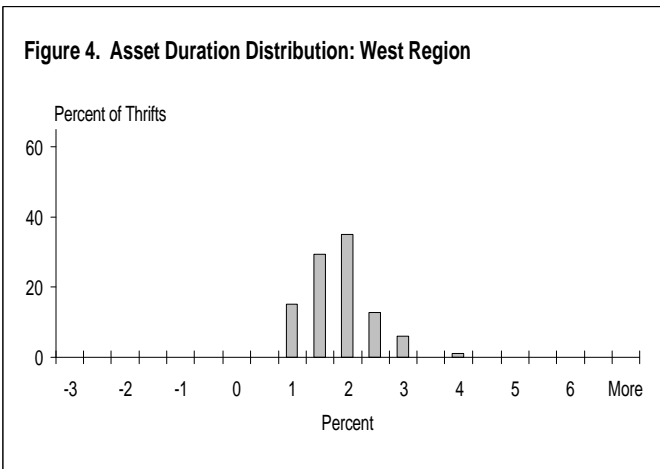
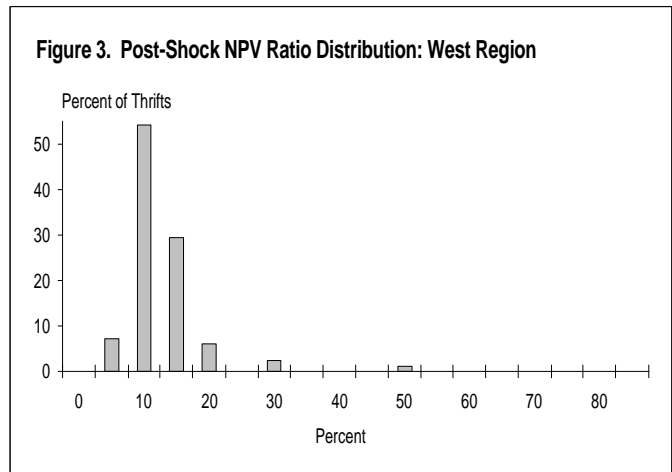
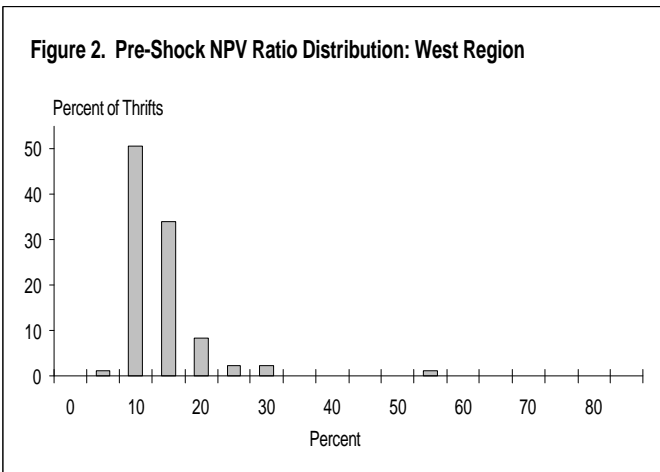
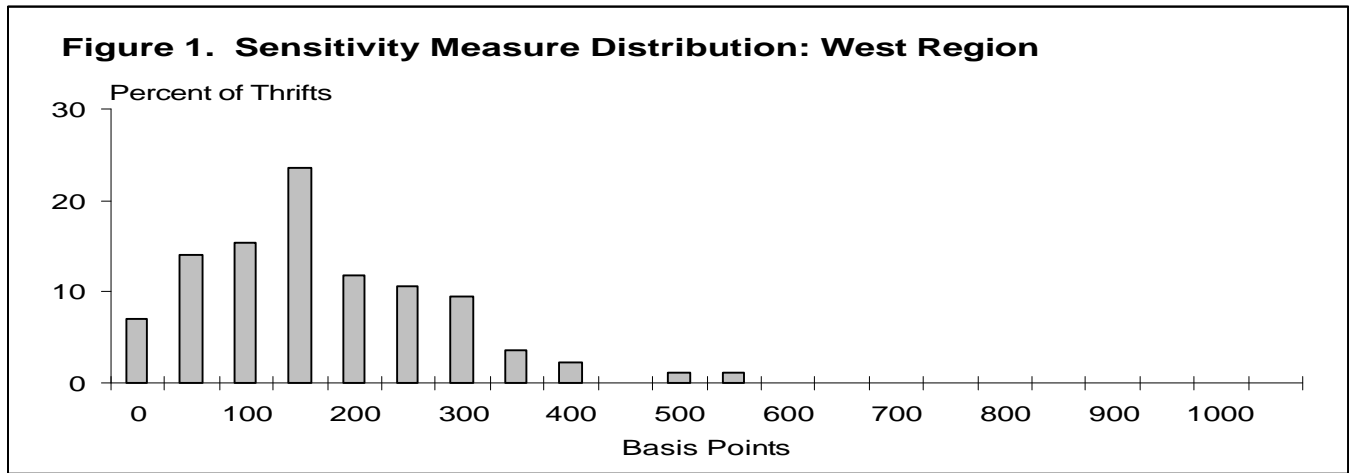
## Appendix B 4 (Midwest Region)

This appendix presents distributions for sensitivity, pre-shock and post-shock NPV ratios, and assets and liabilities durations for reporting thrifts in the Midwest Region at fourth quarter end 1998.



## Appendix B 5 (West Region)

This appendix presents distributions for sensitivity, pre-shock and post-shock NPV ratios, and assets and liabilities durations for reporting thrifts in the West Region at fourth quarter end 1998.



## Appendix C

This appendix reproduces Table 1 and Table 2 from Thrift Bulletin 13a issued this year.

**Table 1. Summary of Guidelines for the "Level of Interest Rate Risk"**

Post-Shock NPV	Interest Rate Sensitivity Measure			
	Under 100bp	101-200bp	201-400bp	Above 400bp
Over 10%	Minimal Risk (1)	Minimal Risk (1)	Minimal Risk (1)	Moderate Risk (2)
6% to 10%	Minimal Risk (1)	Minimal Risk (1)	Moderate Risk (2)	Significant Risk (3)
4% to 6%	Minimal Risk (1)	Moderate Risk (2)	Significant Risk (3)	High Risk (4 or 5)
Below 4%	Moderate Risk (2)	Significant Risk (3)	High Risk (4 or 5)	High Risk (4 or 5)

**Table 2. "S" Component-Rating Guidelines in Matrix Form**

Quality of Risk Management Practices	Level of Interest Rate Risk			
	Minimal Risk	Moderate Risk	Significant Risk	High Risk
Well Controlled	S = 1	S = 2	S = 3	S = 4 or 5
Adequately Controlled	S = 2	S = 2	S = 3	S = 4 or 5
Needs Improvement	S = 3	S = 3	S = 3	S = 4 or 5
Unacceptable	S = 4	S = 4	S = 4	S = 4 or 5



**GLOSSARY**

<b>Pre-Shock NPV Ratio</b>	Equity-to-assets expressed in present value terms (i.e., base case NPV divided by present value of assets).
<b>Post-Shock NPV Ratio</b>	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.
<b>Sensitivity Measure</b>	Difference between Pre-shock and Post-shock NPV Ratios (expressed in basis points).
<b>Estimated Change in NPV</b>	The percentage change in base case NPV caused by an interest rate shock.
<b>Duration</b>	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 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.
<b>Kurtosis</b>	The kurtosis statistic measures the tendency of data to be distributed toward the tails, or ends, of the distribution. A distribution that is approximately normal has a kurtosis statistic close to 0.
<b>Skewness</b>	The skewness statistic measures the degree to which the data of a distribution are more spread out on one side than the other. A distribution that is approximately symmetric has a skewness statistic close to 0.

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