Stumpage Prices in Southern New England (1978–2011): How Do Red Oak, White Pine, and Hemlock Prices Vary over Time?

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ABSTRACT

We analyzed 33 years of red oak, white pine, and hemlock real stumpage prices—after removing inflationary effects—in southern New England. All real prices fluctuated; the real stumpage prices for white pine appear stable, hemlock decreased, but only red oak stumpage increased meaningfully over the 33-year period. This speaks to the importance of management—including silvicultural prescriptions to improve volume increment over time.

Keywords: stumpage, inflation, southern New England, red oak, white pine, hemlock

Financial criteria may play a significant role in the decision to buy, hold, and manage forestland. These criteria are equally useful to inform publicly held forestland management decisions regarding timber, e.g., determining financially optimal stand rotation ages/cutting cycles or stocking levels. One of the key questions posed by some owners/managers is the basic relationship between timber prices and inflation: if after the effects of inflation are removed, do the prices for timber in the woods or stumpage increase or decrease overtime? We reviewed this question for three species (red oak, hemlock, and white pine) for the period 1978–2011 based on southern New England stumpage prices.

Methodology

UMass Extension within the University of Massachusetts Department of Environmental Conservation and in partnership with Cooperative Extension at the University of Connecticut and the Rhode Island Department of Environmental Management has conducted a quarterly stumpage price survey for Massachusetts, Connecticut, and Rhode Island since 1988. Loggers, public and private foresters, and sawmills are contacted by mail and invited to submit stumpage prices (i.e., $/1,000 board feet [mbf], international quarter inch scale) they have either paid or received for standing timber in the previous 3-month period. Participation is voluntary and does not necessarily represent a complete regional record of stumpage transactions in the previous quarter. Between 1988 and 2011, the total number of reported sale transactions in a quarter ranged from 39 to 155 (mean = 88; median = 95). The reported sales, species, and products are recorded and data are aggregated for the entire three-state southern New England region. The quarterly stumpage price report presents results on the basis of the location of the sales, either east or west of the Connecticut River (that generally bisects the region on a north–south basis). Differences in soils, bedrock geology, and markets on either side of the river result in varying prices for red oak, making it economically meaningful to report in this manner, and for the sake of consistency we consider prices east of the Connecticut River for white pine and hemlock as well. For more information on the stumpage data, analysis, and reporting see MassWoods Forest Conservation Program (2012). Although the three states began a coordinated system in 1988, Massachusetts stumpage data also exist from 1978 through 1987 for red oak, white pine, and hemlock. We combine these data sources to create a continuous annual time series from 1978 to 2011.

Our analysis traces these regional southern New England stumpage prices east of the Connecticut River for eastern white pine, hemlock, and red oak. These three commercial species dominate the forests of the region and forest products marketplace. The low, median, and high prices are reported on a quarterly basis. There is considerable spread between the reported low and high price because of a variety of factors such as timber quality, distance to market, accessibility of property, sale volume, market demand, season, skid distance, landowner requirements, method of sale (e.g., competitively bid or directly negotiated), and logging costs. The varying quality of these is typically expressed in a broad range of prices. In our review, nominal (i.e., original) prices have been adjusted by changes in the Producer Price Index (PPI Series TDWPU081) to yield real or inflation-adjusted prices using the PPI commodity code for crude lumber and wood products (see Bureau of Labor Statistics 2012).

Analysis

We used two different approaches to investigate the change of stumpage prices over time. The first is a simple before-and-after

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Table 1. Inflation-adjusted red oak stumpage prices, east of the Connecticut River (2011 dollars).

			1978 vs 2000			1978 vs 2011	
Red oak	1978	2000	Price difference	Percent difference	2011	Price difference	Percent difference
High price	$128	$479	$351	274%	$301	$173	135%
Median price	$ 83	$282	$199	240%	$176	$ 93	112%
Low price	$ 32	$ 47	$ 15	47%	$ 80	$ 48	150%

Table 2. Inflation-adjusted white pine stumpage prices, east of the Connecticut River (2011 dollars).

			1978 vs 2000			1978 vs 2011	
White pine	1978	2000	Price difference	Percent difference	2011	Price difference	Percent difference
High price	$126	$163	$37	29%	$132	$6	5%
Median price	$ 79	$ 96	$17	22%	$ 75	($4)	(5%)
Low price	$ 40	$ 47	$ 7	18%	$ 18	($22)	(55%)

Table 3. Inflation-adjusted hemlock stumpage prices, east of the Connecticut River (2011 dollars).

			1978 vs 2000			1978 vs 2011	
Hemlock	1978	2000	Price difference	Percent difference	2011	Price difference	Percent difference
High price	$81	$84	$3	4%	$80	($1)	(1%)
Median price	$49	$38	($11)	(22%)	$20	($29)	(59%)
Low price	$24	$23	($1)	(4%)	$20	($4)	(17%)

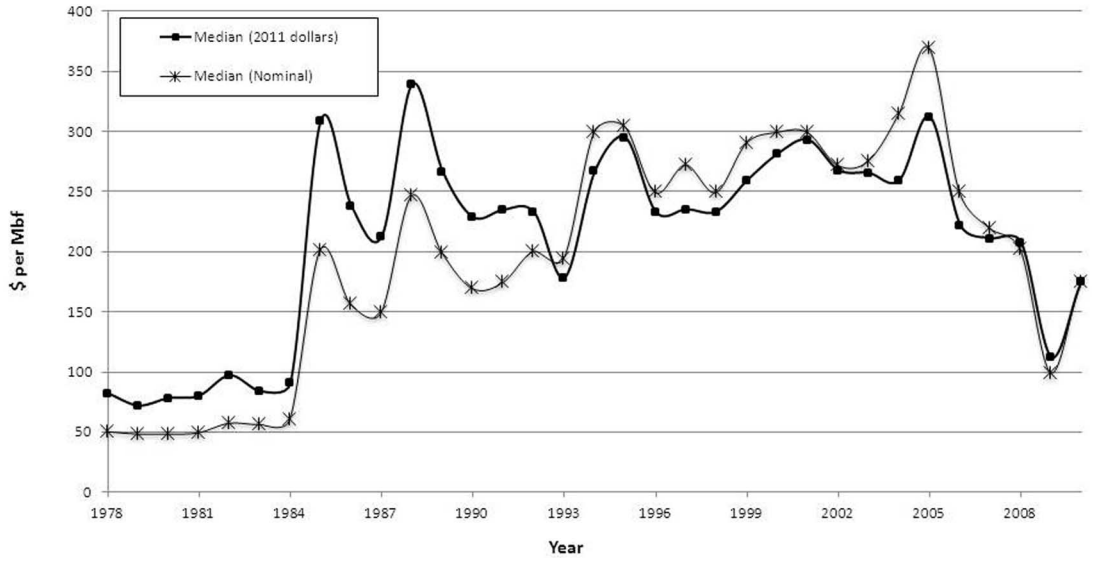

Figure 1. Red oak stumpage prices, east of the Connecticut River (1978–2010).

consideration of the data, noting the percent change in price between two distinct points in time. This is simple to do and intuitively easy to follow. The second approach used statistical analyses and regression methods used by Sendak (1991, 1994), Howard and Chase (1995), and Wagner and Sendak (2005) to estimate the continuous rate of change, which can in turn be converted to an annual percentage rate of change. This is a more objective approach, because it does not depend on arbitrarily choosing the beginning and ending points as means of comparison. It also reveals the way stumpage prices behave over time in a continuous manner, rather than the simplistic average change between two static, arbitrary points. A more-detailed description of this analytical method is available on request. In both approaches, we used the nominal and real prices.

Before and After

In the first, simpler approach, we considered two distinct time periods to compare rates of change over shorter and longer time frames. First, we consider the 22-year time period of 1978–2000. We chose this period because prices appeared to reach maximum levels around 2000. Second, we consider the 33-year time period of 1978–2011. Tables 1–3 summarize the data, indicating very different results.

Over the shorter term (1978–2000), the median real prices of red oak and white pine increased by 240 and 22%, respectively. The same could not be said for hemlock over this period, where the real median price between 1978 and 2000 decreased by 22%.

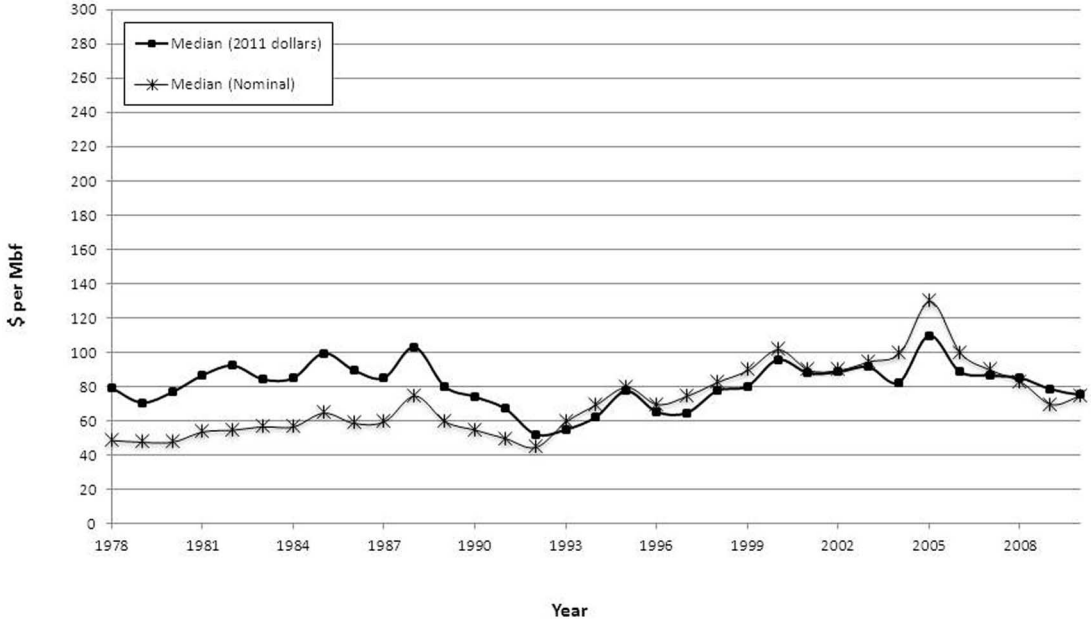

Figure 2. White pine stumpage prices, east of the Connecticut River (1978–2010).

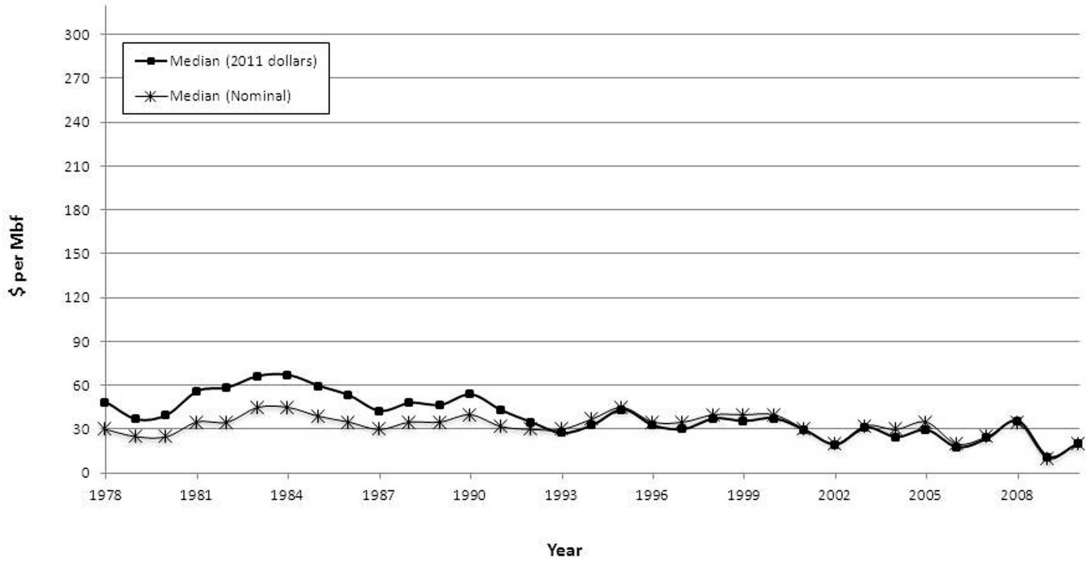

Figure 3. Hemlock median stumpage prices, east of the Connecticut River (1978–2010).

At first glance, a forester or landowner looking at stumpage prices might be impressed by the increases from 1978 to 2011, especially for red oak. Even the median real price of red oak rose from $83 to 176, increasing 112%. This appears to be a notable increase in price over 33 years, especially in light of the recent national economic downturn. On that basis, some might conclude there are meaningful profits to be realized in timber investment. However, price changes for hemlock and white pine tell a different story. For hemlock, real prices for the 33-year period ending in 2011 showed a decrease of −1, −59, and −17% for the high, medium, and low price scenarios, respectively. Median and low real price scenarios for white pine showed a similar decrease of −5 and −55% for the median and low price scenarios, respectively. The high price scenario for white pine showed an increase of 5%; we note that this represents only a slight increase when compared with that of red oak prices.

We reported high and low prices by species over time because we find this to be interesting information, but we hesitate to draw conclusions or inference from their comparison. The reported high and low prices each represent only one reported price observation. Thus, they do not have the rigor of a median that represents multiple observations. In general, we do think it is interesting that red oak price showed a real increase over 33 years, in spite of the serious recession between the fourth quarter of 2007 and the second quarter of 2009. The real softwood stumpage prices we observed over the same time period have not fared as well. This finding may be caused

Table 4. Continuous and annual rates of change (in both nominal and inflation-adjusted real terms)—Hemlock, white pine, and red oak stumpage prices in southern New England (1978–2011).

	Continuous		Annual	
	Nominal	Real	Nominal	Real
White pine	0.0181	0.000223	0.0183	0.0002
Hemlock	−0.0136	−0.0333	−0.0135	−0.0328
Red oak	0.0432	0.0256	0.0441	0.0259

by a decrease in new construction and the corresponding depressed demand for softwood dimension lumber, but analysis of these markets and trends (e.g., housing starts and interest rates) is beyond the scope of this note.

Annual Rate of Change

Figures 1–3 illustrate the volatility of stumpage prices during the 33-year period with red oak being the most and white pine being the least volatile as measured by standard deviation. The before-and-after analysis ignores any volatility between the two end points. The statistical analyses add valuable clarity in examining stumpage price changes over time. The results in Table 4 reveal that between 1978 and 2011 nominal white pine stumpage price in southern New England experienced an annual rate of change of 1.8% but the real annual percent rate of change was zero. The annual rate of change for hemlock during this period showed a decline in nominal (−1.4%) and real (−3.3%) terms. Red oak stumpage prices fared most favorably during this period, experiencing an annual nominal and real percentage rate of change of 4.4 and 2.6%, respectively. As a point of comparison many traditional bank savings accounts and short-term certificates of deposit are offering less than 1.0% annual return.

Discussion

Analyzing the 33-years of stumpage price data showed the importance of the long-term view or perspective. The red oak high price history had peaks in 1988, 1994, and 2001. High price white pine stumpage showed a similar trajectory for 1985 and 2001, but with less obvious peaks. With the exception of perhaps one outlier price in 2001, the high price of hemlock appeared to have been relatively stable, without the wider fluctuations of red oak. Figure 4 shows these high price variations over time for each species. In addition, if we only considered price change in the shorter term (e.g., 1978–2000), we might conclude that real stumpage prices, for the most part, increased. Foresters know the importance of considering timber volume increments over long periods, to dampen out fluctuations of wet and dry years or periodic insect defoliation events. Longer-term observation of prices is equally valuable and can put individual highs or lows into perspective. Likewise, removing the effects of inflation showed how prices behave over time independent of that invisible inflationary tendency for the price of everything to increase. When inflationary effects were removed, the annual percentage change for white pine stumpage price was zero, hemlock decreased, and only red oak increased at 2.6%.

Other Key Things to Consider

Although this article discusses real prices associated with timber harvesting, many other forestry-related factors play a role in the business of growing timber.

Silviculture

There are many ways of enhancing returns (and forest health) through decisions about preferred species, harvest cycles, wood quality, and long-term stand objectives. If done properly, silvicultural decisions will leverage an investment in forestland by generating more value (quantity of wood and/or higher-quality trees) derived from a given site.

Land Base

The value of the land on which timber is managed may influence landowners'/managers' decisions of when and how to harvest. History shows that demand for land increases with time, a relationship that has great bearing on any particular land use, such as forestry. Anecdotal New England wisdom advises to invest in land because they are not making any more of it. Future land use and land value is another component in the matrix of understanding forest economics.

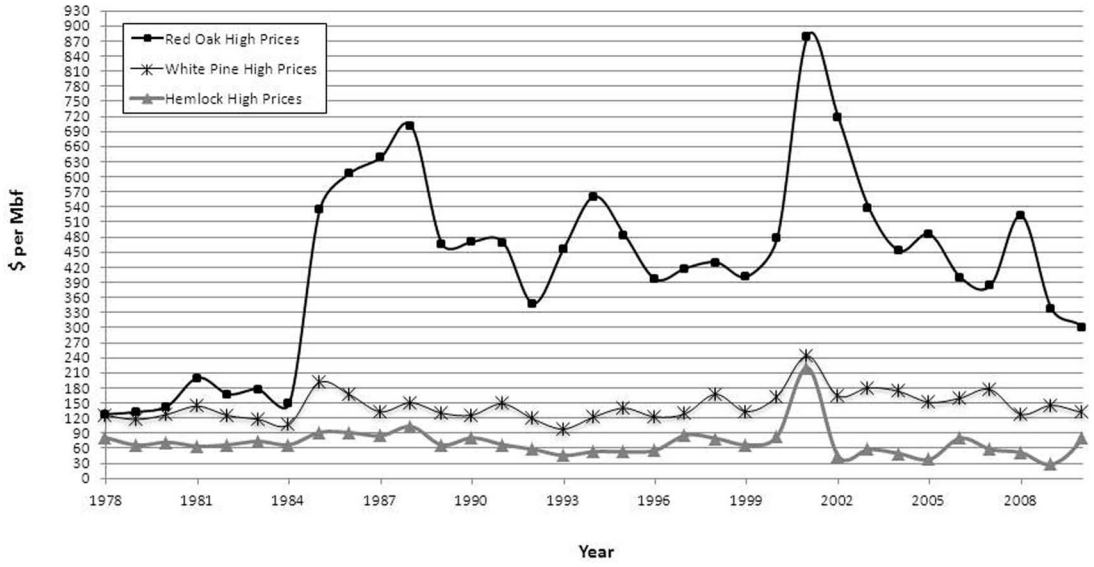

Figure 4. Red oak, white pine, hemlock high price history, east of the Connecticut River (1978–2010; 2011 dollars).

Cost Structure

Numerous expenses associated with growing and selling timber, both capital and operating costs, influence harvest decisions. Operating costs to consider include stand improvement, real estate and other taxes, liability insurance, hiring a consulting forester, and others.

Risk

A critical factor in the decision to grow timber, regardless of inflation, is that of risk. Some potential negative outcomes are completely out of the owner's/manager's control and can change the entire calculation of a return on investment. Legislation can change such that harvesting is no longer feasible. What if a rare species is discovered in the area of harvest or zoning changes to discourage harvest? Disease, fire, and weather-related damage (e.g., wind and ice) can devastate forest inventory. Markets can change reflecting broader economic activity such as the recent recession or changes in consumer preferences.

Conclusion

The aim of this article is to present an overview of inflation-adjusted stumpage prices over time. Our study focuses on three species in a limited geographic area. We find real prices to both increase and decrease over time depending on species, time frame, and price range considered. When analyzed over the 33-year period, white pine real prices did not change, hemlock prices decreased, and only red oak price increased. This implies that any change in value of white pine is dependent on its volume increment alone and not improvement in price. On the other hand, even if red oak volume growth was virtually stagnant (e.g., because of gypsy moth defoliation), its value increment is positive. Importantly, these results do not indicate future price performance. Our study acknowledges some forestry-related factors that might also play a role in price changes, but there are other broader economic factors that could influence prices, including changes in demand due to evolving consumer preferences, changes in harvesting/milling technologies, marketing decisions made by producers and manufacturers, global supply of competing species, and environmental policy preferences expressed by society that can potentially influence supply.

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