

**Funding Strategies  
For Optimizing the Risk/Reward Trade-off  
of Funding Assets on the Balance Sheet**

**Federal Home Loan Bank of Boston Webinar**

Marianne Cacciola  
Financial Strategist  
[marianne.cacciola@fhlbboston.com](mailto:marianne.cacciola@fhlbboston.com)

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## Agenda

- I. Overview of funding strategy model
  - ◆ Objectives and key issues
  - ◆ Gathering input to customize strategy
  - ◆ How to interpret model output
- II. Effective funding strategies for holding long-term, fixed-rate assets
  - ◆ 30-year fixed rate mortgages
  - ◆ 5-year/20-year amortizing commercial loans
  - ◆ 5-year automobile loans

# Overview of the Funding Strategy Model

## Objectives and Key Issues

- Achieve a reasonable spread without excessive risk
  - ◆ Strike a balance between
    - High spread, high interest-rate risk
    - Low spread, low interest-rate risk
  - ◆ Spread on the transaction is *at the margin*
    - Spread is pre-tax, without taking on additional overhead expenses or loan loss provision
- Reduce overall interest-rate risk
- Generate additional profit from positive spread

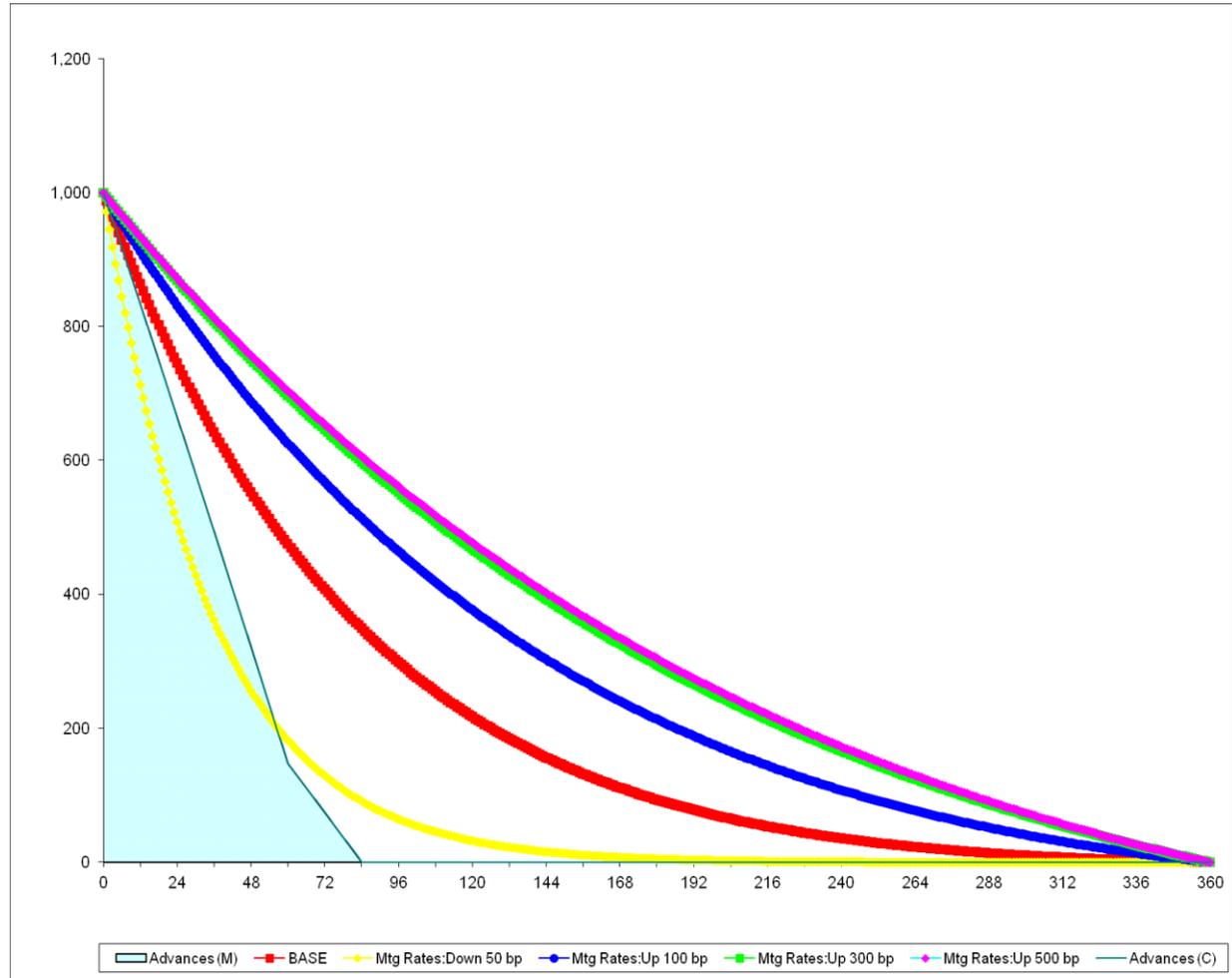
## Customize a Funding Strategy - Gathering Inputs and Making Assumptions

- Asset characteristics
  - ◆ Loan type, term, fixed-rate period, gross/net coupon, prepayment speeds, price paid or points received, dollar amount of strategy
- Mix of advances being considered
  - ◆ Type, term, structure
- Member objectives for interest-rate hedge or earnings
  - ◆ Protect interest-rate risk
  - ◆ Maximize net interest income in initial period
- Ensure assumptions are reasonable and appropriate

## What Does the Model Output Entail?

### Graph as a visual representation of the strategy

- ◆ Colored lines represent the asset balance over time in different rate environments, illustrating impact of prepayment assumptions.
- ◆ Blue shaded area represents FHLB advances.
- ◆ White area between the colored line and the blue shaded area represents the portion of the asset that is funded with the member's cash or short-term advances. White area illustrates the asset balance subject to *interest-rate risk*.



## Model Output Continued

- Assumptions page with details of asset, funding allocation, and prepayment speeds used
- Summary of transaction results for first seven years

Strategy: 269 bps - \$0.50 MM 5 Year amort and \$0.50 MM 7 Year amort.

Rate Scenario	Initial Net Spread	TRANSACTION RESULTS						PRO-FORMA IMPACT			
		Average Long Term Assets	Average Capital/ Assets	Average Asset Yield	Average Cost of Funds	Average Net Interest Spread	7 Year Total Net Interest Income	Return on Assets		Return on Equity	
								Before	After	Before	After
Base Case/ Rates Flat	2.69%	626	11.77%	3.75%	0.92%	2.83%	\$127	0.86%	0.87%	7.33%	7.36%
Up 100 bp	2.69%	737	11.77%	3.75%	1.18%	2.57%	\$137	0.86%	0.87%	7.33%	7.36%
Up 300 bp	2.69%	789	11.77%	3.75%	2.01%	1.74%	\$102	0.86%	0.87%	7.33%	7.35%
Up 500 bp	2.69%	793	11.76%	3.75%	2.87%	0.88%	\$55	0.86%	0.86%	7.33%	7.34%
Down 50 bp	2.69%	387	11.77%	3.09%	1.09%	2.00%	\$68	0.86%	0.86%	7.33%	7.35%
Down 100 bp	2.69%	250	11.77%	2.09%	1.10%	0.99%	\$33	0.86%	0.86%	7.33%	7.34%
Down 150 bp	2.69%	199	11.77%	1.70%	1.10%	0.60%	\$20	0.86%	0.86%	7.33%	7.34%

### Performance Statistics - All Rate Scenarios

Measure	High	Low	Average	Range	Dispersion*
Cost of Funds	2.87%	0.92%	1.47%	1.96%	0.56%
Net Spread	2.83%	0.60%	1.66%	2.23%	0.71%
Net Int Income	137	20	78	116	38
Pro-forma ROA	0.87%	0.86%	0.86%	0.00%	0.00%
Pro-forma ROE	7.36%	7.34%	7.35%	0.02%	0.01%

\* Measures Mean Absolute Deviation from Average

## Model Output Continued

- Average balance sheet and income statement year-by-year for first seven years, across seven different interest-rate scenarios

**MEMBER GENERIC**  
 30yr Fixed Rate Mortgage 3.75%  
 7-Year Annual Return Analysis  
 (\$000s)

### AVERAGE BALANCE SHEET

### PRE-TAX RATIOS

### INTEREST INCOME & EXPENSE

Interest Rate Scenario : BASE (Rates Flat)

Year	AVERAGE BALANCE SHEET					PRE-TAX RATIOS			INTEREST INCOME & EXPENSE											
	Mtg	S-T Inv	Total Assets	Fxd/Am Adv	Opt Adv	S-T Liabs	Total Liabs	Total Equity	Asset Yield	Cost of Funds	NI Spread	Mtg	S-T Inv	Tot Inc	Fxd/Am Adv	Opt Adv	S-T Liabs	Tot Exp	NI Inc	
1	936	-	936	924	-	5	928	8	3.75	1.07	2.68	35	-	35	10	-	0	10	25	
2	808	-	808	756	-	29	785	23	3.75	1.05	2.70	30	-	30	8	-	0	8	22	
3	697	-	697	586	-	74	660	37	3.75	1.01	2.74	26	-	26	6	-	0	7	19	
4	600	-	600	415	-	137	552	49	3.75	0.92	2.83	23	-	23	5	-	0	5	17	
5	517	-	517	242	-	215	457	59	3.75	0.77	2.98	19	-	19	3	-	1	4	16	
6	444	-	444	114	-	261	374	69	3.75	0.61	3.14	17	-	17	1	-	1	2	14	
7	381	-	381	40	-	262	302	78	3.75	0.46	3.29	14	-	14	1	-	1	1	13	
												Totals	164	-	164	34	-	3	37	127

## The Net Interest Spread Will Fluctuate – Why?

- Seven interest rate scenarios are modeled
  - ◆ The short-term cost of funds will change based on the rate environment being simulated
- The rate change phase-in period
- Mix of advances and short-term funding changes over time
  - ◆ Advances will mature or amortize
  - ◆ Structured advance products may reprice, call, extend or expand depending on the rate shock being simulated
- Asset prepayment speeds impact the mix of funding as the short-term rate is used to balance the transaction
  - ◆ Excess cash is reinvested at the short-term rate
  - ◆ Funding gap is filled with short-term advance

# Modeling the Trade-Off: Hedging Interest-Rate Risk Versus Maximizing Potential Earnings

- The various interest rate scenarios illustrate:
  - ◆ Potential impact on net earnings if rates change
  - ◆ Potential liquidity needs along the asset horizon
  - ◆ Effectiveness of the hedge
- Managing to balance sheet sensitivity is crucial for minimizing volatility on earnings in different rate environments

## Managing Effective Funding Strategies Over Time

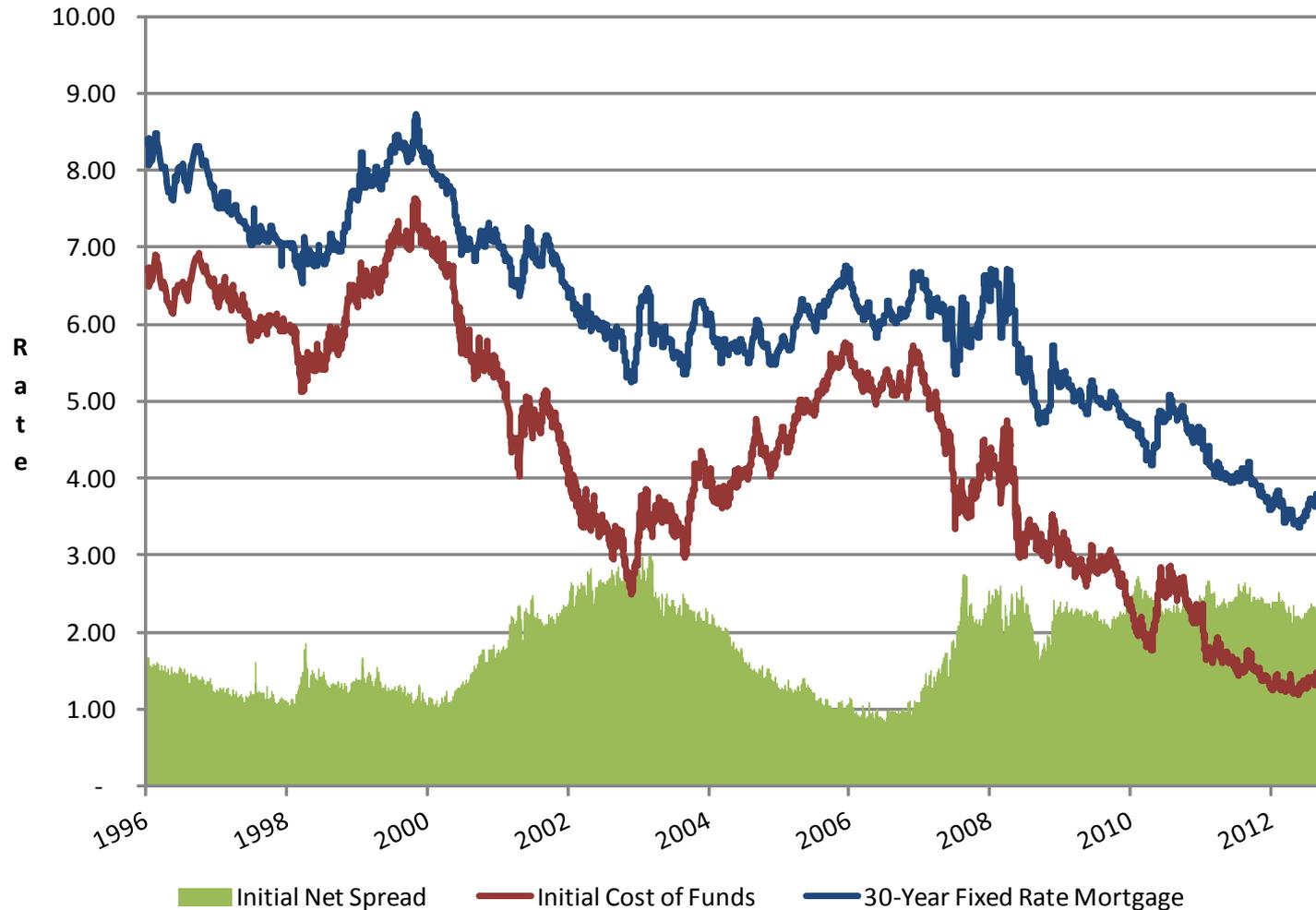
- Cost average with funding requirements
- Manage the transaction over time and ladder in new funding as advances mature or interest-rate risk intensifies
- Evaluate changes in rates and build in protection by extending the funding to closer match balance sheet exposure
- Utilize barbell funding to offset excess deposits
- Implement funding strategies to adjust the aggregate interest-rate risk profile and/or supplement earnings
- Some advances go hand-in-hand for more structured strategies
  - ◆ Barbell of Classic Plus Cap and short-term advances
  - ◆ Expander advance and Symmetrical Prepayment advance

# Effective Funding Strategies for Holding Long-Term, Fixed-Rate Assets

## 30-Year Fixed-Rate Mortgages

- Residential mortgages are the hardest to fund because the borrower has a free prepay option on the balance
- Prepayment assumptions for a like-kind MBS are used as a benchmark to estimate prepayments in different interest rate environments
- Risk of extension versus risk of prepayment impacts the performance of the strategy
  - ◆ If rates rise, mortgage is likely to extend, and funding costs for unhedged balance will be more expensive
  - ◆ If rates fall, mortgage is likely to prepay, and any excess long-term funding will be reinvested at prevailing market rates

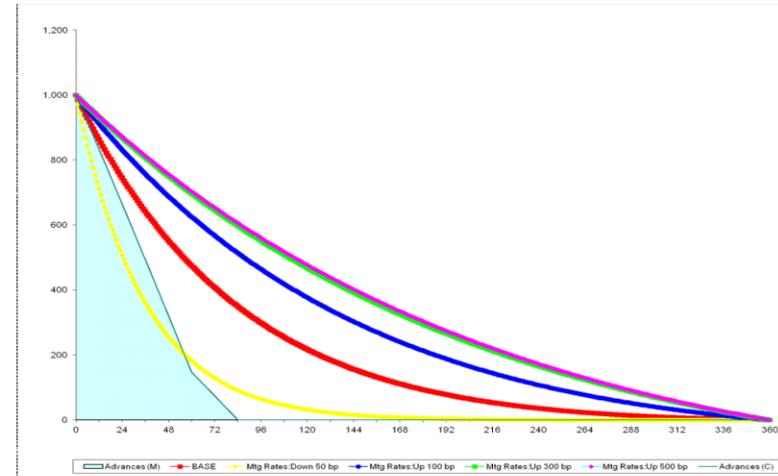
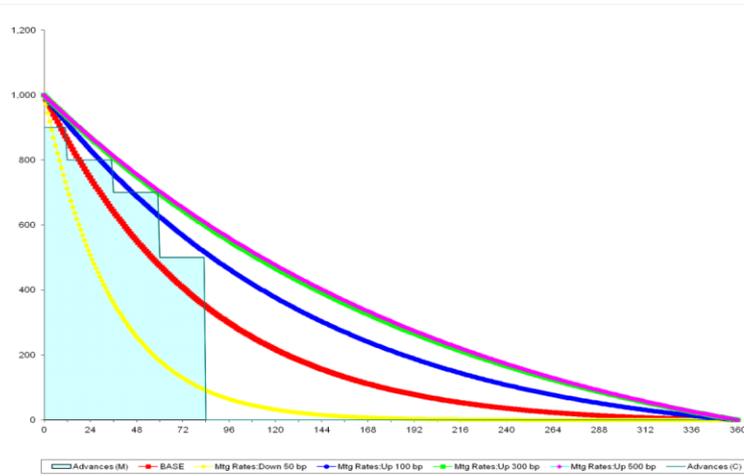
## Historical Mortgage Rate and Initial Spread Analysis



Initial Cost of Funds comprised of: 10% 1-m, 10% 1-yr, 10% 3-yr, 20% 5-yr, 50% 7-yr

30-yr FRM Banxquote Avg Conforming Mortgage US (BXMUS30)

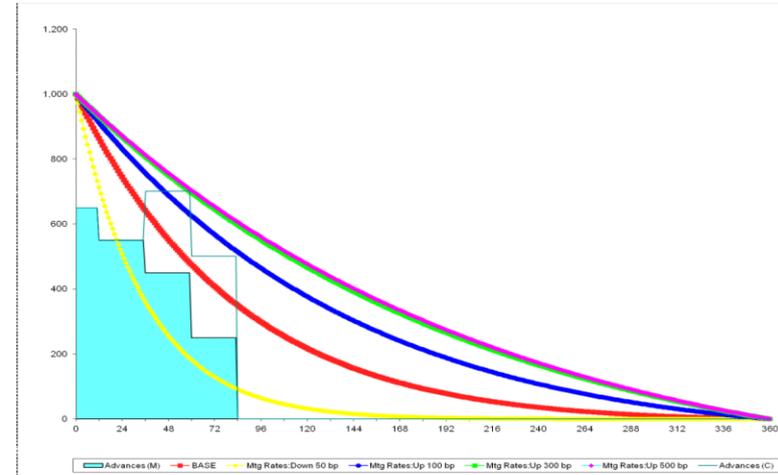
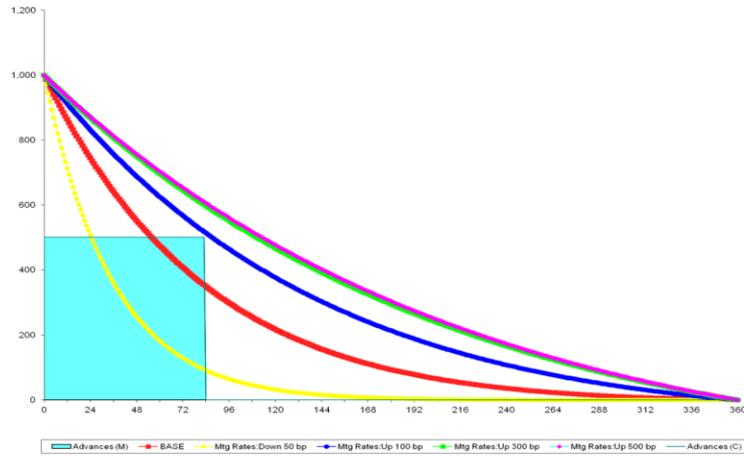
## 30-Year Fixed-Rate Mortgages – Plain Vanilla



<b>30-yr Fixed Rate Mortgage</b>	<b>3.75%</b>
10% 1-mo Classic advance	0.33%
10% 1-yr Classic advance	0.37%
10% 3-yr Classic advance	0.77%
20% 5-yr Classic advance	1.24%
50% 7-yr Classic advance	1.86%
<b>100% Total Liabilities</b>	<b>1.32%</b>
<b>Initial Net Spread</b>	<b>2.43%</b>
<b>Average Net Spread (seven years)</b>	
Down 100 bp	-0.27%
Down 50 bp	0.41%
Base case/Rates Flat	1.57%
Up 100 bp	2.03%
Up 300 bp	2.01%
Up 500 bp	1.89%

<b>30-yr Fixed Rate Mortgage</b>	<b>3.75%</b>
50% 5-yr Amortizing advance	0.88%
50% 7-yr Amortizing advance	1.23%
<b>100% Total Liabilities</b>	<b>1.06%</b>
<b>Initial Net Spread</b>	<b>2.69%</b>
<b>Average Net Spread (seven years)</b>	
Down 100 bp	0.99%
Down 50 bp	2.00%
Base case/Rates Flat	2.83%
Up 100 bp	2.57%
Up 300 bp	1.74%
Up 500 bp	0.88%

## 30-Year Fixed-Rate Mortgages – Structured

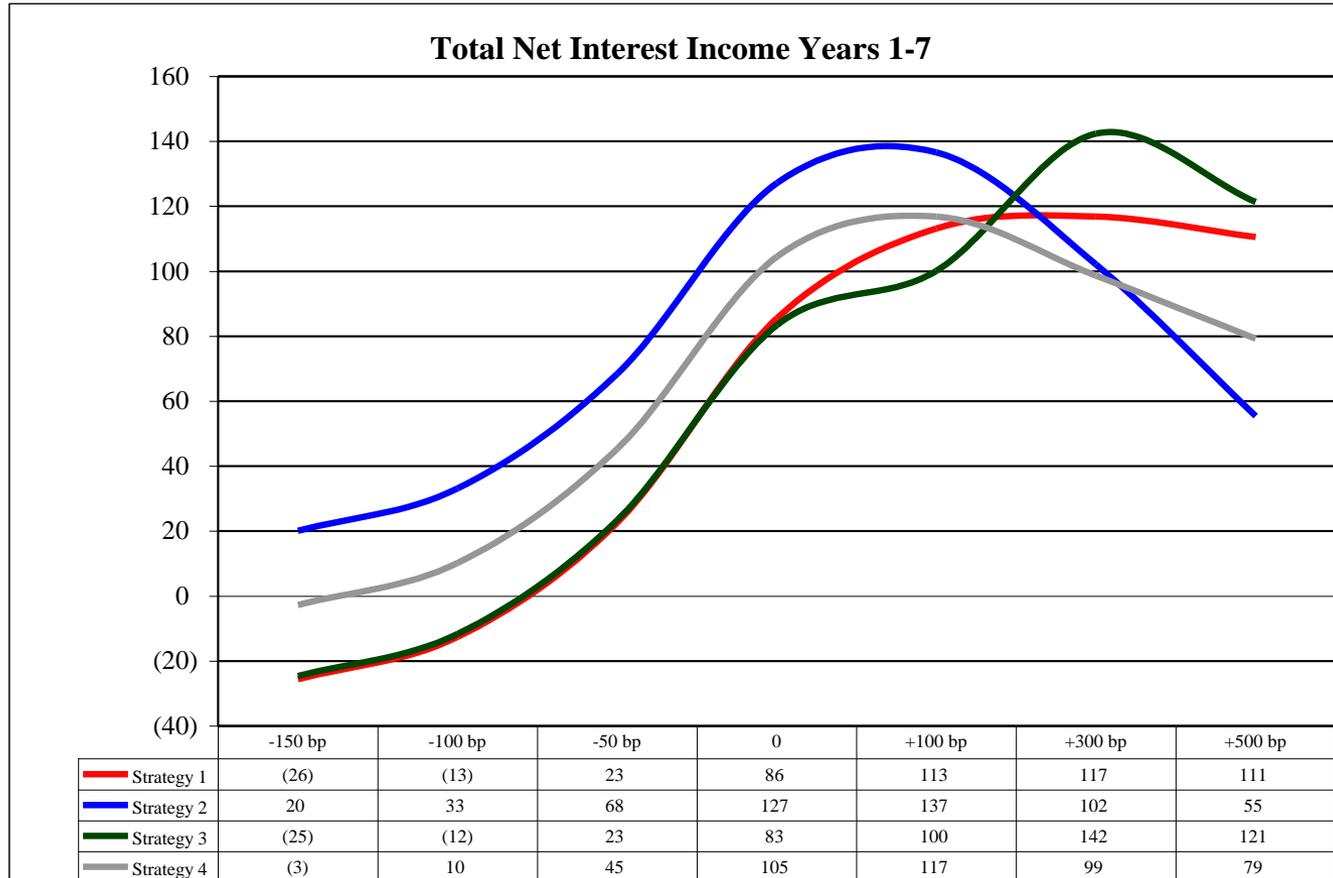


<b>30-yr Fixed Rate Mortgage</b>	<b>3.75%</b>
50% 1-mo Classic advance	0.33%
50% 7-yr Classic Plus Cap 3X 3mL Strike 2.50%	2.22%
<b>100% Total Liabilities</b>	<b>1.27%</b>
<b>Initial Net Spread</b>	<b>2.48%</b>
<b>Average Net Spread (seven years)</b>	
Down 100 bp	-0.33%
Down 50 bp	0.51%
Base case/Rates Flat	1.68%
Up 100 bp	1.84%
Up 300 bp	2.51%
Up 500 bp	2.11%

<b>30-yr Fixed Rate Mortgage</b>	<b>3.75%</b>
35% 1-mo Classic advance	0.33%
10% 1-yr Classic advance	0.37%
10% 3-yr Classic advance	0.77%
20% 5-yr Symmetrical Prepay advance	1.26%
25% 7/3-yr Expander advance	2.32%
<b>100% Total Liabilities</b>	<b>1.06%</b>
<b>Initial Net Spread</b>	<b>2.69%</b>
<b>Average Net Spread (seven years)</b>	
Down 100 bp	0.26%
Down 50 bp	1.19%
Base case/Rates Flat	2.29%
Up 100 bp	2.17%
Up 300 bp	1.68%
Up 500 bp	1.33%

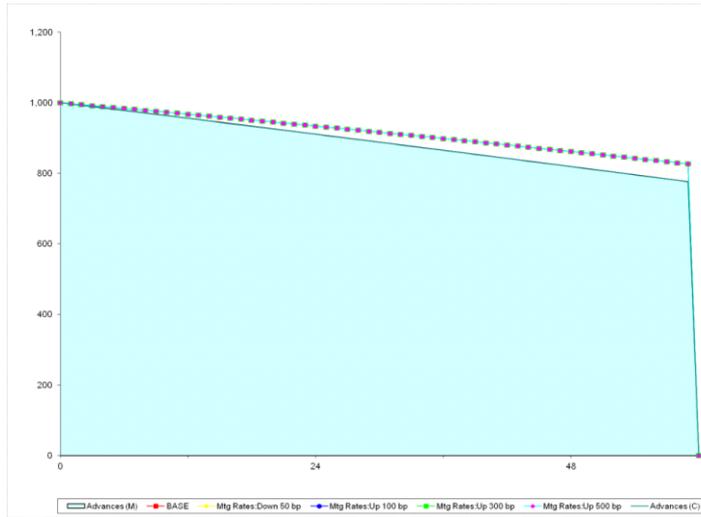
## MEMBER GENERIC

### Analysis of Funding Alternatives for 30-year Fixed Rate Mortgage 3.75%

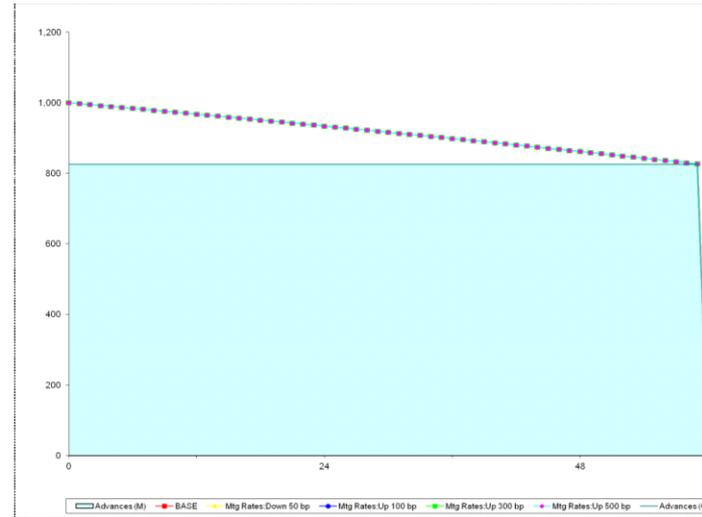


- Strategy 1** 243 bps - \$0.10 MM 1 Yr Bullet, \$0.10 MM 3 Yr Bullet, \$0.20 MM 5 Yr Bullet, \$0.50 MM 7 Yr Bullet and \$0.10 MM Short-Term Funding.
- Strategy 2** 269 bps - \$0.50 MM 5 Year amort and \$0.50 MM 7 Year amort.
- Strategy 3** 248 bps - \$0.50 MM 7 Yr Classic Plus Cap 3X Notional 2.50% LIBOR Strike and \$0.50 MM Short-Term Funding.
- Strategy 4** 269 bps - \$0.10 MM 1 Yr Bullet, \$0.10 MM 3 Yr Bullet, \$0.20 MM 5 Yr SPA Bullet, \$0.25 MM 7/3 Expander- and \$0.35 MM Short-Term Funding.

## 5-Year/20-Year Amortizing Commercial Loans

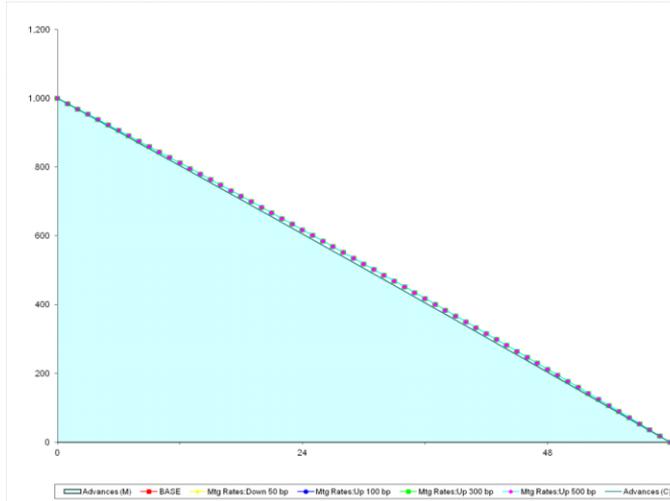


<b>5/20-yr Amortizing Commercial Loan</b>	<b>4.25%</b>
<b>100% 5/20-yr Amortizing advance</b>	<b>1.19%</b>
<b>100% Total Liabilities</b>	<b>1.19%</b>
<b>Initial Net Spread</b>	<b>3.06%</b>
<b>Average Net Spread (five years)</b>	
Down 100 bp	2.96%
Down 50 bp	2.96%
Base case/Rates Flat	2.96%
Up 100 bp	2.98%
Up 300 bp	3.02%
Up 500 bp	3.06%



<b>5/20-yr Amortizing Commercial Loan</b>	<b>4.25%</b>
<b>18% 1-mo Classic advance</b>	<b>0.33%</b>
<b>83% 5/20-yr Amortizing advance</b>	<b>1.19%</b>
<b>100% Total Liabilities</b>	<b>1.08%</b>
<b>Initial Net Spread</b>	<b>3.17%</b>
<b>Average Net Spread (five years)</b>	
Down 100 bp	3.00%
Down 50 bp	3.00%
Base case/Rates Flat	2.99%
Up 100 bp	2.97%
Up 300 bp	2.93%
Up 500 bp	2.88%

## 5-Year Automobile Loans

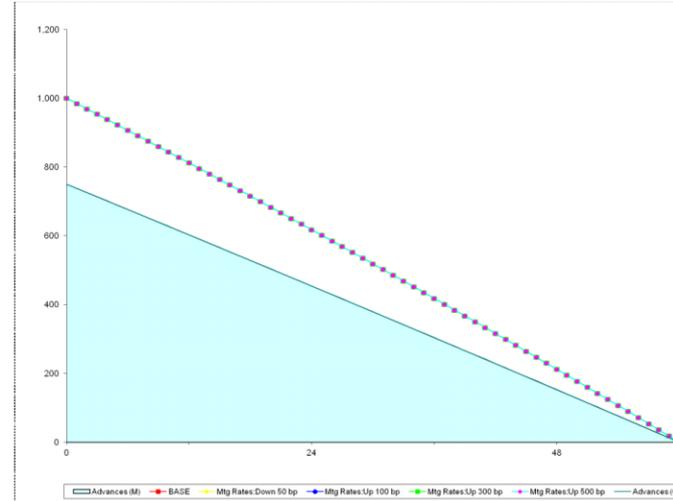


**5-yr Automobile Loan 3.00%**

100% 5-yr Amortizing advance	0.88%
100% Total Liabilities	0.88%

**Initial Net Spread 2.12%**

<b>Average Net Spread (five years)</b>	
Down 100 bp	2.03%
Down 50 bp	2.03%
Base case/Rates Flat	2.03%
Up 100 bp	2.06%
Up 300 bp	2.11%
Up 500 bp	2.17%



**5-yr Automobile Loan 3.00%**

25% 1-mo Classic advance	0.33%
75% 5-yr Amortizing advance	0.88%
100% Total Liabilities	0.74%

**Initial Net Spread 2.26%**

<b>Average Net Spread (five years)</b>	
Down 100 bp	2.27%
Down 50 bp	2.27%
Base case/Rates Flat	2.22%
Up 100 bp	2.08%
Up 300 bp	1.78%
Up 500 bp	1.46%

**For a customized funding strategy, please  
contact one of the Bank's financial strategists**

[Kevin.Martin@fhlbboston.com](mailto:Kevin.Martin@fhlbboston.com)

617.292.9644

[Marianne.Cacciola@fhlbboston.com](mailto:Marianne.Cacciola@fhlbboston.com)

617.425.9452