

fmswhitepaper

Exposure to Deposit Refinancing

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Overview

With the Federal Reserve positioned to raise rates for the first time since June 2006, some generally unanticipated consequences are predictable. Even after material declines in volumes since the Great Recession, time deposits remain a significant \$1.6 trillion component of FDIC-insured financial institution balance sheets. Most community financial institutions fund 10-40% of their balance sheet with time deposits.

However, bankers generally do not consider the potential for their time depositors to act in the depositors' own best interests to use the optionality bankers have embedded within these accounts. In a rising rate environment, depositors may find that they can increase the value of their certificate of deposit "CD" contracts by cashing in early and reinvesting.

This paper provides guidance for measuring the option value of early withdrawal penalties and modeling the potential income and capital at risk within a time deposit portfolio resulting from depositors utilizing this optionality within their accounts to maximize the account values.

The Time Deposit Market

Long-suffering time deposit account holders are hoping for better yields the next time their CDs mature. Bankers anticipate this and model their future interest expense by applying "beta" estimates at the time of deposit maturities in their modeling. "Beta" is the percentage of interest rate changes that must be passed on to the depositors to maintain funding volumes. Although commonly applied to non-maturing deposits, time deposit pre-maturity decay rates have generally been ignored.

Now, bankers are confronted with the possibility of increases in deposit costs and portfolio decay not previously considered. The reason - time deposit customers may soon discover and exploit the options embedded in their time deposit accounts. Simply stated, waiting to maturity may not be the best choice available for many depositors. Deposit holders may be able to "refinance" their CDs by taking action immediately to withdraw before maturity and improve the value of their portfolio without any risk. Beyond typical beta estimates, this potential depositor action presents a largely unanticipated cost to the financial institution that will have to be addressed to maintain funding volumes as rates rise.

Time deposit early withdrawal penalties are commonly set to be a forfeiture of a specific number of months of interest. In the recent environment of low rates, these penalties have become much less punitive. For example, the owner of a five-year, \$100,000 CD opened 12 months ago at an annual percentage yield "APY" of 1.20% with a six-month early withdrawal

penalty, would only forfeit approximately \$600 of interest if he or she withdrew it early. By reinvesting the proceeds for the remaining 48 months, the depositor can recover that \$600 penalty and increase their value at maturity if they can reinvest at any APY above 1.35%. The benefit to depositors resulting from such a modest interest rate increase from 1.20% to 1.35% (15 basis points) illustrates the potential volatility of deposit refinancing.

Depositor ignorance and inaction are unlikely to spare financial institution portfolios. Financial news media and progressive financial institutions looking for properly-priced funding as interest rates rise will have powerful motivations to get the message to depositors. Long-suffering depositors will quickly and easily welcome and explore the potential for the unanticipated windfall in their deposit investments. Unlike bankers, depositors have nothing to lose from considering these options.

Because many bankers have never experienced this phenomenon, it is not a familiar topic. In this case, familiarity has little to do with relevance. [Truth in Savings Reg. DD](#) requires institutions to state if a penalty will or may be imposed for early withdrawal; how it is calculated; and the conditions for its assessment. Yet, few interest rate risk models incorporate scenario analysis of depositors exercising the options these account disclosures provide. Not measuring this risk creates an unnecessary blindness to a relevant threat.

ALCO Needs this Evaluation

As the bank’s Asset-Liability Committee “ALCO” is responsible for managing portfolio risks, including optionality. ALCO’s identification and measurement of depositor refinancing risk is critical.

At the product level, bankers should evaluate the strength of their early withdrawal penalties. CorePoint created a calculator enabling bankers to test the option-adjusted expected cost of a fixed-rate contract when forward implied yields are used as potential refinancing options for depositors. This calculator at <http://calculator.thecdrevolution.com/> models the potential for early withdrawal and reinvestment to predict the depositor’s optimal results over the life of the original CD, which are simultaneously the financial institution’s most costly.

The input section of the calculator contains the basic information of the CD contract.

OPTION ADJUSTED ESTIMATED COST CALCULATOR	
Name:	Deposit Customer
Institution:	First National Bank
Email:	Depositor@gmail.com
Phone Number:	402-444-5555
Principal Value of CD:	100,000
Term of CD in Months:	60
Rate on CD:	2.00
Estimated Maturity Value of Original CD:	\$110,508
FHLB Advance rate for Same Term:	2.14%
Spread to FHLB Advance Rate at Issuance:	-0.14%
Future Spread on CD Rate over FHLB:	0
Penalty Structure for this CD	Months of Interest <input type="text" value="6"/>

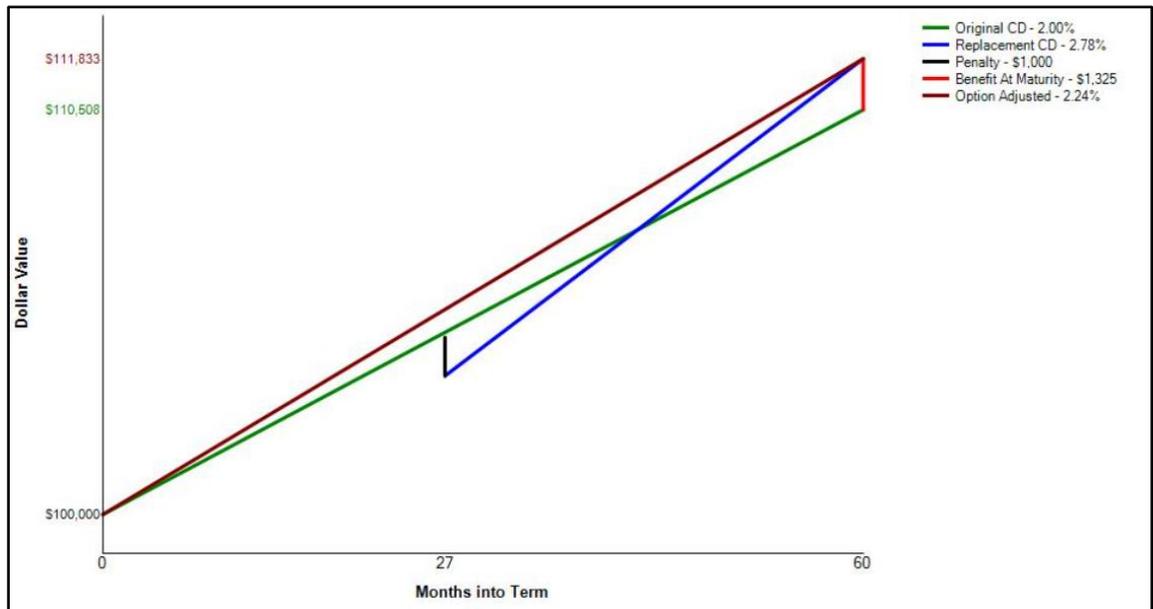
The system needs to forecast future replacement rates. Projecting forward implied yields based on the current FHLB Des Moines advance rates is the approach incorporated in the calculator. The rates used for this sample analysis are stated in the table below.

OPTION ADJUSTED ESTIMATED COST CALCULATOR	
Des Moines FHLB Rates as of 12/04/15	
Term	Rate
1 Month	0.64
2 Month	0.64
3 Month	0.64
4 Month	0.72
5 Month	0.75
6 Month	0.82
7 Month	0.82
8 Month	0.83
9 Month	0.89
10 Month	0.91
11 Month	0.94
1 Year	0.98
1 1/2 Year	1.14
2 Year	1.28
3 Year	1.57
4 Year	1.91
5 Year	2.14
6 Year	2.34
7 Year	2.53
8 Year	2.77
9 Year	2.91
10 Year	3.03
15 Year	3.53
20 Year	3.82

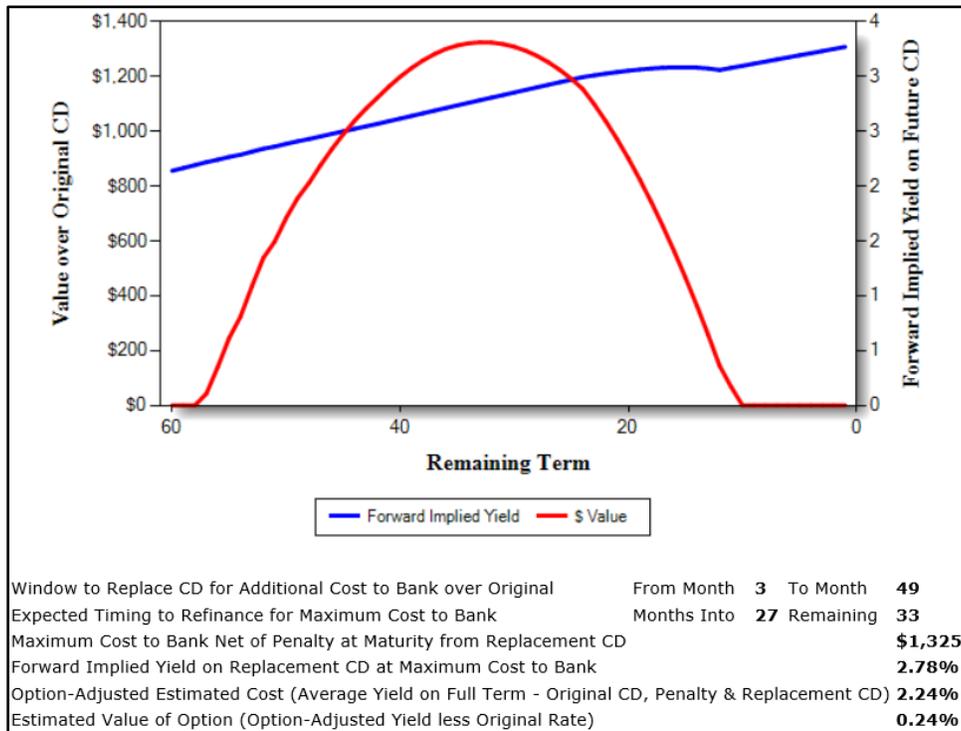
With these inputs, the system projects the opportunity each month forward to withdraw early by paying the early withdrawal penalty and reinvesting the entire proceeds in a new fixed-rate contract for the remaining term of the original CD. The reinvested values at maturity are then compared to the value at maturity of the original CD. When the replacement is more valuable at maturity than the original, the difference is displayed as the Forecasted Additional Cost to Bank.

Remaining Term	Months Into Term	Forward Implied FHLB Yield	Forward Implied CD Yield Opportunity	Maturity Value Net Penalty	Forecasted Additional Cost to Bank	Penalty	Show Graph
60	0	2.14	2.14	\$ 110,170	\$ 0	\$ 1,000	View
59	1	2.17	2.17	\$ 110,297	\$ 0	\$ 1,000	View
58	2	2.19	2.19	\$ 110,423	\$ 0	\$ 1,000	View
57	3	2.22	2.22	\$ 110,550	\$ 42	\$ 1,000	View
56	4	2.24	2.24	\$ 110,648	\$ 140	\$ 1,000	View
55	5	2.27	2.27	\$ 110,754	\$ 246	\$ 1,000	View
54	6	2.29	2.29	\$ 110,832	\$ 324	\$ 1,000	View
53	7	2.31	2.31	\$ 110,943	\$ 435	\$ 1,000	View
52	8	2.34	2.34	\$ 111,046	\$ 538	\$ 1,000	View
51	9	2.36	2.36	\$ 111,106	\$ 598	\$ 1,000	View
50	10	2.39	2.39	\$ 111,192	\$ 684	\$ 1,000	View
49	11	2.41	2.41	\$ 111,264	\$ 756	\$ 1,000	View
48	12	2.43	2.43	\$ 111,320	\$ 812	\$ 1,000	View
47	13	2.45	2.45	\$ 111,384	\$ 876	\$ 1,000	View
46	14	2.48	2.48	\$ 111,443	\$ 935	\$ 1,000	View
45	15	2.50	2.50	\$ 111,497	\$ 989	\$ 1,000	View
44	16	2.52	2.52	\$ 111,547	\$ 1,039	\$ 1,000	View
43	17	2.55	2.55	\$ 111,591	\$ 1,083	\$ 1,000	View
42	18	2.57	2.57	\$ 111,631	\$ 1,123	\$ 1,000	View
41	19	2.59	2.59	\$ 111,671	\$ 1,163	\$ 1,000	View
40	20	2.62	2.62	\$ 111,707	\$ 1,200	\$ 1,000	View
39	21	2.64	2.64	\$ 111,739	\$ 1,231	\$ 1,000	View
38	22	2.66	2.66	\$ 111,767	\$ 1,259	\$ 1,000	View
37	23	2.69	2.69	\$ 111,790	\$ 1,282	\$ 1,000	View
36	24	2.71	2.71	\$ 111,809	\$ 1,301	\$ 1,000	View
35	25	2.74	2.74	\$ 111,821	\$ 1,313	\$ 1,000	View
34	26	2.76	2.76	\$ 111,829	\$ 1,322	\$ 1,000	View
33	27	2.78	2.78	\$ 111,833	\$ 1,325	\$ 1,000	View
32	28	2.81	2.81	\$ 111,832	\$ 1,324	\$ 1,000	View

Assuming rates rise as projected and depositors execute the most valuable refinance option, the calculator can display what can be expected to be the graphical representation of the financial results.



All the refinancing options are accumulated on a graph showing over time the anticipated future value of replacement accounts and the forecasted additional cost to the bank, which is simultaneously the additional value to the depositor accruing from their refinancing action.



When the optimized results for the depositor are evaluated over the term of the refinanced deposit, the internal rate of return can be compared with the stated rate of the original deposit. The difference represents the estimated value of the option embedded in the CDs early withdrawal penalty. In this example, the 2.00% account with a six-month early withdrawal penalty can be expected to produce total annual interest cost of 2.24%. Therefore, the option value of the penalty is 24 basis points when interest rates move as indicated by the forward implied yields and when depositors execute refinance in the 27th month of their ownership with 33 months left to maturity. The bank holding the deposit will lose \$1,325 of value over and above the early withdrawal penalty collected of \$1,000.

Interest Rate Risk Modeling

On an enterprise-wide level, bankers should measure the current exposure to loss of funds and cost of funds that they have previously considered as not volatile. The variables required for this enterprise-wide evaluation include three data elements: the current portfolio, early withdrawal penalties and CD offering rates currently available to depositors. The current portfolio data requires current balance, interest rate, date of deposit and maturity date. The early withdrawal penalty structure must be stated for all accounts. Currently available CD offering rates should consider scenarios which include the financial institution's own offerings and competitors' offerings for comparable remaining terms.

Using the above three data elements, each account is analyzed for the value at maturity if redeemed early and reinvested versus holding to maturity. Results reveal the percentage of the portfolio for which depositors would be wise to refinance, the sum of early withdrawal penalties that should be assessed and the sum of the net benefit to transfer that will be achieved for the depositors' accounts at maturity.

As an example, analysis of a typical current bank portfolio is presented here. The portfolio consists of about \$150 million of CDs with a weighted average interest rate of 0.91% and a weighted average remaining term to maturity in months of 16.6. The early withdrawal penalties "EWP" were set at 1 month interest forfeited for term to maturity of less than 12 months; 3 months forfeited for terms less than 24 months; 6 months forfeited for terms less than 36 months; and 12 months for longer terms. The replacement CD offering rate was set to equal FHLB Des Moines advance rates for the remaining term of the CD.

Time Deposit Refinance Exposure Analysis					
Results with 11/24/2015 FHLB Advance Rates					
EWP = <12Mo=1, <24Mo=3, <36Mo=6, >=36Mo=12					
Portfolio Evaluated					
Total Balance		149,641,181			
Weighted Average Rate		0.91			
Weighted Average Remaining Term		16.60			
Net Benefit to Transfer	Sum of Balance	Sum of EWP	Count of Positive Net Benefit to Transfer	Sum of Positive Net Benefit to Transfer	
0.01-200.01	25,416,811	71,924	1,443	49,592	
200.01-400.01	12,061,548	53,252	149	41,617	
400.01-600.01	390,108	2,136	10	4,665	
600.01-800.01	685,705	7,828	14	9,837	
800.01-1000.01	543,831	6,091	9	7,444	
1000.01-1200.01	110,814	1,241	2	2,047	
1200.01-1400.01	497,061	5,567	8	9,761	
1400.01-1600.01	218,994	2,453	3	4,796	
1600.01-1800.01	879,402	9,849	7	11,762	
2200.01-2400.01	403,360	4,518	4	8,909	
3000.01-3200.01	594,786	6,662	3	9,028	
4800.01-5000.01	1,505,671	12,045	3	14,556	
Grand Total	43,308,090	183,567	1,655	174,015	

The current exposure was that \$43 million or 29% of the balances would benefit the deposit holder from an immediate refinance; the bank would collect \$184K in early withdrawal penalties; and the aggregate net benefit to depositors at maturity after paying the penalty would be \$174K. The "Sum of the Positive Net Benefit to Transfer" is the amount in excess of the Early Withdrawal Penalty. It represents the net cost to the bank from depositors' usage of these early withdrawal options.

The table below shows the results of the model at various rates above recent FHLB advance rates. For example, in an environment where rates are current FHLB + 100 basis points, the

bank would collect \$685K if every depositor who could gain from refinancing does. However, the additional interest expense would total \$1.69 million more than the income the bank receives from the penalties.

Summary Table				
Time Deposit Refinance Exposure Analysis				
EWP = <12Mo=1, <24Mo=3, <36Mo=6, >=36Mo=12				
Portfolio Evaluated				
Total Balance		149,641,181		
Weighted Average Rate		0.91		
Weighted Average Remaining Term		16.60		
Total Accounts		4,384		
	Sum of Balance Impacted	Sum of Early Withdrawal Penalties	Count of Positive Net Benefit to Transfer	Sum of Positive Net Benefit to Transfer
FHLB + 0 Basis Points	43,308,090	183,567	1,655	174,015
FHLB + 50 Basis Points	86,544,614	509,029	2,545	789,151
FHLB + 100 Basis Points	103,475,210	684,512	2,876	1,690,685
FHLB + 150 Basis Points	110,538,960	778,371	3,027	2,655,126

The benefit to depositors described above is ultimately a cost to the financial institution holding the deposit and expecting to hold it to maturity. As we have demonstrated here, deposit refinancing costs can become a significant financial burden. The analysis above indicates the potential magnitude of unexpected costs to ALCO committees that fail to incorporate deposit refinance analytics in their interest rate risk models.

Naturally, increasing the early withdrawal penalties negates some of the benefit to refinancing. Many bankers have incrementally increased their penalties in recent years. Doubling the penalty from 6 months to 12 months seems like a big improvement. However, many might be surprised at the risk that remains after this kind of penalty adjustment. The only way to know the risk in a portfolio is to run the numbers. After observing a considerable number of these analyses, it becomes obvious that every financial institution needs to promptly perform a portfolio specific analysis to understand their exposure to this critical and timely issue.

Retail Bankers Need to Prepare

The impacts on financial institutions extend beyond the direct financial cost. Conversations about refinancing deposits will be new territory for many retail bankers. Time deposit sales conversations need to become much more robust. The awareness of previously unobserved opportunities for depositors to improve their position brings into question the analytics that will be used to guide decisions. This issue also has income tax consequences.

Selling CDs as commodities with a static rate sheet that lists term and yield is inadequate to address this issue. Depositors will legitimately demand to know the dollar difference between the value of their current CD contract and the value of a replacement. There are too many variables to expect retail bankers to run the numbers accurately on a calculator. A customized analysis designed for this purpose is needed to clearly and accurately determine the net benefit at maturity that results from refinancing.

Bankers hoping to avoid this dialogue are quite vulnerable. Leaving retail bankers unarmed to analyze these opportunities puts the destiny of your funding in the hands of your competitors and depositors. What will bankers do when a current depositor comes in to withdraw their account before maturity to take their money to your competitor? When bankers explain that they hate to see the depositor incur penalties, depositors will tell them that they have run the numbers and even after paying the penalty they will collect \$X,XXX more at maturity by cashing in the account now and reinvesting at the new higher rates. Without preparation, this money is lost and customers are left to conclude that your organization is out-of-touch.

Penalty on early withdrawal of savings reduces adjusted gross income in the year paid. This means that depositors can get more than just a higher net value at maturity of their deposit. They can also get an income tax reduction in the current year. Retail bankers need to be prepared to discuss this issue.

Also, family members may take an increased level of involvement. Many children of senior citizens are likely to weigh-in on this matter as it creates a legitimate opportunity for them to help their parents manage their money. This will likely change the conversations with retail bankers, since it is likely that these depositors will seek to get every last cent out of such trades.

If retail bankers are not ready to proactively address this, it is highly likely that competitors will be more than happy to invite and welcome your current depositors as they trade-up to their new market rate offerings at another financial institution. Now is the time to assess this exposure and define the customer experience you will offer regarding this situation.

Summary

Time deposit account holders may discover they are able to profitably refinance their CDs without any risk. Therefore, the risk lies within the portfolios of financial institutions. ALCO committees need to anticipate and quantify the financial burden of deposit refinance. Analysis indicates the magnitude of the associated cost as interest rate offerings rise. Though more substantial early withdrawal penalties mitigate a portion of the cost, analysis shows the risk often remains material. Interest rate risk models need to be augmented to account for time deposit refinance optionality.

Conversations with deposit customers will need to address the new dynamics created by deposit refinance. Retail bankers need the tools to independently analyze the net value at maturity from a replacement contract. They can also expect other family members to have influence on decisions of their depositors.

As interest rates rise, effective executive leadership will use performance analytics to anticipate the costs and prepare their associates to retain deposits at optimal levels and engage informed depositors.

About the Author



Neil Stanley

Neil Stanley has been a banker for over 25 years. Neil was the CEO of Northwest Bank in Spencer, Iowa. Prior to Northwest Bank, Neil was an executive for over 22 years with what became the largest privately held banking organization in the country – First National of Nebraska / Lauritzen Corporation. He served First National as Chief Investment and Liquidity Officer and Lauritzen Corporation as Vice President in general administration and supervision of community banks.

In 2009, Neil founded **The CorePoint** (formerly known as Bank Performance Strategies). The company helps client financial institutions use proven and innovative methods to lower their cost of funds while retaining and attracting properly-priced, longer-term core retail deposits. The CorePoint offers a web-based retail deposit pricing and sales platform and performance analytics incorporating patent protected solutions.

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