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ARKANSAS'

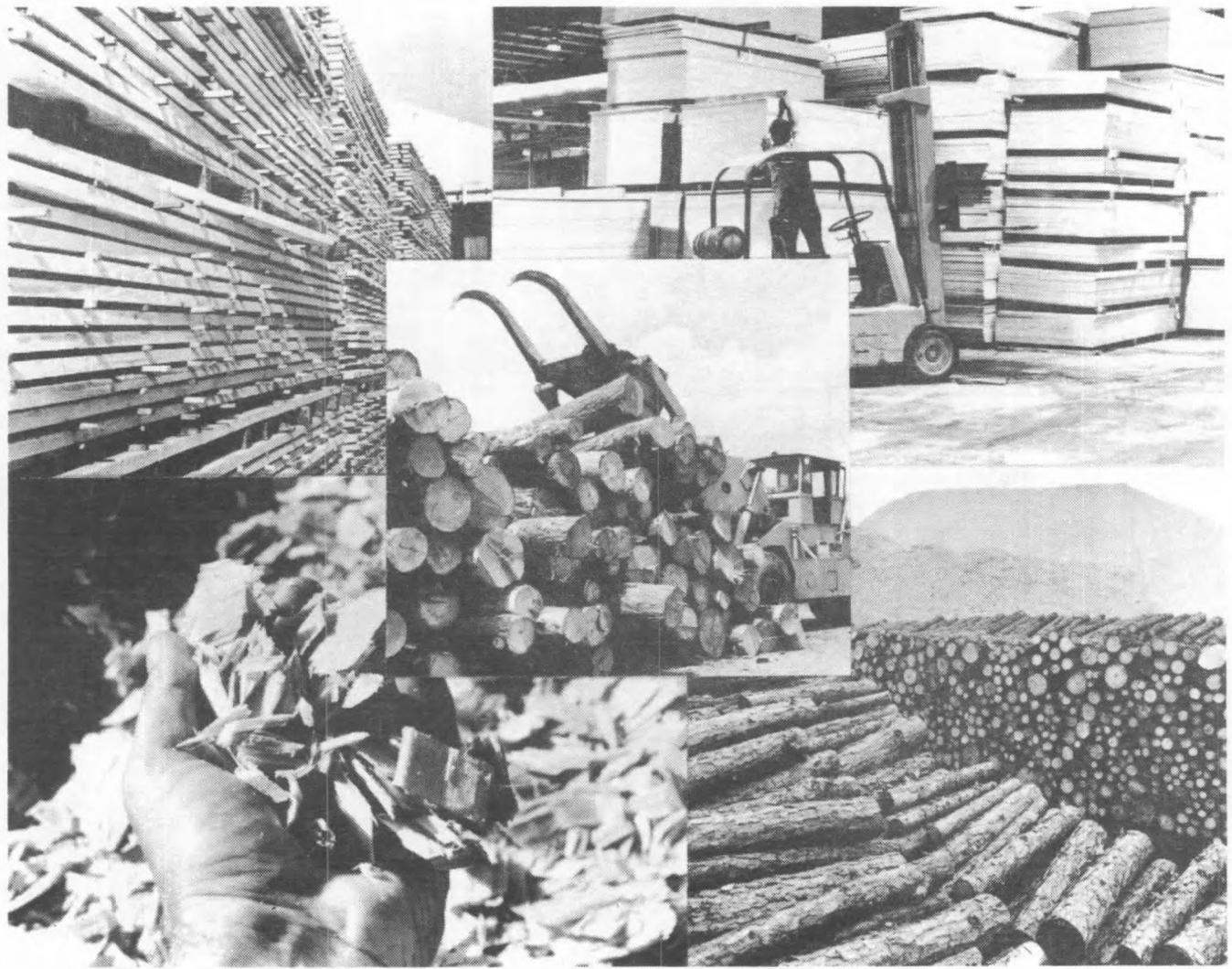
Forest Products Industry:

Performance and Contribution

to the State's Economy,

1970 to 1980

Con H Schallau, Wilbur R. Maki, Bennett B. Foster, and Clair H. Redmond



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Abbreviations

States

AL Alabama
AR Arkansas
FL Florida
GA Georgia
KY Kentucky
LA Louisiana
MS Mississippi
NC North Carolina
OK Oklahoma
SC South Carolina
TN Tennessee
TX Texas
VA Virginia
SO South
US United States

Industries

FPI Forest Products Industry
LWP Lumber and Wood
Products
PAP Paper and Allied
Products
WF Wood Furniture

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Abstract

Schallau, Con H; Maki, Wilbur R.; Foster, Bennett B.; Redmond, Clair H. Arkansas' forest products industry: performance and contribution to the State's economy, 1970 to 1980. Res. Pap. PNW-RP-380. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1987. 22 p.

Accounting for one of every six basic jobs, the forest products industry in Arkansas is the second largest component of the State's economic base. Furthermore, Arkansas is the most timber-dependent State in the South. Between 1970 and 1980, employment increased in the paper and allied products segment but decreased in the wood furniture and the lumber and wood products segments. Arkansas was one of two Southern States that had a smaller share of the Nation's employment in the forest products industry in 1980 than in 1970. This trend resulted partially from a shakeout of the southern pine plywood industry.

Keywords: Forest products industries, economics (forest products industries), employment (forest products industries), Arkansas.

Preface

This report briefly describes Arkansas' forest products industry—its composition, location, evolution, and relation to economic activity elsewhere in the State, the South, and the Nation.

Estimates of employment and earnings shown in this report were derived from U.S. Department of Commerce data. All references to dollar amounts are in constant 1977 dollars.

This is one in a series of reports for each of the 13 Southern States. These reports are companions to an analysis of the interregional competition in the forest products industries of the South and the Pacific Northwest.

Highlights

- Arkansas is the most timber-dependent State in the South. The forest products industry, which accounts for one of every six basic jobs, is the second largest component of Arkansas' economic base.
- Despite modest growth in employment, value added by the forest products industry increased substantially between 1972 and 1977.
- Value added increased by 17 percent; paper and allied products experienced the most growth and wood furniture the least.
- The paper and allied products segment had the highest productivity in Arkansas' forest products industry. Productivity per worker hour was almost 50 percent greater than the average for the State's forest products industry. The lumber and wood products segment experienced the largest gain in productivity between 1972 and 1977.
- The forest products industry is, in general, more important in the southern half of the State than elsewhere. In the southern half, the forest products industry grew in importance between 1970 and 1980, unlike the situation in the rest of the State.
- Between 1970 and 1980, employment in the forest products industry increased in every Southern State except Arkansas and Louisiana. Moreover, the Southern States also increased their share of the Nation's employment in the forest products industry, and all but Louisiana increased their share of earnings.

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**The Forest Products
Economy of Arkansas
The State's Work Force**

Arkansas' estimated full- and part-time work force in 1980 was comprised of about 981,000 employees and proprietors (see appendix 1, table 1, for sources of employment and earnings data). Arkansas' work force grew significantly faster between 1970 and 1980 than did the national average (27.3 versus 22.3 percent). Total earnings—wage and salary payments and proprietorial income—grew much faster than the national average. Measured in constant 1977 dollars, the State's earnings increased by 44.6 percent compared with 27.4 percent for the Nation. As can be seen in the following tabulation, manufacturing, services, retail trade, and State and local government were the State's four largest employer categories:

<u>Employers</u>	<u>Percent of total employment, 1980</u>	
	<u>Arkansas</u>	<u>U.S.</u>
Major industries:		
Manufacturing (including forest products industry ^{1/})	21.3	19.2
Services	14.5	18.2
Retail trade	12.3	14.2
State and local government	12.1	12.6
Agriculture	10.6	4.4
Self-employed	8.6	6.6
Transportation, communication, and public utilities	4.4	4.8
Wholesale trade	4.0	5.0
Construction	3.8	4.1
Finance, insurance, and real estate	3.2	5.0
Federal military	2.4	2.8
Federal civilian	2.1	2.8
Mining	.5	1.0
 Total ^{2/}	 100.0	 100.0

^{1/}The forest products industry is comprised of (1) lumber and wood products (SIC 24), except mobile homes (SIC 2451); (2) wood furniture manufacturing (SIC 2511, 2512, 2517, 2521, 2541); and (3) paper and allied products (SIC 26).

^{2/}Sum of parts may not equal totals because of rounding.

Components of the State's Economic Base

Along with total employment there is another and perhaps more important way to judge an industry's contribution to Arkansas' economy. For the State's economy to grow and develop, it must attract new dollars so residents can buy goods and services produced elsewhere. The industries that export products and services beyond local boundaries (that is, to elsewhere in the State, to other States, and to the world) and bring in new dollars, constitute the areas' economic base. Generally speaking, most manufacturing employment is classified as "economic base" (or "basic"); service or residentiary employment (for example, barber shops, realty firms, schools, and local government) is geared primarily to producing for local needs. Some services may, however, be basic. Furthermore, a particular industry may qualify as basic at the local level but not at the State level. Federal military, therefore, qualifies as a basic industry.

Residentiary employment is supported by the economic base. Money flowing in provides income for wage earners and entrepreneurs to spend on locally purchased goods and services. In most cases, the economic growth of a region is dependent on the success of its economic base.

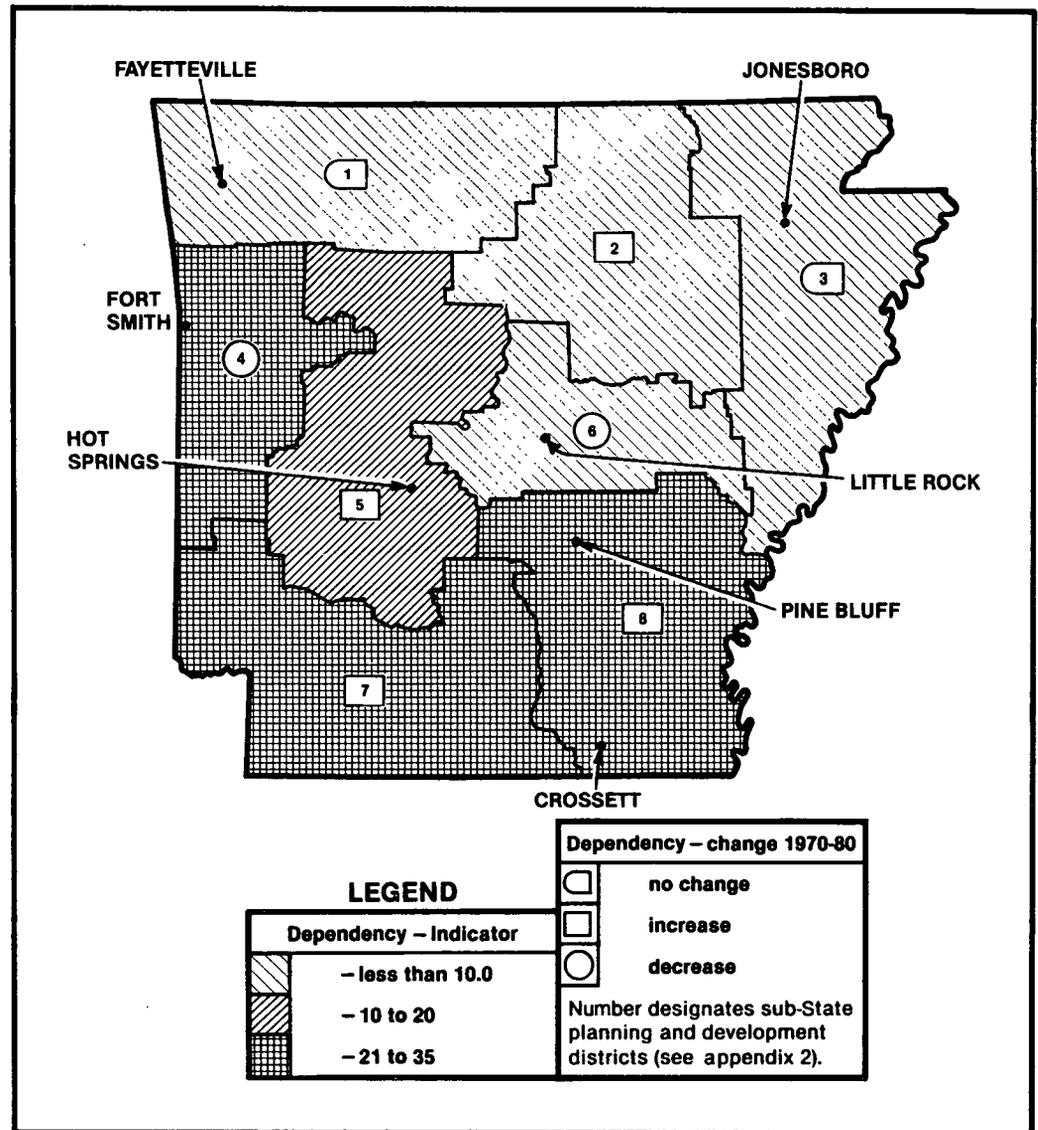
We used the excess employment technique to identify the industries that comprise Arkansas' (or sub-State district's) economic base. This approach accepts the national distribution of employment among industries as a norm. Any industry with employment in excess of this norm is considered to be producing for export markets outside the State (or sub-State district) and is part of Arkansas' economic base. The percentage of Arkansas' excess employment served as an indicator of the State's dependency on a particular industry for generating new dollars from outside the State (table 2 shows how excess employment and industry dependency indicators for Arkansas were calculated).

In 1980, seven industries accounted for 91.4 percent of the State's excess employment—that is, its economic base (see tabulation below). Although these same industries accounted for about the same share (93.3 percent) in 1970, the change in shares of certain individual industries is noteworthy. In 1970, agriculture and food and kindred products accounted for about 60 percent of the State's basic employment. By 1980, they accounted for only 53 percent. Meanwhile, the combination of the forest products industry and the self-employed components of the economic base increased in importance. Many in the self-employed component are involved in logging, hauling, and other forest products industry activities.

<u>Economic base industries</u>	<u>Dependency indicator</u>	
	<u>1970</u>	<u>1980</u>
	(Percent of economic base)	
Agriculture	54.0	42.0
Forest products	17.0	16.6
Self-employed	10.4	13.6
Food and kindred products	6.7	11.5
Leather and leather products	3.8	3.5
Electrical machinery	.1	2.6
Railroad transportation	<u>1.3</u>	<u>1.6</u>
Subtotal	93.3	91.4
All other industries	<u>6.7</u>	<u>8.6</u>
Total	100.0	100.0

**Geographical Importance
of the State's Forest
Products Industry**

The contribution of the forest products industry to Arkansas' economic base varies considerably among sub-State districts (see appendix 2 for a listing of counties by district). The industry is least important in the northwestern and northeastern districts. The two southern-most districts were not only more timber dependent than most of the remainder of the State, but also were more timber dependent in 1980 than in 1970.



Source: Sub-State estimates for 1970 and 1980 were derived from unpublished county data series provided by the U.S. Department of Commerce, Regional Economic Information System, Washington, DC, and from the Department's *County Business Patterns*. The numbers designate sub-State districts corresponding to the geographical classification of counties as shown in appendix 2.

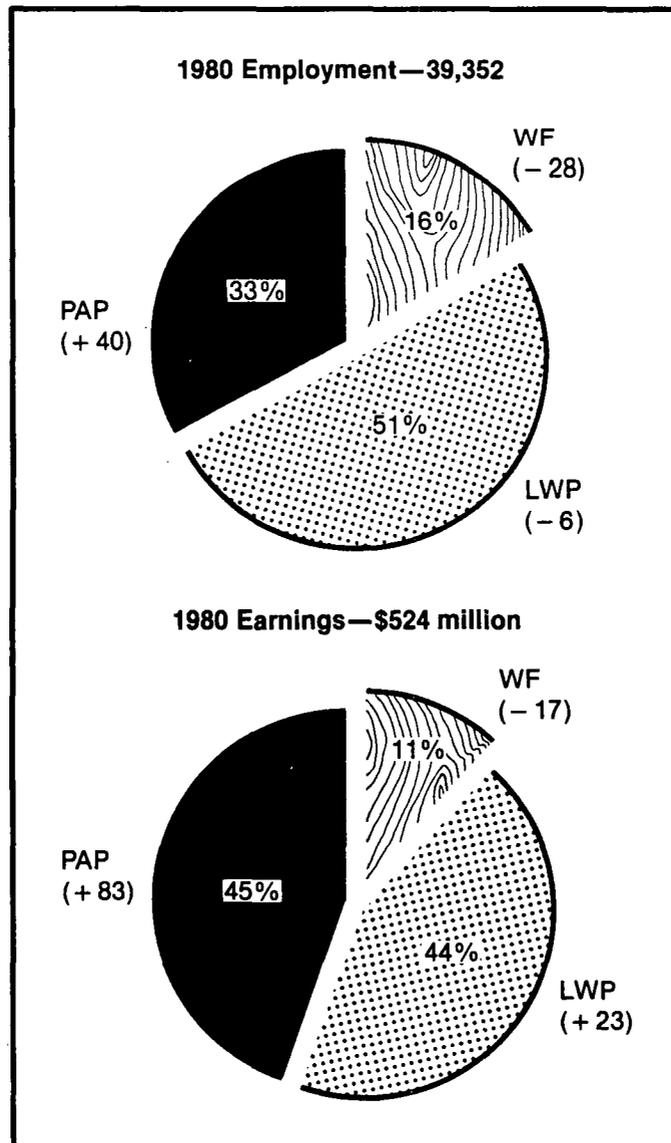
Composition of the State's Forest Products Industry

Arkansas' forest products industry is comprised of paper and allied products, lumber and wood products (not including mobile homes), and wood furniture manufacturing. Employment decreased in two of the three segments between 1970 and 1980. This decrease reflects, in part, the closure of older, more labor-intensive sawmills and a shakeout in the southern pine plywood industry.^{3/}

In 1980, lumber and wood products accounted for the largest share of about 39,000 workers employed by Arkansas' forest products industry. The share of 1980 earnings for paper and allied products was slightly larger than that for lumber and wood products.

While employment increased appreciably in paper and allied products between 1970 and 1980, it decreased in the other two segments of the industry. Earnings in the paper and allied products segment came close to doubling during the 1970's. Meanwhile, lumber and wood products increased by nearly 25 percent.

^{3/}Shakeout is one of five fundamental stages of product-market evolution: development, growth, shakeout, maturity-saturation, and decline. See David A. Cleaves and Jay O'Laughlin. 1985. "Forest inventory, plant location and company strategies." In: Proceedings of the 1985 Southern Forest Economic Workers (SOFEW) workshop; 1985 March 13-15; Athens, GA. Athens GA: University of Georgia; p. 35-43.

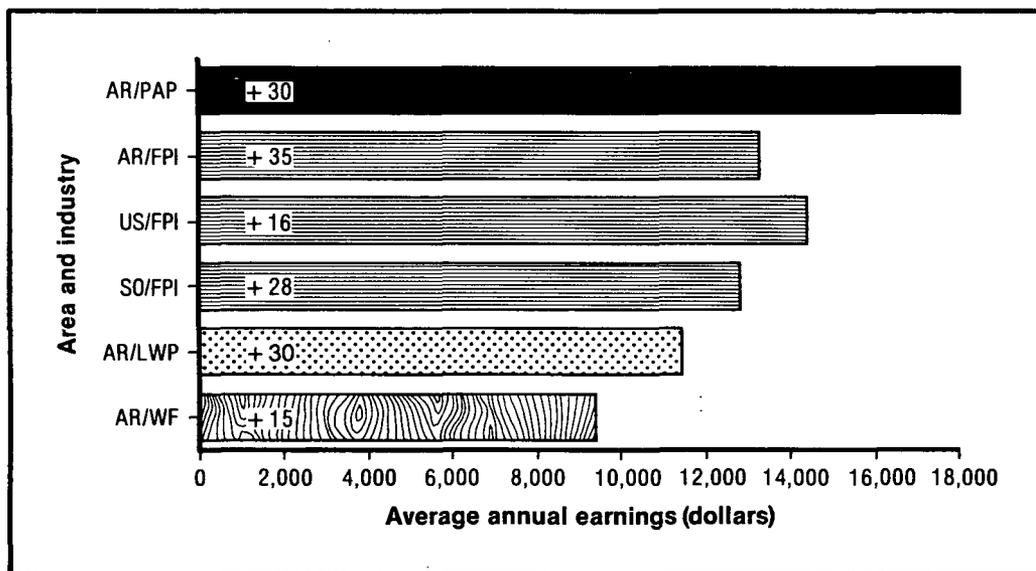


Numbers in parentheses show percentage of change from 1970 to 1980.

Average Annual Earnings per Worker

Average annual 1980 earnings per worker in the paper and allied products segment were greater than were earnings in the other two segments of the forest products industry. Higher average skill levels, capital investment per worker, and unions account for this difference. Earnings in the wood furniture industry were more than half of those for paper and allied products and were significantly below the average for all forest products industries in the South and the United States.

The rate of growth in earnings was greater for Arkansas' forest products industry than for the South and the Nation. The difference resulted from the growth in earnings of both the paper and allied products and lumber and wood products segments. The rate of change for wood furniture was less than that of the United States and less than that of the forest products industry in the South.

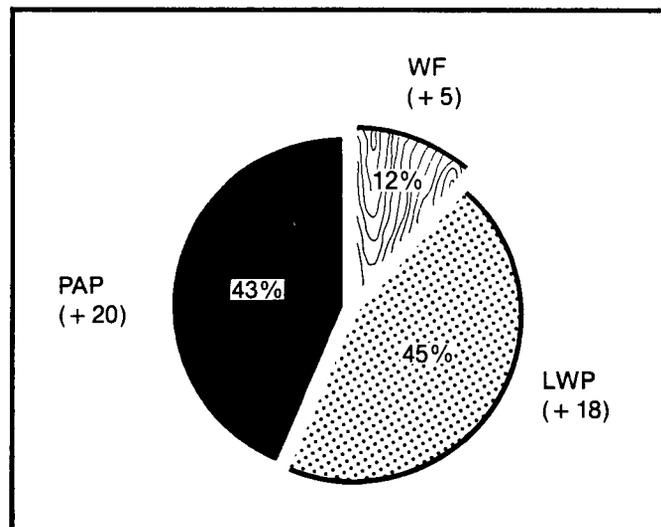


Numbers in bars show percentage of change from 1970 to 1980.

Value Added by the Forest Products Industry

Value added by manufacturing represents income payments made directly to workers and business owners. It is equal to the value of shipments less the cost of materials, parts, supplies, fuel, goods purchased for resale, electric energy, and contract work. Unlike value of shipments, value added includes only the economic contributions of the State's forest products industry. Consequently, value added by manufacturing is considered a better monetary gauge of the relative economic importance of a manufacturing industry. In 1977, lumber and wood products had the largest share of the \$940 million of value added by Arkansas' forest products industry.

Despite modest growth in employment, value added by the forest products industry increased substantially between 1972 and 1977. Value added increased by 17 percent; paper and allied products experienced the most growth and wood furniture the least.



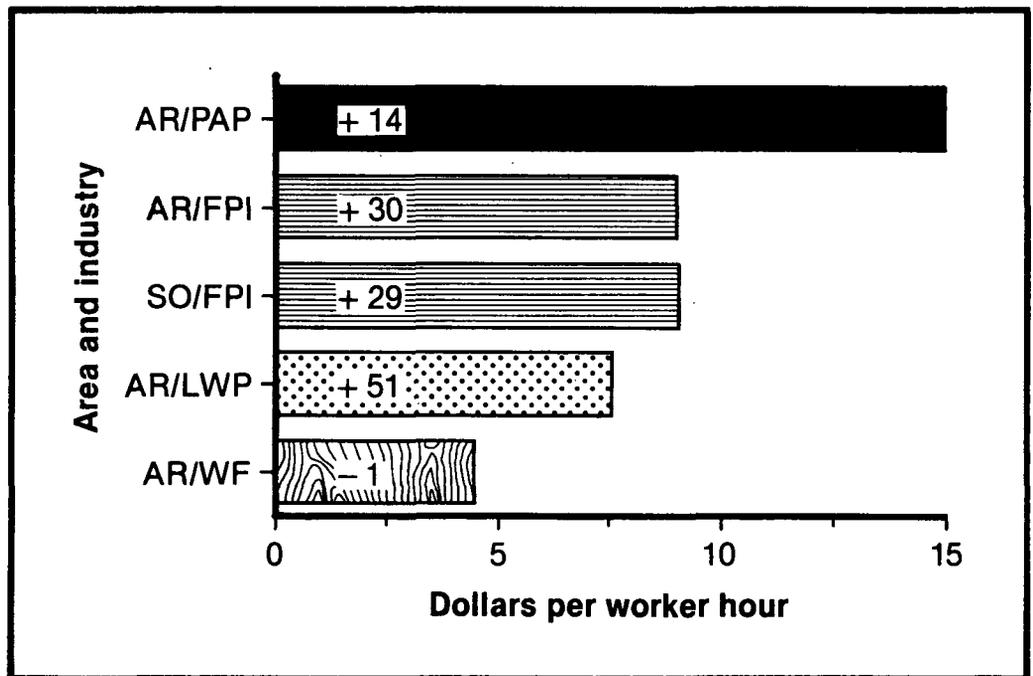
Numbers in parentheses show percentage of change from 1972 to 1977.

Capital Productivity

Increases in productivity are necessary for an industry to remain competitive in the marketplace. The productivity of capital of an industry is measured in terms of value added minus payrolls per worker hour—VAMP (see table 3 for an explanation of how productivity was calculated for Arkansas' forest products industry). This measure of productivity represents profits before taxes and adjusts for wide differences in payrolls among industries.

Paper and allied products had by far the highest productivity in Arkansas' forest products industry. Productivity per worker hour in this segment was almost 50 percent greater than the average for the State's forest products industry.

The lumber and wood products segment experienced the largest gain in productivity between 1972 and 1977. Paper and allied products is more capital intensive and in the past has attracted considerable investment in new facilities and equipment. As a consequence, its productivity increased despite increased labor costs. During the mid-1970's, however, this segment exhibited a smaller gain in productivity than the average for the forest products industry in the South.

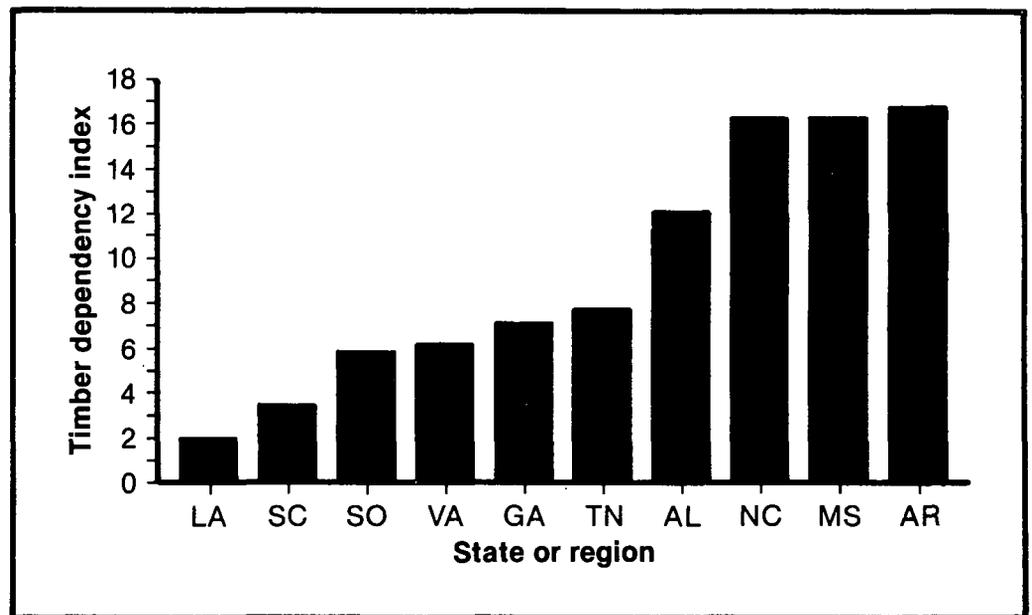


Numbers in bars show percentage of change from 1972 to 1977.

The Forest Products Industry in the South
Importance of the Industry Across the South

The dependency indicators suggest that in 1980 all but four States in the South manufactured forest products in excess of statewide needs. Agriculture continues to dominate Arkansas' basic economy; nevertheless, Arkansas was the most timber-dependent State in the South.

Florida, Kentucky, Oklahoma, and Texas were not self-sufficient with respect to forest products; that is, these States imported more forest products than they exported. Consequently, on net balance, their respective forest products industries did not generate new dollars from the outside. In three States—Arkansas, Mississippi, and North Carolina—the forest products industry accounted for about one of six basic employees.



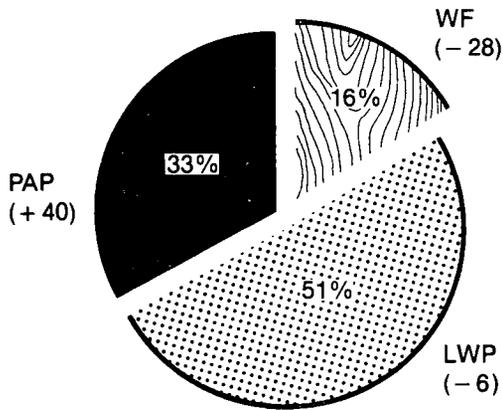
Industry Composition

Both the paper and allied products and lumber and wood products segments accounted for larger shares of 1980 employment and earnings in Arkansas' forest products industry than they did for the South. Employment in the lumber and wood products segment decreased in Arkansas during the 1970's, unlike employment in that segment in most Southern States.

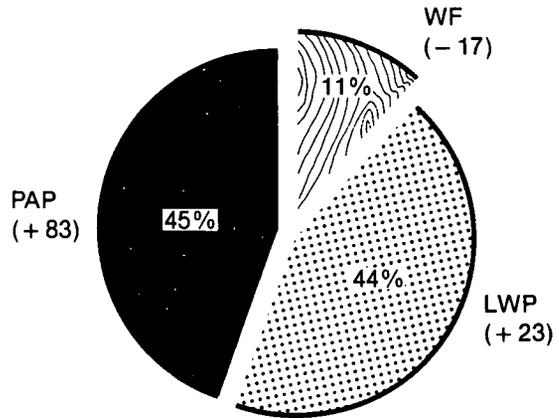
Wood furniture is much less prominent in Arkansas than in the South in general; furthermore, earnings and employment declined during the 1970's. Meanwhile, employment and earnings in the lumber and wood products segment accounted for a larger share of the forest products industry in Arkansas than they did at the national level.

ARKANSAS

1980 Employment—39,352

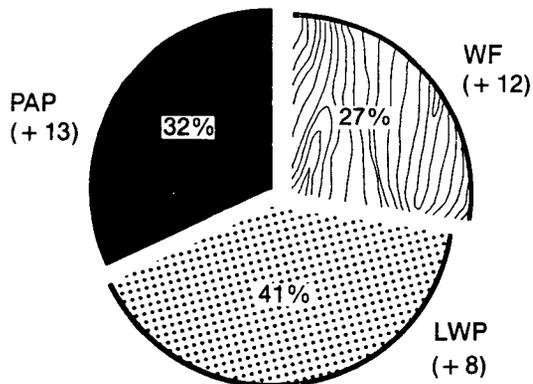


1980 Earnings—\$524 million

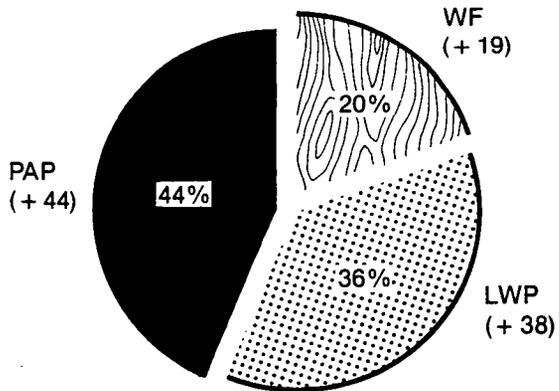


THE SOUTH

1980 Employment—620,567

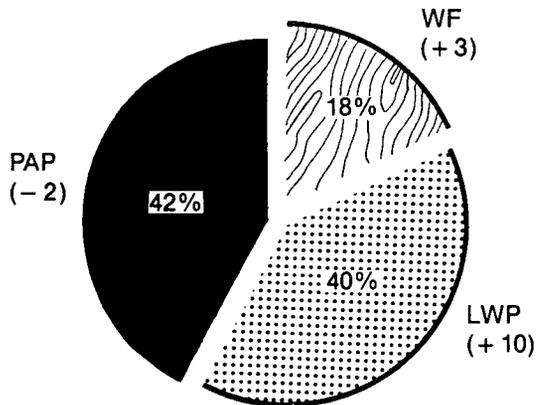


1980 Earnings—\$7.96 billion

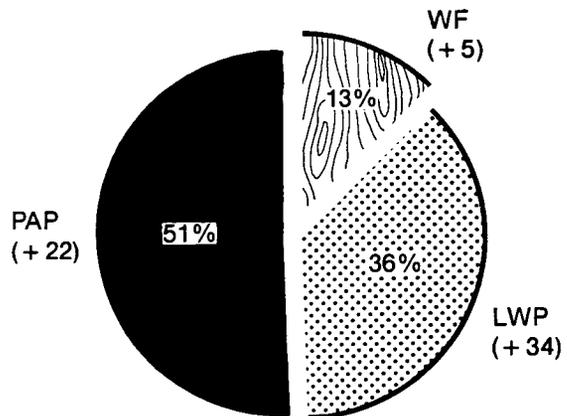


UNITED STATES

1980 Employment—1,634,000



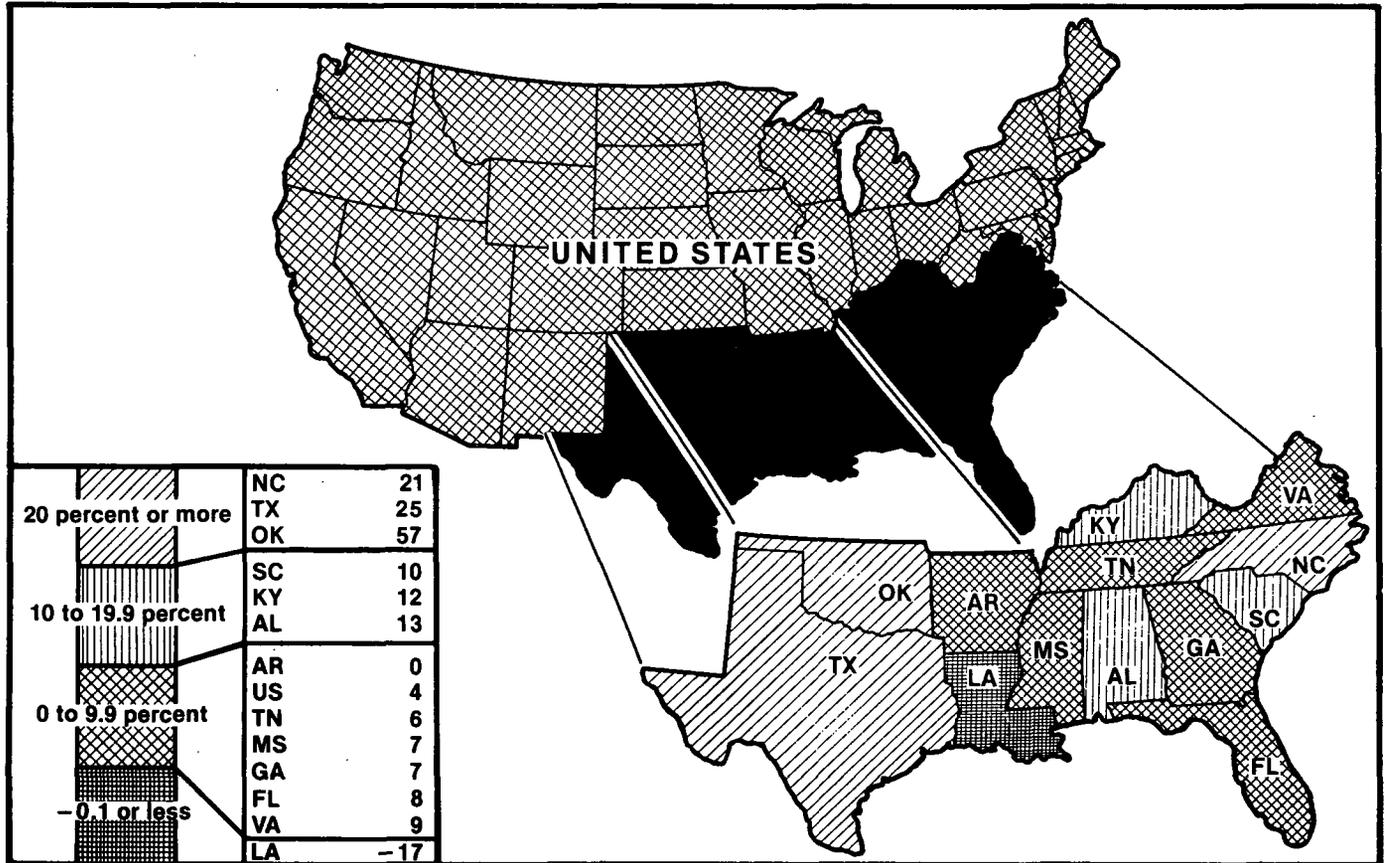
1980 Earnings—\$23.65 billion



Numbers in parentheses show percentage of change from 1970 to 1980.

Growth of Employment

Employment in the forest products industry in each of the Southern States, except Arkansas and Louisiana, grew faster between 1970 and 1980 than did the U.S. counterpart. Employment in two States—Oklahoma and Texas—grew faster than the all-industry average of 22.3 percent.

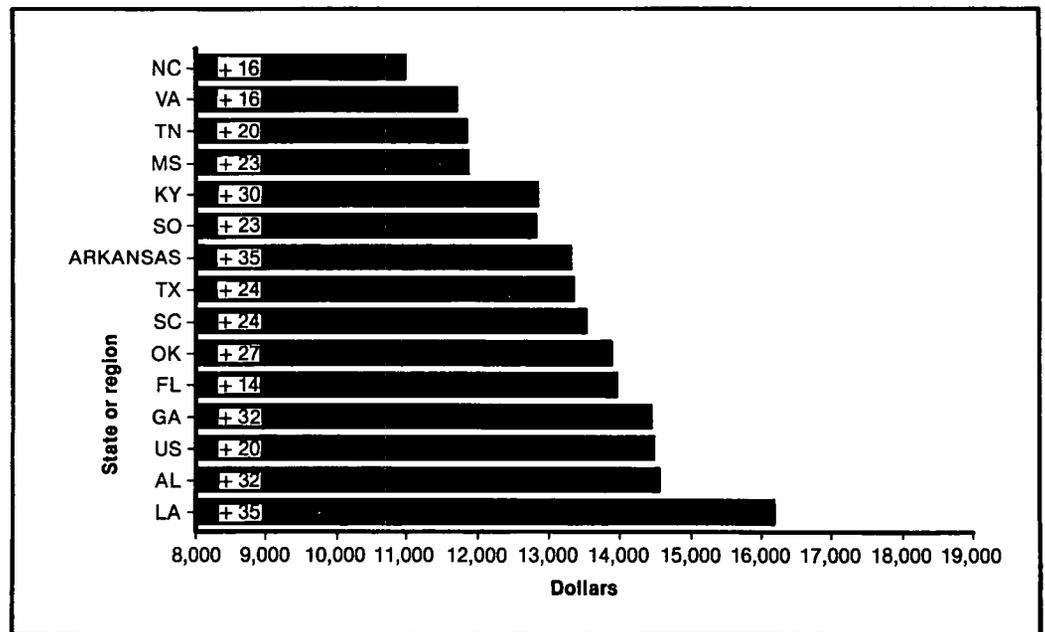


Average Annual Earnings

Average annual earnings per worker in the forest products industry differed significantly by State in 1980: about \$5,000 separated the State with the highest (Louisiana) from the State with the lowest (North Carolina). Pulp and allied products manufacturing, which has traditionally paid higher wages than have other segments of the forest products industry, dominated Louisiana's forest products industry. Wood furniture, which has paid lower wages, dominated North Carolina's industry.

Average annual earnings in the forest products industry in Arkansas were slightly above the average for all States in the South but below the average for the United States. Furthermore, earnings increased much faster in Arkansas than in either the South or the Nation.

In general, paper and allied products dominated the forest products industry in the States with the highest average annual earnings. This relation reflects a higher level of job skills and unions in pulp and paper manufacturing. Wages, by and large, were the lowest in States where the labor-intensive wood furniture industry was more important.



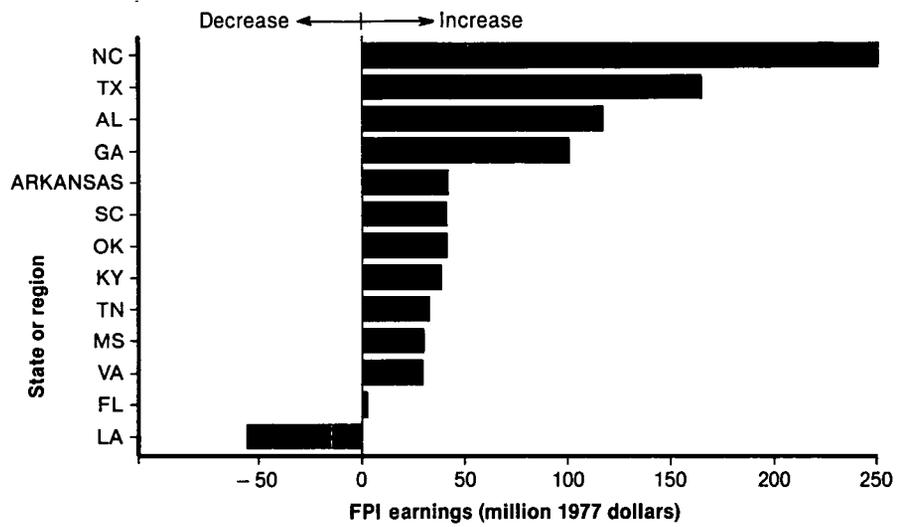
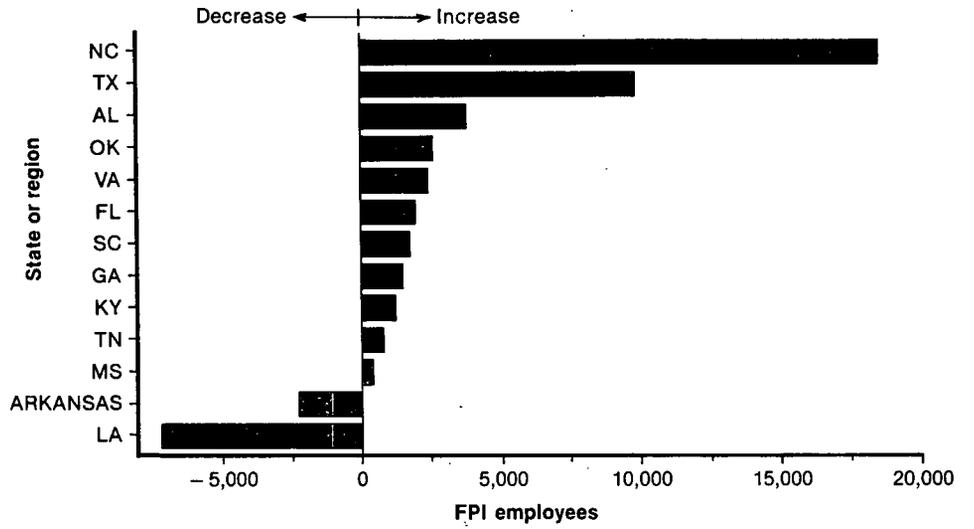
Numbers in bars show percentage of change from 1970 to 1980.

Shift in Employment and Earnings

The regional shift shows how much more or less employment and earnings a State would have had in the forest products industry in 1980 had it grown at the national rate. For example, Arkansas had about 2,300 fewer employees in 1980 than it would have had if its forest products industry had grown at the national rate.

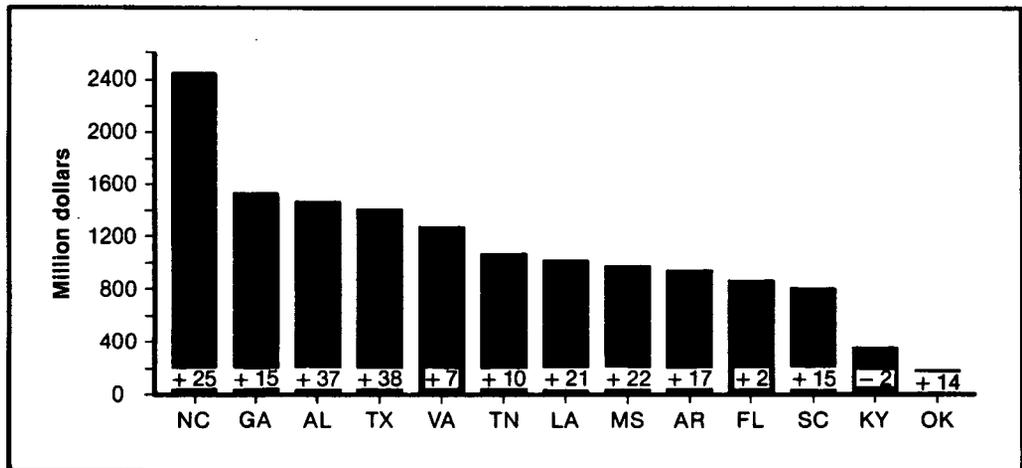
Between 1970 and 1980, total employment in the forest products industry in the United States remained constant but increased in every Southern State except Louisiana. All but Arkansas and Louisiana increased their share of the Nation's forest products industry employment, and all but Louisiana increased their share of earnings.

Increased shares of employment and earnings reflect the comparative advantage the South's forest products industry enjoyed over this industry in the rest of the Nation. Several factors (for example, relatively lower labor costs, lower raw materials costs, and closer proximity to markets) might account for a region's comparative advantage, although adverse trends in one factor need not reduce a region's advantage. In the South, for instance, increasing labor costs need not adversely affect the regions comparative advantage if increased capital or labor productivity offsets higher labor costs.



Value Added by the Forest Products Industry

In 1977, the forest products industry of North Carolina produced more value added than any other State in the South. Georgia was second among the 13 Southern States, and Arkansas was ninth. Texas was not only one of the leading States in terms of total value added, but also led the South in the change in value added between 1972 and 1977. In Arkansas, the change in value added was less than the average rate for the region (19 percent). One State, Kentucky, produced less value added in 1977 than in 1972.



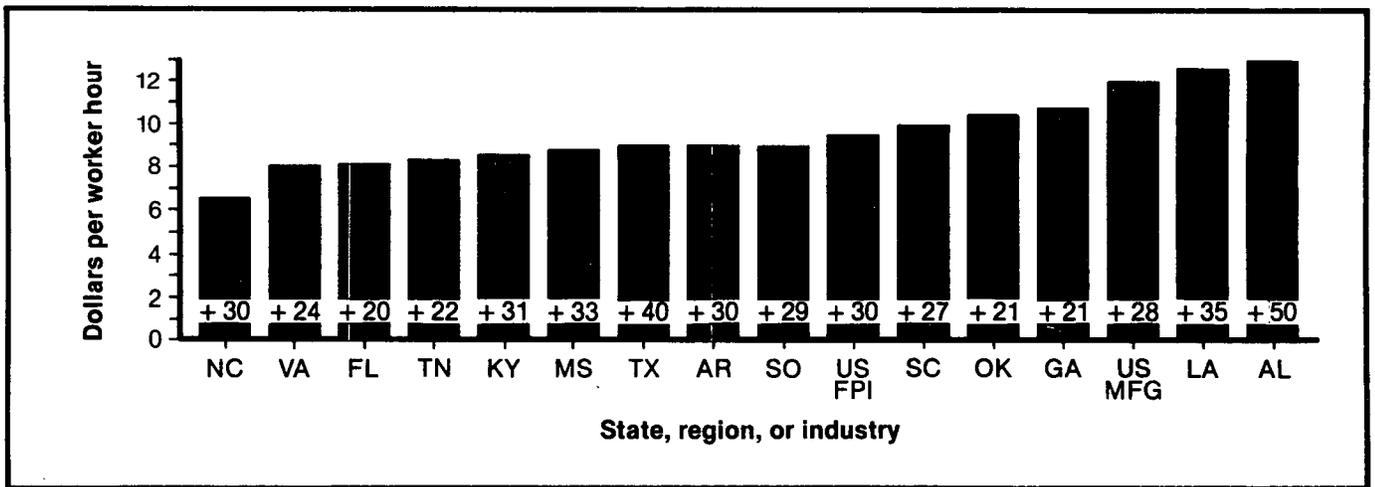
Numbers in bars show percentage of change from 1972 to 1977.

Capital Productivity

The paper and allied products segment, which is more capital-intensive and, therefore, more susceptible to technological change than are other segments of the forest products industry, exhibited the highest productivity within the forest products industry. Wood furniture, on the other hand, is the most labor-intensive of the three. North Carolina, for example, produced more value added than any other State in the South, but the productivity of its forest products industry in 1977 was the lowest. This reflects the dominant role of labor-intensive wood furniture manufacturing in North Carolina.

Increases in productivity exceeded increases in payroll per worker between 1972 and 1977 for all the Southern States. This relation is, in part, responsible for the South's comparative advantage in the forest products industry.

In 1977, productivity of Arkansas' forest products industry was equal to the average for the 13 Southern States. Between 1972 and 1977, productivity increased by 30 percent. This increase, which tied for sixth highest in the South, was achieved despite Arkansas' average annual wages being higher than the average for the region.



Numbers in bars show percentage of change from 1972 to 1977.

Acknowledgment

Many helpful suggestions of several reviewers were incorporated in this research report. The project was funded in part by USDA Forest Service, Resource Program and Assessment Staff, and State and Private Forestry, Area Planning and Development, State Planning for Forest Resources.

Appendix 1 Tables

Table 1—Total labor and proprietorial employment and income, by industry, Arkansas, 1980^{1/}

Industry number	Industry	Employees	Total income
		<i>Number</i>	<i>Thousand 1977 dollars^{2/}</i>
Wage and salary			
1	Agriculture	29,489	632,453
2	Agricultural services, forestry, and fisheries	4,888	45,883
3	Coal mining	134	2,976
4	Oil and gas extraction	3,215	72,515
5	Metal mining	478	8,451
6	Nonmetallic minerals	1,330	17,856
7	Construction	37,546	562,182
8	Food and kindred products	32,565	329,705
9	Tobacco	0	0
10	Textile mill products	3,923	40,624
11	Apparel and other textiles	13,453	92,753
12	Paper and allied products	12,920	233,719
13	Printing and publishing	9,141	94,159
14	Chemical and allied products	7,569	138,668
15	Petroleum refining	1,591	31,864
16	Rubber and miscellaneous plastics	7,882	101,270
17	Leather and leather products	7,324	55,318
18	Lumber and wood products, except mobile homes	19,930	228,419
19	Mobile homes	587	6,728
20	Wood furniture	6,502	61,381
21	Other furniture and fixtures	3,328	31,417
22	Stone, clay, and glass products	5,011	64,683
23	Primary metals	7,847	130,366
24	Fabricated metals	13,373	170,261
25	Machinery, excluding electrical	13,657	167,288
26	Electrical machinery	23,240	277,424
27	Transportation equipment, except motor vehicles	4,035	54,196
28	Motor vehicles	3,194	41,159
29	Ordnance	3/—	3/—
30	Instruments and related equipment	7,991	79,903
31	Miscellaneous manufacturing	4,154	40,414
32	Railroad transportation	7,209	147,330
33	Trucking and warehousing	13,768	216,495
34	Local transit	958	9,812
35	Air transportation	1,009	14,420

See footnotes at end of table.

Table 1—Total labor and proprietorial employment and income, by industry, Arkansas, 1980^{1/} (continued)

Industry number	Industry	Employees	Total income
			<i>Thousand</i>
			<i>1977</i>
		<i>Number</i>	<i>dollars^{2/}</i>
Wage and salary			
36	Pipeline transportation	319	6,227
37	Transportation services	461	12,788
38	Water transportation	307	4,551
39	Communications	10,719	188,021
40	Electrical, gas, and sanitation services	8,958	147,016
41	Wholesale trade	39,726	529,792
42	Retail trade	120,419	959,864
43	Banking	11,815	127,668
44	Other credit agencies	4,311	70,981
45	Insurance	8,526	138,495
46	Real estate and combinations	6,424	85,498
47	Hotel and other lodging	7,868	46,455
48	Personal, miscellaneous business, and repair services	21,070	215,057
49	Auto repair service	4,150	62,885
50	Amusement	4,521	27,554
51	Motion pictures	850	3,713
52	Private households	23,106	51,876
53	Medical and other health	43,287	536,131
54	Private education	4,247	32,579
55	Nonprofit organizations	26,496	146,131
56	Miscellaneous services	6,933	176,860
57	Federal civilian	20,863	298,621
58	Federal military	23,635	132,041
59	State and local government	118,832	978,773
Proprietorial			
60	Farm proprietors	69,920	542,736
61	Nonfarm proprietors	84,274	765,877
	Total	981,278	10,493,992

^{1/}Source of data for this table for Arkansas, other States of the South, and the United States: unpublished data, U.S. Department of Commerce, Regional Economics Measurements Division, Regional Economic Information System (REIS), Washington, DC, 1982. Unpublished data used by the U.S. Department of Commerce in preparing their *County Business Patterns* (CBP) series on employment and payroll were used to differentiate wood-related from nonwood-related employment and earnings. For example, CBP data were used to separate mobile homes (no. 19) from the lumber and wood products (no. 18) industry. Wood furniture (no. 20) was similarly separated from other furniture and fixtures (no. 21).

^{2/}The Personal Consumption Expenditure (PCE) deflator, 1977 = 100, was used to deflate nominal dollars.

^{3/}Included with fabricated metals and other related industries.

Table 2—Calculation of 1980 dependency indexes for Arkansas

(In percent)

Industry	Employment		Arkansas excess employment ^{1/}	Dependency index ^{2/}
	Arkansas	United States		
Agriculture	3.51	1.46	2.05	11.72
Agricultural services, forestry, and fisheries	.58	.62	—	—
Farm proprietors	8.33	3.03	5.30	30.28
Coal mining	.02	.27	—	—
Oil and gas extraction	.38	.60	—	—
Metal mining	.06	.11	—	—
Nonmetallic minerals	.16	.14	.02	.12
Construction	4.47	4.74	—	—
Food and kindred products	3.88	1.87	2.01	11.49
Tobacco	—	.07	—	—
Textile mill production	.47	.93	—	—
Apparel and other textiles	1.60	1.39	.22	1.24
Paper and allied products	1.54	.76	.78	4.48
Printing and publishing	1.09	1.37	—	—
Chemical and allied products	.90	1.22	—	—
Petroleum refining	.19	.22	—	—
Rubber and miscellaneous plastics	.94	.80	.14	.82
Leather and leather products	.87	.26	.61	3.50
Lumber and wood products, except mobile homes	2.37	.71	1.67	9.52
Mobile homes	.07	.05	.02	.11
Wood furniture	.77	.32	.45	2.58
Other furniture and fixtures	.40	.19	.21	1.19
Stone, clay, and glass products	.60	.73	—	—
Primary metals	.93	1.26	—	—
Fabricated metals	1.59	1.77	—	—
Machinery, excluding electrical	1.63	2.73	—	—
Electrical machinery	2.77	2.31	.46	2.61
Transportation equipment, except motor vehicles	.48	1.21	—	—
Motor vehicles	.38	.87	—	—
Instruments and related equipment	.95	.77	.18	1.02
Miscellaneous manufacturing	.49	.47	.03	.17
Railroad transportation	.86	.58	.27	1.57
Trucking and warehousing	1.64	1.40	.24	1.37
Local transit	.11	.29	—	—
Air transportation	.12	.50	—	—
Pipeline transportation	.04	.02	.02	.09
Transportation services	.05	.22	—	—
Water transportation	.04	.23	—	—
Communications	1.28	1.48	—	—
Electrical, gas, and sanitation services	1.07	.90	.16	.94
Wholesale trade	4.73	5.79	—	—
Retail trade	14.35	16.50	—	—
Banking	1.41	1.72	—	—
Other credit agencies	.51	.99	—	—

See footnotes at end of table.

Table 2—Calculation of 1980 dependency indexes for Arkansas (continued)

(In percent)

Industry	Employment		Arkansas excess employment ^{1/}	Dependency index ^{2/}
	Arkansas	United States		
Insurance	1.02	1.89	—	—
Real estate and combinations	.77	1.16	—	—
Hotel and other lodging	.94	1.20	—	—
Personal, miscellaneous business, and repair services	2.51	4.69	—	—
Auto repair service	.49	.63	—	—
Amusement	.54	.84	—	—
Motion pictures	.10	.24	—	—
Medical and other health	5.16	5.71	—	—
Private education	.51	1.47	—	—
Nonprofit organizations	3.16	3.01	.15	.83
Miscellaneous services	.83	1.63	—	—
Federal civilian	2.49	3.27	—	—
Federal military	2.82	2.68	.14	.77
Nonfarm proprietors	10.04	7.66	2.38	13.59
Total ^{3/}	100.00	100.00	17.51	100.00

^{1/}Arkansas employment minus U.S. employment. Figures may not be exactly equal to Arkansas minus U.S. because of rounding. Dashes signify no excess employment.

^{2/}Individual industry excess employment expressed as a percentage of Arkansas' total excess employment (sum of column 4).

^{3/}Sum of parts may not equal totals because of rounding.

**Table 3—Value added, hours worked, payroll, and capital productivity,^{1/}
Arkansas forest products industry, 1977^{2/}**

Industry	Value added	Payroll	Hours worked	Productivity	Productivity change, 1972-77
	---- \$Million ----		Million	\$VAMP per hour	Percent
Lumber and wood products	422.3	171.3	33.5	7.49	50.87
Wood furniture	108.0	54.0	12.1	4.48	-56
Paper and allied products	409.7	151.5	17.3	14.92	14.01

^{1/}Productivity equals value added minus payroll (VAMP) divided by hours worked. For a discussion of VAMP, see W. Charles Sawyer and Joseph A. Ziegler. 1980. "The use of VAMP shift as a predictive model." Unpublished paper presented at the annual meeting of the Western Regional Science Association, Monterey, California.

^{2/}Source: U.S. Bureau of the Census, Census of Manufactures, for 1972 and 1977, Arkansas and the United States, available in 1976 and 1980, respectively. In the few instances where data were not available for some subindustry segments, the distribution of the number of establishments was used to estimate nondisclosures.

Appendix 2
Arkansas Counties by
Sub-State Planning and
Development Districts

District code	Counties
1	Baxter, Benton, Boone, Carroll, Madison, Marion, Newton, Searcy, Washington
2	Cleburne, Fulton, Independence, Izard, Jackson, Sharp, Stone, Van Buren, White, Woodruff
3	Clay, Craighead, Crittenden, Cross, Greene, Lawrence, Lee, Mississippi, Phillips, Poinsett, Randolph, St. Francis
4	Crawford, Franklin, Logan, Polk, Scott, Sebastian
5	Clark, Conway, Garland, Hot Spring, Johnson, Montgomery, Perry, Pike, Pope, Yell
6	Faulkner, Lonoke, Monroe, Prairie, Pulaski, Saline
7	Calhoun, Columbia, Dallas, Hempstead, Howard, Lafayette, Little River, Miller, Nevada, Ouachita, Sevier, Union
8	Arkansas, Ashley, Bradley, Chicot, Cleveland, Desha, Drew, Grant, Jefferson, Lincoln

Schallau, Con H; Maki, Wilbur R.; Foster, Bennett B.; Redmond, Clair H. Arkansas' forest products industry: performance and contribution to the State's economy, 1970 to 1980. Res. Pap. PNW-RP -380. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; 1987. 22 p.

Accounting for one of every six basic jobs, the forest products industry in Arkansas is the second largest component of the State's economic base. Furthermore, Arkansas is the most timber-dependent State in the South. Between 1970 and 1980, employment increased in the paper and allied products segment but decreased in the wood furniture and the lumber and wood products segments. Arkansas was one of two Southern States that had a smaller share of the Nation's employment in the forest products industry in 1980 than in 1970. This trend resulted partially from a shakeout of the southern pine plywood industry.

Keywords: Forest products industries, economics (forest products industries), employment (forest products industries), Arkansas.

The Forest Service of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives — as directed by Congress — to provide increasingly greater service to a growing Nation.

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