

The Yield Curve and Monetary Policy in 2018

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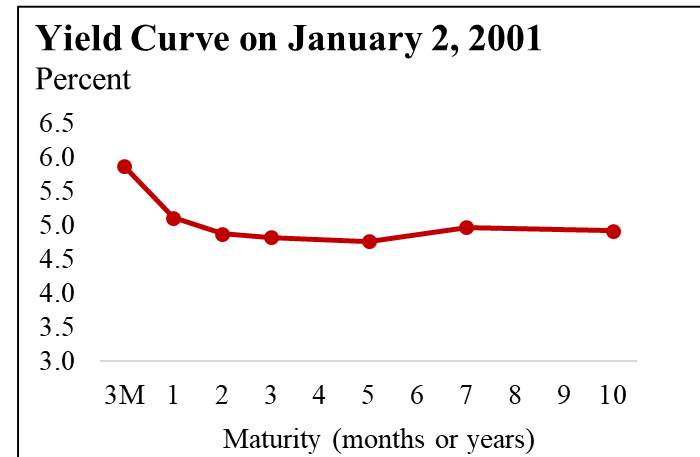
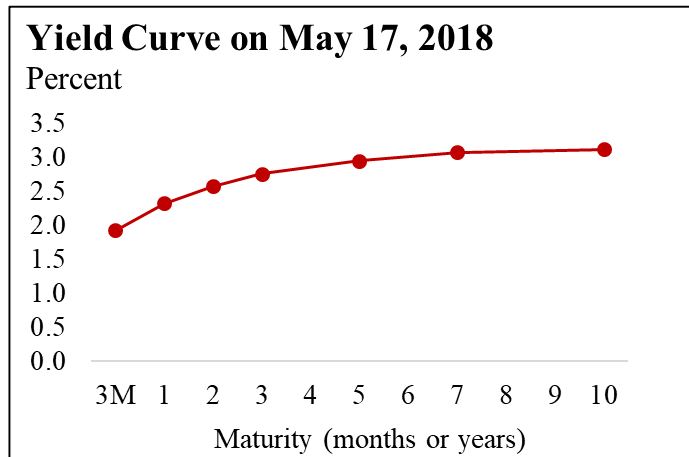
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What Is the Yield Curve?

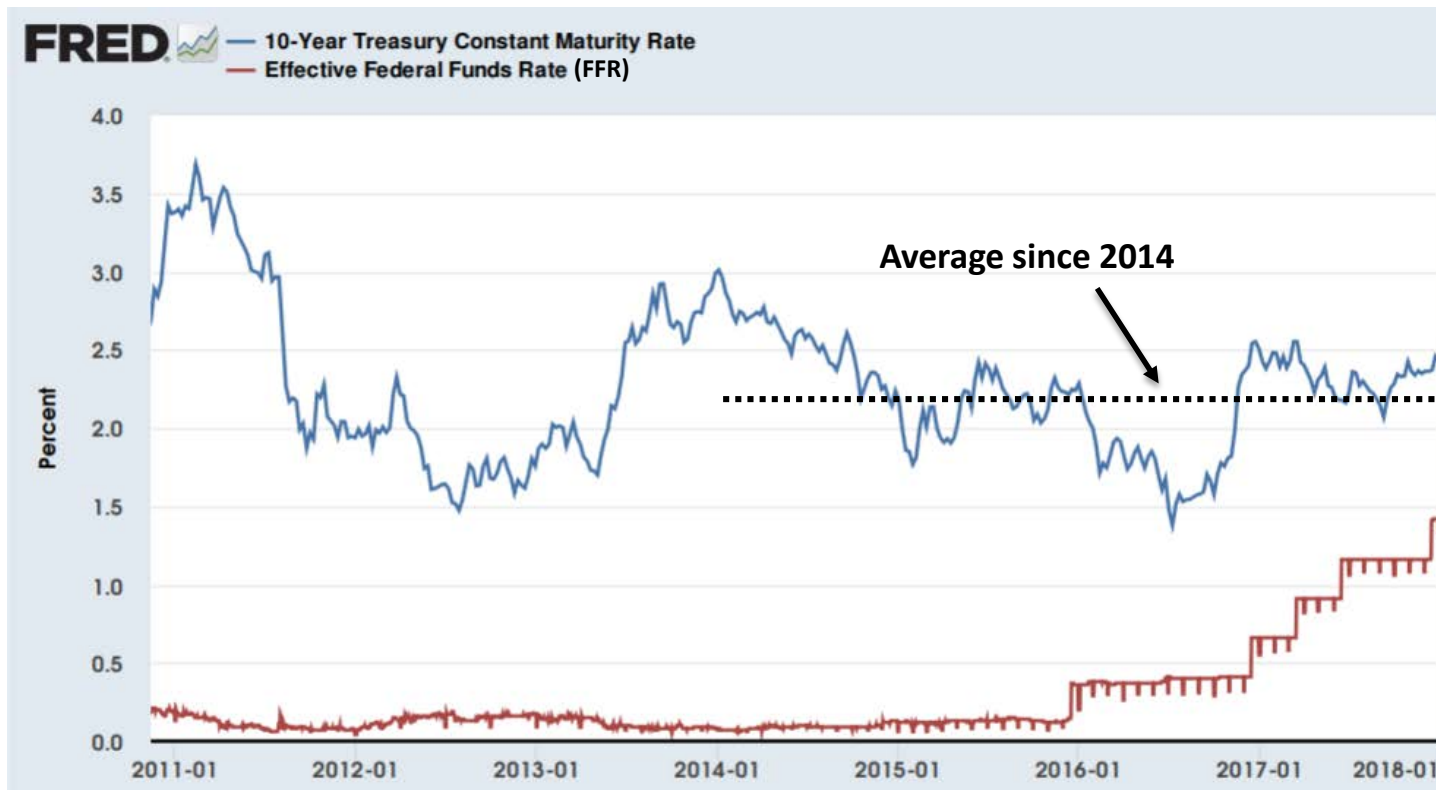
- The **yield curve** is a plot of a Treasury bond's maturity against its rate of return at a given point in time.
- While the curve normally slopes upward, on rare occasions the slope turns negative.



The Yield Curve Has Flattened

- The yield curve is often discussed in terms of a **spread**.
- Between Dec. 2015 and Jan. 2018, the Federal Open Market Committee (FOMC) raised the policy rate five times.
- Over this period, the 10-year Treasury yield remained relatively stable.
- As a result, the spread between the 3-month Treasury yield and 10-year Treasury yield *narrowed* by 109 bps.

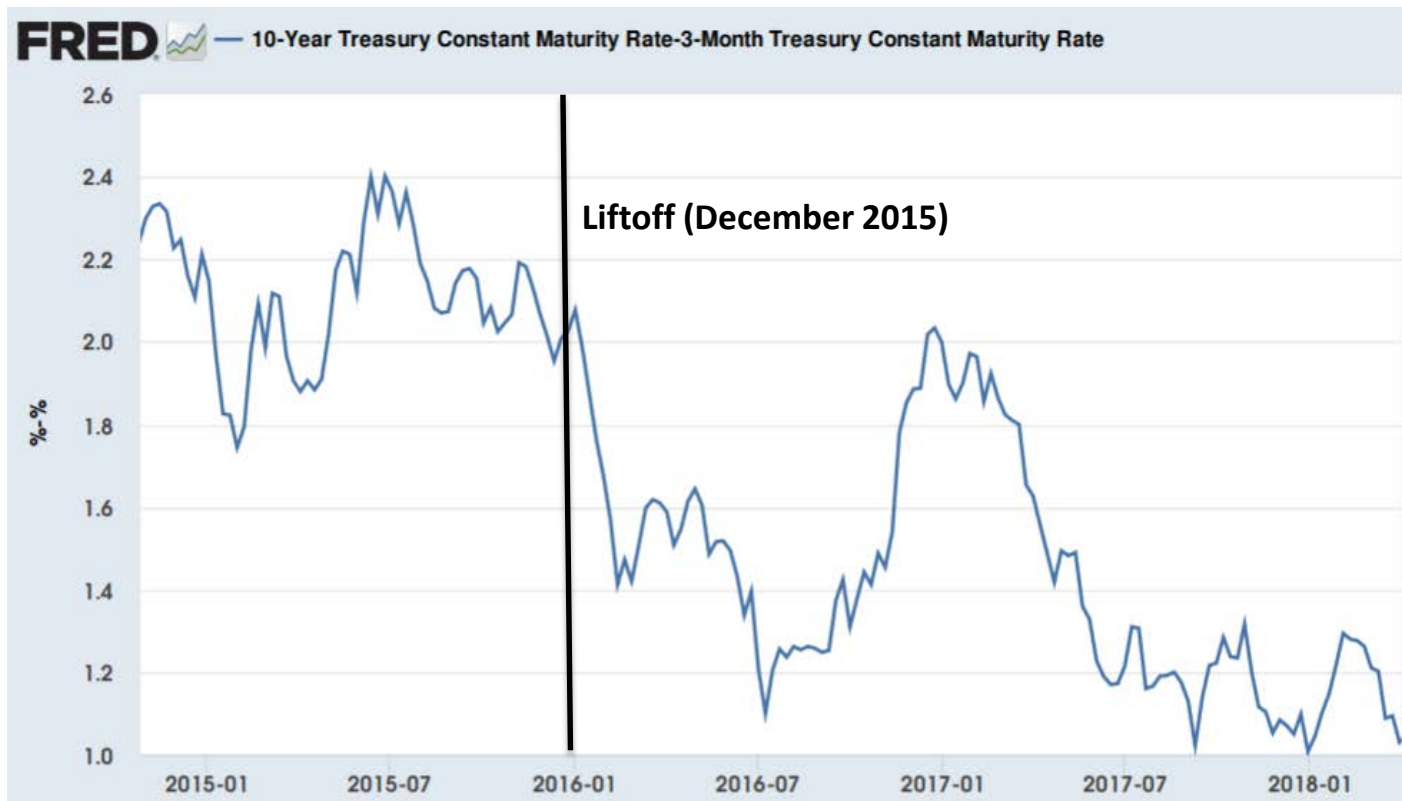
Flattening Due to Rising Short-Term Rates



Graph shows data through first week of January 2018.

Source Board of Governors of the Federal Reserve System (US)

The Spread Has Declined



Graph shows data through first week of January 2018.

Source Board of Governors of the Federal Reserve System (US)

Why Does This Matter?

- If this spread continues to narrow, the FOMC risks **inverting** the yield curve.
- Since inversion often comes before recessions, the yield curve is viewed as a useful leading indicator.
- As a result, the FOMC will have to carefully assess the pace of tightening moving forward.

Key Questions

1. What information does the yield curve contain?
2. Why does the yield curve invert before recessions?
3. What factors currently influence the risk of inversion?

What Information Does the Yield Curve Contain?

Expectations of Short-Term Rates

- The yield curve is a factor of several components.
- Let's begin by considering the choice of holding a two-year bond versus a sequence of one-year bonds.
- Investors will alter their demands for these two options until they have the same average rate of return over two years.
- Accordingly, the yield curve is shaped based on **expectations of short-term rates** – our first component.

Expectations of Short-Term Rates (cont.)

- We can again think of this as a spread: the difference between the nominal yield on a two-year bond and that on a one-year bond, for example.
- When this spread is positive, the yield curve slopes up.
- This implies expected short rates are predicted to rise.
- **Problem:** The spread is almost always positive in the data, but we cannot expect short rates always to be increasing!

Accounting for Risk

- This brings us to our second component – **risk**.
- We priced this bond without any discussion of risk, liquidity or safety value of the longer-dated bond.
- So there is typically a *term premium* that investors demand to hold long-dated assets.
- Most of the time this premium is positive but sometimes it is very small or even negative (as it is now).

Putting It All Together

- We now know that (1) expected short-term rates and (2) risk influence nominal bond yields.
- We can take this one step further and break expected short-term rates into a real component and an inflation component.
- Thus, the spread is determined by **expected** changes in the real rate of return and inflation, in addition to risk.
- These components reflect current monetary policy and the outlook for key economic variables.

Why Does the Yield Curve Invert before Recessions?

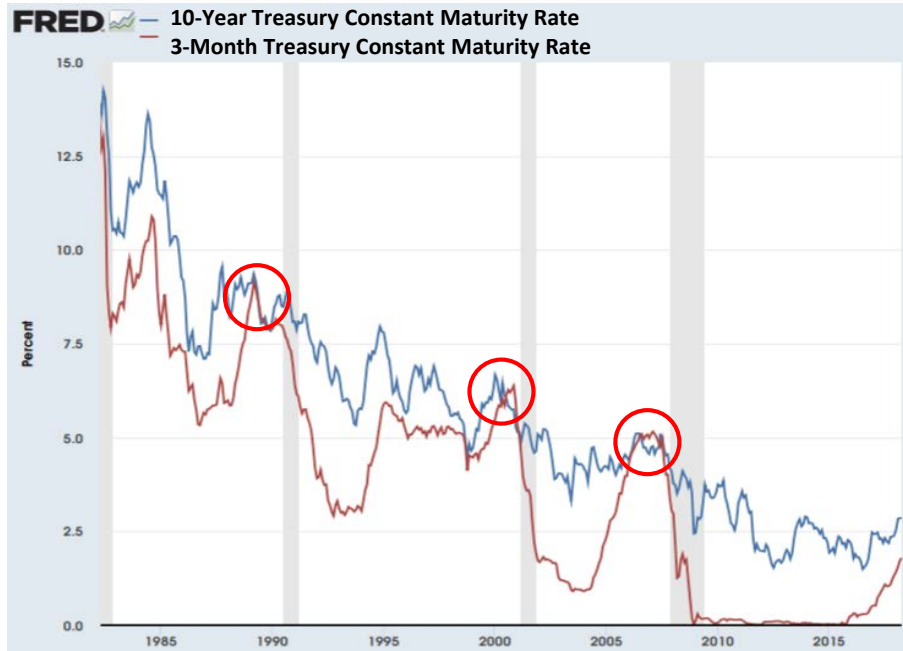
What Leads to a Negative Slope?

- The yield curve will have a negative slope if investors believe real interest rates and/or inflation will fall notably.
- Real rates fall when productivity drops.
- Inflation tends to fall when there is excess supply of goods and services.
- Both tend to happen in recessions.

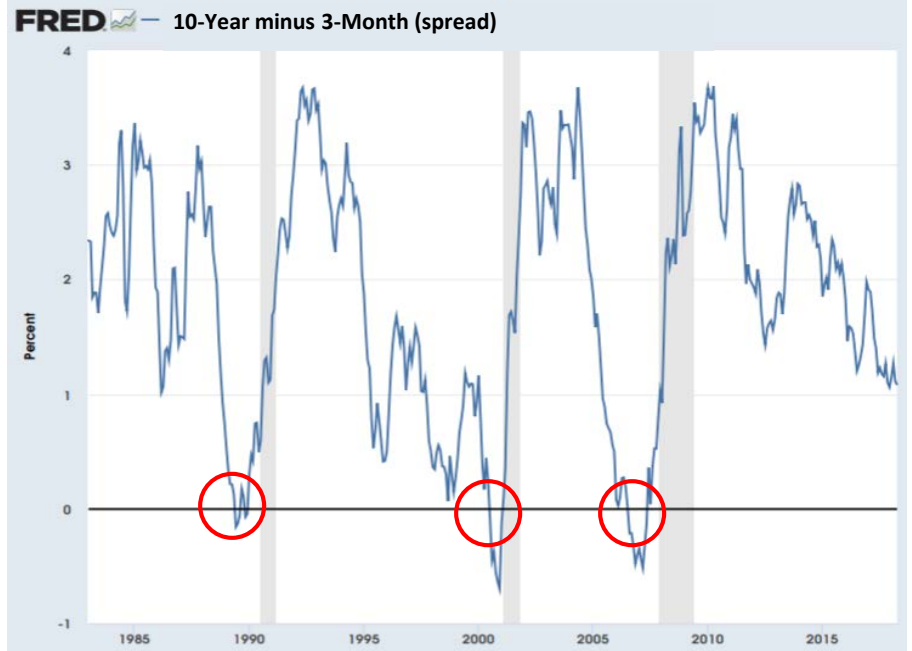
What Leads to a Negative Slope? (cont.)

- Additionally, if investors' outlook worsens, they flock to safe assets. This pushes up the price, which lowers the return.
- As such, an inverted yield curve is the market's sign of a pessimistic outlook.
- Important distinction: The yield curve is a **signaling mechanism**; it does not in and of itself cause a downturn!
- How well does a negatively sloped yield curve actually predict recessions? Let's look at the data.

Inversions Occur Before Recessions



Shaded areas indicate U.S. recessions Source Board of Governors of the Federal Reserve System (US)



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Post-WWII Yield Curve Inversions

First Month of Inversion	First Month of Recession	Months Between First Inversion and Recession
N/A	Aug-1957	N/A
N/A	Apr-1960	N/A
Sep-1966	Dec-1969	39
Jun-1973	Nov-1973	5
Dec-1978	Jan-1980	13
Nov-1980	Jul-1981	8
Jun-1989	Jul-1990	13
Jul-2000	Mar-2001	8
Aug-2006	Dec-2007	16
Average:		15

7 for 9—not a bad batting average!

Recessions begin a little more than a year after the inversion.

Note: The yield curve is defined as the 10-year Treasury yield minus the 3-month Treasury yield.

Source: Federal Reserve Board and author's calculations.

Outlook for the Yield Curve

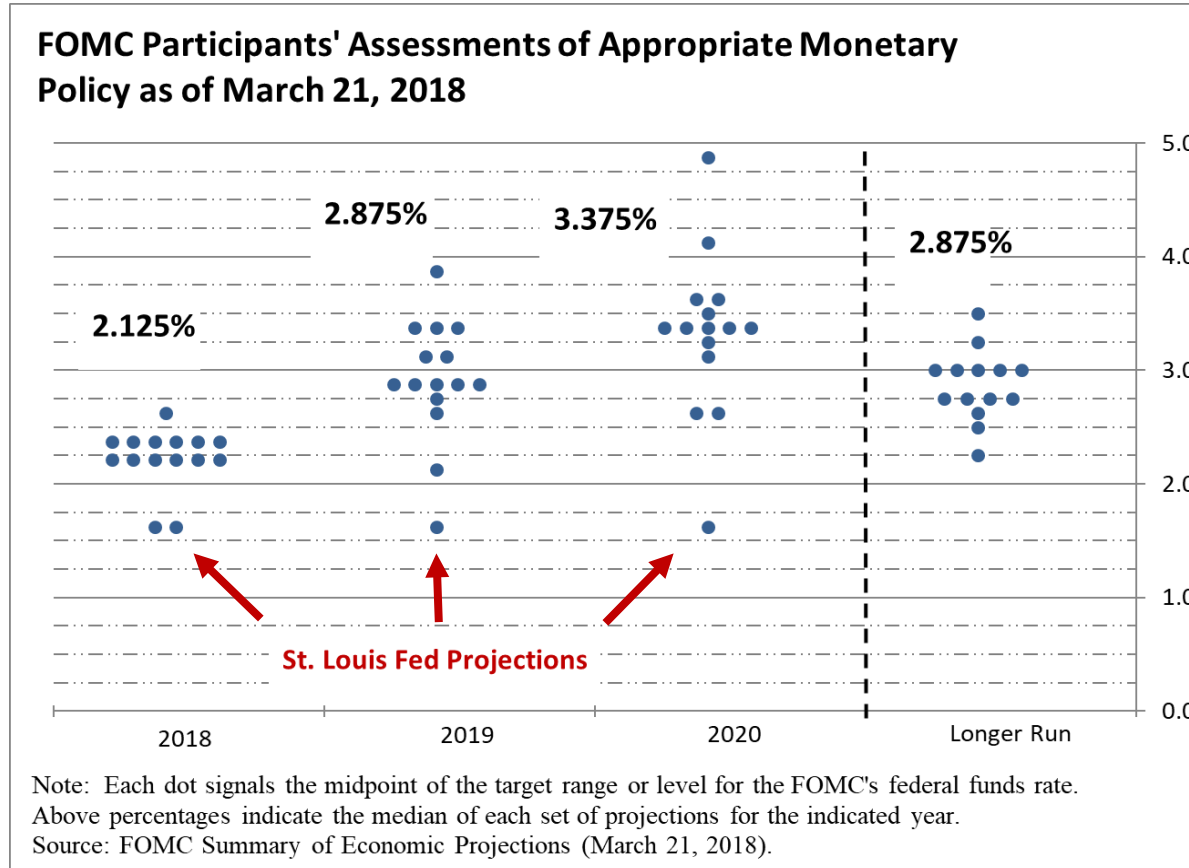
- The likelihood of an inversion depends on the future path of short- and long-term rates.
- Short-term rates move in tandem with the policy rate, which is set by the FOMC.
- Longer-term rates are factors of Treasury supply/demand, influenced by expected inflation and a term premium.
- We will discuss each of these in detail.

Factors Influencing Inversion: Short-Term Rates

Path of Short-Term Rates

- Short-term rates depend on the FOMC's assessment of the economy, which has remained upbeat.
- The median FOMC projection indicates a higher trajectory of policy rate hikes (two more in 2018, three in 2019).
- Markets are slightly more hawkish, but have aligned with the Fed throughout this tightening cycle so far.
- However, these diverge with the St. Louis Fed's projections, which call for a flat policy rate over 2018.

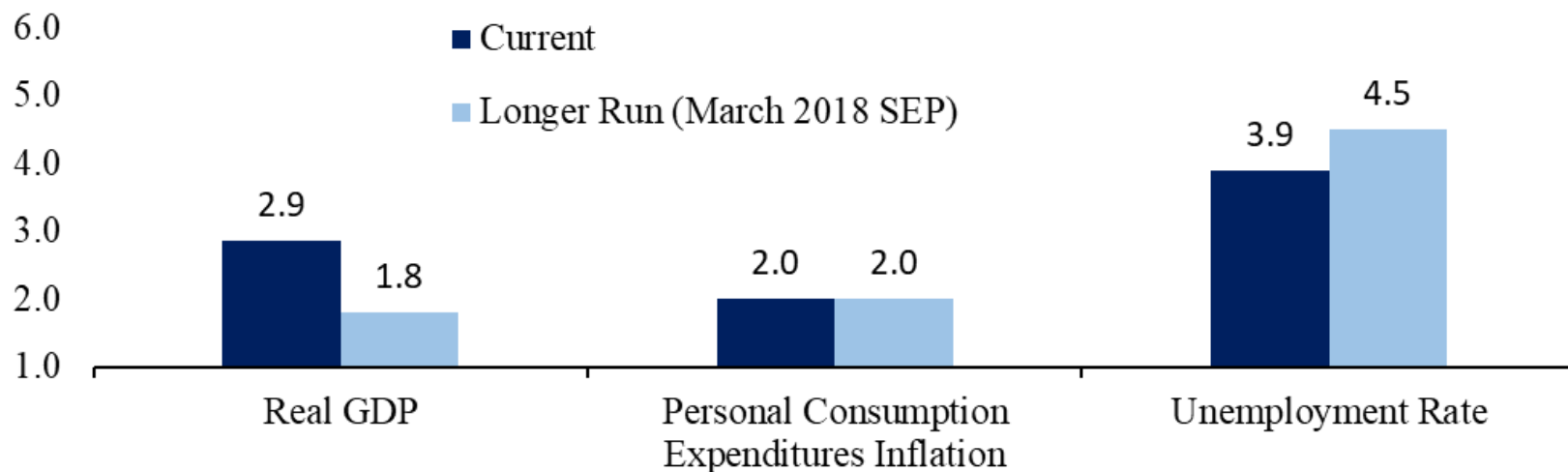
Two More Projected Rate Hikes This Year



Even as the Fed Is Near Its Goals

Key Economic Variables: Actual and Median Projections

Percent



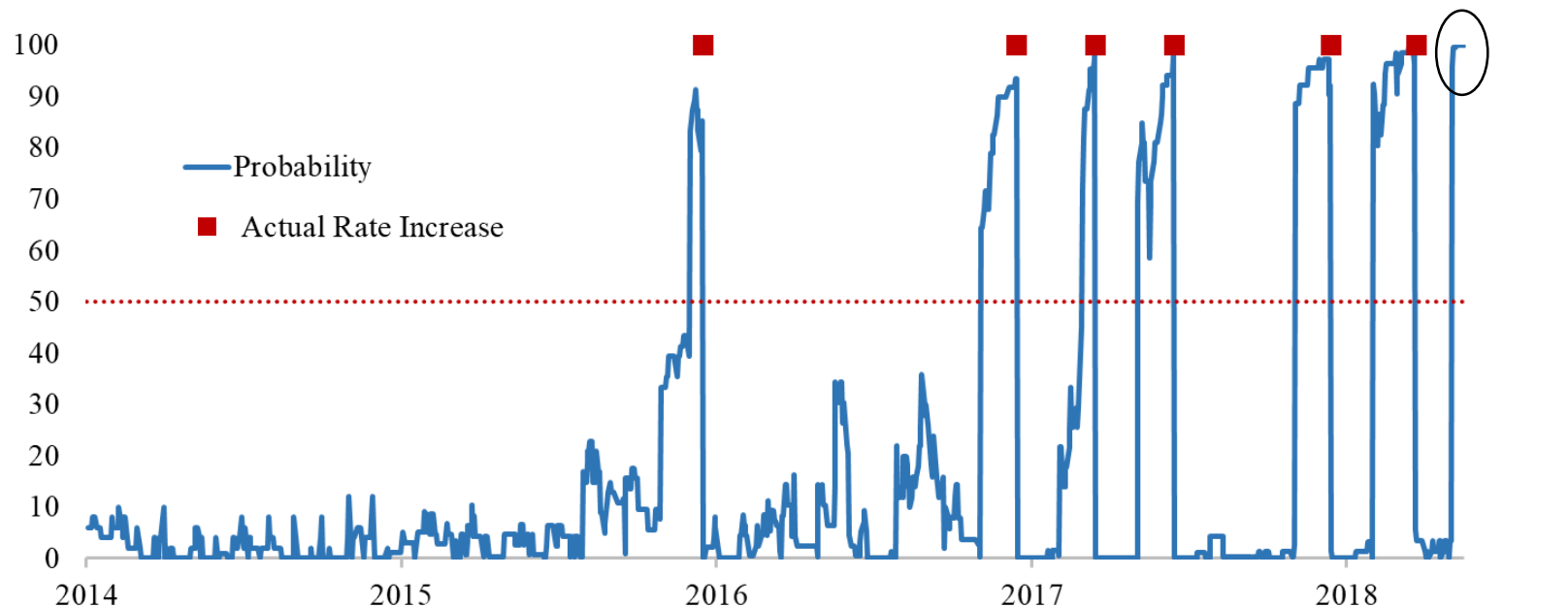
Note: Current values for real GDP and inflation are year-over-year percent changes; unemployment rate is a percent. Longer-run projections are Q4/Q4 (GDP, inflation) and Q4 average (unemployment).

Sources: FOMC Summary of Economic Projections (March 21, 2018), BEA and BLS.

Markets Have Aligned with the Fed So Far

Probability of a Rate Increase at the Next FOMC Meeting

Percent



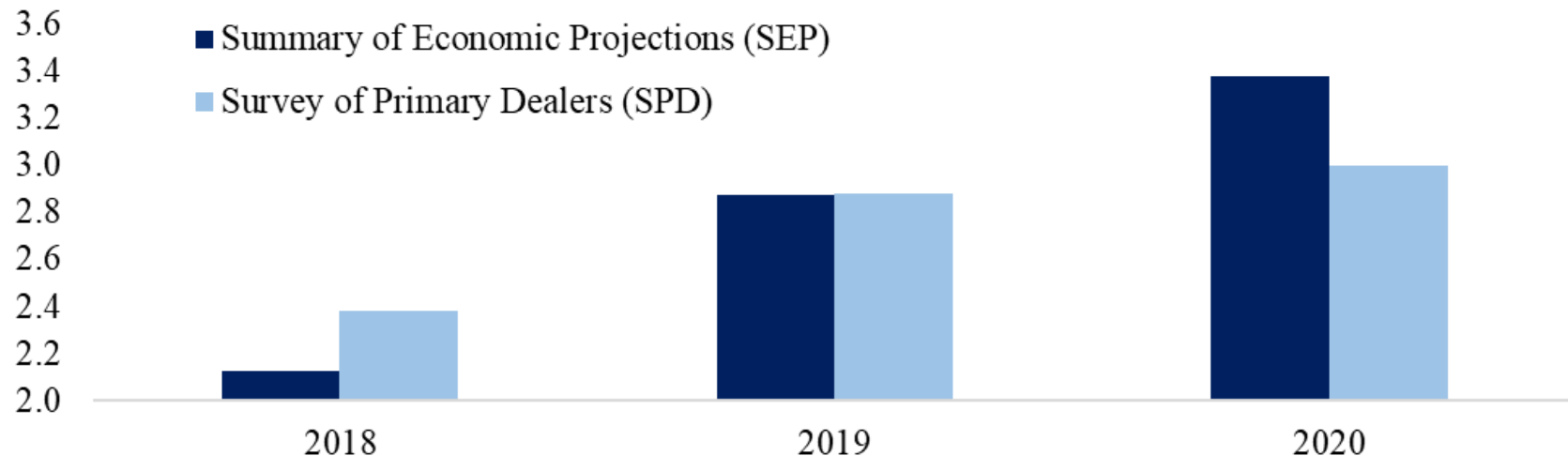
Note: Last updated May 17, 2018.

Sources: Federal Reserve Board, CBOT and Haver Analytics.

But Will We Eventually See a Divergence?

Projections for the Federal Funds Rate (FFR)

Percent



Note: SEP taken from March 21, 2018 release. SPD participants received the survey on March 12, 2018 and responses indicate the most likely outcome for the target FFR following year-end FOMC meetings. Both sets of responses indicate the median projection.

Sources: FOMC SEP and Federal Reserve Bank of New York.

Factors Influencing Inversion: Long-Term Rates

Long-Term Rates and Supply/Demand

- Long-term rates are a factor of supply/demand for longer-term U.S. Treasuries.
- When supply exceeds demand, this pushes down the price.
- Since prices and yields are inversely related, a lower price means a higher yield.
- Currently, (1) balance sheet policy, (2) tax reform and (3) inflation are affecting the supply/demand for Treasuries.

(1) Fed Balance Sheet Normalization

- As of October 2017, principal payments are only reinvested if they exceed pre-specified caps.
- By not reinvesting, the supply of U.S. Treasuries will gradually rise as the balance sheet begins to shrink.

<u>Asset</u>	<u>Initial Cap</u>	<u>Rate of Cap Increase</u>	<u>Current</u>	<u>Cap Limit</u>
Treasury securities	\$6B/month	Increase in steps of \$6B at 3-month intervals over 12 months	\$18B/month	\$30B/month
Agency debt and MBS	\$4B/month	Increase in steps of \$4B at 3-month intervals over 12 months	\$12B/month	\$20B/month

Look Closely, or You Might Miss It!

Fed Balance Sheet: Total Assets

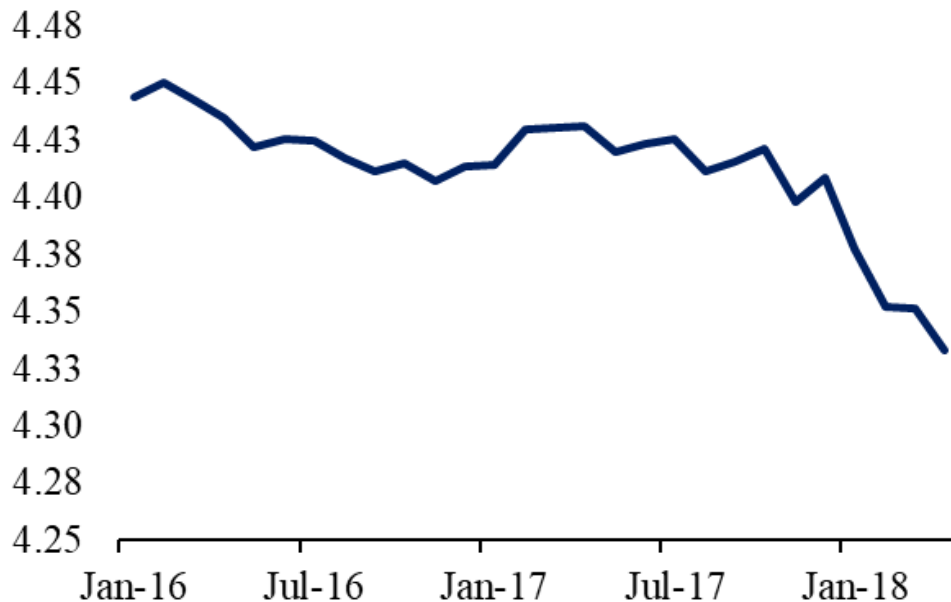
Trillions of dollars



Source: Federal Reserve Board.

Fed Balance Sheet: Total Assets

Trillions of dollars



Source: Federal Reserve Board.

(2) Tax Reform

- On Dec. 22, 2017, President Trump signed into law the Tax Cuts and Jobs Act.
- The act lowers individual (mostly) and business tax rates, while broadening the corresponding tax bases.
- Lower tax revenue translates to a larger deficit.
- Its cost is roughly \$1.5 trillion over 10 years, a limit set by the Congressional Budget Resolution for fiscal year 2018.

Projections: Individual Tax Reform

	<u>2018-22</u>	<u>2018-27</u>
Individual Tax Reform:		
New tax brackets & rates.....	-668.7	-1214.2
Nearly double standard deduction.....	-402.7	-720.4
Double AMT exemption.....	-314.7	-637.2
Reform child tax credit.....	-292.8	-544.0
20% deduction for for pass-thru income.....	-149.6	-264.1
Double estate & gift tax exemption.....	-36.8	-83.0
All other.....	-1.4	9.4
Index individual provisions to chain CPI.....	27.0	133.5
Reduce ACA subsidies.....	81.1	314.3
Limit deductions for mortgage interest & SALT...	345.3	668.5
Repeal personal exemption.....	670.2	1211.6
TOTAL, Individual Tax Reform.....	-743.1	-1125.6

(Billions of \$)

Sources: Joint Committee on
Taxation and Macroeconomic
Advisers by IHS Markit.

Projections: Corporate Tax Reform

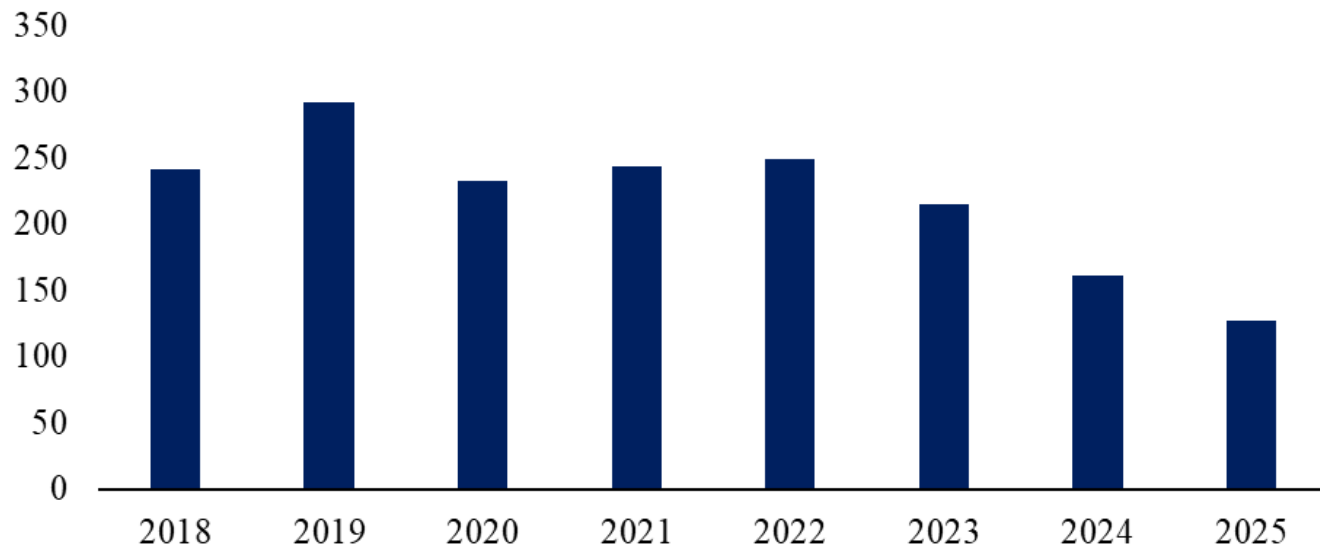
	<u>2018-22</u>	<u>2018-27</u>	
Business Tax Reform:			
Reduce top corporate rate from 35% to 21%.....	-620.8	-1348.4	
Expensing provisions, including Section 179.....	-140.2	-112.4	
Repeal alternative minimum tax.....	-34.1	-40.3	
Limit interest deduction to 30% of EBITA.....	90.3	253.5	
All other base broadening.....	185.9	594.5	
TOTAL, Business Tax Reform.....	-518.9	-653.1	(Billions of \$)

Sources: Joint Committee on Taxation and Macroeconomic Advisers by IHS Markit.

Lower Revenue → Larger Deficits

Change in Deficit Projection Before and After Tax Legislation

Billions of Dollars



Note: Bars show difference in deficit projection for the above years between April 2018 vintage and June 2017 vintage.

Sources: Congressional Budget Office and Joint Committee on Taxation.

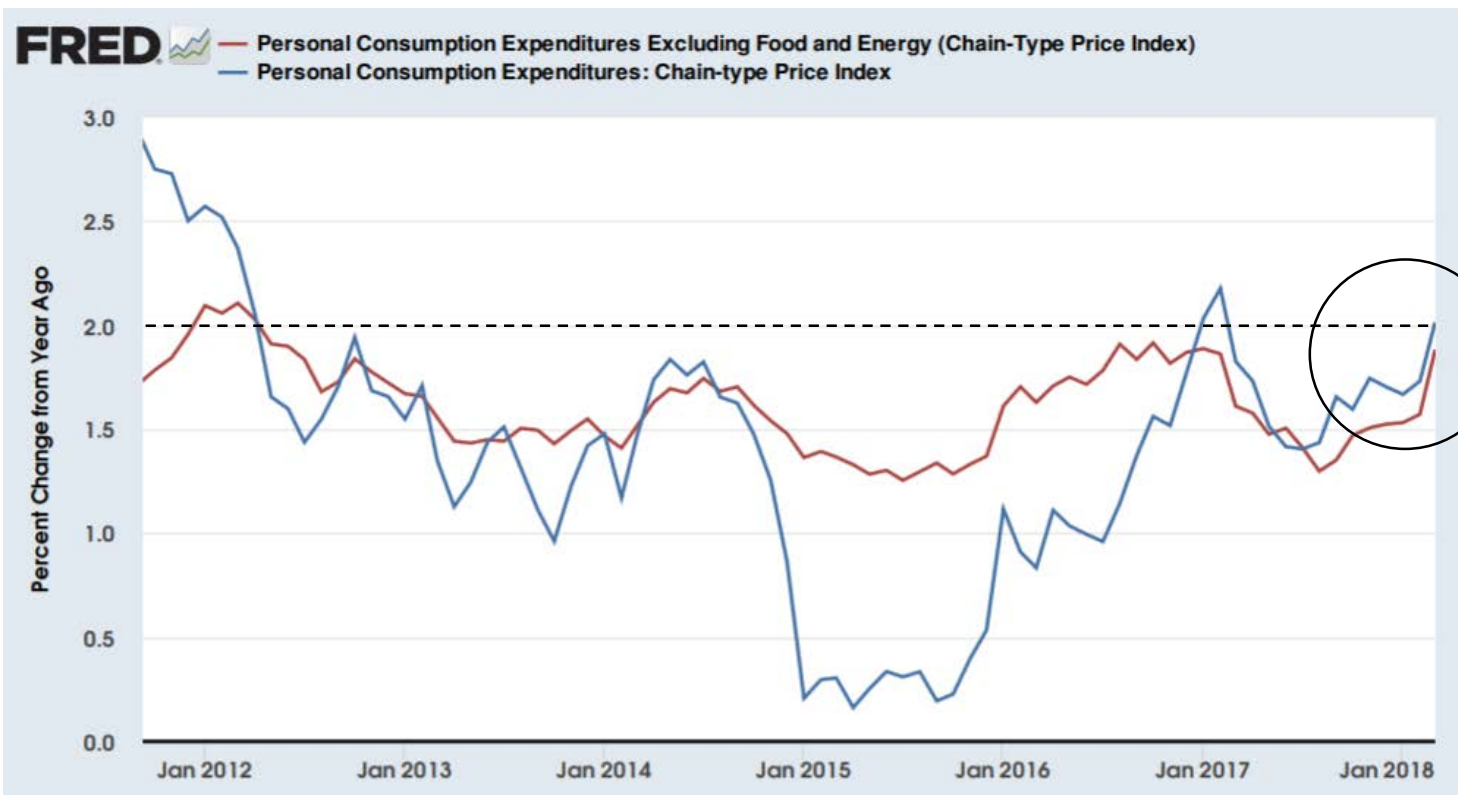
Tax Cuts and the Policy Path

- Large tax cuts can help stimulate new consumer spending and/or new business investment.
- However, unemployment and inflation are near the Fed's goals and the FOMC is removing accommodation.
- The possibility of an ill-timed stimulus has caused Fed officials to reassess the appropriate path of policy.
- The result is greater uncertainty and the possibility of faster rate hikes.

(3) Inflationary Pressures

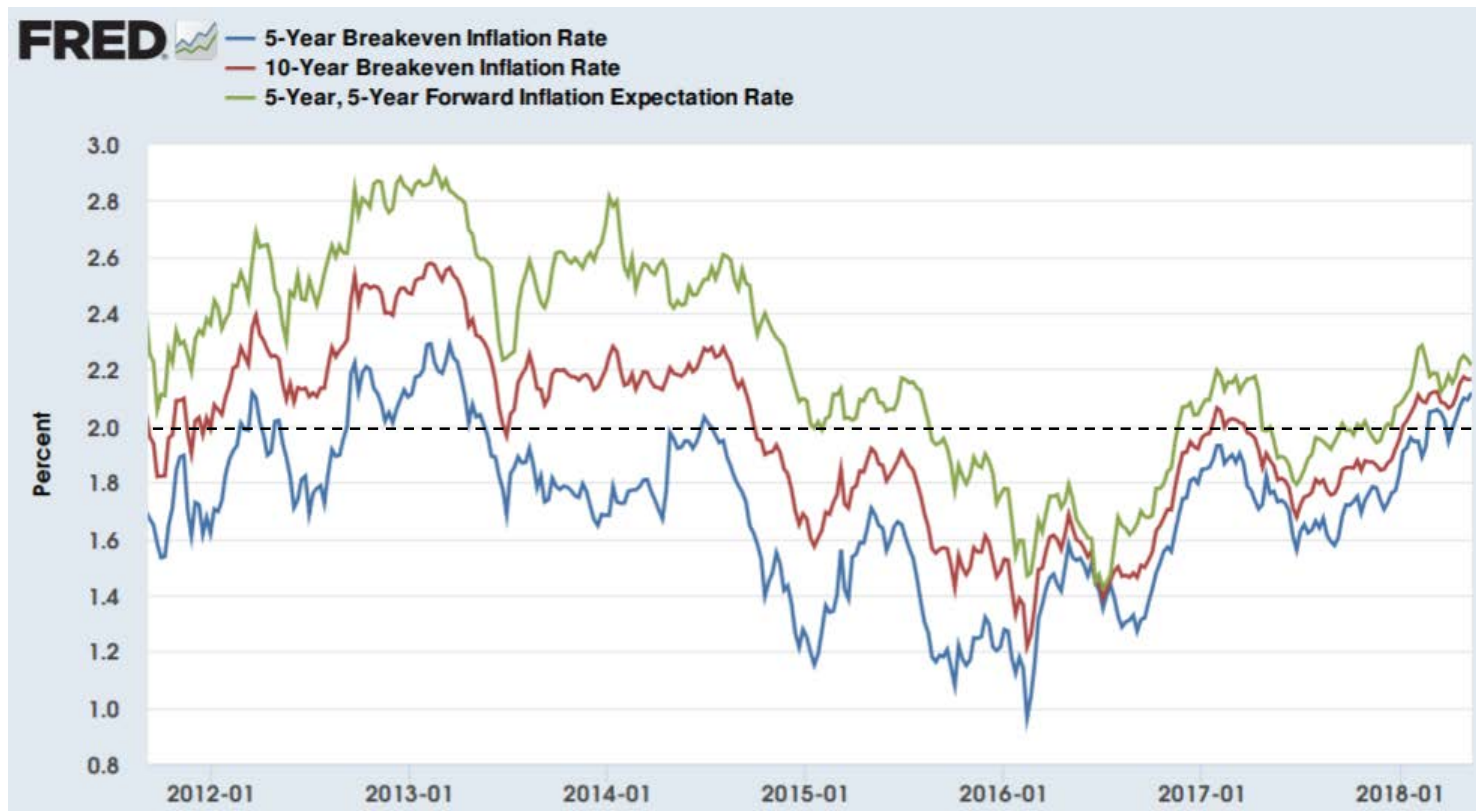
- Higher expected (future) inflation will increase the spread between short- and long-term rates.
- Conceptually, inflation erodes the value of a bond, so investors are compensated with higher rates of return.
- This would reduce the likelihood of near-term inversion.
- Are we seeing inflationary pressures in the data?

Headline PCE Only Recently Hit 2%



Source: U.S. Bureau of Economic Analysis

Longer-Term Expectations Around 2%



Source: Federal Reserve Bank of St. Louis

Is the Market Buying It?

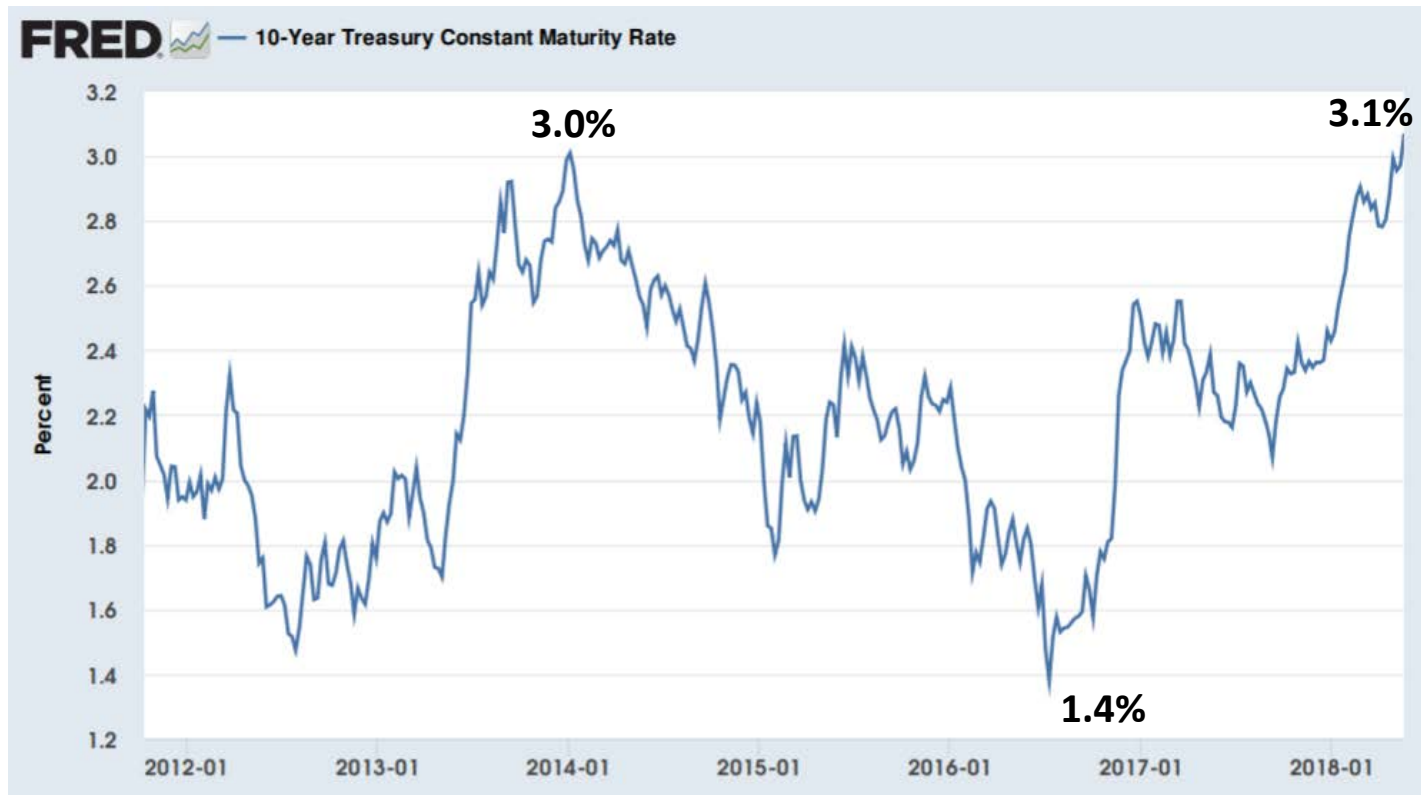
- Fundamentally, it doesn't appear that the markets see much inflation pressure.
- Job gains have been solid and the unemployment rate is projected to fall further.
- Per the last 20 years of data, diminishing labor market slack has not translated to higher inflation.
- Markets seem to buy this and are not preemptively pricing in an inflation premium.

Recent Developments and Policy Implications

Recent Developments

- As mentioned, longer-term rates had been relatively stable from 2014 through 2017.
- But since January 2018, we've seen longer-term rates rally, with the 10-year Treasury yield topping 3 percent.
- Over this same time period, the FOMC has only raised its policy rate once.
- While this decreases the chance of near-term inversion, the FOMC must exercise caution in raising its policy rate.

10-Year Rallies from 2016 Lows

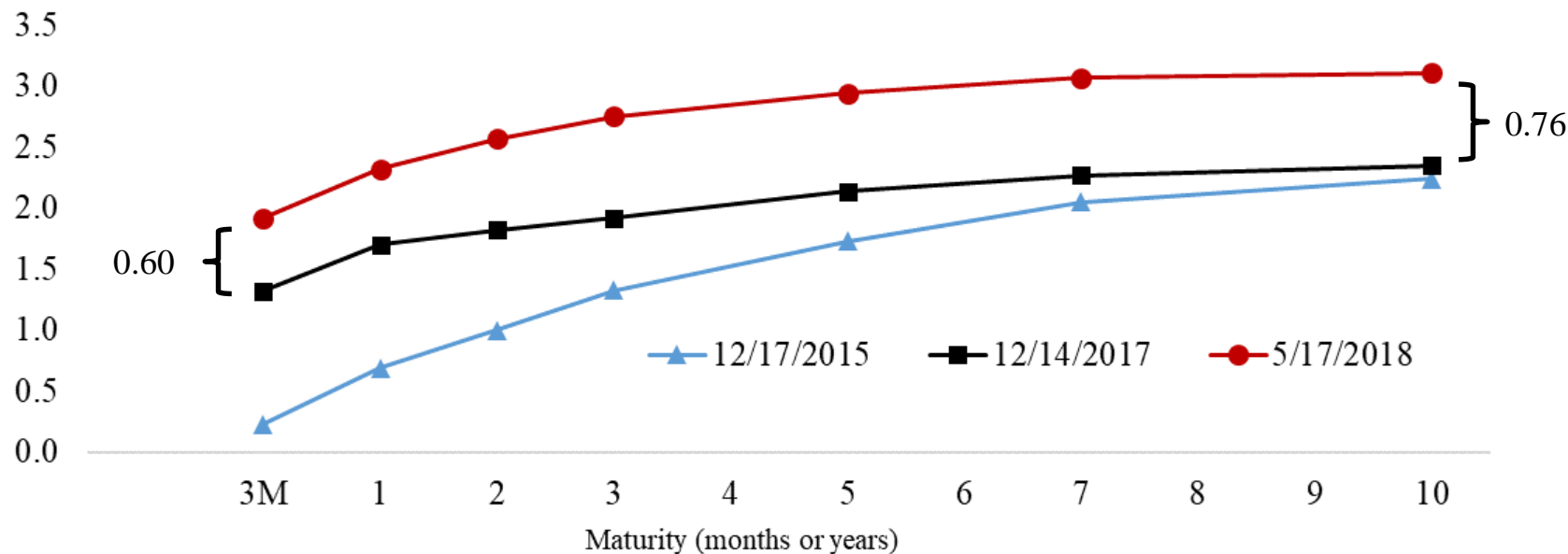


Source Board of Governors of the Federal Reserve System (US)

Curve Steepens As a Result

Yield curve over the current tightening cycle

Percent



Source: Federal Reserve Board.

However, the Risks Are Asymmetric

- Yield curve inversions before recessions are associated with either (1) policy mistakes or (2) a run-up in inflation.
- Since inflation doesn't appear to be a concern, adopting a wait-and-see approach avoids a potential policy mistake.
- If there are data surprises to the upside, the FOMC can evaluate these and respond with additional rate hikes.
- But if growth or inflation remains flat, and the FOMC continues tightening, it risks inverting the yield curve.

Conclusion

- Empirically, the yield curve seems to be a useful, leading indicator of recessions.
- Rising inflation, a shrinking balance sheet and a larger deficit should put upward pressure on long-term rates.
- However, the yield curve has remained *relatively* flat, and there are minimal inflation pressures despite job gains.
- Given the Fed is near its goals, a wait-and-see approach is the more prudent course of action.

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