Does the Yield Curve Signal Recession?

by Joseph G. Haubrich

Predicting the future has always fascinated humans, and economic forecasting doubles the interest by adding a chance to turn a profit. One popular forecasting tool—the yield curve—has made headlines lately because it may be predicting a recession. Though traditionally among the most accurate of economic forecasting instruments, the yield curve is at odds with many other current predictions. So what is this yield curve, in what sense is it predicting a recession, and why are others skeptical of this prediction?

Bonds, Yields, and Maturity
The U.S. Treasury issues many types of debt, from short-term to long-term. You can buy Treasury bonds that mature in three months or in thirty years, and quite a few in between. You can buy them straight from the Treasury or from others who are selling ones they bought from the Treasury. The interest rate on the bonds that is relevant to the yield curve is the “yield to maturity” or just “yield,” which accounts for both the coupon payments from the bonds and the price you paid for the bond. The yield curve simply plots the yield on the bond against its time to maturity. Usually, the yield curve slopes up: longer-term bonds have higher yields than do short-term bonds, as people feel those longer-term bonds have more risk, requiring a higher return. Put differently, the spread (difference) between any given long rate and a short rate is usually positive. When short rates rise above long rates, the yield curve is said to be inverted (and the spread is negative).

As figure 1 shows, since 1960, the yield curve has inverted seven times, and in six of those times a recession has followed in short order. The yield curve has inverted recently, sending both the 10-year minus the 2-year and the 10-year minus the 3-month spreads negative, and generating disagreement about whether the inversion signals a recession or not. In the past several months, a variety of Federal Reserve officials, market gurus, and general prognosticators have weighed in on the issue, a good many of them concluding it unlikely that the current inversion signals an incipient recession. So how concerned should we be about the inversion? To answer this, it is best to examine what the yield curve is predicting at this point in time and to consider the reasons we may have for doubting its prediction.

What Does the Yield Curve Predict?
Yield curve predictions about future growth come in two general flavors. One tries to predict the rate of growth that can be expected at some point in the future, the other tries to predict the probability of a recession occurring.

The first uses a term spread to predict future output, usually at a horizon of two, four, or six quarters. This approach has an advantage in that it reveals more of the information that is in the yield curve. Inversions are not the curve’s only signal: While negative spreads precede negative growth, positive spreads precede positive growth. In general, the steeper the curve, the higher the expected growth.

For the week of March 10, 2006, the spread stood at –13 basis points, so this approach predicts real GDP growth over the next four quarters of 2.12 percent. Using a different spread (such as the 10-year minus the 2-year spread) or a different measure of output would give similar results.

This yield-spread prediction can be seen as pessimistic, as it is well below the Blue Chip Economic Forecasters’
probability of recession at 38 percent.
Since 1960, the economy has been in a
recession 14 percent of the time. So
while not predicting a recession for sure,
the yield curve indicates that the odds are
substantially greater than average.

Do We Have Reason to
Doubt the Yield Curve’s
Predictions?

Despite the evidence linking the yield
curve to economic growth, and even
though yield-curve inversions preceded
the two most recent recessions, many
have suggested that the yield curve no
longer reliably predicts economic
growth. Noting that the economy is con-
tinually evolving, particularly the finan-
cial sector, they discount past successes.
They point to two recent “near misses”
in 1995 and 1998, when a flat yield
curve did not presage slow growth. And
indeed, evidence since the early 1990s
suggests that the relationship between
the yield curve and growth has shifted, if
not disappeared.

Thus, some people argue that it is inap-
propriate to use data before 1990 to
measure the connection between the
yield curve and economic growth. Even
using this more modern sample, though,
the yield curve’s predictions have not
fallen in line with the consensus. Using
the shorter sample, the analysis predicts
growth of 2.45 percent, higher than
before, but still below the consensus
estimate. Using data since 1990 to pre-
dict the probability of recession results
in a recession probability of 55 percent,
even higher than the previous estimate
of 38 percent.

Recent data, then, although perhaps
indicating a different relationship
between the yield curve and growth, still
points to slower growth and a nontrivial
chance of recession, and so by itself
does little to impugn the yield curve’s
record. However, those expressing
doubts about predictions from the yield
curve have some more specific reasons
for their skepticism.

When describing why he thought the
yield curve should be interpreted care-
fully, Alan Greenspan noted the flat
curve in 1992–94, but also stressed
another factor. Greenspan argued that
“the key component from which the
yield curve slope derives much of its
predictive power for future GDP
growth” is “the gap between the current
and long-run levels of the real federal
funds rate.” That is, when the real federal funds rate—the target rate set by the FOMC, adjusted for inflation—is high relative to its long-run level, the chance of a recession increases. While Greenspan does not cite the statistical analysis he refers to, there is some evidence that movements in short-term rates account for much of the yield curve’s predictive ability.

The relationship Greenspan refers to can be applied to give another approach to using the yield curve to predict recessions. It provides a more optimistic assessment of GDP growth. Using data since 1960 on the gap between the real fed funds rate and its long-term average results in a prediction of 3.6 percent growth over the next four quarters; using data since 1989 gives a prediction of 3.0 percent growth.

The other reason often cited for why the yield curve inversion may not mean a recession is the Fed’s credibility in the fight against inflation. In one version of this argument, long-term rates are low, not only because expectations of inflation are low, but because the risk of inflation (inflation variability) is also low. Not only is the market’s best guess that inflation will be low, but the market thinks it quite unlikely that its guess will be off by much.

As figure 2 makes clear, inflation variability has dropped quite dramatically since 1989–90. This fall in variability most likely results in a reduced inflation-risk premium for long bonds, which lowers long-term interest rates. Economists at both Goldman Sachs and Deutsche Bank suggest that this is the key to low long-term rates, and the key to understanding why the inversion does not signal a recession. Roughly speaking, in the old days, fears of inflation meant the yield curve was steep, and investors demanded high rates to protect themselves against inflation. A yield curve inversion, then, meant that short-term rates had moved up a lot. And those high short rates signaled, or even caused, a recession. Now, with a credible Fed and a low risk premium, an inversion only signals moderately high short rates, and thus less risk of recession.

A related reason also looks to the increase in Fed credibility, but emphasizes reductions in the persistence, rather than in the variability of inflation (though clearly the two can be related).

In this work, a more credible regime means less persistent inflation: The Fed stops inflation quickly once it starts, and so inflation is only temporarily high. In a less credible regime, once high inflation begins, it stays around, and the monetary authority does little or nothing to stop it.

In the case of the less credible regime, inflation shocks will tend to shift up both short- and long-term interest rates, as inflation feeds through to both. Thus, with persistent inflation, nominal shocks don’t shift the yield curve’s slope very much—both long and short rates move together. Now suppose that these inflationary expectations aren’t the part of the yield curve that predicts real activity. That is, the real part of the yield curve, interest rates adjusted for inflation, is what predicts real activity. Then, under a less credible regime, nominal shocks don’t distort the curvature of the yield spread, and inversions can signal recessions.

Under a credible regime, with low persistence of inflation, it is a different matter. In this case, an inflation shock will increase short rates, but not long rates, because long-term expectations of inflation don’t change. Thus a nominal shock twists the yield curve, distorting the message of the underlying real curve. This pattern seems to hold—at least for the United States; times of high inflation persistence are also times when the yield curve predicts well. In times of low persistence (like in the present, credible regime), the yield curve does less well.

### Still Worth a Look

Economists do not currently have a well-accepted theory of why the yield curve predicts future economic growth. Given that, speculating on whether or not the yield curve is truly predicting a recession remains exactly that: speculation. Using the yield curve remains an exercise in judgment that requires balancing the long, successful history of the yield curve’s predictive power with some recent evidence of its fading foresight. It also requires judgment because predictions of real activity represent only one facet of the problem facing the FOMC: Inflation is the other. Still, as the Committee becomes more familiar with the risk-management approach to policymaking, it seems that the signal from the yield curve deserves some weight.

### Recommended Reading

For a good overview of the basic issues see:


The source of the Greenspan quote is:


Some work supporting Greenspan’s claim about the importance of short rates can be found in:


Variants of the low inflation premium story appear in:


The story emphasizing persistence first appeared in:


And is developed in:


Some work presenting evidence that the yield curve’s predictive ability has changed recently can be found in:


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