Comment on "Corporate Bond Yield Spreads in Recent Decades"

By Thomas Lam

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I have always enjoyed reading the articles in *Business Economics*. In fact, a recent article by Douglas J. Lamdin (2004) caught my curiosity. Although the discussion of the "examination of trends, changes, and stock market linkages" in the article is relatively interesting, the results based on the Granger causality tests between stock price movements in the S&P 500 Index and bond spreads should be interpreted with more caution. In general, results produced by Granger causality tests are highly sensitive to the different time periods that are included in the analysis and the number of lagged variables that are examined.

In the article, the author notes that at the 99 percent confidence interval the causality tests indicate that "the stock market [S&P return] tends to precede (predict) a change in yield spreads," but "causality tests do not show that changes in yield spreads precede stock price movements." However, if different time periods are used, the results are different. A Granger causality test (based on five lagged values) on the monthly difference in the Baa and the 10-year-Treasury (Baa-T) spread and the monthly change in the S&P 500 Index (with reinvested dividends) from February 1970 through December 2002 indicates that the S&P return precedes changes in the Baa-T spread and vice-versa, both at the 99 percent confidence interval.[1] (See Table 1.)

TABLE 1

DUAL CAUSALITY BETWEEN MOVEMENTS IN STOCK PRICES AND THE BAA-T SPREAD

Null Hypothesis	Obs	F-Statistic	Probability
BS does not Granger Cause S	390	3.38336	0.00529
S does not Granger Cause BS	390	8.48687	1.3E-07

Note: BS = The difference in Baa-T spread (basis 5 points);
S = The change in the S&P 500 Index

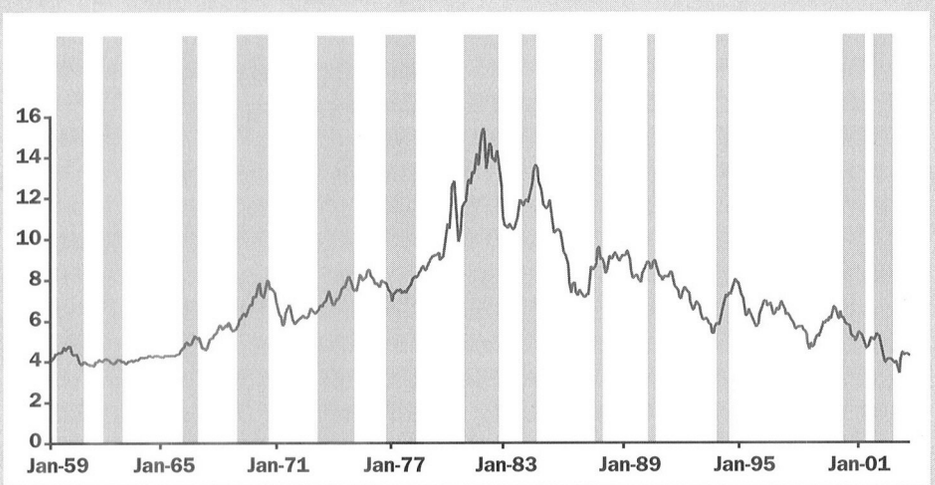
Hence, investors and financial market participants should be reminded of the caveats of correlations and causality tests and be wary of the highly elusive dream of profiting from such relationships.

How About Movements in Bond Prices and Stock Prices?

An eminent economist, the late Geoffrey H. Moore, once intimated that movements in bond yields (or the inverse, bond prices) have an imperfect negative relationship (bond prices correlate positively) with stock prices and tend to precede move-

FIGURE 1

10-YEAR TREASURY YIELD & PERIODS OF BEAR MARKET IN THE S&P 500 INDEX



Note: Shaded bars denote absolute declines in the S&P 500 Index (i.e., peak to trough); the line graph is the 10-year Treasury yield in percentage form
Source: Federal Reserve and The Conference Board

[1]In the article, the author includes three lagged variables of the S&P 500 Index and various bond yield spreads from February 1970 through May 2003 for the Granger causality test. The Baa-to-10-year Treasury spread was chosen for analysis instead of the other bond yield spreads that were presented in the Lamdin article because it has the highest correlation with S&P return (see Table 2 in the Lamdin article).

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ments in stock prices.[2] Figure 1 depicts a negative relationship between movements in the 10-year Treasury yield and periods of bear market in the S&P 500 Index.

Since 1959, the 10-year Treasury yield has a tendency to lead the peak levels in the S&P 500 stock index by an average duration of eight months and four months at troughs (see Table 2). It is important to note, however, that the bond yield is an imperfect cyclical indicator of the movements in stock prices: there are instances where the bond yield reaches a cyclical peak/trough without a corresponding response from the stock market.

Other Imperfect Cyclical Indicators of Movements in Stock Prices

Numerous studies have shown that the stock market is a relatively decent indicator of the turning points in the aggregate economy. Therefore, it is not surprising that The Conference Board includes the S&P 500 Stock Index as one of the components in the Composite Index of Leading Indicators. Past studies have shown that the ratio of the Composite Index of Coincident Indicators to the Composite Index of Lagging Indicators (C-L), a measure of imbalances in the economy, has been a pretty reliable leading indicator of the business cycle, but with a longer duration.[3] Hence, the growth rate of the C-L ratio tends to lead the cyclical declines in the S&P stock index, though imperfectly, since 1960 (see Figure 2). Graphically, it appears that the C-L tends to perform better at signaling stock market peaks than troughs.

Figure 3 depicts the relationship between the growth rate in M2 velocity (calculated by dividing the monthly personal income with M2 money

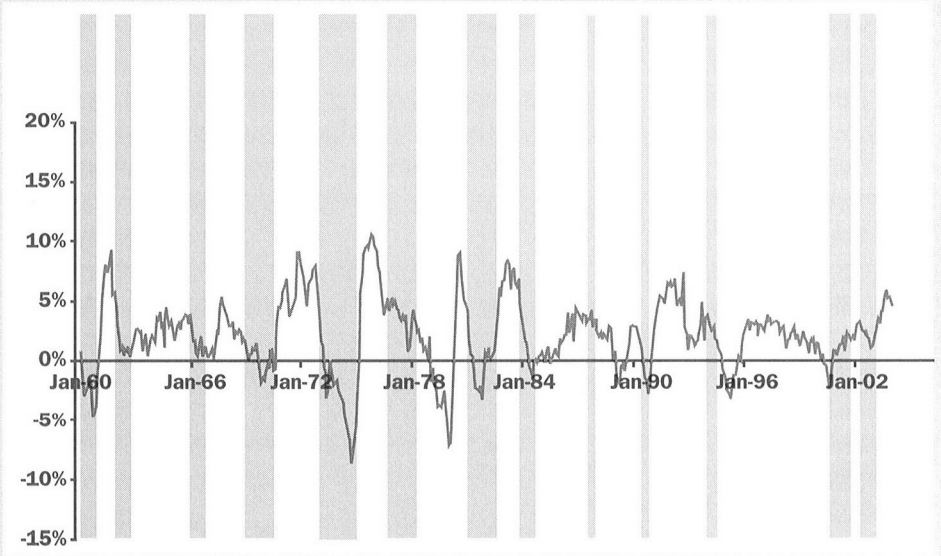
TABLE 2

THE 10-YEAR TREASURY BOND YIELD AND S&P STOCK INDEX: PEAKS AND TROUGHS

Peak S&P 500 Index	Trough 10-Y Treasury	Months (-) Lead (+) Lag	Trough S&P 500 Index	Peak 10-Y Treasury	Months (-) Lead (+) Lag
Jul-59	Apr-58	-15	Oct-60	Jan-60	-9
Dec-61	May-61	-7	Oct-62	Jan-62	-9
Jan-66	Nov-64	-14	Oct-66	Aug-66	-2
Dec-68	Aug-68	-4	Jun-70	May-70	-1
Jan-73	Nov-71	-14	Dec-74	Aug-73	-16
Sep-76	Dec-76	3	Mar-78	Feb-80	23
Nov-80	Jun-80	-5	Jul-82	Sep-81	-10
Oct-83	May-83	-5	Jul-84	Jun-84	-1
Aug-87	Jan-87	-8	Dec-87	Oct-87	-2
Jun-90	Dec-89	-6	Oct-90	Sep-90	-1
Jan-94	Oct-93	-3	Jul-94	Nov-94	4
Aug-00	Dec-98	-20	Sep-01	Jan-00	-20
Mar-02	Oct-01	-5	Feb-03	Mar-02	-11
	Average Lead	-8		Average Lead	-4
	Median Lead	-6		Median Lead	-2

FIGURE 2

GROWTH IN THE COINCIDENT TO LAGGING RATIO & PERIODS OF BEAR MARKET IN THE S&P 500 INDEX



Note: Shaded bars denote absolute declines in the S&P 500 Index (i.e., peak to trough); the line graph is the centered six-month smoothed growth rate of the coincident-to-lagging ratio.
Source: The Conference Board.

[2]Moore also suggested that capitalized profits might be a better cyclical indicator of the movements in the stock market than just the bond yield alone.

[3]Niemira (1990) pointed out that Moore has suggested using the lagging index (on an inverted basis) as a leading indicator of stock price movements in some unpublished work.

stock) on an inverted basis and periods of S&P bear markets. Since the 1990s, however, it appears that the foregoing relationship has loosened somewhat. According to the Federal Reserve, the introduction of sophisticated financial products/vehicles have undoubtedly "altered the empirical relationship between economic activity and what we defined as money" (Greenspan 2003). More recently, the ebbs and flows of the mortgage-refinancing wave have compromised the relationship between economic activity and monetary aggregates.

Milton Friedman (1988) introduced the concept of using the "monetary velocity" (on an inverted basis) as an indicator of movements in stock prices.[1] The rationale for using the monetary velocity variable is based on the theory that fluctuations in stock market wealth are related to fluctuations in the quantity of money demanded. In other words, an increase in the quantity of money demanded (because of a rise in stock prices) relative to income is related to a decrease in the velocity of money. Friedman offers the following explanations for the foregoing relationship:

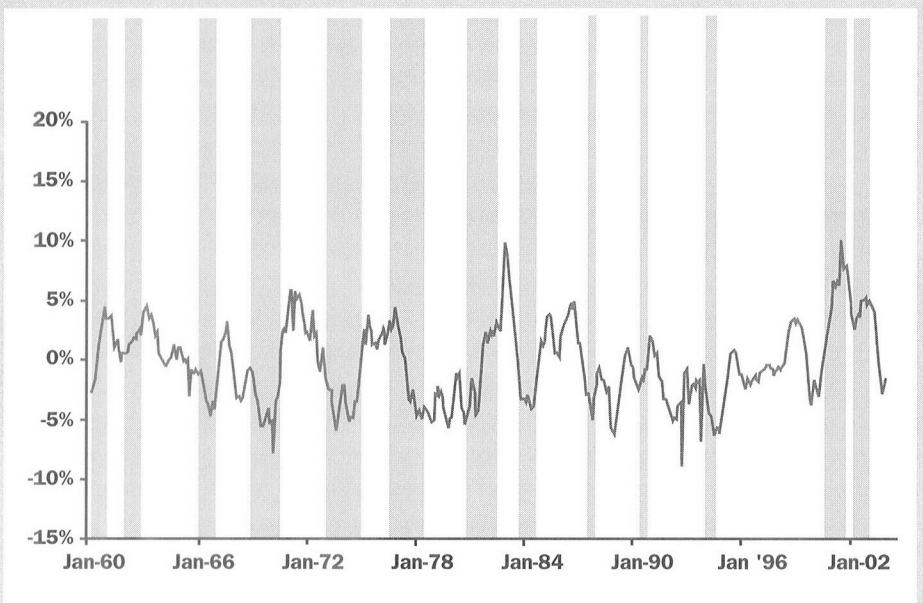
1) A higher wealth to income ratio (from an increase in stock prices) "can be expected to be reflected in a higher money to income ratio or a lower velocity."
2) An increase in stock prices implies "a rise in the dollar volume of financial transactions, increasing the quantity of money demanded to facilitate transactions."
3) An increase in stock prices "reflects an increase in the expected return from risky assets relative to safe assets." "Such a change …need not be accompanied by a lower degree of risk aversion or a greater risk preference," however, because it could be "offset by increasing the weight of relatively safe assets in an aggregate portfolio" such as "short-term fixed income securities plus money."

Another potential indicator of the cyclical turning points in the stock market is the Job Cycle Leading Index (JCLI), which is related to the cyclical characteristics of the unemployment rate. The "official" monthly unemployment rate—reported the Bureau of Labor Statistics—is a trendless variable and is a leading indicator of business cycle peaks but either lagging or roughly coincident at troughs. Holding the seasonal, cyclical, and irregular characteristics of a time series constant, a trendless variable tends to reach a peak at a much earlier period than a series that has an upward sloping trend component. On the flip side, the presence of an upward trend component in a series would inevitably result in a series reaching an earlier trough than a series that is trendless.

The Job Cycle Leading Index (JCLI,) a proprietary composite index of leading indicators of labor market turning points, is comprised of nine leading indicators of the labor market cycle, and tends to lead the unemployment rate both at peaks and troughs by five months on average. Hence, the JCLI, like the C-L ratio, appears to lead the cyclical turning points in the aggregate economy with a longer duration. Hence, it would be interesting to see if the JCLI, with an eye to the labor market, leads the cyclical turning points in the stock market.

FIGURE 3

GROWTH IN M2 VELOCITY & PERIODS OF BEAR MARKET IN THE S&P 500 INDEX

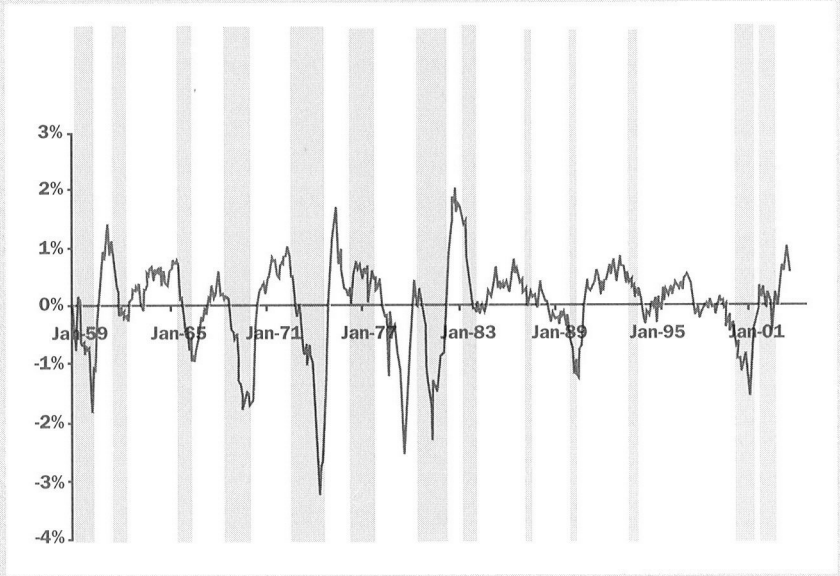


Note: Shaded bars denote absolute declines in the S&P 500 Index (i.e., peak to trough); the line graph is the centered six-month smoothed growth rate of M2 velocity (on an inverted basis).
Source: Federal Reserve, The Conference Board, and BEA.

[1]Friedman suggested the examination of the real quantity of money demanded relative to income *vis-à-vis* the real price of equities.

FIGURE 4

GROWTH IN THE JOB CYCLE LEADING INDEX & PERIODS OF BEAR MARKET IN THE S&P 500 INDEX



Note: Shaded bars denote absolute declines in the S&P 500 Index (i.e., peak to trough); the line graph is the centered six-month smoothed growth rate of the Job Cycle Leading Index.
Source: The Conference Board and proprietary data.

Graphically, the JCLI depicts a pretty decent relationship with the cyclical turning points in the stock market (see Figure 4). The JCLI, however, appears to perform better as a cyclical indicator at stock market peaks than at troughs. Nevertheless, the JCLI, like the other cyclical indicators presented herein, is imperfectly correlated with the turning points in the stock market.

Conclusion

A steady increase in the volume of international trade for goods and services coupled with on-going liberalization of international financial markets over time has compelled the global economy to evolve into a more sensitive and intricate network of economic and financial linkages. The U.S. economy, against the backdrop of a widening current account deficit, continues to attract capital flows and investments from abroad into a variety of asset classes. As a result, domestic indicators alone, irrespective of the extent of economic and financial coverage, cannot adequately capture the cyclical characteristics of the U.S. equity market. Similarly, until we have a firm understanding of the complexities that surround the interaction between global linkages and the U.S. stock market, any observable relationship between the stock market and the different cyclical indicators is incomplete and must be interpreted with caution. ■

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Reply on "Corporate Bond Yield Spreads in Recent Decades"

By Douglas J. Lamdin

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It is good to see that one's work is read, and even better that it generated enough interest to elicit a written response. The type of replication that Thomas Lam undertook is something we could use more of in economic research. As I will show, Lam and I seem to agree more than disagree.

I assume that the reader does not recall the details of my original article, so I will spell out the primary findings. I examined monthly data from over the past three decades (1970 through mid-2003) for the following variables: the promised yield on Aaa and Baa rated corporate bonds, the 10-year Treasury rate, and the S&P 500 return with reinvested dividends. The three "yield spreads" of the Aaa and Baa rates minus the Treasury rate and the Aaa minus the Baa rate were derived from these data. The level of the yield spreads and changes in these levels were the primary concern. Some of the major results are recapped here. (The reader is referred to the original article for a full presentation of all of the results.) The levels of the three yields (Aaa, Baa, and T) were highly contemporaneously correlated. The level

of the Treasury rate was negatively correlated with the (Aaa - T) spread, positively correlated with the (Baa - Aaa) spread, and essentially uncorrelated with the (Baa - T) spread. When one looks at the monthly changes in, rather than levels of, each of the yields and the yield spreads, some interesting differences emerge. The changes in yield are again highly positively correlated. The changes in the Treasury rate, however, are negatively correlated with all three yield spread changes. The contemporaneous correlation of the change in each yield is negatively related to the return on the S&P 500. This last result confirms a common observation: as interest rates rise, the stock market declines. The three yield spread changes, however, have a positive, though statistically insignificant relationship with the S&P return.

To further examine the relationship between the changes in each yield spread and the return on the S&P 500, I applied standard Granger causality tests. This is the part of the article on which Lam focuses. These causality tests allow for examination of whether there is some lead-lag relationship between variables that a contemporaneous correlation would not detect. What I found, using three lags of the relevant variables, is that none of the three yield spread changes "cause" (precede) the S&P return at the one percent significance level. The changes in the (Baa - T) yield spread, however, are significant at less stringent five percent level. The R-squared value of the (Baa - T) model was the largest of the three, but only a paltry 2.8 percent. When the causality regressions are turned around to see whether lagged S&P return changes cause changes in each yield spread, all three models are significant at the one percent level. R-squared values for these models are much larger, however they are still somewhat small, ranging from 9.6 percent to 17.3 percent. The largest was for the change in the (Baa - T) spread model. Because the models with the (Baa - T) yield spread changes were those with the best fit, Lam focuses on these.

Lam finds that with five (recall that I used three) lags, there is evidence of dual causality at the one percent significance level for the models with the (Baa - T) yield spread change. He can reject the hypothesis that the (Baa - T) spread does not cause the return on S&P, and also reject (as I did) the hypothesis that the S&P return does not cause changes in the (Baa - T) spread. Both Lam and I, and most empirical economists would agree that Granger causality test results can be sensitive to lag length and also to the choice of the time frame of the data. The latter is not at issue here, because both he and I used the same data. Also, I note that the choice of significance level can change the interpretation, as I would have found the same "significant" dual causality with a five percent significance level and my three lags. I agree that financial market participants should be cautious in using such results. As I pointed out in the article, the largest R-squared that I found was 17.3 percent, and thus a huge proportion of the variance of changes in the (Baa - T) yield spread are unexplained by the model. This brings me to another point.

Perhaps more revealing as a way to examine predictive ability is to look at out-of-sample forecasting ability of models rather than, or in addition to, "in sample" R-squared values. That is, fit the model, but "hold out" say 20 percent or so of the observations at the end of the data in doing so. Then perform a pseudo forecasting exercise to see if the model truly has better predictive ability than competing alternatives using the various forecasting accuracy metrics. Of course, even if it does, that is no assurance that this ability will hold in the future. This is not the forum to go through such an exercise, but perhaps an interested and enterprising reader can follow up and do this.

The remainder of Lam's comment concerns lead-lag relationships between various economic variables and the stock market, namely: the level of the Treasury bond yield, the coincident-lagging indicators ratio, the M2 money supply velocity, and the Job Cycle Leading Index. This goes beyond the focus and scope of my original article, so I have limited comments on this. It would have been useful to see a statistical analysis to accompany the graphs, such as Granger causality tests, with a focus on robustness to lag length. The pseudo forecasting exercise mentioned above would also be relevant when comparing various candidates as predictors.

No doubt, analysts will continue to search for ways to better "time the market" in a profitable way. Whether these efforts can pay off is a long-standing question in financial economics. My impression of the research in this area is that the answer is most likely "no." ■