

The Yield Curve and Recessions

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How the difference between long- and short-term interest rates anticipates recessions in the United States and other industrial economies.

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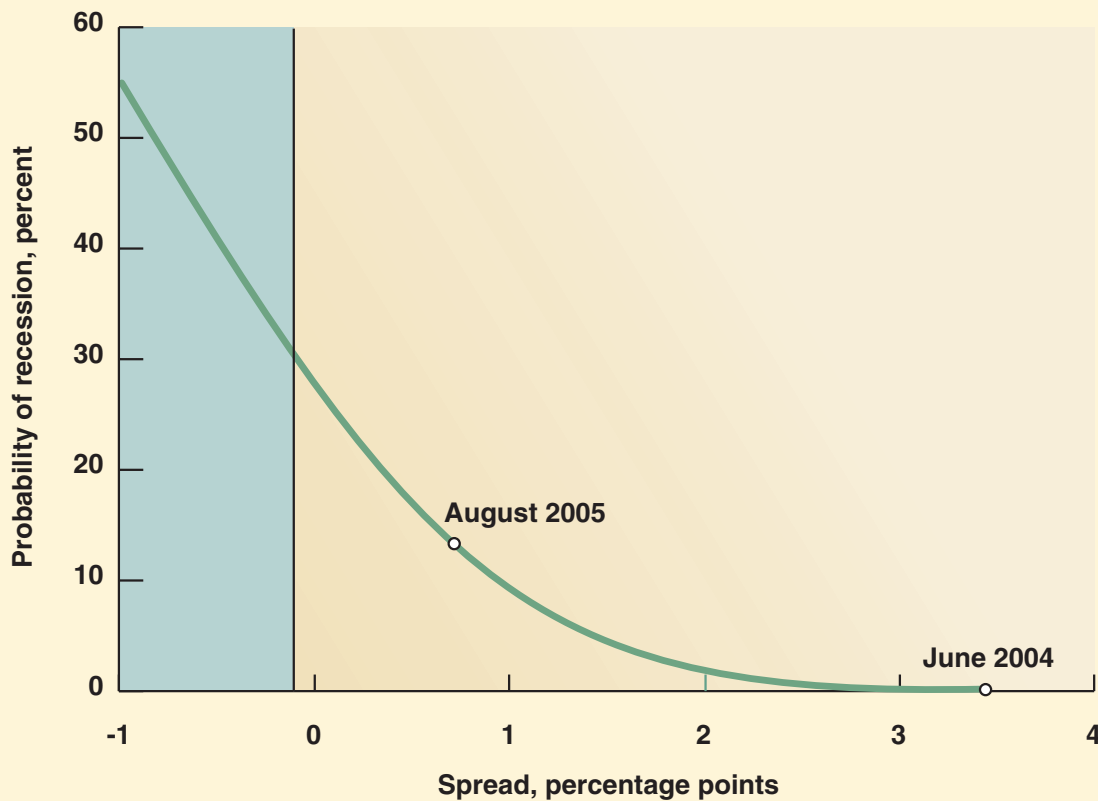
In the late 1980s, economists became aware of a remarkable phenomenon: every U.S. recession since 1950 has been preceded by a sharp drop in the yield curve spread, the difference between long- and short-term interest rates. By the time this result was published in a scholarly journal in 1991, the regularity had been confirmed by yet another recession. The empirical relationship is remarkable both in its consistency over decades and in the long forecast horizon of about a year. Moreover, subsequent work has uncovered similar patterns in other industrial economies, with particularly strong results for Germany and Canada.

These regularities suggest a simple way of gleaned accurate and timely forecasts from financial market data. A convenient rule of thumb is that the monthly average difference between 10-year and 3-month Treasury rates has turned negative (the yield curve has inverted) before every recession since 1960. The only seemingly false signal—an inversion in 1966—was followed by a well-documented “credit crunch” and a marked drop in industrial production.

Another way to interpret the yield curve signals is to apply a statistical model that converts the 10-year minus 3-month spread into a probability of a recession twelve months later, as shown in the chart. When the yield curve is steep and the

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Yield curve spread and the probability of recession twelve months later



spread is high, the probability of a subsequent recession is close to zero and not very sensitive to changes in the spread. As the spread approaches zero, the probability

rises more rapidly. The shaded region represents the range of the spread for which the probability of recession exceeds 30 percent, which has been the case prior to every recession since 1960.

How does the yield curve compare with other leading indicators of recession? Research suggests that the yield curve dominates on two counts: accuracy and consistency over time.

Why does this consistent relationship exist? Two important factors are monetary policy and market expectations of real activity and inflation. A tightening of monetary policy is normally associated with a rise in short-term interest rates. If the higher levels are expected to persist for some time, long-term rates tend to rise as well. However, if the change is not viewed as permanent, long-term rates do not rise as much and the yield curve flattens. Of course, another consequence of monetary tightening is a subsequent slowdown in economic activity, and the predictive result follows.

An alternative way to look at the relationship is to focus on market expectations. Interest rates are determined in part by the real demand for credit and by expected inflation. A rise in short-term interest rates may be a harbinger of a future slowdown in real economic activity and

Continued on page 38

Continued from page 9

demand for credit, putting downward pressure on future real interest rates. At the same time, slowing activity usually leads to a decline in expected inflation. Given this interpretation, future short-term rates may be expected to decline, which tends to reduce current long-

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term rates and flatten the yield curve. Once again, the observed correlation between the yield curve and recessions follows.

Is it the level or the change in the yield curve spread that matters? For recessions, it is clearly the level. We can see this in the chart, which shows that a given change in the spread can have a very different impact, depending on the initial level of the spread. In this connection, note that the Conference Board, which added the yield curve spread to its index of leading indicators in 1996, announced in June 2005 that it will adjust its procedures so as to focus on the level and not on the change.

Does it matter if the yield curve flattens as short rates rise or as long rates decline? Since it is the level and not the change that matters, the immediate source of the change does not affect the signal. Note, however, that every recession since 1960 has been preceded, with varying lead times, by a rise in short-term rates. By the time the recession is under way, both short- and long-term rates typically are on their way down.

A strong indication of an impending recession results only if the signal from the yield curve is persistent. Existing empirical research generally is based on averages of the yield curve spread over a month or more. Over shorter periods, the spread could experience transitory changes as a result of trading factors, short-term market imbalances, or unclear informational shocks, which do not necessarily have the same significance for future real activity.

How does the yield curve compare with other leading indicators of recession? Research suggests that the

yield curve dominates on two counts: accuracy and consistency over time. Some other indicators, such as stock prices and credit quality-based interest rate spreads, have performed quite well as predictors during some periods, but at other times have produced strong false signals or failed to move in anticipation of recessions. These differences in predictive performance are particularly stark when we go back and simulate the forecasts from each indicator—or combination of indicators—using the information available at each point in time.

Does the predictive power of the yield curve still hold? Many economic relationships shift as national and global economies evolve, and some models are not robust in response to changes in monetary policy procedures, such as those announced by the Fed in October 1979. However, the recession probability model seems robust to this and other changes, and performed quite well in anticipation of the 2001 recession.

The August 2005 values of the yield curve spread and the probability of recession are indicated in the chart. The spread has declined substantially from a historically high value in June 2004, but the probability of recession assigned by the model has so far remained well below the 30 percent threshold. ♦

FOR FURTHER READING:

- Bernard, Henri and Stefan Gerlach. 1998. Does the term structure predict recessions? The international evidence. *International Journal of Finance and Economics* (July): 195–215.
- Estrella, Arturo. 2005. Why does the yield curve predict output and inflation? *The Economic Journal* (July): 722–44.
- Estrella, Arturo and Gikas Hardouvelis. 1991. The term structure as a predictor of real economic activity. *Journal of Finance* (June): 555–76.
- Estrella, Arturo and Frederic S. Mishkin. 1996. The yield curve as a predictor of U.S. recessions. *Current Issues in Economics and Finance* (Federal Reserve Bank of New York).
- Estrella, Arturo and Frederic S. Mishkin. 1998. Predicting U.S. recessions: Financial variables as leading indicators. *Review of Economics and Statistics* (February): 45–61.
- Estrella, Arturo, Anthony P. Rodrigues, and Sebastian Schich. 2003. How stable is the predictive power of the yield curve? Evidence from Germany and the United States. *Review of Economics and Statistics* (August): 629–44.
- Stock, James and Mark Watson. 2003. Forecasting output and inflation: The role of asset prices. *Journal of Economic Literature* (September): 788–829.