

## A Simple Approach to ALM Back-Testing?

One of the more controversial ALM topics is the utility and process of back-testing ALM assumptions and results. On occasion, ALM practitioners and bank management may dispute the validity of back testing, while other risk management professionals and bank regulators assert the value of ALM back testing.

Back testing is a method to analyze the robustness of risk modeling and critical assumptions (see OCC 2000-16 “Model Validation”, Vol. 17, No. 4 issue of BALM “Model Validation: Industry and Regulatory Perspectives” and the recent “Model Governance” from the Winter 2005 issue of the FDIC’s Supervisory Insights). The range of back testing methodologies varies from a bank level, or macro focus, to very granular approaches.

This article focuses on a particular macro-approach. One key component of ALM back testing is to test, or validate, the relationship between the change in interest rates and the resultant change in a banks’ financial performance. The purpose of the retroactive analysis is to determine the historic relationship between the banks’ financial performance and the movement of market rates. Instead of using the banks’ current balance sheet to forecast future interest rate sensitivity, one approach is to analyze a banks’ actual performance over the past, as relates to market rates.

This article uses bank-level performance metrics (Table 1) and is an abstract of a more granular approach we suggest banks uses. Our sample bank is a \$5 billion asset community bank. This summary displays market rates and:

- The yield on average earning assets, or Yield;
- The cost of funds to support average earning assets, or COF;
- The net interest margin of average earning assets, or NIM; and
- The return on assets, or ROA.

**Table 1: Analysis of Earnings and Market Rates, 24 quarters, annualized averages**

<u>Category</u>	<u>Dec 00</u>	<u>Dec 01</u>	<u>Dec 02</u>	<u>Dec 03</u>	<u>Dec 04</u>	<u>Dec 05</u>
Yield (TE)	8.63	7.99	6.97	6.13	5.71	6.11
COF	4.39	3.72	2.33	1.64	1.49	2.09
NIM (TE)	4.23	4.27	4.65	4.49	4.22	4.02
ROA	1.24	1.29	1.43	1.19	1.26	1.40
Fed Funds	6.24	3.89	1.67	1.13	1.35	3.21
<u>5 yr UST</u>	<u>6.15</u>	<u>4.58</u>	<u>3.82</u>	<u>2.97</u>	<u>3.43</u>	<u>4.05</u>
Spread	(0.09)	0.69	2.15	1.84	2.08	0.84

*Bank data at [www.fdic2.gov](http://www.fdic2.gov) per UBPR*

*Average Funds & UST rates per H15 at [www.frb.gov](http://www.frb.gov)*

The banks’ performance metrics are compared to two market rates:

- The Fed Funds effective rate, and
- The 5-year U.S. Treasury rate.

Published research usually focuses on the 10-year Treasury rate. In our experience, however, banks assets and liabilities are frequently priced off of the 5-year part of the curve. In addition, we review the impact of the spread between these two market rates as an estimate of curve slope. In essence, this approach is a simplified form of performance attribution.

The banks’ performance is compared to market rates via single-factor, or linear, regression analysis. That is, we assume that the banks’ performance is related to a single factor --- interest rates. Two relevant statistics are displayed (Table 2):

- Correlation and
- Sensitivity (also known as slope or beta).

Correlation measures the tendency for two factors to move together. For the purposes of hedge accounting (i.e. SFAS 133), the correlation between a derivative instrument and the financial product being hedged, a correlation of 80% is required for the hedge to be “effective”. When there is a correlation of around 80% between a market rate and bank performance metric, we will suggest that it is a good fit.

**Table 2: Statistical Analysis of Earnings and Market Rates**

Category	Correlation Matrix:			Sensitivity Matrix:		
	Fed Funds	5 yr UST	Spread	Fed Funds	5 yr UST	Spread
Yield (TE)	<b>85%</b>	88%	9%	<b>50%</b>	93%	44%
COF	92%	93%	2%	55%	99%	12%
NIM (TE)	-45%	-33%	22%	-5%	-7%	31%
ROA	-9%	-4%	5%	<b>0%</b>	0%	3%
BOLI Yield	66%	73%	12%	13%	26%	14%

The Banks’ yield and cost of funds correlation to market rates have been about 85% to 95%, respectively. This suggests that the Banks’ the margin components are well correlated with Fed Funds and the 5-year U.S. Treasury rate.

Sensitivity measures how sensitive the change in one factor is to the change in another factor. For example, the historic sensitivity of the Yield to the Fed Funds rate is 50%. This means that, over the past six years, a 100 basis point increase in Fed Funds has resulted in a 50 basis point increase in the asset yield. The liability cost sensitivity is 55%; resulting a net “liability sensitive” position of -5%. This means that for a 100 basis point increase in the 5 yr. UST rate, the Net Interest Margin is estimated to decrease 5 bps.

This is consistent with the banks’ ALM strategy. They target assets with a slightly longer duration than liabilities to benefit, over time, from a positively sloped curve. Further, this historic analysis is consistent with their projected earnings sensitivity for yield curve shifts, including slope changes. Note that the banks’ ROA sensitivity is 0%, meaning that it is unrelated to the level of rates (albeit with a statistically insignificant R-squared).

Finally, note that the interest level measures for the yield, cost, and margin are relatively strong, statistically significant at the .9 level (stats not displayed), and consistent with their strategy and pro forma ALM analysis. The slope measures are less strong and less statistically significant. This result is consistent with the typical performance attribution results, where interest rate level measures are stronger and more meaningful than slope measures.

This analysis, while relatively simple (the full analysis is more granular and rigorous), provides the ALM team, management, the board, and regulators some additional insight into the banks’ ALM profile.

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