Funding Strategies in a Rising Interest Rate, and a Flattening Yield Curve Environment

Chief Financial Officers must now make important choices about the maturity of their corporate liabilities but the right decisions are not obvious. Although most forecasters believe that the federal funds rate will settle around 3 percent or higher, and that the 10-Year Treasury rate will rise to 4 percent or higher, another group of forecasters believe that risk-free interest rates will be stuck around their relatively low levels currently, and may even move lower because of investor risk aversion and fear of trade wars and overvalued financial assets. Moreover, an increasing number of market participants have seen the flattening U.S. yield curve as a predictor of an oncoming U.S. recession.

by Niso Abuaf, Clinical Professor of Financial Economics, Pace University;
and Chief Economist and Strategist, Samuel A. Ramirez and Co.*

This macroeconomic background suggests that an optimal corporate funding strategy may be a "barbell" that combines short-term borrowings (to exploit still-low short-term rates) with some long-term borrowing to lock in historically low interest rates against the possibility of rising inflation and interest rates.

I will demonstrate that a "barbell" funding strategy is on the "efficient frontier" of corporate liability structure. Most efficient frontier strategies consist of a barbell with occasional medium-term borrowings, but with some "roll-over" or funding risk attached.

Once the efficient frontier has been delineated, the Chief Financial Officer (CFO) can use breakeven analysis to choose the optimal maturity mix. The choice between fixed and floating interest rates will depend upon management's tolerance for earnings fluctuations resulting from moves in short-term rates. Additionally, a corporate funding strategy should also take into account the duration of corporate assets as well as its liabilities and spread principal repayments across various maturities.

In what follows, I describe the current macroeconomic environment within the context of interest rate history and explore the pros and cons of various funding strategies. Finally, I offer funding strategies that reflect my own subjective opinions about rates.

*The author would like to thank his colleagues Konstantin Semyonov, Duncan Sinclair, and Aidi Qyqja for helpful comments, suggestions, and analytical assistance.

The Current Macroeconomic Environment, the Interest Rate and its Drivers

A Synopsis

• Almost a decade after the onset of the Great Contraction of 2007-2009, the Federal Reserve deserves at least an "honorable mention" for achieving both full employment and price stability; the cries of naysayers or the nattering nabobs of negativity, notwithstanding.

• The Fed is now gradually raising the federal funds rate to around 3 percent and contracting its balance sheet passively.

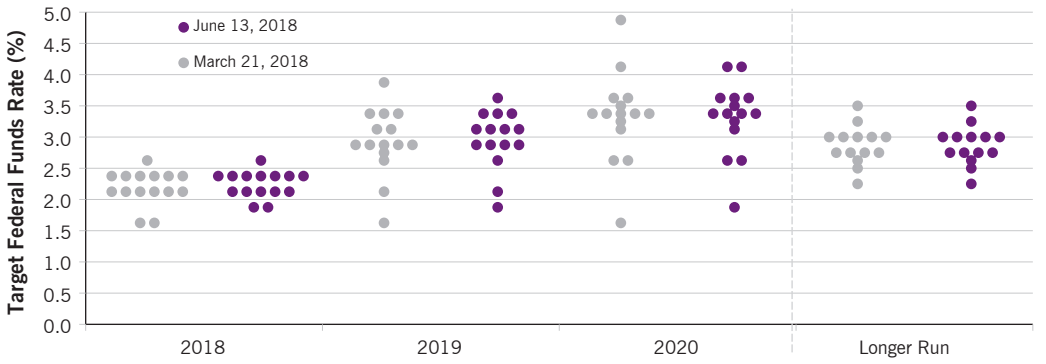
• Economic optimists think that 10-Year Treasury rates will rise to 4 percent as the economy expands while relatively bearish forecasters think that the 10-Year yield will vary around 3 percent. The most bearish forecasters see yields dropping below current levels, possibly because foreign Central Bank balance sheets continue to expand and because global demand for safe assets remains strong.

• Over the past year, we have seen a secular flattening of the yield curve across the maturity spectrum.

• Possible risks on the horizon include rising U.S. debt-to-GDP levels and financial market distress due to "trade wars"

Figure 1

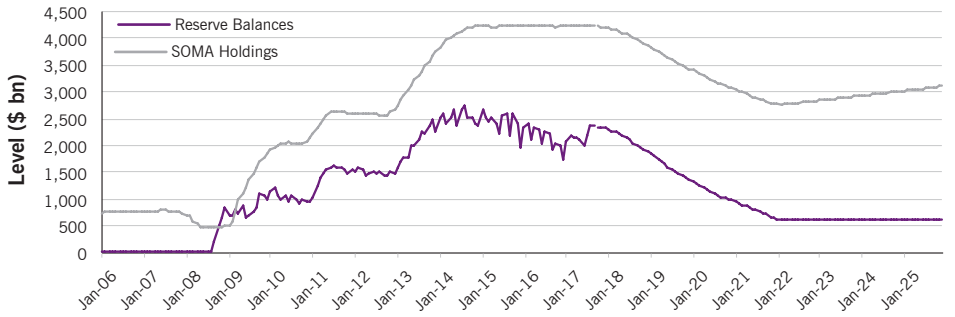
Outlook on Pace of Policy Firming, as of June 2018



Source: U.S Federal Reserve, Bloomberg.

Figure 2

Primary Dealer Expectations on Fed Reserves and Holdings, Jan 2006——Dec 2025



Source: U.S Federal Reserve.

or "overpriced assets," upward pressure on short-term rates due to heavy U.S. Treasury borrowing, and the sort of flat or inverted yield curve that has signaled recessions in the past.

• It is unclear whether the Fed will navigate smoothly around the above-mentioned risks.

• A consensus seems to be emerging that the Fed's balance sheet will not contract as sharply as expected previously.

The Macroeconomic Environment

Political Risk. Political risk can affect financial markets and, in turn, the real economy. While tensions about North Korea subsided after the Trump——Kim summit, trade tensions are increasing. It remains to be seen whether the President's tweets about trade are simply "Art of the Deal" theatrics[1] or whether a serious trade war will break out.

Economic growth. Although U.S. economic indicators were sluggish earlier this year, the forecast for the remainder of the year is strong, and significantly above most estimates of its long-term trend. Fiscal stimulus has been strong with interest rates still historically low. Real GDP will likely pick up in the next few quarters as consumer spending, income gains, consumer confidence, and employment prospects remain strong.

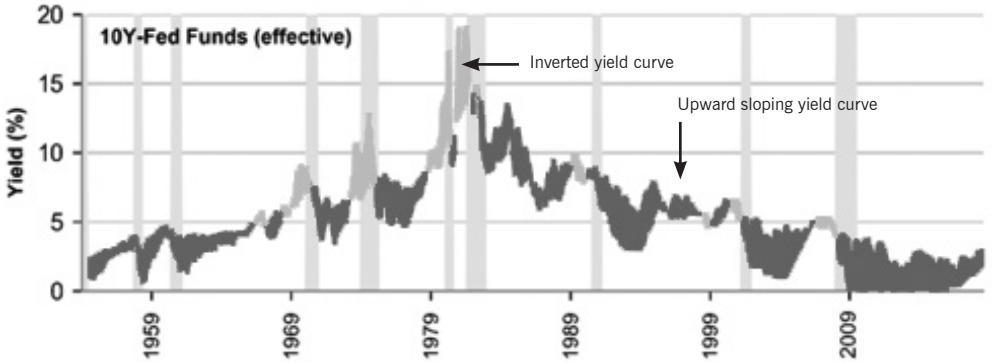
The U.S. unemployment rate is below most estimates of its long-term level. The Fed believes that high demand for workers will support wage growth and more employment and a tight labor market may support productivity growth as businesses invest more in technology and training.

Internationally, risks are higher in the Euro area because of political developments in Italy. Because inflation is lower than expected in Europe and Japan, the monetary policies of those countries will likely differ from those in the US.

1 See Donald J. Trump and Tony Schwartz, 1987, "*The Art of the Deal*," Ballantine Books. New York, NY.

Figure 3

Historical Treasury Rates and Slope of the Yield Curve, December 1954–July 2018



Source: Bloomberg, Federal Reserve Bank, Computations by Ramirez & Co.
Shaded bars represent recessions.

Rising U.S. interest rates, energy prices, and a strong dollar have caused capital outflows and financial distress in some emerging markets such as Argentina, and Turkey.

The Federal Reserve. A decade after the major financial crisis, the Fed seems to have been broadly successful in delivering low inflation and full employment, as hoped. The Fed is now on its next policy of "normalization" where it will gradually increase the federal funds rate to around 3 percent (see Figure 1 for the dot diagrams), and will passively contract its balance sheet (see Figure 2). Despite risks such as bear markets and rising Federal debt, the Fed will likely complete this policy phase by 2019-2020.

The European Central Bank (ECB), on the other hand, will continue to make asset purchases at €30B/month until end-September 2018, and at €15B/per month until end-December 2018, after which it will stop, depending on incoming data. ECB's policy rates remain stuck at minus 40 basis points to zero basis points.

The Yield Curve. Many observers worry about an inversion of the yield curve because, historically, such inversions have often predicted recessions in the U.S. Since 1960, there has been only one case where the yield curve has inverted and a recession has not followed——in 1966 (see Figure 3).

Yield curve inversions often signal recessions either because the Fed causes short term-rates to rise relative to long-term rates, or because long-term rates decline relative to short-term rates, perhaps reflecting a flight to safety. Having watched the yield curve flatten somewhat, I find two things noteworthy: 1) the 10-Year rate is unusually low and 2) the difference between 10-Year and the 3-Month rates has narrowed in recent years, possibly because both central banks and investors have been buying short-term assets heavily. Nonetheless, the Fed expects that the 10 year/3 month difference will rise by about 100 basis points in the medium term (see Figure 4).

Because term-premiums are very low, any amount of monetary policy tightening may cause an inversion. Nonetheless, term premiums may recover somewhat from their recent depressed levels because of the gradual runoff of the Fed's balance sheet but are unlikely to return to the high levels (steep yield curve) of prior years.[2]

Interest Rate Forecasts. As reflected in Figure 1, Federal Open Market Committee (FOMC) participants expect that the federal funds rate will stabilize around 3 percent in the longer run, suggesting a 1percent real rate and a 2 percent inflation rate. There will be variations around this central tendency, however, which I regard just as "noise." Other observers, such as St. Louis Fed President James Bullard, believe the equilibrium rate, known as r* ("R star"), has declined from historical levels largely due to demographics, declining productivity, and increased demand for safe assets.[3]

Major Wall Street Banks (see Figure 5) provide different forecasts. Some see 10-year rates rising only to 2.5 percent over the next year while others expect increases reaching 3.5–4 percent. The dispersion of 10-Year Treasury rate forecasts increase further more than one year out (though not reflected in this Figure).

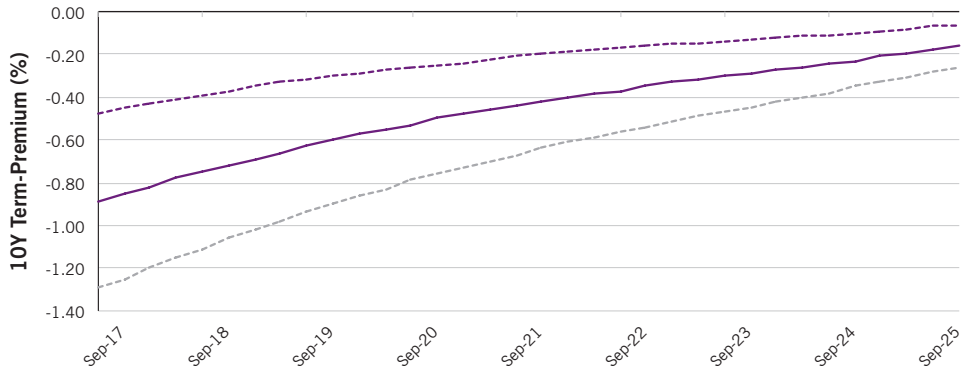
My own *base-case forecast* is that the federal funds rate will rise to about 3 percent, and the 10-Year to about 4 percent, in a year or two, with the term premium increasing by 100

2 Brian Bonis, Jane Ihrig, and Min Wei, 2017, "Projected Evolution of the SOMA Portfolio and the 10-year Treasury Term Premium Effect," *FEDS Notes. Washington: Board of Governors of the Fed eral Reserve System, September 22, 2017*, https://doi.org./10.17016/2380-7172.2081.

3 James B. Bullard, 2018, "R-Star Wars: the Phantom Menace," *Business Economics, Volume 3, Issue 2*, 60-65.

Figure 4

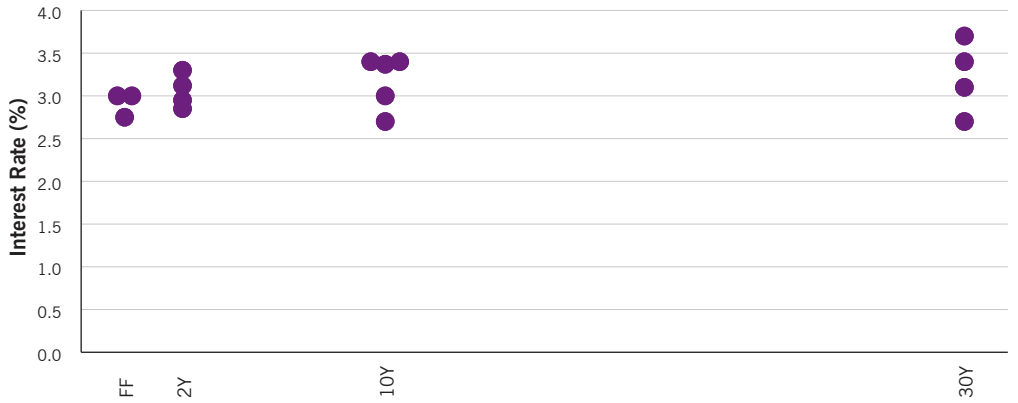
Historical Treasury Rates and Slope of the Yield Curve, December 1954–July 2018



Source: Bloomberg, Federal Reserve Bank, Computations by Ramirez & Co.

Figure 5

Major Bank Rate Projections, as of June 2018, *(Surveyed Projections, 2Q 2019)*



Source: Wall Street Research, Bloomberg, Calculations by Ramirez.

basis points as discussed above. Under my bullish economic scenario, rates would rise even more while under my bearish scenario, the federal funds rate will remain at or below current levels with 10-Year Treasuries yielding about 2.5 percent.

The Interest Rate and its Drivers

Figure 3 shows how U.S. interest rates (including both 10-Year U.S. Treasuries, and the federal funds rate) have moved from the early 1950s to the present. We can divide this 60-year time span into two primary periods, a roughly 30-year increase in interest rates and a roughly 30-year decline in interest rates. The first period culminated when Federal Reserve Chairman Paul Volcker doubled the federal funds rate from 10.25 percent to 20 percent in March 1980 in order to end double-digit inflation. The second period is almost a mirror image of the first, with the second culminating when the Fed lowered the federal funds rate to between of 0 and 25 basis points in December 2008, and kept it at that level till December 2015.

The question is whether we will completely reverse the trend of the last 30 years and live with steadily rising interest rates again.

Although interest rates have increased a bit recently, they are still very low by historical standards. According to financial historians Sidney Homer and Richard Sylla, interest rates were around 20 percent in the Babylon of 1772 B.C., 40+ percent in 539 B.C. when King Cyrus took Babylon, 20 percent in the Venice of the 1430s, and an average of 15.84 percent in the 1980s, during the Reagan administration.[4]

4 Sidney Homer and Richard Sylla, 2005. "*A History of Interest Rates*," John Wiley & Sons, Inc. Hoboken, New Jersey.

Figure 6

Statistical Distribution of the 10Y Real Rate of Interest, Aug 1999–Aug 2018

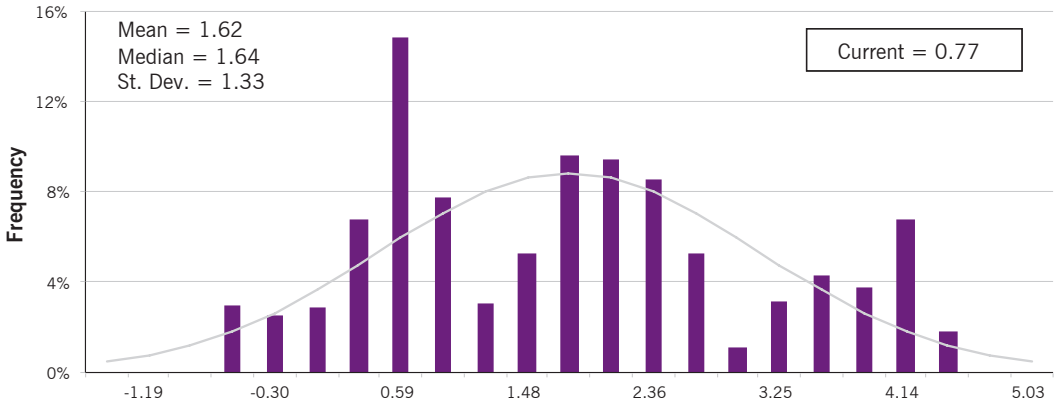


Figure 7

Statistical Distribution of the 10Y Expected Inflation, Aug 1999–Aug 2018

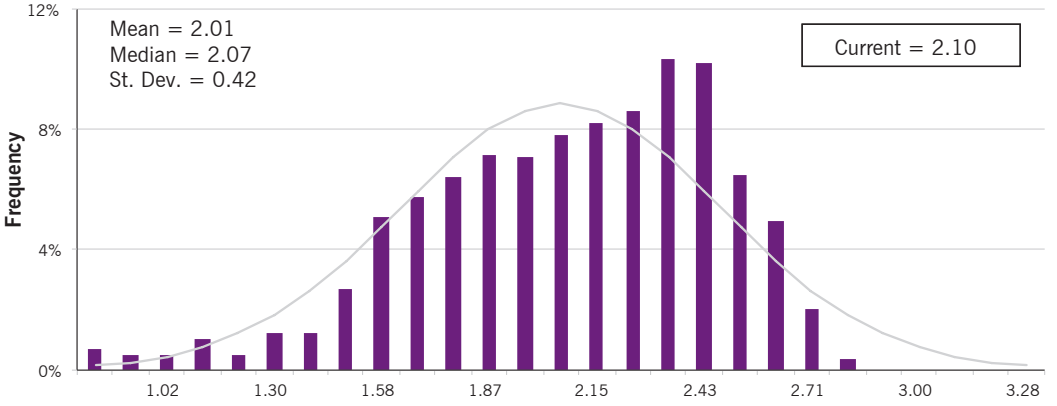
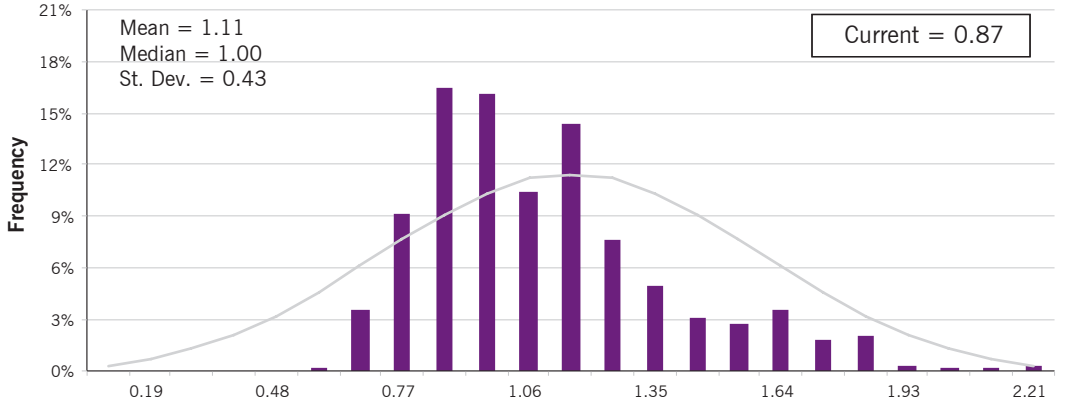


Figure 8

Statistical Distribution of 10Y, A-Rated Industrial Company Credit Spreads, Aug 1999–Aug 2018



To understand the behavior of the rate of interest, we need to understand its three components. The nominal rate of interest should equal 1) the real rate of interest plus 2) inflationary expectations plus 3) a credit spread. Figures 6-8 plot the histograms of each of these interest rate components for the period August 1999–August 2018.

Figure 9

Statistical Distribution of U.S. Real GDP Growth, Q2 1953–Q2 2018

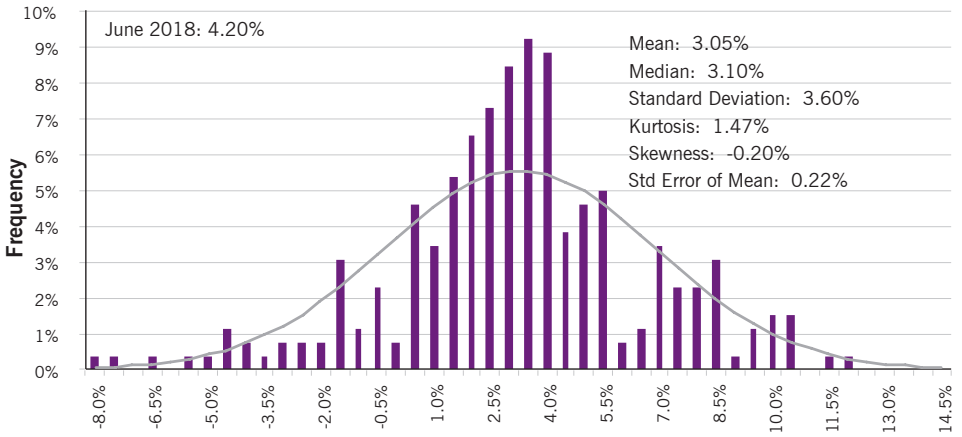
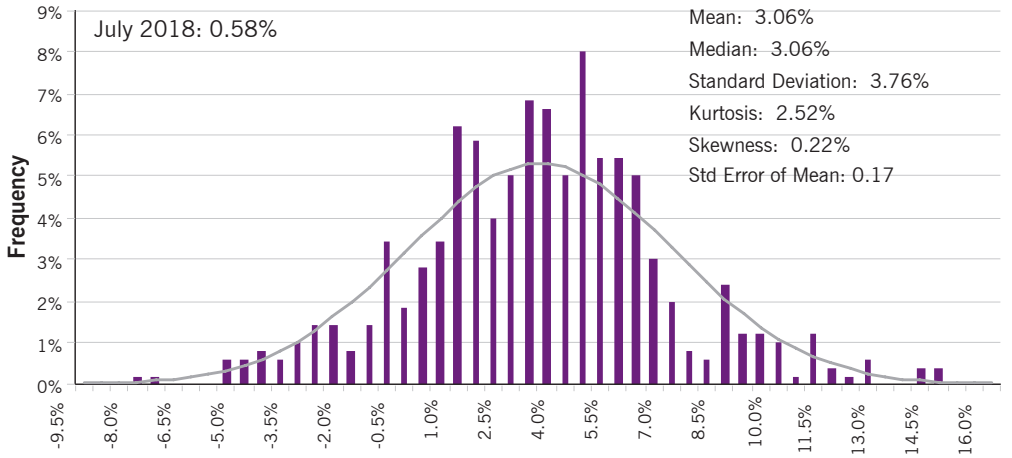


Figure 10

Statistical Distribution of U.S. 30Y Real Interest Rates, Feb 1977–Jul 2018



And, Figures 9 & 10 plot the histograms of U.S. real GDP growth and U.S. 30-Year Treasury rates respectively for the periods Q2 1953–Q2 2018 and February 1977–July 2018.

The graphs above suggest the following:

• In the long run, the real rate of interest converges to real GDP, as would be predicted by conventional theory,

• The current real rate of interest is significantly below its historical mean, and correspondingly below the growth rate of real GDP,

• The current inflation rate and credit spread are not significantly different from their historical means.

I therefore conclude that if interest rates were to rise above current levels, they will do so because:

• The real rate of interest rate will revert to its historical pattern of approximating real GDP growth, and/or

• The inflation rate will significantly increase beyond its current level of 2 percent, and

• I do not expect significant variation around the credit spread.

I believe the real rate of interest is significantly below its historical mean for two reasons:

1. Real GDP growth in the U.S. and in the rest of the developed world will not be 3 percent annually as in the past but only around 2 percent, because of declining demographics and weak productivity growth,

2. As Jim Bullard notes,[5] the equilibrium r* (R- star) has fallen below real GDP growth due to increased demand for safe assets and ballooning Central Bank balance sheets.

5 James B. Bullard, 2018, "R-Star Wars: the Phantom Menace," *Business Eco-*

Figure 11

Cost of a Barbell Funding Strategy vs. Cost of Corresponding Maturity Bond, 19 July 2018

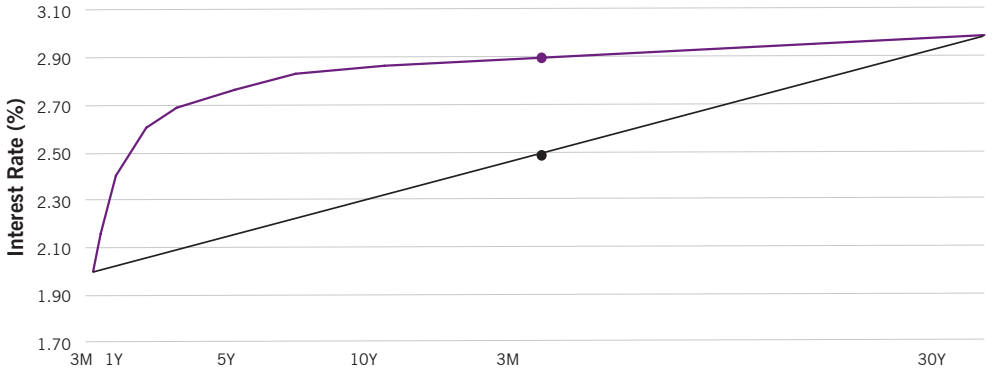
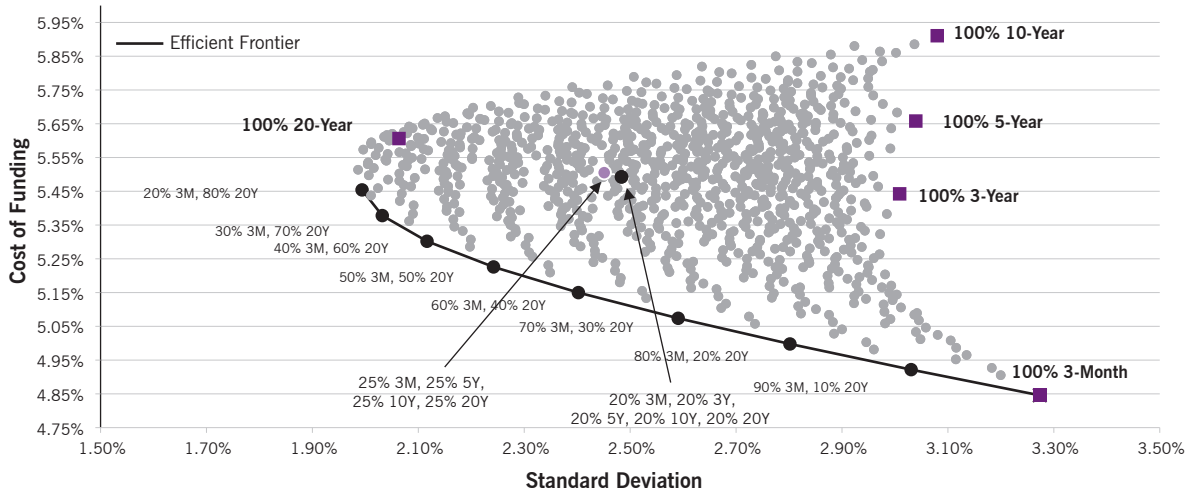


Figure 12

Liability Portfolio Efficient Frontier in a Mixed Interest Rate Environment, Apr 1953–Jan 2015, *(Using Treasury Rates)*



Funding Strategies

This macroeconomic environment suggests that an optimal funding strategy might be a barbell, consisting of both short-term and long-term borrowings. If the yield curve is upward sloping, a blend of 3-Month and 30-Year interest rates would actually be lower than a 15 year interest rate (roughly the midpoint of 3 month and 30 years) as long as the rising yield curve is "convex", as is usually the case (see Figure 11).

Intuition may show that a barbell strategy is optimal, but it also has a mathematical basis. In a 2013 article, I showed empirically that a barbell funding strategy is on the efficient frontier,[6] i.e. the curve tracing the lowest cost and lowest standard deviation points (see Figure 12).

I construct this efficient frontier by building all the possible combinations of portfolios consisting of five instruments (3M, 3Y, 5Y, 10Y, and 30Y) in ten percentage point increments, and calculating the cost and the standard deviation associated with each portfolio. The three-month (3M) represents the shortest maturity, while the three-year (3Y), the five-year (5Y), and the ten-year (10Y) represent medium maturities. The 20-year (20Y) represents the longest maturity.[7]

Nonetheless, if the yield curve is exceptionally flat, or if roll-over risk arising out of a general economic crisis is a concern, the

nomics, Volume 3, Issue 2, 60-65.

6 See Niso Abuaf, 2013, "The Macroeconomic Outlook and Liability Management Strategies," *Journal of Applied Finance*, 2.

7 I would have liked to use the 30-year but this data series is not continuous as there have been episodes when the U.S. Treasury has not issued the 30-year. I source my data from the *Federal Reserve Board (FRB) Selected Interest Rates Publication*–H. 15. All the time series are continuous, except for the 20-Year which has missing data from January 1987 to September 1993. I replaced the missing data points by interpolating the 10Y and 30Y interest rates.

Figure 13
Liability Portfolio Efficient Frontier, May 1994–Jan 2014, *(Using Shock-Adjusted SWAP Rates)*

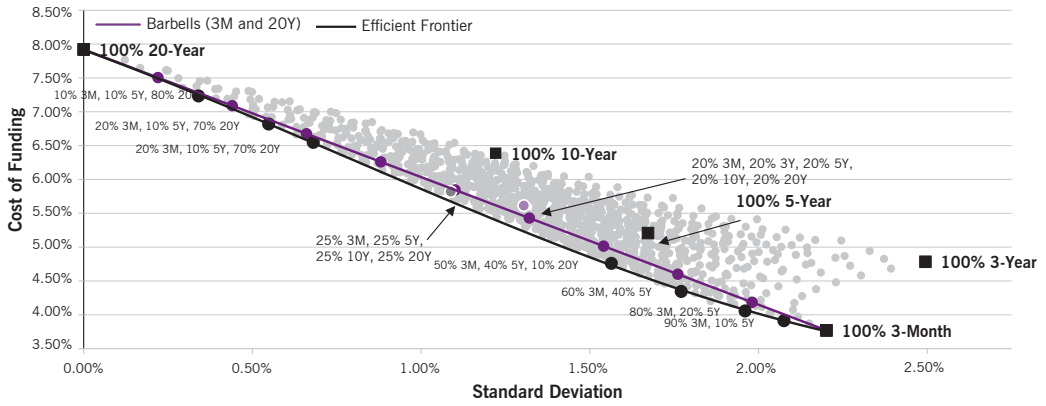


Table 1
Breakeven Analysis

Average "BBB" Rated Industrial Yields as of 7/11/2018	
10Y Rate	4.33%
20Y Rate	4.45%
30Y Rate	4.57%
BE Rate	4.81%
Δ to BE	36 bps

Average "BBB" Rated Industrial Yields as of 7/11/2018	
5Y Rate	3.78%
10Y Rate	4.33%
BE Rate	5.02%
Δ to BE	125 bps

Source: Bloomberg. Computations by Ramirez & Co

CFO may prefer a flatter maturity profile by issuing mid-term maturities such as 5-year or 10-year (see Figure 13).

Once the efficient frontier is delineated, the CFO can choose a mix of fixed and floating interest rates consistent with the enterprise's pain tolerance for interest rate volatility. The mix of fixed and floating rates should also reflect the choices made by other firms in the same industry because of competitive considerations. In speaking to a variety of companies, I have found that floating-rate exposures are typically in the 10-20 percent range.

Breakeven Levels for Short- and Long-Ends of the Yield Curve

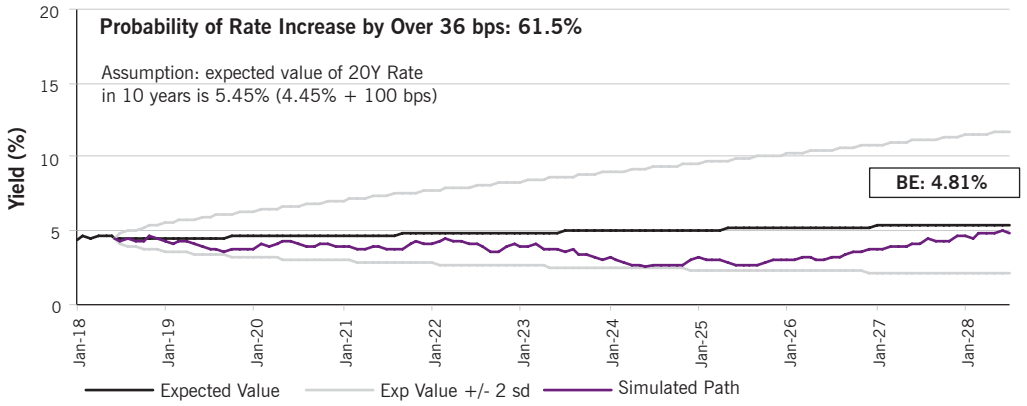
Deciding what maturities are optimal should depend heavily on break-even analysis. A company may be able to choose between issuing either a 30-Year bond today or issuing a 10-Year note now and issuing a twenty note ten years from now. The decision to go one way or the other, depends on the 20-Year rate 10 years from now (the forward rate) as well as current yields. Table 1 presents these breakeven (BE) rates associated with these strategies, for BBB-rated industrial companies, using the present value of cash flows associated with each strategy.

Table 1 shows that if the 20-Year rate rises by more than 36 basis points over the next 10 years, then the 30-Year funding strategy would be the cheaper alternative. Similarly, if the 5-Year rate 5 years from now rises by more than 124 basis points, the 10-Year would be cheaper than issuing successive five year notes.

This does not depend upon subjective interest rate forecasts, either. If interest rates follow a "random walk with drift," (represented by the natural logarithm) then the drift term and the annualized standard deviation ("volatility") of interest rates determine the underlying probability distribution.

Figure 14

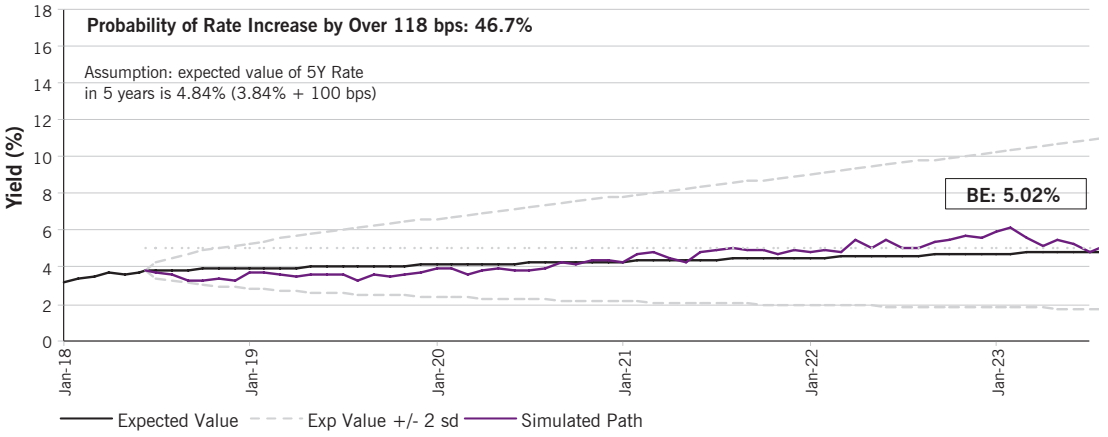
20Y Interest Rate Cone Over 10 Years, June 2018



Assumption: expected value of 20Y Rate in 10 years is 5.45% (4.45% + 100 bps)
Source: Bloomberg. Computations by Ramirez & Co.

Figure 15

5Y Interest Rate Cone Over 5 Years, June 2018



Assumption: expected value of 5Y Rate in 5 years is 4.78% (3.78% + 100 bps)
Source: Bloomberg. Computations by Ramirez & Co.

To illustrate, the results illustrated and summarized in Figures 14 and 15, and in Table 2 assume 13.5 percent annual volatility based on the standard error of the auto regression of the logarithm of the 20-Year Bloomberg BBB industrial index and 20 percent volatility based on the 5-Year Bloomberg BBB industrial index.

Some of the highlights of these observations are:

• If the 20-Year rate increases by 100 basis points (the drift term) over the next 10 years, the probability of breaching the breakeven is 61.5 percent. Given our base case macroeconomic scenario, I would recommend a 30-Year financing versus a 10-Year financing.

• If the 5-Year rate increases by a 100 basis points over the next 5 years, the probability of breaching the breakeven is almost 48 percent. This observation and our macroeconomic base case suggest that the choice between funding for 10 versus 5 years is more of a toss-up, than the 30 versus 10 plus 20 years case.

• If we believe that rates will increase significantly, say by 200 basis points and beyond, than according to Table 2, the probability that the 30-Year would be the cheaper alternative

Table 2

Issuing 30Y now vs. 10Y + 20Y, and 10Y now vs 5Y + 5Y

Probability that a Single 30Y Tranche is Cheaper than 10Y + 20Y Strategy	
Expected 20Y rate in 10 years	Probability Single 30Y is cheaper
4.45% (today)	43%
Today +50bp	53%
Today +100bp	61%
Today +150bp	69%
Today +200bp	75%

Probability that a Single 10Y Tranche is Cheaper than 5Y + 7Y Strategy	
Expected 5Y rate in 5 years	Probability Single 10Y is cheaper
3.76% (today)	27%
Today +50bp	36%
Today +100bp	46%
Today +150bp	54%
Today +200bp	62%

Source: Bloomberg. Computations by Ramirez & Co.

is 75 percent; while the probability that the 10-Year is the cheaper alternative is 62 percent.

Conclusion

According to the seminal Miller and Modigliani (M&M) theorem[8] and its logical extensions, changing the maturity profile of a firm's debt or of its fixed versus floating interest rate mix will have no impact on the value of the firm. So, for debt structure and liability management decisions to matter, one or more of the footnoted "perfection assumptions" will need to be at least slightly imperfect.

Until fairly recently, very few scholarly articles were published on the optimal maturity structure of debt. Almost all of this new research focuses on some aspect of the M&M imperfections delineated above. For example, researchers have shown recently that,

> *"Long debt maturities eliminate equity holders' incentives to reduce leverage when the firms performs poorly. By contrast, short debt maturities commit equity holders to such leverage reductions. However, shorter debt maturities also lead to higher transaction costs when maturing bonds must be refinanced. We show that this tradeoff between higher expected transaction costs against the commitment to reduce leverage when the firm is doing poorly motivates an optimal maturity structure of corporate debt. Since firms with high costs of financial distress benefit most from committing to leverage reductions, they have a stronger motive to issue short-term debt."*[9]

By contrast, most of the existing literature predicts that a lot of short-term debt leads to early default. But looking at matters as I do here, an upward sloping yield curve can easily make short-term debt cheaper than long term although that comes at the cost of higher volatility. It follows that in a flatter yield curve environment, longer maturities may be more attractive.

If a company's revenues are highly correlated with short-term rates, as is the case with major retailers, where sales may have nearly a 40–50 percent correlation with Libor, that company should keep maturities relatively short.

That said, if my base case scenario holds, that interest rates increase 100 basis points across the curve, CFOs should lengthen maturities now. This is especially true for issuing 30-Year versus 10 plus 20 years, but less so for issuing 10-Year versus 5 plus 5 years.[10]

My Alternative 1 scenario assumes even higher future interest rates than the base case, making long maturities that much more attractive. Under my Alternative 2 scenario (a very pessimistic scenario), where the economy does poorly, trade wars increase in intensity, and financial stress increases due to the bursting of some asset bubble somewhere, compa-

8 That is, assuming perfect capital markets with no taxes, no transaction costs, no bankruptcy or distress costs, no agency costs, no information asymmetries and no signaling, no accounting illusions, no clientele effects, no behavioral-finance type anomalies or imperfections of any sort, no impediments to capital-markets access, and no market under or over-reactions. See Franco Modigliani and Merton Miller, 1958. "The Cost of Capital, Corporation Finance and the Theory of Investment," *American Economic Review 48* (No. 3), 261-297; and Franco Modigliani and Merton Miller, 1961, "Dividend Policy, Growth and the Valuation of Shares," *Journal of Business 34 (no. 4)*, 411-433.

9 See Thomas Dangl and Josef Zechner, 2016, "Debt Maturity and the Dynamics of Leverage," Center for Financial Studies Working Paper Series, No. 547, Goethe University, Frankfurt am Mein, Germany.

10 My bias towards issuing longer-term maturities is further explored in Niso Abuaf, 2012, "Issuing 50 to 100-Year Bonds," *Journal of Applied Finance*, 1.

Table 3

Issuing 30Y now vs. 10Y + 20Y, as a Function of the 30Y-10Y Slope and Expected Drift in 10 Years

		Expected Drift 20Y in 10 Years (bps)				
		+0	+50	+100	+200	+500
Increase in Slope between 30Y and 10Y rates today (bps)	+0	43.2%	53.0%	61.7%	75.5%	94.3%
	+25	36.6%	46.0%	54.7%	69.2%	91.6%
	+50	31.0%	39.7%	48.1%	62.9%	88.3%
	+75	26.2%	34.2%	42.1%	56.8%	84.6%
	+100	22.2%	29.4%	36.8%	50.9%	80.5%
	+125	18.8%	25.2%	32.0%	45.5%	76.1%

← Current slope

Light Purple: Probability a single 30Y is cheaper than a 10Y followed by a 20Y
Medium Purple: Probability a 10Y+20Y is cheaper than a 30Y

nies are better off with shorter maturities. CFOs who share the view of the St. Louis Fed's James Bullard's, should weight their liabilities towards the short end.

Putting it all together, Table 3 summarizes the probability of the 30Y being the cheaper strategy versus the 10Y +20Y, as a function of the slope of the yield curve and the ex pected drift term 10 years out. We observe that as the yield curve flattens and the drift increases, the probability that the 30Y will be the cheaper strategy increases.

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