The Quarterly Review of Interest Rate Risk

Second Quarter Sees Sensitivity Rise

Between March 31, 2008 and June 30, 2008, interest rates rose and the upward sloping yield curve flattened slightly. Rates on the shorter end of the curve rose by more than rates at the longer end of the curve. The three and six-month rates rose by 52 and 66 basis points to 1.90% and 2.17% respectively. The 12 month and five-year Treasury rates rose by 81 and 88 basis points to 2.36% and 3.34%. The ten-year and 30-year rates increased by 54 and 23 basis points to 3.99% and 4.53%.

During the quarter, the 30-year mortgage rate on conforming fixed rate loans increased 59 basis points from 5.63 percent to 6.22 percent. The target for the federal funds rate was lowered from 2.25 percent at the end of the first
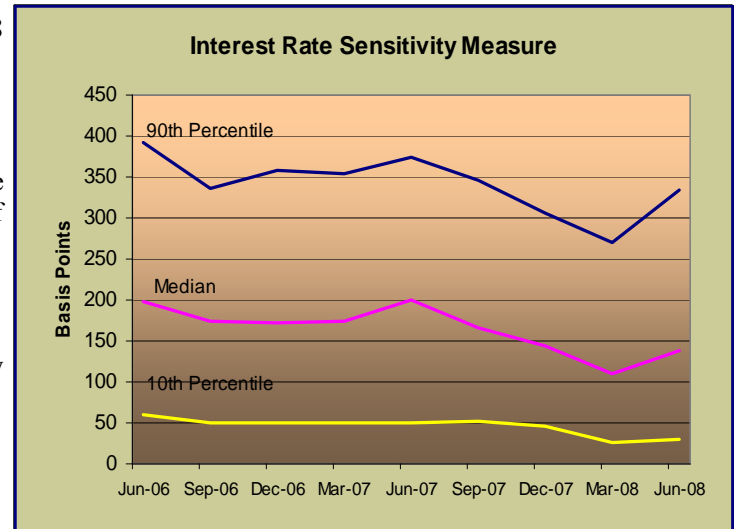
Interest Rate Sensitivity Measure

Discovering the "Hold-to-Maturity" Price

In the weeks leading up to the passage of the Emergency Economic Stabilization Act (EESA) of 2008, U.S. Treasury officials stated their intent to purchase mortgage-related assets at prices above their current fire sale levels in order to restart the market. Their plan is based on the belief that market prices on mortgage-related securities no longer reflect just the inherent credit risk embedded in the collateral. Rather, current market values now include an "illiquidity" discount which reflects the fact that these instruments have fallen out of favor with investors. After all, if the instru-

ment can be held-to-maturity the investor shouldn't have to write the assets down to the fire sale market value that reflects an oversized liquidity premium.

As an alternative to today's distressed prices, Treasury officials suggested paying something closer to the "hold-to-maturity" price, or in other words, a price that does not reflect the illiquidity discount. In the previous edition of this publication, we referred to this price as a security's "intrinsic value." Getting the value of a security to accurately reflect the risk of the underlying cash flows is of critical importance

as sentiment in the securities market can often be "imputed" to the whole-loan and bank balance sheet positions. That is, even banks that aren't required to mark-to-market can suffer from this illiquidity discount as investors and analysts look-through to the bank's underlying loan portfolio, and may attribute securitization market prices to the bank's loan position.

Treasury officials believe that closing the gap between current market values and the intrinsic value is one of the keys to resolving the current financial crisis. The underly-

Discovering "Hold-to-Maturity" Price (continued)

(Continued from page 1)

ing theory is as follows: Bankers are unwilling to sell their mortgage-related securities at today's unreasonably low market values for fear of having to realize losses that could effectively wipe out their bank's capital. As such, they have moved into preservation mode, hording cash and refraining from many forms of lending activity until the market normalizes. Treasury's Asset Purchase Program aims to speed up the normalization process. But just what is a "hold-to-maturity" price? In coming weeks, Treasury officials will be exploring ways to answer this question such that it achieves their objective of jump starting the financial system, but that does not result in the U.S. taxpayers overpaying for a bank's distressed assets.

A firm that has come up with a quantitative methodology for assessing the illiquidity discount is Andrew-Davidson and Company (AD-Co), a New York–based provider of fixed-income research and analytical solutions. In a recent paper entitled "Intrinsic Marks" Alex Levin, AD-Co's valuation expert and financial engineer, outlines his process for discovering an asset's intrinsic value by calculating what he terms a "credit-adjusted" OAS.

Dr. Levin leads the firm's efforts in developing new, efficient valuation models for mortgages, derivatives, and other financial instruments. He has devel-

oped a suite of valuation and term-structure models and is widely published. His most recent work has focused on modeling credit risk in mortgage products, specifically in a rigorous stochastic valuation setting. Dr. Levin has been in the mortgage business for 15 years and has a Ph.D. in Control and Dynamic Systems from Leningrad State University.

Recently, we spoke with Dr. Levin about some of his recent work on credit modeling and, importantly, the issue of intrinsic value versus market price.

OTS: Thanks for agreeing to the interview, Alex. One of the issues we have been hearing a lot about has to do with mark-to-market accounting and the problems associated with establishing fair value in a distressed market. What are your thoughts on this?

Alex Levin: We have been spending a lot of time thinking about this problem. Fundamentally, one of the major issues relates to an abnormally high liquidity spread being applied to many of the assets that banks and other financial intermediaries are holding. As you know, market values embed not only the market's prepayment and credit loss estimate but also a liquidity spread, which has become abnormally wide. This is a real problem since, as many have suggested, the underlying expected losses from the credit risk aren't high enough to warrant the

"market price" markdown. Clearly investors should recognize the full effect of credit risk in the economic values they attribute to loans and securities, including the cost of its hedging. However, with the MBS market as stagnant as it has been, there really is a difference between the inherent value and the quoted market price.

OTS: Does this suggest that there is something wrong with the accounting? That is, that mark-to-market should be eliminated?

Alex Levin: I am not an accountant, but from an economic point of view, and considering what we see in terms of available prices and quotes, to rely on observed prices in a distressed market may not be a good gauge for the economic risks. This isn't to say market prices can be ignored, but in this environment there are many technical reasons why available price may not always be the best indicator. Market prices are a great leading risk indicator; however, direct marking-to-market when prices reflect systematic illiquidity seems problematic. We have developed a method of computing intrinsic values based on market quotes, with a mild use of models. This method was meant to apply for situations when the market is illiquid, but reasonable raw market quotes still exist.

OTS: We have said the same in prior articles we've written; that there is a funda-

mental difference between value and price. In our March 2008 article entitled, *Valuation Challenges, Regulation, and Evolving Standards of Practice*, we noted that price is what someone is willing to trade at; value is what something is worth intrinsically.

Alex Levin: This is very true. The market price includes not only the market's expectation of cash flows adjusted for interest rate, call, and credit risks, but also for liquidity risk and similar technical factors. Many mortgage bonds haven't traded, or when they do trade the volumes are low and the sellers are selling under duress. There really is a need to look at the intrinsic value of the cash flows with a view toward "usual" levels of liquidity rather than these distressed levels. This is the way I interpret this notion of "held-to-maturity" price. Clearly, if you can hold to maturity, then the transitory market illiquidity risks aren't a factor.

OTS: Chairman Bernanke referred to the distressed prices as "fire-sale" prices. Are these "fire-sale" prices liquidity based, credit based, or both?

Alex Levin: Clearly they are both. The current market is very skittish and a lot of liquidity has pulled back from the market due to fear and lack of transparency into loans and portfolios. Selling into such distressed markets should be, if possi-

---

1 Available from AD-Co. in its October 2008 issue of "The Pipeline."

Discovering "Hold-to-Maturity" Price (continued)

(Continued from page 2)
ble, avoided if the underlying economic value of the risk doesn't warrant those levels. Also, with the growth of the non-agency mortgage market and the current focus on sub-prime and other risk in affordability products, credit risk is a real concern and there isn't a whole lot of history to go on with some of these new products. Using Andrew-Davidson's LoanDynamics™ model (LDM), we are able to account for collateral and contractual credit risks, including the default and loss severity impacts of home price depreciation. We are able to use standard valuation technologies, like option-adjusted spread, and produce a "credit-adjusted" OAS, or crOAS.

OTS: What is the difference between a regular OAS and crOAS?

Alex Levin: Take a look at Table-1. This particular transaction is a sub-prime deal and is a member of the ABX 07-1 index. The deal has four different tranches, each with a different level of credit protection. We have analyzed this deal monthly over the course of the entire year; Table-1 reflects the analysis as of September 2007. With a regular OAS the losses that accrue

to each tranche aren't considered. Thus, the OAS metric "absorbs" all of the credit loss. For example, the OAS level for the M8 trades at an astronomic 2,030 basis points.

However, if we introduce delinquencies, defaults, and losses into the cash flow forecasts for the various underlying loans, we put credit risk directly in the numerator of the discounted cash flow equation. Like the well-known mortgage prepayment option—or call risk—default risk is just another option that lenders give to the borrower, for a price. A borrower that is unable to pay can choose to default or walk away. This decision is a function of home price, although borrower characteristics, like FICO or payment shock, can inflict initial delinquency that brings potential default. A default, therefore, can be viewed as a put option on the property just as the prepayment is viewed as a call option on the loan. If we establish a credit-risk model to account for home price changes and how this relates to expected default and loss severity, we can use modern pricing frameworks, familiar to all traders and risk managers, to quantify the entire probability distribution of potential credit-loss and option-adjusted cash flows.

This is really important to understand. Markets value tranches by considering all possible, even remote, losses. This means that a true stochastic pricing framework is needed. Much that passes for credit analysis of bonds these days is deterministic and is often biased by analyst judgments. It is preferable to produce 1,000 possible credit-adjusted cash flows and look at the whole distribution. Once we create this modeling framework, we can discount all of these cash flows at some spread until we obtain the market price. This "new" spread isn't a regular OAS. It is what we call a credit-adjusted OAS. You can see this in Table-1. The regular OAS is 876 for tranche M5 and the credit OAS is 378.

OTS: This is quite similar to a concept that the Office of Thrift Supervision (OTS) recently presented at a September FFIEC Capital Markets conference. One of the questions we received at that event was: How do you control the loss, or otherwise tune the estimates?

Alex Levin: The loss estimates are endogenous to the model. However, within our modeling framework, we do allow for HPA "tuning" of both the short-

term home price appreciation (HPA) rate and the long-term HPA. By tuning the home price appreciation/depreciation, we can increase or decrease losses based on the analysts' to view to match HPA the forward rate, or to achieve the crOAS (i.e., liquidity spread) that is mutually consistent across the tranches.

For technical details, I would refer you to our article on credit OAS that was published in the Spring 2008 issue of the Journal of Portfolio Management. It is also available on our website at http://www.ad-co.com/.

OTS: As a bank supervisor, this is all very interesting and we definitely have learned the importance of modeling losses and understanding loss sensitivity to home price changes. Your suggested framework is also quite new, and seems rather complex. I am sure you must sometimes hear that criticism. How do you quantify or otherwise account for model risk and get comfortable with calibrations?

Alex Levin: The concept is really not terribly difficult to understand. After all, the MBS industry has gotten quite accustomed to sophisticated OAS methods, which at first blush seem very complex. All we are doing now is adjusting the cash flows to be reflective of all of the options, not just the prepayment options. In valuation modeling, we seek to form objective—as op-

Table-1: Valuation Comparision using regular OAS and Credit OAS methods for SAS06BC4

Class	IDC Price	Regular OAS Method			Credit OAS Method				
		OAS	OAD	OAC	crOAS	crOAD	crOAC	PV(loss)	Intrinsic Price
A5	92.26	312	0.7	0.1	254	1.6	-0.7	0	98.8
M2	75.43	737	2.1	0.4	511	7.8	-5	2.1	95.83
M5	65.44	876	3.3	0.6	378	20.9	-9.8	17.3	76.96
M8	37.13	2030	3.8	1.6	480	47.9	7	57.6	53.11

Discovering "Hold-to-Maturity" Price (continued)

posed to subjective—assumptions. In our paper and other works, we stressed the need for risk-neutrality—whether referring to the interest rate risk, prepay model risk, or losses. Risk neutrality refers to the cost of hedging or risk-pricing in other markets. If this cost can be established, there is much less discussion on the validity of modeling assumptions. Much loss estimation and analysis of credit lacks this risk neutrality, and for policy-makers and prudential supervisors this should be a real economic concern. Without this framework, you risk underestimating exposure to a significant degree. Of course, even with such a framework you may underestimate exposure, but now we have an objective methodology that allows us to stress-test results and create boundaries around our view of risk.

OTS: How exactly do you derive risk-neutral assumptions for losses?

Alex Levin: We know at least three methods. First, we can employ residential derivatives. For example, CME futures on the Case-Shiller indices or swaps on the Residential Property Indices (RPX) can give us a "forward curve." While volumes aren't large, maybe around $2 billion in volume on RPX since the beginning of 2008, it is a good source of data and is modestly liquid. Second, we can establish conditions endogenously, the way we have done in Table-1. Effectively, we "tuned" the loss distribution until liquidity spreads became mutually consistent up and down the capital structure of the deal. Third, we can use mortgage insurance (MI) quotes. MI companies

and GSEs set aside capital to cover "unexpected" losses. The cost of this capital points to the price of credit risk.

OTS: Fair enough. Jumping back to the results of Table 1, how should we interpret this crOAS number?

Alex Levin: This number is really what's "left over" in spread after accounting for call and put options in the contractual cash flows of the underlying loans. The way to interpret this number is as the market-implied liquidity spread.

OTS: So this analysis is telling us that the M5 tranche has more liquidity than the M2 tranche?

Alex Levin: Not necessarily. Keep in mind that we are using quoted market prices to get to this residual crOAS, so the spread really "falls out" of the model. To the degree there are problems in the market quotes, and in today's markets that's pretty much assured, it will be built into this residual crOAS number.

In this example, the crOAS's make sense intuitively, but I wouldn't put too fine a point on these numbers as being some perfect measure of the "right" liquidity spread. It is an indicative number.

Interestingly and importantly, the resultant crOAS would not make any sense if we ran the same deal recently or even for most of 2008; however, this is good information too. If you don't get a collective pattern of crOAS that is intuitively consistent, then you should be led to question the veracity of the price quotes. In distressed markets, this is a good filter to use to determine if price quotes may have prob-

lems. A knowledgeable investor, someone who knows how mortgage bonds and structure trade, can look at the crOAS and determine if the difference between tranches make sense. In this example, the spreads made sense a year ago in that the junior bonds exposed to losses are somewhat less liquid than the senior piece.

OTS: How do you determine if those levels are warranted or not? Clearly if the market price is wrong and the economic, or intrinsic, value is really higher, wouldn't a smart investor scoop-up all of the low-hanging fruit?

Alex Levin: There are many issues at play, not the least of which is leverage and the availability of market funding. Investors that might otherwise come into today's markets aren't able to maintain the same level of leverage and, thus, aren't coming in with a bid. There is also, generally, a lack of ability to really separate this "stressed" liquidity risk component from the credit risk component. With the framework we are using at AD-Co, we can look at the residual crOAS and then ask the question: What is crOAS (i.e., liquidity spread) in a normal market?

OTS: So do you have an answer for what that spread should be?

Alex Levin: It requires judgment. Based on analysis we've done, and we are doing a lot more consulting than ever on this topic, we know that the liquidity spreads that investors are seeing are far wider than prior time periods. Once you have a modeling framework like this, and traders and investors trade using the models,

they get a natural sense for what is normal and not normal, but it isn't a precise science. There definitely is art and judgment involved. I know that sounds a bit "soft," but using this modeling apparatus, we are able to begin *objectively* quantifying distressed versus normal liquidity spreads, which is the really important point.

OTS: This has been fascinating, and we think we have a lot more reading to do on this topic; however, we can see the value and how this could be used to better understand the liquidity risk. Let us start to wrap this up by asking the obvious question: How do we use this to now determine an economic, or intrinsic, value; what Chairman Bernanke has called a "held-to-maturity" price?

Alex Levin: Let's jump back to Table-1 again. The last column in the table is the intrinsic value. To get this value, we re-ran the calculation but we assume that the input crOAS, that is the liquidity spread, is 50 basis points (bps).

OTS: Where did 50bps come from?

Alex Levin: We just make the assumption that 50bps is a fair liquidity spread in a normal market. It's not that important as practitioners' views can differ, but not widely.

If we accept for a moment that 50bps is correct, then we rerun our credit-aware OAS analysis and derive the intrinsic values. What's interesting here is that the difference between the market quote and the intrinsic value is quite significant. For the M2 tranche, there is a 20-point difference or 27% mispricing.

Discovering "Hold-to-Maturity" Price (continued)

(Continued from page 4)

OTS: You had previously mentioned to us that, as magic as the intrinsic marking to market method sounds, it was malfunctioning for most of 2008. How do you suggest determining economic value for an MBS when you don't have any price quotes? This seems a common problem these days.

Alex Levin: The alternative is intrinsic marking to model. If we disregard quoted market prices, and nowadays very few transactions get executed at those prices, align the home price simulator to the forward market, and run the crOAS at the same 50 basis point spread, we are able to compute intrinsic values. They are shown in Figure-1, for the same deal, month after month, since September 2007.

The mezzanines show good overall correlation between our intrinsic values and the market quotes with major changes occurring synchronously or within one month. The A5 tranche remains still relatively well-protected, from our modeling viewpoint. In most cases, intrinsic marks lie visibly above market prices as one would expect, but not in all.

OTS: We see that both the market quotes and your intrinsic marks fell considerably in the fall of 2007 and continued to gradually slide after that point. What caused such dynamics?

Alex Levin: When producing this analysis we noticed that the RPX forward rates took a dive between October and November of 2007. The HPA tunings have changed little since, which actually meant an extended further home price deterioration. Hence, the dots continued their slow descent after November, as did the bars.

The intrinsic mark-to-model method is more practical and faster than the intrinsic mark-to-market, but it relies on the model more heavily. The differences between dots and bars can be explained by the liquidity, but also by the prepayment and credit assumptions employed within the LDM, as well as by bad market quotes.

OTS: Alex, thank you very much. This has been interesting and we look forward to hearing more about how this framework is being used, and reading your further research in this area.

Alex Levin: Thank you.

Figure-1. Intrinsic marks-to-model (dots) versus IDC prices (bars) for the SAS06BC4 sub-prime deal
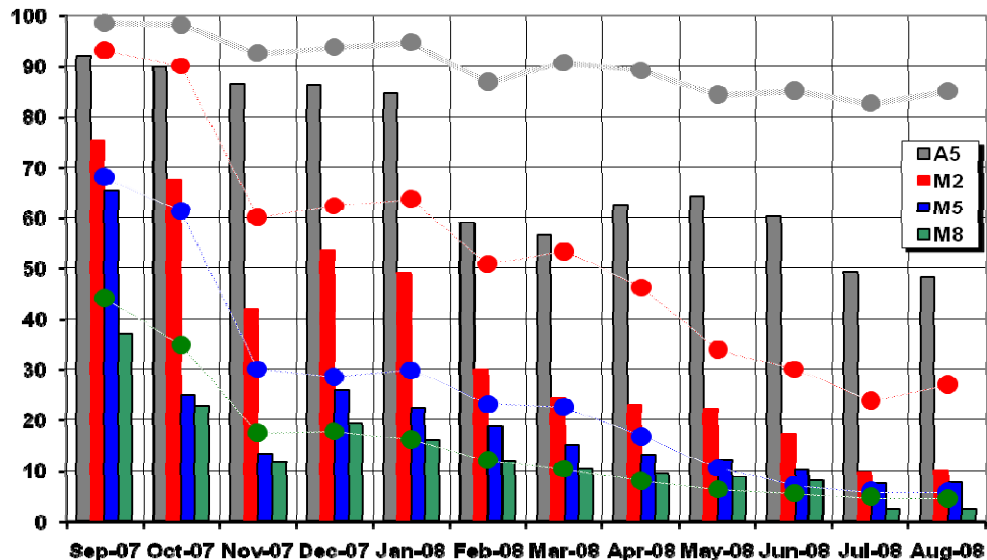
Second Quarter Sees Sensitivity Rise (continued)

(Continued from page 1)

quarter to 2.00 percent at the June quarter end.

Given the fact that most OTS-regulated thrifts are liability-sensitive (meaning that they fund longer term assets with shorter term maturities), the interest rate changes that occurred during the quarter negatively impacted the interest rate risk profile of the typical thrift. Higher interest rates typically decrease the value of fixed rate mortgage loans and trigger a corresponding decrease in pre-shock capital.

During the second quarter, thrifts set aside a record $14.0 billion in loan loss provisions, substantially increasing their reserve for potential loan losses. The record provisions increased the industry's loan loss reserve ratio over 50 percent to an all-time high of 2.27 percent from 1.51 percent in the prior quarter. These large provisions resulted in a quarterly net loss of $5.4 billion.

Troubled assets (noncurrent loans and repossessed assets) rose to 2.68 percent of assets, up from 2.06 percent in the prior quarter and 0.95 percent a year ago. Mortgages on 1-4 family properties comprise approximately 81 percent of the industry's current troubled assets, with an additional 13 percent consisting of commercial real estate loans (nonresidential mortgages, multifamily complexes, and construction loans), and six percent in nonmortgage loans.

The industry's capital position remains solid, but down from record levels. Thrifts' capital rose to record or near record levels in advance of the housing market downturn, and generally peaked in mid-2007. But recent net losses have reduced current capital ratios to pre-mid-2007 levels. Nevertheless, current regulatory capital measures remain solid. Equity capital at the end of the second quarter was 8.66 percent of assets, down from 10.80 percent one year ago, and from 9.05 percent in the prior quarter. At the end of the second quarter, over 98 percent of the industry exceeded well-capitalized standards and seven thrifts were less than adequately capitalized.

Net losses in the second quarter were $5.4 billion compared to a loss of $627 million in the prior quarter and net income of $3.8 billion in the second quarter one year ago. The second quarter loss was the second highest in history for the thrift industry – the loss of $8.8 billion in the fourth quarter of 2007 was the highest.

Profitability, as measured by return on average assets (ROA), was a negative 1.41 percent in the second quarter compared to negative 0.17 in the first quarter. One year ago the industry ROA was 1.02 percent. Return on average equity (ROE) was a negative 16.05 percent in the second quarter, down from a negative 1.83 percent in the first quarter, and from 9.54 percent in the second quarter a

year ago.

In the second quarter, net interest margin increased to 291 basis points (or 2.91 percent of average assets) from 277 basis points in the first quarter, and from 276 basis points in the comparable quarter a year ago. Loan loss provisions increased to 3.68 percent of average assets in the second quarter from 2.02 percent in the first quarter and from 0.38 percent in the second quarter a year ago. The recent increases in loss provisions reflect the increase in noncurrent loans stemming from the housing market downturn and the deterioration of loans originated in the past several years. Loan loss provisions averaged 0.26 percent of average assets between 2001 and 2003 and generally trended lower from the beginning of 2003 through the first half of 2006, reflecting historically low levels of problem assets.

Total fee income, including mortgage loan servicing fee income and other fee income, was 1.56 percent of average assets in the second quarter, up from 1.11 percent in the prior quarter, and from 1.42 percent in the second quarter one year ago. Other noninterest income was a negative 0.19 percent of average assets in the second quarter, down from 0.60 percent in the first quarter and from 0.48 percent in the second quarter a year ago.

Noninterest expense increased to 2.79 percent of average assets in the second quarter from 2.77 percent in the prior quarter, and from
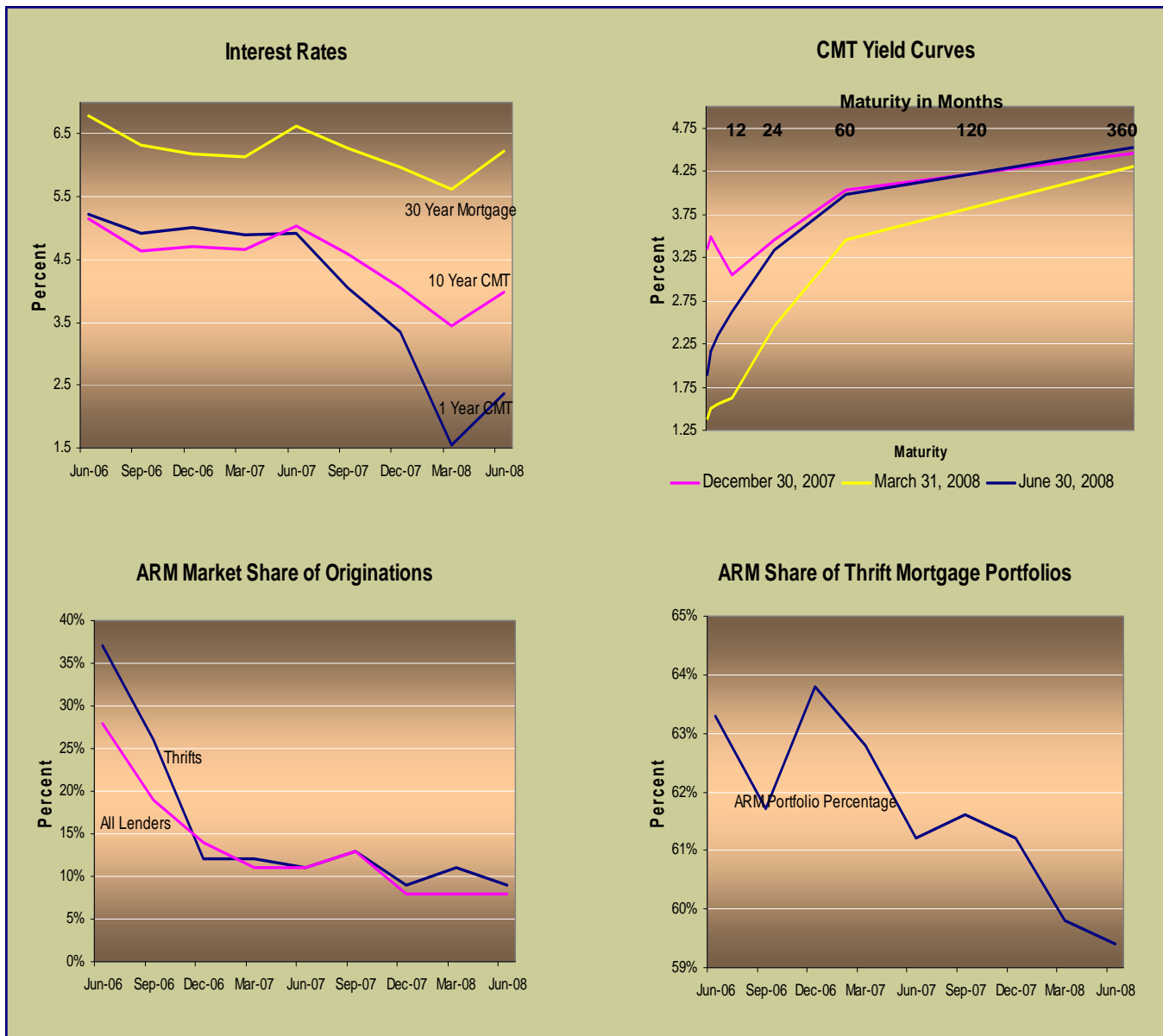
2.72 percent in the second quarter one year ago. General and administrative expense, the largest component of noninterest expense, was 2.68 percent of average assets in the second quarter, up from 2.63 percent in the comparable year ago quarter. Taxes were down 135 basis points over the year to a negative 0.80 percent of average assets in the second quarter, and were down from a negative 0.14 percent in the prior quarter.

Thrifts remain focused on residential mortgage lending, with 49.5 percent of assets invested in 1-4 family mortgage loans at the end of the second quarter, down from 50.9 percent one year ago. Of these 1-4 family mortgage loans, 7.9 percent are home equity lines of credit, up from 7.1 percent one year ago. Holdings of consumer loans decreased to 5.8 percent of assets from 6.1 percent a year ago, and multifamily mortgages increased over the year from 4.2 percent of assets to 4.3 percent at the end of the second quarter. Commercial loans increased to 3.9 percent of assets at the end of the second quarter from 3.8 percent one year ago.

Total thrift industry mortgage originations (which include multifamily and nonresidential mortgages) were $128.3 billion in the second quarter, down 34 percent from $194.6 billion in the second quarter a year ago and down four percent from $133.8 billion in the prior quarter. An estimated nine percent of thrift

Interest Rates and ARM Market Share

Interest Rates

CMT Yield Curves

Maturity in Months

— December 30, 2007   — March 31, 2008   — June 30, 2008

ARM Market Share of Originations

ARM Share of Thrift Mortgage Portfolios

Second Quarter Sees Sensitivity Rise (continued)

(Continued from page 6)
originations were ARMs in the second quarter, down from 11 percent in the prior and comparable year ago quarters.

The volume of mortgage refinancing, as a percentage of total originations, remained strong in the second quarter as borrowers converted adjustable rate mortgages to fixed rate mortgages. Refi-

nancing activity accounted for 41 percent of thrift originations in the second quarter, down from 50 percent in the prior quarter, and from 48 percent in the second quarter a year ago.

Deposits and escrows fell by two percent over the year to $929 billion from $949 billion. As a percentage of total assets, deposits and escrows decreased to 61.5 per-

cent from 63.1 percent one year ago. Federal Home Loan Bank advances were up from 14.3 percent one year ago to 19.7 percent of total assets.

Second-quarter median interest rate sensitivity rose to 139 basis points, up from 110 basis points in the prior quarter. The median pre-shock Net Portfolio Value (NPV) ratio rose in the second quarter by approximately 49 basis

points while the median post-shock ratio declined by two basis points. The number of thrifts with post-shock NPV ratios below 4.0 percent decreased from nine to seven institutions.

The industry's median effective duration of assets increased from 1.55 to 1.80 in the second quarter. The increase in the duration of as-
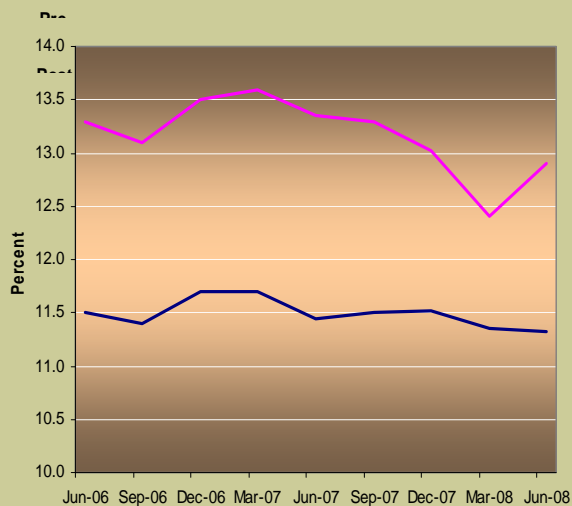
Duration and NPV Sensitivity Measures
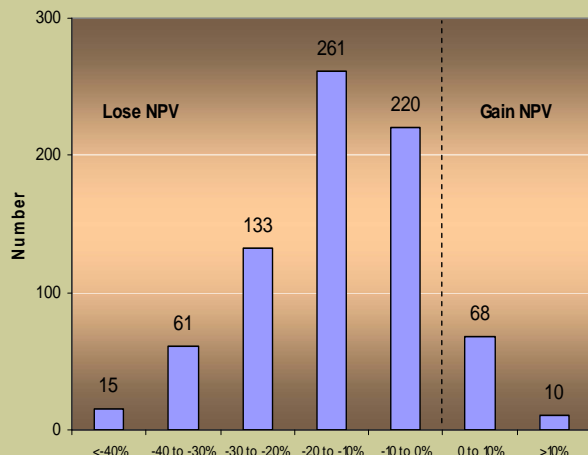
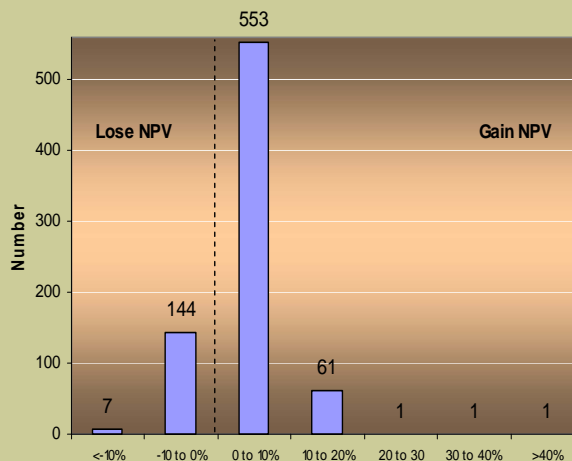### Median Effective Duration Gap
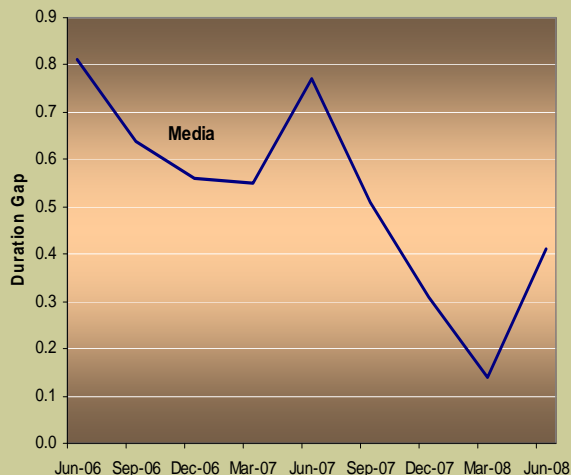
Median Pre- and Post-Shock NPV Ratios

Estimated Change in NPV: +200bp Rate Change

Estimated Change in NPV: -100bp Rate Change

Second Quarter Sees Sensitivity Rise (continued)

(Continued from page 7)
sets was caused by the increase in interest rates, which decreased estimated prepayment speeds. The second quarter saw the industry's median effective duration of liabilities decrease from 1.40 to 1.35. The increase in the effective duration of assets coupled with the decrease in

the duration of liabilities resulted in an increase in the duration gap for the thrift industry in the second quarter from 0.14 to 0.41.

Of the thrifts that submitted Schedule CMR data in the second quarter, the NPV model estimated that about 90 percent would experience a loss of net portfolio value if

rates rose by 200 basis points and approximately 80 percent of thrifts would experience an increase in net portfolio value should rates fall 100 basis points. The NPV model estimated that the thrift industry would lose 12 percent of its net portfolio value if rates rose by 200 basis points in the second quarter, and the indus-
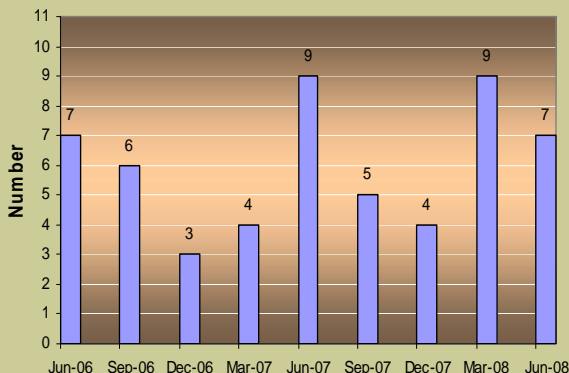
try would gain three percent if rates fell by 100 basis points.

Based on TB 13a guidance for the "S" rating for those institutions that submitted scheduled CMR, 624 thrifts (81.3 percent) initially would be assigned a minimal interest rate risk rating, 112 thrifts (14.6 percent) a moder-

Interest Rate Risk Measures

Thrifts with Post-Shock NPV Ratios Under 4 Percent

**Interest Rate Risk Measures
Industry Aggregates
Last Two Quarters**

	NPV as % of PV of Assets		% Change in NPV	% Change in NPV
	Mar-08	**Jun-08**	**Mar-08**	**Jun-08**
+300	7.97%	8.39%	-19%	-20%
+200	8.68%	9.17%	-11%	-12%
+100	9.21%	9.77%	-4%	-5%
Base	9.54%	10.15%	0%	0%
-100	9.65%	10.35%	2%	3%

**Post-Shock NPV Ratio and Sensitivity Measure Matrix
June 2008**

	Under 100bp	101-200bp	201-400bp	Over 400bp	Total
Over 10%	211	142	122	24	**499**
6% to 10%	65	79	82	6	**232**
4% to 6%	5	5	19	1	**30**
Below 4%	1	0	3	3	**7**
Total	**282**	**226**	**226**	**34**	**768**

Minimal	Moderate	Significant	High

**Post-Shock NPV Ratio and Sensitivity Measure Matrix
March 2008**

	Under 100bp	101-200bp	201-400bp	Over 400bp	Total
Over 10%	246	139	96	7	**488**
6% to 10%	102	90	52	2	**246**
4% to 6%	8	11	6	0	**25**
Below 4%	2	2	3	2	**9**
Total	**358**	**242**	**157**	**11**	**768**

Minimal	Moderate	Significant	High

## Second Quarter Sees Sensitivity Rise (continued)

(Continued from page 8)
ate rating, 25 thrifts (3.3 percent) a significant rating, and 7 thrifts (0.9 percent) a high rating. The number of thrifts with significant or high interest rate slightly increased from 15 in the first quarter to 32 in the second quarter.

Comparative Trends in the Five OTS Regions

Median Sensitivity by OTS Region
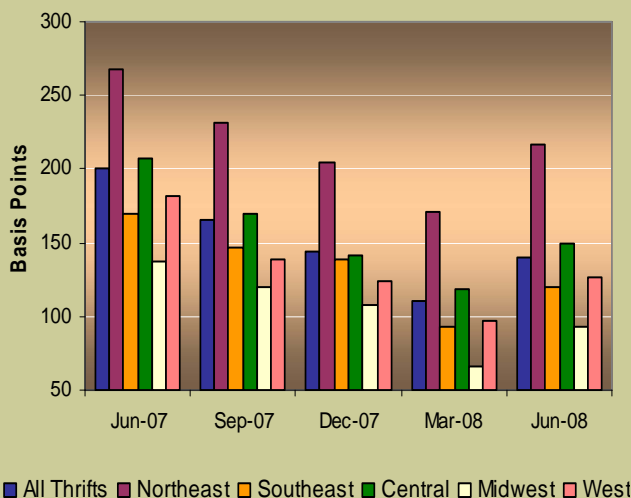
Median Assets Duration by OTS Region
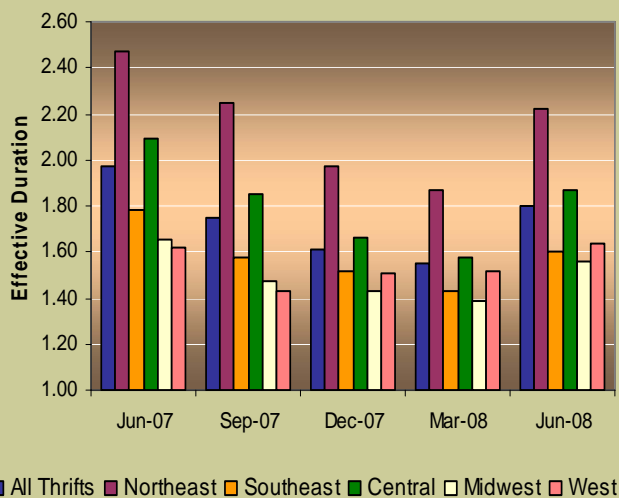
Median Pre-Shock NPV Ratio by OTS Region
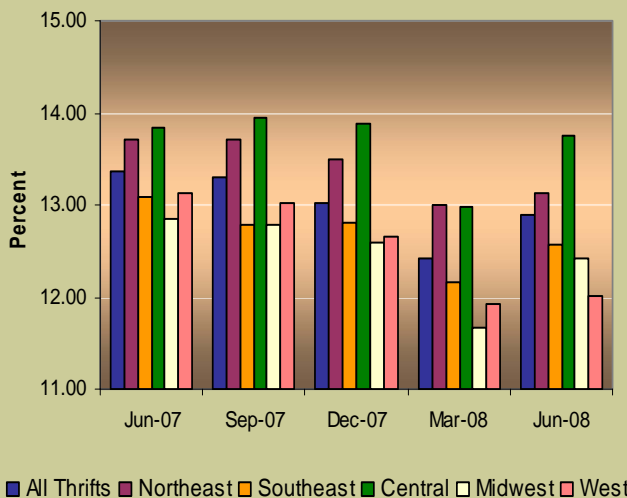
Median Post-Shock NPV Ratio by OTS Region
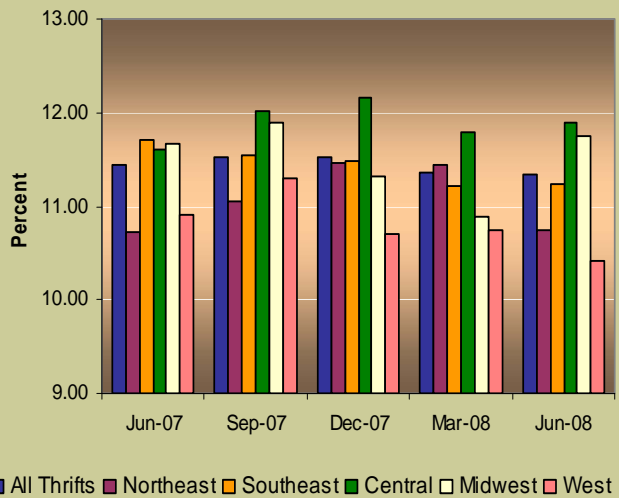
Regional Comparisons

At the end of the second quarter, the Northeast Region had the highest median sensitivity at 217 basis points, while the Midwest Region had the lowest median sensitivity at 93 basis points.

All five regions saw their median sensitivities rise, with the Midwest Region's sensitivity rising the most (46 basis points).

The Central Region had the highest median pre-shock NPV ratio at 13.74 percent. The West Regions had the lowest pre-shock NPV ratio at 12.00.

The Central Region had the highest median post-shock NPV ratio, at 11.90 percent, while the West Re-gion had the lowest, at 10.42 percent. While the overall post-shock median ratio was almost flat with a two basis point decline, the Northeast Region showed a decline of 70 basis points with the Mid-west Region improved 86 basis points.

The Northeast Region had the highest median asset duration, at 2.22, while the Midwest Region had the low-est, at 1.56, at quarter end.

The Southeast Region had the lowest median liabil-ity duration, at 1.21, while the Northeast Region had the highest, at 1.48.■

Appendix A — All Thrifts

Sensitivity Measure Distribution
All Thrifts

Percent of Thrifts

Descriptive Statistics

Median = 139
Mean = 166
Standard Deviation = 121
Skewness = 0.96
Kurtosis = 1.06
Maximum = 768.518
Minimum = 0
Count = 768

Basis Points

Pre-Shock NPV Ratio Distribution
All Thrifts

Percent of Thrifts

Descriptive Statistics
Median = 12.9
Mean = 15.01
Standard Deviation = 9.02
Skewness = 4.93
Kurtosis = 34.07
Maximum = 94.618
Minimum = 2.277
Count = 768

NPV Ratio (Percent)

Post-Shock NPV Distribution
All Thrifts

Percent of Thrifts

Descriptive Statistics
Median = 11.33
Mean = 13.35
Standard Deviation = 9.12
Skewness = 4.99
Kurtosis = 34.86
Maximum = 94.323
Minimum = -0.294
Count = 768

NPV Ratio (Percent)

Asset Duration Distribution
All Thrifts

Percent of Thrifts

Descriptive Statistics
Median = 1.8
Mean = 1.82
Standard Deviation =0.72
Skewness = -0.32
Kurtosis = 3.45
Maximum = 4.042
Minimum = -3.553
Count = 768

Duration

Liabilities Duration Distribution
All Thrifts

Percent of Thrifts

Descriptive Statistics
Median = 1.35
Mean = 1.35
Standard Deviation = 0.41
Skewness = 0.38
Kurtosis = 2.21
Maximum = 3.562
Minimum = 0.032
Count = 768

Duration

Appendix B — Northeast Region

Sensitivity Measure Distribution
Northeast

Percent of Thrifts

Descriptive Statistics
Median = 217
Mean = 222
Standard Deviation = 117
Skewness = 0.6
Kurtosis = 1.53
Maximum = 749.265
Minimum = 9.6
Count = 168

Basis Points

Pre-Shock NPV Ratio Distribution
Northeast

Percent of Thrifts

Descriptive Statistics
Median = 13.13
Mean = 14.38
Standard Deviation = 5.78
Skewness = 1.72
Kurtosis = 4.75
Maximum = 44.232
Minimum = 5.339
Count = 168

NPV Ratio (Percent)

Post-Shock NPV Distribution
Northeast

Percent of Thrifts

Descriptive Statistics
Median = 10.75
Mean = 12.16
Standard Deviation = 6.06
Skewness = 1.44
Kurtosis = 3.37
Maximum = 41.08
Minimum = 0.831
Count = 168

NPV Ratio (Percent)

Asset Duration Distribution
Northeast

Percent of Thrifts

Descriptive Statistics
Median = 2.22
Mean = 2.16
Standard Deviation = 0.65
Skewness = -0.41
Kurtosis = -0.19
Maximum = 3.776
Minimum = 0.284
Count = 168

Duration

Liabilities Duration Distribution
Northeast

Percent of Thrifts

Descriptive Statistics
Median = 1.47
Mean = 1.48
Standard Deviation = 0.42
Skewness = 1
Kurtosis = 4.63
Maximum = 3.562
Minimum = 0.168
Count = 168

Duration

Appendix C — Southeast Region

Sensitivity Measure Distribution
Southeast

Percent of Thrifts

Descriptive Statistics
Median = 120
Mean = 153
Standard Deviation = 120
Skewness = 1.05
Kurtosis = 0.49
Maximum = 515.579
Minimum = 0
Count = 186

Basis Points

Pre-Shock NPV Ratio Distribution
Southeast

Percent of Thrifts

Descriptive Statistics
Median = 12.57
Mean = 14.74
Standard Deviation = 7.66
Skewness = 4.12
Kurtosis = 30.84
Maximum = 81.574
Minimum = 5.079
Count = 186

NPV Ratio (Percent)

Post-Shock NPV Distribution
Southeast

Percent of Thrifts

Descriptive Statistics
Median = 11.25
Mean = 13.22
Standard Deviation = 7.67
Skewness = 4.28
Kurtosis = 32.59
Maximum = 81.026
Minimum = 2.927
Count = 186

NPV Ratio (Percent)

Asset Duration Distribution
Southeast

Percent of Thrifts

Descriptive Statistics
Median = 1.6
Mean = 1.69
Standard Deviation = 0.67
Skewness = 0.52
Kurtosis = -0.22
Maximum = 3.578
Minimum = 0.408
Count = 186

Duration

Liabilities Duration Distribution
Southeast

Percent of Thrifts

Descriptive Statistics
Median = 1.21
Mean = 1.22
Standard Deviation = 0.39
Skewness = 0.4
Kurtosis = 0.28
Maximum = 2.457
Minimum = 0.121
Count = 186

Duration

Appendix D — Central Region

Sensitivity Measure Distribution
Central

Percent of Thrifts

Descriptive Statistics
Median = 150
Mean = 173
Standard Deviation = 122
Skewness = 1.23
Kurtosis = 2.61
Maximum = 768.518
Minimum = 0
Count = 189

Basis Points

Pre-Shock NPV Ratio Distribution
Central

Percent of Thrifts

Descriptive Statistics
Median = 13.75
Mean = 15.59
Standard Deviation = 9.35
Skewness = 5.22
Kurtosis = 37.33
Maximum = 91.043
Minimum = 4.858
Count = 189

NPV Ratio (Percent)

Post-Shock NPV Distribution
Central

Percent of Thrifts

Descriptive Statistics
Median = 11.9
Mean = 13.86
Standard Deviation = 9.45
Skewness = 5.27
Kurtosis = 37.9
Maximum = 90.539
Minimum = -0.294
Count = 189

NPV Ratio (Percent)

Asset Duration Distribution
Central

Percent of Thrifts

Descriptive Statistics
Median = 1.87
Mean = 1.88
Standard Deviation = 0.66
Skewness = 0.23
Kurtosis = 0.54
Maximum = 4.042
Minimum = 0.239
Count = 189

Duration

Liabilities Duration Distribution
Central

Percent of Thrifts

Descriptive Statistics
Median = 1.35
Mean = 1.37
Standard Deviation = 0.4
Skewness = -0.05
Kurtosis = 1.29
Maximum = 2.578
Minimum = 0.056
Count = 189

Duration

Appendix E — Midwest Region

Sensitivity Measure Distribution
Midwest

Percent of Thrifts

Descriptive Statistics

Median = 93
Mean = 123
Standard Deviation = 102
Skewness = 1.15
Kurtosis = 0.75
Maximum = 465.82
Minimum = 0
Count = 160

Basis Points

Pre-Shock NPV Ratio Distribution
Midwest

Percent of Thrifts

Descriptive Statistics

Median = 12.42
Mean = 15.14
Standard Deviation = 11.24
Skewness = 5.24
Kurtosis = 31.83
Maximum = 94.618
Minimum = 2.277
Count = 160

NPV Ratio (Percent)

Post-Shock NPV Distribution
Midwest

Percent of Thrifts

Descriptive Statistics

Median = 11.75
Mean = 13.91
Standard Deviation = 11.23
Skewness = 5.42
Kurtosis = 33.61
Maximum = 94.323
Minimum = 2.277
Count = 160

NPV Ratio (Percent)

Asset Duration Distribution
Midwest

Percent of Thrifts

Descriptive Statistics

Median = 1.56
Mean = 1.61
Standard Deviation = 0.76
Skewness = -1.57
Kurtosis = 12.68
Maximum = 4.024
Minimum = -3.553
Count = 160

Duration

Liabilities Duration Distribution
Midwest

Percent of Thrifts

Descriptive Statistics

Median = 1.36
Mean = 1.35
Standard Deviation = 0.42
Skewness = 0.37
Kurtosis = 3.26
Maximum = 3.082
Minimum = 0.032
Count = 160

Duration

Appendix F — West Region

Sensitivity Measure Distribution
West

Percent of Thrifts

Descriptive Statistics
Median = 126
Mean = 149
Standard Deviation = 122
Skewness = 1.07
Kurtosis = 0.6
Maximum = 490.521
Minimum = 0
Count = 65

Basis Points

Pre-Shock NPV Ratio Distribution
West

Percent of Thrifts

Descriptive Statistics
Median = 12.01
Mean = 15.37
Standard Deviation = 12.06
Skewness = 3.57
Kurtosis = 13.59
Maximum = 75.126
Minimum = 5.449
Count = 65

NPV Ratio (Percent)

Post-Shock NPV Distribution
West

Percent of Thrifts

Descriptive Statistics
Median = 10.42
Mean = 13.88
Standard Deviation = 12.21
Skewness = 3.63
Kurtosis = 13.82
Maximum = 74.334
Minimum = 5.375
Count = 65

NPV Ratio (Percent)

Asset Duration Distribution
West

Percent of Thrifts

Descriptive Statistics
Median = 1.64
Mean = 1.67
Standard Deviation = 0.78
Skewness = 0.41
Kurtosis = 0.2
Maximum = 3.791
Minimum = 0.115
Count = 65

Duration

Liabilities Duration Distribution
West

Percent of Thrifts

Descriptive Statistics
Median = 1.35
Mean = 1.3
Standard Deviation = 0.38
Skewness = -0.18
Kurtosis = 0.22
Maximum = 2.335
Minimum = 0.388
Count = 65

Duration

Glossary

Duration: A first-order approximation of the price sensitivity of a financial instrument to changes in yield. The higher the duration, the greater the instrument's price sensitivity. For example, an asset with a duration of 1.6 would be predicted to appreciate in value by about 1.6 percent for a 1 percent decline in yield.

Effective Duration: The average rate of price change in a financial instrument over a given discrete range from the current market interest rate (usually, +/-100 basis points).

Estimated Change in NPV: The percentage change in base case NPV caused by an interest rate shock.

Kurtosis: A statistical measure of the tendency of data to be distributed toward the tails, or ends, of the distribution. A normal distribution has a kurtosis statistic of three.

NPV Model: Currently measures how five hypothetical changes in interest rates (three successive 100 basis point increases and two successive 100 basis point decreases) affect the estimated market value of a thrift's net worth.

Post-Shock NPV Ratio: Equity-to-assets ratio, following an adverse 200 basis point interest rate shock (assuming a normal interest rate environment), expressed in present value terms (i.e., post-shock NPV divided by post-shock present value of assets). Also referred to as the exposure ratio.

Pre-Shock NPV Ratio: Equity-to-assets expressed in present value terms (i.e., base case NPV divided by base case present value of assets).

Sensitivity Measure: The difference between Pre-shock and Post– shock NPV Ratios (expressed in basis points).

Risk Modeling and Analysis Division

Scott Ciardi
Director
Phone: 202-906-6960
Email: scott.ciardi@ots.treas.gov

Tom Day
Senior Capital Markets Specialist
Phone: 202-906-7933
Email: tom.day@ots.treas.gov

Andrew Carayiannis
Financial Analyst
Phone: 202-906-6919
Email: andrew.carayiannis@ots.treas.gov

Jeff Adams
Capital Markets Specialist
Phone: 202-906-6388
Email: jeff.adams@ots.treas.gov

Tom Wilderman
Capital Markets Specialist
Phone: 202-906-6973
Email: thomas.wilderman@ots.treas.gov

Haranath Chadive
I T Specialist, NPV Model
Phone: 202-906-6898
Email: haranath.chadive@ots.treas.gov

We're on the Web!

www.ots.treas.gov/StatisticalReleases