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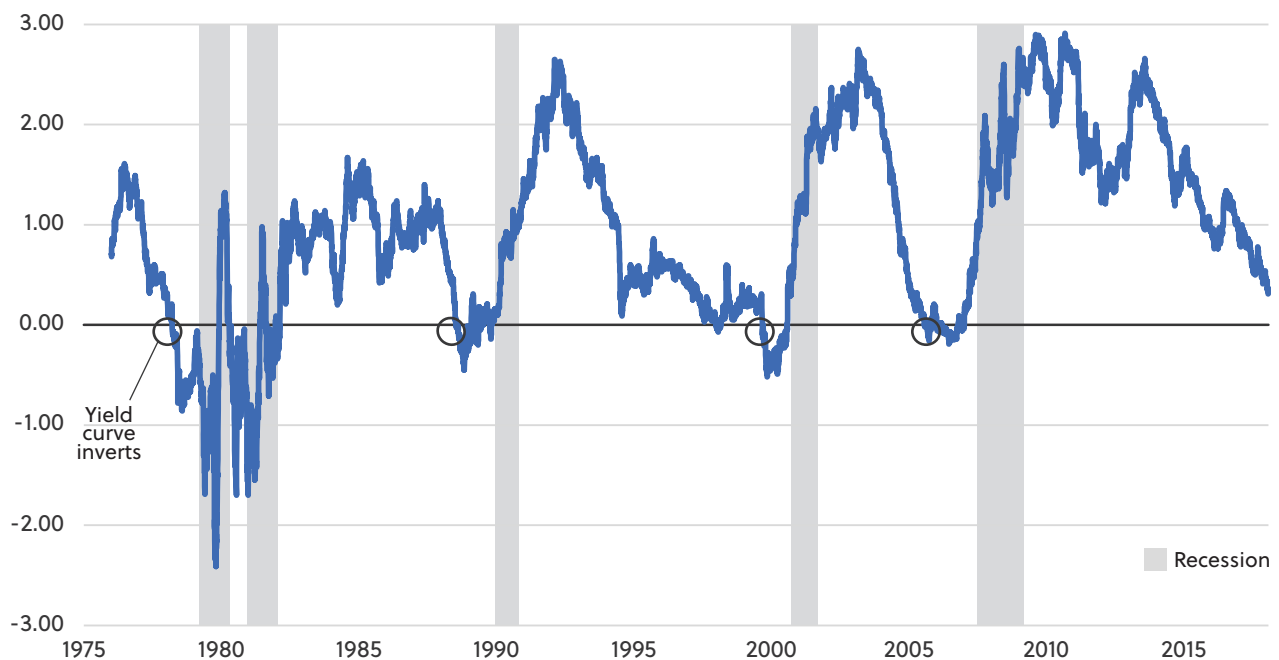
Reading the Yield Curve

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The shape of the yield curve has received more attention this year as it continues to flatten. Investors have called attention to the matter because an inverted yield curve (where shorter-term rates are higher than longer-term rates) has historically preceded a recession (see Exhibit 1). However, current conditions in the fixed income market, heavily influenced by unconventional monetary policy, suggest that we must view the flattening in conjunction with other indicators for a true gauge on the state of the economy.

The spread (difference) between 10- and two-year Treasury yields has been declining since the beginning of 2014, when it stood at over 260 basis points (bps) (2.60 percent). As of July 31, 2018, it has fallen to just 30 bps. With the spread narrowing to historically tight levels, what is the yield curve telling us now? Are we on the brink of a recession? What other factors, besides the shape of the curve, inform investors about potential recessions?

Exhibit 1: 10-Year Treasury Yield Minus Two-Year Treasury Yield



Source: Federal Reserve Economic Data (FRED)



What Does the Shape of the Yield Curve Mean?

The spread between the yield on 10-year and two-year Treasuries is just one measure of market expectations for interest rates over the short term versus the longer term. For instance, if two-year Treasuries are higher yielding than 10-year Treasuries, the market expects rates to be higher over the next two years than over the long term. This then implies that long-term rates are expected to be lower between year two and year 10.

Research by multiple economists has concluded that an inverted yield curve had occurred before each of the preceding six recessions.¹ In fact, recent Federal Reserve (Fed) research shows that during the past 60 years an inverted yield curve preceded every recession by anywhere from six to 24 months, with only one exception in the mid-1960s.² Typically, the curve inverts because short-end yields rise while the long-end yields rise less or even decline. While the curve has not yet inverted, the current environment fits this pattern as yields on the short end have risen in lockstep with the Fed increasing rates, while the 10-year Treasury yield has stagnated around 3 percent.

So why has the relationship between inversion and recession held in the past? Although little consensus exists among economists, there are a few possible explanations. One possibility is that the shape of the curve influences the availability of credit. Since banks borrow short and lend long, the shape of the curve influences their profitability and willingness to lend; a flatter curve makes lending less profitable, in turn, leading to less lending and slower economic activity. Another possible explanation is that an inverted curve is a sign of investors' belief that the Fed has increased rates too much, ultimately triggering a slowdown in the economy and forcing the Fed to eventually lower rates in response.

While these anecdotal explanations have some logic, other researchers have pointed out that, although the relationship seems to hold for the U.S., the record is less definitive elsewhere. In a recent research piece, AQR examined the yield curves in other developed markets and found that the relationship between the shape of the curves and recessions is mixed.³ For example, in Australia, the yield curve has inverted four times since 1990, but Australia has only experienced one recession during that time (three false positives). Since the real estate and stock market bubbles burst in the early 1990s, Japan has had multiple recessions, yet its yield curve never inverted during that period. So, while an inverted yield curve has a good track record of predicting U.S. recessions, outside of the country, the record is far less reliable.

The Shape of the Yield Curve Does Not Equal an Imminent Recession

While PFM is paying close attention to the flattening yield curve as a possible indicator of a future recession, we also analyze a variety of other leading indicators. Another gauge that has a good track record of predicting oncoming recessions is the unemployment rate. While the unemployment rate is typically viewed as a lagging indicator, research has shown that it typically rises before the economy enters a recession; during the nine months leading up to previous recessions, the unemployment rate began to rise (see Exhibit 2 on the next page).⁴

- 1 Arturo Estrella and Mary R. Trubin, "The Yield Curve as a Leading Indicator: Some Practical Issues," *Current Issues in Economics and Finance* 12 no. 5 (2006). Accessed August 2, 2018. https://www.newyorkfed.org/medialibrary/media/research/current_issues/ci12-5.pdf
- 2 Michael D. Bauer and Thomas M. Mertens, "Economic Forecasts with the Yield Curve" *FRBSF Economic Letter*, 2018 no. 7 (March 5, 2018). Accessed August 2, 2018. <https://www.frbsf.org/economic-research/files/el2018-07.pdf>
- 3 "Macro Wrap-Up: The Yield Curve Is a Very Interesting Topic," AQR (May 4, 2018). Accessed August 2, 2018. <https://www.aqr.com/Insights/Research/Macro-Wrap-Up/Macro-Wrap-Up-The-Yield-Curve-is-a-Very-Interesting-Topic>
- 4 Kevin L. Kliesen, "Recession Signals: The Yield Curve vs. Unemployment Rate Troughs," *Recession Synopses* 2018 no. 16 (June 1, 2018). Accessed August 2, 2018. <https://research.stlouisfed.org/publications/economic-synopses/2018/06/01/recession-signals-the-yield-curve-vs-unemployment-rate-troughs/>



Exhibit 2: Unemployment Rate



Source: FRED

With the unemployment rate currently at approximately 4 percent, and with expectations that it will fall further, it is not currently showing any signs of weakness. That being said, if the unemployment rate continues to fall, a tighter labor market could put pressure on wages, leading to higher inflation in a potentially overheating economy. This, in turn, would likely lead to more aggressive monetary tightening by the Fed. If the Fed continues to raise rates, the economy may start to slow, the unemployment rate may begin to rise, and the economy could eventually enter a recession. It may be possible for the Fed to engineer a “soft landing,” but it has had trouble slowing the economy in the past without contributing to the onset of a recession. We are reluctant to conclude that this time would be any different.

Another indicator of a possible recession is the year-over-year (YoY) change in the Leading Economic Index (see Exhibit 3 on the next page), made up of various forward-looking economic data that is combined to forecast the direction of the U.S. economy six months in the future. Historically, when the Leading Economic Index has dropped below its level from a year prior, a recession has tended to follow. Currently, the index is above this threshold and continues to rise. Based on this indicator, we are not expecting a recession in the near future.

The Fed and the Shrinking Term Premium

While the relationship between an inverted yield curve and a recession has historically been strong, we may currently be in uncharted territory, partially due to the Fed’s management of its large balance sheet. One place we can see this is the 10-year term premium (see Exhibit 4 on the next page).

Investors typically demand a premium (higher yield) to buy 10-year Treasuries versus buying shorter-dated Treasuries and rolling them over as they mature for a period of 10 years. According to the New York Fed, from June 1961 to April 2012, that term premium was approximately 1.80 percent: Investors earned 180 bps more by purchasing 10-year Treasuries versus buying short-term Treasuries and rolling them forward.



Exhibit 3: YoY Change In the Leading Economic Index

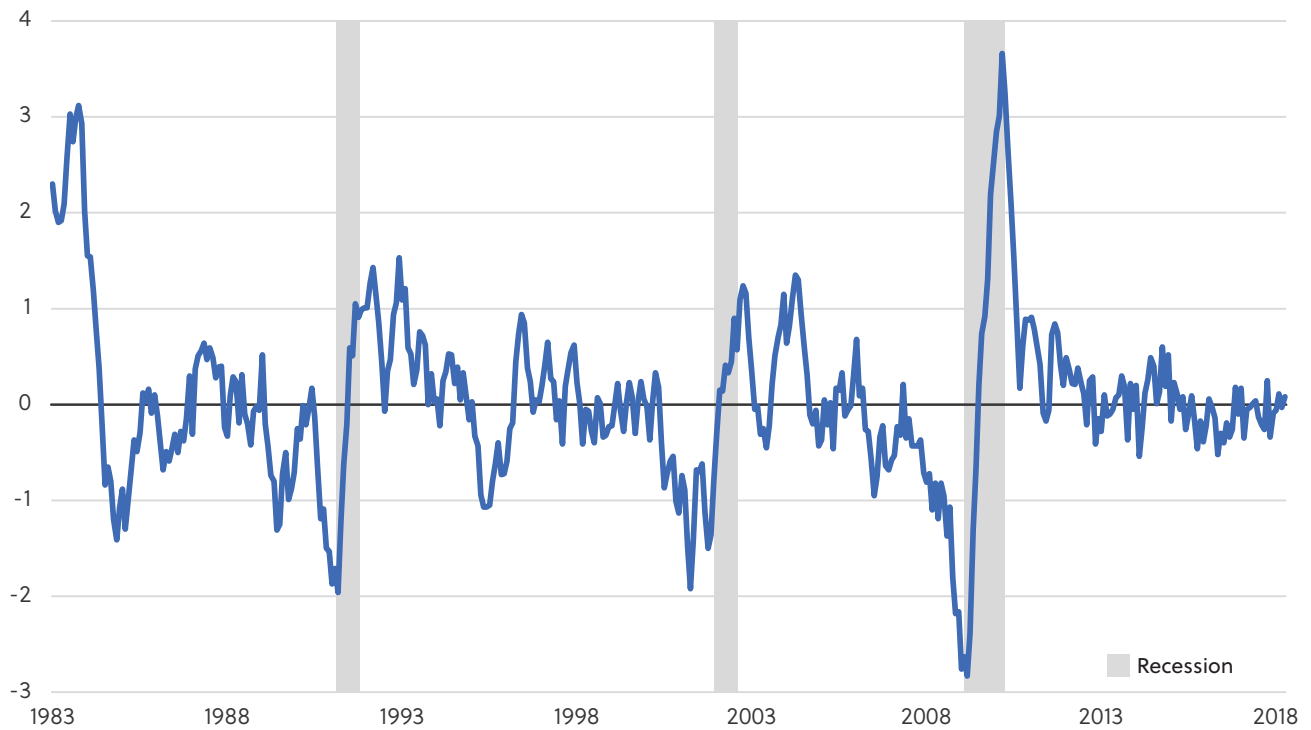
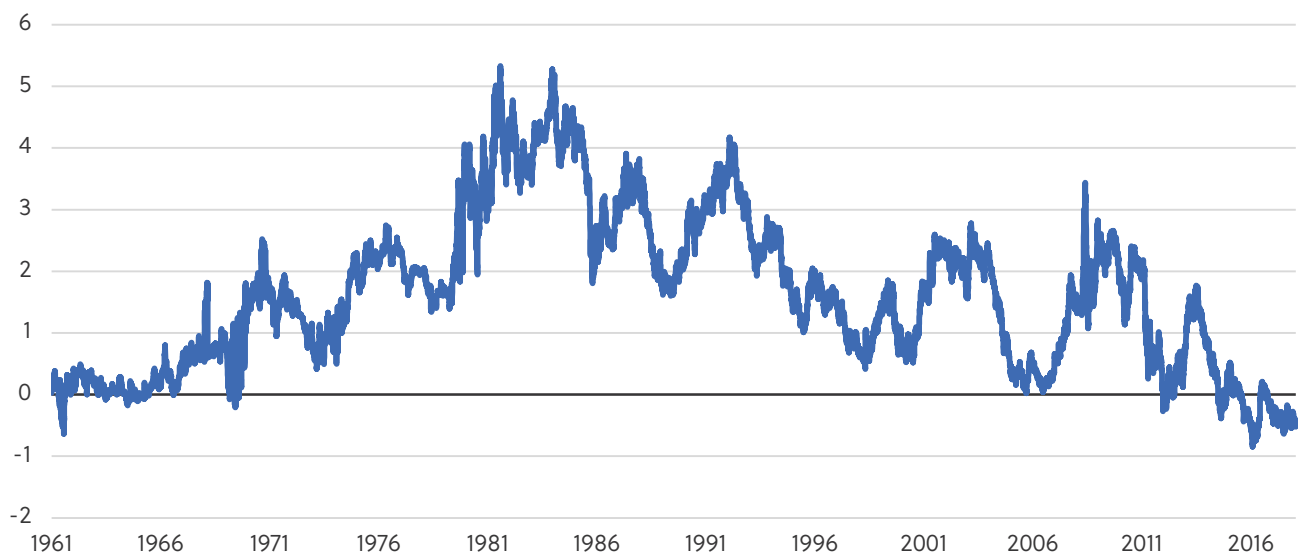


Exhibit 4: 10-Year Term Premium



Although the term premium has varied widely over time, it has rarely been as little as it has been recently. In fact, starting in 2014, investors buying 10-year Treasuries began earning a negative term premium, meaning they would earn a higher expected return buying short-term Treasuries and rolling them over than investing in long-term Treasuries.

While economists do not fully agree on why the term premium is now negative, one possibility is the Fed's large accumulated balance of Treasuries and Agency mortgage-backed securities. Prior to the financial crisis, the Fed's balance sheet was less than \$1 trillion. As a result of several large-scale bond-buying programs



(Quantitative Easing, or QE), it grew to \$4.5 trillion. One Fed study estimates that the Fed's QE program has lowered the term premium by 100 bps.⁵ In addition, the Fed's 2011-12 "Operation Twist," the shifting of Treasury holdings from short maturities to longer-term ones, had the effect of further lowering longer-term rates.⁶

If the Fed has indeed distorted market rates, the relationships of the past may no longer hold. In addition, the Fed's balance sheet is much larger than in the past, implying that the Fed's balance sheet actions could continue to have a significant impact on rates and the shape of the yield curve. The Fed is now in the process of reducing its balance sheet, which may begin to unwind some of the curve impact, but some Federal Open Market Committee (FOMC) members have indicated that reduction process may already be near coming to a close. While the relationship between a flattening yield curve and economic activity may still be valid, it may not have the strong link it did in the past. Therefore, a small inversion in the curve today may not predict a recession.

The Fed has, of course, acknowledged the flattening yield curve, but will this cause it to slow or pause its rate increases? The short answer is "no." Historically, it has not done so, and we believe it would be inappropriate for the Fed to alter its course based solely on the shape of the curve if other economic indicators suggest the economy is growing and inflation is firming. Of course, the shape of the curve is something that FOMC members have said they monitor, but, short of other indicators pointing to a slowdown in the economy, we expect the Fed to continue on its current path of periodic, gradual rate increases.

Our Final Read

Following a pickup in the second quarter, recent economic data suggests the U.S. economy continues to grow at a modest, sustainable pace. Based on PFM's 2018 Capital Market Assumptions established at the beginning of the year, we see the 10-year Treasury yield ending 2018 around 3.2 percent and 2019 around 3.7 percent. Further, we expect the Fed funds rate to rise to approximately 3.25 percent to 3.5 percent by the end of 2019. None of the economic data released so far this year has materially changed our assumptions.

Thus, in our current view, we do not expect the curve to invert, nor do we believe the current yield curve flattening signals an oncoming recession. In addition, changes in the fixed income market since the financial crisis of a decade ago suggest that the linkage between a flattening yield curve and weaker future economic activity may not be what it once was.

Nevertheless, we respect the predictive historical relationship between inverted yield curves and recessions in the U.S. and will continue to monitor the shape of the yield curve, as well as a comprehensive range of other economic indicators, to make appropriate investment decisions for our clients. In any case, changes in the yield curve will certainly give investors and economists something to argue about, at least until the next economic slowdown is upon us.

5 Brian Bonis, Jane Ihrig and Min Wei, "The Effect of the Federal Reserve's Securities Holdings on Longer-term Interest Rates," *FEDS Notes* 2017 (April 20, 2017). Accessed August 2, 2018. <https://www.federalreserve.gov/econres/notes/feds-notes/effect-of-the-federal-reserves-securities-holdings-on-longer-term-interest-rates-20170420.htm>

6 "Maturity Extension Program and Reinvestment Policy," Board of Governors of the Federal Reserve System, last modified August 2, 2013. Accessed August 2, 2018. <https://www.federalreserve.gov/monetarypolicy/maturityextensionprogram.htm>

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