Comparing a Measure of Historical Timberland Returns with Published Timberland Indices
by
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Abstract
The Timberland Performance Index (TPI) and the National Council of Real Estate Investment Fiduciaries (NCREIF) Timberland Index provide data on timberland returns. Both have limitations, perhaps the most important of which is their short duration. To provide an indication of longer returns, a theoretical model is needed to backcast returns. Returns calculated by a theoretical model are compared to the returns reported by the published indices for the same time periods. Similar returns would indicate that the theoretical model can be used to produce backcasts of timberland returns.

As the institutional timberland investment industry developed in the early 1980’s, several timberland investment management organizations developed timberland return indexes based on theoretical timberland investments. While each of these proved useful in providing an indication of expected returns for timberland investments, none was widely accepted by the industry. As historical returns accumulated over time, it became possible to develop indexes based on these actual returns.

Two published indexes exist, the Timberland Performance Index (TPI) and the National Council of Real Estate Investment Fiduciaries (NCREIF) Timberland Index. There is some overlap in the data used in calculating the indexes, but each also has unique data. Both have limitations, perhaps the most important of which is their short duration. The TPI published returns for 1981 through 1999. NCREIF publishes returns for 1987 through the present. To provide an indication of longer returns, one of the theoretical models is needed to backcast returns.

Figure 1 compares the TPI returns with returns from the NCREIF South index.

The John Hancock Timber Index was developed in the early 1990s by the Hancock Timber Resource Group (HTRG) to provide an indication of timberland returns for its clients and prospective clients. The index is described in a research note available on the HTRG web site (www.HTRG.com). The research note formerly reported returns for the US South, Pacific Northwest, and Northeast, but now includes returns for British Columbia and New Zealand. For this analysis, we focus on returns for the US South.

The index uses timber prices to calculate a return for timberland according to the following formula:

\[
\text{Rate of Return}_t = \frac{\text{Net Income}_t + \text{Capital Value}_t}{\text{Capital Value}_{t-1}} - 1
\]

where:

- **Net Income**, is an index of the net revenue produced by the forest during quarter \( t \) and is the current price multiplied by an income rate of 1.00% for the South.

- **Capital Value**, is an index of the value of the forest land and timber growing stock during quarter \( t \), based on an eight-quarter weighted average of timber prices with the weights declining linearly from the current quarter.

Figure 2 shows the returns calculated by the model for the US South.

Table 1 compares returns from the three indices over the period 1987-1999. The JHTI reported lower returns and higher volatility than the other two indices, which reported similar returns and volatility.

<table>
<thead>
<tr>
<th>Index</th>
<th>ACR*</th>
<th>Std Dev</th>
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<tbody>
<tr>
<td>JHTI—South</td>
<td>10.62%</td>
<td>9.44%</td>
</tr>
<tr>
<td>NCREIF—South</td>
<td>12.95%</td>
<td>5.15%</td>
</tr>
<tr>
<td>TPI</td>
<td>13.39%</td>
<td>6.03%</td>
</tr>
</tbody>
</table>

*Annually Compounded Return

Table 2 presents correlation coefficients for the three indices. The correlation between the JHTI and NCREIF and the JHTI and TPI are fairly strong. The correlations are stronger over longer time periods (e.g., 1981-1999 vs. 1987-1999).

<table>
<thead>
<tr>
<th>Correlation Coefficients</th>
<th>87-99</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCREIF vs. JHTI--1987-2000</td>
<td>0.63</td>
</tr>
<tr>
<td>TPI vs. JHTI--1981-1999</td>
<td>0.54</td>
</tr>
<tr>
<td>NCREIF vs. TPI--1987-1999</td>
<td>0.38</td>
</tr>
</tbody>
</table>

1 Resource Economist, James W. Sewall Company, 147 Center Street, Old Town, ME 04468
JHTI is more closely correlated with both indices than the indices are correlated with each other.

The comparison shows that the JHTI provides a reasonably accurate picture of timberland returns when compared to the published timberland indices. This means that the JHTI can be used to make backcasts of timberland returns. The model can also be used to forecast timberland returns if a good timber price forecast is available.

**Figure 1. Published Timberland Returns--US South**

**Figure 2. John Hancock Timberland Index--US South**