FHLB Chicago
Federal Home Loan Bank of Chicago

FHLBC Solutions

Residential Lending Strategies: Funding Mortgages

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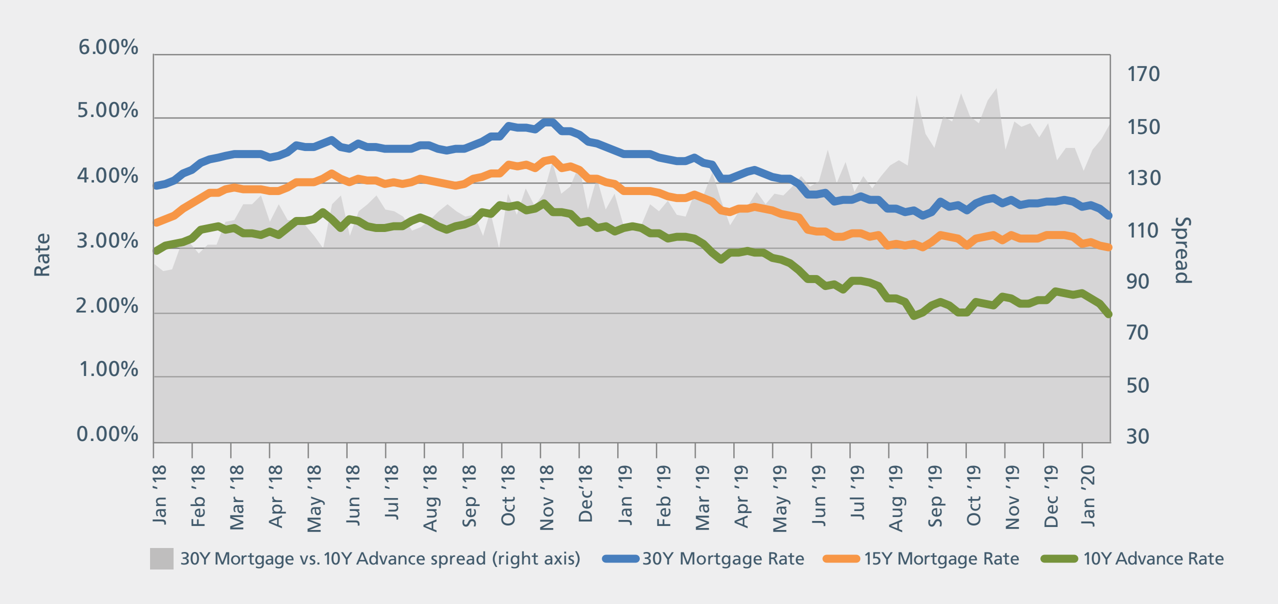
Overview

Thirty and fifteen year mortgage rates started dropping in 2019, according to Freddie Mac data. The Federal Home Loan Bank of Chicago's (FHLBank Chicago's) 10-year advance rate has fallen even more, and thus, the spread between the two has risen (see Figure 1). With this increased spread, it is a great time for members to evaluate holding mortgages funded with FHLBank Chicago advances.

Figure 1: 30Y and 15Y Mortgage Rate vs. 10Y Advance Rate



Source: Freddie Mac and FHLBank Chicago

In this paper, we will examine strategies for hedging both a 15-year and a 30-year mortgage portfolio with advances. Please note that our summaries on net interest margin (NIM) use forward rates in all scenarios, including the base case.
All rates are as of February 5, 2020.

15-Year Mortgage Example

In this example, shown in Table 1 and 2, the portfolio consists of 15-year mortgage loans pooled together at a rate of 3% and reduced by 13 basis points for servicing costs. The average loan size ranges from $250,000 to $350,000. The funding solution includes a ladder of fixed rate advances, as well as some deposits to fill the gap. The deposits are assumed to have an average rate of 1.08%, based on 1% cost of funds adjusted by a forward 1-month LIBOR, a beta of 0.6, and a lag of 10 basis points per month in each rate shock scenario.

Table 1: Mortgage Loan Portfolio Detail – 15Y

Transaction Size	$10,000,000
Average Life	3.5 years
Portfolio Yield	3.00%
Servicing Cost	0.13%
Net Portfolio Yield	**2.87%**

Table 2: Funding Solution – 15Y

Description	Percentage	Funding	Rate	Duration (years)
1Y Fixed	16%	$1,600,000	1.74%	1.0
2Y Fixed	16%	$1,600,000	1.65%	2.0
3Y Fixed	16%	$1,600,000	1.64%	3.0
4Y Fixed	11%	$1,100,000	1.67%	4.0
5Y Fixed	9%	$900,000	1.69%	5.0
6Y Fixed	7%	$700,000	1.82%	6.0
Deposits	25%	$2,500,000	1.09%	5.0
Total/Avg.	**100%**	**$10,000,000**	**1.54%**	**3.5**

The average life of the loans matches the weighted average maturity duration of the funding. With this strategy, an FHLBank Chicago member could earn an estimated starting NIM of 133 basis points.

Table 3: NIM and Net Interest Income (NII) Instant Rate Shocks – 15Y

Rate Shocks:	-100	0	100
Starting Avg. NIM	1.33%	1.33%	1.33%
1Y Avg. NII	$108,062	$122,082	$124,731
1Y Avg. NIM	1.26%	1.34%	1.30%
3Y Avg. NII	$179,962	$293,208	$344,891
3Y Avg. NIM	0.95%	1.38%	1.34%

Figure 2: Average NIM Instant Rate Shock Chart – 15Y

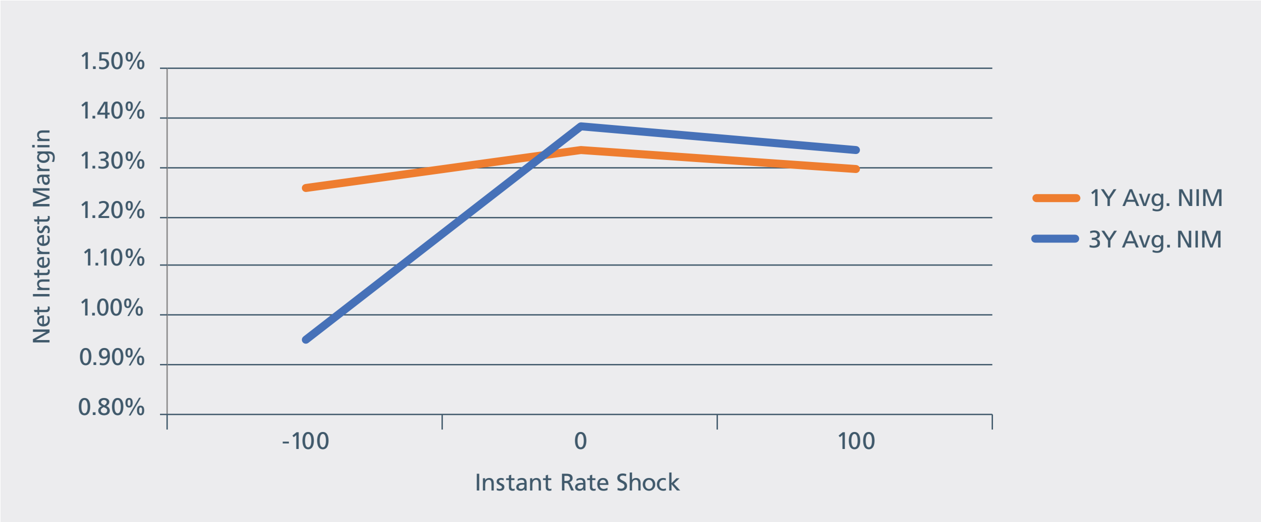


Table 4: Option-Adjusted Duration (years) – 15Y

	Instant Rate Shock		
	-100	0	100
Loan Portfolio	1.88	3.20	4.68
Advance Funding	2.95	2.91	2.87
Net	**-1.07**	**0.29**	**1.81**

As described in Figure 2 and Tables 3 and 4, an FHLBank Chicago member could earn as much as 138 basis points in NIM over a 3-year horizon, assuming rates remain unchanged. Contraction risk could cause NIM compression in scenarios where interest rates fall on the horizon as prepayments of the loans increase. Table 4 shows that the option-adjusted duration of the loan portfolio would fall to 1.88 years, while the advance funding would be 2.95 years. In this scenario, new loans adjusted to a lower yield are assumed to replace the paid-down balance up to the excess advance balance.

Leverage may change capital, asset, equity, and other ratios, such as return on average equity (ROAE), return on average assets (ROAA), and return on risk-based capital. Table 5 displays the impact on the balance sheet after the mortgage portfolio is added. FHLBank Chicago members had an average of $488 million in total assets as of Q3 2019, excluding non-depository institutions and the top five largest banks by asset size. The $10 million portfolio strategy proposed in this paper represents only 2% of those average assets. Yet, it can provide significant value to your institution.

Table 5: Ratios – 15Y Example

Metrics	Q3 2019 FHLBank Chicago Members*	1 Year Later			3 Years Later		
		-100	0	+100	-100	0	+100
NII AND NIM							
Annualized Interest Income (000s)	$22,789	$23,038	$23,058	$23,072	$22,957	$22,999	$23,044
Annualized Interest Expense (000s)	($5,303)	($5,443)	($5,449)	($5,461)	($5,411)	($5,415)	($5,443)
Annualized Net Interest Margin (000s)	$17,486	$17,594	$17,608	$17,611	$17,546	$17,584	$17,601
YTD Average Earning Assets (000s)	$461,100	$471,100	$471,100	$471,100	$471,100	$471,100	$471,100
Annualized Net Interest Margin	**3.79%**	**3.73%**	**3.74%**	**3.74%**	**3.72%**	**3.73%**	**3.74%**
ROAA AND ROAE							
Annualized Net Income (000s)	$6,154	$6,262	$6,276	$6,279	$6,214	$6,252	$6,269
YTD Average Total Assets	$487,878	$497,878	$497,878	$497,878	$497,878	$497,878	$497,878
YTD Average Total Equity	$57,927	$57,927	$57,927	$57,927	$57,927	$57,927	$57,927
Return on Average Assets	**1.26%**	**1.26%**	**1.26%**	**1.26%**	**1.25%**	**1.26%**	**1.26%**
Return on Average Equity	**10.62%**	**10.81%**	**10.83%**	**10.84%**	**10.73%**	**10.79%**	**10.82%**
RISK-BASED CAPITAL							
YTD Average Risk-Based Capital	$58,418	$58,418	$58,418	$58,418	$58,418	$58,418	$58,418
YTD Average Risk-Weighted Assets	$381,851	$386,851	$386,851	$386,851	$386,851	$386,851	$386,851
Risk-Based Capital Ratio	**15.30%**	**15.10%**	**15.10%**	**15.10%**	**15.10%**	**15.10%**	**15.10%**
RISK-BASED ROAA AND ROAE							
Return on Average Risk-Based Assets	**1.61%**	**1.62%**	**1.62%**	**1.62%**	**1.61%**	**1.62%**	**1.62%**
Return on Average Risk-Based Capital	**10.53%**	**10.72%**	**10.74%**	**10.75%**	**10.64%**	**10.70%**	**10.73%**

*Depository institutions with membership at FHLBank Chicago, excluding the top five by asset size

As Table 5 shows, the sample FHLBank Chicago members have an ROAA ratio of 1.26% and a ROAE of 10.62%. This 15-year mortgage loan strategy would add an estimated 21 basis points of ROAE after 1 year, assuming all else remains constant. The figure remains mostly unchanged over a 3-year horizon.

Mortgages must be held at 50% weights for risk-based capital purposes, according to Basel III guidelines. In this example, the institution's total risk-based capital ratio would take a 20 basis point reduction. However, after 1 year, the return on risk-based capital would have improved by 21 basis points in the base case. A member would earn an additional $97,000 per year over 3 years with this strategy.

30-Year Mortgage Example

In this example, the portfolio consists of 30-year mortgage loans pooled together at a rate of 3.5%, and reduced by 13 basis points for servicing costs. The average loan size ranges from $250,000 to $350,000.

Table 6: Mortgage Loan Portfolio Detail – 30Y

Transaction Size	$10,000,000
Average Life	3.8 years
Portfolio Yield	3.50%
Servicing Cost	0.13%
Net Portfolio Yield	**3.37%**

Table 7: Funding Solution – 30Y

Description	Percentage	Funding	Rate	Duration (years)
1Y Fixed	15%	$1,500,000	1.74%	1.0
2Y Fixed	12%	$1,200,000	1.65%	2.0
3Y Fixed	10%	$1,000,000	1.64%	3.0
4Y Fixed	10%	$1,000,000	1.67%	4.0
5Y Fixed	8%	$800,000	1.69%	5.0
10NP1Y BERM	20%	$2,000,000	1.02%	5.3
Deposits	25%	$2,500,000	1.09%	5.0
Total/Avg.	**100%**	**$10,000,000**	**1.40%**	**3.8**

Tables 6 and 7 describe a pool of 30-year mortgage loans primarily funded with advances. The funding solution includes a ladder of fixed rate and fixed rate putable advances, as well as some deposits to fill the gap. Fixed rate putable advances give FHLBank Chicago the right to terminate the funding after a specified lockout period. For example, 10NP1Y BERM is a 10-year fixed advance that may not be put for 1 year, but then is putable every 3 months thereafter. The average life of the loans matches the weighted average maturity duration of the funding. Using this strategy, an FHLBank Chicago member could earn an estimated starting NIM of 197 basis points.

Table 8: NIM and NII Instant Rate Shocks – 30Y

	-100	0	100
Starting Avg. NIM	**1.97%**	**1.97%**	**1.97%**
1Y Avg. NII	$181,121	$184,779	$194,203
1Y Avg. NIM	**2.07%**	**2.06%**	**2.02%**
3Y Avg. NII	$359,659	$403,247	$466,726
3Y Avg. NIM	**1.83%**	**1.99%**	**1.83%**
5Y Avg. NII	$429,539	$522,396	$663,879
5Y Avg. NIM	**1.64%**	**1.94%**	**1.77%**

Figure 3: Average NIM Instant Rate Shock Chart – 30Y

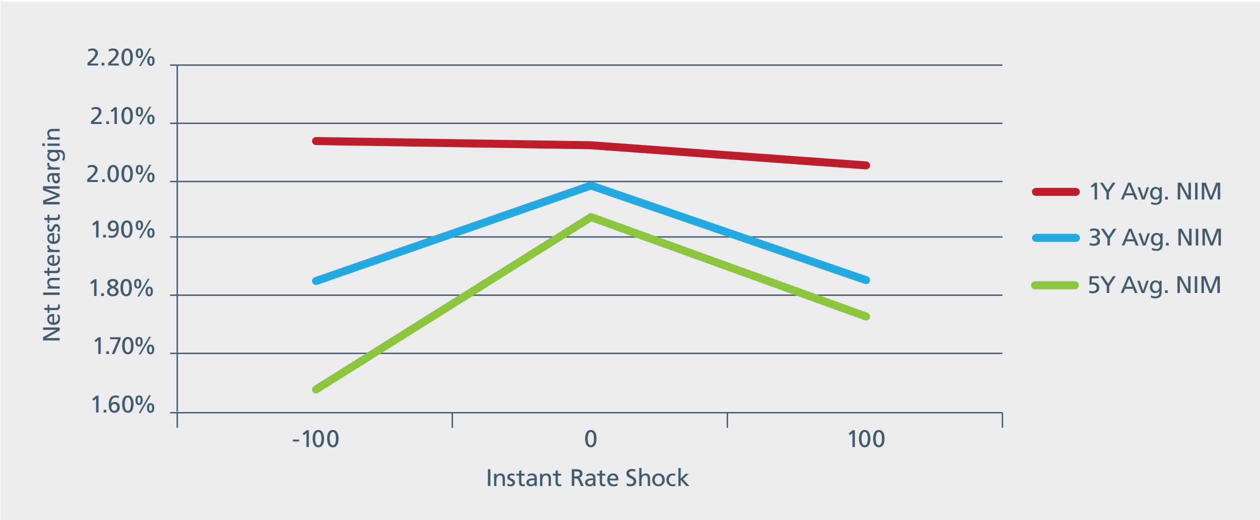


Table 9: Option-Adjusted Duration (years) – 30Y

	Instant Rate Shock		
	-100	0	100
Loan Portfolio	2.94	4.16	5.98
Advance Funding	3.54	2.79	2.27
Net	**-0.60**	**1.37**	**3.71**

As shown in Figure 3 and Tables 8 and 9, an FHLBank Chicago member could earn as much as 194 basis points of NIM over a 5-year horizon, assuming rates remain unchanged. As in the pool of 15-year mortgage loans, contraction risk may cause NIM compression. Table 9 indicates that in the falling-rate scenario, the option-adjusted duration would fall to 2.94 years for the loan portfolio, and rise to 3.54 years for the advance funding. The option-adjusted duration of the advance funding would contract in a rising-rate scenario, as the probability of termination for the putable advances increased. Deposits with the same assumptions as in the 15-year funding strategy are assumed to fill the gaps.

Leverage may change capital, asset, equity, and other ratios, such as ROAE, ROAA, and return on risk-based capital. The same sample FHLBank Chicago members used in the 15-year mortgage example are shown in Table 10.

Table 10: Ratios – 30Y Example

Metrics	Q3 2019 FHLBank Chicago Members*	1 Year Later			3 Years Later		
		-100	0	+100	-100	0	+100
NII AND NIM							
Annualized Interest Income (000s)	$22,789	$23,095	$23,103	$23,126	$23,005	$23,022	$23,091
Annualized Interest Expense (000s)	($5,303)	($5,427)	($5,432)	($5,446)	($5,399)	($5,402)	($5,449)
Annualized Net Interest Margin (000s)	$17,486	$17,667	$17,671	$17,680	$17,606	$17,621	$17,642
YTD Average Earning Assets (000s)	$461,100	$471,100	$471,100	$471,100	$471,100	$471,100	$471,100
Annualized Net Interest Margin	3.79%	3.75%	3.75%	3.75%	3.74%	3.74%	3.74%
ROAA AND ROAE							
Annualized Net Income (000s)	$6,154	$6,335	$6,339	$6,348	$6,274	$6,289	$6,310
YTD Average Total Assets	$487,878	$497,878	$497,878	$497,878	$497,878	$497,878	$497,878
YTD Average Total Equity	$57,927	$57,927	$57,927	$57,927	$57,927	$57,927	$57,927
Return on Average Assets	1.26%	1.27%	1.27%	1.28%	1.26%	1.26%	1.27%
Return on Average Equity	10.62%	10.94%	10.94%	10.96%	10.83%	10.86%	10.89%
RISK-BASED CAPITAL							
YTD Average Risk-Based Capital	$58,418	$58,418	$58,418	$58,418	$58,418	$58,418	$58,418
YTD Average Risk-Weighted Assets	$381,851	$386,851	$386,851	$386,851	$386,851	$386,851	$386,851
Risk-Based Capital Ratio	15.30%	15.10%	15.10%	15.10%	15.10%	15.10%	15.10%
RISK-BASED ROAA AND ROAE							
Return on Average Risk-Based Assets	1.61%	1.64%	1.64%	1.64%	1.62%	1.63%	1.63%
Return on Average Risk-Based Capital	10.53%	10.85%	10.85%	10.87%	10.74%	10.77%	10.80%

*Depository institutions with membership at FHLBank Chicago, excluding the top five by asset size

As shown in Table 10, the hedging strategy for a $10 million portfolio of 30-year mortgage loans can provide even more value to your institution than the 15-year strategy. It would add an estimated 32 basis points of ROAE after 1 year, assuming all else remains constant. This figure moves slightly lower over a 3-year horizon as the strategy matures.

In this example, the institution's total risk-based capital ratio would take a 20 basis point reduction, but after 1 year the return on risk-based capital would have improved by 32 basis points in the base case. The return on risk-based assets would improve by 3 basis points after 1 year. The member would earn an additional $134,000 per year over 3 years with this strategy.

While fixed rate mortgage loans are used in this strategy, members could use a variety of different assets, such as hybrid adjustable rate mortgages, commercial and industrial loans, commercial real estate loans, and consumer loans. Members can also use many different advance structures, with or without embedded options, to meet their needs.

To Learn More

If your institution would like more specific information about these strategies, please feel free to reach out to the Sales team or your Sales Director at membership@fhlbc.com.

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