



WHAT TO KNOW ABOUT YOUR INVERSION

Overview

Institutional investors are forever looking for clues in the behavior of the fixed income market that might predict the future course of the economy – particularly the probability, timing, and potential severity of a recession. In this search, all aspects of the fixed income market are fair game: the level of interest rates, the direction of change in rates, and most importantly, the shape of the yield curve.

Much of this reading of the “yield curve tea leaves” is focused on the hypothesis that an inversion of the yield curve – that is, when short-term interest rates are higher than long-term interest rates – is a signal that a recession is relatively close at hand. Or, at the very least, a signal that a recession is becoming increasingly probable within the time horizon of most investors.

This thesis that a yield curve inversion often portends an economic recession has been a staple theory within the institutional investment community broadly for many decades, and has been borne out by economic developments during a number of historical periods.

Within this context, we believe that there are three aspects of the most recent yield curve inversion which make the possible connection between shifts in the yield curve and future economic developments especially worthy of consideration at this point in time:

1. The ongoing inversion witnessed in 2019.
2. The possible predictive value connecting sustained yield curve inversions and recession; albeit with the caveat that while the historical record is lengthy, the sample size of inversion-recession incidents is relatively small.
3. Emerging claims from academia and the institutional investor community that this perception of a historical relationship between yield curve inversions and subsequent recessions is no longer valid in the post Great Financial Crisis (“GFC”) policy landscape and capital markets environment.

The purpose of this memo is to explore the basics of the issues surrounding the yield curve inversion / recession thesis less from the viewpoint of an academic economist and more from the perspective of those responsible for overseeing pools of institutional capital.

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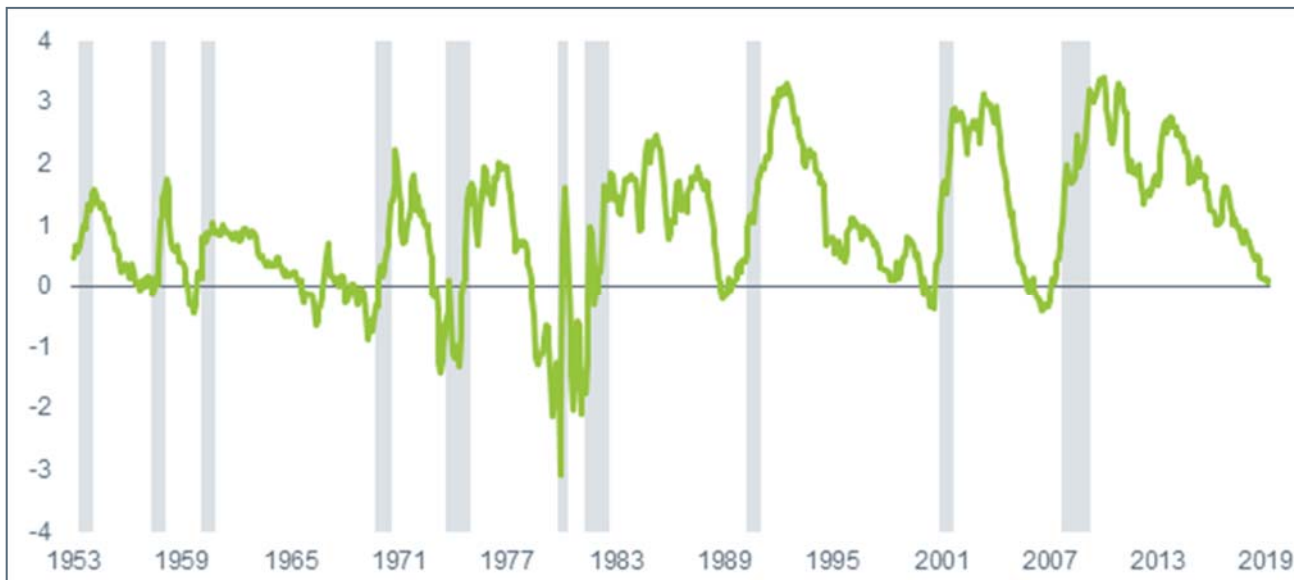
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Why Do Yield Curve Inversions Matter to Institutional Investors?

The immediate concern for institutional investors lies in the notable track record linking yield curve inversions to forecasting of building recessionary pressures, and ultimately economic recessions over the following one to two years. According to recent research by the Federal Reserve¹, **every** US recession over the past 60 years has been preceded by an inversion of the US Treasury yield curve as measured by the interest rate differential between 1-year and 10-year Treasury securities, highlighted in [Exhibit 1](#). A similar potential for predictive power has likewise been demonstrated by a number of other spread metrics, such as the interest rate differential between 3-month and 10-year or 3-month and 5-year Treasury securities².

Exhibit 1: Difference between 1-Year and 10-Year Treasury Securities (%)



Source: RVK, Federal Reserve Bank of St. Louis. Shaded areas indicate U.S. recessions. Data as of 6/2019.

Given the adverse impact that virtually all recessionary markets have had on corporate earnings and asset prices, the emergence of a well-known recessionary indicator has the potential to be directly relevant for many institutional investors as they consider what kind of risk profile and what level of market sensitivity their asset allocation and investment choices should target.

For example, as many investment managers and allocators have observed over recent periods, investors anticipating a near-term recession and subsequent drop in asset prices may choose to tilt their overall portfolio more toward income generation rather than price appreciation. This often results in larger allocations toward income producing assets such as asset-backed debt, or investments with lower market sensitivity such as strategies designed to deliver high levels of diversification. However, as always, we note that any tactical investment decisions made in response to changing markets should be considered with respect to, and bounded by, client objectives and long-term asset allocation targets.

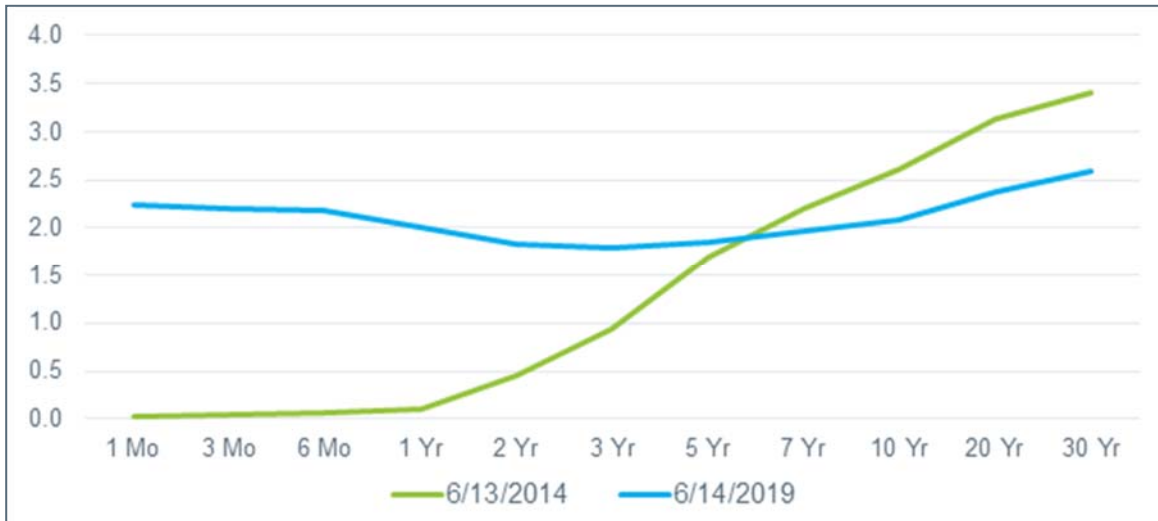
¹ Economic Forecasts with the Yield Curve. Federal Reserve Bank of San Francisco. (March 2018)

² Recovering Expectations of Consumption Growth from an Equilibrium Model of the Term Structure of Interest Rates. Campbell Harvey. (December 1986)

Why is the Yield Curve Inverting Now?

As can be seen in [Exhibit 2](#), the recent yield curve inversion has, by most metrics, been fairly pronounced, especially as compared to its “normal” parameters, which we proxy with rates from a period more representative of historical norms such as observed in 2014.

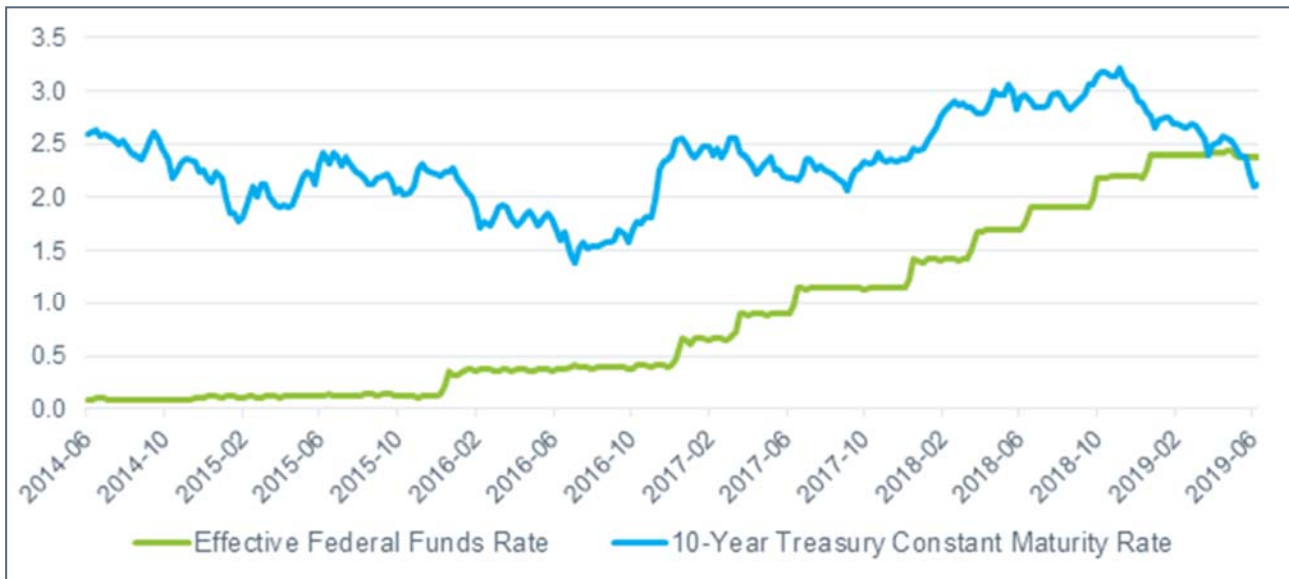
Exhibit 2: Treasury Yield Curve (%)



Source: RVK, US Treasury Department. Data as of 6/14/2019.

When considering why this yield curve change has occurred, market participants generally suggest that the most notable driver of the current US Treasury yield curve flattening (and, based on some metrics, inverting) is the Federal Open Market Committee’s (FOMC) short-term policy rate increases. This is a reasonable assessment when reviewing the *absolute* change in the slope of the yield curve over the past few years, as the FOMC has increased policy rates by 240 basis points since beginning the tightening cycle in 2015 (see [Exhibit 3](#)).

Exhibit 3: Federal Funds Rate and 10-Year Treasury Rate (%)



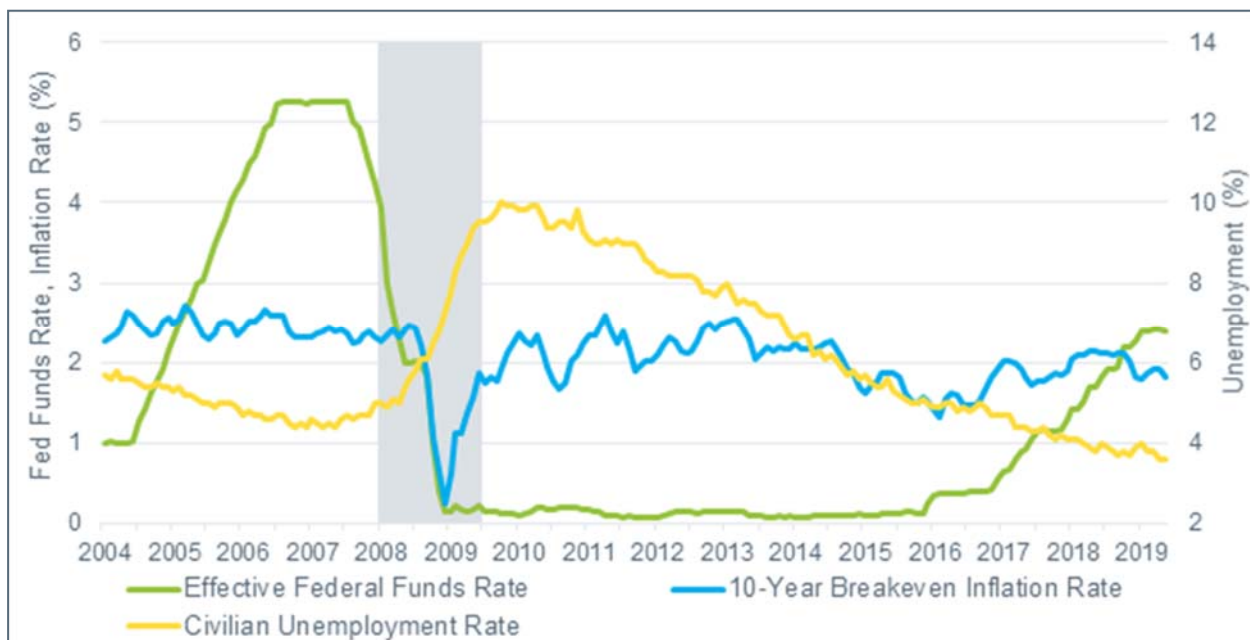
Source: RVK, Federal Reserve Bank of St. Louis. Data as of 6/2019.

However, an additional factor for consideration is that with monetary policy rates being held close to zero for a number of years, a case could be made that longer-dated yields should be notably higher than where they currently stand.

Stated another way, the lack of realized higher rates is also a component in the flattening yield curve, insomuch as, based on traditional economic theory, these would normally have been expected to move higher due to the economic growth and inflation expectations resulting from aggressive accommodative monetary policy.

Record low unemployment rates, a ratio of job openings to unemployed workers of greater than one, and steady housing price appreciation all provide support for those advocating that policy rates should be higher than where they currently stand. However, inflation (as one of the mandates of the FOMC) and inflation expectations have been notably soft since the financial crisis (see [Exhibit 4](#)), and have kept policy makers from more aggressively using the monetary policy tools at their disposal to tighten financial conditions.

Exhibit 4: Federal Funds Rate, Inflation Rate, and Unemployment Rate



Source: RVK, Federal Reserve Bank of St. Louis. Shaded areas indicate U.S. recessions. Data as of 5/2019.

Is it Different This Time? Is the Inversion-Recession Relationship Obsolete?

As often happens after a potential recessionary indicator emerges, many market participants and publications have voiced a belief that the yield curve inversion has lost its predictive power, that “this time it’s different,” and market participants should not expect a recession to follow the recent and ongoing curve inversion. In this context, market participants have highlighted several factors that could reflect unique, non-economic pressures driving the yield curve to remain persistently flat and even occasionally invert without a direct link to any elements known to cause economic recessions.

Most of these factors are challenging if not impossible to measure, and the degree to which they could be significantly influential in shaping the yield curve or inducing an inversion is, at best, ambiguous. Nonetheless, we outline them here in order to give readers a better understanding of any potential for the recent yield curve inversion to break its historical predictive patterns.

Potential Factor 1: Persistent Demand for Higher Yielding, Risk Free Assets

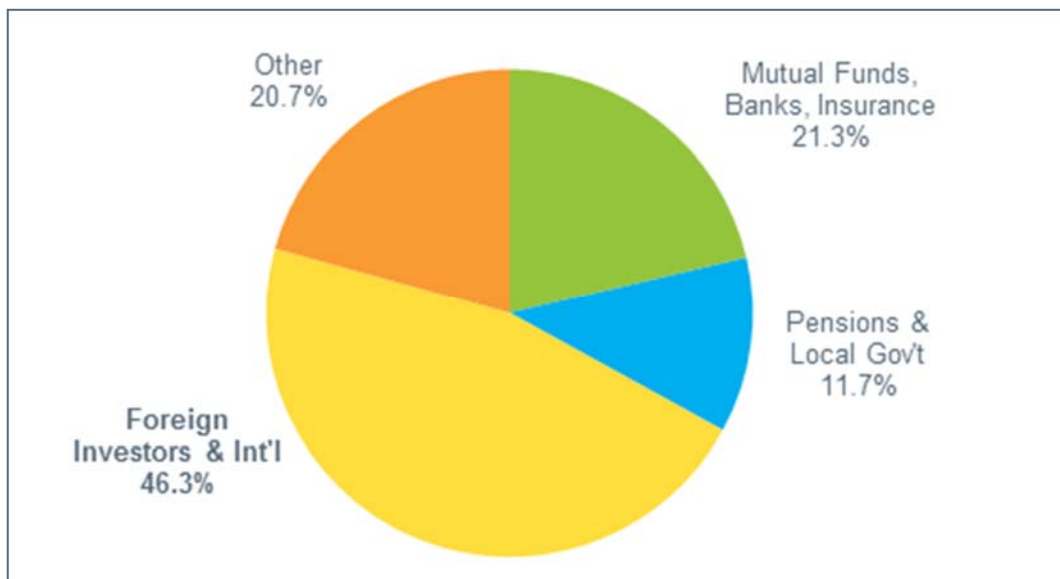
Continued heightened demand for Treasury securities (and more generally for most long-dated bonds) by global investors is one factor often cited as a potential source of yield curve inversion unlikely to either lead to or indicate a recession. While this elevated demand for long-term bonds has existed for a number of years, recent weakness in European and Asian economies has driven the sovereign debt yields in these respective regions back to negative levels.

For global investors, US Treasuries offer attractive relative returns when compared to the negative yielding government bonds of developed economies that are still struggling to reignite economic growth and healthy self-sustaining domestic demand.

As such, global demand has steadily favored US Treasury securities in search of better relative value (see [Exhibit 5](#)). At the same time, aging populations across the developed world, rising pension and entitlement obligations, and increased insurance pools have steadily increased the demand for long-dated bonds across virtually all parts of the developed world.

These developments have in turn placed greater downward pressure on US Treasury yields (i.e. increased demand) and relative equivalents as market participants seek safer and higher yielding assets. This notable demand has the potential to continually drive yields lower, to a point where they no longer accurately reflect economic and policy expectations. If this demand causes a persistent yield curve inversion while US economic growth remains positive, a recession by traditional definition would not necessarily be linked to the yield curve shift.

Exhibit 5: Private Holdings of Treasury Securities, \$13.5 Trillion



Source: RVK, US Treasury Department. Data as of 09/2018.

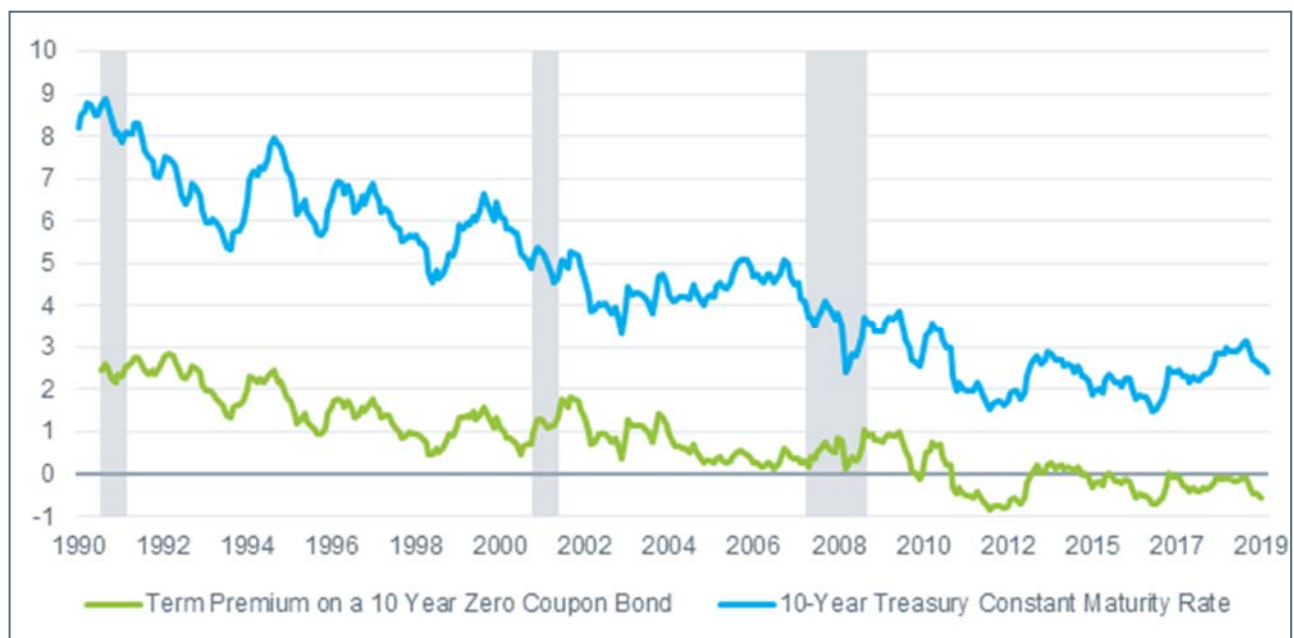
Potential Factor 2: Negative Term Premium

There is compelling analysis that suggests the interest rate term premium (or the additional yield required by investors as compensation for investing their capital over long periods of time) may, in fact, be negative. Global investors may currently be willing to lose money and in essence pay a negative term premium in order to hold a long-dated asset as opposed to a short-dated asset of a comparable type (see [Exhibit 6](#)). Typically, investors that choose to take this course of action in spite of a negative term premium do so in order to avoid near-term or intermediate-term volatility and reinvestment risk, or to safeguard their ability to meet specific long-term funding needs. In some cases, investors in several parts of the world have even shown a willingness to invest their capital at negative real interest rates, in essence paying the banking system a premium for the long-term safeguarding of their capital.

Though the common causes of a negative term premium are the subject of ongoing debate, this is sometimes understood to reflect a lack of attractive near-term investment opportunities that would provide additional return with commensurate duration and risk.

If investors are now more willing to tolerate the potential risks and opportunity costs of longer-term investments, and have become more price-inelastic in their demand for long-term Treasury securities, then yields on longer-dated securities could be declining for reasons other than changes to expectations of future inflation or economic growth.

Exhibit 6: Term Premium and 10-Year Treasury Rate (%)



Source: RVK, Federal Reserve Bank of St. Louis. Shaded areas indicate U.S. recessions. Data as of 5/2019.

Potential Factor 3: Lower “Natural” Rate of Interest/Growth

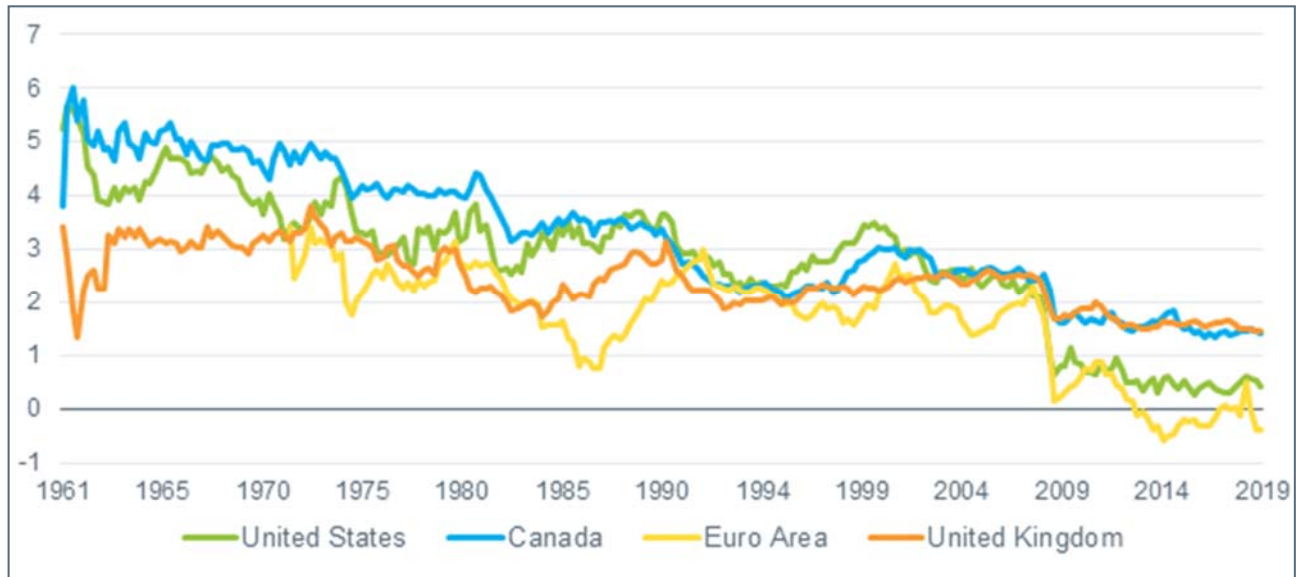
Analysis³ suggests that the estimated real equilibrium rate (i.e. the “natural rate,”⁴ or the short-term interest rate that occurs when the economy has achieved maximum employment and stable inflation) has been persistently declining over time due to ongoing changes in investor and saver preferences (see [Exhibit 7](#)).

³ Measuring the Natural Rate of Interest. Federal Reserve Bank of New York. (June 2019)

⁴ By definition, the natural interest rate is a theoretically inferred interest rate which is considered to be a measure of how fast an economy can grow on its own domestic economic forces without trade and foreign investment. These factors include demographic drivers like growth of the labor force and household formation.

If true, this implies that the economy has entered a new regime, and that the FOMC need not raise short-term policy rates to historical norms in order to achieve their targeted long-term restraining effect on inflation. Moreover, if this should be the case going forward, yet the structural demand for longer-dated bonds persists, that state of the world could naturally lead to a persistently flat or at least flatter yield curve. Additionally, a tendency to occasionally invert may be fairly common, even in the absence of economic distress or any market consensus concern that a recession may be imminent.

Exhibit 7: The Natural Rate of Interest, or R^* (%)



Source: RVK, Federal Bank of New York. Data as of 01/2019.

Potential Factor 4: The “Fed Put”

The hypothesis of the “Fed Put,” or the expectation that the FOMC will be more aggressive in addressing any perceived recessionary risks going forward than it has through measures taken ahead of previous recessionary episodes, has potential merit.

Market participants supporting this expectation highlight the extraordinary policy response taken by the FOMC during the financial crisis, and the FOMC’s greater apparent ongoing willingness to take a series of actions outside of their traditional toolbox of policy responses, even many years into the subsequent economic recovery.

As a recent example, the FOMC’s Summary of Economic Projections released at its March 2019 meeting was notably more accommodative than financial markets were anticipating. This was highlighted by market participants in the context of the record-breaking strength of US employment and largely stable inflation expectations, which should *increase* the risk of future policy rate hikes over the near term.

In summary, investors who hold the expectation that the Fed will continue acting early and often to re-stimulate the economy may be more likely to continue to take duration risk (and to accept a near zero or even negative term premium). This could, in turn, create a persistent tendency toward a flat or flatter yield curve if a critical mass of market participants were to hold this view.

Potential Factor 5: Inversions Are Typically Measured in Months... Not Days

The 3-month to 10-year curve (3m/10y), 3-month to 5-year curve (3m/5y), 1-year to 10-year curve (1y/10y), and 1-year to 5-year (1y/5y) curve, are generally the most referenced curves in the study of yield curve inversions and likelihood of subsequent recessions. This is for good reason, as these measures have shown the potential for strong predictive power.

However, one important element of this underlying analysis is that these inversions typically lasted for months in past observations, not the days or weeks which have characterized the most recent inversions. Specifically, the 3m/10y inverted only briefly in March 2019, before inverting again in May where it has persisted as of this writing: approximately 6 weeks.

This is not to say the current inversion doesn't ultimately prove to be an additional data point supporting the strong relationship between inversions and recessions; just that it's still quite early in the measurement window, and as such, may likewise be too early to pass definitive judgement.

Summary

In light of recent developments across the US Treasury yield curve, we believe investors should:

- Be aware that inversions of a particular nature and persistence have historically been strong predictors of subsequent economic downturns.
- Understand that transitory inversions lacking this predictive power can occur, and that not every inversion or "kink" in the yield curve necessarily predicts an outright economic recession.
- Be aware that a number of fundamental changes have taken place in both the US policy landscape and the patterns of global investor demand over the past ten years, and that these changes have the potential to create a "new normal" for the yield curve that could alter its historical link to recessionary environments.

As always, RVK welcomes the chance to further discuss the issues raised in this paper with our clients, if desired. In addition, we will shortly be posting supplemental material on our website outlining in greater detail the historical relationship between yield curve inversions and recessionary economic environments.

Appendix: Inversion Primer and Recession Forecasting Resources

What is an Inversion?

A yield curve inversion occurs when the yield(s) on longer-term debt securities are lower than those of shorter-term debt securities. By this definition, yield differentials between any two securities, whether the difference in maturity of securities is one day or 30 years, would technically be considered an “inverted” yield curve.

Typically, yield curves are “normal” shaped, where shorter-dated yields are lower than longer-dated yields, leading to an upward sloping curve when drawing a line through the maturity points. Generally, the normal upward sloping yield curve reflects investors’ requiring compensation in the form of higher yields in exchange for taking on additional risk due to the perceived greater uncertainty associated with investing their capital for longer periods of time. This is also noted as the technical definition of a “term premium,” and is considered the primary factor for the upward slope of the curve.

In financial terms, the normal relationship between duration and return breaks down. Since yields generally rise when there are more available securities than buyers, and fall when there are more buyers than available securities, falling medium-term and long-term yields indicate that more investors are looking for long-term assets, even at lower rates of return. The risk/return difference between short-term and medium-term investments can then become compressed, even to the point where the very short-term policy rate (which is controlled by the central bank) is equal to, or even higher than, the medium-term and long-term rates on risk-free bonds (which are largely set by investor supply and demand in open markets).

For example, a fixed, guaranteed return on a five-year loan typically becomes increasingly attractive as returns on other non-guaranteed types of five-year investments become less and less certain. Investors would then stop investing in five-year non-governmental investment opportunities in favor of a much lower return on a guaranteed five-year government bond, pushing the prices of five-year government bonds up, and their yields down. If short-term rates remained unchanged, this would shrink the difference in yields between five-year and short-term government bonds, compressing the term premium and flattening and possibly inverting the yield curve.

Why Do Inversions Happen?

Research largely shows that Treasury yields serve as a robust proxy for a combination of near-term monetary policy expectations and US economic fundamentals. As a result, changes in the yield curve have been shown to reflect investors’ changing expectations for US monetary policy, economic growth (including changes in GDP, consumption, production, and investment), inflation, and various combinations thereof. When growth expectations for the future are higher than at present, investors assume that a higher rate of return is possible in the future. In this context, a flattening and potentially inverting yield curve is consistent with the positioning of market participants for expected future weakness in the US economy.

However, this is not to suggest that an inversion *guarantees* a recession is on the horizon. Indeed, no research has concluded that inversions are clear *drivers* of recessions. Instead, the historical evidence has only shown that every recession in the US has been preceded by an inversion of the US Treasury yield curve.

Notable Studies on Inversions and Recession Probabilities

A number of studies have been conducted on the interpretation of yield curve dynamics in the context of being a potential leading indicator of recessionary risks. One of the most frequently cited represents the ongoing work conducted by the Federal Reserve⁵ system, which includes contributions from Federal Reserve economists as well as economists and market participants outside the Reserve system.

The study presents research that was originally conducted in the 1980s, but provides further updates as various research professionals build on the analysis over subsequent years. The information is publicly available on the Federal Reserve Bank of New York's website, and includes an extensive bibliography of supporting research on the yield curve as a predictor of US recessions. For the purposes of gaining a deeper understanding of the factors that drive yield curve inversions, and the potential likelihood for recessions, we recommend clients start with this source.

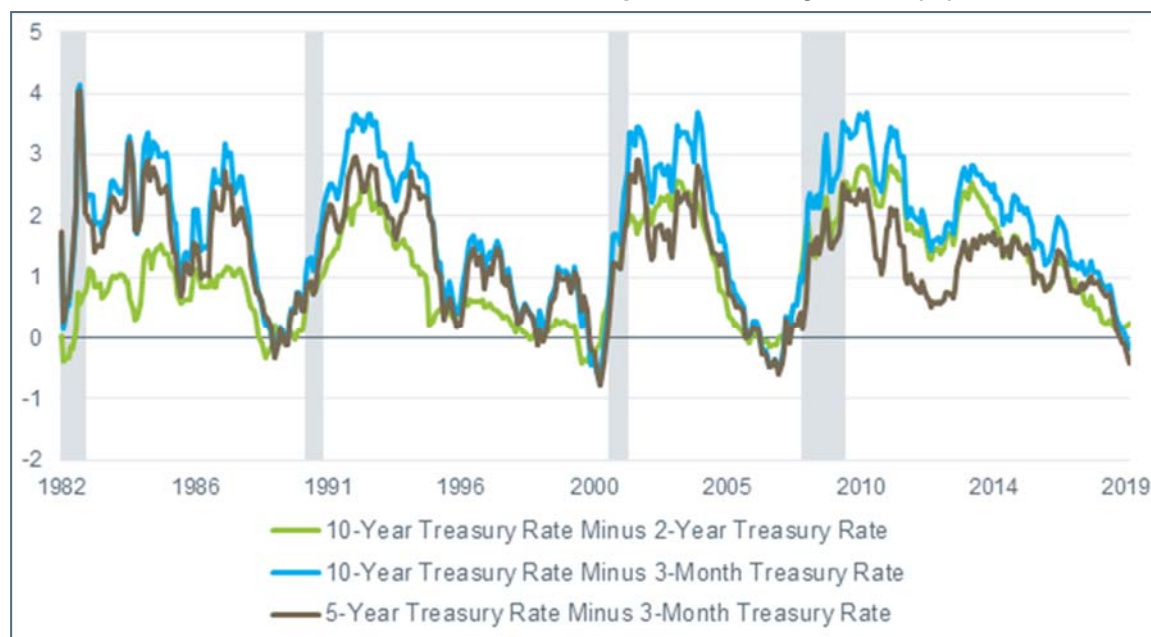
For clients interested in exploring further, a number of impactful studies have been conducted across a range of reputable financial publications over the past several decades. Notably, Campbell Harvey's work on economic growth forecasting laid the foundation for the widely followed 3-month/five-year spread metric⁶.

What Does Research Suggest About the Relationship between Inversions and Recessions

Using the Difference between Specific Maturity Points

Using changes in the slope of the yield curve as a means to forecast recessionary risks is a well-developed field of study, and for good reason. Reviewing the generally accepted analysis on the topic reveals that ahead of the last five recessions, a measured inversion across the 3-month to 10-year maturity points has foretold every recession over the last 60 years (see [Exhibit 8](#)).

Exhibit 8: Differences Between Specific Maturity Points (%)



Source: RVK, Federal Reserve Bank of St. Louis. Shaded areas indicate U.S. recessions. Data as of 6/2019.

⁵ The Yield Curve as a Leading Indicator. Federal Reserve Bank of New York. (May 2019)

⁶ Forecasts of Economic Growth from the Bond and Stock Markets. Financial Analysts Journal. Campbell Harvey. (October 1989)

When reviewing analysis of inversions measured across the 2-year to 10-year maturity points, an inversion occurred with nearly the same level of consistency.

Lastly, when reviewing the spread between the 3-month to 5-year maturity points, the results were roughly as strong as the other measures in predicting upcoming recessions.

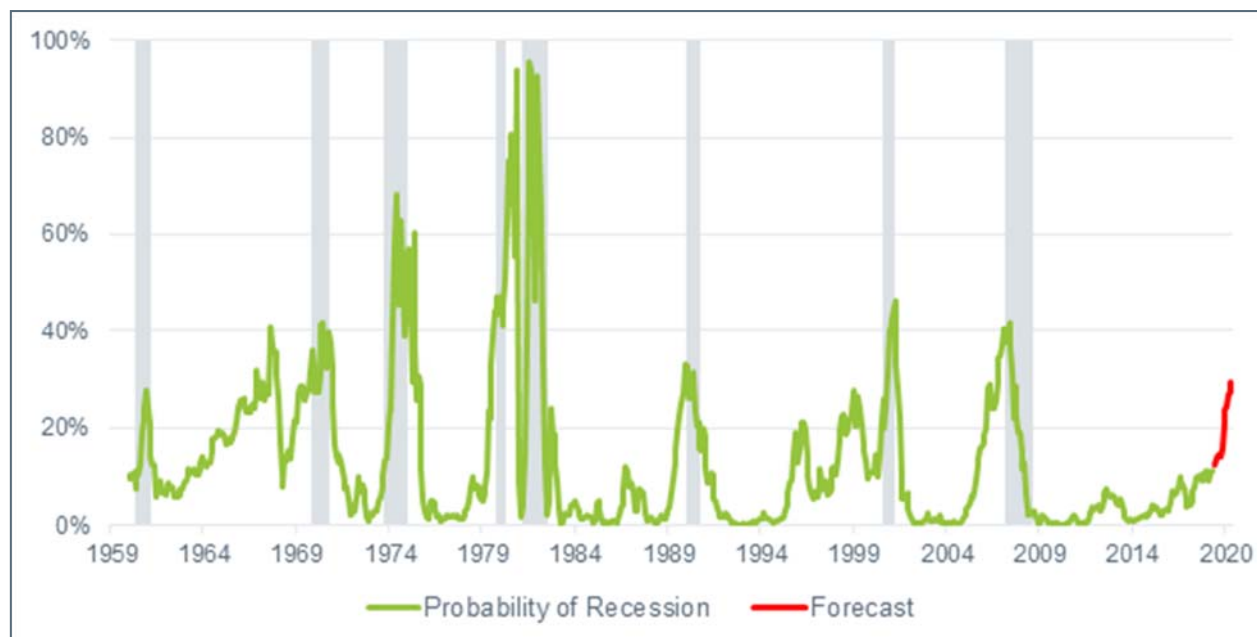
This indicates that there is a range of different maturity points that have demonstrated the potential for significant predictive power.

Using Model-Based Measures to Predict Recessions

In addition to using the simple comparison of yields across specific maturity points, a number of models have been built to attempt to assign a probability to pending recessions. Most of these models contain factors derived from the level of term premium suggested by the slope of the yield curve, but they also increasingly factor in other elements, such as corporate bond spreads and other explanatory variables that have also shown potential statistical importance.

The Federal Reserve Bank of New York publishes one of these models (see [Exhibit 9](#)), and as of May 31 (eight days following the current 3-month/10-year inversion), this model placed the probability of a recession in the next 12 months at nearly 30%. While not 100%, it is worth noting that ahead of prior recessions, the probabilities assigned by the same model only exceeded 60% two times, and averaged around 35% for the remainder.

Exhibit 9: Probability of Recession Calculated from the Yield Curve



Source: RVK, Federal Reserve Bank of New York. Shaded areas indicate U.S. recessions. Forecast is twelve months ahead. Data as of 5/2019.

Survey Measures Suggest the Odds for a Recession are Slightly Lower than Model-Based Estimates

Surveying market participants on their outlooks for monetary policy and economic growth has proven to be another way to reasonably gauge recessionary expectations. In one such recent survey, the Survey of Professional Forecasters⁷ (SPF), contributors have revised down their risk estimates for contraction in GDP over the next year. Specifically, over the next year, the highest probability forecasters put on negative economic growth was 21.9% for the first quarter of 2020. While lower growth estimates are directionally consistent with model-based measures, professional forecasters are generally not seeing a recession on the horizon.

The Federal Reserve Bank of New York (FRBNY) also conducts a survey of market participants⁸ as part of its ongoing market monitoring objectives. In its most recent survey ahead of the March FOMC meeting, the primary dealer community placed a median probability of recession in the next 6 months at 15 percent, and a probability of 26% in both 2020 and 2021. Consistent with the SPF, primary dealers see economic fundamentals weakening of the next few years and recessionary risks increases, but less so than model-based estimates.

How do Policy Makers use the Inversion Measure?

Perhaps the most important measure of yield curve inversion should be the one under the consideration of those who are charged with guiding the path of interest rates to ensure US price stability and sound employment; namely, the FOMC.

While the FOMC does not have a stated policy on what maturity points they consider most important when measuring a yield curve inversion, market participants have derived through speeches, related commentary, as well as research published by Federal Reserve economists, that the 3-month to 10-year nominal yield comparison is largely how monetary policy makers review the state of recessionary risks through the lens of the yield curve.

Other researchers have focused on other maturity points, including the 2-year to 10-year points, which has a notable following. But the relationship to the 3-month to 10-year is significant enough to assume directional consistency when assessing recessionary risk expectations.

⁷ The Survey of Professional Forecasters is the oldest such survey in the US and provides market participants with macroeconomic expectations across US economic growth, unemployment, inflation, and few additional related measures.

⁸ The survey is conducted ahead of respective FOMC meetings, and typically asks questions on monetary policy and policy related economic estimates.

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