A Review of Retail Deposit Pricing in the United States: Before and After the Financial Meltdown

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Introduction

The extended period of low and (effectively) floored bank deposit rates prevalent during and since the Great Recession has raised concerns about bank readiness to effectively manage the rate-setting process when monetary policy reverts to a more market-oriented focus and rates begin to rise.

We examine and present evidence from actual rate histories as to whether deposit management has become less rigorous and systematic in the post-recession, low-rate world. We employ a rate model incorporating partial adjustment and asymmetrical responses to evaluate rates in national, regional and local markets.

We first examine the pre-recession period and document a robust and durable pattern of **deposit rate structures** incorporating consistent approaches to pricing, tiering, bounding and cross-product constraints.

We then examine the recession and post-recession period for evidence of continuity of the rate structures and, by implication, the processes that determined them. We conclude that, although monetary policy has driven all rates lower and forced a rate convergence among product tiers, the pre-existing structural relationships remain both evident and robust with both the core deposit and the CD product groups.

Market Rate Histories

We begin with an examination of deposit driver rates and present In Figure 1 below a graph the16+ year rate histories for 1-month LIBOR, 12-month LIBOR and 5-year Swap rates. We select 1-Month LIBOR because it is commonly used by bank liability pricing committees[1] to price core deposits. 12-month LIBOR and the 5-year Swap rates are most frequently applied to price 1-year and 5-year CDs, respectively[2].

[1] We define core deposits as checking, interest checking, savings, and money market accounts.
[2] We use the Swap rates from the Fed's H15 report to provide the longer-term indicative market rates.

Fig. 1
Selected LIBOR and Swap Rates

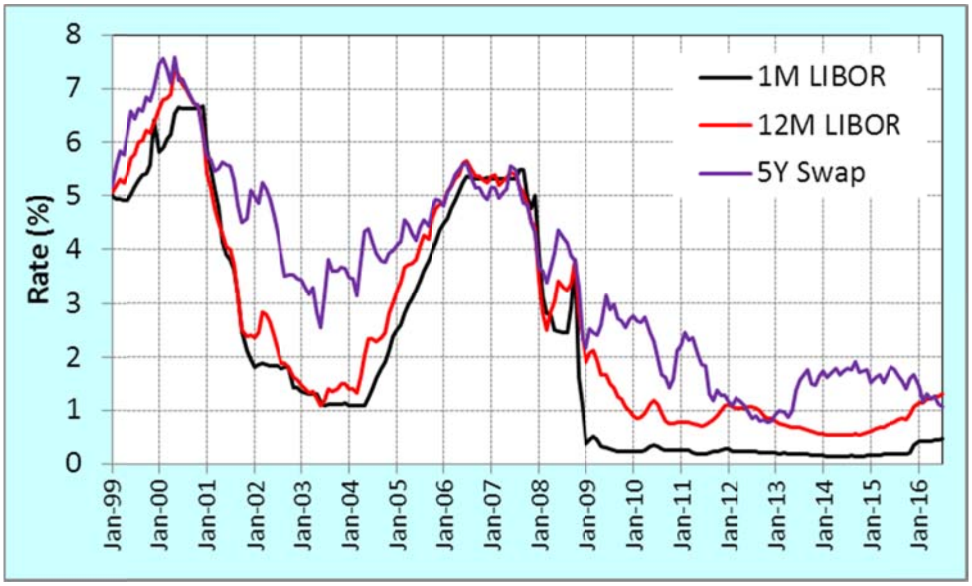


Table 1
Average Monthly Market Rates Jan 2009 – Nov 2015

Rate	Average
1M LIBOR	0.23
3M LIBOR	0.37
12M LIBOR	0.91
3Y Swap	1.12
5Y Swap	1.76

The data depict two significant rate cycles prior to 2008, followed by a rapid secular decline induced by monetary policy beginning in late 2008, with only a single rise following a 25 bp increase in the Fed Funds rate in December 2015.

In the post-recession period, this remarkably stable and extended rate environment, there was little reason for core deposit rates to reprice and, absent a policy of induced negative rates, no place for rates to go. Short term LIBOR and, consequently core deposit rates were remarkably stable.

CD rates are tied to longer-duration driver rates that match the maturity yield of the products and market expectations of future rate increases. As a consequence, these rates were higher and showed greater volatility. As indicated in Table 1, average yields on three LIBOR maturities and a 5 year Swap rate.

While these histories are well-known to the readers of BALM, our purpose is to demonstrate that, even with short-term rates approaching zero and the relatively flat yield curve, the data allow us to discriminate pricing behavior and confirm our finding of stable rate pricing structures across two broadly different rate environments.

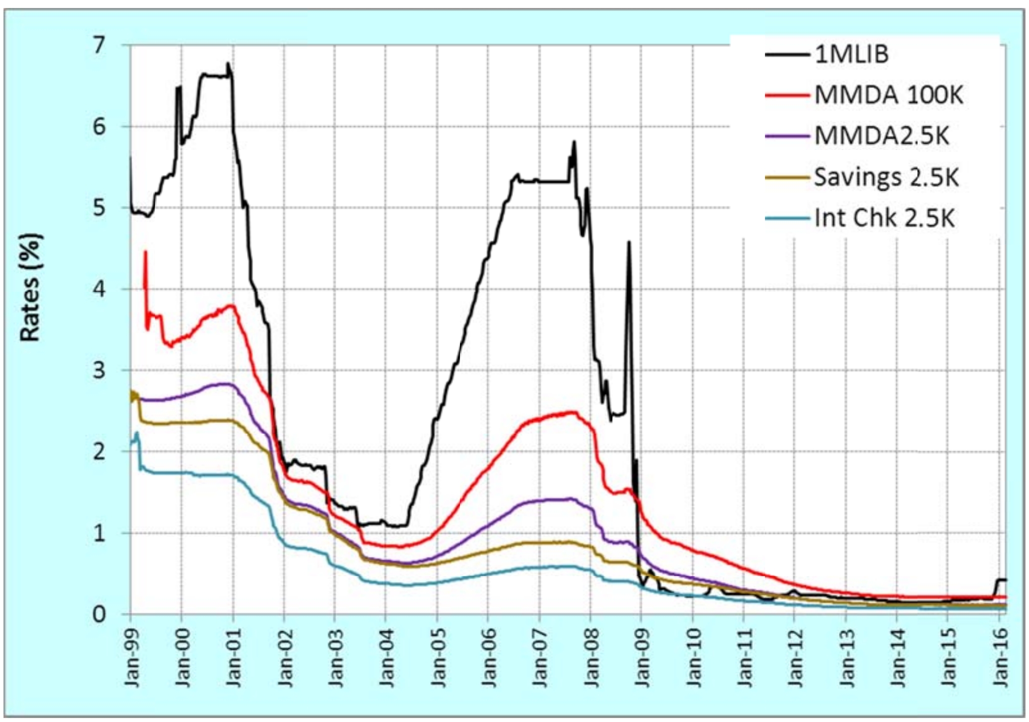
Retail[3] Core Deposit and CD Rates before and After the Financial Collapse

We first examined rates for core deposits at the dominant[4] $2.5K tier. In Figure 2, following, we plot the rate histories for that tier of MMDA, Savings and Interest Checking products, along with MMDA in the $100K tier, against 1-month LIBOR. In Table 2 we tabulate the average rates, by product. We observe a persistent structure of relationships among these rates:

- On average, the savings rate is above the Interest checking rate
- Lower balance money market rates are above the savings rates
- High tier money market rates are above the low tier money market rates

A close examination of the average rates (table 2) reveals that this pattern was compressed in the post-recesion period, but maintained on average throughout the sixteen years.

Figure 2
Selected Retail Core Deposit Rates



Note: Data are weekly extracts from the ALCO Partners database

3 We focus on retail deposit rates as the commercial deposit rate histories show greater variance than the patterns discussed below.

4 We chose this tier because we had the most observations across the core deposit products. We chose the $10K tier for CDs for a similar reason.

Table 2
Average Retail Core Deposit Product Rates
January 2009 – November 2015

Product	Pricing Tier	Average
Interest Checking	$2.5K	0.14
Savings	$2.5K	0.22
Money Market	$2.5K	0.25
Money Market	$100K	0.44

Next, we examined CD rates for a representative $10K pricing tier, plotting each maturity against its relative index. Results are show in the four panels in Figure 3.

As was the case in core deposits, we observe a persistent structure of relationships, determined principally by maturity, among these rates. Further, these relationships were, although more readily discernible period preceding the Great Recession, nonetheless present and robust in the period since and, therefore, throughout the period we examined.

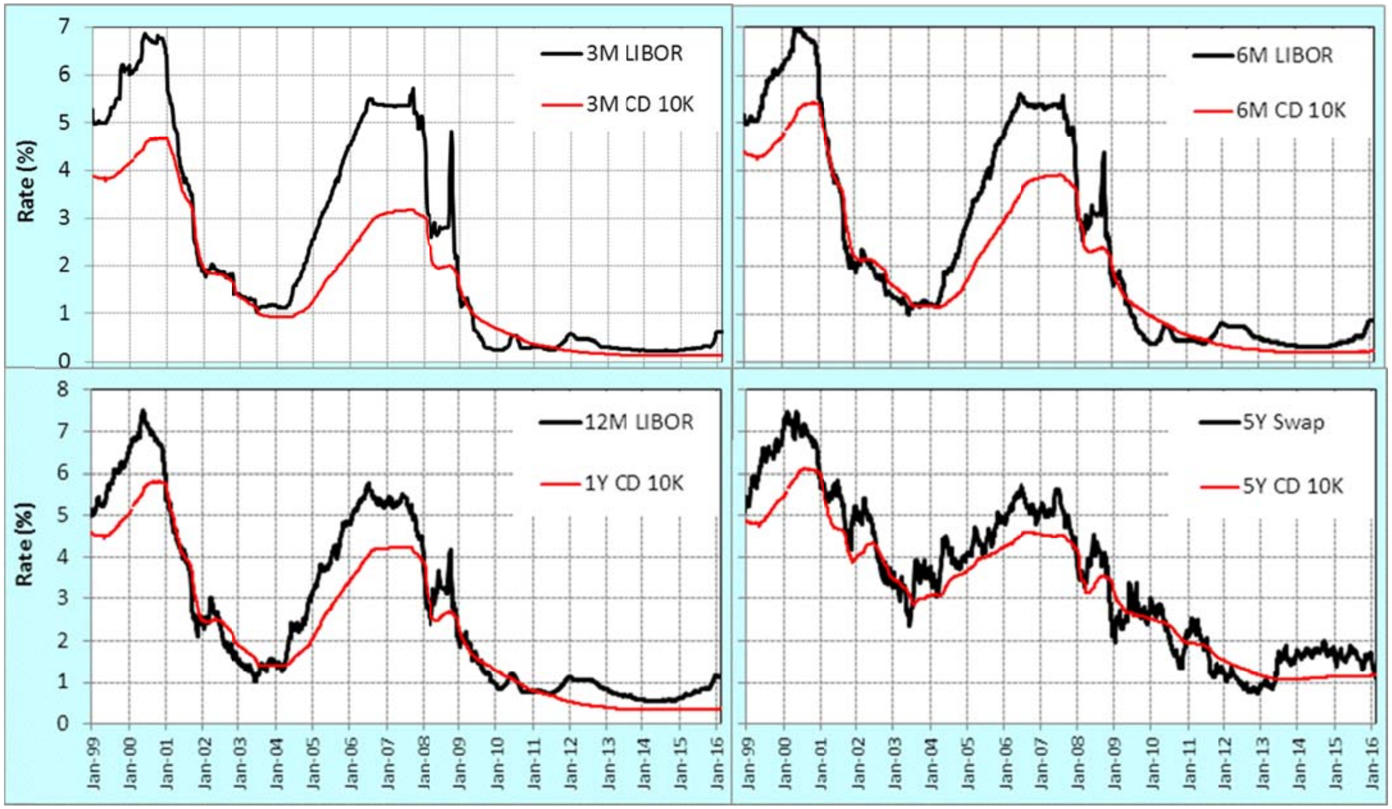
Preliminary Observations on Retail Deposit Pricing Histories

First, the relationships among the core deposit rates are robust over a very long historical period. As amplified above, tier pricing and cross-pricing constraints have persisted over the entire period and across all geographies.

Second, the well-documented asymmetric pricing responses of deposit rates to market rates is confirmed. Increases in deposit rates lag market rates in an “up” market and are adjusted more quickly in a “down” market.

Finally, liability pricing committees respond to short-term volatility by “smoothing” the rate-settings on CD rates. This effect is most apparent in the pricing of 5-year CDs, as shown in Figure 3.

Figure 3
Selected CD Rates



Note: Data are weekly extracts from the ALCO Partners database

Partial Adjustment Models and Their Application to Deposit Rates

Partial adjustment models are widely used in econometric estimation of time series data.[5] They are frequently used to explain the evolution of a dependent variable that depends on an independent exogenous variable (in this case, the market rate) in the long run, but adjusts to some equilibrium relation only with a lag; hence, the name "partial adjustment." [6]

We employed the model in Box A, using weekly data from January 1999 to December 2015[7] to describe all of the rates above and to illustrate our principle observations and conclusions regarding the presence and durability of rate structures of both core deposits and CDs.

We then back-tested the estimation of deposit rates against the evolution of rates from September 2008 through December 2015. Table 3, below, summarizes our estimates and results.

Box A

Partial Response Deposit Rate Model

As an approximation, deposit rates can be simulated using a four factor "partial response" model, which is summarized by two equations:

Target Rate Equation: $DR^*(t) = S + P * MR(t), \quad DR^*(t) \geq 0$

Actual Deposit Rate: $DR(t) = MAX\{DR(t-1) + \lambda (d)* [DR^*(t) - DR(t-1)]\}$

Where,

MR(t) = the market interest rate in week t that motivates the change in the deposit rate which is assumed to be the 1 month Libor rate for core deposits and matched maturity for CDs.

DR*(t) = theoretical "target" or equilibrium deposit rate in week t should market rates evolve to a specific level and remain there

S = spread coefficient in the target rate equation

P = proportionality coefficient in the target rate equation

λ(d) = adjustment speed coefficient that is allowed to vary depending on whether rates are rising or falling

Given a sufficient time series of product rates, the above equations can be estimated in EXCEL using the SOLVER.[8]

[5] For example, Peter Kennedy, A Guide to Econometrics (2003)

[6] For example, Hawkins, Ray and Arnold, Michael "Relaxation Processes in Administered Rate Pricing" Physics Review E (September 2000).

[7] The models were estimated using data through August 2008 and simulated thereafter using a simulated lagged dependent variable for Sep '08 – Dec '15.

[8] S and P were first estimated using the EXCEL "LINEST" function.

Table 3
Partial Adjustment Model Estimates

Product	Variable				R^2 to Aug'08	MAD* (Sep'08-Dec'15)
	S	P	λ(up)	λ(down)		
Interest Checking	-0.52	0.29	0.0016	0.0094	0.9978	0.04
Savings	-0.72	0.42	0.0012	0.0088	0.9984	0.06
MMDA 2.5K	-0.64	0.50	0.0052	0.0119	0.9998	0.08
MMDA 100K	0.10	0.51	0.0222	0.0466	0.9975	0.15
3M CD	-0.15	0.70	0.0235	0.0423	0.9997	0.15
6M CD	-0.04	0.79	0.0338	0.0517	0.9997	0.14
1Y CD	0.08	0.81	0.0433	0.0586	0.9998	0.22
5Y CD	0.22	0.82	0.0413	0.0568	0.9994	0.21

* MAD is the mean absolute deviation for the September 2008-December 2015 period, using the forecast lagged dependent variable in the out of sample simulation.

The high R^2 values reported in Table 3 are indicative of how well the model fit the data. Asymmetric pricing adjustments are also confirmed in the data, but their contribution to explaining (reducing) the error is limited by the high correlations between current and lagged-dependent variables. We report them, nonetheless, because they capture the observed "asymmetric" behavior of liability pricing committees in responding more quickly to downward movements in market rates than to upward movements

Our most interesting finding relates to the ex-post forecast performance summarized as "MAD" – the mean absolute deviation in the back-test. Our expectation was that error would be greater in the simulation period, principally because the equations were estimated using data with higher and more widely dispersed rates, as well as because the simulations did not incorporate any factor capturing cross-product constraints.

In figures 4 and 5, below, we graph our estimations against actual results for core deposits, and CDs, respectively.

Conclusions

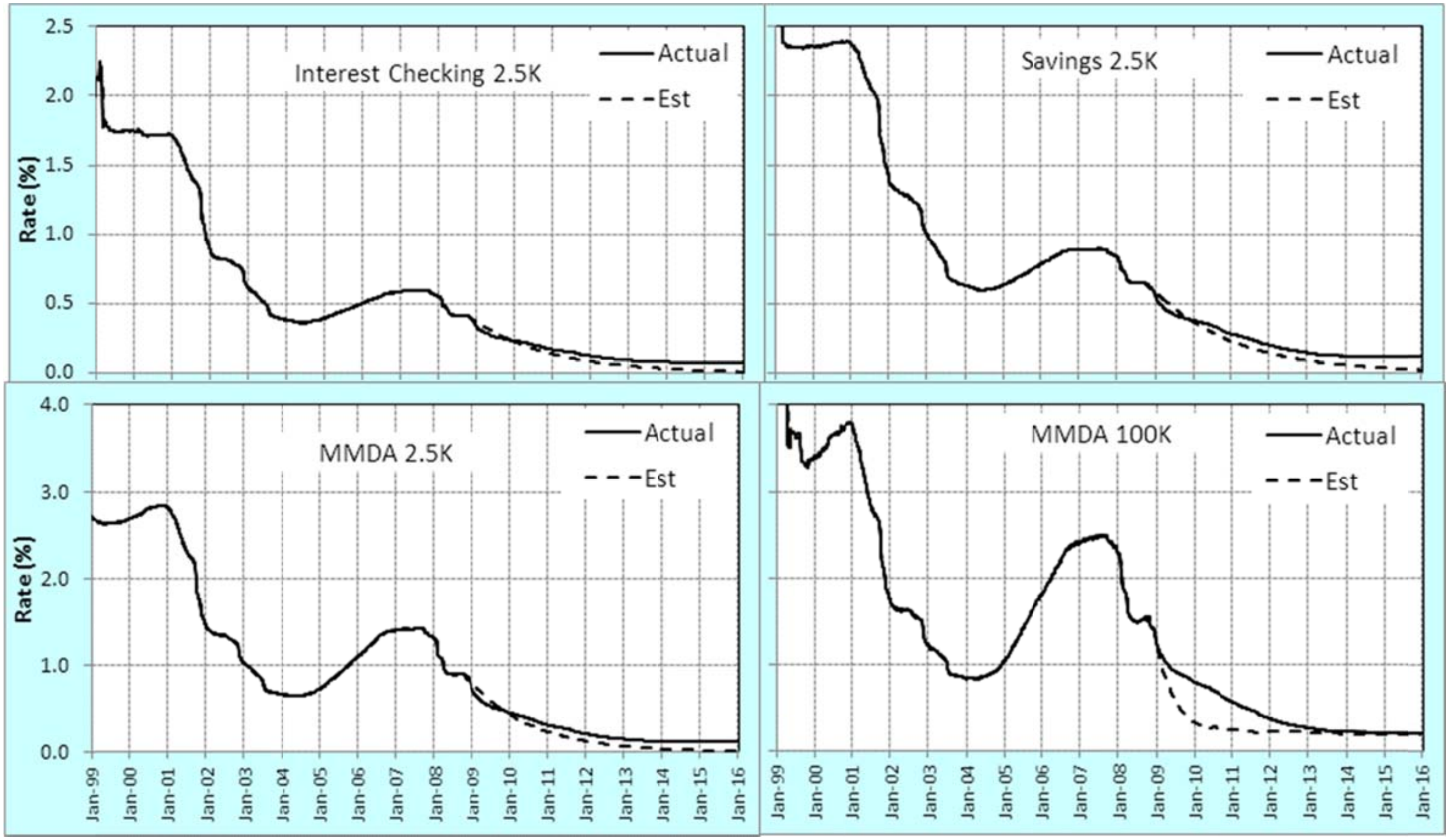
Further tests indicate the importance of the zero bound constraint embedded in the target rate equation of the partial adjustment model used in this analysis. Absent that constraint, core deposit rates would become negative, a finding not true of CD rates.

We also note that actual core deposit rates were consistently higher (by small margins) than simulated rates. The exception was the rates for the highest tier of money market accounts. In the two year period Feb 2009- Feb 2011 this deposit rate was 37 bp higher than was predicted by the model.

CD pricing generated a similar result, with the model simulating rates lower than actual. This effect dissipated for shorter term CDs and reversed for longer maturities.

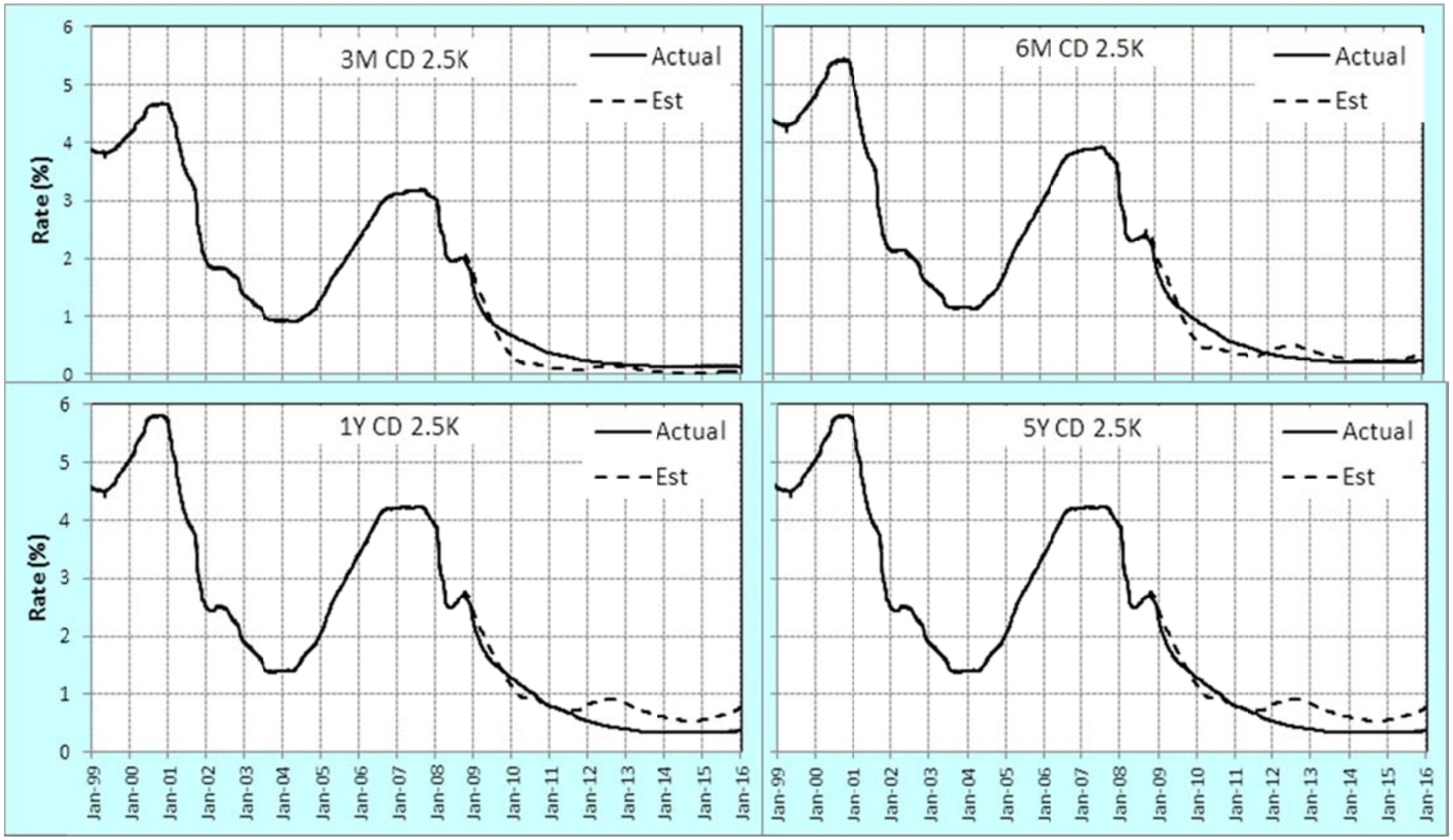
Finally, we editorialize with a lament that data retention policies in many banks cause them to forego a growing list of potential benefits to be gleaned from their own data.

Figure 4
Simulated Retail Core Deposit Rates



Note: the estimated rates are so close to the actual rates between Jan '99 and Aug '08, that the differences aren't visible in these graphs.

Figure 5
Simulated CD Rates



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