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Manhattan Atlantic Capital

The Inverted Yield Curve Might Miss the Next Recession

The inverted yield curve—the spread or lack thereof between the yield of the ten year U.S. Treasury and that of the three month U.S. Treasury—is the best predictor of impending recessions. It has predicted, with 5 to 16 months' lead time, seven of the last seven U.S. recessions. When comparing the forecasting performance of the yield curve spread to those of the New York Stock Exchange (NYSE) stock price index, the Commerce Department's index of leading economic indicators, and the Stock-Watson index one, two, four, and six quarters in the future to actual periods of recession non inverted yield curve forecasting models such as Stock-Watson and NYSE index produce the most accurate recession forecast one quarter ahead, but time horizons beyond one quarter invite the purview of the inverted yield curve.

What is the intuition behind the inverted yield curve? Short term Treasury yields display, more often than not, lower yields than ten year ones given that investors expect to be compensated for higher returns or yields for holding onto a security for a long time horizon. However, when these investors suspect an impending recession, as the Fed tightens monetary policy to curb inflation, the values of these short term securities drop as investors move their funds to more long term debt instruments such as the ten-year note. As the demand for long

term notes grows, corresponding yields fall (less incentive to entice such investors with higher yields), inviting an inverted yield curve whereby the yield of long term bonds are trumped by short term ones.

The outputs of the probit model provides the probability of a recession with a corresponding three months and ten-years yield spread posit that 1.21 spread suggests 5 per cent probability of a recession four quarters ahead and that -2.40 spread suggests a 90 per cent probability of a recession four quarters ahead. March 24th, 2016 provides a three-month yield of 0.30 per cent and the corresponding ten-year note is 1.91 per cent, resulting in a 1.61% spread. The aforementioned probit model suggests that 1.61 per cent spread exhibits a less than 5 per cent chance of a recession in the next four quarters. The ten-year yield will need to be negative in order for an inverted yield curve to occur in light of a 0.30 per cent yield on a three month note or the Fed must steadily raise short term rates by more than five times the current yield assuming that the ten-year note remains at 1.61 per cent which it probably will not given that the rise in short term rates will reduce the corresponding bond prices and force investors to flee to long term rates and by extension lower the yields. Nonetheless, adherence to the probit model suggests a very small probability of a recession.

However, the historical data inputs into the probit model do not contain large scale Federal Reserve's quantitative bond buying programs, adding, in the last case, more than \$3.5 trillion to its balance sheet. Such actions might steepen or flatten treasury yield curves. Though it is worth noting that correlation does not mean causation as other variables need to be controlled.

Quantitative Easing(QE) 1 began on November 25th, 2008 and ended on March 31st, 2010. Following QE1, ten year yields trended upward(2.1 per cent at the beginning of QE1) ,contrary to market orthodoxy, leaving yields at 4 per cent at the end of QE1 before trending downward from 4 per cent to 2.5 per cent in the intervening eight months at the end of QE1 and the beginning of QE2. A similar pattern follows for QE2 and QE3. This might be due to investors flocking away from ten year notes, expecting downward pressure on yields to place upward pressure on equity returns or that yields might have been even higher than they were without such intervention.

In light of the Fed's intervention one should ask: Are both the three month and the ten-year note reflecting their correct yields? I am not sure that they are given the massive government intervention. In order to gain a viable number for the aforementioned yields, it is important to gauge what these numbers will be without or with little Fed intervention.

To evaluate the impact of unconventional monetary policy on both ten-year and three-month bond yields, the following regression model could be deployed.(Note that the equations' coefficients will be determined after the regression is carried out)

$$y_{t} = \alpha + \beta \text{treas10yt} + \beta \text{treas3mont} + \beta \text{inflat} + \beta \text{GDPT} + \epsilon_{t} \quad (1),$$

where y_{t} , the dependent variable, represents purchases of US Treasury bonds by the Fed in month t , as a percent of the total stock of US government debt. This variable captures the Fed's purchase size relative to the stock of US government debt and highlights how a change in three month, ten year treasury yields and other independent variables track the Fed's treasury purchases. α represents the intercept, $\beta \text{treas10yt}$ represents the ten year treasury yield on day t ; $\beta \text{treas3mont}$ represents the three month treasury yield on day t ; βinflat represents inflation on day t ; βGDPT represents the percentage change in GDP from one quarter to the next and ϵ_{t} represents the error size of the model.

Since the Fed's QE programs involve the purchase of both treasuries and MBS/GSE debt, it is important to gauge each instrument's separate influence on yields as opposed to conflating them into one dependent variable. Hence, equation 2.

$$y_{\text{MBS/GSE},t} = \beta \text{treas10yt} + \beta \text{treas3mont} + \beta \text{inflat} + \beta \text{GDPT} + \epsilon_{t} \quad (2),$$

where $y_{\text{MBS/GSE},t}$, the dependent variable, represents purchases of MBS/GSE debt by the Fed in month t , as a percent of the total stock of MBS/GSE government debt. This variable captures the Fed's purchase size relative to the stock of MBS/GSE debt and highlights how a change in three month, ten year treasury yields and other independent variables track the Fed's purchase of MBS/GSE.

Stress testing both equations 1 and 2 provides various outputs for ten and three-month treasury yields. It is important to plug viable (little Fed intervention) three and ten yield outputs from equations 1 and 2 into the probit model to gauge the probability of a recession. I presume that it is more than

five per cent probability in the next four quarters.

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