CHIEF INVESTMENT OFFICE

# Educational Series

## Learning the Curve

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AN INTRODUCTION TO THE YIELD CURVE AND WHAT IT MEANS:

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The yield curve has been a major focus in the financial press this year—for both the stock and bond markets. In this piece, we discuss what the yield curve is, why it's important, how to interpret it and importantly what it is—and is not—telling us right now.

### What Is the Yield Curve?

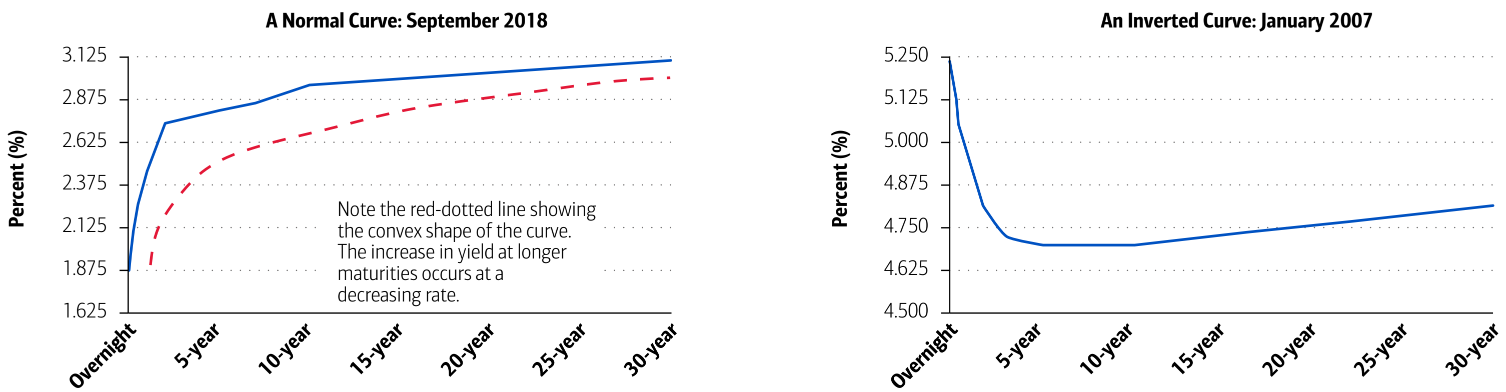
The yield curve is simply the relationship between bond yields and maturities. In most market environments, longer-term bonds yield more than short-term bonds. Longer-term bonds have more risk—lower liquidity, greater price volatility, and more sensitivity to interest rates and inflation. Higher yields are compensation for this risk.

A graph of Treasury yields versus Treasury maturities will show that yields increase as maturities increase. However, it's important to note that while yields do rise with maturities, *they do so at a decreasing rate*. For example, the yield difference between a 15-year and a 10-year Treasury is generally less than the yield difference between a 10-year and 5-year Treasury. This creates a convex "curve"—hence the phrase "yield curve."

When longer-term rates are *higher* than short-term rates, this is called an upwardly sloping or "normal" curve.

When longer-term rates are *lower* than short-term rates, this is called a downward-sloping or "inverted" curve.

**Exhibit 1: An Example of a Normal (Upward-Sloping) Curve and an Inverted Curve**




Source: Bloomberg, September 12, 2018 and January 1, 2007 (inverted).

### What are the major yield curves?

The yield curve technically refers to the entire yield versus maturity spectrum—from overnight to 30 years. As shorthand, however, most participants compare two yields at two specific maturity dates and refer to that as "the curve." When people discuss the yield curve, they are usually referring to some version of the Treasury curve—yields versus maturities for U.S. Treasurys. (Very rarely the reference may be to the corporate curve, for investment grade corporate bonds, or the municipal curve, for tax-exempt bonds.)

There is, therefore, more than one yield curve. For U.S. Treasurys, the most commonly referenced curves are:

**1. The 2-year / 10-year curve ("2s/10s," pronounced "twos-tens.")**

- This is the difference between the 10-year Treasury Note yield and the 2-year Treasury Note yield.
- This is the yield curve metric most frequently discussed by investors, asset managers and market pundits, as both of these Treasurys are actively traded, making it a popular way to place bets on the direction of the curve.

**2. The 3-month / 10-year curve ("3m/10s," pronounced "three months-tens.")**

- This is the difference between the 10-year Treasury Note yield and the 3-month Treasury Bill yield.
- This is more often the metric discussed by policymakers and economists.
- It has a long history in academic literature, and has historically been the most accurate curve for economic forecasting.

**3. The Fed Funds / 10-year curve ("FF/10s," pronounced "Fed Funds-tens.")**

- This is the difference between the 10-year Treasury Note yield and the Federal Funds Rate.
- This is also more generally used by policymakers, and is very similar to 3m/10s curve as the 3-month Treasury Bill yield quickly incorporates near-term expectations for Fed Funds rate moves.
- This is also the official curve used in the Conference Board Leading Economic Index—the most widely watched leading macroeconomic indicator for the U.S. economy.

If it is not specified, and you're listening to an investor or pundit, assume they are discussing 2s/10s. If you're listening to or reading a Federal Reserve (Fed) speaker, academic or trained economist, assume they are discussing 3m/10s. If in doubt, ask for clarification.

### What does it mean for a curve to be "flat" or "steep"?

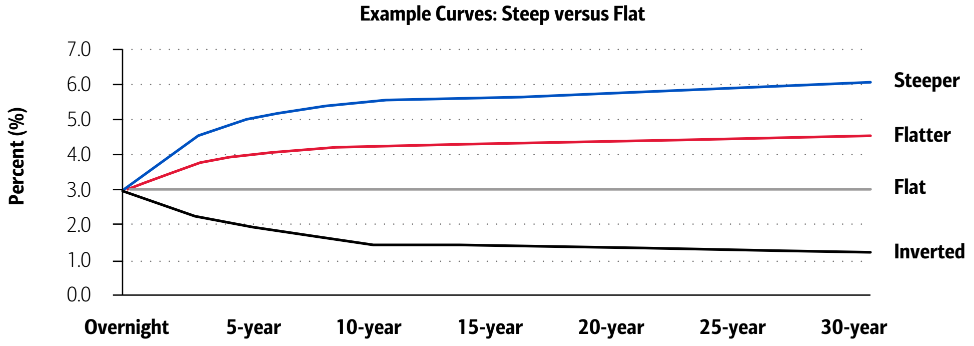
When the difference between long and short rates is large, the curve is referred to as "steep." When long rates increase faster than short rates—or conversely when short rates drop more quickly than long rates—the curve is getting steeper, or "steepening."

Steep curves imply that monetary policy is accommodative—that is, because short rates are lower than long rates, banks have an incentive to create credit by borrowing at lower short-term rates and lending at higher long-term rates. This is one of the principal mechanisms the Federal Reserve uses to manage monetary policy—it lowers short-term interest rates, which should stimulate lending and thus help the economy.

When the difference between long and short rates is small, the curve is referred to as "flat." When long rates increase more slowly than short rates—or conversely when short rates rise more quickly than long rates—the curve is said to be getting flatter, or "flattening."

Flattening curves imply that monetary policy is becoming more restrictive—that is, because short rates are getting closer to long rates, the incentives for banks to lend is diminished. As short rates approach long-term rates, the short-term rate is said to be approaching its "neutral" level—that is, the rate which is neither stimulative nor restrictive for the economy as a whole.

**Exhibit 2: Types of Yield Curve**




Source: Chief Investment Office. Data for illustrative purposes.

### How does the shape of the curve relate to the business cycle?

If we think of the business cycle as occurring in four stages—an **expansion** that leads to a peak, followed by a **recession** that results in a trough, which leads to a **recovery** that becomes the next **expansion**—the yield curve has behaved in a similar way historically in each of the four stages. This is not a coincidence or mere correlation, as the Fed's monetary policy—the largest factor that drives the shape of the yield curve—helps dictate the business cycle.

During an expansion, the economy is growing, unemployment is decreasing and inflation is increasing. The Federal Reserve will be raising the Fed Funds rate to stop the economy from growing too quickly and stoking inflation. This leads to short rates moving up faster than long rates, and the curve flattens.

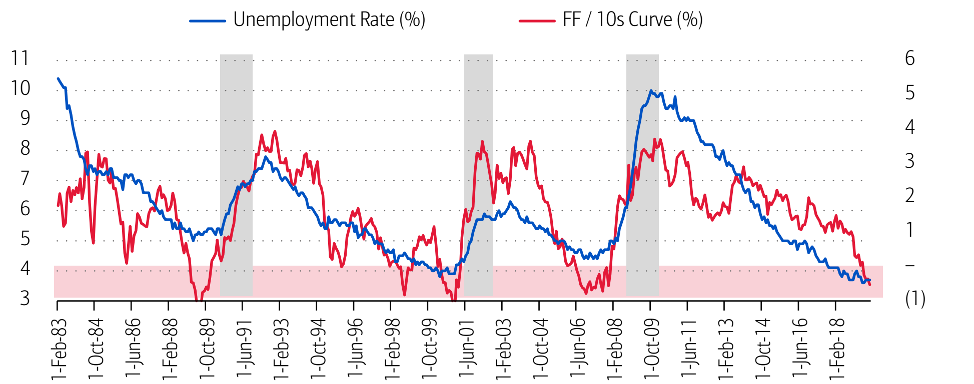
At some point, to stop an economy from overheating, the Federal Reserve may increase the Federal Funds rate to above the 10-year Treasury rate. This is generally near the peak of the economic cycle, when the long-term rate is signaling that the Fed will likely be cutting rates in the near future. **An inverted FF/10s curve has preceded every recession over the last 50 years, and the FF/10s curve has never inverted substantially in terms of amount and duration without a recession following in the next 18-36 months based on U.S. economic data. This is one reason why the yield curve is such an important metric to watch.** It signals when monetary policy is becoming restrictive enough to cause a recession.

Once a recession occurs, unemployment increases and high inflation is no longer a concern, and the Fed will begin cutting rates to engineer a so-called soft landing—a gradual shift from strong growth to slower growth, in contrast to a hard landing where the shift is rapid. This helps stimulate the economy by spurring bank lending and credit creation, as discussed above. As the Fed cuts rates, short rates drop more quickly than long-term rates, and the curve steepens.

Once a recession troughs, a recovery takes hold and the rate-cutting cycle ends, the curve peaks in steepness. This recovery will eventually turn into the next expansion, and the cycle repeats.

One way to visualize the link between the yield curve and the business cycle is to use the unemployment rate as a proxy for the business cycle. The unemployment rate is highly correlated with the business cycle, rising when the economy is doing poorly, and falling when it is doing well. Because of this, comparing unemployment to the yield curve highlights the connection.

**Exhibit 3: The yield curve is highly correlated with the unemployment rate and thus with the business cycle**




Source: Bloomberg, September 12, 2018.
Note red shaded area highlights when the curve is inverted. Gray shaded areas highlight U.S. recessions.

**What has the curve been telling us recently?**

From the second quarter of 2018 through August 2019, the FF/10s curve flattened relentlessly—from +150 basis points (bps) positive to lower than -50 bps *negative*. To us, this was the clearest indication that the Fed had an overly restrictive monetary policy, and needed to reduce the Fed Funds rate substantially. We had been cautioning that while time had not run out yet, this was an obvious indication from markets that the clock was ticking. We were slightly comforted, however, by the fact that even though the FF/10s curve had already inverted, the 2s/10s curve had been positive and range-bound for a year, averaging about +20 bps. This lack of inversion in 2s/10s implied that the market anticipated that the Fed would adjust course correctly, thereby forestalling a recession and allowing the economic expansion to continue.

In August 2019, however, there was a noticeable change in market sentiment. The 2s/10s curve flattened dramatically so that 2-year and 10-year rates were basically the same yield—a totally flat curve, the lowest since the financial crisis. Moreover, at the same time the 30-year Treasury broke below its record low yield of 2.10%. These were both increasingly ominous signs that the Fed was getting further behind the curve instead of ahead of it, and another warning from markets that time was quickly running out to significantly reduce the chances of economic weakness.

At that point, the market was anticipating another four Fed rate cuts for a total of another 1% cut in short-term rates, bringing the Fed Funds rates down to 1.125%. Assuming the 10-year bond stayed at its then-current level of around 1.6% (or rose in yield), this would be more than enough to return the yield curve to a normal, positively-shaped slope. The Fed was firmly on notice that swift and significant action was likely necessary.

We believe that an inverted yield curve—both historically and now—accurately forecasts increased recession probabilities. We are skeptical of any arguments for why "this time is different," be it the effects of quantitative easing—essentially the Fed's bond buying programs—or more significant long-term demand for long-dated bonds by pension funds since Americans are living longer. One implication of the Fed's risk-management approach is that the downside from letting inflation heat up is much less than the downside from causing an unnecessary recession. This makes ignoring the yield curve potentially a far costlier mistake, especially after the experiences of 2000 and 2007. We will continue to monitor how short- and long-term rates react and will be listening closely to what the curve tells us.

# Index Definitions

**The Conference Board Leading Economic Index** is an American economic leading indicator intended to forecast future economic activity. It is calculated by The Conference Board, a non-governmental organization, which determines the value of the index from the values of ten key variables.

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