

Regulation and Stumpage Prices

A Tale of Two States

Conventional wisdom suggests that the regulation of timber harvesting adds expense to the process, thereby reducing profitability, and that landowners would bear the resulting cost of this regulation through reduced stumpage values. This study compared more than five years of quarterly stumpage prices in Massachusetts, a state with comprehensive statewide forest cutting practices regulations, with prices in Connecticut, a similar and adjacent state with no such regulations. The results suggest that the Massachusetts regulations do not adversely affect stumpage prices and landowner profit from the sale of timber.

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Growing public concern about environmental quality and federal mandates to address nonpoint-source water pollution have led to a variety of policy approaches influencing timber harvesting at the state level (Ellefson and Chang 1994). Some states, such as Virginia, have adopted a voluntary approach to the use of best management practices (BMP). Others, such as Massachusetts, have developed statewide forest practice regulations to ensure the use of erosion control methods, and Maryland has a variety of laws and regulations pertaining to forest practices (Hawks et al. 1993). Martus et al. (1995) reported on the proliferation of local regulation of private forestry, which has increased more than fourfold in the past 10 years. They predicted that local regulation will continue to expand as people unaccustomed to traditionally rural activities, such as harvesting, relocate from urban areas to the countryside. A plethora of conflicting local regulations could create an environment favorable to the creation of statewide regulations. Cabbage and Siegel (1988), in a review of local regulation of private forestry in the East, also predicted that regulation of timber har-

vesting would increase in the future, and that it was only a question of whether it would be done at the state or local level.

In considering the potential effects of regulation on stumpage prices, one possible adverse effect is the added public cost of implementing the program and the potential reduction in private profits (Cabbage 1991). Statewide regulatory programs can create considerable administrative expense. Ellefson and Chang (1994) reviewed a variety of state forest practice programs and their costs. Ten states with comprehensive forest practice regulation programs experienced an average annual increase in program expense of 18 percent since 1985.

The conventional wisdom is that the cost of compliance with regulations on private lands must be borne by landowners and timber harvesters (Ellefson and Chang 1994). A midwestern study, for example, reported a net revenue reduction in timber sales of as much as 59 percent because of compliance with water quality protection regulations (Ellefson and Miles 1985). In another study, the cost of implementing BMPs in Alabama, Georgia, and Florida reduced gross harvest revenues by 3 percent (Ellefson and



Although it is one of the most densely populated regions in North America, southern New England is the site of considerable commercial timber harvesting activity.

Chang 1994). Hawks et al. (1993) reported that compliance with forest practice regulations in Maryland could cost as much as \$1,620 for a harvest operation, to cover the expense of an erosion control plan, critical areas plan, county timber harvest plan, and a county grading permit. A Wisconsin study of the economic impacts of a regional restriction on timber harvesting indicated that the effect generally was not greater than 20 percent of the overall property value (Stier and Martin 1997). Siegel and Haines (1990) also concluded that complex and restrictive requirements to protect wetlands add expense to forestry operations.

Cubbage (1995) reported on several

studies that concluded that mandatory and voluntary forest practice guidelines impose substantial costs on either the private landowners or on the governments charged with implementing them. The only difference is that society bears the expense of implementing voluntary programs that use education and promotion, whereas landowners are responsible for the cost of meeting the regulatory standards. Cubbage (1995) observed that discussion of these trade-offs is frequently based more on rhetoric than research. Ultimately, he recommended that policies balance the social benefits of environmental protection with costs borne by private landowners.

Objective of the Case Study

Few studies have been conducted to assess the cost of regulation to landowners or timber harvesters. Stumpage data from Massachusetts and Connecticut provide an excellent opportunity to look for possible differences that may be attributable to statewide regulation. The overall objective of this case study was to analyze stumpage data for four different species categories, from 22 fiscal quarters, in two similar and adjacent states in the same region that differ in their approach to harvest regulation. Such an analysis would allow for a test of the theoretical prediction that regulatory costs will result in lower stumpage prices paid to landowners.

Background

Forest ownership and harvesting characteristics. Forests dominate the landscape of both Massachusetts and Connecticut; both states are roughly 60 percent forested (Brooks et al. 1993). The vast majority of this forestland is owned by thousands of nonindustrial private individuals (Brooks et al. 1993), and the average parcel size is 10.6 acres in Massachusetts and 17.0 acres in Connecticut (Birch 1985).

In spite of the small ownerships, there is considerable harvesting activity. In Massachusetts there are more than 500 licensed timber harvesters and more than 100 sawmills. Between 1990 and 1994, an annual average of 665 permitted harvesting operations covering roughly 26,000 acres removed more than 48 million board feet each year. In Connecticut, where there are more than 270 timber harvesters and at least 50 sawmills (Connecticut DEP 1994), the Connecticut Division of Forestry estimated that 70 million board feet are harvested annually.

Regulation in Massachusetts. Massachusetts regulates harvesting activities on both public and private land (Massachusetts General Laws, Chapter 132). Before any commercial harvest greater than 25 mbf or 50 cords, a forest cutting plan must be submitted to the state's Department of Environmental Management (DEM) for review and approval by a county service forester. A two-page form requests information on the landowner and harvester, silviculture, and BMPs to be used to control nonpoint-source pollution. Two required maps detail the locations of landings, skid trails, wetlands, streams, and harvest areas, as well as the property within a broader geographical context. If rare species habitat is involved, the state's Natural Heritage and Endangered Species Program is notified, and mitigating measures are recommended. All abutting landowners must be notified via certified mail of the proposed harvest activity. Interim and final reviews are made by the county service forester to ensure compliance with BMPs (for example, filter strips, stream crossing methods, water bars,

disturbed soil stabilization) and other activities outlined in the cutting plan. Only harvesters licensed by DEM may operate commercial timber sales, and licenses may be revoked and landowners fined for failure to comply with the regulations.

These regulations have been in place since 1983, and were revised in 1995. In general, the cost of compliance with these regulations falls on the purchaser of stumpage (that is, the logger or procurement forester). In most cases, the harvest plans are prepared by the purchaser, or by a private consultant acting as an agent of the landowner. The expense of implementing required BMPs falls on the purchaser.

Either regulations do not cause an appreciable difference in stumpage price, or some compensating factor that is not obvious is reducing stumpage prices.

Regulation in Connecticut. Although in 1991 Connecticut legislation authorized the commissioner to promulgate harvest practice regulations, such regulations had not been developed, reviewed, or approved by the end of the study period. Consequently, there was no state-level regulation of timber harvesting in Connecticut during the study period. A few municipalities passed local timber harvesting regulations in the late 1970s and early 1980s. A 1984 survey found 17 municipal timber harvesting ordinances enacted in Connecticut out of 169 towns. Only 7 of these ordinances, however, were considered to have been "successfully implemented" by the municipality in question (Youell 1985). Connecticut's inland wetlands act enables municipalities to regulate land use on wetland soils, but

enforcement is sporadic and pertains only to wetlands and their adjacent buffer zones in some municipalities. It is possible that Connecticut foresters and loggers are voluntarily incorporating BMPs to some extent into their harvesting activities (for example, water bars on skid trails), but it is unlikely they are preparing harvest plans with spatial detail, or applying BMPs to the full extent required in neighboring Massachusetts.

Methods

Extension foresters in southern New England (Connecticut, Massachusetts, and Rhode Island) have surveyed loggers and foresters quarterly since 1988 to describe market trends in stumpage for a number of species categories. We used 22 quarters of data from 1988 to 1993 as the basis for comparison. Data were incomplete for two quarters during this period (quarters 1 and 10), and hence were unavailable for use. We used four categories based on species composition by volume in the timber sale: (1) at least 66 percent oak species; (2) more than 90 percent oak species; (3) predominantly beech, birch, or maple; and (4) white pine. A standard two-sample t-test was used to find significant differences between Massachusetts and Connecticut stumpage prices by quarter and species category. Before the application of each t-test, a test for equivalency of variances was conducted between the two state samples. If the variances were not significantly different, a pooled variance t-test was applied. In cases where the variances were not equal, unequal variance t-tests were applied.

Results

Eighty-eight comparisons (4 species categories over 22 quarters) were made between Connecticut and Massachusetts mean stumpage prices. A total of 3,755 sales were used. In 15 cases there were significant differences in mean stumpage price (at the .05 significance level). In 13 of these cases, however, the mean Massachusetts stumpage price was greater than the Connecticut price. Therefore, in only 2 of 88 comparisons, or 2.5 percent of observa-

tions, were Connecticut stumpage prices significantly greater than equivalent Massachusetts prices. This pattern held for both the high-value sales dominated by oak, and the sales of lesser-value pine and other hardwoods.

Discussion

Overall, there was no appreciable difference between stumpage prices in Massachusetts and Connecticut during the study period for four different species categories. This result contradicts conventional wisdom that would suggest that statewide harvesting regulations would result in lower stumpage prices in Massachusetts. It is beyond the scope of this study to attempt to model or explain stumpage price variation, or to investigate the economics of timber sales and the role of regulation. We used data from 3,755 stumpage transactions over more than five years from a 12,800-square-mile area of two adjoining states in the northeastern United States to test this wisdom. We concluded that there is no difference in stumpage prices between the two states for this period.

In this case study, the available data did not permit a comprehensive econometric analysis of the plethora of factors that affect stumpage prices. The conventional wisdom that we tested was that Massachusetts prices would be lower because of regulation. The possibility exists that one or more factors not related to regulation may be compensating, for example:

- *Physical characteristics such as terrain or skidding distance may be significantly different and more onerous in Connecticut.* We believe this is an unlikely explanation, since the two states adjoin and share similar glacial history and forest physiography (Bowman 1911; Barrett 1995). These two states also share similar nonindustrial private forest ownership patterns and average parcel sizes (Birch unpublished), thus making potential skidding distances not appreciably different.

- *Timber quality in Connecticut could be significantly inferior to timber in Massachusetts.* We believe this explanation is unlikely, as the two states share similar land use history, forest species composition, and ownership

patterns (Brooks et al. 1993).

- *Land use conversion of forest to some developed use could be significantly greater in Connecticut and result in appreciably more stumpage and logs on the market.* We believe this explanation to be unlikely as well. The two neighboring states have similar overall population densities and NIPF forest ownership patterns (Brooks et al. 1993), as well as general economies.

- *There are significantly fewer sawmills in Connecticut and hence less competition for stumpage.* We believe this is an unlikely explanation. Both states are roughly 60 percent forested, which supports local sawmills and rural economies in both states.

- *Connecticut loggers and foresters are applying the same levels of harvest planning and BMPs on a voluntary basis as is mandated in Massachusetts, so stumpage prices in both states are affected equally.* We believe that, although there is probably voluntary BMP implementation in Connecticut, it probably does not compare with the level of attention or regulatory scrutiny typical in Massachusetts.

The fact that only limited and sporadic statistical differences exist between Massachusetts and Connecticut suggests that there are no differences in stumpage prices. If the Massachusetts statewide Forest Cutting Practices Act was a significant factor in expenses borne by landowners, one would expect to see significantly lower stumpage values. In general, either regulations do not cause an appreciable difference in stumpage price, or some compensating factor that is not obvious is reducing stumpage prices in Connecticut compared to Massachusetts.

Roughly 85 percent of the forestland in Massachusetts and Connecticut is owned by nonindustrial private individuals and families, who typically place great importance on aesthetic and recreational values (MacConnell and Archey 1982; Alexander 1986; Rickenbach et al. 1998). Harvesting is typically "selective," representing some form of either true uneven-aged treatments, an intermediate treatment in an even-aged stand, high grading, or some combination of these treatments. The harvesting in

this region is not typically clearcutting or other forms of large-scale silviculture. For example, the Massachusetts Department of Environmental Management reported that there were 13 clearcuts statewide in 1994, with an average size of 13.1 acres (Thompson 1995, pers. commun.), representing 2 percent of all harvesting operations for that year. Results reported here may not apply in other regions where harvesting is typically larger or more intensive in scale.

It may be true that the Massachusetts statewide Forest Cutting Practices Act does not adversely affect landowners and the stumpage prices they receive for their timber. There may still be an adverse and costly effect of the regulation that is not expressed in stumpage prices. Massachusetts timber harvesters may internalize the cost of the regulation, and realize less profit themselves. An analysis of Massachusetts timber harvesting expenses may be useful to explore this issue and look for this effect. It is also possible that meeting the level of environmental protection required by the Massachusetts Forest Cutting Practices Act does not add significant cost to harvesting. The cost of compliance may be such a small factor that it is lost among the other variables of timber quality, terrain, and other conditions that affect price.

Conclusions

The relationship between stumpage and harvest regulations is not a simple one. The imposition of state and local regulations could decrease timber harvests, which in turn could cause an increase in stumpage prices (Greene and Siegel 1994). Furthermore, as the marketplace for wood becomes increasingly global, the significance of harvest regulations may diminish compared to the overall worldwide increase in the demand for wood (Mather 1990). The results of this case study do not conclusively prove that statewide regulations in Massachusetts do not add an additional cost to be borne by the landowner. Further study is warranted both of this possibility, and that costs are potentially internalized by harvesters. It is nevertheless significant that a pronounced effect in stumpage

price was not detected, over more than five years and 3,755 transactions. We believe that this case study casts significant doubt on the conventional wisdom that harvest practice regulations necessarily depress stumpage values or returns to landowners.

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Tools of the Trade

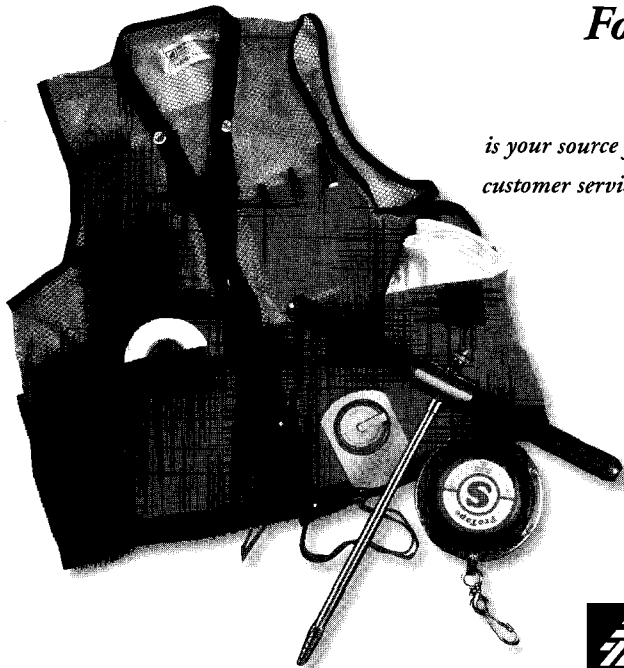
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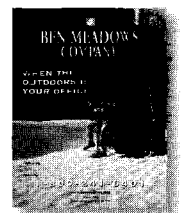
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