THE TIMBER ECONOMY OF THE MID-ATLANTIC REGION:
Some Preliminary Results from the Mid-Atlantic Integrated Assessment

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ABSTRACT

The Mid-Atlantic Integrated Assessment (MAIA) is a multi-agency effort headed by the USEPA to assess the health and sustainability of ecosystems in an 8 state region. We present some preliminary results on the economic impact of forest industries from the socio-economic component of the MAIA forest assessment. Employment and income trends between1975-1995 are examined for three specific sectors of the economy in the Mid-Atlantic region: (1) Lumber and Wood Products - Standard Industry Classification (SIC) 24, (2) Paper and Allied Products -SIC 26, and (3) Furniture and Fixtures - SIC 25. During the last two decades, forest based industries in the MAIA produced an average of 244,100 jobs and $4.5 billion in real wages per year, or about 2 percent of all wage employment and income in the MAIA region. However, during this time period the forest industry sector has generally not grown as rapidly as the rest of the MAIA economy (with the exception of SIC 24 in Delaware, West Virginia, and Pennsylvania and SIC 25 in Delaware) and several states have even experienced negative rates of growth in their forest industry sectors. If recent trends continue, forest industry will continue to be an important source of employment and income for parts of some states in the MAIA region; however, forest industry's importance relative to the entire Mid-Atlantic economy will continue to decline in the 21st century.

INTRODUCTION

This paper presents some preliminary results from the ongoing socio-economic component of the Mid-Atlantic Integrated Assessment (MAIA), a multi-agency effort headed by the USEPA to assess the health of all ecosystems in the Mid-Atlantic region of the United States. The USDA Forest Service, Forest Health Monitoring Program is coordinating the analysis of forest ecosystems for the MAIA project and the Southern Research Station's Economics of Forest Protection and Management Work Unit is responsible for the socio-economic component of the MAIA forest assessment. The overall goal for the MAIA socio-economic assessment is to develop systems for understanding and monitoring the relationship between changes in forest ecosystems and human well-being and quality of life in the MAIA region. During meetings with stakeholders in the region, 22 socio-economic assessment questions were identified covering land use, resource (market and non-market) use, population demographics, investments in forest management, and forest policies. Here, we present preliminary results of our analysis of one of the 22 assessment questions. Specifically, trends in wood products employment and income between 1975-1995 are used to examine the economic contributions of the forest based manufacturing sector in the Mid-Atlantic region.

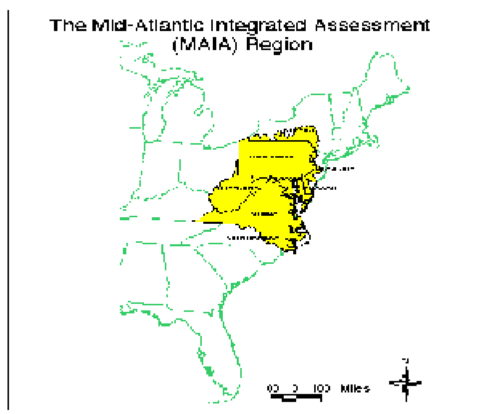

Figure 1. Map of the Mid-Atlantic Integrated Assessment Region.

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The MAIA region is defined primarily by the Chesapeake, Delaware, Ablemarle and Pamlico watersheds and includes the entire states of Delaware, Maryland, Pennsylvania, Virginia, and West Virginia and parts of New Jersey, New York, and North Carolina (Figure 1). The MAIA landscape is dominated by forest cover with forests covering 67 million acres or 61% percent of the total land area. Ninty five percent (63.5 million acres) of the region's forest is classified as timberland. Non-industrial private landowners own the vast majority (79%) of MAIA timberlands while forest industry owns around 7 percent. The remaining 14% is divided between state governments (7%), National Forests (5%), and other federal, state and local governments (2%). With the exception of Virginia and North Carolina, hardwoods dominate the forests in the MAIA. For the region as a whole, oak /hickory is the predominant forest type group covering 31.8 million acres (47.5% of total forest land area). Northern hardwoods, however, is the dominant forest type in the northern Mid-Atlantic (Pennsylvania and southern New York) accounting for 10.2 million acres. The other predominant forest types in the Mid-Atlantic region are loblolly/shortleaf pine (7.3 million acres) and oak/pine (3.9 million acres).

METHODS

To quantify the economic importance of forest based industries to the Mid-Atlantic region, we examine the employment and income generated by the following sectors of the MAIA economy: (1) Lumber and Wood Products - Standard Industry Classification (SIC) 24, (2) Paper and Allied Products -SIC 26, and (3) Furniture and Fixtures - SIC 25. Data is derived from Bureau of Labor Statistics, ES-202 database compiled by the Department of Labor. However, the ES-202 data does not include self employed people and hence under-reports total employment and income. The income from all wages and salaries were corrected for inflation using the GDP price deflator and expressed in terms of buying power in 1982 dollars. To estimate the rate of change in employment and income of forest products sectors in the Mid-Atlantic region between 1975-1995, a linear regression equation of the following form is used:

$$Y = b_0 + b_1X + å \qquad (1)$$

where Y = natural logarithm of employment or real wages
X = year
$b_{0,}$ b_1 = regression coefficients
å = error term

RESULTS

Wage Employment. Table 1 and Figure 2 summarize the employment contributions for the lumber and wood products sector (SIC 24), paper and allied products sector (SIC 26), and the wood furniture sector (SIC 25) in relation to all sectors in the economy of the Mid-Atlantic region. Total employment in the Mid-Atlantic region averaged 11.9 million per year between 1975-1995. During this period the lumber and wood-products industries produced on average 83,600 jobs per year, the furniture industries 73,100 jobs per year, while the paper and allied industries provided 87,400 jobs per year. For the entire MAIA region, forest industries produced an average of 244,100 jobs annually (2.03 percent of all wage employment) between 1975-1995. At the state level, forest industries contributed more than 2% of all employment in North Carolina (2.78%), Pennsylvania (2.13%) and Virginia (3.32%). In the remaining states, forest industry employment ranged from a low of 0.78% of all employment in New Jersey to 1.77% in Virginia.

Wage employment in the lumber and wood products sector (SIC 24) expanded at an average annual rate of 1.32 percent per year between 1975-1995 (Figure 2). This was the only wood-products sector that observed any significant change in employment for the entire MAIA region as the trends in employment were not statistically significant in the paper and allied products sector (SIC 26) and furniture and fixtures sector (SIC 25). Employment in the furniture and fixtures sector was quite volatile during the last two decades. Following an overall upswing between 1975-1987, employment in furniture and fixtures has consistently declined since 1987 falling in 1990 to lower levels than in 1975. In contrast, employment in the paper and allied products sector has been quite stable between 1975-1995 with employment slightly higher in 1995 than in 1975.

Between 1975-1995, wage employment in the entire economy in the Mid-Atlantic region expanded at an higher average annual rate (1.93 percent per year) than in the forest industry sectors (Table 1). As a result, forest industry share of employment in the MAIA fell from 2.31 percent in 1975 to 1.74 percent

Table 1. Average wage and salary employment and annual rates of change in all sectors, lumber and wood products (SIC 24), furniture and fixtures (SIC 25), and paper and allied products (SIC 26) in the Mid-atlantic Region, 1975-1995.

State/sector	Average Employment (thousand employees)	Percent of Total Economy's Employment (%)	Average Annual Rate of Change (%)
Total MAIA Region			
All sectors	11969.8	100.00%	1.93
SIC 24	83.6	0.70%	1.32
SIC 25	73.1	0.61%	NS
SIC 26	87.4	0.73%	NS
Total SIC 24+25+26	244.10	2.04%	
Delaware			
All sectors	248.3	100.00%	2.75
SIC 24	0.82	0.33%	3.36
SIC 25	0.5	0.20%	5.8
SIC 26	2.5	1.01%	NS
Total SIC 24+25+26	3.82	1.54%	
Maryland			
All sectors	1455	100.00%	2.62
SIC 24	3.8	0.26%	NS
SIC 25	3.3	0.23%	-1.23
SIC 26	9.4	0.65%	-0.84
Total SIC 24+25+26	16.50	1.14%	
New Jersey			
All sectors	1441.2	100.00%	2.24
SIC 24	2.6	0.18%	-1.44
SIC 25	1.8	0.12%	NS
SIC 26	6.8	0.47%	-1.62
Total SIC 24+25+26	11.20	0.77%	
New York			
All sectors	972.7	100.00%	1.93
SIC 24	4.7	0.48%	NS
SIC 25	6.6	0.68%	1.15
SIC 26	4.2	0.43%	0.84
Total SIC 24+25+26	15.50	1.59%	
North Carolina			
All sectors	1439	100.00%	2.46
SIC 24	16.8	1.17%	NS
SIC 25	16.7	1.16%	-1.06
SIC 26	6.5	0.45%	1.34
Total SIC 24+25+26	40.00	2.78%	
Pennsylvania			
All sectors	4042.6	100.00%	0.97
SIC 24	25.4	0.63%	2.98
SIC 25	19.3	0.48%	NS
SIC 26	41.3	1.02%	-0.43
Total SIC 24+25+26	86.00	2.13%	
Virginia			

State/sector	Average Employment (thousand employees)	Percent of Total Economy's Employment (%)	Average Annual Rate of Change (%)
All sectors	1893.3	100.00%	3.22
SIC 24	23.3	1.23%	NS
SIC 25	24	1.27%	-0.95
SIC 26	15.5	0.82%	1.21
Total SIC 24+25+26	62.80	3.32%	
West Virginia			
All sectors	477.7	100.00%	NS
SIC 24	6.2	1.30%	2.3
SIC 25	0.97	0.20%	-2
SIC 26	1.3	0.27%	-1.92
Total SIC 24+25+26	8.47	1.77%	

NS indicates that the rate of change was not significant at the 95 percent level.
(Source: Department of Labor, unemployment insurance database, ES-202)

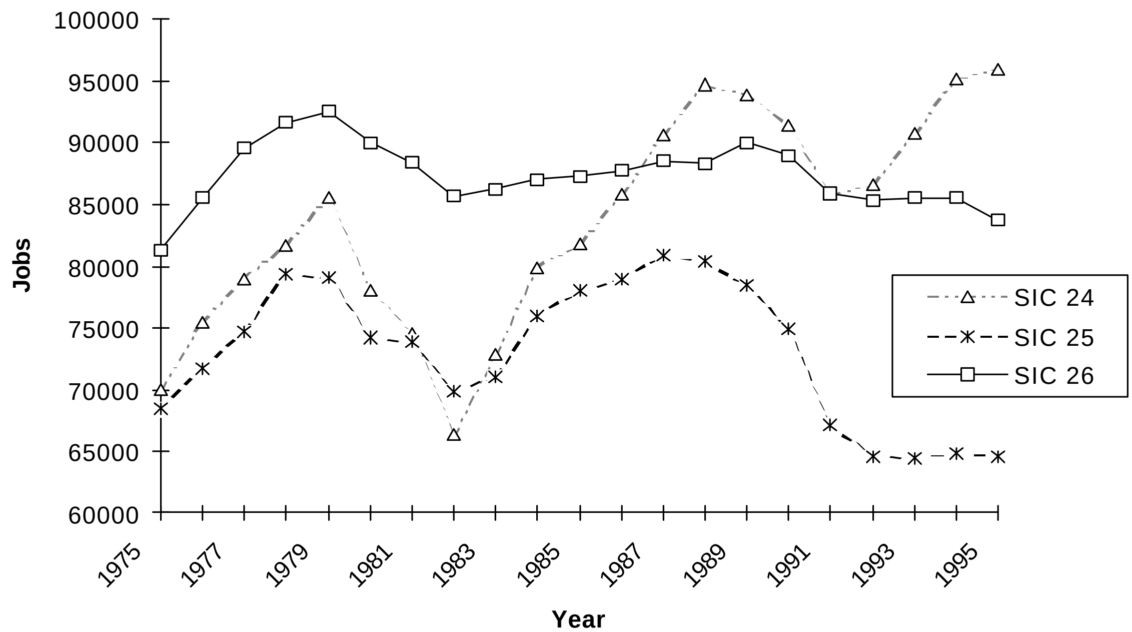

Figure 2. Wage and salary employment in lumber and wood products (SIC 24), furniture and fixtures (SIC 25), and paper and allied products (SIC 26) in the Mid-Atlantic region (Source: Department of Labor, unemployment insurance database, ES202).

in 1995.

Forest industry job growth varied widely between states in the MAIA region between 1975-1995. Overall, Delaware experienced the highest rate of growth in employment in the forest industry sector, where both the lumber and wood products industries (3.36 percent) and furniture industries (5.8 percent) experienced the highest increase in employment in the region. In Delaware the share of employment in wood products industries in relation to other sectors also increased marginally from 0.9 percent in 1975 to 1.1 percent in 1995. The only other state with an increase in the share of wood products employment was West Virginia where it increased from 1.9 percent in 1975 to 2.1 percent in 1995. The share of wood products employment in all the other states in the region declined in 1995 in comparison to 1975. In Maryland it declined from 1.5 percent in 1975 to 0.9 percent in 1995 and in Pennsylvania it declined from 2.2 percent to 2 percent. The decline in Virginia's share of wood products employment was the most from 4.4 percent in 1975 to 2.6 percent in 1995, a total decline of 1.8 percent. In North Carolina the wood products employment share declined from 3 percent to 2.17 percent, in New Jersey from 1 percent to 0.5 percent and in New York from 2 percent to 1.5 percent between 1975 and 1995. The states of Delaware (3.4 percent), Pennsylvania (2.9 percent) and West Virginia (2.3 percent) observed significant increase in the average annual rate of change in employment in the lumber and wood products industries. However, a significant decrease (-1.44 percent) in employment was observed in New Jersey in this sector.

In the furniture and fixtures sector only Delaware (5.8 %) and New York (1.2%) experienced a positive growth in employment while Maryland (-1.23%), North Carolina (-1.06%), Virginia (-0.95%) and West Virginia (-2%) experienced employment declines. Employment in the paper industries grew in New York (0.84%), North Carolina (1.34 %) and Virginia (1.21%). However, Maryland (-0.84%), New Jersey (-1.62%), Pennsylvania (-0.43 %) and West Virginia (-1.92 %) showed negative trends in employment in paper industries during the period.

Wages and Salaries[3]. Table 2 and Figure 3 summarize the contributions to wage and salary income for the lumber and wood products sector, paper and allied products sector, furniture and fixtures sector in relation to all sectors in the economy of the Mid-Atlantic region. Real wage and salary income for entire economy of the Mid-Atlantic region averaged $222.3 billion per year between 1975-1995. Of this, about 2.02 percent ($4.5 billion) was produced by forest industries. Wages and salaries grew more rapidly than employment in all sectors in all states.

The paper industries in the Mid-Atlantic region produced an average of $2.1 billion/year in wage income, while the lumber and wood products sector produced $1.3 billion/year, and the furniture industries $1.1 billion/year. However, wages in the lumber and wood products industries grew more rapidly (3.34 percent/year) than both the paper industries (2.16 percent/year) and the furniture industries (1.35 percent/year). Overall, wage income for the Mid-Atlantic region economy as a whole grew faster (3.81%/year) than the forest industry sectors.

Among the states in the Mid-Atlantic region, Delaware experienced the largest average annual growth in wages in the forest industry sectors with average annual rates of growth of 4.7% in the lumber and wood products sector, 7.86% in furniture and fixtures sector, and 2.4% in the paper industry. In contrast, wages in the paper industries grew an average of 3.5 percent per year in North Carolina while in Pennsylvania, wages in the lumber and wood products industries grew an average of 4.5 percent per year. Virginia experienced a growth in wages in both the lumber and wood products industries (3 percent) and paper industries (3.7 percent). However, in West Virginia, only lumber and wood products industries experienced a growth in wages (4.2 percent).

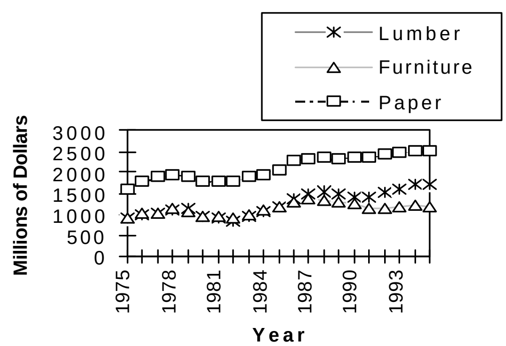

Figure 3 Real wages and salaries (1982=100) for forest industries in the Mid-Atlantic region, 1975-1995. (Source: Department of Labor, unemployment insurance database, ES-202).

[3]All wage and salary figures are in 1982 dollars.

Table 2. Wages and salaries and annual rates of change in all sectors, lumber and wood products (SIC 24), furniture and fixtures (SIC 25), and paper and allied products (SIC 26) in the Midatlantic Region, 1975-1995.

State/sector	Average Wage and Salary (million dollars)[1]	Percent of Total Economy's Wages and Salaries (%)	Average Annual Rate of Change (%)
Total MAIA Region			
All sectors	222295.7	100.00%	3.81
SIC 24	1253	0.56%	3.34
SIC 25	1128.7	0.51%	1.35
SIC 26	2115.8	0.95%	2.16
Total SIC 24+25+26	4497.5	2.02%	
Delaware			
All sectors	4985.4	100.00%	4.19
SIC 24	12.4	0.25%	4.7
SIC 25	7.9	0.16%	7.86
SIC 26	54	1.08%	2.44
Total SIC 24+25+26	74.3	1.49%	
Maryland			
All sectors	27517.2	100.00%	4.69
SIC 24	62	0.23%	1.57
SIC 25	55.7	0.20%	NS
SIC 26	202.9	0.74%	1.2
Total SIC 24+25+26	320.6	1.17%	
New Jersey			
All sectors	29204.3	100.00%	5.02
SIC 24	45.3	0.16%	NS
SIC 25	33.5	0.11%	2.29
SIC 26	159	0.54%	0.88
Total SIC 24+25+26	237.8	0.81%	
New York			
All sectors	17014.4	100.00%	3.57
SIC 24	74.3	0.44%	2.19
SIC 25	109.5	0.64%	2.95
SIC 26	87.4	0.51%	3.05
Total SIC 24+25+26	271.2	1.59%	
North Carolina			
All sectors	25583	100.00%	3.43
SIC 24	216	0.84%	2.55
SIC 25	243.9	0.95%	1.45
SIC 26	156.1	0.61%	3.49
Total SIC 24+25+26	616	2.40%	
Pennsylvania			
All sectors	75782.4	100.00%	2.55
SIC 24	423.1	0.56%	4.52
SIC 25	345.4	0.46%	1.4
SIC 26	1027.4	1.36%	1.78
Total SIC 24+25+26	1795.9	2.38%	

State/sector	Average Wage and Salary (million dollars)[1]	Percent of Total Economy's Wages and Salaries (%)	Average Annual Rate of Change (%)
Virginia			
All sectors	33680.7	100.00%	5.39
SIC 24	338.7	1.01%	3.02
SIC 25	320.5	0.95%	NS
SIC 26	406.7	1.21%	3.65
Total SIC 24+25+26	1065.9	3.17%	
West Virginia			
All sectors	8528.3	100.00%	0.67
SIC 24	81.1	0.95%	4.18
SIC 25	12.4	0.15%	NS
SIC 26	22.2	0.26%	NS
Total SIC 24+25+26	115.7	1.36%	

[1] 1982=100, prices are adjusted for inflation and expressed in terms of value in 1982.
NS indicates that the rate of change was not significant at the 95 percent level.
(Source: Department of Labor, unemployment insurance database, ES-202)

The average wage per job increased in all the sectors between 1975-1995 (Figure 4). The average real wage per job for the economy of the Mid-Atlantic region was about $18,000 between 1975-1995 growing from about $16,000 in 1975 to $21,000 in 1995, an increase of 31 percent. The average wage per job in the paper industries ($24,000) was higher than the regional average for the entire economy by almost 33 percent. The average wage per job in the lumber and wood products industries ($14,816) and furniture industries ($15,497) fell below the regional average by 18 percent and 14 percent, respectively. The wage per job in the paper industries increased by 52 percent between 1975-1995 compared to 40 percent increase in the lumber and wood products industries and 39 percent in the furniture industries.

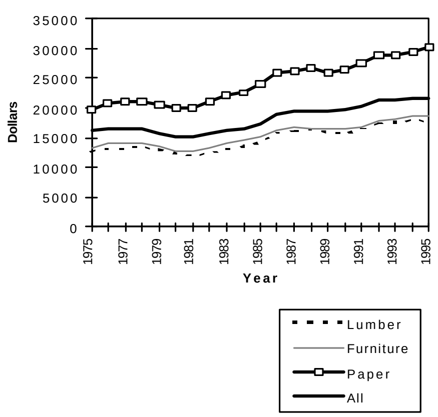

Figure 4. Real wages per job in lumber and wood products, furniture and fixtures, paper and allied products, and all sectors, 1975-1995. (Source: Department of Labor, unemployment insurance database, ES-202)

CONCLUSIONS

Forest industry has been an important contributor to the economy of the MAIA region providing an average of a quarter million jobs (2.03% of all wage employment) and generating $4.5 billion in wages and salaries each year between 1975-1995. However, with the exception of SIC 24 (lumber and woods products) in Delaware, West Virginia, and Pennsylvania and SIC 25 (funiture and fixtures) in Delaware, the forest industry sector is not growing as rapidly as the rest of the MAIA economy and several states have experienced negative rates of growth in forest industry sectors. As a result, the share of employment in forest industries declined during the last two decades in all states except West Virginia and Delaware. Likewise, growth in wage and salary income in the forest industries lagged the rest of the MAIA economy between 1975-1995. With the exception of the paper and allied products industry, wages per job in forest industry were 14-18% lower than the average wage for the entire economy. If recent trends continue, forest industry will continue to be an important source of employment and income for parts of some states in the MAIA region; however, forest industry's importance relative to the entire Mid-Atlantic economy will continue to decline in the 21st century.

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