



Inflation and Timberland Returns—Part 2

If This Was Easy, I Wouldn't Have a Job

In the last issue, we said lagging timberland returns resulted in a higher correlation with inflation. This suggests that timberland returns contribute to the inflation rate.

So we thought we'd see how strongly timber prices are correlated with inflation—we assumed that, since timber prices are an important component of timberland returns and lagged timberland returns are highly correlated with inflation, lagged timber prices should also be highly correlated with inflation, too.

But sometimes they are not.

Table 1¹ adds changes in prices of Douglas-fir domestic-grade sawlogs and southern pine sawtimber stumpage to the analysis.

While the lagged Douglas-fir log price changes are about as correlated with inflation as are timberland returns, lagged changes in southern pine sawtimber are not.

¹ **Correction:** There was an error in the spreadsheet used in preparing the previous issue of Forest Research Notes. The formulae used to produce the correlation coefficients in the text were calculating the coefficients only through 2003, not 2006 (the charts are OK). The differences are not great, but we show them here to make the record clear. The extra three years of returns result in slightly lower correlation coefficients:

	Inflation and Timberland	Inflation and Lagged Timberland
through 2003	0.3876	0.6058
through 2006	0.3820	0.5947

Table 1. Correlation Coefficients for Inflation, Lagged Timberland Returns and Lagged Changes in Timber Prices

	Inflation- CPI	Timberland-- US	DF #2 Saw	So Pine Saw
1960-2006	1.0000	0.5947		
1987-2006	1.0000	0.5818	0.5285	0.1645

Sources: Ibbotson Associates, NCREIF, Timber Mart-South, Log Lines, ForestWeb, Oregon Department of Forestry

Why are southern pine sawtimber prices not positively correlated with inflation? Well, they are at times. **As always, the time period analyzed can make a big difference in the conclusions you reach when looking at correlations.**

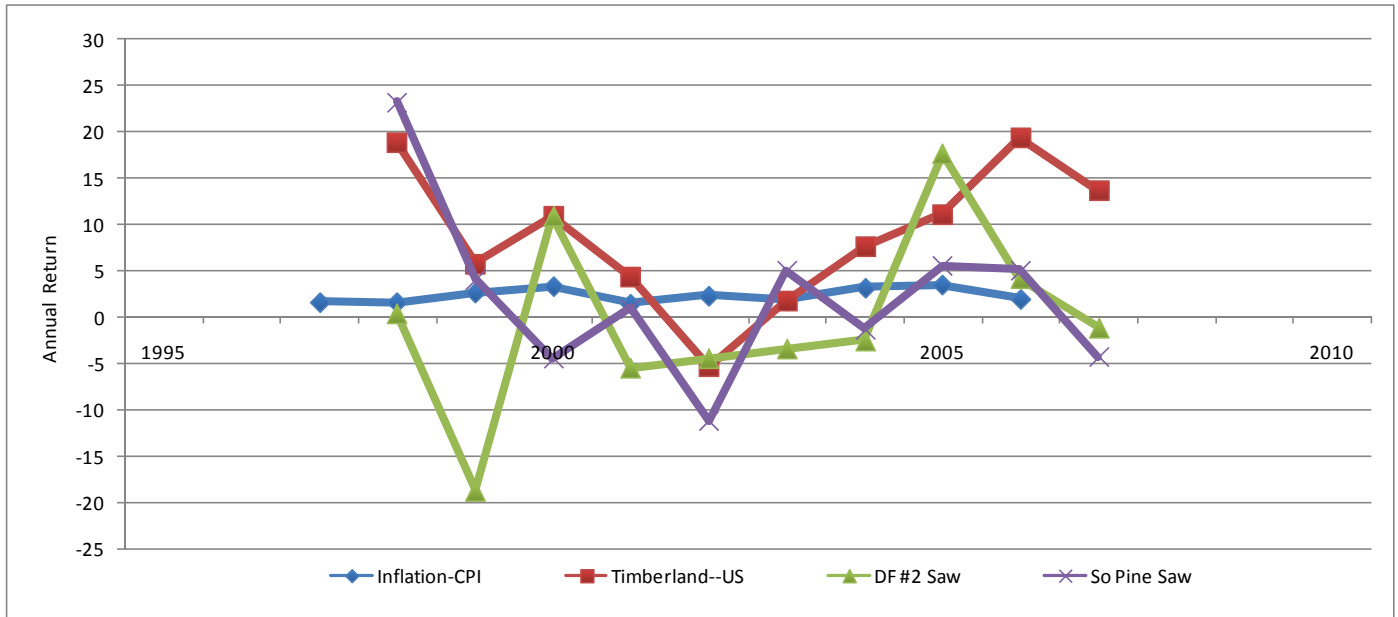
If we look at different time periods (as we did in *That Was Then, This is Now*, (Vol 4, No 2), we get the results shown in Table 2. Lagged southern pine sawtimber prices are strongly positively correlated with inflation for the period 1977 through 1986, negatively correlated for the period 1987-1996 and strongly positively correlated again for the period 1997-2006.

Table 2. Correlation Coefficients for Inflation, Lagged Timberland Returns and Lagged Changes in Timber Prices,

	Inflation- CPI	Timberland-- US	DF #2 Saw	So Pine Saw
1960-2006	1.0000	0.5947		
1977-2006	1.0000	0.4824		0.3608
1987-2006	1.0000	0.5818	0.5285	0.1645
1977-1986	1.0000	0.7869		0.6685
1987-1996	1.0000	0.5712	0.3119	-0.2172
1997-2006	1.0000	-0.0197	0.4373	0.4541

Sources: Ibbotson Associates, NCREIF, Timber Mart-South, Log Lines, ForestWeb, Oregon Department of Forestry

Figure 1. Inflation, Lagged Timberland Returns and Lagged Changes in Timber Prices



Sources: Ibbotson Associates, NCREIF, Timber Mart-South, Log Lines, ForestWeb, Oregon Department of Forestry

But look again at 1997-2006. Lagged US timberland returns were not correlated with inflation for that period, but the timber prices were. Why? The data series for 1997 through 2006 are plotted in Figure 1.

The inflation rate is relatively low for the period and is not very volatile. Inflation tended to be a little lower at the two ends of the analysis period. In contrast, the lagged changes in timberland returns were highest at the two ends of the analysis period and the changes were much larger. (Remember, the correlation coefficient measures both direction and magnitude of change.) But the two timber price series moved in such a way that they were more positively correlated with inflation than were timberland returns.

If timberland is not positively correlated with inflation, can it be an inflation hedge? How are you defining “hedge”? If you want an investment that keeps up with, or ahead of, inflation, timberland has consistently done that (Table 3), whether it has been correlated for the time period or not.

Table 3. Returns for Inflation and Timberland

	Inflation- CPI	Timberland- -US	Timberland- -SO	Timberland- -PNW	Timberland- -NE
1987-2006	3.04%	15.18%	11.21%	19.80%	
1987-1996	3.68%	22.13%	13.82%	32.10%	
1997-2006	2.40%	8.62%	8.67%	8.65%	12.58%

Sources: Ibbotson Associates, NCREIF

Where is Your Timberland?

Returning to an earlier issue, how can southern pine prices be negatively correlated with inflation if timberland is positively correlated (most of the time)? It is because we have been looking at US timberland returns and regional timber prices.

In Regional Diversification in Timberland (Vol 1, No 3) we looked at whether different investment portfolios would benefit from timberland investments in different regions. The results showed that this hypothesis was incorrect, but we did find that different timberland regions provided better returns over different time periods.

Our conclusion was that a geographically diversified timberland portfolio was more likely to provide better returns over time than a timberland portfolio that was focused on a single region. This also appears to be the case when inflation-hedging is a key objective in a timberland investment program. Table 4 shows that each region has been more strongly correlated with inflation over some time span the other regions during that time.

Table 4. Correlation Coefficients for Inflation and Lagged Timberland Returns

	Inflation- CPI	Timberland- -US	Timberland- -SO	Timberland- -PNW	Timberland- -NE
1960-2006	1.0000	0.5947	0.5986	0.5227	0.2445
1987-2006	1.0000	0.5818	0.1200	0.6712	0.0059
1997-2006	1.0000	-0.0197	-0.1179	-0.0092	0.4479

Sources: Ibbotson Associates, NCREIF

You have to look at the details

Table 5 shows the correlation coefficients for lagged southern timberland and changes in southern stumpage prices with inflation. Southern timberland returns have been strongly correlated with inflation from 1960 and 1977 through 2006, but not so much since 1987. And timber prices have not been very strong correlated at any time. And sawtimber prices have been strongly negatively correlated with inflation over the last 10 years.

Table 5. Correlation Coefficients for Inflation and Lagged Southern Timberland Returns and Stumpage Price Changes

	Inflation- CPI	Timberland- -SO	So Pine Saw	So Pine CNS	So Pine Pulp
1960-2006	1.0000	0.5986			
1977-2006	1.0000	0.4961	0.2425		0.2561
1987-2006	1.0000	0.1200	-0.1302	-0.0230	0.2487
1997-2006	1.0000	-0.1179	-0.4082	-0.2455	-0.0671

Sources: Ibbotson Associates, NCREIF, Timber Mart-South

Lagged timberland returns from the Pacific Northwest (Table 6) have been positively correlated since 1960, even more strongly since 1987, but not since 1997. Domestic log prices have been positively correlated with inflation even when timberland returns have not.

Table 6. Correlation Coefficients for Inflation and Lagged Western Timberland Returns and Log Price Changes

	Inflation- CPI	Timberland- -PNW	DF #2 Saw	DF Japan
1960-2006	1.0000	0.5227		
1987-2006	1.0000	0.6712	0.5285	0.2205
1997-2006	1.0000	-0.0092	0.4373	0.3869

Sources: Ibbotson Associates, NCREIF, Log Lines, ForestWeb, Oregon Department of Forestry

Timberland Returns and Timber Prices
Timberland and timber appear to go in different directions at times when you look at their correlation with inflation.

But our analysis shows that timberland returns are highly correlated with timber price changes. All the southern pine products are highly correlated with southern timberland returns across the three time periods in Table 7.

Table 7. Correlation Coefficients for Southern Timberland Returns and Stumpage Price Changes

	Timberland- -SO	So Pine Saw	So Pine CNS	So Pine Pulp
1977-2006	1.0000	0.7139	0.6609	0.4962
1987-2006	1.0000	0.5817	0.8173	0.6493
1997-2006	1.0000	0.6161	0.7960	0.6566

Sources: NCREIF, Timber Mart-South

We get a similar picture with western timberland and timber (Table 8). Log price changes have been strongly correlated with timberland returns over the past 20 years.

Table 8. Correlation Coefficients for Western Timberland Returns and Log Price Changes

	Timberland- -PNW	DF #2 Saw	DF Japan
1987-2006	1.0000	0.7238	0.5165
1997-2006	1.0000	0.5188	0.5138

Sources: *Ibbotson Associates, NCREIF, Log Lines, ForestWeb, Oregon Department of Forestry*

We've not spent time analyzing the Northeast timberland returns and timber prices because there is no region-wide timber price report for that region.

Other Research

The tables above suggest that you need a geographically-diversified portfolio if you want timberland to serve as an inflation hedge.

This conclusion is supported by research done (using a completely different approach) by Court Washburn and Clark Binkley about 15 years ago.

In *Do Forest Assets Hedge Inflation?* (Forest Science, August 1993, 69(3):215-224), they concluded: "...forests in the West and South have been effective hedges against high-than-anticipated inflation; northeastern forests have been less effective hedges. Markets for western and southern forests have not efficiently incorporate expectations of inflation into forest values; forest in these regions have been overvalued during periods of relatively high expected inflation. Markets for forests in the Northeast have been relatively efficient processors of inflation expectations."

There is much more to their analysis than correlation coefficients, but note that northeastern forests have been strongly correlated with inflation since 1997 (Table 3). This might indicate that an update of Washburn and Binkley's work could find that Northeast forests have traded roles with the South and West. And it would support our point that a diversified timberland portfolio is a better inflation hedge than investments in a single region.

Summary

Over the past 45 years, US timberland returns have been positively correlated with inflation. But they have not been correlated over the past 10 years. And returns for different regions have been positively correlated with inflation at different periods of time.

If you expect to use timberland as an inflation hedge and you are measuring timberland's ability to act as a hedge using the correlation coefficient, you need to have a geographically diversified portfolio.

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