



The Quarterly Review of Interest Rate Risk

Volume 5, Number 1

First Quarter, 2000

Sensitivity Shows Modest Increase

Although interest rates displayed volatile upward movements, thrift sensitivity rose only slightly. In the first quarter, median sensitivity for the thrift industry rose only nine basis points to 240. A modest increase in asset duration associated with a slowdown in prepayments caused the increase in sensitivity. The median pre- and post-shock NPV ratios, as well as the median equity capital ratio, rose in the first quarter. In addition, the number of thrifts with “significant or high interest rate risk” as defined in TB 13a fell in the first quarter.

OVERVIEW OF INDUSTRY TRENDS

Despite volatile upward movements in interest rates coupled with a humped inverted yield curve, thrifts reported strong earnings of \$2.23 billion in the first quarter. Although interest rate sensitivity rose, it showed the smallest quarterly increase over the past five quarters. Median sensitivity

rose only nine basis points, increasing to 240 in the first quarter of 2000 (see Figure 1). The percentage of thrifts with sensitivities over 400 basis points was about 14 percent in the first quarter, up from about 12 percent in the fourth quarter of last year. The percentage of thrifts with sensitivities under 200 basis points decreased to 16 percent in the first quarter.

Figure 1. Sensitivity Measure and 1 year CMT

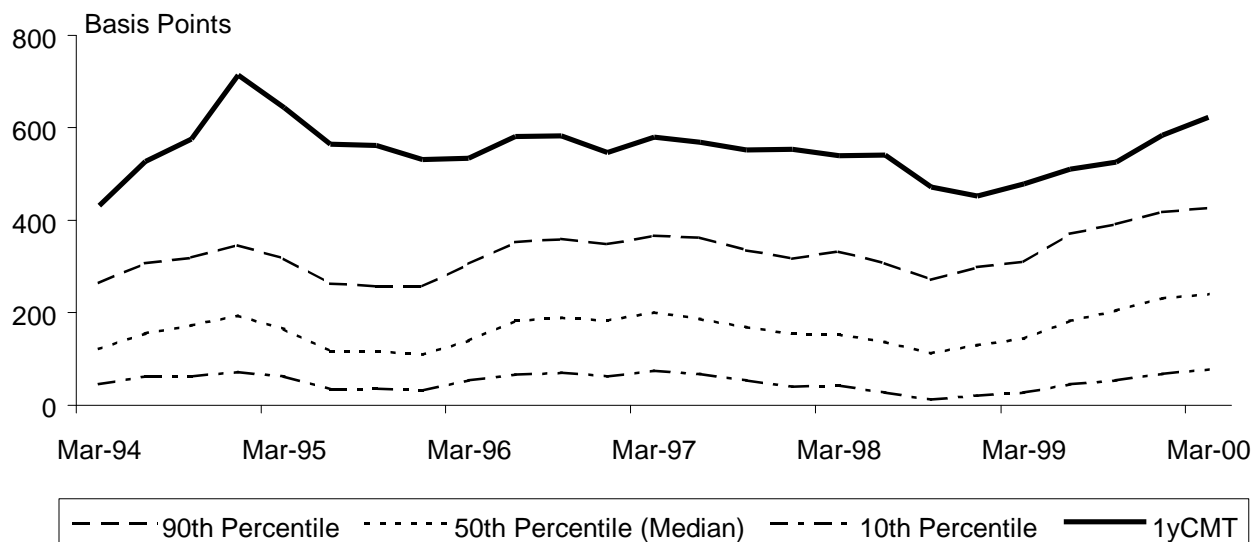
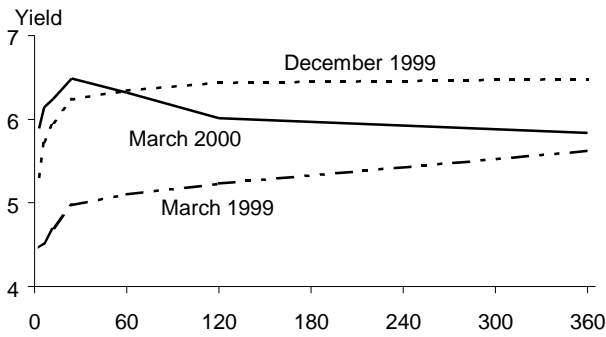


Figure 2. Treasury Yield Curves



An increase in interest rates was the primary cause of the increase in median sensitivity. The Treasury yield curve shifted upward in the short-term range and shifted downward and became inverted in the long-term range between the fourth quarter of last year and the first quarter of this year (see Figure 2). The humped shape of the yield curve up through the five-year maturity reflects increases in short-term rates, while Treasury buybacks of longer maturity securities account for the inverted shape over the longer-term part of the yield curve. On January 13, 2000, the Treasury Department announced planned buybacks of up to \$30 billion in debt in the long-end of the yield curve (10- and 30-year maturities) throughout 2000.

Recent increases in interest rates and the fear that rates will continue to rise have negatively affected bank and thrift stock prices. As shown in

Figure 4. Median Duration of Assets and Liabilities

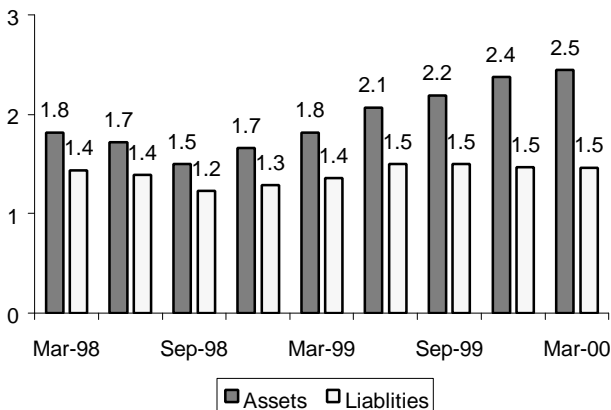


Figure 3. Bank and Thrift Indices and 10 Year CMT

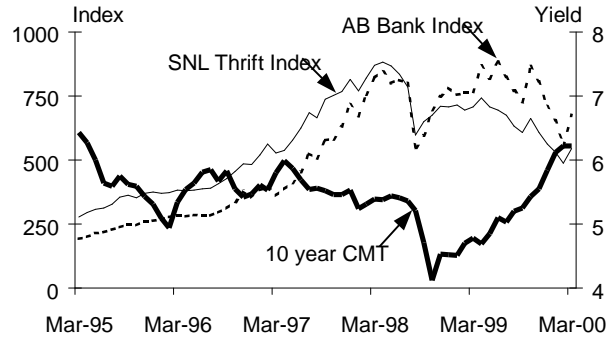


Figure 3, there is a strong negative correlation between the movement in interest rates (here the 10-year CMT) and equity indices for banks and thrifts.

Despite the inverted yield curve, thrifts saw their net interest margin remain stable at 270 basis points in the first quarter, displaying little change from the level at the end of last year. Net interest margin remained largely unchanged because thrifts increased their investments in higher yielding nonresidential mortgage loans, construction and land loans, consumer loans, and commercial loans. In addition to this balance sheet restructuring, upward rate adjustments on adjustable-rate mortgages and a rise in low cost transaction accounts also helped to keep net interest margins stable. The increase in interest rates was associated with a continued slowdown in mortgage originations during the first quarter, although the percentage of adjustable-rate mortgage origina-

Figure 5. Median Sensitivity by Asset Size

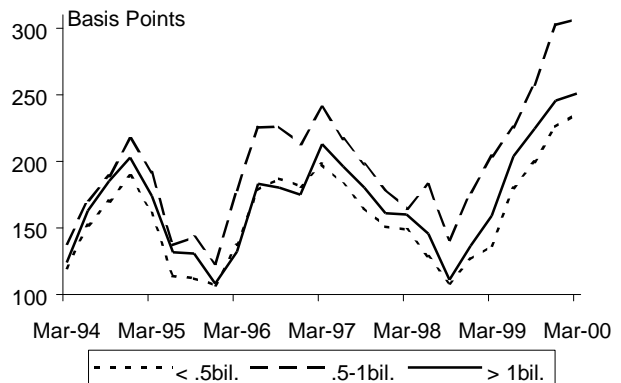


Table 1. Interest Rate Risk Measures

(Industry Aggregate Data)

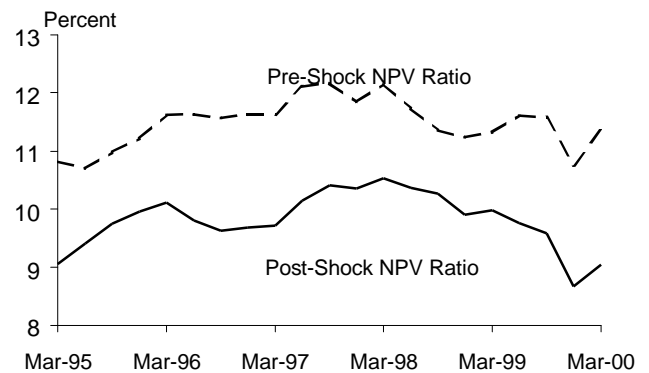
Change in Interest Rates (Basis Points)	Percentage Change in NPV			Ratio of NPV to Assets		
	Mar-99	Dec-99	Mar-00	Mar-99	Dec-99	Mar-00
+300	-34.0	-50.3	-49.8	6.3	4.4	4.6
+200	-19.9	-31.4	-31.8	7.5	6.0	6.1
+100	-8.3	-14.3	-15.1	8.5	7.3	7.5
Base Case	0.0	0.0	0.0	9.1	8.4	8.6
-100	4.0	9.7	10.5	9.4	9.1	9.4
-200	6.7	15.2	14.4	9.5	9.4	9.6
-300	11.6	18.8	16.5	9.8	9.6	9.7

tions made by thrifts increased.

As shown in Figure 4, the thrift industry’s median effective duration for assets rose to 2.5 in the first quarter, while the median effective duration for liabilities remained unchanged at 1.5. Mortgage durations have continued to increase as a result of slower prepayment speeds precipitated by the rise in interest rates during the past several quarters. Median thrift sensitivity by asset size is displayed in Figure 5. The higher median sensitivity for thrifts in the \$500 million to \$1 billion category appears to be explained by their higher median asset duration.

The extension risk of mortgage portfolios associated with slower prepayment speeds is at an all-time high. Extension risk is the risk that stems from slower than expected repayment of mortgages, either due to special characteristics of the underlying mortgages or to interest rates that re-

Figure 6. Median Pre- and Post-Shock NPV Ratios



main too high to generate repayment or refinancing. About 62 percent of 30-year fixed-rate mortgages have coupons between 6.5 and 7 percent. Less than 4 percent of 30-year fixed-rate mortgages had a refinancing incentive of 50 basis points or more at mortgage rates that prevailed in the first quarter, representing the lowest historical percentage.

The median pre-shock NPV ratio rose to 11.4 percent in the first quarter, exceeding well-capitalized levels by a substantial amount (see Figure 6). The increase occurred as the result of an increase in the present value of assets associated with a rise in values of mortgage servicing and core deposit intangibles, and a decrease in the present value of liabilities. Mortgage servicing provides a natural hedge against rising interest rates. The decrease in the present value of liabilities was associated with an increase in the volume

Figure 7. Estimated Change in NPV: +200bp Rate Change (First Quarter 2000)

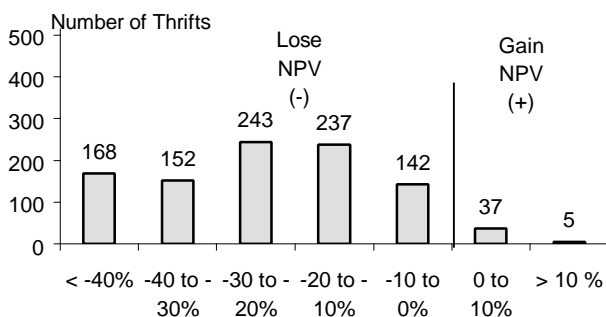


Figure 8. Estimated Change in NPV: -200bp Rate Change (First Quarter 2000)

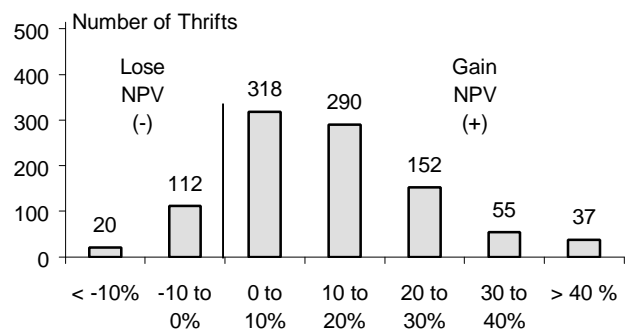
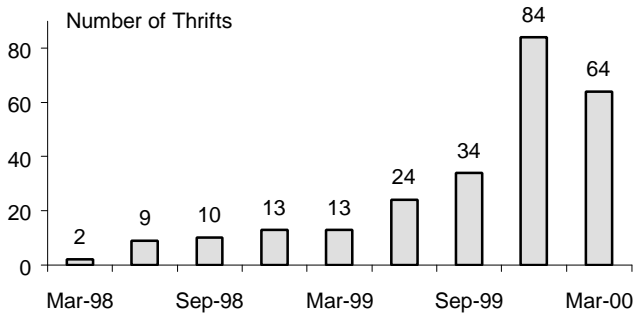


Figure 9. Number of Thrifts with Post-Shock NPV Ratios Under 4.0 Percent



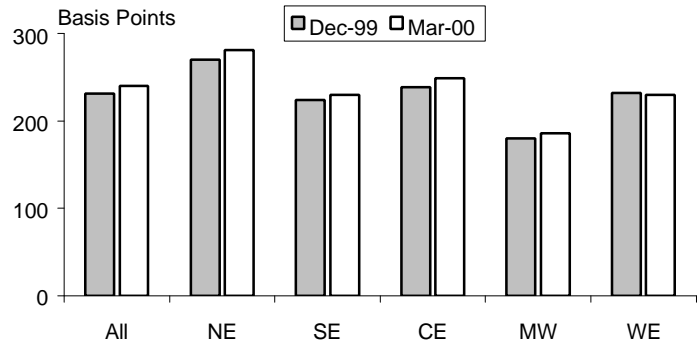
of low cost transaction accounts in the first quarter. The industry’s median post-shock NPV ratio rose to 9.0 percent, as a result of the increase in the median pre-shock ratio. The median equity capital ratio also increased to 9.6 in the first quarter. All indications are that industry capital levels have improved, despite an unfavorable interest rate environment.

Despite volatile upward movements in interest rates during the first quarter, thrift use of financial derivatives remained unchanged. About 80 thrifts used financial derivatives to hedge their interest rate risk exposure. The two most commonly used derivative instruments were fixed-for-floating interest rate swaps and interest rate caps. Wide swap spreads and FAS 133 might account for the lack of an increase in derivative use.

Gains and Losses

In the first quarter, the thrift industry would have

Figure 10. Median Sensitivity Measure by OTS Region



lost 31.8 percent of its net portfolio value if rates rose by 200 basis points. This percentage is up slightly from the previous quarter. The industry would have gained 14.4 percent in value if rates fell by 200 basis points (see Table 1).

Of the 984 reporting savings associations in the first quarter, about 96 percent would have experienced a loss of net portfolio value if rates increased by 200 basis points. About 57 percent of thrifts would have lost more than 20 percent of their value if rates rose by 200 basis points. If rates fell by 200 basis points, about 87 percent of reporting thrifts would have experienced increases in their net portfolio values. (see Figures 7 and 8)

Highly Exposed Thrifts

The number of thrifts with post-shock NPV ratios below 4 percent fell in the first quarter. This represents the first decrease in over five quarters. Figure 9 shows that the number of highly exposed

Figure 11. Mortgage Distribution

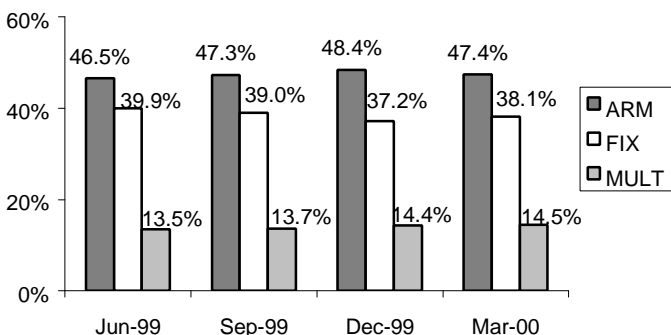
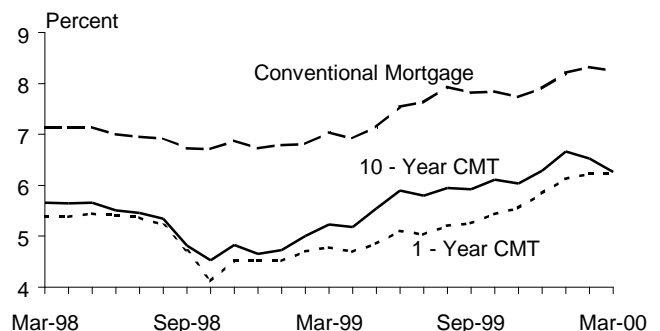


Figure 12. Mortgage-Related Interest Rate Indices



thrifts fell to 64 in the first quarter, down sharply from 84 thrifts at the end of 1999. The percentage of thrifts with post-shock NPV ratios below 4 percent fell to 6.5 percent. The reduction in the number of highly exposed thrifts was due to the improvement in pre-shock NPV ratios in the first quarter. Despite the reduction, overall, the industry remains exposed to an increase in interest rates.

Regional Trends

With the exception of the West Region, all OTS regions saw their median sensitivity go up in the first quarter. The Northeast Region thrifts had the largest median sensitivity measure (282), while the Midwest Region had the smallest measure (186). The largest percentage increases in median sensitivity occurred in the Northeast and Central Regions, where sensitivity rose 4 percent in both regions. In contrast, the West Region saw its median sensitivity fall by about 1 percent from year-end (see Figure 10).

Appendices B1 to B5 present distributions for sensitivity, pre- and post-shock NPV ratios, and assets and liabilities durations for each OTS region and the industry.

MORTGAGE-RELATED INTEREST INDICES

First quarter mortgage originations by thrifts fell substantially as rates rose and refinancing activity dropped off. The rise in rates increased demand for adjustable-rate mortgages, while the demand for fixed-rate mortgages fell. In the first quarter, 75 percent of thrift mortgage originations were adjustable-rate mortgages. Figure 11 shows how the distribution of mortgage loans held by thrifts in their portfolios changed during the past several quarters. The proportion of adjustable-rate mort-

gages rose. Also evident is a slight increase in the proportion of multifamily mortgages.

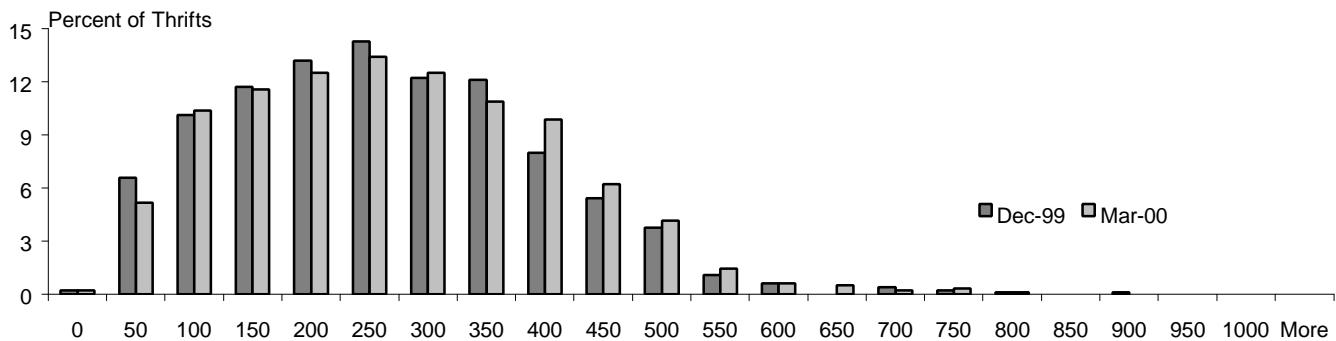
Despite the decrease in the 10-year Constant Maturity Treasury (CMT) interest rate in the first quarter, the Freddie Mac 30-year fixed-rate commitment rate for conventional mortgage loans rose in the first quarter. At the end of the first quarter, the commitment rate was 8.23 percent, up from 8.06 at the end of the fourth quarter last year. As a result, the spread between the 30-year commitment rate and the 10-year CMT widened to 210 basis points (see Figure 12). The 10-year CMT has become a less reliable benchmark for rates on longer-term contracts as the Treasury yield curve has been shifted by technical factors instead of fundamentals during the past several quarters.

Table 2. Post-Shock NPV Ratio and Sensitivity Measure Matrix, March 2000

Post-Shock NPV	Sensitivity Measure				Total
	Under 100bp	101-200bp	201-400bp	Above 400bp	
	# of Thrifts (% of Total)	# of Thrifts (% of Total)	# of Thrifts (% of Total)	# of Thrifts (% of Total)	
Over 10%	103 10.5%	110 11.2%	165 16.8%	30 3.0%	408 41.5%
	Minimal Risk (1)	Minimal Risk (1)	Minimal Risk (1)	Moderate Risk (2)	
6% to 10%	51 5.2%	111 11.3%	173 17.6%	41 4.2%	376 38.2%
	Minimal Risk (1)	Minimal Risk (1)	Moderate Risk (2)	Significant Risk (3)	
4% to 6%	1 0.1%	14 1.4%	94 9.6%	27 2.7%	136 13.8%
	Minimal Risk (1)	Moderate Risk (2)	Significant Risk (3)	High Risk (4 or 5)	
Below 4%	0 0.0%	2 0.2%	27 2.7%	35 3.6%	64 6.5%
	Moderate Risk (2)	Significant Risk (3)	High Risk (4 or 5)	High Risk (4 or 5)	
Total	155 15.8%	237 24.1%	459 46.6%	133 13.5%	984 100%

Table 3. Post-Shock NPV Ratio and Sensitivity Measure Matrix, December 1999

Post-Shock NPV	Sensitivity Measure				Total
	Under 100bp	101-200bp	201-400bp	Above 400bp	
	# of Thrifts (% of Total)	# of Thrifts (% of Total)	# of Thrifts (% of Total)	# of Thrifts (% of Total)	
Over 10%	107 10.5%	99 9.7%	150 14.8%	26 2.6%	382 37.6%
	Minimal Risk (1)	Minimal Risk (1)	Minimal Risk (1)	Moderate Risk (2)	
6% to 10%	61 6.0%	130 12.8%	168 16.5%	32 3.1%	391 38.5%
	Minimal Risk (1)	Minimal Risk (1)	Moderate Risk (2)	Significant Risk (3)	
4% to 6%	4 0.4%	21 2.1%	107 10.5%	27 2.7%	159 15.6%
	Minimal Risk (1)	Moderate Risk (2)	Significant Risk (3)	High Risk (4 or 5)	
Below 4%	0 0.0%	3 0.3%	48 4.7%	33 3.2%	84 8.3%
	Moderate Risk (2)	Significant Risk (3)	High Risk (4 or 5)	High Risk (4 or 5)	
Total	172 16.9%	253 24.9%	473 46.6%	118 11.6%	1016 100%

Figure 13. Comparison of Sensitivity Distributions, December 1999 and March 2000

The spread between the Freddie Mac fixed-rate commitment rate (8.23 percent) and the average ARM contract rate (7.14 percent) was 109 basis points at the end of the first quarter, down from 149 basis points at the end of 1999. In addition, the spread between the 10-year CMT and the 1-year CMT fell to -22.4 basis points at the end of the first quarter. This negative spread reflects the inverted yield curve.

THRIFT BULLETIN 13a AND THE “S” RATING

The industry’s interest rate exposure and sensitivity matrix for the first quarter is shown in Table 2. Table 3 reports results for the fourth quarter of last year for comparison. Of the 984 reporting thrifts, 13.5 percent had sensitivity measures that exceeded 400, up from 11.6 percent in the previous

quarter (see Figure 13). Also, 42 percent of thrifts had post-shock NPV ratios that exceeded 10 percent, up from the fourth quarter. Only 6.5 percent of thrifts had post-shock NPV ratios below 4 percent. These results show improvement in capital levels between the fourth quarter of last year and the first quarter of this year, despite the increase in sensitivity.

Based on TB 13a guidance, 55 percent of thrifts might initially be assigned a “1” rating, 22 percent a “2” rating, 14 percent a “3” rating, and 9 percent a “4” or a “5” rating. The percentage of thrifts with significant or high interest rate risk was 23 percent in the first quarter, down from 24 percent in the fourth quarter of last year. These results suggest that thrifts are taking appropriate measures to protect their capital levels in a very unfavorable interest rate environment.

Tidbit for the Quarter

Income Simulations Underestimate Risk in Options; Undervalue Hedges (Adapted from James T. Wilkinson, Financial Managers Update, May 9, 2000)

Financial institutions that rely on income simulations to measure risk may be underestimating their exposure and undervaluing option-based hedges that can offset risk. The reason this occurs is income simulations often do not fully measure the sensitivity of stand-alone options and options embedded in assets and liabilities.

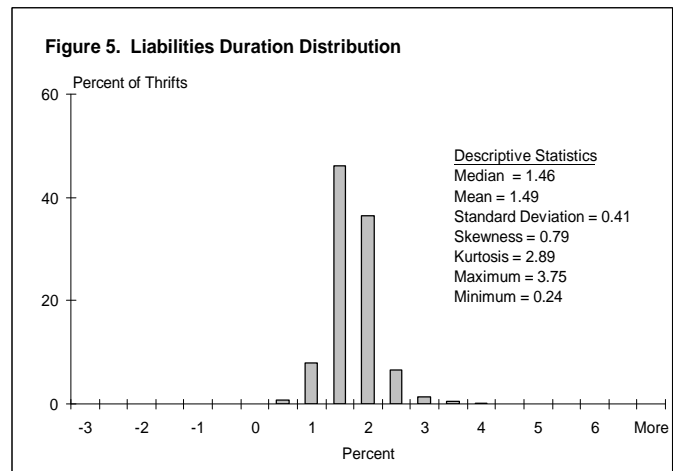
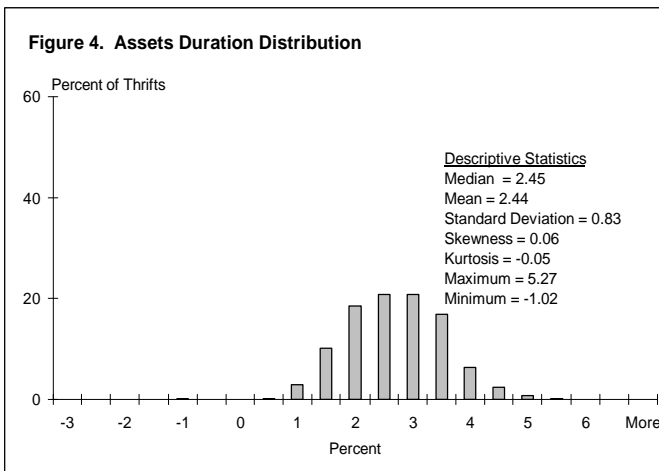
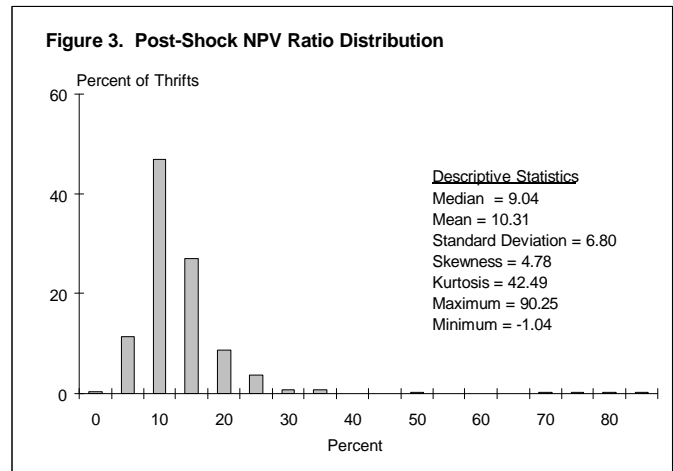
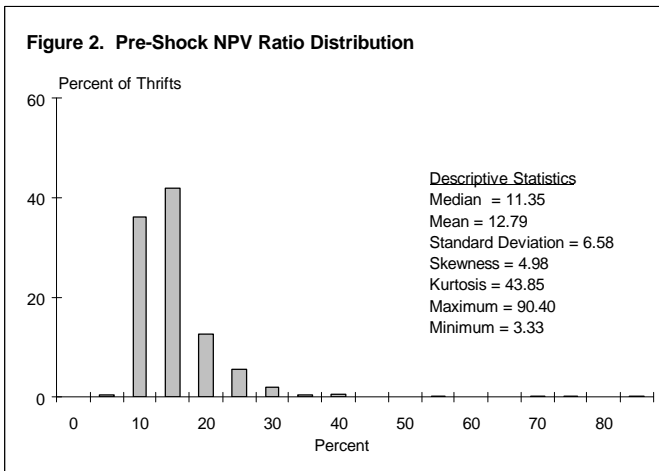
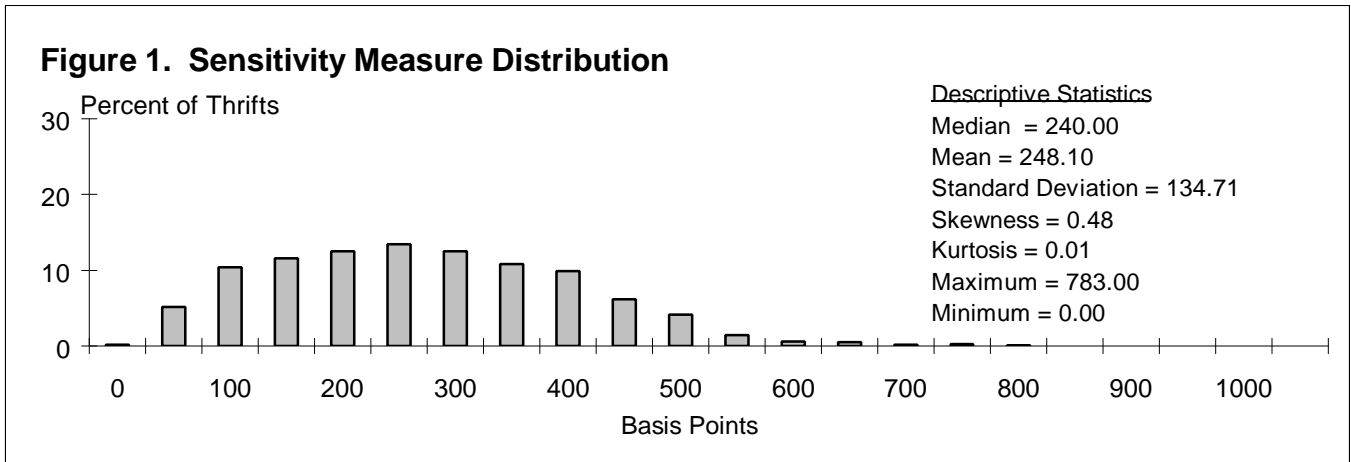
To measure the interest rate risk exposure of the current balance sheet, simulations are used to compare the incomes generated in the base case and in scenarios where interest rates change by a given amount. Simulations often fail to measure the impact of options and instruments with embedded options. This occurs because income simulation models typically only use a limited number of interest rate paths or scenarios to measure risk. Typically, rates are increased and decreased by 100 and 200 basis points. However, there are an infinite number of possible interest rate paths, and the range of these is determined by the volatility of market rates. Standard option-pricing theory says that the interest rate volatility will be an important factor in determining the value of the rate-sensitive options in a bank.

The value of an option is composed of its intrinsic value and its time value. The value is determined by the amount the option is “in the money,” and the time value of the option. The more the option is in the money, the higher its intrinsic value. The time value of the option is derived from the probability that an option may move into, or farther into, the money before it expires. Time value is determined by the time remaining to maturity and by the volatility of the underlying instrument, which for financial institutions is the risk-free interest rate. The option is more valuable when there is a longer time to maturity and when volatility is higher. For an option that is “out of the money,” the entire value of the option is its time value.

Income simulations typically look at limited number of interest rate paths and include only cash flows received under those paths. Simple, discounted cash flow, market value models have the same problem. The analysis does not capture the value associated with the probability that rates may change by a greater amount. Thus, for stand-alone financial options or assets and liabilities with embedded options, the simulations capture only the option’s intrinsic value, and ignore its time value. Income simulation works well if it is certain that rates will rise by 100 basis points, but rates may rise by 50, 100, 150, or 163 basis points. Failure to capture this uncertainty, that is, volatility, means that an important part of the option value is omitted.

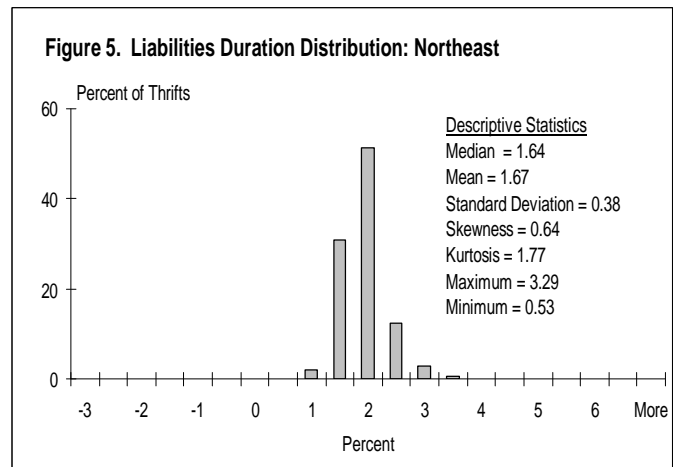
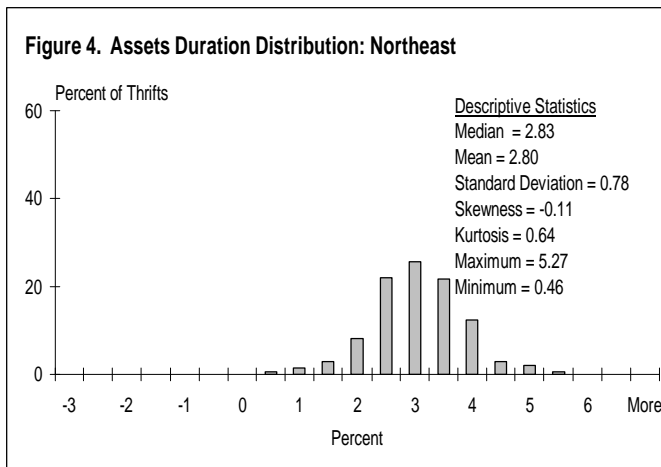
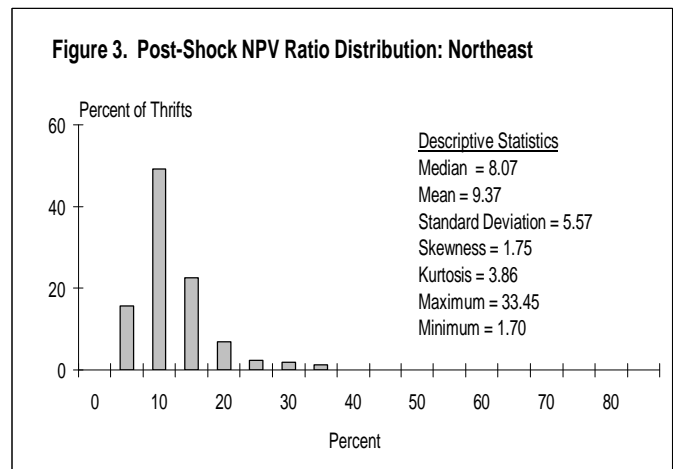
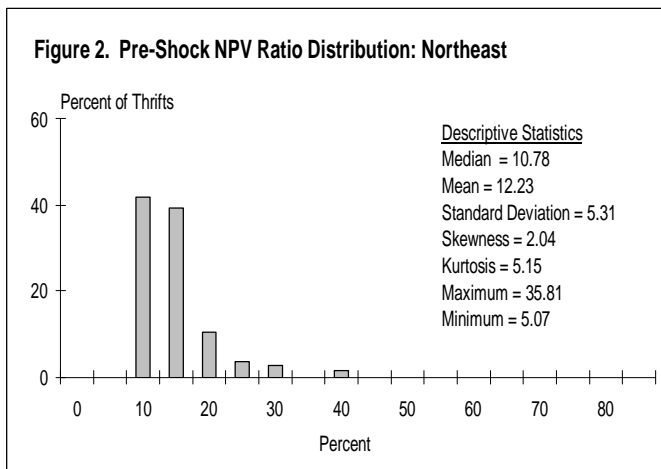
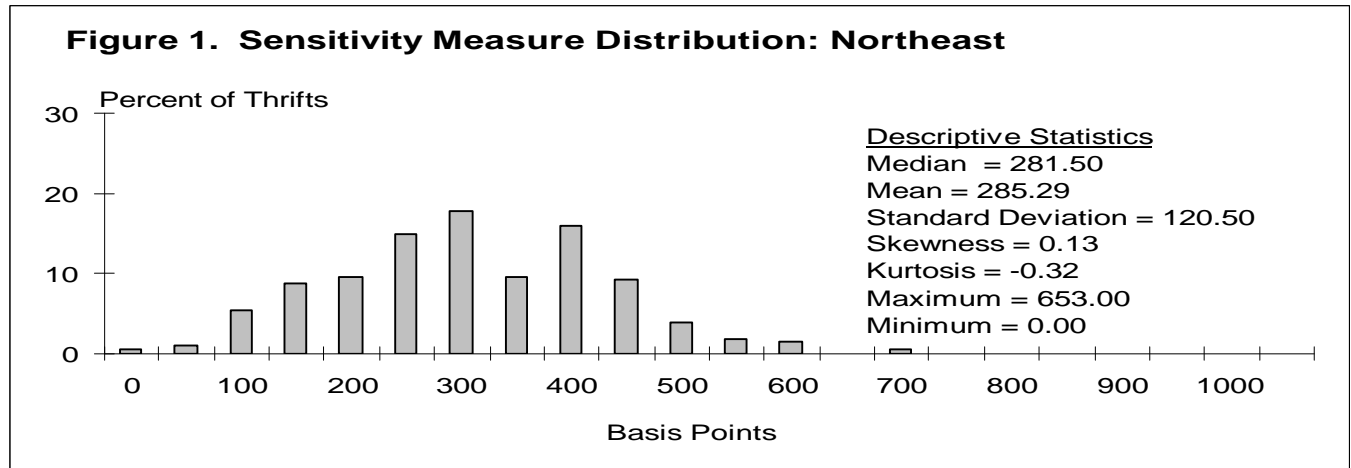
Appendix A (All Thrifts)

This appendix presents distributions for sensitivity, preshock and post-shock NPV ratios, and assets and liabilities duration for all reporting thrifts at first quarter end 2000. Also included in each figure are descriptive statistics.



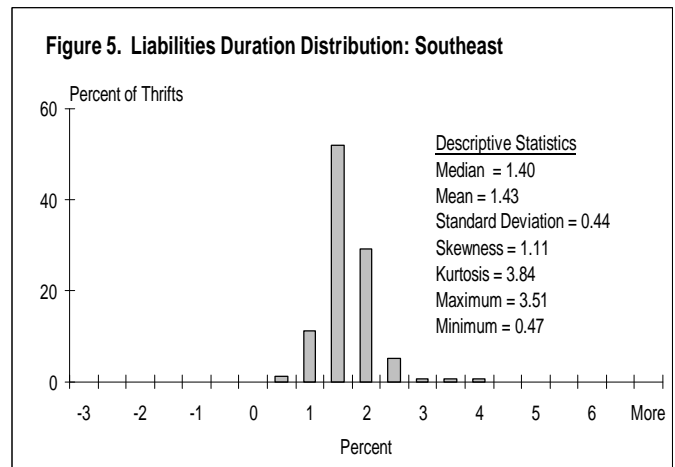
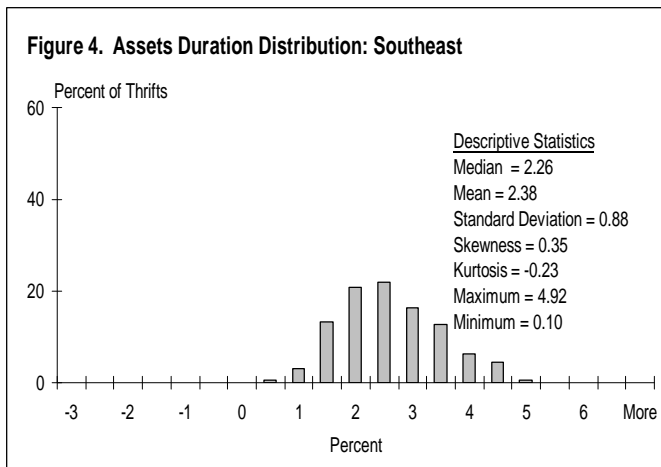
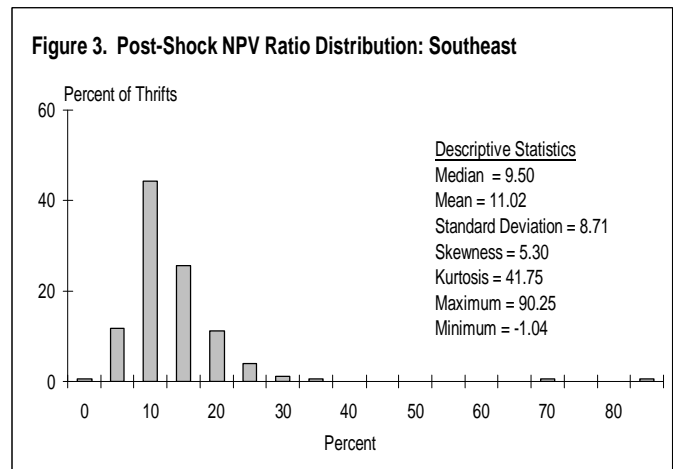
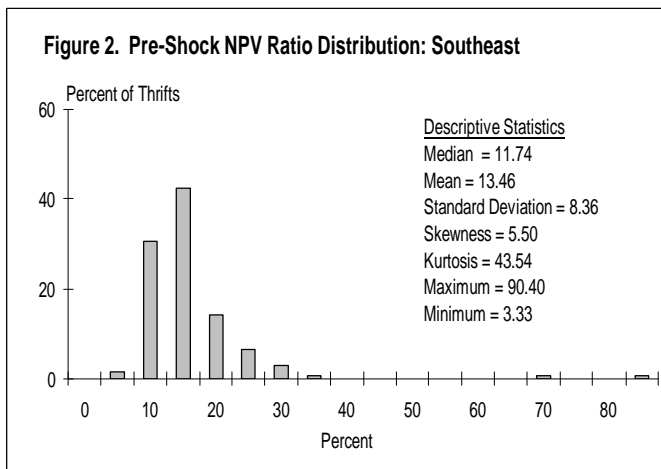
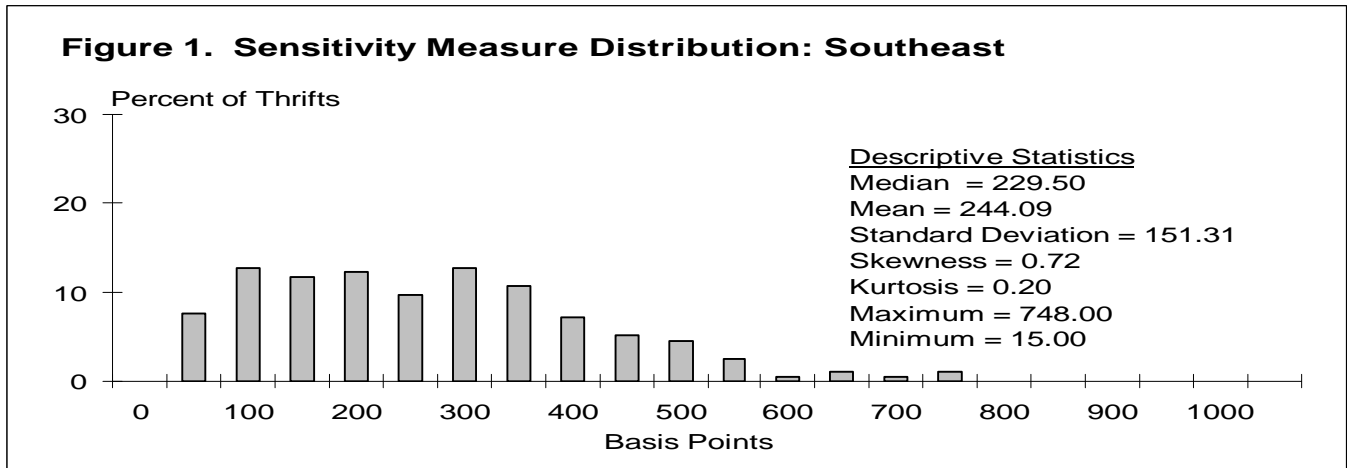
Appendix B 1 (Northeast Region)

This appendix presents distributions for sensitivity, pre-shock and post-shock NPV ratios, and assets and liabilities duration for reporting thrifts in the Northeast Region at first quarter end 2000. Also included in each figure are descriptive statistics.



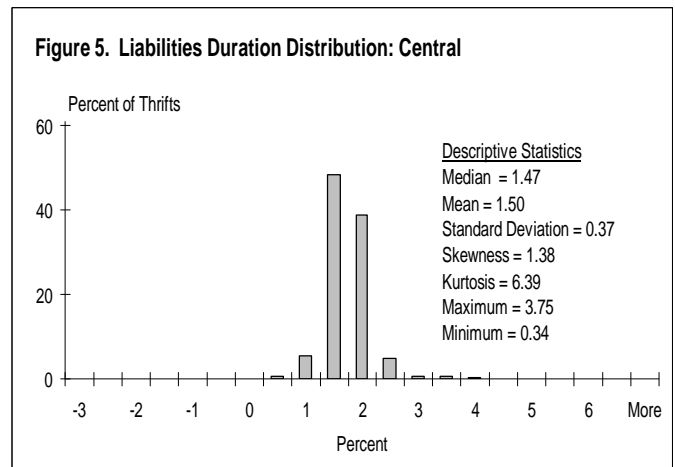
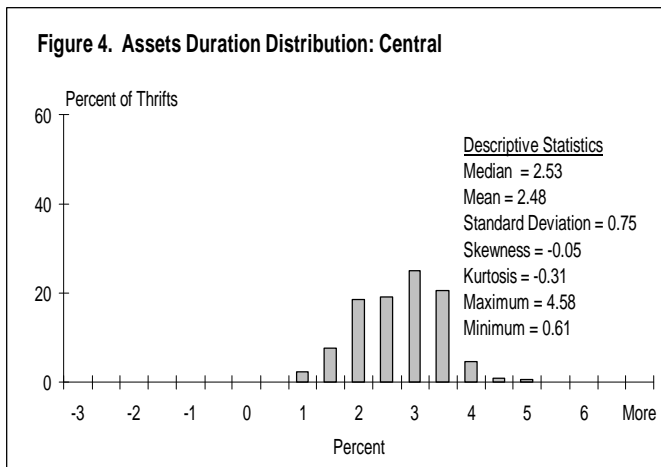
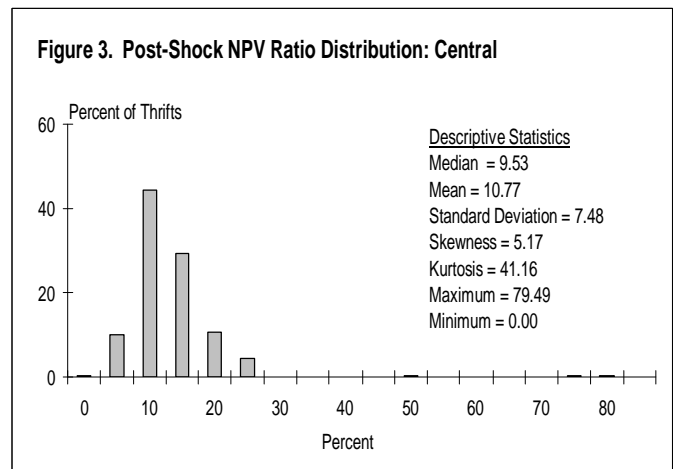
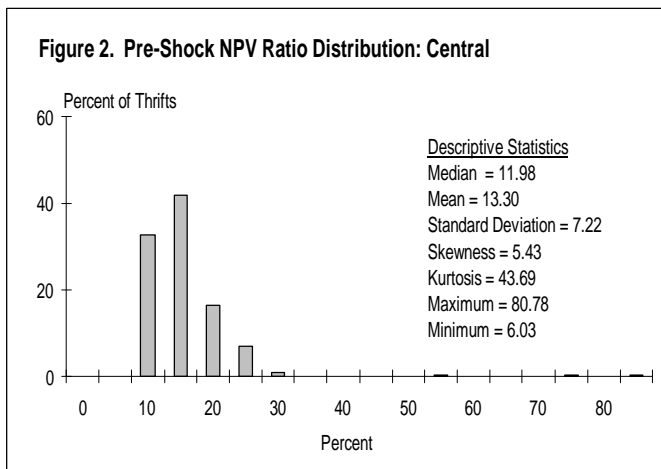
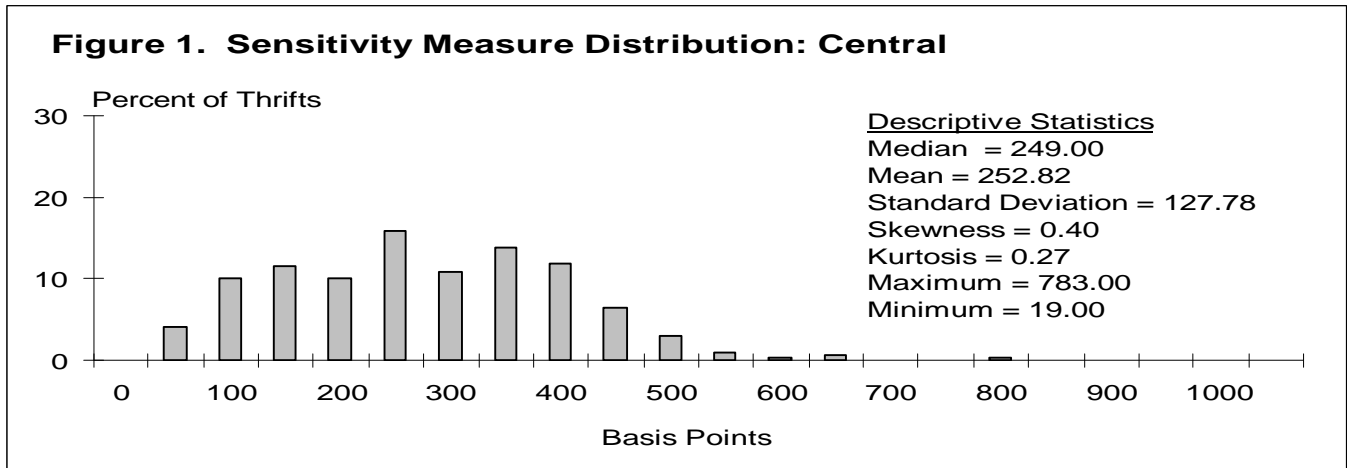
Appendix B 2 (Southeast Region)

This appendix presents distributions for sensitivity, pre-shock and post-shock NPV ratios, and assets and liabilities duration for reporting thrifts in the Southeast Region at first quarter end 2000. Also included in each figure are descriptive statistics.



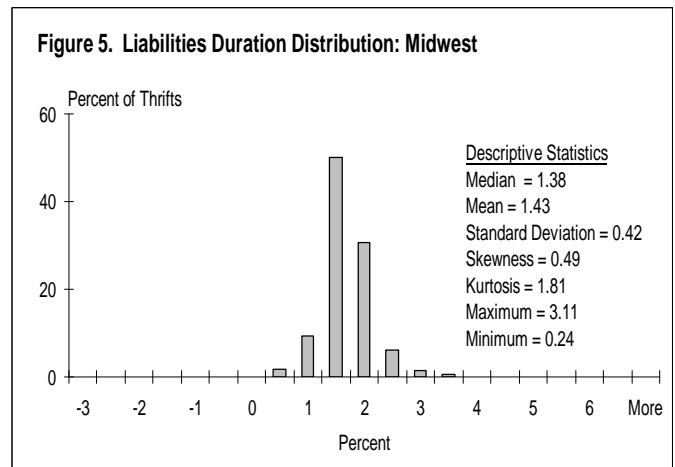
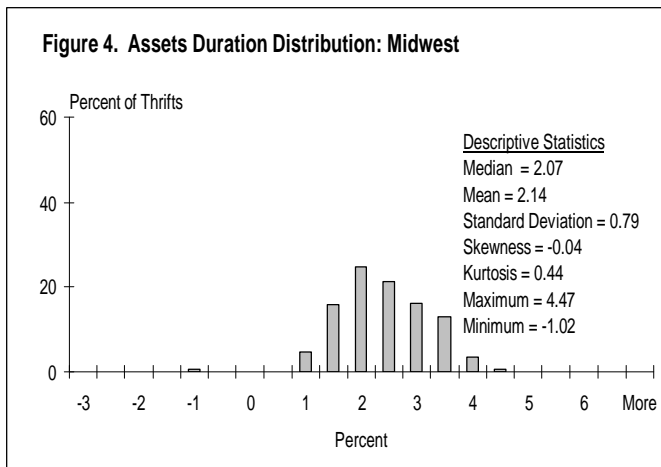
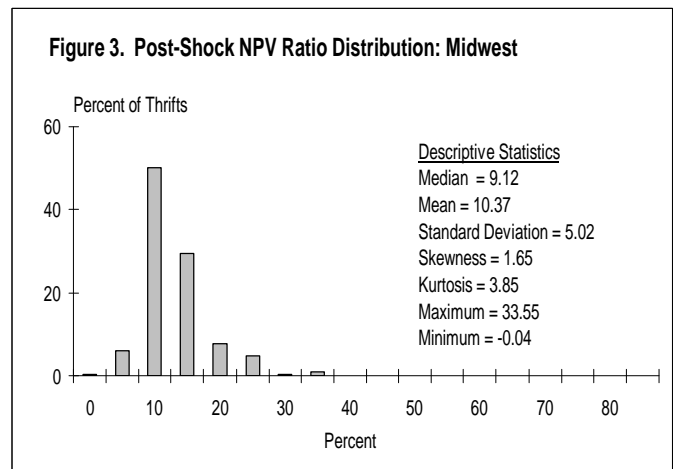
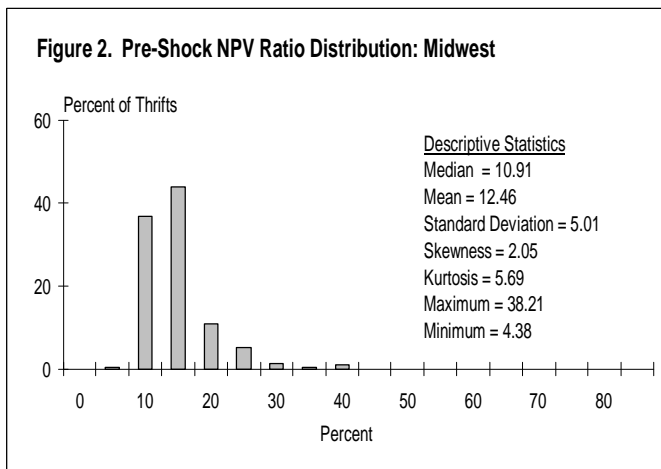
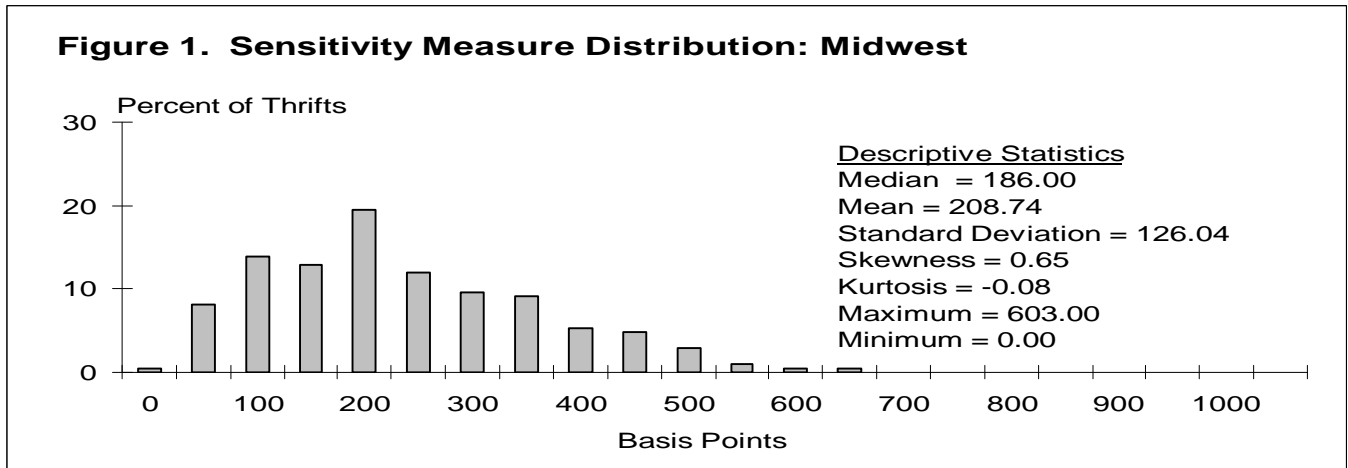
Appendix B 3 (Central Region)

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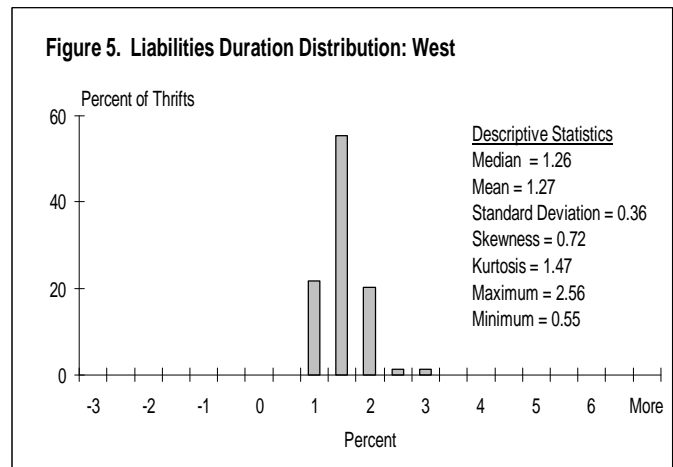
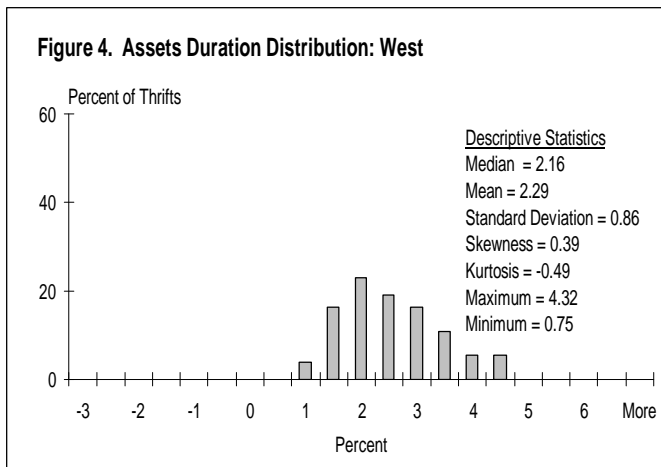
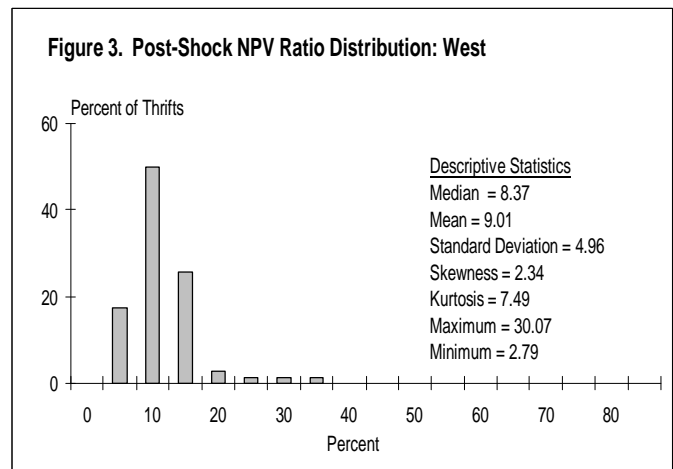
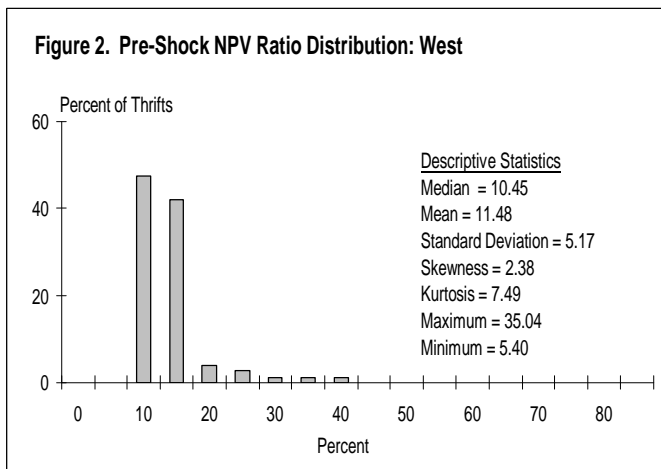
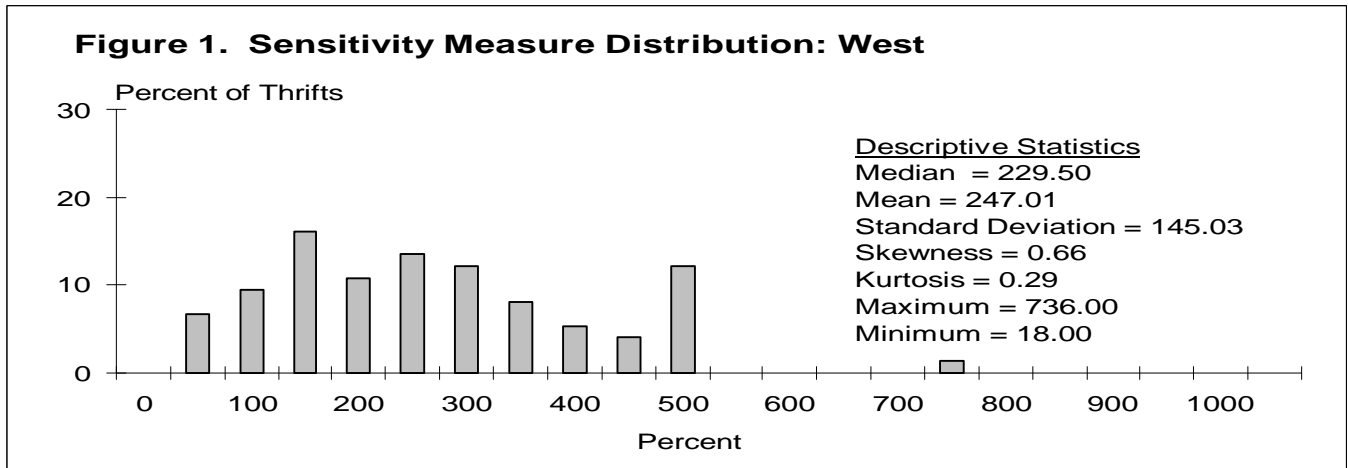
Appendix B 4 (Midwest Region)

This appendix presents distributions for sensitivity, preshock and post-shock NPV ratios, and assets and liabilities duration for reporting thrifts in the Midwest Region at first quarter end 2000. Also included in each figure are descriptive statistics.



Appendix B 5 (West Region)

This appendix presents distributions for sensitivity, pre-shock and post-shock NPV ratios, and assets and liabilities duration for reporting thrifts in the West Region at first quarter end 2000. Also included in each figure are descriptive statistics.



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.
Duration	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.
Kurtosis	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.
Skewness	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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