

Beware of Low Funding Rates with Embedded Options

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With the rate rally the financial markets have experienced in 2019, even amidst a steadily churning US economy, many financial institutions are asking whether to lock in low borrowing costs for their balance sheets. We have recently received inquiries from clients to evaluate Federal Home Loan Bank (FHLB) callable advances as part of their overall funding strategies. While funding structures with embedded options are not new, and can appear enticing with their seemingly low rates, it is critical to carefully evaluate callable structures in a risk-adjusted framework and understand what being short optionality means for the institution.

Options Exercised, When You Don't Want Them to Be

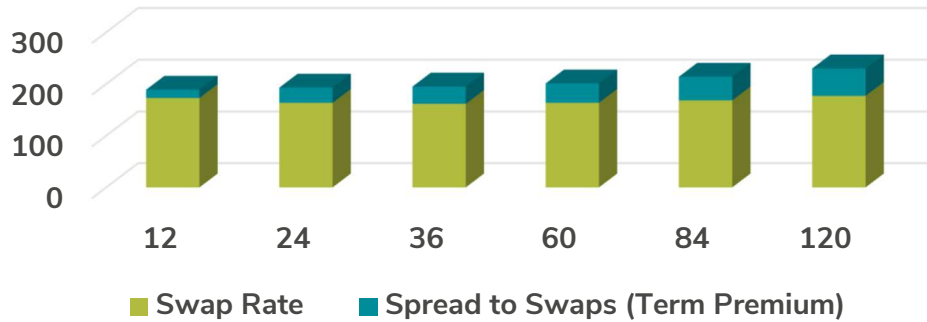
Financial institutions have historically been short optionality to their borrowers via the most American product there is, the 30-year mortgage. In that loan structure, the borrower has the right to prepay her mortgage ahead of schedule, most often doing so by refinancing when current market rates dip below the rate paid by the borrower. If rates fall, however, the lending institution may find itself sitting on a pile of cash from refinanced mortgages and forced to lend out at lower rates than what the recently prepaid mortgages were paying. If rates rise, on the other hand, the mortgage borrower would have no incentive to refinance and the lending institution would find its money tied up in a loan paying lower than the market. This is what being short optionality means for financial institutions. Lenders are only willing to take on this risk by being fairly compensated in terms of option cost. This is the critical point – evaluating optionality requires looking through a risk-adjusted framework and employing an Option-Adjusted Spread (OAS) financial model in order to separate the various types of risks taken on by the lender, including the prepayment risk.

Being short the option is identical whether the financial institution is making a mortgage loan or taking on an FHLB callable borrowing – in both scenarios the institution has sold optionality to the other party. In the case of a callable borrowing, being short optionality means that when rates rise and it would be advantageous for the institution to maintain low-cost funding, the FHLB will call the borrowing and leave the institution looking for ways to finance itself, albeit at now higher costs. When rates fall and the institution would prefer to have its borrowing costs follow the market, the callable advance extends and the institution will be stuck paying higher-than-market borrowing costs for longer. In order to properly understand the callable advance structure faced by the financial institution, we must examine each of its components individually.

Breaking Down Each Component

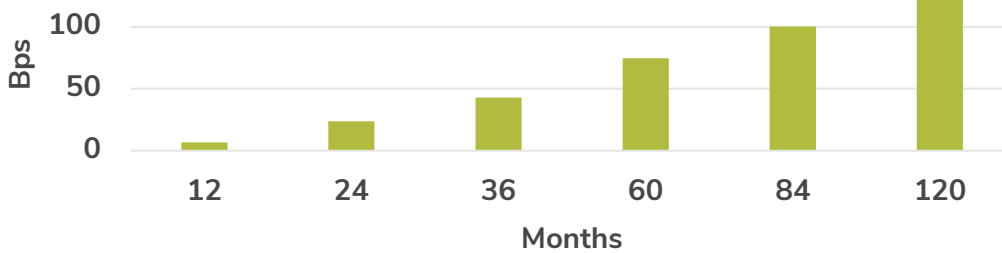
The three components of an FHLB callable advance are the duration-matched cost of funds, a spread over swaps, or term premium, charged by the FHLB, and the option cost. It should not be a surprise that the FHLB advance will cost the financial institution more than funding itself at a zero premium to swap rates, whether the advance is callable or not. The FHLBs are in the lending business after all and charging a premium over Swaps when lending is one of the ways they make money. It is important to note that the premium increases with the tenor of the advance (Exhibit 1).

Exhibit1: Topeka FHLB Term Advance Rates



The third component of the callable advance structure is the option cost and having a firm grasp on option value dynamics is critical. This is where institutions turn to an OAS-model which allows them to value embedded optionality in various instruments. Without getting too deep into the weeds, a few simple concepts exist. The longer the timeframe over which the option can be exercised, the more valuable that option is, all else held equal. The logic there is fairly straightforward: a lot more can happen in a long timeframe than in a short one, so there is a higher probability of an option going “in the money,” or becoming exercisable to the option holder’s advantage, when the option is outstanding for longer. This is known as the option’s theta, or time decay. Exhibit 2 shows how option cost increases with tenor of callable advances.

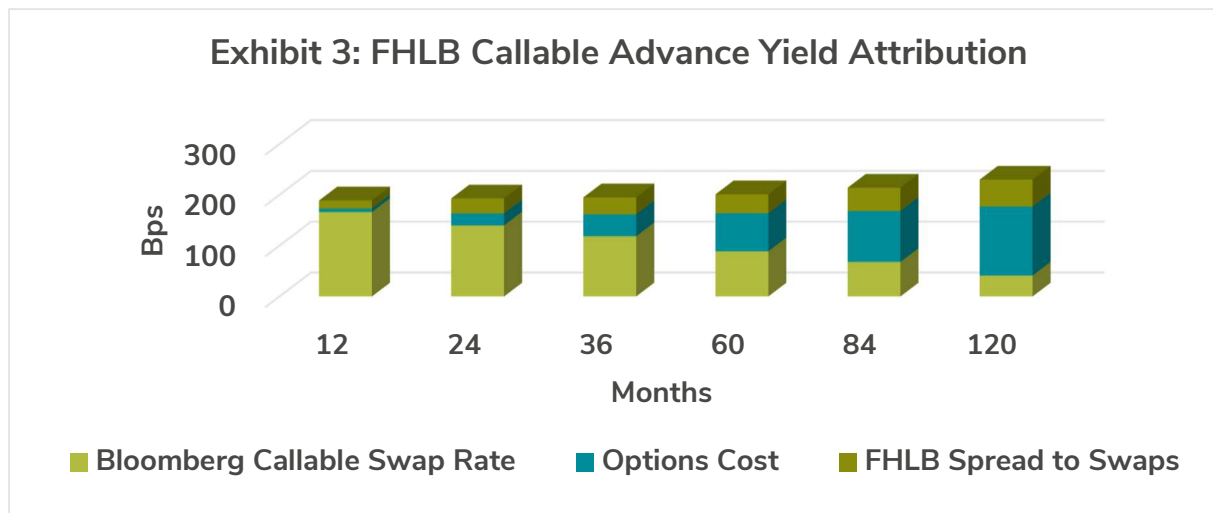
Exhibit 2: Option Cost by Callable Advance Tenor



The other relationship is captured by the option’s vega, or price sensitivity to changes in volatility of the underlying asset. The higher the volatility, the higher the option’s value, all else held equal. The logic is straightforward as well: because volatility captures the expected dispersion of possible outcomes of the asset’s value, or interest-rate levels in the case of interest-rate options, the greater the dispersion, the higher the probability of an option going “in the money” for the benefit of the option’s holder. Volatility levels used in calculating option cost in an OAS-model is usually informed by implied volatility observed in the market, but it can be overridden to custom levels per an investor’s own views.

When putting all the components together, one can see that for longer term callable advances, the option cost makes up the greatest component of the yield structure (Exhibit 3). For the financial institution looking to take out a callable advance, the borrowing rate paid is the sum of the FHLB’s cost

of funds, or the swap rate, plus the spread, or term premium, charged by the FHLB to engage in the transaction. The borrower does not see the option cost in the rate paid, which is why a 10-year callable advance by FHLB Atlanta at 0.80% can seem so attractive, but she is short a great amount of optionality, approximately 140 basis points, and long the corresponding contraction/extension risk.



Being long extension/contraction risk means, as mentioned earlier, that the financial institution that has taken out the borrowing will see it most likely disappear when rates rise substantially and will be stuck with the borrowing for much longer when rates fall substantially. Exhibit 4 displays expected average life and effective duration profiles of the aforementioned callable advance correspondent with 10 basis point interest rate shocks. In the base case, meaning in the current interest rate environment including forward rate expectations, the borrowing is expected to last for a little less than a year. If rates rise by 50 basis points, the expected average life plummets to 2.4 months as the FHLB is expected to call the borrowing at the next quarterly call date and re-lend at higher rates. If rates fall by 50 basis points, the advance's expected average life increases to 2.8 years.

Exhibit 4:

Level Shift (bps)	Option Cost (bps)	Exp Avg Life (yrs)	Eff Duration (%)
-50	111	2.8	4.38
-40	117	2.5	3.92
-30	122	2.3	3.46
-20	129	1.7	2.90
-10	136	1.5	2.37
Base	144	0.9	1.80
10	86	0.7	1.33
20	37	0.4	0.88
30	14	0.3	0.60
40	3	0.2	0.36
50	0	0.2	0.26

The Importance of OAS-Model Analytics

Given the complexity of the callable advance structure, such funding may not be warranted for an institution without access to an OAS-model and timely analytics. Furthermore, given the short expected average life of the advance, there are not many duration-matched asset choices where the institution can deploy that funding. One area where the institution can find duration-matched positive spread is term repo, or repurchase agreements with broker-dealers, where the institution can lend on a collateralized short-term basis. Because the FHLB can call the borrowing every quarter, it may be prudent to put on a 3-month repo where the rate is currently 1-month Libor plus a 17 basis point spread for a total of 1.75% and a spread over the 0.80% callable advance rate of 0.95%. However, should the repo rate fall below 0.80%, the institution would be stuck losing money on the trade since the FHLB advance will have extended significantly given lower rates. Exhibit 5 displays the payoff structure of the trade for different interest rate shifts:

Exhibit 5:

Level Shift (bps)	Advance Cost	3M Repo Yield	Profit	Exp Avg Life (yrs)
-150	0.80%	0.25%	-0.55%	5.2
-120	0.80%	0.55%	-0.25%	4.7
-90	0.80%	0.85%	0.05%	4.0
-60	0.80%	1.15%	0.35%	3.2
-30	0.80%	1.45%	0.65%	2.3
Base	0.80%	1.75%	0.95%	0.9
30	0.80%	2.05%	1.25%	0.3
60	0.80%	2.35%	1.55%	0.2

The trade can earn substantial positive spread as long as rates remain fairly steady. If rates begin to trend higher, the trade will simply go away. The financial institution will only begin to see losses on the trade if rates fall around 100bps.

Interested in Discussing Your Financial Institution's Strategy & Options? The experts at ALM First are just a call or click away. Contact your strategic advisor directly or reach out to us at info@almfirst.com.