The Anti-Correlation Heresy

Timberland is negatively correlated with stocks—or is it?

Investment managers and investors look at a variety of statistics when evaluating and comparing investment asset classes. Alphas, betas, standard deviations, Sharpe ratios and correlation coefficients are among the tools in the investor's analysis kit.

We have always been a little surprised at the weight that is placed on an asset's correlation with other assets and especially at the way the relationship is often misinterpreted.

Most of the published analyses use a long-term data series, and many of them show a negative correlation between most asset classes and timberland. Figure 1 shows a typical analysis of this type. The timberland returns are based on the US NCREIF Timberland Index since 1987 and uses theoretical returns calculated using a timberland return model developed by John Wilson, widely known as the John Hancock Timber Index.

The conclusion that is often drawn from such a chart is that **timberland returns are negatively correlated with returns from stocks and bonds.**

However, the correlation shown in the chart is based on a particular analysis period, and a different time period can present a very different picture. For example, Figure 2 shows the same type of analysis for the period 1987-2003, which corresponds to the length of the NCREIF Timberland Index series.

Anyone looking at Figure 2 would conclude that timberland returns are *positively* correlated with returns from stocks and bonds.

So what is going on? We conclude that timberland is *neither* positively *nor* negatively correlated with most other assets—it is simply *not correlated at all*.

Figure 1. Typical Correlation Chart, Timberland vs. Other Assets, 1960-2003
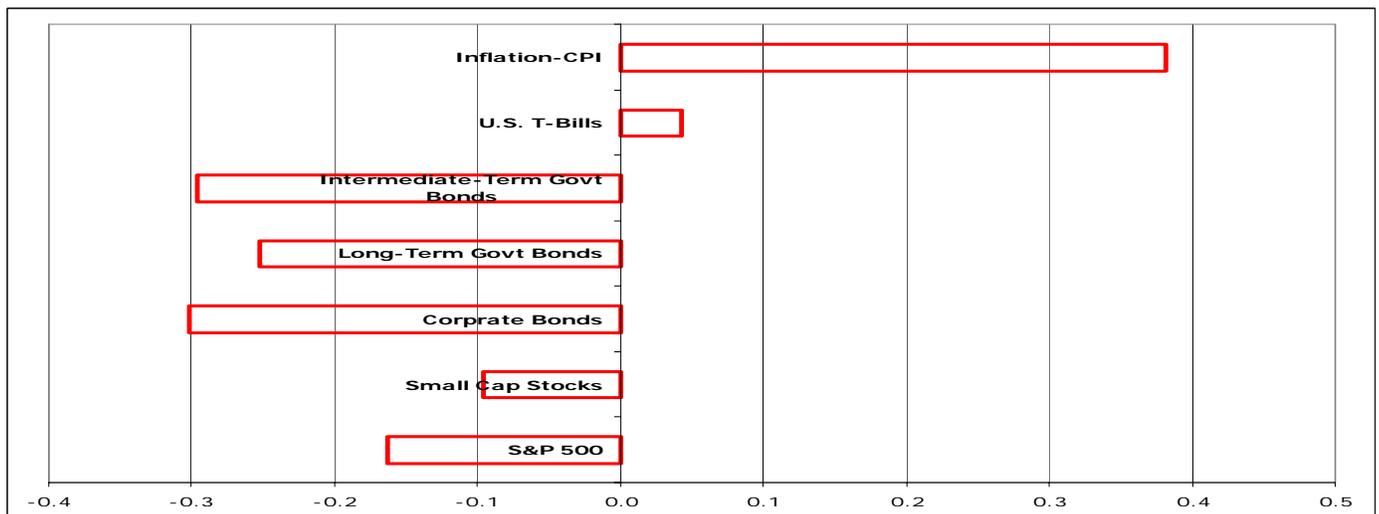
Sources: Ibbotson Associates, National Council of Real Estate Fiduciaries

Figure 2. Typical Correlation Chart, Timberland vs. Other Assets, 1987-2003
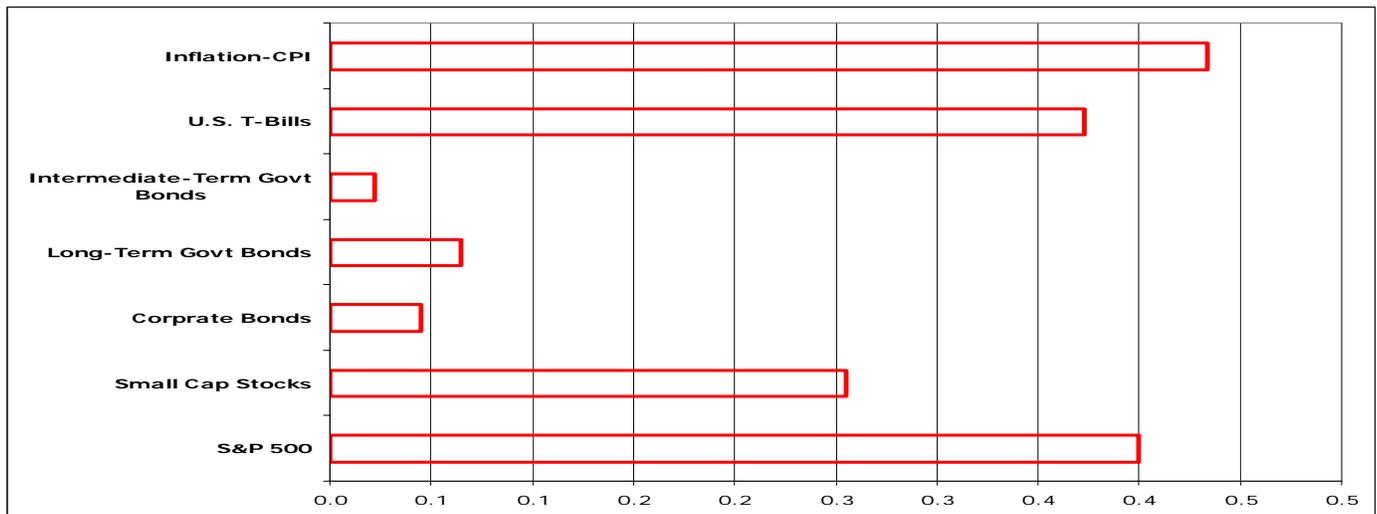
Sources: Ibbotson Associates, National Council of Real Estate Fiduciaries

Any appearance of correlation between timberland and most other asset classes is largely a result of the time period chosen for the analysis. Figure 3 shows how shows how the correlation coefficient between the S&P 500 and timberland has changed over time. The red bar shows the correlation for 1960-2003 (from Figure 1) and the dark green bar shows the correlation for 1987-2003 (from Figure 2).

While there are institutional investors that have held timberland investments since the early 1980s, there are many who have held timberland for shorter periods of time (5-10 years) and a number of funds that have liquidated after a decade or so. The blue bars show the correlation for individual 10-year periods: 1960-1969, 1961-1970, etc., showing what such short-term investors might have found over their investment period.

Investors for every 10-year period ending before 1989 would have found a negative correlation. Anyone investing between 1980 and 1990 would have found a very low correlation between the two assets. Anyone investing since 1992 would have found a positive correlation over a ten year period.

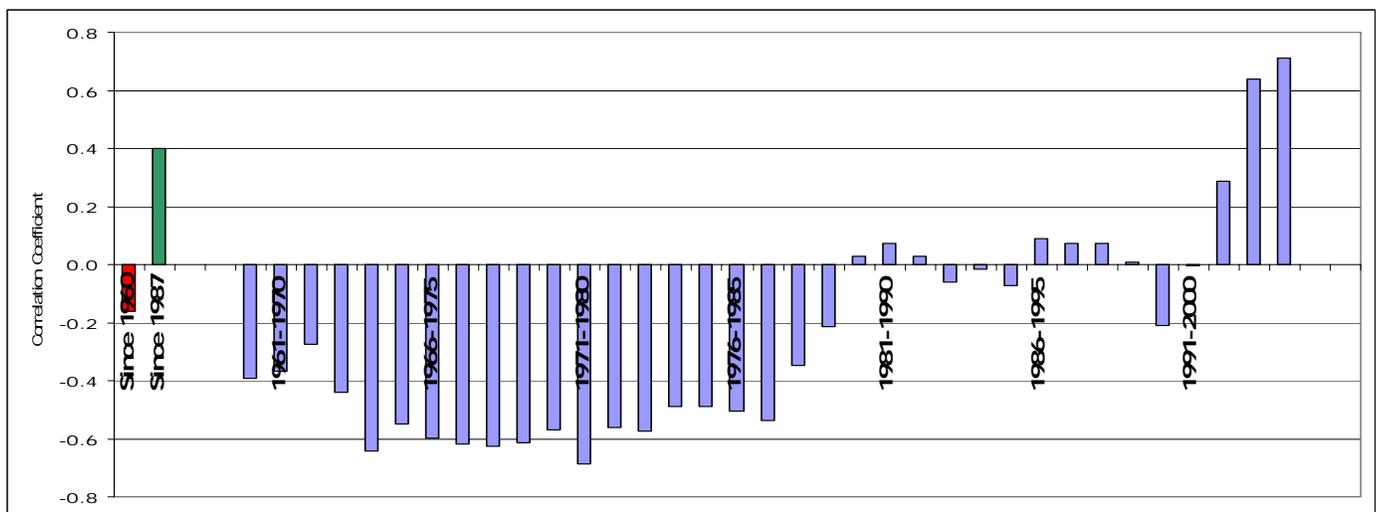**Figure 3. Correlation Between Stocks and Timberland Over 10-Year Periods**
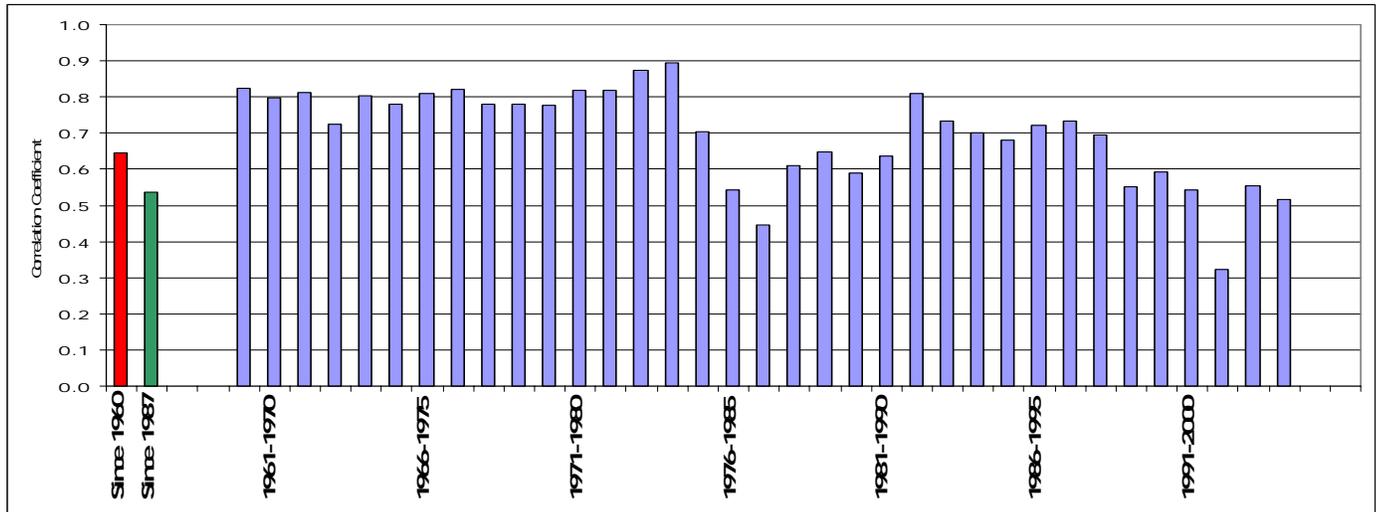
Figure 4. Correlation Between Large Cap Stocks and Small Cap Stocks Over 10-Year Periods

Have other asset classes changed correlations over time, or is timberland a special case? Figure 4 shows the correlation between large and small cap stocks. Again, the red bar is for the period 1960-2003, the green bar is for the period 1987-2003 and the blue bars are 10-year investment periods. The chart shows very little change over time.

Figure 4 does not present any surprises. When there is a panic (or boom) on Wall Street, stocks of all kinds—growth, value, large cap, small cap, penny—are affected.
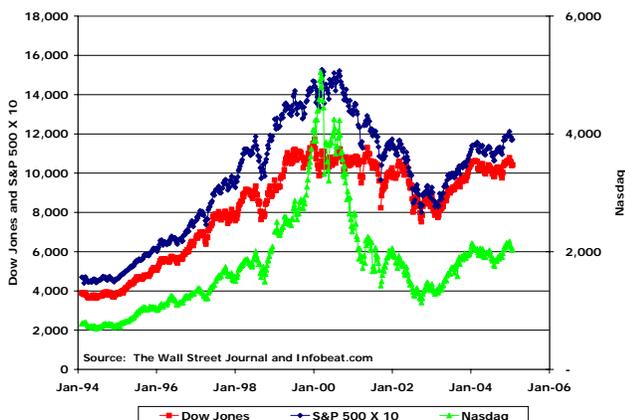
Figure 5. Stock Indexes

Figure 5 shows week-ending levels for the Dow Jones Industrials, the S&P 500 and the NASDAQ Index since January 1994. (The S&P 500 value is multiplied by 10 so that it can be graphed on the same chart with the other two indices.) The dot-com boom in the late 1990s lifted most stocks. And while most of dot-coms were listed on the NASDAQ, that didn't keep the Dow or the S&P from rising. Once the bubble broke, all three indexes dropped. And all three have been climbing since January 2003.

But there is no such connection between stocks and timberland. We buy toilet paper regardless of the value of our Kimberly-Clark or Georgia-Pacific stock.

Timberland and stocks both move in response to economic conditions. But stocks can move more quickly and many investor react to short-term economic changes. Timberland values are heavily dependent on timber values, and timber values do not usually respond to short economic changes.

Misleading Correlations

Why do the calculations show a strong negative correlation between timberland and the S&P 500 if there is no real relationship? My old statistics textbook calls the correlation coefficient the statistic most subject to misinterpretation. Strong correlation coefficients are not necessarily good indicators of strong cause-and-effect relationships between asset classes.

The correlation coefficient measures and compares the direction and magnitude of changes in two data series. But it cannot tell you if one series causes changes in the other. You can run into the same sort of thing with regression analysis. If you load up the regression model with enough variables, you can boost the apparent strength of you model.

Somewhere in my library is a clipping from The Wall Street Journal that discusses this issue. The author—if I could find the clipping, I could tell you his name—noted that the performance of the stock market for any given year is highly correlated with the winner of the Super Bowl--the market usually does well when the NFC wins, and usually does not do well when the AFC wins.

I did a little checking and found the following for the first 38 Super Bowls:

29	years of positive S&P returns
9	years of negative S&P returns
21	years of NFC Super Bowl wins
17	years of AFC Super Bowl wins
19	years of S&P gains/NFC wins
7	years of S&P losses/NFC losses
10	years of S&P gains/NFC losses
2	years of S&P losses/NFC wins

However, the author went on to say that the apparent correlation is a mirage because the market *usually* goes up and the NFC *usually* wins the Super Bowl. The point: while the two data series may be correlated, there is no cause and effect between the Super Bowl and the stock market.

Another recently discussed football-driven correlation is that the Washington Redskins game immediately before a Presidential election is supposed to be an indicator of which party will win. The Republicans win when the Redskins win and the Democrats win when the Redskins lose. (Except it didn't work that way in 2004.)

Summary

- Correlation coefficients are widely used in investment analysis.
- Sometimes the correlation coefficient is misinterpreted.
- Timberland is *not* negatively correlated with stocks (or most other asset classes).
- But timberland is *not* positively correlated with stocks, either.
- *Timberland is simply not correlated with stocks.*
- If you need an asset class that is always negatively correlated with stocks, timberland is not it.
- If you need an asset class that is not correlated with stocks, timberland may be it.