



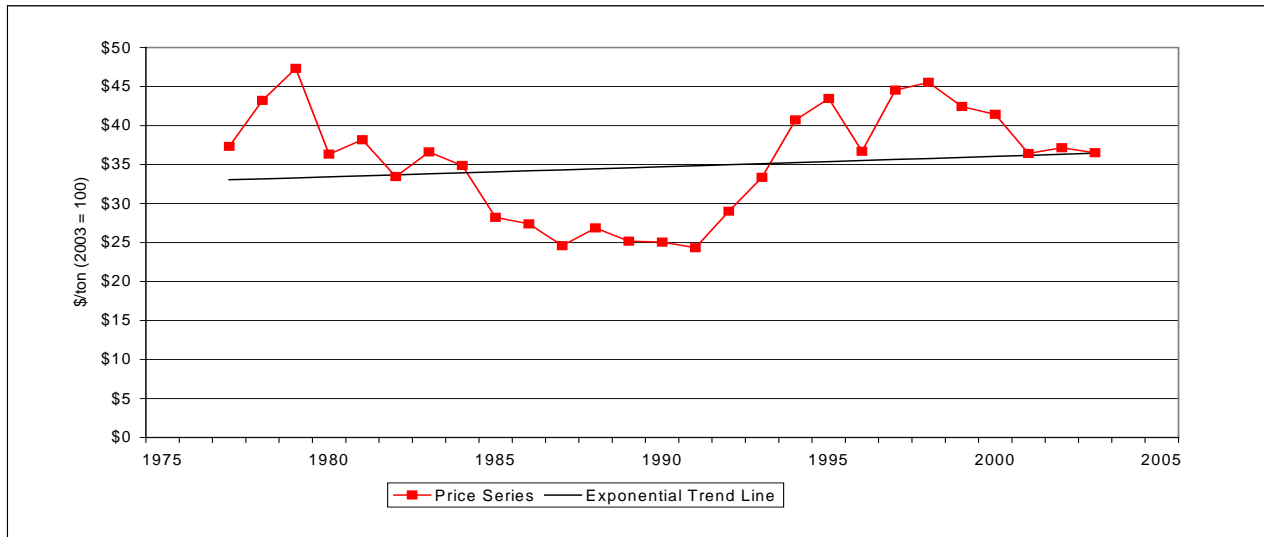
## Southern Pine Sawtimber Price Trends

Real southern pine stumpage sawtimber prices rose sharply during the mid-1990s, but have been struggling since (Figure 1). They appear to have leveled off in the past three years. Where will they go from here? Will we experience a long downward drift such as the one that occurred during the 1980s? Or does the trend line give a better indication of the future? Even if the trend line is weak? Can we use the past to predict the future at all?

### Looking Further Back

Both trend lines show an upward trend in prices, but the  $R^2$ 's indicate that they are not statistically strong. What happened to prices before 1977? Were they rising before 1977 or were they level or were they falling? Or have they been cycling between \$25/ton and \$45/ton for decades? Timber Mart South began publishing in 1976, so we cannot look further back than that using that source. However, there is another source we can consider in attempting to backcast prices.

Figure 1. Southwide Pine Sawtimber Prices (Real 2003\$)



\$/ton	Current Price	Actual /Trend	Coeff. Of Variation	$R^2$	Compound Growth Rate		
					History	10-Yr Proj	25-Yr Proj
Actual	\$36.50		19.80%		-0.09%		
Exponential Trend	\$36.46	100.11%		0.0211	0.38%	0.37%	0.37%
Linear Trend	\$37.06	98.48%		0.0207	0.36%	0.49%	0.39%
Linear Trend Change	\$0.13 /year						

**LDAF Sawtimber Prices**

The Louisiana Department of Agriculture and Forestry (LDAF) has been publishing timber prices since 1955. If we compare LA prices since 1976 with TMS prices for the same period, and if they look similar, we might be comfortable with using them to backcast timber prices.

of variation, which is to be expected from averaging together many state data series. (It is interesting to note that the LDAF prices average about \$10/ton higher than the TMS Southwide prices, but the TMS Louisiana prices start at the LDAF level in 1977 and drop to the TMS Southwide level by 2003.)

Figure 2 compares pine sawtimber prices from the Louisiana data to TMS Louisiana and Southwide sawtimber prices. All three data sets show similar patterns of ups and downs and there is a high degree of correlation among the sets. The two Louisiana-only series have nearly identical coefficients of variation. The southwide set has a lower coefficient

The LDAF and TMS prices have shown a fairly consistent parallel pattern for the past 30 years. It seems reasonable to assume we can use the LDAF data to backcast TMS Southwide timber prices.

**Figure 2. Comparison of LDAF, TMS Louisiana and TMS Southwide Pine Sawtimber Stumpage Prices (Real 2003\$)**

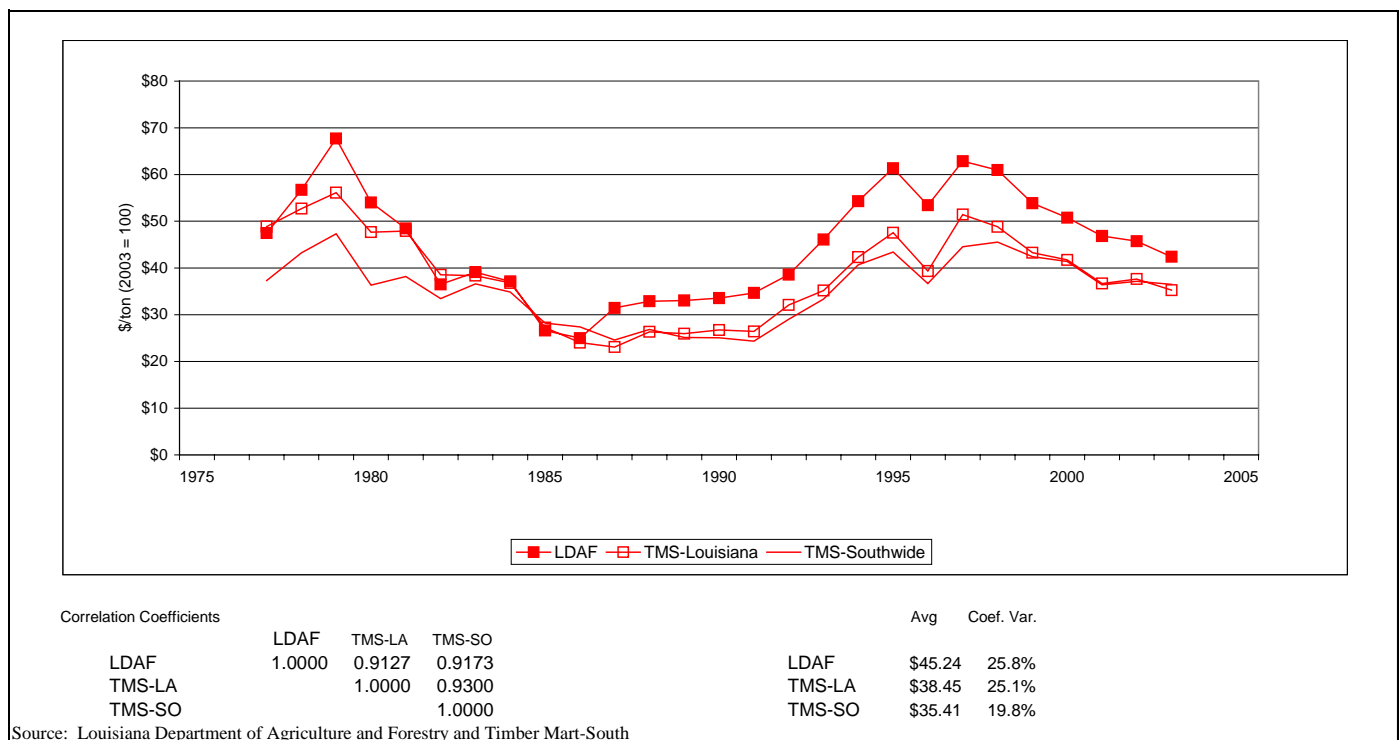


Figure 3 shows LDAF pine prices since 1955, and presents a different picture than Figure 1. Current prices are at about 80% of both long-term trend lines. The R<sup>2</sup>s for the trend lines are twice those for the shorter series, but still not particularly strong. This series shows a higher volatility than prices since 1977 (coefficient of variation of 32.7% since 1955 vs. 25.8% since 1977.) \

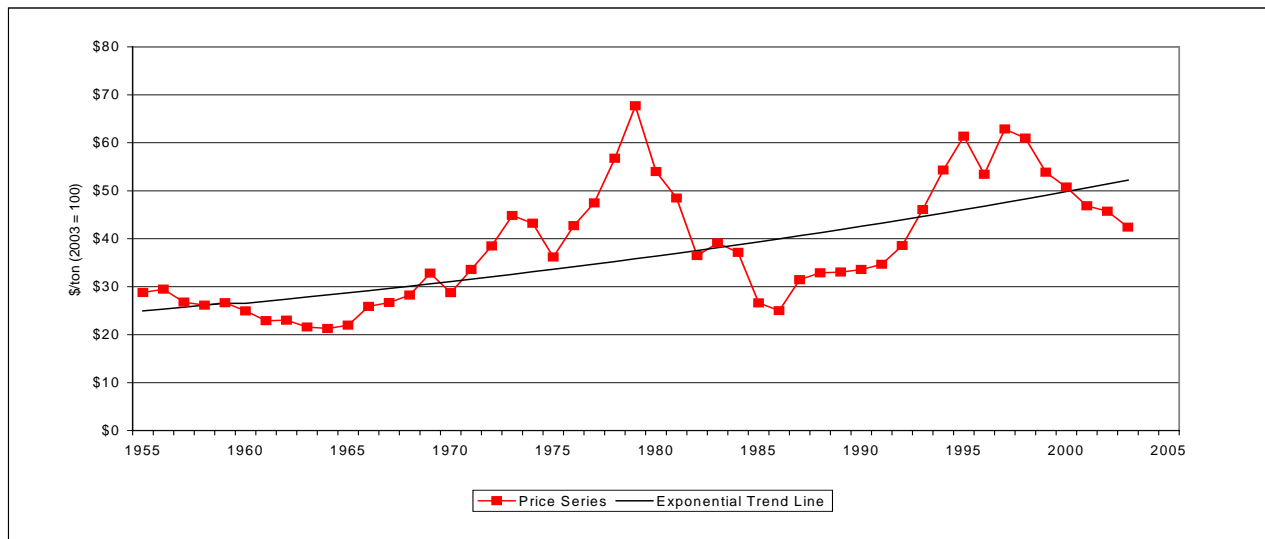
**Mean Reversion**

It turns out the low R<sup>2</sup>s on the trend lines are very important. The trends have been very weak. In fact, we can show statistically that sawtimber prices have really not gone anywhere for the past 50 years.

To show this, we use process control charts frequently used by operations engineers (Figure 4). In order for the price series to be mean reverting, 95% of the prices must fall between the upper and lower dotted lines and/or 99% of the prices must fall between the upper and lower solid lines. In this case, no observations fall outside the 99% boundary and only one observation falls outside the 95% boundary.

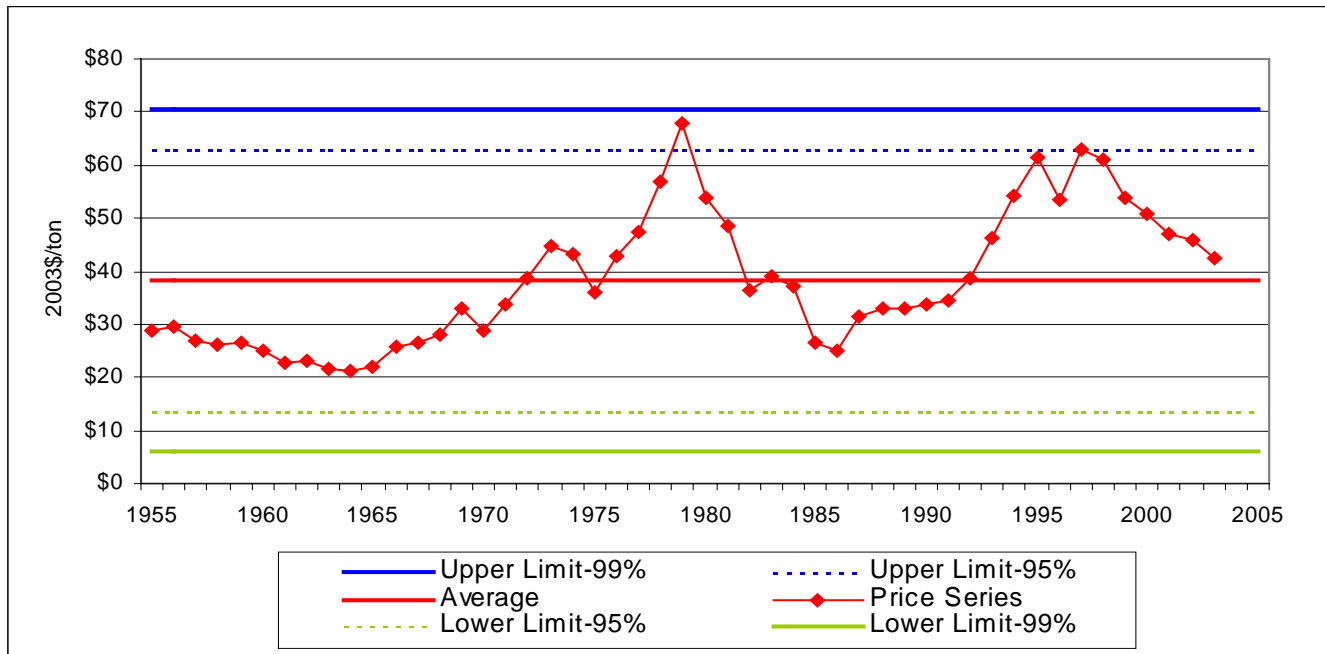
Our conclusion is that southern pine sawtimber stumpage prices are mean reverting. We also looked at the period 1977-2003 and found the same results, although the average LDAF price is \$45.24 for the period.

**Figure 3. Long-Term LDAF Pine Sawtimber Stumpage Prices**



\$/ton	Current Price	Actual /Trend	Coeff. Of Variation	R <sup>2</sup>	Compound Growth Rate		
					History	10-Yr Proj	25-Yr Proj
Actual	\$42.38		32.70%		0.81%		
Exponential Trend	\$52.24	81.13%		0.4827	1.59%	3.73%	2.44%
Linear Trend	\$51.66	82.05%		0.4393	1.58%	3.09%	1.80%
Linear Trend Change	\$0.58 /year						

Figure 4. Process Control Chart for Louisiana Statewide Pine Sawtimber Stumpage Prices



**Summary**

Our analysis indicates that southern pine sawtimber stumpage prices are mean-reverting, with a 50-year mean of \$38.29/ton (based on LDAF data). Those prices have held to that mean through 50 years of timber supply and demand shocks and significant changes in timber harvesting and processing technology. *That* means we should not expect a significant increase in sawtimber stumpage prices in the near future. This supports the current practice of many timberland investors who are using 0% real appreciation rates in their timberland investment models.

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**Explanation of the Price Trend Chart and Statistics (Figure 1)**

Exponential and linear trend lines for each series are calculated using Microsoft Excel’s LogEst and LinEst functions. The trend line with the strongest R<sup>2</sup> is then plotted on the chart. In Figure 1, the exponential trend line happens to have the strongest R<sup>2</sup>. Note, however, that often the “strongest” R<sup>2</sup> is very weak, indicating the trend line is a very poor fit to the data

Immediately under the chart are statistics from the analysis. To the left are the current actual price and the current prices calculated for the exponential and linear trend lines. The current price in Figure 1 is at 100.1% of the exponential trend and 98.5% of the linear trend.

To the right of the current price data is information about the historic data and trend lines. First is the compound growth rate for the historical prices (-0.09%). Then comes data for the exponential trend line. In this case, the trend line shows prices have grown at a 0.38% rate, and the trend line has an R<sup>2</sup> of .0211. The column “10 Yr Proj” shows that, if the exponential trend line were continued forward for 10 years, the current actual price would have to grow at a 0.37% real rate in order to meet the line in 10 years and at 0.375% in order to meet the exponential trend line in 25 years. Immediately below the exponential trend data is similar information about the linear trend line.