David R. Larr
Director of Research
Bridge Trading Company
230 Park Avenue, Suite 753
New York, New York 10169
212-687-8120

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DESCRIPTION

Campbell R. Harvey of Duke University Forecasts Real GNP Growth From the Yield Curve.

PURPOSE

Our purpose is two-fold. First, to illustrate a means of testing some of the notions that appear in the paper each day and to then monitor those relationships which appear to have merit. Second, to test the relationship described in the attached article from the New York Times.

COMMAND

7AB/SC/MO/REL(((LS/LS.12)-1)*100)/BAS(LS.12#2-LS.12#1)/SYM:QY%01Y:QY%05Y/DAT=1-JAN-80:1-JAN-89
A B C D E F

DEFINITIONS
A = Real GNP
B = Year-Over-Year Percent Change in Real GNP (dependent variable)
C = 5 Yr. Treas. Yield Minus 1 Yr. Treas. Yield 12 Months Prior (independent variable)
D = 1 Yr. Treas. Yield
E = 5 Yr. Treas. Yield
F = Beginning and Ending Dates for the Analysis

Note, due to the nature of the linear correlation (SC) facility on Bridge, which encourages experimentation, we have not canned this command so that users will be encouraged to learn the command structure and will thereby know how to alter the variables in the command line in searching for the best relationship. The detailed command line is shown above with portions highlighted to show the dependent and independent variables.

RELATED COMMANDS

/DOC/SC	Documentation on the (SC) linear correlation facility
QY%[AV]	Listing of symbols for treasury yields of various maturities
/DOC/DSI	Listing of symbols for Decision Services, Inc. (DSI) economic data

EXAMPLES

Economic Scene - Leonard Silk
The New York Times
Friday, June 23, 1989 — EXAMPLE A

7AM/SC/MO/REL(((LS/LS.12)-1)*100)/BAS(LS.12#2-LS.12#1)
/SYM:QY%01Y:QY%05Y/DAT=1-JAN-80:1-JUN-89 ↵ — EXAMPLE B

Economic Scene | Leonard Silk

The Markets As Forecasters

HOW well do financial markets forecast the economy? Although the stock market remains in the Government's index of leading indicators, doubts about its reliability have intensified since the stock market crash of 1987 was followed not by a recession, as most economists expected, but by continuing economic growth.

Even before that colossal forecasting failure, some economists had recognized the stock market's unreliability and tendency to over-predict recessions. Paul A. Samuelson, the first American to win the Nobel Memorial Prize in Economic Science, coined what has become the standard Wall Street joke that "the stock market has forecast nine of the last five recessions."

Actually, its recent forecasting record has been a bit worse than that. From 1961 to 1988, the stock market fell to nine lows on a year-to-year basis; these down sides were followed by only four recessions, in 1969-70, 1973-74, 1979-80 and 1981-82.

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The bond market, however, has been a far more reliable predictor of the economy than the stock market. Campbell R. Harvey of Duke University observes that the yield curve, measured as the difference between three-month Treasury bills and 10-year Government bonds, inverted in 1969, 1973, 1979 and 1981, when long-term bond rates fell below short-term Treasury bill rates. All four of those inversions were followed by recessions. Normally, the yield curve floats upward since there is less risk in holding short-term instruments than those of longer maturities.

The yield curve came close to inverting in 1959, but this was followed by a down side in 1960 that bottomed out in the first quarter of 1961.

At the moment, the yield curve has a peculiar shape. Roger Kubarych of Henry Kaufman & Company calls it "hump backed," with yields on three-month Treasury bills lower than those on six-month to two-year Treasuries, flat compared with three- and four-year Treasury bonds and higher than yields on 5- to 30-year bonds.

What does this hump-backed yield curve portend? Mr. Harvey has developed a simple method of extracting economic forecasts from the yield curve, even when its shape is irregular. The theory for linking asset markets and real economic growth, he notes, was formalized by Irving Fisher of Yale University in 1907. The one-year interest rate, according to this theory, should reflect the marginal value of income today compared with its marginal value next year.

This concept, embodied in modern asset-pricing theories, implies that if investors expect a return next year, they will try to smooth out their income and consumption by switching now to assets that will provide insurance or a hedge for an expected recession next year. This switch bids up the prices of longer-term assets and lowers their yields; this flattens or inverts the yield curve.

Mr. Harvey has put together a single-equation model that makes real economic growth equal to the difference between the yields on a three-month Treasury bill and on five-year or ten-year Treasury bonds, multiplied by a risk factor and scaled to keep the result in line with past relationships between yield curves, risk factors, and subsequent economic growth.

From 1966 through 1988, Mr. Harvey finds, the changing yield curve explained 40 percent of the variations in real economic growth. This was far better than the explanatory power of stock prices, which accounted for only about 5 percent of the variance in economic growth. Further, the stock market was much more volatile and gave many more false signals than the bond market.

The difference between the two was mainly due, not to the greater ability of bond investors to see ahead, but to the big swings in investors' perceptions of the riskiness of owning stocks compared with owning bonds.

Indeed, the relatively simple method of forecasting with the yield curve has produced results that compare commercially with the highly complex models of commercial forecasting services. From 1976 to 1985, the average absolute error of the Harvey method, calculated retroactively, was 1.7 percentage points. That was equal to or better than five of the econometric services, and only a little higher than the 1.6 percentage point average error of Data Resources Inc., and the 1.5 point average error of Wharton Econometrics. By a second statistical measure, none of the seven econometric methods showed a lower error rate than the yield curve in forecasting the real economy.

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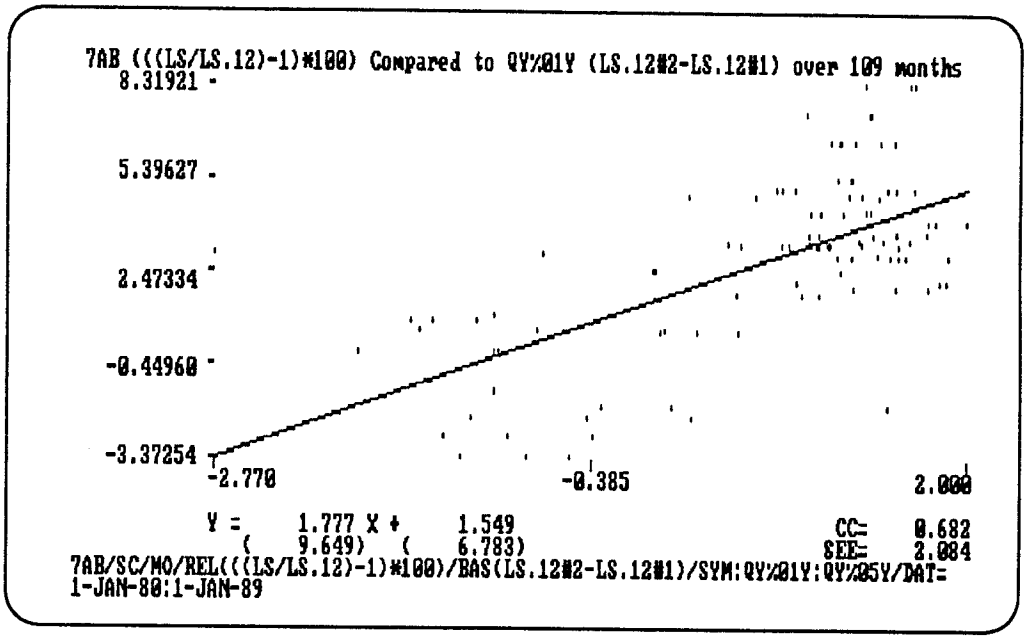
What is the yield curve forecasting now? In the final quarter of 1988, it predicted that in 1989 real G.N.P. would grow by 2.7 percent; Data Resources is also predicting 2.7 percent growth for this year. How about 1990? Here is the calculation: During the current April-June quarter, the five-year Treasury bond has been an average of 22 basis points lower than the three-month Treasury bill, or negative .0022. That number, when multiplied by a computed risk factor of 1.3, and raised by two percentage points, derived from the long-run trend, yields a forecast of 1.7 percent for the growth of real G.N.P. from the third quarter of 1989 through the third quarter of 1990.

The method cannot be counted as sure-fire; the yield curve itself may change, and the level of interest rates, and not just the overall spread among them, is also important to the business outlook.

Example A

EXAMPLE B



DESCRIPTION OF DISPLAYS

Example A attempts to explain the relationships used by Campbell R. Harvey but is not entirely clear as to the exact formula. Therefore we have done some exploration of our own and have made a minor alteration to his basic formula.

Mr. Harvey correlates current real economic growth to the difference between three-month treasury bills and five- **or** ten-year treasuries, **12 months prior**. Our exploration led us to **Example B** which gives a higher correlation if we use the difference between the 5- and 1-year treasuries, **12 months prior**.

Referencing Example B, we see Real Annual Rate GNP Growth on the vertical Y-axis and the Percentage Yield Difference between 5-year and 1-year treasuries on the horizontal X-axis. The line through the scatterplot is the line of best fit defined by the equation in the lower left, Y=1.777X+1.549. The correlation coefficient of 0.682 (CC=0.682) is fairly good for relationships involving the security markets and economic variables. The latest observation is highlighted with a white plus sign.

CURRENT INTERPRETATION

It is a bit difficult to determine precise values on the X and Y axis, so, we can use the equation of the line to calculate the current GNP Growth forecast. By simply typing in QY%05Y [↵] and QY%01Y [↵] we get **current** 5- and 1-year treasury values of 8.01% and 7.97% respectively. Subtracting the 1-year from the 5-year we get a current difference of .04%. Substituting this difference in the equation Y=1.777X+1.549 for X we get Y=1.777(.04)+1.549=1.620.

Therefore, **If** we believe the **current** difference between 5- and 1-year treasuries is a good representation of the yield curve, then the 1.620% is a reasonable forecast for the growth in Real GNP over the next 12 months. If the current difference is not considered appropriate, then one must make a brave assumption and resolve the equation.