



## Diversification among Timberland Regions

We compared historical returns and their volatility for U.S. timberland investments in three regions: the West, the Southeast, and the Northeast. Historical returns for timberland investments were obtained primarily from the National Council of Real Estate Investment Fiduciaries (NCREIF) Timberland Property Index for the calendar years 1987 through 2002.

The NCREIF Timberland Property Index captures a subset of timberland properties in the U.S. It includes timberland properties held in a fiduciary setting for either tax-exempt or taxable investors. The properties must be comprised primarily of fee simple ownership and are reported on an unleveraged basis. NCREIF Timberland Property Index data for calendar years returns starts in 1987 for the West and Southeast. NCREIF began reporting returns for the Northeast in 1994. Returns for the Northeast for 1987 through 1993 were estimated using the John Hancock Timber Index return estimation methodology.

Table 1 shows the mean and standard deviation of the calendar year returns for each region from 1987 to 2002. NCREIF Timberland Property Index data is before fees and the returns are not adjusted for inflation. The data indicates that the regions have different risk and return profiles. The greatest return has been in the West, but those returns have been the most volatile. The Northeast lies between the other two regions in terms of risk and return. The Southeast has experienced a slightly lower return than the Northeast, but with less volatility.

**Table 1. Mean and standard deviation of calendar year returns for timberland by region, 1987 to 2002.**

<b>Region</b>	<b>Return (%)</b>	<b>Standard Deviation (%)</b>
Southeast	11.1	6.6
West	20.4	24.9
Northeast	11.9	10.7

Our interviews with timberland investment management organizations (TIMOs) suggest that the historical risk and return pattern is somewhat at odds with expectations for the future. In general, managers typically project smaller differences in annual returns between the West and other regions. The higher return in the West may in part be an artifact of the time period used in our analysis. For instance, it includes the early 1990s, a time of unusually high returns in the Northwest due to a strong export market and reductions of timber harvesting on public lands.

In addition, some TIMOs have indicated they expect returns in the Northeast to be less than the South, but that they also expect Northeast returns to have lower volatility. However, the data suggests that this has not been true between 1987 and 2002. We believe that the greater volatility in the northeastern returns may be due to the inclusion of Pennsylvania properties in the Northeast index. Strong demand for hardwood sawtimber, such as cherry, has increased the value of these properties in recent years, resulting in strong returns. Additional annual return data may clarify if the northeastern volatility is indeed lower than the South.

## REGIONAL DIVERSIFICATION

Many large, institutional timberland owners seek to invest in timberland in more than one region to gain the benefits of portfolio diversification. Table 2 suggests that this strategy can be effective in timberland investments. An analysis of returns between 1987 and 2002 indicates that West and South are weakly, positively correlated. The same is true of the Northeast and South. The West is weakly negatively correlated with the Northeast. Portfolio theory suggests that these relationships offer diversification benefits -- in particular that a portfolio with a mix of regions can reduce volatility without sacrificing return.

**Table 2. Correlation coefficients of regional timberland returns, 1987 to 2002.**

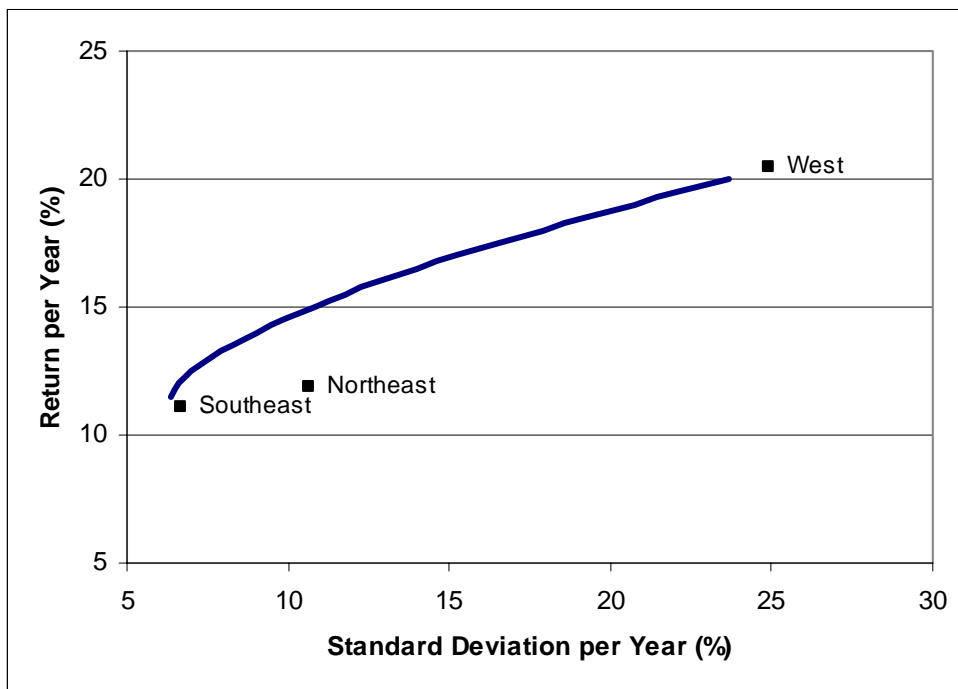
<b>Region</b>	<b>Southeast</b>	<b>West</b>	<b>Northeast</b>
Southeast	1.000	0.336	0.339
West	0.336	1.000	-0.080
Northeast	0.339	-0.080	1.000

Using the historical data, we calculated a risk-efficient return frontier for a diversified, U.S. timberland portfolio. The percentage allocations at various return levels appear in Table 3. As target return increases, risk (as measured by standard deviation) increases. The risk-efficient allocation among regions also varies substantially.

**Table 3. Regional allocation of timberland providing minimum risk at various return levels.**

<b>Return (%)</b>	<b>Standard Deviation (%)</b>	<b>West (%)</b>	<b>Southeast (%)</b>	<b>Northeast (%)</b>
12.0	6.6	7.5	67.7	24.8
12.5	7.0	12.5	58.2	29.3
13.0	7.6	17.5	48.6	33.8
13.5	8.3	22.5	39.1	38.4
14.0	9.0	27.5	29.6	42.9
14.5	9.9	32.5	20.1	47.4
15.0	10.8	37.5	10.6	51.9

Figure 1 is a plot of the efficient frontier showing the data using target returns varying from 11.5% to 20.0%. Table 3 and Figure 1 both show that regional diversification can provide reduced risk at a return level commensurate with a single region portfolio, and that higher returns are associated with greater risk.



*Figure 1. Efficient frontier for a timberland-only portfolio.*

## CONCLUSIONS

Our analysis of the historical data indicates that there are portfolio diversification benefits associated with owning timberland in more than one region. Investors can reduce or increase their projected return and risk (as measured by standard deviation of annual returns) though allocating capital among the regions. Returns have been greatest in the West, but with the highest level of volatility among the three regions. Northeastern returns have been slightly greater than those in the South, but with higher volatility.

Our analysis is limited by several factors. First, it relies on the available historical data. A rational investor may well question whether conditions will remain the same in the future. Interviews with timberland investment management organizations suggest that their expectations for future returns differ from historical returns. In addition, our analysis relies on only 16 years of data. Additional historical data would provide a greater degree of confidence in our findings. Finally, our analysis ignores other assets, including stocks, bonds, and riskless assets that are available to investors. Timberland investments have been shown to have important portfolio diversification benefits when combined with the other asset classes.

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