

Regional Economic Analyses of Forest Products and Tourism Sectors in North Carolina

P.B. Aruna and Frederick Cabbage¹

Abstract

We analyzed the economic contributions of the forest products sector and tourism sector in North Carolina based on the 1977 and 1996 IMPLAN model. We also used various other data bases to examine regional impacts of forest products and tourism components of the North Carolina economy. As of 1996, forest products firms employed 105,000 people and the tourism industry employed about 91,000 people. Total employee compensation in the wood based industries was \$3.2 billion; for tourism it was \$1.4 billion. Thus the average wood based industry annual wage was \$30,800; the average tourism sector annual wage was \$15,500. The state average annual wage was \$26,500. Industrial output was \$13.5 billion for the forest products industry in 1996, and \$3.9 billion for the tourism sector. Thus the forest products sector had greater economic impacts on the state's economy in 1996 than tourism. But from 1977 to 1996, the wood based industries grew more slowly than the rest of the state's economy, and tourism sectors grew much more rapidly.

POPULATION AND ECONOMIC TRENDS

We analyzed the regional economic impacts of forest products manufacturing and nature-based tourism using various economic data sets and modeling approaches. We summarized data from Department of Commerce and the Census Bureau to examine business and demographic trends.

As of 1996, North Carolina's population was 7.3 million people. The greatest population densities were in the Piedmont, with 250 people per square mile. Population densities in the Mountains and Coastal Plain were about 100 people per square mile. North Carolina population is projected to increase 30% between 1998 and 2025. People age 65 and over are projected to increase about 90% during the period; younger people about 20%. Personal income is projected to increase 68% by 2025.

The Regional Economic Information System (REIS) data from the Bureau of Economic Analysis were used to examine economic trends from 1970 and 1995. In 1970, the manufacturing sector accounted for 32% of the employment in the region. Government enterprises, services, and retail trade sectors were the next and employed 17.8%, 16.1% and 13.4% of the total employment in the region. By 1995, the service sector was the largest employer, at 24.2% of the employment in the state. There was a 11.6% decline in employment in the manufacturing sector (to 20.7% of state employment). Government sector employment declined to 15.9% of the total and retail trade increased

to 17.2% by 1995.

IMPLAN MODEL ANALYSES

We analyzed the economic contributions of the forest products sector and tourism sector in North Carolina based on the 1977 and 1996 IMPLAN model. The forest products sector industrial codes for solid wood products, wood-based furniture, and pulp and paper were identified directly in the IMPLAN data base. Nature-based tourism economic contributions were estimated as a proportion of several identified service sectors, based on a method developed by Redmond (1999) for the Southern Appalachian Assessment Study (SAMAB 1996). The share of each sector's contributions to tourism were based on a study performed by Gordon McClung in West Virginia. The sector shares included: hotels and lodging (36%), amusement and recreation (36%), air transportation (28%), local, interurban transit (36%), retail trade-merchandise and food (5%), eating and drinking (15%), auto repair (12%), and auto rental (9%).

Employment, Compensation, Industrial Output, and Value Added

As of 1996, forest products firms employed 105,000 people and the nature-based tourism industry employed about 91,000 people (Table 1). Total employee compensation in the wood based industries was \$3.2 billion; for tourism it was \$1.4 billion. Thus the average wood based industry annual wage was \$30,800. This could be computed as an average annual

¹ P.B. Aruna and Frederick Cabbage are Research Assistant Professor and Professor, respectively, Department of Forestry, North Carolina State University, Box 8008, Raleigh, NC 27695-8008. Email: a.pb@worldnet.att.net; fred_cabbage@ncsu.edu.

wage of \$47,200 for the paper and allied products sector, \$26,600 for wood furniture, and \$25,800 for lumber and wood products sectors. The average tourism sector annual wage was \$15,500. The state average annual wage was \$26,500.

Industrial output was \$13.5 billion for the forest products industry in 1996, and \$3.9 billion for the tourism sector. Similar estimates of tourism total sales were computed from estimates of recreation visitor days times expenses per day derived from other sources. Value added for the forest products industry (\$4.9 billion) was greater than for the tourism sector (\$2.2 billion), but not as much greater than the comparative industrial output measures. This indicates that tourism, which relies mostly on labor and local inputs, creates more value to the state's economy per amount of sales. Forest industry, however, creates more sales value with fewer employees, because of high capital inputs.

As of 1996, the forest products sector in total comprised 2.75% of employee compensation payments in the state; 3.6% of industrial output; and 2.4% of value added. Nature-based tourism comprised 1% of employee compensation; 0.9% of industrial output; and 1.1% of value added. Both sectors comprised slightly more than 2% of total state employment. Forest industry employment levels have essentially stabilized in the last two decades, while tourism employment, as part of the service sector, is increasing faster than the overall state average.

The forest products sector had greater economic impacts on the state's economy in 1996 than tourism. Indeed, the sector was very robust, among the largest of any state in the South or the country. However, from 1977 to 1996, the wood based industries grew more slowly than the rest of the state's economy, at rates of about 200% to 250%, compared to the state average growth rate of 350% to 380% for all economic measures. The nature-based tourism sector grew more rapidly, at about 430%.

Regional Economic Multipliers

The Type I and Type II output multipliers represent the value of production required from all sectors by a particular sector to deliver one million dollar's worth of output to final demand. Final demand is the ultimate consumption of commodities, including both goods and services. The size of the multiplier does not represent the importance of a given industry for the economy. It provides an estimate of the impact created if that industry's sales to final demand changed. Hence, it is

an indicator that can be used to gauge the interdependence of sectors. The larger the output multiplier, the greater the dependence of the sector on the rest of the regional economy and the more a dollar turns over in an economy.

Type I multipliers give the direct and indirect effects only, where as Type II give the direct, indirect and induced effects. The Type II multipliers say that for a one dollar change in final demand for an industry, increases occur in inter-industry economic activity (as in Type I), but it also means that the income of people employed producing the output for this industry increase. These people spend their income on personal consumption, which leads to demands from other local industries.

Regional economic multipliers were generated by IMPLAN for each forest products sector and we computed weighted average multipliers for tourism based on the proportion of each sector making up the total tourism sector. Pulp and paper Type I multipliers ranged from 1.63 for Industrial Output to 2.11 for Employment; Type II multipliers ranged from 1.93 to 3.12. Wood furniture Type I multipliers ranged from 1.36 to 1.53 for Value Added; Type II multipliers from 1.80 to 2.10. Lumber and wood products sector Type I multipliers ranged from 1.50 for Employment to 1.70 for Value Added; Type II ranged from 1.88 to 2.25. Tourism Type I multipliers ranged from 1.11 for Employee Compensation to 1.42 for Value Added; Type II from 1.43 to 1.90.

Overall, the forest products sector multipliers were slightly to moderately greater than those for tourism. Pulp and paper multipliers were the highest, since more inputs are purchased from outside the local economy. The differences between the solid wood sector and the furniture sector and tourism sector were small, indicating that local economies benefitted slightly more from new wood-based manufacturing than from tourism services in generating additional economic activity.

TRADEOFFS AND NONMARKET VALUES

Debates about timber and tourism tradeoffs are common, and indeed the principal reason prompting this regional economic study in North Carolina. An analysis of the timber market structure in the state indicated that timber markets are well integrated, and are becoming more so with new wood chip mill impacts. Thus their economic and ecological impacts can be compared appropriately with the models we used in the study. The large increase in both the forest

products sector of the economy and the nature-based tourism sector over the last two decades suggests that in the macro economy, timber and tourism tradeoffs are not evident. Local competitive effects of manufacturing and recreation are apt to be more germane, and bear further research.

A brief literature review indicated that other market values for nature-based recreation in North Carolina, which are implicitly included in our IMPLAN analyses, are large. Hunting leases in North Carolina alone exceed \$100 million per year, and aggregate hunting expenditures approach \$500 million per year. Camping, hiking, bird watching, kayaking, skiing, and driving for pleasure all generate substantial direct income that were included in our IMPLAN estimates.

Nonmarket values of forests in North Carolina appear to be quite large as well, perhaps in the \$100 million per year to \$1 billion range in total. The nonmarket values reported in the literature are a mix of marginal and total values for the South as a whole, so bear further specific research for North Carolina. Of course, it is not possible for any particular individual or firm to capture or profit from nonmarket values.

Some of those nonmarket values might be adversely affected by forestry practices such as timber harvesting, which might decrease the aesthetic enjoyment and recreation performed on forest lands. On the other hand, active forest management might increase some of these nonmarket forest values by promoting healthier forests. Carbon storage in particular has potential to generate nonmarket benefits in excess of \$100 million per year from tree plantations or increased stocking levels in natural forests.

CONCLUSION

In conclusion, it is clear that both the forest products sector and the tourism sector are extremely important to the economy of North Carolina. Indeed, eliminating either sector would lead to drastic consequences for the state as a whole, and particularly for the rural areas where one or both of the sectors provides a large share of the economic development and activity. Timber-based manufacturing employment has pretty much stabilized due to labor-saving approaches. Timber manufacturing economic contributions for employee compensation, industrial output, and value added grew at an annual rate of about 5.9% per year from 1977 to 1996. Tourism-based employment continued to increase rapidly, and its other economic contributions grew at annual rate of about 8.7% per year from 1977 to 1996.

Projections indicate that North Carolina's population will grow rapidly in the next two decades, with about a 30% increase statewide. However, the population of age 65 and older is projected to increase almost 90% during this period. Coupled with projected large increases in disposal personal income, we expect that nature tourism demands will increase even more rapidly than the state economy as a whole or than the manufacturing based economy.

We do believe that prudent development of both timber-based and tourism-based activities can provide more economic benefits from each sector in the future. We anticipate that timber-based economic contributions will remain large, and tourism based contributions will grow rapidly. Timber-based and nature tourism-based sectors do complement each other as long as neither becomes too large, like all manufacturing and service sectors. The crux of successful economic and environmental protection policies will be to balance growth of these natural resource based sectors carefully and sustainably so that we do not diminish their utility, value, and enjoyment for future residents of and visitors to North Carolina.

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Table 1. Summary of Regional Economic IMPLAN Analyses for North Carolina

Trends in employment, employee compensation, total industrial output and value added for wood based manufacturing and tourism industries in North Carolina, 1977 and 1996

Sector	Employment			Employee Compensation			Industrial Output			Value Added			Average Wage		
	1977 (number)	1996	Change (%)	1977 (million \$)	1996	Change (%)	1977 (million \$)	1996	Change (%)	1977 (million \$)	1996	Change (%)	1977 (\$)	1996 (\$)	Change (%)
Lumber and wood products	32,895	39,713	21	280	1,023	265	1,352	4,475	231	456	1,661	264	8,526	25,770	202
Wood furniture	38,921	42,534	9	390	1,131	190	1,148	3,506	205	469	1,428	204	10,014	26,595	166
Paper and allied products	21,189	23,109	9	356	1,091	207	1,524	5,568	265	530	1,828	245	16,785	47,224	181
Total wood based manufacturing	93,005	105,356	13	1,026	3,246	216	4,024	13,549	237	1,455	4,917	238	11,030	30,809	179
Total Tourism based sector	32,645	90,974	179	264	1,413	435	737	3,902	429	420	2,206	425	8,087	15,532	92
Region's all sectors	2,338,876	4,449,948	90	26,013	117,932	353	82,256	375,694	357	42,252	204,967	385	11,122	26,502	138
% wood based manufacturing of North Carolina's economy	3.98	2.37		3.94	2.75		4.89	3.61		3.44	2.40				
% Tourism based sector of North Carolina's economy	1.40	2.04		1.01	1.20		0.90	1.04		0.99	1.08				
Economic Multipliers, 1996	Type I	Type II		Type I	Type II		Type I	Type II		Type I	Type II				
Lumber and wood products	1.50	2.01		1.65	2.13		1.55	1.88		1.70	2.25				
Wood furniture	1.36	1.80		1.40	1.81		1.43	1.89		1.53	2.10				
Paper and allied products	2.11	3.12		1.87	2.41		1.63	1.93		1.90	2.44				
Tourism	1.29	1.61		1.11	1.43		1.40	1.75		1.42	1.90				