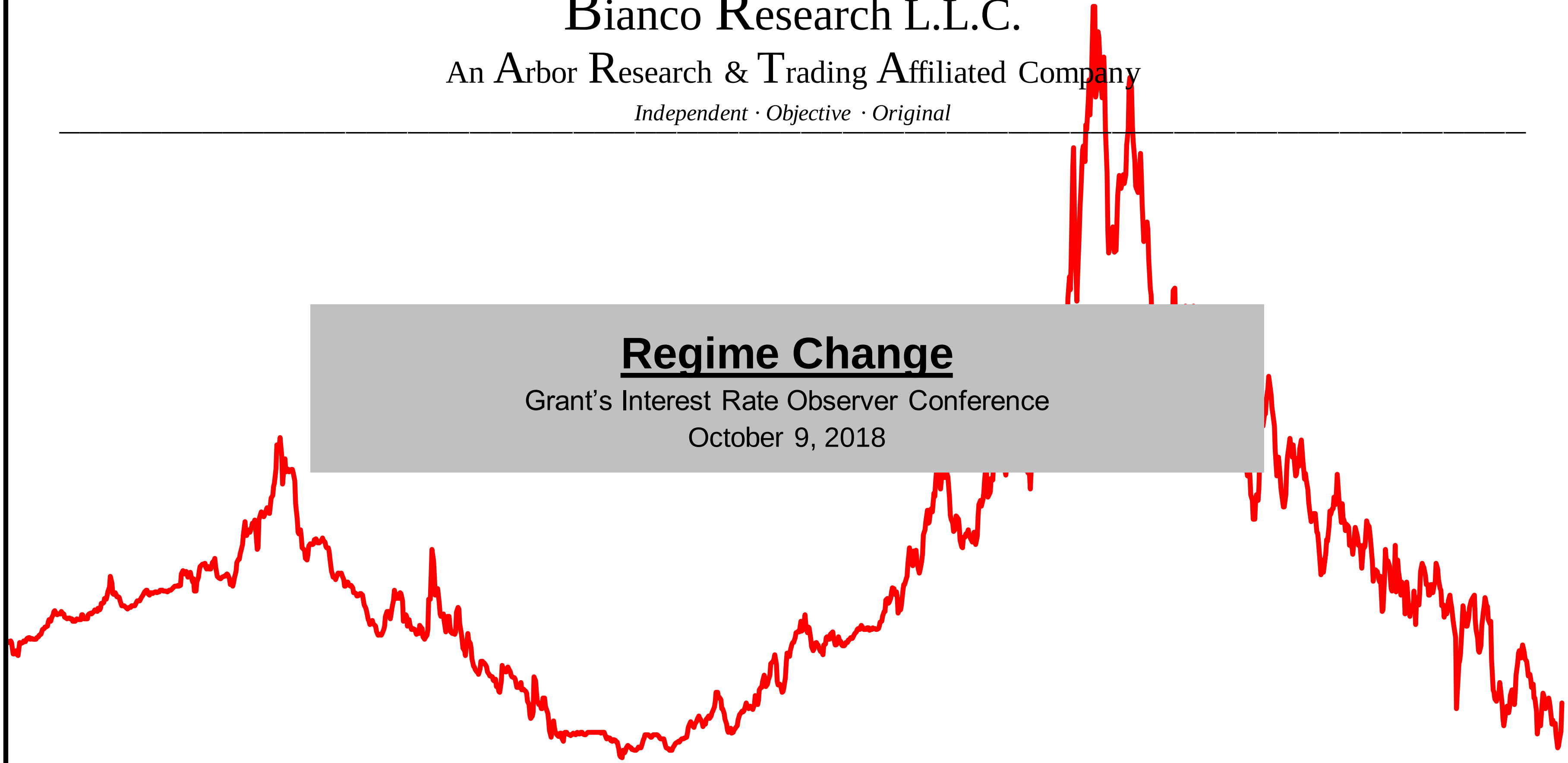
Bianco Research L.L.C.

An Arbor Research & Trading Affiliated Company

Independent · Objective · Original



Regime Change

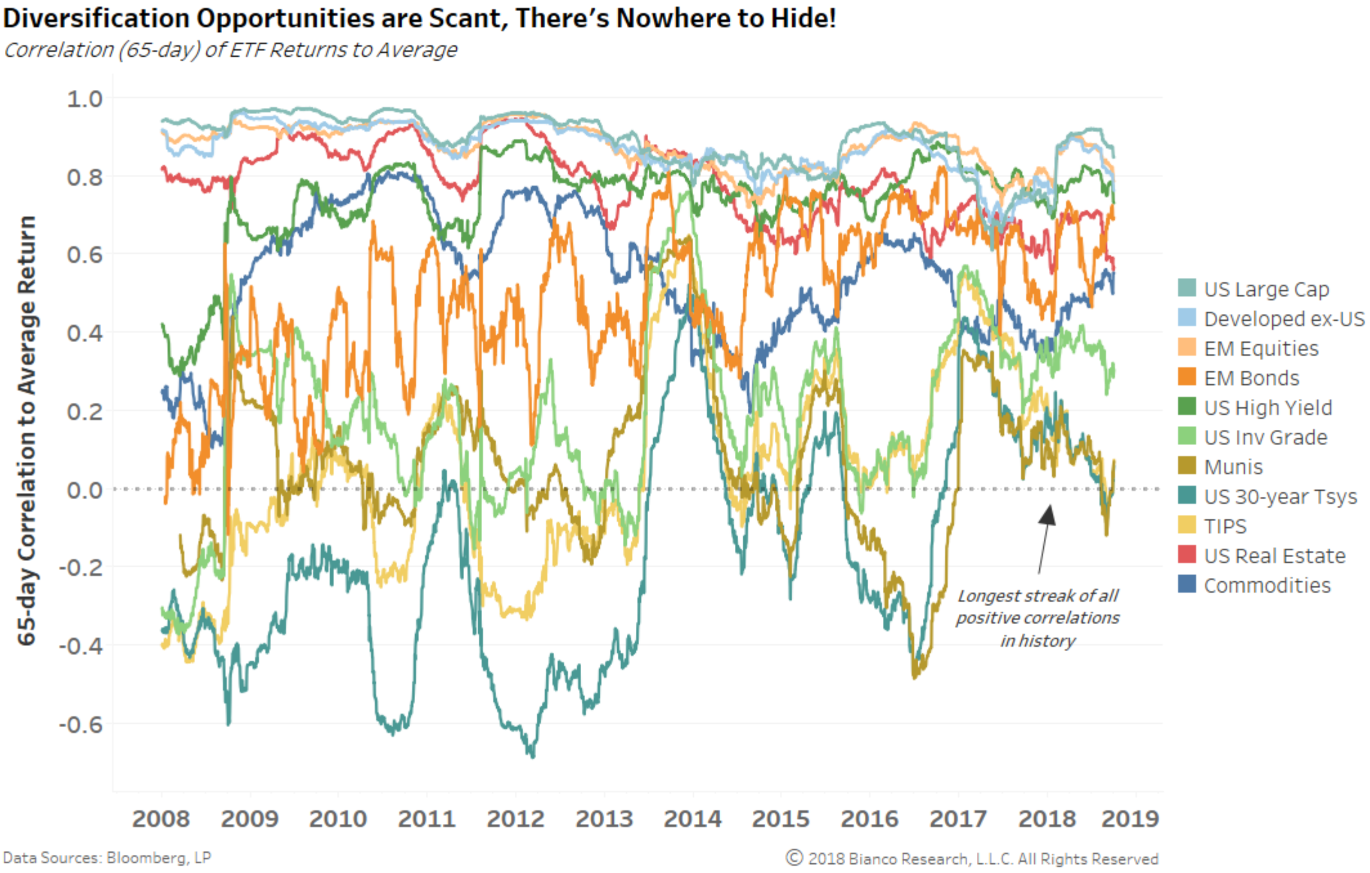
Grant's Interest Rate Observer Conference

October 9, 2018

Long-Term Interest Rates - 1900 to 2017

Earlier we noted that constructing a diversified portfolio is hard than ever as the chart below shows the rolling three-month correlation of major ETF returns to a portfolio average. **Not a single asset class offered a negative correlation throughout 2017 into August 2018.**

A brief period of negative correlation to the portfolio average by U.S. Treasuries, inflation protection (TIPS), and municipal bonds in August and September 2018 has ended.



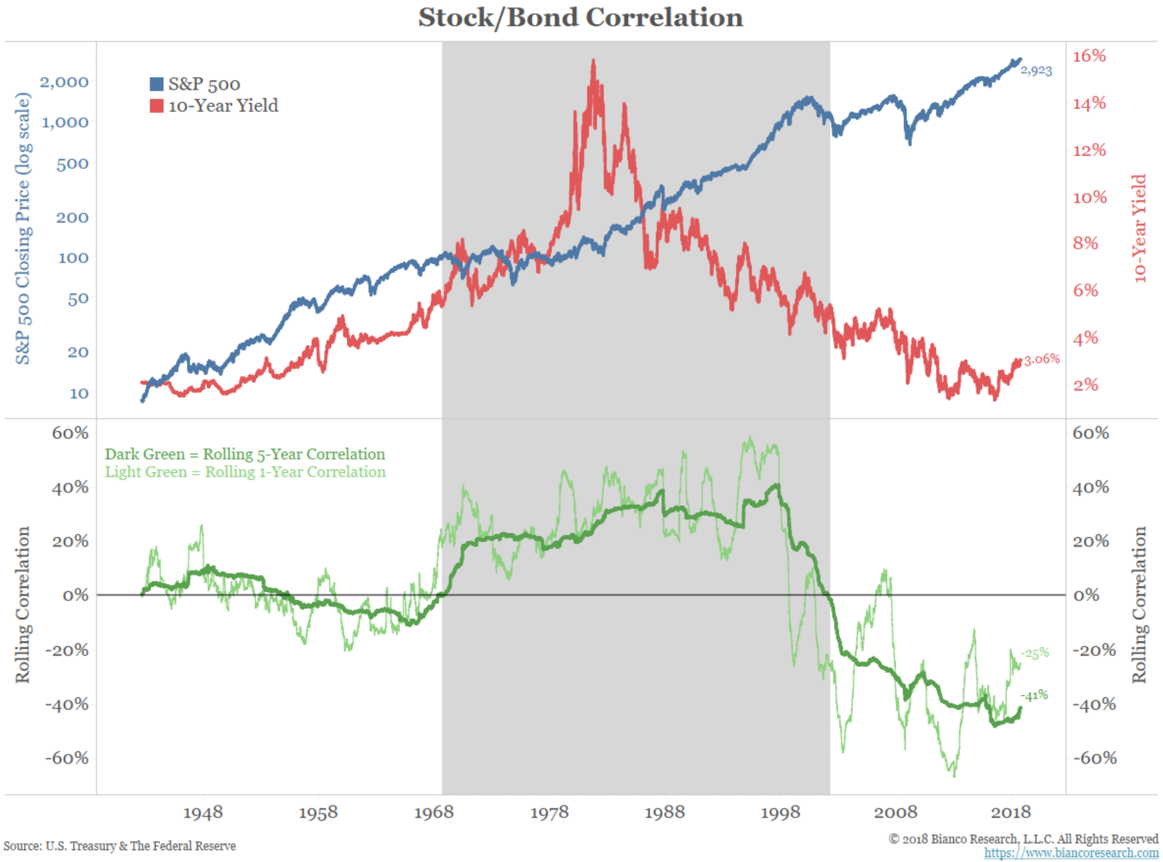
***Rule 1**: most things will prove to be cyclical*
***Rule 2**: some of the greatest opportunities for gain and loss come when other people forget rule number 1.*
- Howard Marks

The Stock/Bond Relationship

Markets are not stationary. Relationships change. It is critical for any investor to be able to recognize the longer-term regime shifts as they occur.

Should a regime shift occur without one adjusting to the new reality, a portfolio will suffer. Conversely, if an investor changes in anticipation of a regime change without one actually occurring, it can be equally as painful.

For the first time since the late 1990s, we believe a regime shift could be underway in the relationship between stocks and bonds. Markets are transitioning from a deflation mindset to an inflation mindset. Because the relationship between stocks and bonds is critical to popular investing strategies of the last two decades such as risk-on/off, the 60/40 portfolio and risk-parity, such a shift would have major implications.

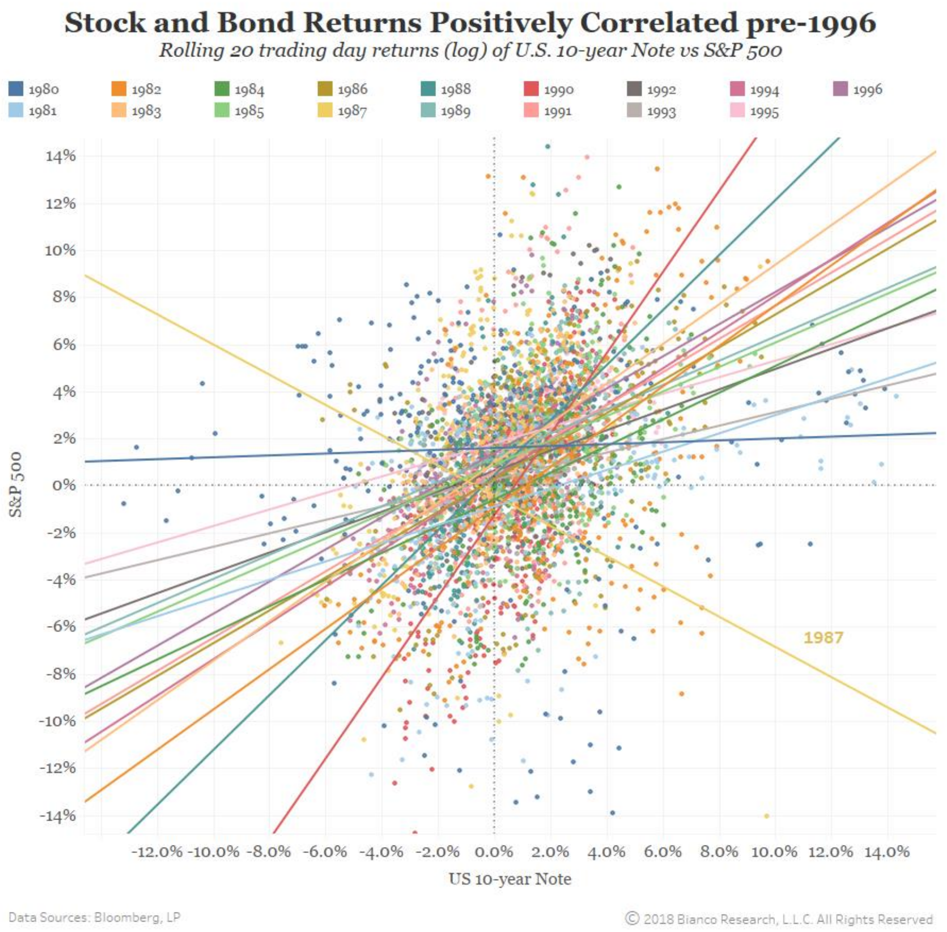


1980 to 1996 Relationship

The scattergraph below shows the period 1980 to 1996, the shaded area above. It shows a rolling 20-day change in the S&P 500 (y-axis) and the price of the 10-year note (x-axis). Each year denotes a different color and each year's trend line is also shown.

Note that the relationship between these two assets' prices was positive most of these years, when stocks rallied, bond rallied (upper right quadrant). conversely, when stocks declined, bonds declined (lower left quadrant). This is the inflation mindset described above.

The exception was 1987 as the stock market crash in October of that year distorted everything,

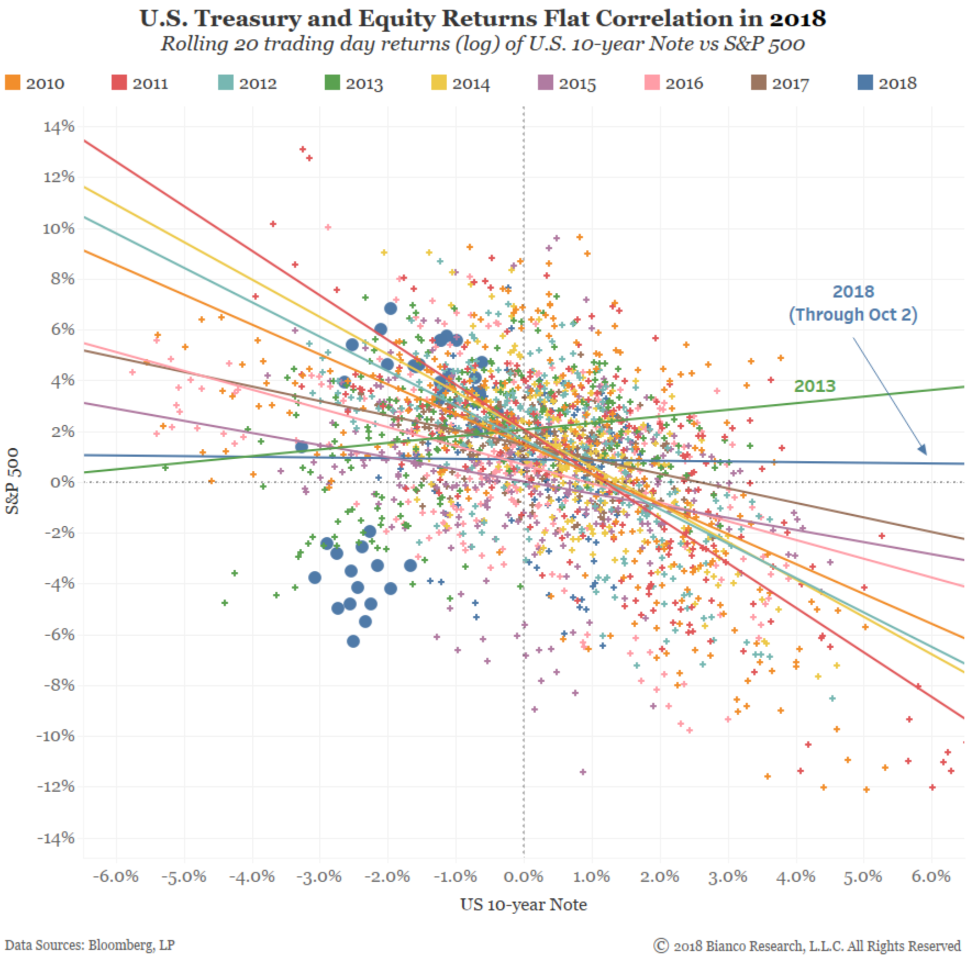


The next chart starts in 2010 (post-crisis) and has the same format as the chart above. The relationship showed actually started in 2003 (we started in 2010 for readability purposes).

Note the relationship between stocks and bonds is the inverse from above. While the period shown in the chart above was a positive slope, since 2010, this has largely been a negative slope. Meaning when stocks gain, bonds lose (upper left quadrant). When bonds gain, stocks lose (lower right quadrant). This is the deflation mindset described above.

The two exceptions were in 2013, which only had a slight upward slope, and in 2018, which has a flat correlation.

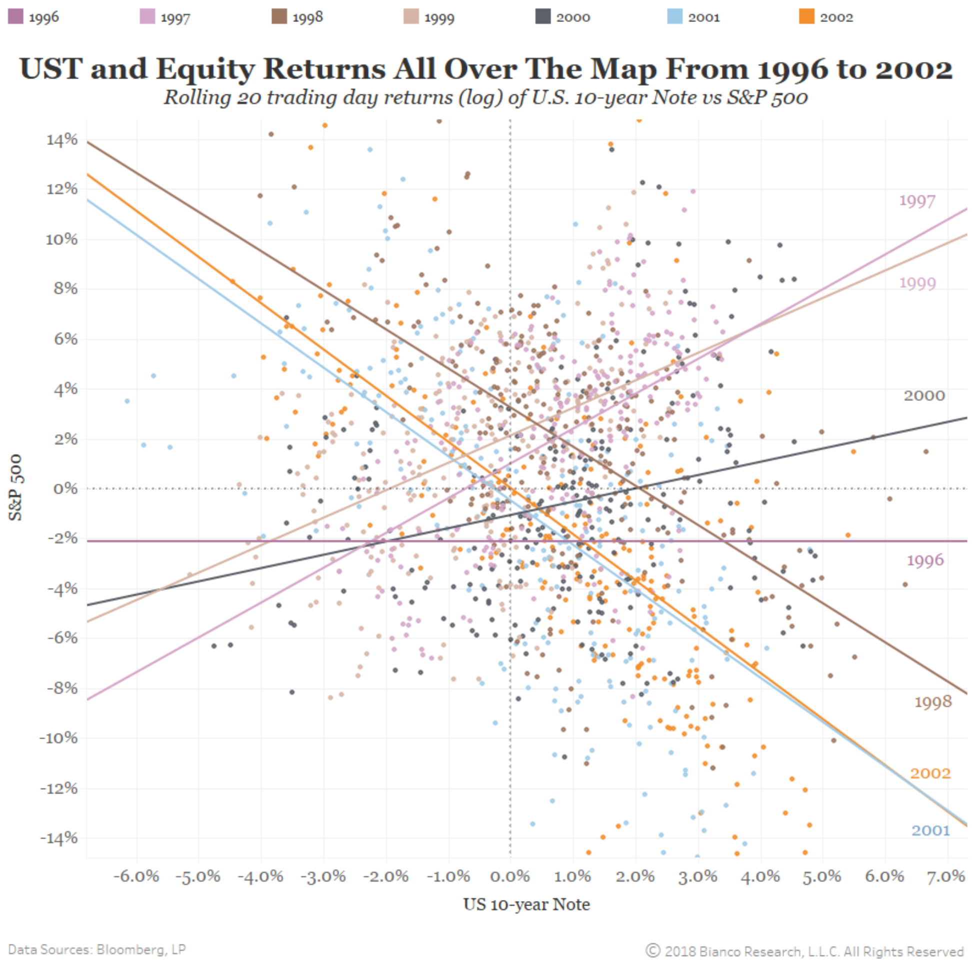
2013 and 2018 have common themes that make this relationship different than other post-crisis years. The defining characteristic of 2013 was the taper tantrum, when the market feared the end of Fed/central bank stimulus. Bonds and stock fell together in 2013, although the relationship was not terribly strong. So far the defining characteristic in 2018 is the return of inflation and the market's fear that Fed/central banks are going to have to remove the stimulus faster than anticipated.



How Things Change

The final scattergraph in this series shows the period from 1996 to 2002. This is when the relationship transitioned from the inflation mindset (shaded area in the long-term correlation chart above) to the deflation mindset. Note this period was not stable.

- 1997 saw a strong positive slope
- 1998 saw a strong negative slope
- 1999 saw a strong positive slope again
- 2000, 2001 to 2002 saw the slope fall each year, and then stay negative through today.



THE NEW YORK TIMES, SUNDAY, JULY 28, 2002

Investing

PORTFOLIOS, ETC.

JONATHAN FUERBRINGER

Tracking Bonds by Watching Stocks

AS the stock market has plunged in the last four and a half months, the bond market has rallied. But while millions of investors have asked where the bottom is for stocks, fewer are worrying about reaching a top in bonds.

Picking the bottom or the top of a market, of course, is best done with hindsight. It is no certainty that stocks have touched bottom, despite the rally on Wednesday, the biggest one-day gain since the 1987 crash.

Bond investors, however, may have an edge over equity mavens in this mugs game because there is, at the moment, a way to scope out if not pinpoint the top of the bond market: Watch stocks.

To put it bluntly, stocks have been leading bond yields by the nose recently because the leash on yields has tightened significantly over the last five years. So when stocks rise, bond yields climb. This means that a turnaround in stocks will be a good tip-off for a bond market top.

Bond prices and bond yields move in the opposite direction, so there are two ways to show the inverse relationship between bonds and stocks. One is with prices, with bond prices going up when stock prices are going down. The other is comparing bond yields to stock prices, showing that yields go up when stocks rise, and

A Bond Barometer

There has been a sharp shift in the relationship between the stock and bond markets over the last five years. The move toward an inverse correlation indicates bonds will fall as stocks recover.

Correlation of the Lehman Brothers aggregate bond index to the Standard & Poor's 500-stock index. A level of +1.0 is a perfect correlation, with both moving in lock step; −1.0 is a perfect inverse correlation.

Source: Ibbotson Associates

The New York Times

barometer had dropped to a low of minus 0.0957.

How long this inverse relationship will hold is not predictable. But this behavioral shift may be explained by the persistence of low inflation. And that is holding for now.

In the past, rising inflation was bad news for both bond prices and stock prices, so they would fall at the same time. In a low-inflation environment, expectations of economic growth have become the main driver of the markets. With strong growth expected — without worrisome inflation — stocks rise. But bonds fall because of the threat of rate increases by the Federal Reserve to keep inflation in check. When growth expectations dim, the reverse occurs.

The performance of the Treasury market since early March is another

point, to 4.38 percent. The two-year yield is down one and a half percentage points, to 2.22 percent.

This rally led to a total return in the Treasury market of 7.1 percent since March 25.

But what happened to interest rates after Sept. 11 shows why bond investors must be wary now.

After the terrorist attacks, interest rates fell sharply, as stocks declined and the Fed aggressively cut short-term interest rates by one and half percentage points in two months. But once the Fed had made its third half-point cut, on Nov. 6, yields on the 10-year note and the two-year note began to shoot higher as stocks were making a bold run. The Dow rose 21.7 percent from the post-attack lows to year-end, while the Nasdaq surged 37 percent.

How long this inverse relationship will hold is not predictable. But this behavioral shift may be explained by the persistence of low inflation. And that is holding for now.

In the past, rising inflation was bad news for both bond prices and stock prices, so they would fall at the same time. In a low-inflation environment, expectations of economic growth have become the main driver of the markets. With strong growth expected -- without worrisome inflation -- stocks rise. But bonds fall because of the threat of rate increases by the Federal Reserve to keep inflation in check. When growth expectations dim, the reverse occurs.

Asset Allocation

Introducing the WisdomTree 90/60 U.S. Balanced Fund (NTSX)

08/02/2018

Jeremy Schwartz, CFA, Director of Research

Tweet Share Feedback

For many investors, a balanced portfolio (60% equities,[1] 40% bonds[2]) serves as the bedrock (and benchmark) for their asset allocation (AA) decisions. From this core, they will often seek to select securities with characteristics that can provide diversification, return enhancement or manage volatility.

Thanks in large part to investment community feedback we received on Twitter, WisdomTree saw the need to create a more capital-efficient vehicle for providing exposure to the traditional 60/40 AA vehicles.

The general concept is that if an investor could potentially free up capital for diversifying strategies, that investor could complement a 60/40 allocation with alternative strategies that might assist in lowering volatility. While risk parity strategies employ some similar tactics, and there are some actively managed bond managers who then try to add equity index returns on top of the bonds, until now, there was no models-based implementation of this more capital-efficient 60/40 concept.

The Efficiency of 90/60

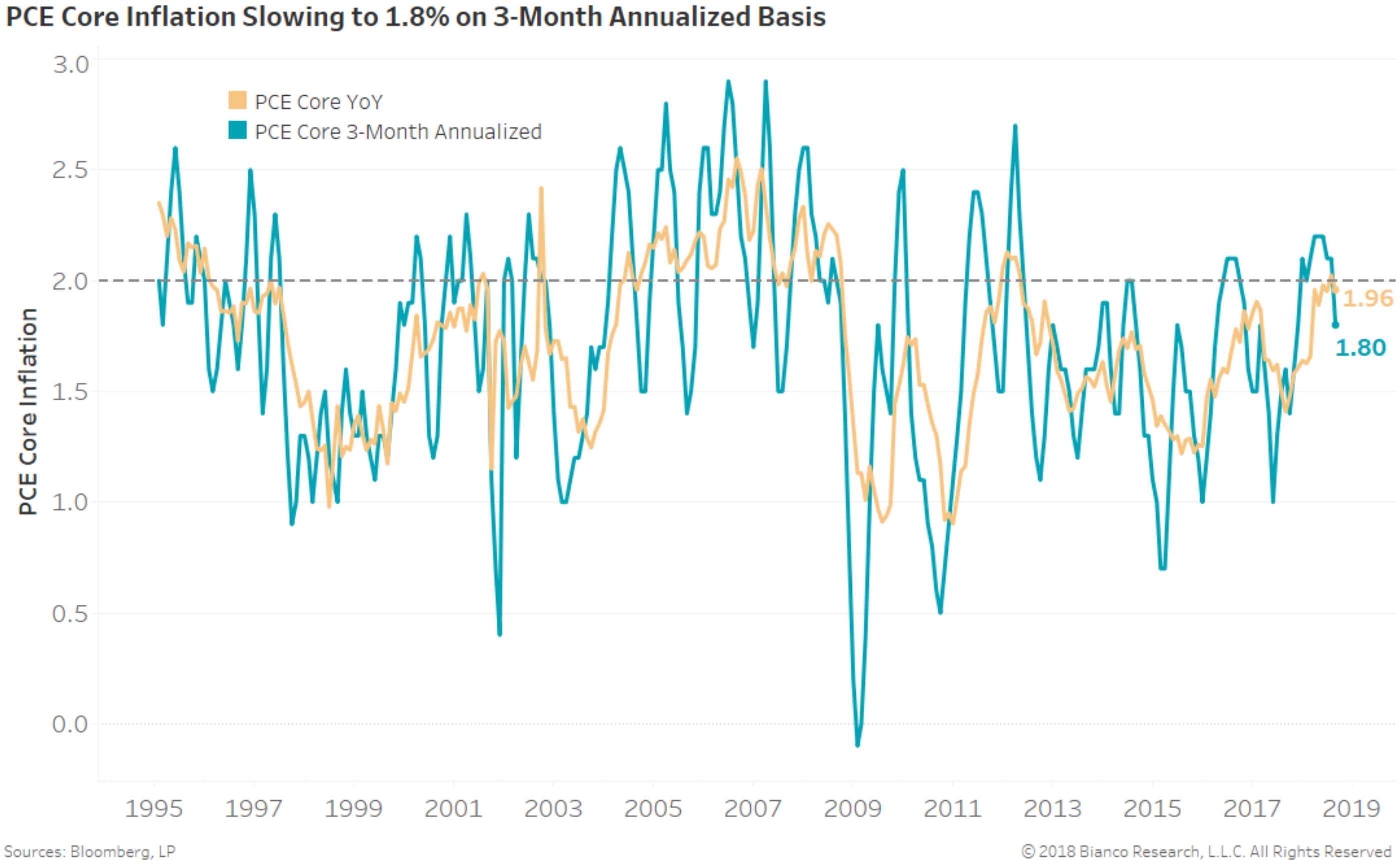
The WisdomTree 90/60 U.S. Balanced Fund (NTSX) is created by investing 90% of Fund assets in equities and 10% in short-term fixed income. The 60% bond exposure is achieved by overlaying Treasury futures contracts to achieve the net 90/60 target. Through this higher-efficiency portfolio, investors can devote a smaller percentage of their assets (66.6%) to core holdings while still pursuing their desired exposure.

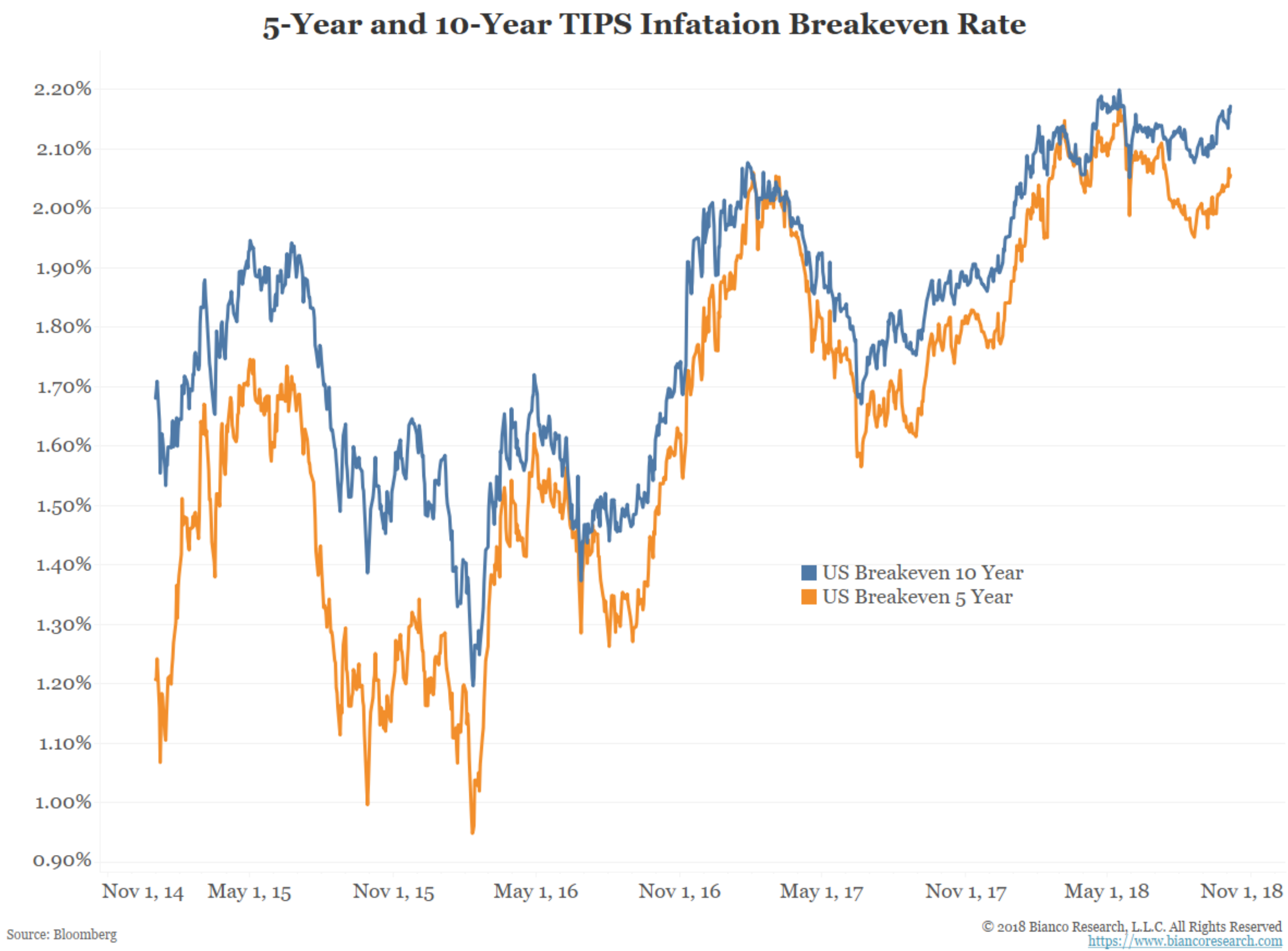
In addition to helping potentially boost capital efficiency, we also believe that 90/60 provides investors with the ability to enhance returns with non-core assets such as long/short equities, risk parity, commodity trading advisors or true alternatives. In other words, by deploying an overlay strategy to boost capital efficiency, a 90/60 strategy has the potential to enhance total returns while also helping to dampen volatility via alternatives.

The personal consumption expenditure (PCE) core price index is suffering from slowing momentum into summer-end. Its three-month annualized rate shown in the chart below has fallen from a recent peak of 2.2% to 1.8% in August 2018.

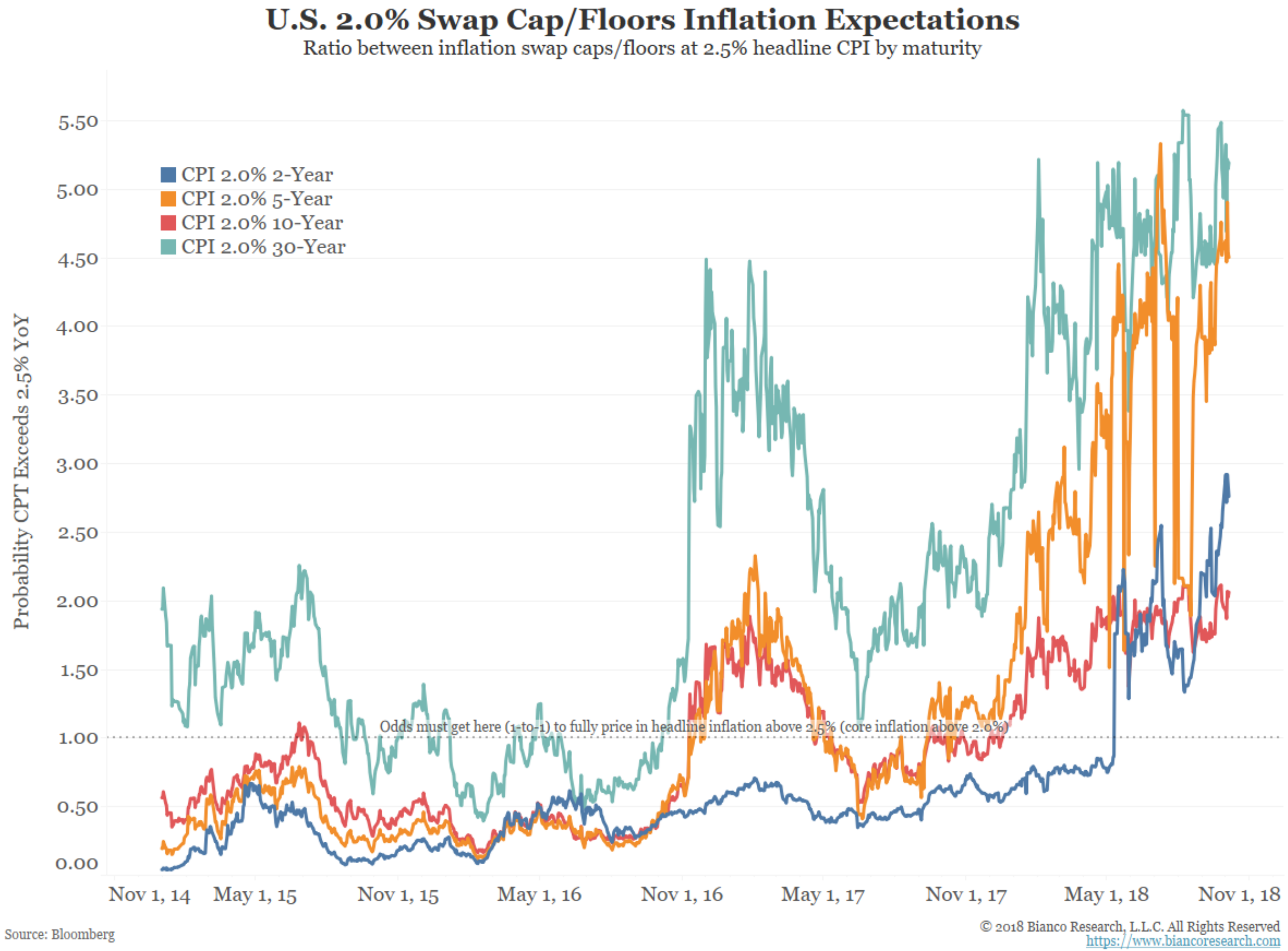
Thus far, the Federal Reserve is confidently engineering a soft landing with core inflation likely to stall near the targeted 2.0% year-over-year. Our own forecast is putting its chips on core inflation rising a modest 0 to 25 basis points over the year ahead (61% probability).

Volatility and term premium have little reason to budge given such low uncertainty.

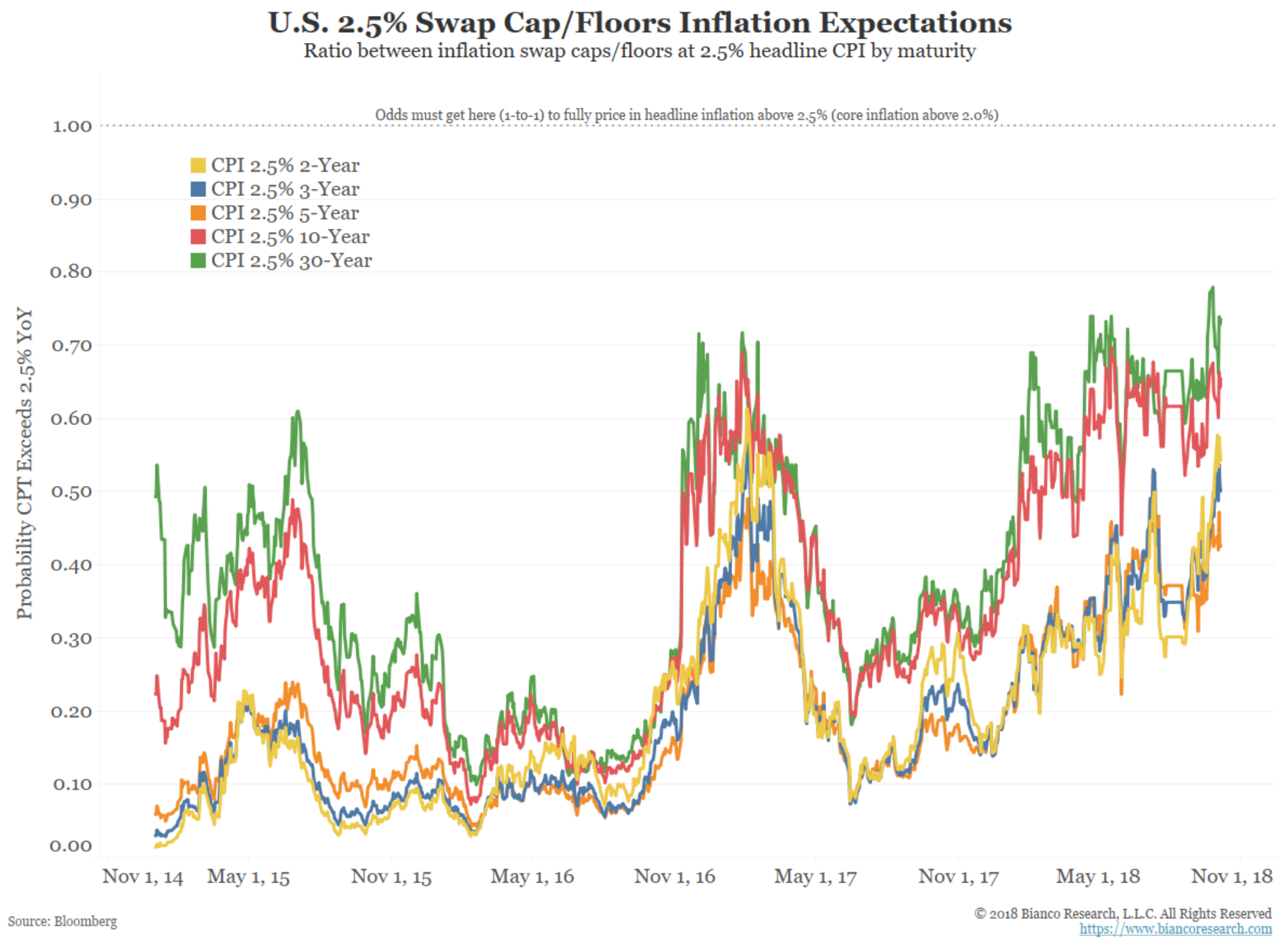




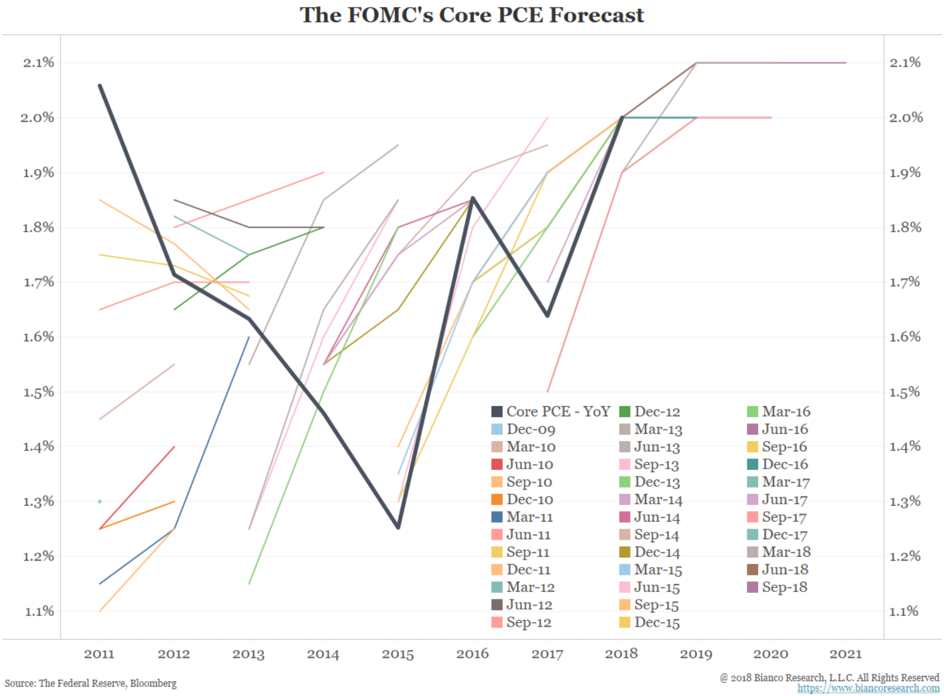
5-Year and 10-Year TIPS Infataion Breakeven Rate
2.20%
2.10%
2.00%
1.90%
1.80%
1.70%
1.60%
1.50%
1.40%
1.30%
1.20%
1.10%
1.00%
0.90%
Nov 1, 14
May 1, 15
Nov 1, 15
May 1, 16
Nov 1, 16
May 1, 17
Nov 1, 17
May 1, 18
Nov 1, 18
US Breakeven 10 Year
US Breakeven 5 Year
Source: Bloomberg
© 2018 Bianco Research, L.L.C. All Rights Reserved
https://www.biancoresearch.com

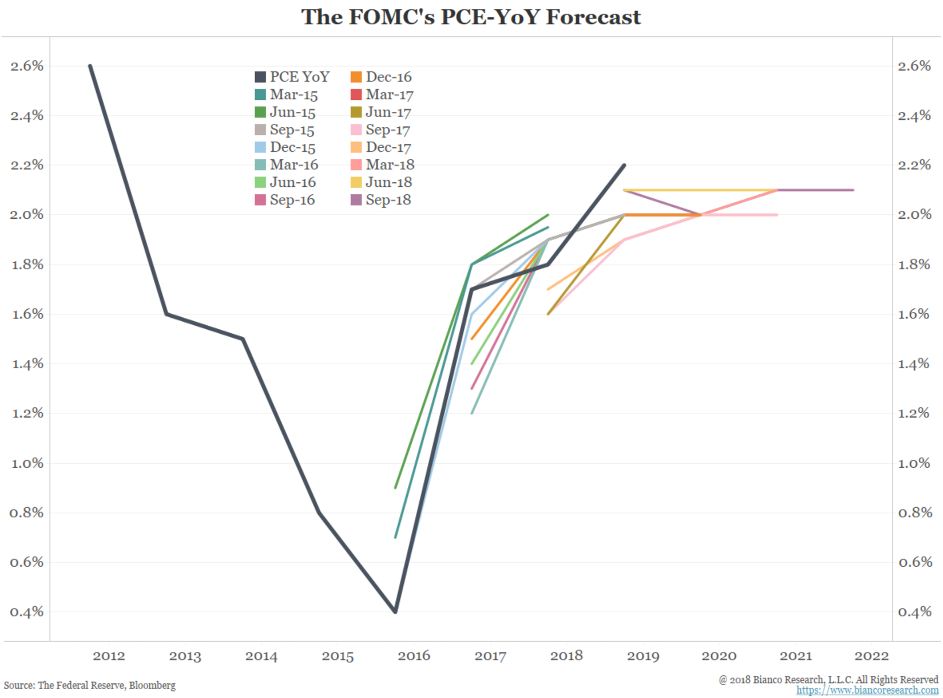


U.S. 2.0% Swap Cap/Floors Inflation Expectations
Ratio between inflation swap caps/floors at 2.5% headline CPI by maturity
CPI 2.0% 2-Year
CPI 2.0% 5-Year
CPI 2.0% 10-Year
CPI 2.0% 30-Year
Probability CPT Exceeds 2.5% YoY
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Odds must get here (1-to-1) to fully price in headline inflation above 2.5% (core inflation above 2.0%)
Nov 1, 14
May 1, 15
Nov 1, 15
May 1, 16
Nov 1, 16
May 1, 17
Nov 1, 17
May 1, 18
Nov 1, 18
Source: Bloomberg

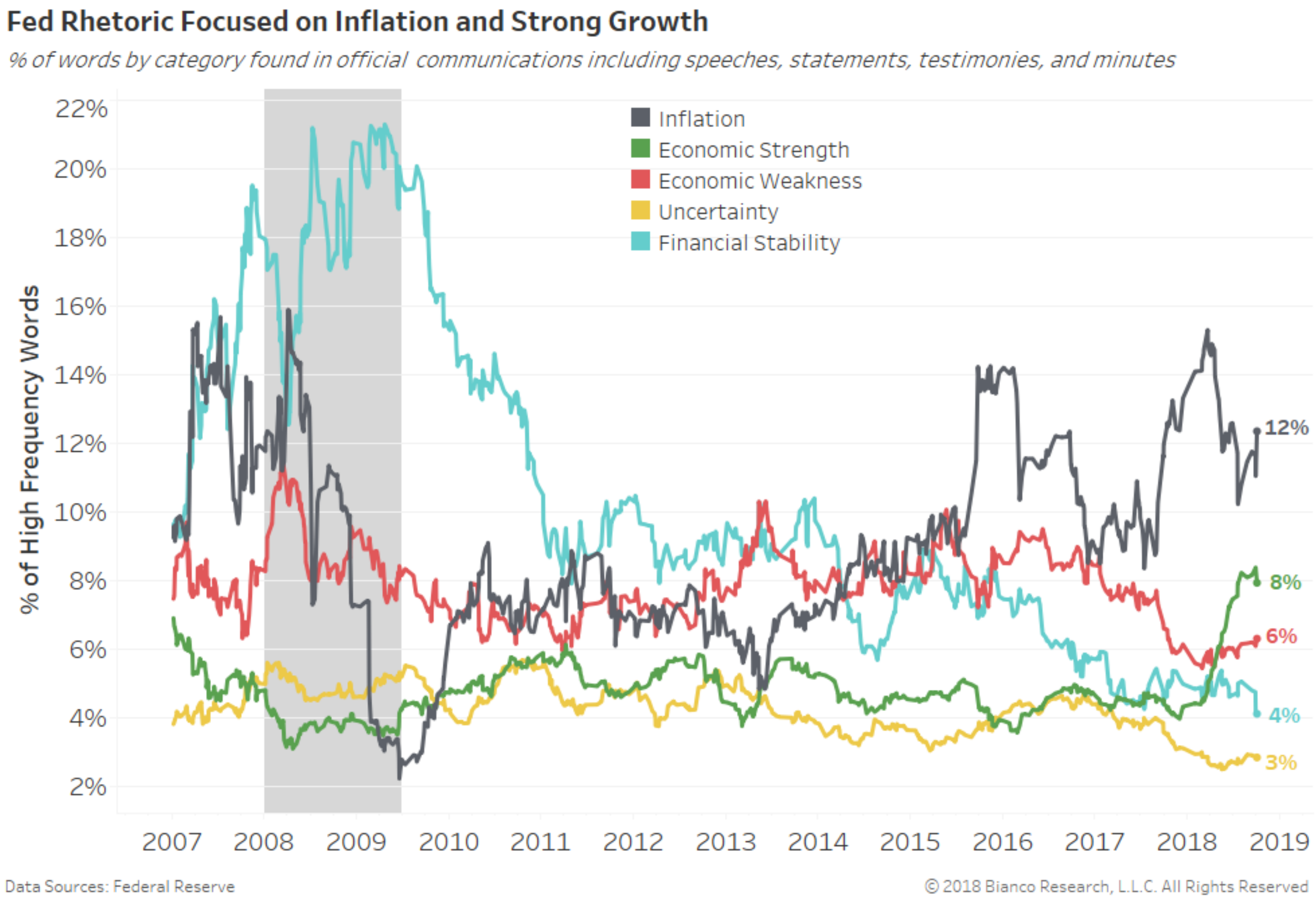


U.S. 2.5% Swap Cap/Floors Inflation Expectations
Ratio between inflation swap caps/floors at 2.5% headline CPI by maturity
Odds must get here (1-to-1) to fully price in headline inflation above 2.5% (core inflation above 2.0%)
CPI 2.5% 2-Year
CPI 2.5% 3-Year
CPI 2.5% 5-Year
CPI 2.5% 10-Year
CPI 2.5% 30-Year
Probability CPT Exceeds 2.5% YoY
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Nov 1, 14
May 1, 15
Nov 1, 15
May 1, 16
Nov 1, 16
May 1, 17
Nov 1, 17
May 1, 18
Nov 1, 18
Source: Bloomberg
© 2018 Bianco Research, L.L.C. All Rights Reserved
https://www.biancoresearch.com


The FOMC's Core PCE Forecast
2.1%
2.0%
1.9%
1.8%
1.7%
1.6%
1.5%
1.4%
1.3%
1.2%
1.1%
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Core PCE - YoY
Dec-09
Mar-10
Jun-10
Sep-10
Dec-10
Mar-11
Jun-11
Sep-11
Dec-11
Mar-12
Jun-12
Sep-12
Dec-12
Mar-13
Jun-13
Sep-13
Dec-13
Mar-14
Jun-14
Sep-14
Dec-14
Mar-15
Jun-15
Sep-15
Dec-15
Mar-16
Jun-16
Sep-16
Dec-16
Mar-17
Jun-17
Sep-17
Dec-17
Mar-18
Jun-18
Sep-18
Source: The Federal Reserve, Bloomberg
@ 2018 Bianco Research, L.L.C. All Rights Reserved
https://www.biancoresearch.com


The FOMC's PCE-YoY Forecast
2.6%
2.4%
2.2%
2.0%
1.8%
1.6%
1.4%
1.2%
1.0%
0.8%
0.6%
0.4%
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
PCE YoY
Mar-15
Jun-15
Sep-15
Dec-15
Mar-16
Jun-16
Sep-16
Dec-16
Mar-17
Jun-17
Sep-17
Dec-17
Mar-18
Jun-18
Sep-18
Source: The Federal Reserve, Bloomberg
@ 2018 Bianco Research, L.L.C. All Rights Reserved
https://www.biancoresearch.com

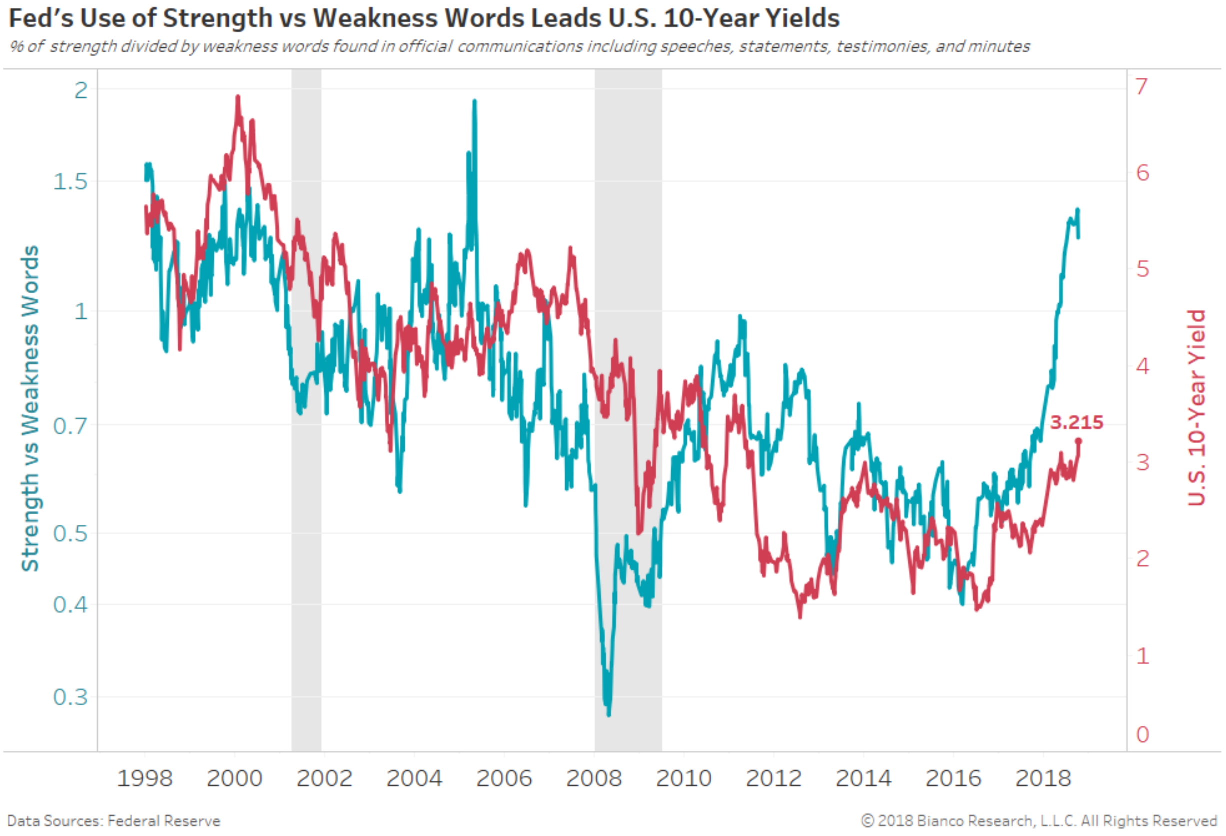
The chart below shows the percentage of Federal Reserve rhetoric allocated to each topic from inflation to financial stability. We use a rolling 25-speech/statement sum divided by the use of the highest frequency words found in our lexicon.
Inflation remains the topic of choice, while uncertainty and financial stability fall off the map. Most notably, Fed officials have uttered words of economic strength (**green**) at their greatest rate post-crisis, exceeding words of weakness (**red**) for the first time in early May 2018.

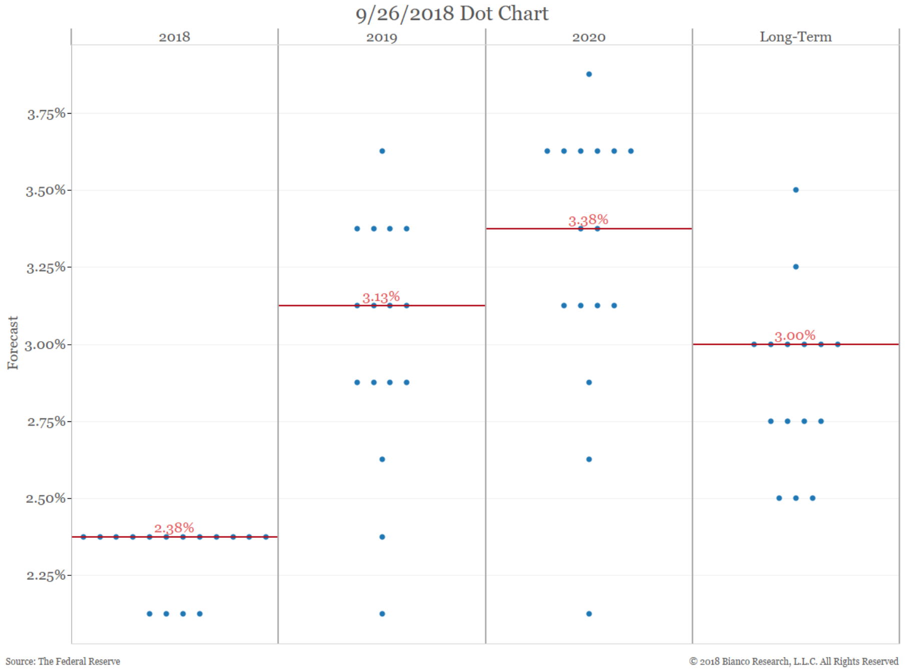


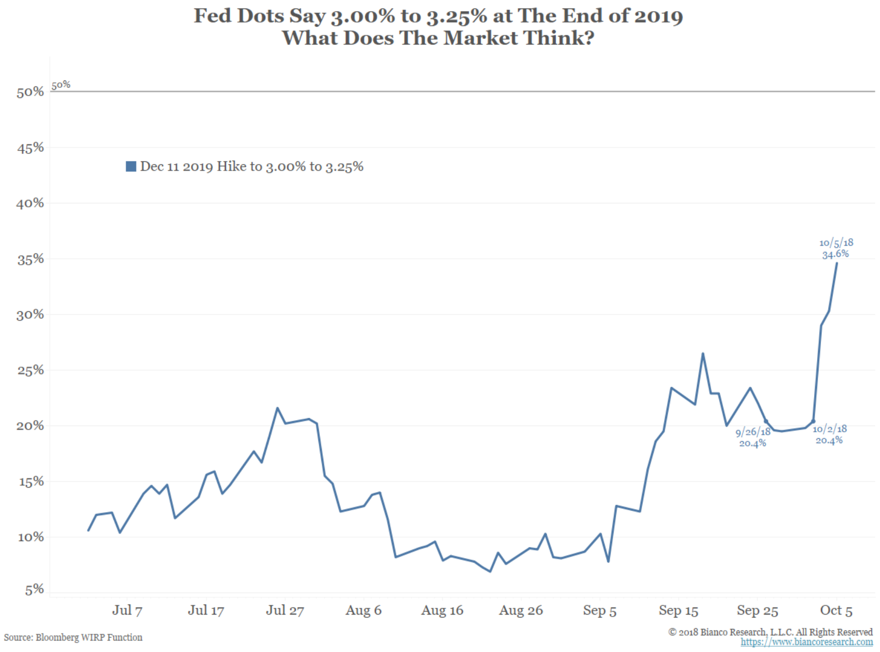
"There's really no reason to think that this cycle can't continue for quite some time, effectively indefinitely," Powell said Wednesday at an event in Washington hosted by The Atlantic magazine and the Aspen Institute. – Bloomberg, October 4, 2018

The next chart shows the ratio between the share of strength and weakness words in Fed communications (blue, left axis) along with the U.S. 10-year note yield (red, right axis).

The ratio has emphatically turned to strength not heard since May 2005. The doves, centrists, and hawks are all offering very upbeat comments on U.S. consumers and businesses.




9/26/2018 Dot Chart
2018
2019
2020
Long-Term
3.75%
3.50%
3.25%
3.00%
2.75%
2.50%
2.25%
Forecast
2.38%
3.13%
3.38%
3.00%
Source: The Federal Reserve
© 2018 Bianco Research, L.L.C. All Rights Reserved


Fed Dots Say 3.00% to 3.25% at The End of 2019
What Does The Market Think?
Dec 11 2019 Hike to 3.00% to 3.25%
50%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
10/5/18
34.6%
9/26/18
20.4%
10/2/18
20.4%
Jul 7
Jul 17
Jul 27
Aug 6
Aug 16
Aug 26
Sep 5
Sep 15
Sep 25
Oct 5
Source: Bloomberg WIRP Function
© 2018 Bianco Research, L.L.C. All Rights Reserved
https://www.biancoresearch.com

What does the market expect going forward?

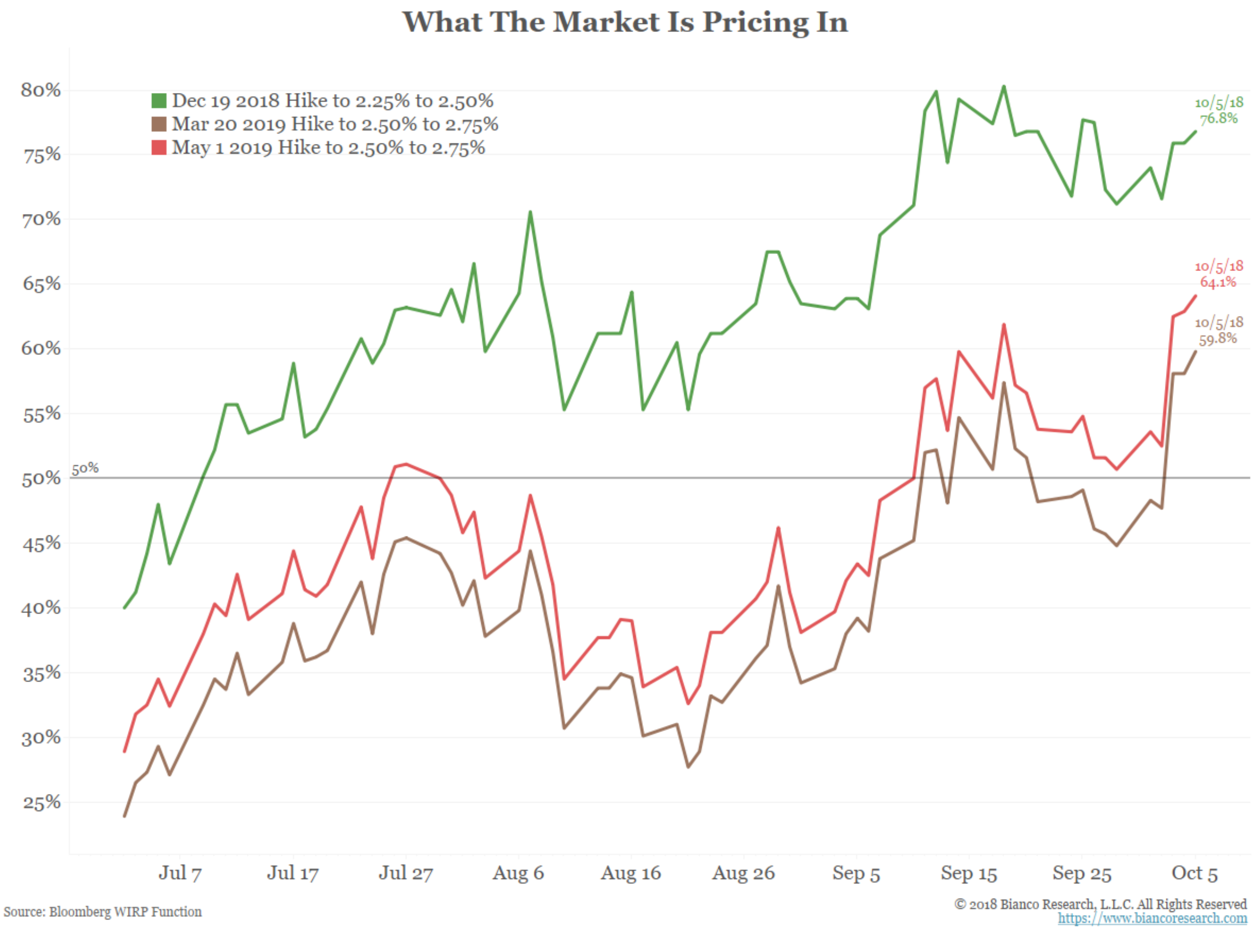
The top pink line in the next chart shows the market's implied odds of a hike at next week's meeting. Assuming the FOMC hikes to a range of 2.00% to 2.25% next week, the green line shows the probability of a hike to a range of 2.25% to 2.50% at the December 19, 2018, FOMC meeting. The brown and bottom pink lines show the implied odds of a hike to 2.50% to 2.75% at the March 20, 2019 and May 1, 2019 meetings.

•The probability of a hike to 2.00% to 2.25% at next week's FOMC meeting is 98%.

•The probability of another hike to 2.25% to 2.50% at the December 19 FOMC meeting is 74%.

•The probability of a hike to 2.50% to 2.75% is 50% at the March 20, 2019 FOMC meeting and 55% at the May 1, 2019 FOMC meeting.

Simply put, the market is pricing in two more hikes by year-end and the odds of one more hike in the first half of 2019 are a coin flip.

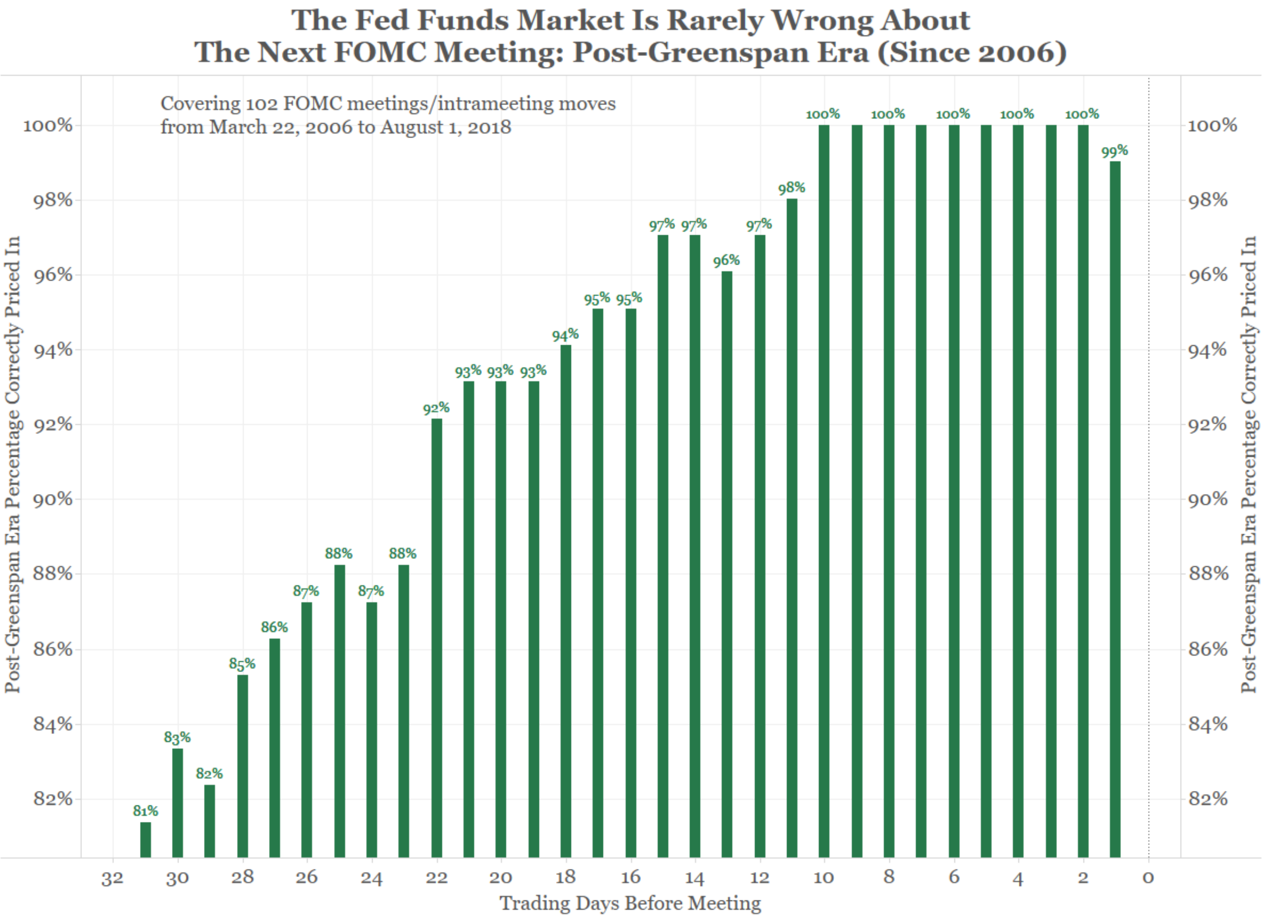


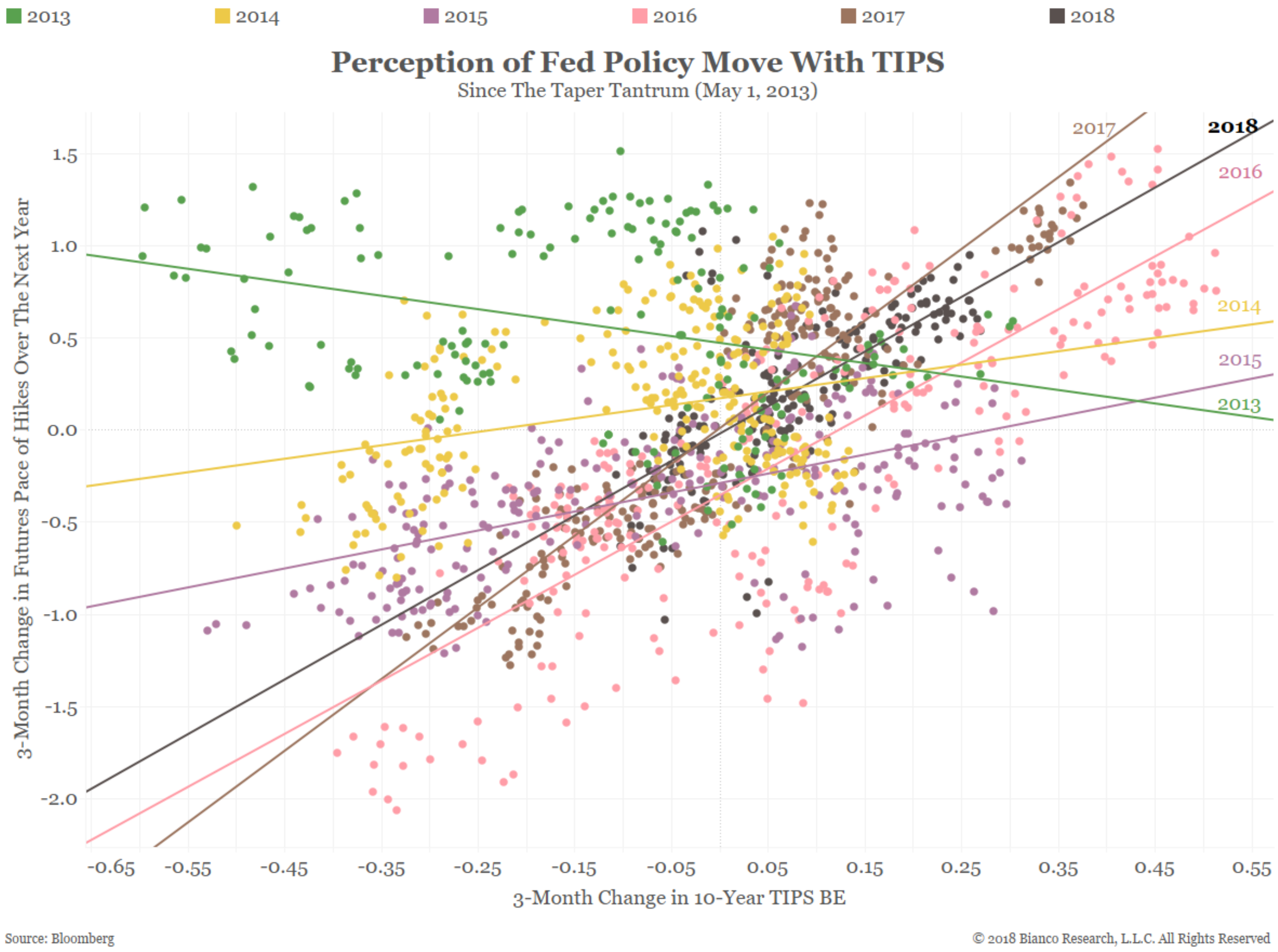
The next chart aggregates the market's track record of predicting the outcome of the 102 meetings since Bernanke became chairman. It shows how accurate the market is in pricing Fed policy based on the number of days prior to the meeting.

•30 trading days before the FOMC meeting, the fed funds futures market has correctly discounted the Fed's eventual move (or non-move) about 83% of the time.

•17 trading days, or more than 3 weeks before an FOMC meeting, the market has accurately predicted the outcome 95% of the time.

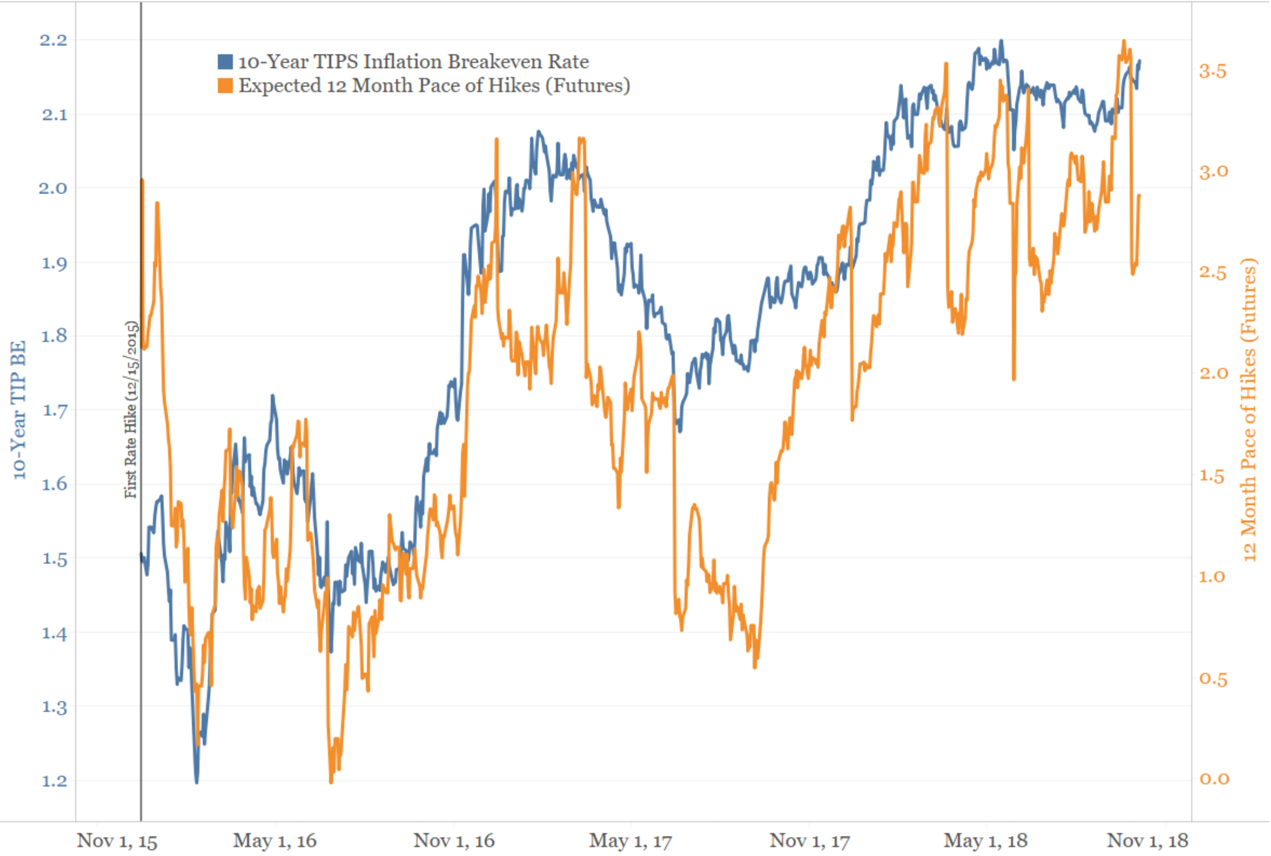
•Note that the market was "only" 99% accurate on the day prior to a meeting. On September 16, 2008, one day prior to a meeting, the market priced in a cut due to panic surrounding Lehman's bankruptcy. The Fed did not cut at that meeting, however they did cut rates 50 basis points in an emergency meeting on October 7. That marks the only time the market incorrectly priced fed funds futures on the day prior to a meeting since Bernanke took the helm.



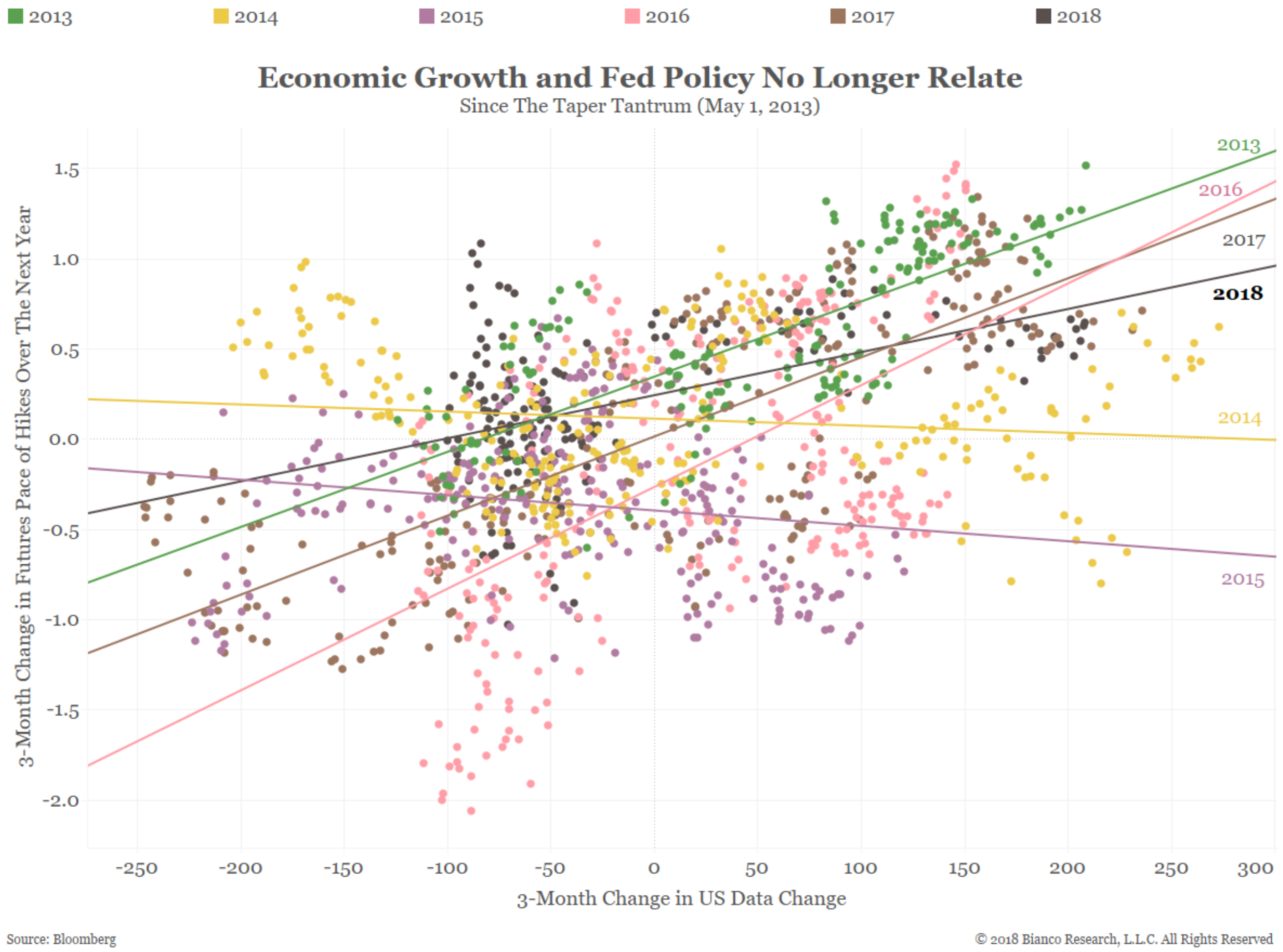


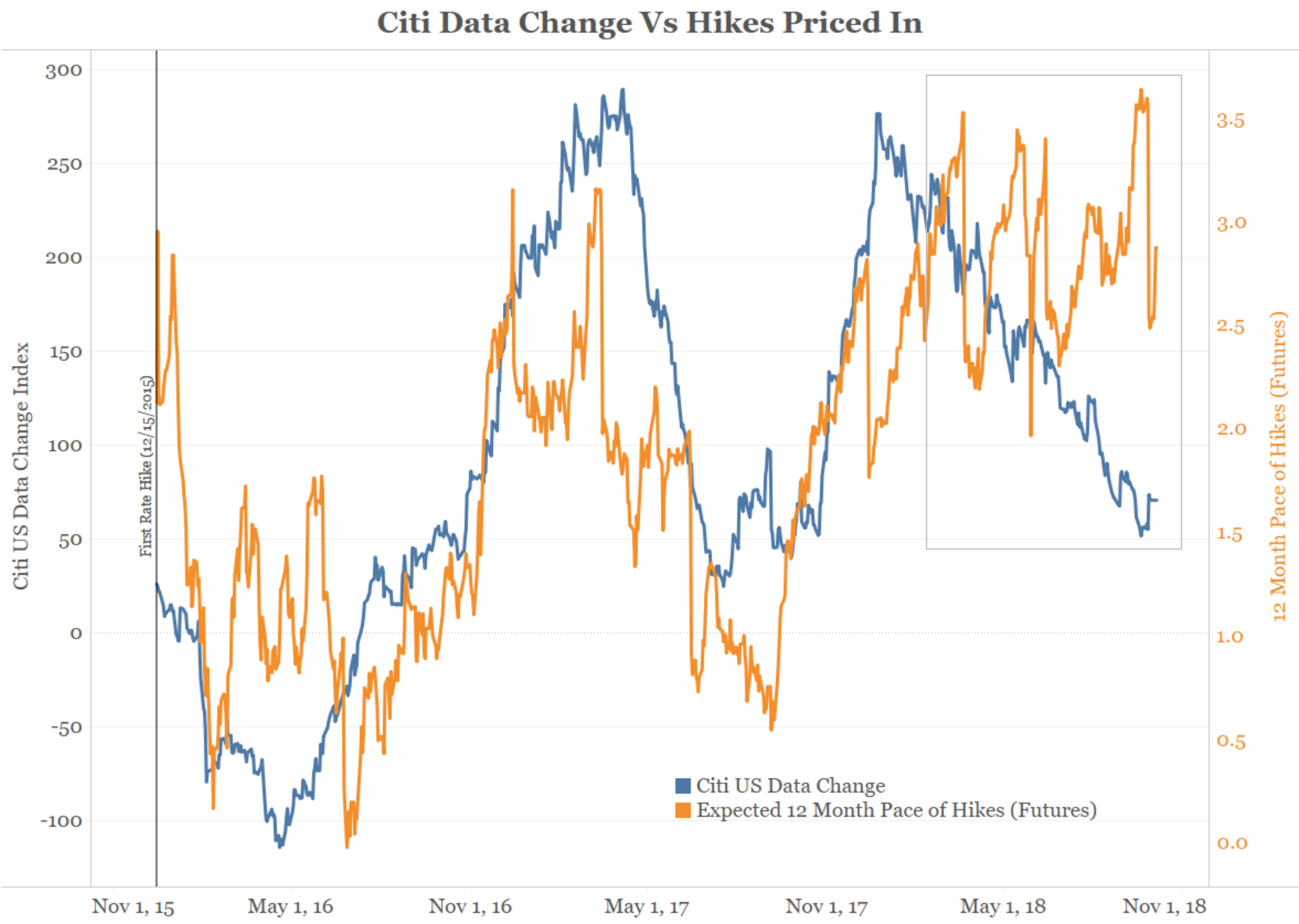
2013
2014
2015
2016
2017
2018
Perception of Fed Policy Move With TIPS
Since The Taper Tantrum (May 1, 2013)
3-Month Change in Futures Pace of Hikes Over The Next Year
3-Month Change in 10-Year TIPS BE
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
-0.65
-0.55
-0.45
-0.35
-0.25
-0.15
-0.05
0.05
0.15
0.25
0.35
0.45
0.55
Source: Bloomberg
© 2018 Bianco Research, L.L.C. All Rights Reserved

10-Year TIPS BE Vs Hikes Priced In



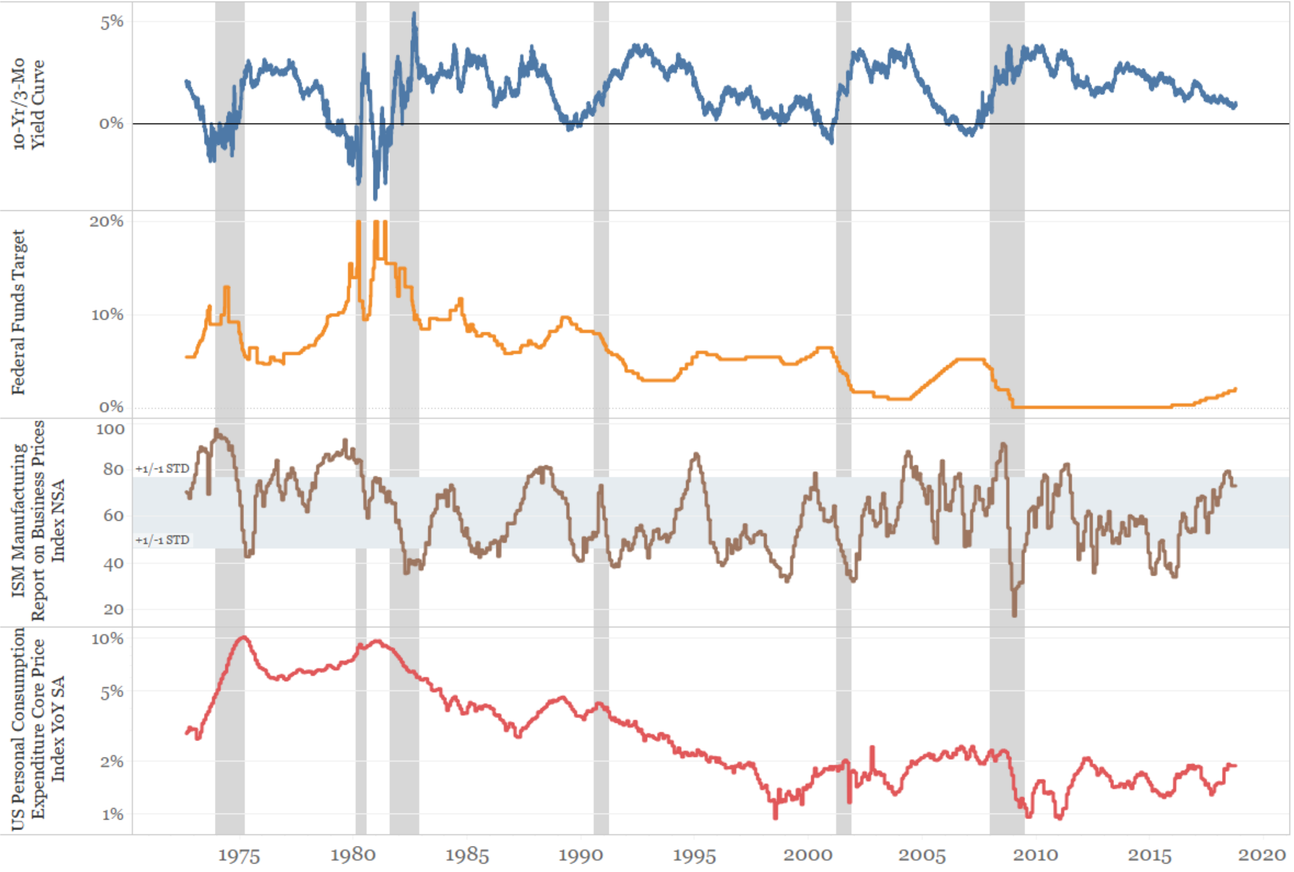
Source: Bloomberg


2013
2014
2015
2016
2017
2018
Economic Growth and Fed Policy No Longer Relate
Since The Taper Tantrum (May 1, 2013)
3-Month Change in Futures Pace of Hikes Over The Next Year
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
-250
-200
-150
-100
-50
0
50
100
150
200
250
300
3-Month Change in US Data Change
2013
2016
2017
2018
2014
2015
Source: Bloomberg
© 2018 Bianco Research, L.L.C. All Rights Reserved

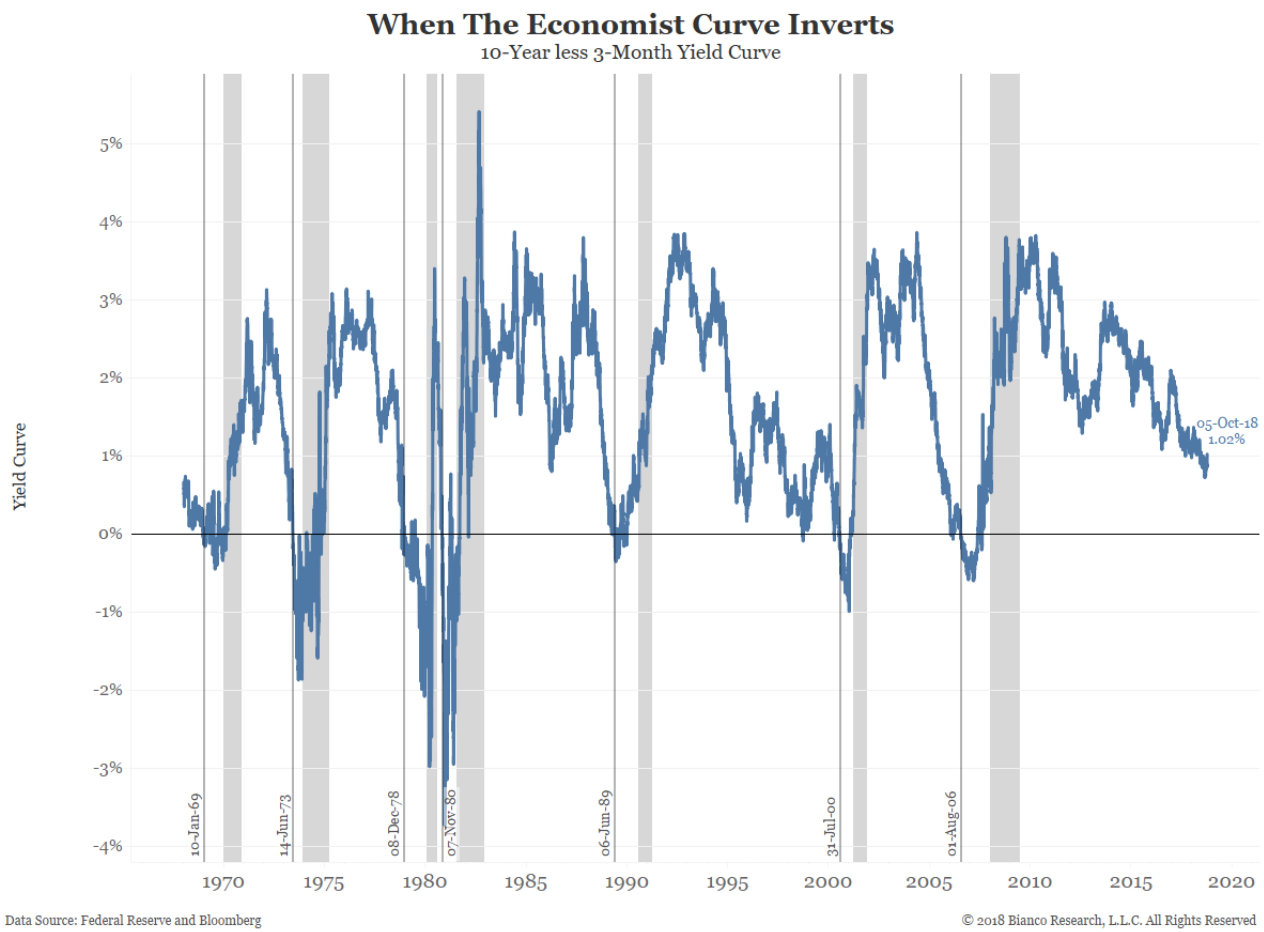


Source: Bloomberg

Why Does The Yield Curve Invert?



Data Source: Federal Reserve and Bloomberg



How Long Until The Recession?

When the 3M/10Yr Curve Inverts For 10 Straight Days

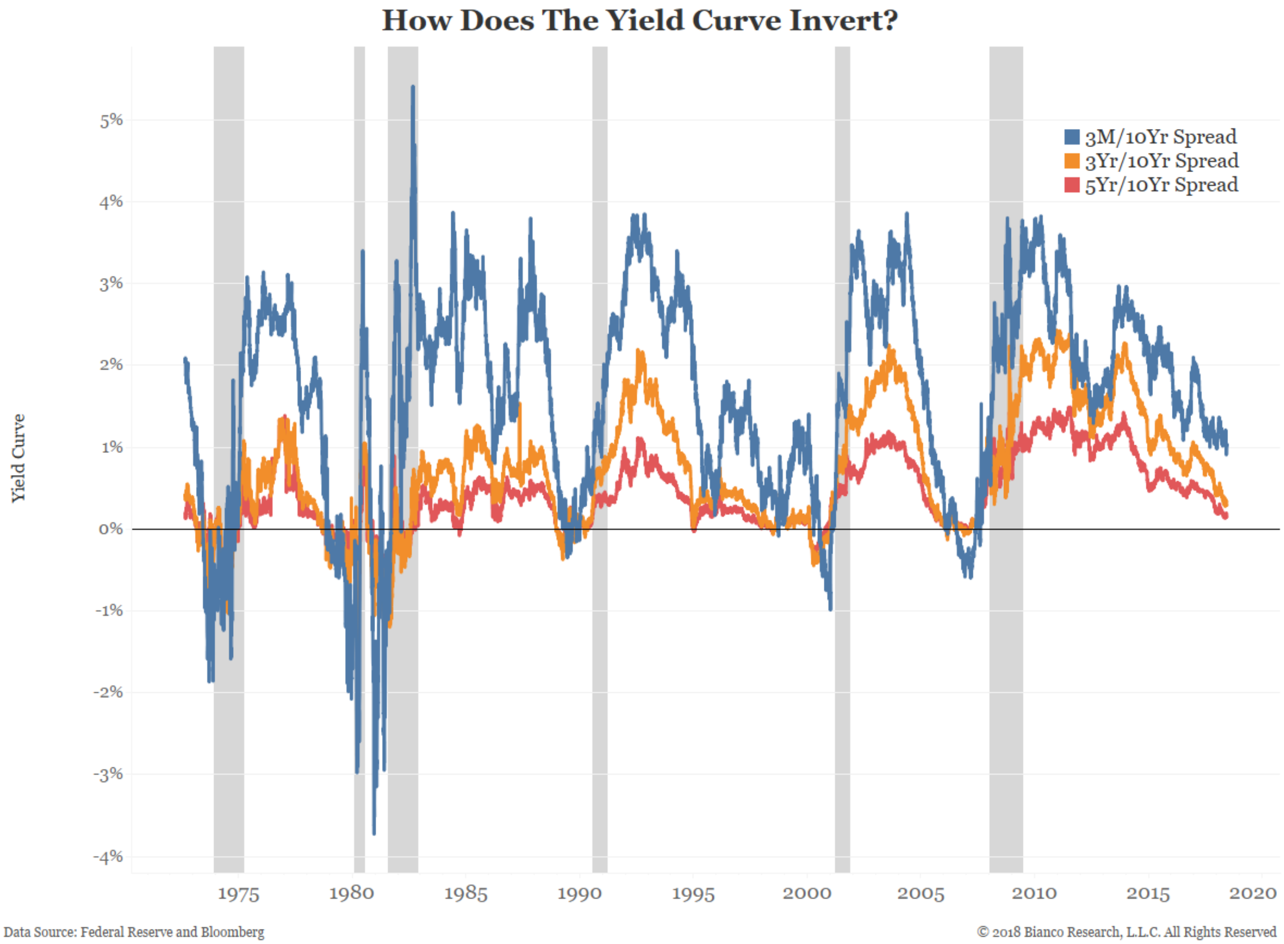
Date of Inversion	Date of Next Recession	Days to Next Recession
1/10/1969	Dec-69	325
6/14/1973	Nov-73	140
12/8/1978	Jan-80	389
11/7/1980	Jul-81	236
6/6/1989	Jul-90	390
7/31/2000	Mar-01	213
8/1/2006	Dec-07	487
Average		**311**

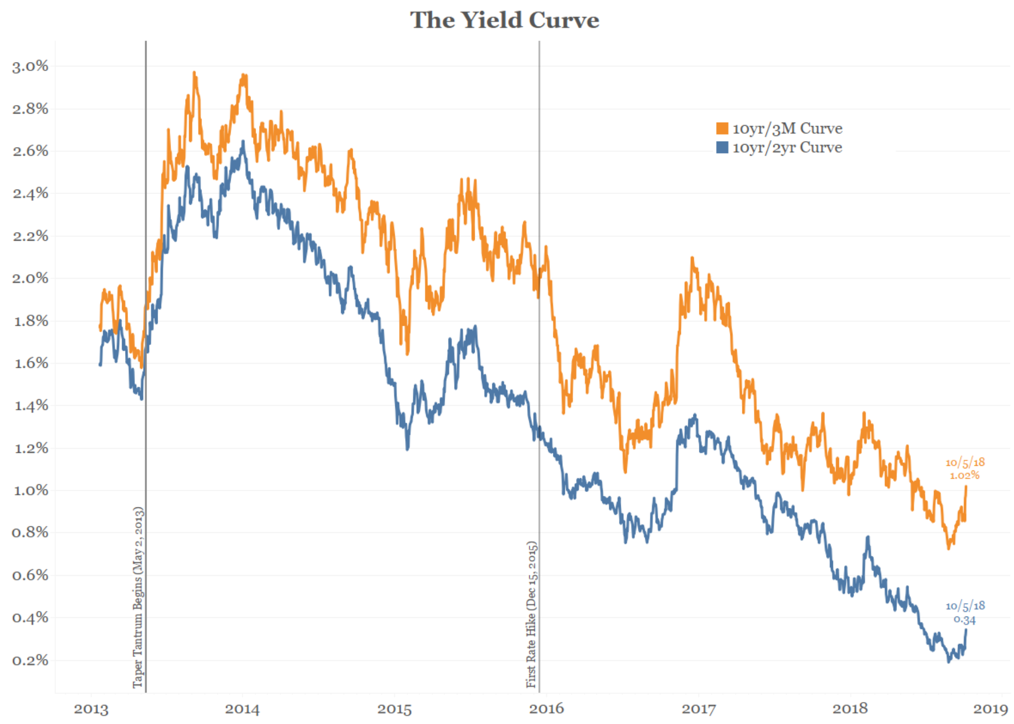
How The Curve Inverts

It is important to note the curve is smooth as this fact makes the next chart important. It shows three different curves – the 5yr/10yr curve in red, the 3yr/10yr curve in orange and the 3m/10yr curve in blue.

Note that in every instance the 5yr/10yr curve inverts first, followed by the 3yr/10-year curve and then the 3m/10yr. Typically a recession follows about a year after these inversions.

This is how it should be given the smooth nature of the curve. It inverts from the inside out. Also note that, other than a few instances in the 1980s when the curve inverted by fewer than 5 basis points, once the 5y/10yr curve inverts, eventually the rest follow. Since 1989 there are no instances when the 5yr/10yr curve inverts in isolation.





Source: Bloomberg

Federal Reserve Bank of New York leader **John Williams** said Thursday the prospect of a yield-curve inversion by itself wouldn't be enough to stop him from supporting further rate rises if he thought the economy called for them.

"I think we need to make the right decisions based on our analysis of where the economy is and where it's heading," Mr. Williams told reporters after a speech in Buffalo. "If that were to require us to move interest rates up to the point where the yield curve was flat or inverted, that would not be something I find worrisome on its own." – **The Wall Street Journal, September 6, 2018**

John Williams, who takes the helm of the powerful Federal Reserve Bank of New York in June, played down risks the yield curve would become inverted as the U.S. central bank gradually raises interest rates.

Speaking in Madrid Tuesday, the current president of the Fed's San Francisco branch said a truly inverted yield curve "is a powerful signal of recessions" that historically has occurred "when the Fed is in a tightening cycle, and markets lose confidence in the economic outlook." That is not the case now, he said.

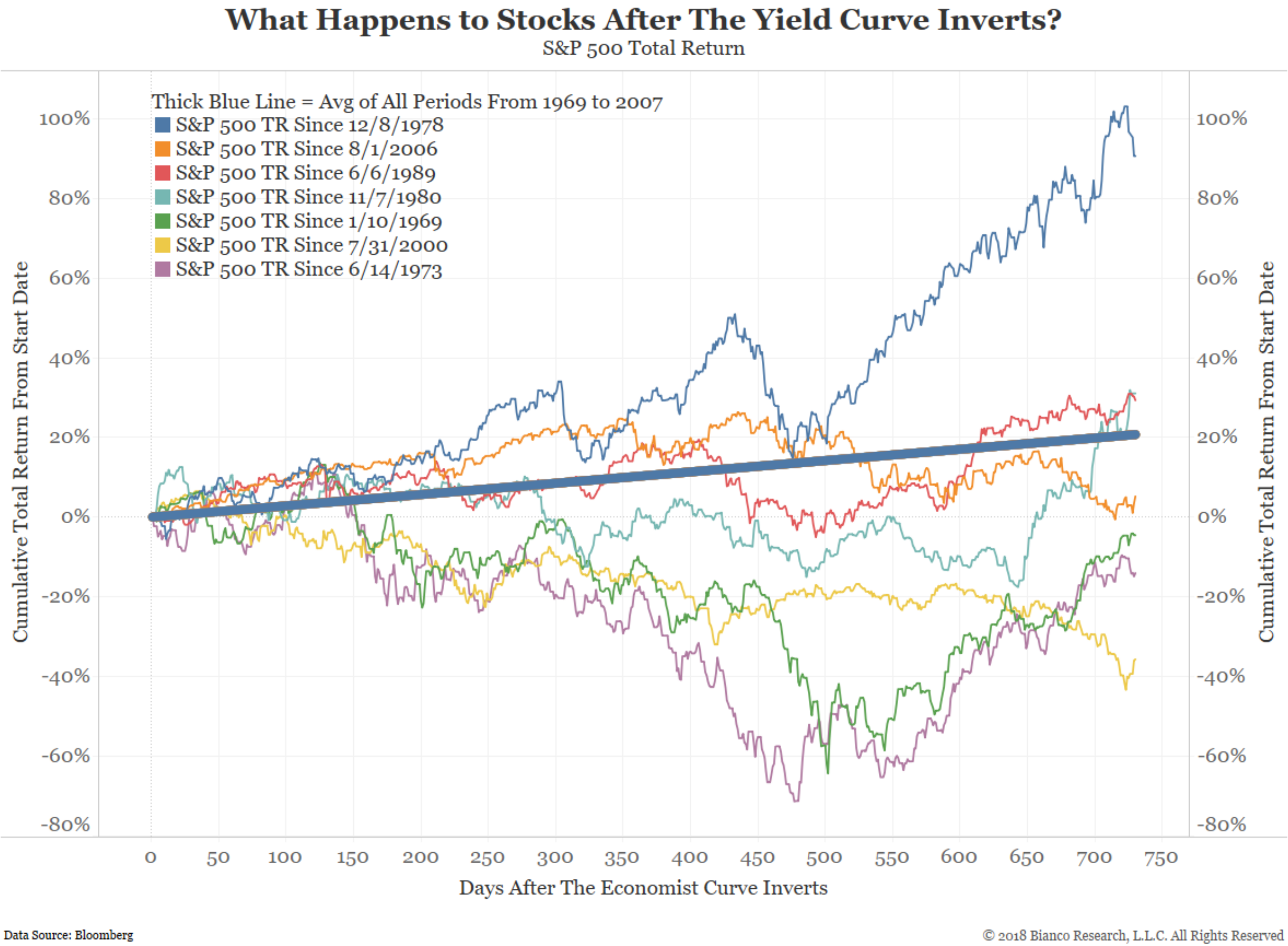
"The flattening of the yield curve that we've seen is so far a normal part of the process, as the Fed is raising interest rates, long rates have gone up somewhat -- but it's totally normal that the yield curve gets flatter," Williams said. – **Bloomberg, April 17, 2018**

So, what does the economists' curve mean for the stock market?

The next chart shows the stock market's total return in the two years following the inversions noted above. The thick blue line shows the S&P 500's average yearly return from 1969 to 2007 (10.26%/year). We believe this serves as a decent buy-and-hold benchmark.

Note that the longer the inversion, the worst the stock market does relative to the average of all periods (buy/hold). Stocks only outperformed a buy/hold strategy to a meaningful degree during the December 1978 inversion.

Note that these results are very different from those shown in *The Wall Street Journal* graphic above. An inversion in the economists' curve portends trouble, especially if the inversion lasts for a long time.



Bianco Research L.L.C.

550 W. Washington Blvd
Suite 201
Chicago IL 60661

Phone: (847) 304-1511
e-mail: research@biancoresearch.com
http://www.biancoresearch.com

For more information about the contents/ opinions contained in these reports:

President (847) 756-3599
James A. Bianco jbianco@biancoresearch.com

Analysts (847) 304-1511
Greg Blaha gblaha@biancoresearch.com
Ben Breitholtz ben.breitholtz@biancoresearch.com
Peter Forbes peter.forbes@biancoresearch.com
Ryan Malo rmalo@biancoresearch.com

For subscription/service Information:

Arbor Research & Trading, Inc.
Director of Sales & Marketing (800) 606-1872
Max Konzelman Max.Konzelman@arborresearch.com

Arbor Research & Trading, L.L.C

1000 Hart Road, Suite 260
Barrington IL 60010

Phone: (847) 304-1550 Fax: (847) 304-1595
e-mail: inforequest@arborresearch.com
http://www.arborresearch.com

Domestic - For more information about Arbor Research & Trading and its services:

New York Sales Office
10 East 40th Street 13th Floor
New York, NY 10174
Edward T. McElwreath ed.mcelwreath@arborresearch.com
Phone (212) 867-5326 Fax (212) 370-1218

International - For more information about Arbor Research & Trading and its services:

London Sales Office
Room 303
New Broad Street House
35 New Broad Street
London
EC2M 1NH
Phone 44-207-100-1051
Neil Tritton neil.tritton@arborresearch.com
Ben Gibson ben.gibson@arborresearch.com

Chicago Sales Office
James L. Perry james.perry@arborresearch.com
Phone (847) 304-1560 Fax (847) 304-1595

Geneva Sales Office
Rich Kleinbauer rich.kleinbauer@arborresearch.com
Phone (41) 22 565-2480