TIMBER DEPENDENT COMMUNITIES: HOW DO THEY STACK UP?

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Abstract.—Timber dependency was determined by calculating the percent of total income in a county derived from wood products sectors. Socio-economic data provided a general description of these counties. We then compared these counties with rural counties dependent on farming and manufacturing as well as with urban counties. This comparison provided information about whether timber dependent counties are better or worse off, in general, than other rural counties. The analysis also provided information on the special needs and opportunities in timber dependent counties that may be useful in the design of rural forestry policies and in the implementation of development programs.

INTRODUCTION

Historical patterns of resource use created rural communities that depend on extractive use of both publicly and privately owned natural resources. However, recent changes in resource exploitation have disrupted some of these communities. In response, federal and state governments have undertaken various rural development programs designed to assist rural agricultural and timber-dependent communities.

To help implement such programs, we need improved criteria to assess where to spend rural development funds, who to spend it on, and how to measure the success of the program. For forestry and timber related programs, more also needs to be known about what characterizes timber-dependent communities.

Rural development programs are designed to improve rural economies and rural standards-of-living. This study was part of ongoing research that will investigate various methods to measure and analyze (1) economic diversity of rural areas, (2) economic dependency on forests and forest products, (3) social characteristics of rural areas, and, (4) potential responsiveness of rural areas to forest-related rural development projects. The objective of this paper is to identify timber dependent communities in Georgia and correlate this dependency with measures of economic well-being as well as with other measures of economic dependency. Georgia was chosen as a case study because it has a large timber industry, a typical southern resource base, and significant urban and rural areas.

Recent administration and congressional inquiries and laws have increased public awareness of the plight of timber dependent communities, particularly those in the Pacific Northwest. However, the programs being used to address timber dependency are national in scope and will be used to influence rural development in the South, including Georgia. For example, though not a large sum, a total of $243,000 was allocated to the USDA Forest Service Southern Region for forestry related rural development projects in fiscal year 1993. Most of these funds were for industrial planning or scoping projects.

One question that is consistently raised is whether rural development projects should be used to increase or decrease dependency on timber. This is an important question in Georgia, where timber products comprise more than 2 percent of employment, income and total industry output (table 1). In fact, Lindsey (1986) states that forestry sector economic activity will increase faster in Georgia than in the U.S. as a whole over the next decade. In this paper, we address whether higher or lower levels of timber dependency would be desirable in Georgia counties.

This paper first discusses the methods and data used to determine both dependency and economic well-being. The following section compares and summarizes the relationship between timber dependency and other economic dependencies and compares the economic well-being of timber dependent and non-dependent communities. Last, the implications of this case study for timber-related policy options to address rural economic well-being are discussed.

METHODS

Due to both the nature of forestry in Georgia and the limited data on non-wood products from forests, we defined timber

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employment, and the supply of forest products. Unfortunately, timber stand attributes usually are not related to political or Forest Service regional boundaries. Because important hardwood attributes are extremely variable and usually unrelated to political boundaries, examination of hardwood timber issues by use of aggregated data collected over state or multisite areas may lead to spurious conclusions.

To analyze regional timber issues in a consistent manner, individual regions must be somewhat homogeneous with respect to biological and physiologic attributes. Current inventory statistics developed by Forest Service forest inventory and analysis units are designed to be valid at the multicounty survey unit level. However, analysis of timber issues at this survey unit level is impractical because of the number of units that exist in the eastern United States. A more practical size can be developed by aggregating contiguous survey units of similar biological and physiologic attributes. Once these regions are defined, additional data on forest industry production capacity, rate of timber growth, employment, sociological and demographic characteristics, and other pertinent data could be relationally linked to the regional timber data base.

DEVELOPMENT OF HARDWOOD TIMBER REGIONS

The proposed boundaries of the alternative or new timber regions would be based on previously developed Forest Service state survey units. However, these individual units will be combined without consideration of current regional political delineations. The new regions will be based on identifiable characteristics such as physiography terrain, tree quality, species composition and distribution, and other important stand and site attributes that are homogeneous over the potential region.

Under the new regional classification system, Virginia could be divided into three regions (Figure 2). The northern and southern mountain units could be classified into the Appalachian region; the northern and southern Piedmont units could be classified in the eastern Piedmont region; and the Coastal Plains unit could be classified as Coastal Plains region.

The three regions within Virginia would not end at the state line or even the southeastern survey region. As currently developed, the Coastal Plains region extends from the Florida peninsula to sections of Maryland, Delaware, and New Jersey. The Piedmont region includes the Piedmont areas of North Carolina, Virginia, and Maryland. The Appalachian region includes the mountain areas of Virginia, North Carolina, Georgia, Tennessee, Kentucky, all of West Virginia, and potentially the south-central survey unit in Pennsylvania.

SOUTHERN UPLANDS EXAMPLE

As mentioned previously, concerns over hardwood resource issues tend to occur in specific regions. An example of such a situation is occurring in the Southern Uplands region encompassing northeastern Mississippi, northern Alabama, northwestern Georgia, and the eastern half of Tennessee. The primary concern in this region is that hardwood timber supplies may or may not be adequate to meet increasing demands by the hardwood pulp and lumber industries. An additional concern is that a large proportion of the chips produced in this region are being exported to Japan and other Asian markets.

Unfortunately, timber use is changing so quickly in the Southern Uplands region that the forest survey data developed by the Forest Service are insufficient to analyze the current situation. However, analysis of this region using a variety of information from several relational data bases allows the current problem to be put into focus.

At present, our analysis using the regional approach has been accomplished only for data sets for the state of Alabama. However, Alabama lends itself well to demonstration of a relational approval to data analysis. Northern Alabama is part of the Southern Uplands region. This region extends north of the Fall Line boundary of the Gulf Coastal Plain and Piedmont Uplands in Alabama and contains diverse geological formations usually found in predominantly ridge and valley physiography. For our analysis, the entire region is contained in the Forest Survey units of northern and north-central Alabama and is referred to as northern Alabama (Figure 3). About 50 percent of the forest type in this area is classified as oak-hickory compared to 34 percent for the state as a whole.

To analyze these issues, several data bases of information were developed and related to each other as well as to forest inventory statistics for the region. These data bases include hardwood lumber and log production, hardwood pulpwood and chip production, and chip mill and pulp mill capacity and location. Data from a variety of sources were compiled at a county level and aggregated to the forest inventory unit level.

HARDWOOD SAWTIMBER RESOURCES AND PRODUCTION

The most recent forest inventory for Alabama was completed in 1990. The largest land holding group in this region is the nonindustrial private land owner, with nearly 80 percent ownership of forest lands. The volume of hardwood sawtimber estimated on nonindustrial private lands in northern Alabama increased from 5.35 billion board feet in 1982 to 7.8 billion board feet in 1990. These data do not indicate a problem in sawtimber reduction in northern Alabama. If we
dependent communities as counties that were dependent on
wood products manufacturing. Using the 1985 IMPLAN data
base at the county level, we calculated total direct income
in the wood products sectors for all 159 counties. Total income
is defined as the sum of proprietor income and labor income.
All of SIC 24, Lumber and Sawmills (including logging) and
all of SIC 26, Pulp and Paper were included, as was the
wood furniture portion of SIC 25.

The percent of income from all wood products sectors ranged
from 0 to greater than 35 percent of total county income.
The statewide average was 2.5 percent. We used a level of
5 percent to define timber dependency, twice the statewide
average. This value is consistent with the value used by
deVilbias (1992) in determining leading sectors in Rocky
Mountain economic regions. Using this value for rural
counties only, 29 percent (35 out of 121) are timber
dependent (figure 1). In addition, 6 of 38 metropolitan
counties are also considered timber dependent. In the
remainder of this paper, we address primarily the rural
counties.

Manufacturing and farming dependency criteria were
established by the Economic Research Service (ERS) (Bender
et al. 1985, Hady and Ross 1990) for all counties in the U.S.
Counties were designated manufacturing dependent if more
than 30 percent of total direct income is derived from
manufacturing sectors. Farming dependent counties are those
where more than 20 percent of total direct income is derived
from farming activities. Other ERS dependencies include
retirement (where net migration rates of people 60 and over
were 15 or more percent of population 60 and over),
government (more than 25 percent of total income), mining
(more than 20 percent of total income), persistent poverty
(per capita income in the lowest quintile for 1950-1980), and
federal lands (more than 33 percent of total land in 1977 was
in federal ownership). The ERS results for Georgia were also
reported in McNamara and Green (1988). None of these
previous studies included timber dependency measures.

The sector level data in the ERS studies were obtained from
the Bureau of Economic Analysis. In Georgia, 52 of the 121
rural counties were designated as manufacturing dependent,
20 were farming dependent, 22 were retirement destinations,
7 were federal lands dependent, 12 were government
dependent and 4 were mining dependent. The dependency
designations used are not exclusive, for example, a county
may be both farming and manufacturing dependent.
Likewise, in our comparison, a county may be both timber
dependent and manufacturing dependent.

Measures of economic well-being are varied, and the measure
used can significantly affect whether a county can be
classified as well-off or not. While there is evidence that
some measures favor urban over rural areas, there is little
evidence that any of the measures bring a particular bias to
comparisons of rural counties (Reeder 1990). Often, per
capita income (PCI) or unemployment rates are used. PCI is
often considered the most appropriate measure for rural areas,
but can present problems because PCI has less variation than
other measures (Reeder 1990). Measures of unemployment
generally favor providing aid to urban over rural areas.
However, because our analysis excludes urban areas, using
unemployment data should not introduce a bias.

In this paper, we used PCI and unemployment, as well as
several additional socio-economic measures from the 1990
Census of Population and Housing to measure rural standard-
of-living. Our measures included data on high school
graduation rates, percent of persons below poverty level,
percent of housing with inadequate plumbing, percent of
housing older than 50 years (a good proxy for rates of past
economic development), the unemployment rate, and per
capita income.

Different levels of timber dependency were compared to
assess the validity of our 5 percent cut-off for timber
dependency. PCI and unemployment of different levels of
timber dependency counties were compared using Tukey
means tests. The six measures of economic well-being were
then summarized for timber dependent (greater than 5 percent
of total income in wood products sectors) and non-dependent
counties. We also compared PCI and unemployment of
timber dependent counties to other ERS-designated dependent
counties and with urban counties. A final comparison of the
economic measures was made between National Forest
Service (NFS)-adjacent counties and other rural counties.

DISCUSSION

Most of the measures indicate that the least well-off counties
are located in southern Georgia, particularly at and below the
fall line (a physiographic break running from Columbus
through Macon to Augusta). This is consistent with Saunders
(1987), who found that north Georgia is better off than south
Georgia, and that urban areas fare better than rural areas.

The determination of a timber dependency level was
examined as summarized in tables 2 and 3. In table 2, PCI
and unemployment for counties with timber dependency levels
of 0-2.5, 2.6-5, 5.1-10, 10.1-20 and greater than 20 percent
were compared using a Tukey means test. This test allows
for pairwise comparisons between more than one pair. None
of the groups were significantly different from the other at the
.05 level of significance. There were no obvious statistical
reasons to use the 5 percent, or any other percent of
manufacturing in wood products to define timber dependency.
In fact, while the group of counties between 10 and 20
percent dependency has the lowest PCI, it also has the lowest
unemployment. This would imply that the two measures are
not identical, and that the choice of measures could affect the
decisions made regarding economic health of timber
dependent counties.

A second type of comparison is shown in table 3, where PCI
and unemployment for counties above dependency levels of
5, 10, 15 and 20 percent are displayed. These are not
exclusive groups and between-group means are not compared
using statistical tests, but in t-tests with the means of the
counties not included in each group (not shown), there were
no significant differences. Perhaps not surprisingly, the
counties with the highest dependency levels had higher PCI
and comparable unemployment to the lower dependency
levels. As such, not much can be concluded about the
relative status of timber dependent counties vs. non-dependent
counties. Also, there is no compelling evidence for or against
using 5 percent as the criterion for timber dependency.

A summary of the means of dependent and non-dependent
counties (less than 5 percent of total income from wood
products sectors) for the six economic measures is shown in
Table 4. None of the differences were statistically significant
(0.05 level). From these data, it can be seen that while timber
dependent counties are not significantly worse off than other
rural counties, dependent counties are somewhat lower in
each category. The largest differences are in percent of
housing with inadequate plumbing, implying lower rates of
recent economic development, and in the percent of persons
below poverty.

In a second set of comparisons, the rural timber dependent
counties were compared with other dependencies as
determined by the ERS. More counties in Georgia are
manufacturing dependent (52) than timber (35), farming
(20) or retirement (22) dependent. Table 5 shows
comparisons of PCI and unemployment for each of these
(non-exclusive) dependency groups. The all-rural group had
significantly lower PCI and higher unemployment than the all-
urban group, but other pairings were not tested because of
non-exclusivity of the groups. The means indicate that timber
dependent counties were second lowest, after farming
dependent counties, in PCI. However, timber dependent
counties had unemployment rates comparable to other
dependent county classes. Again, these results do not provide
conclusive evidence that timber dependent communities are
economically better or worse off than other types of rural
counties.

Because of the USDA Forest Service emphasis on providing
rural development assistance to NFS-adjacent counties, these
counties were compared to all other rural counties. These
adjacent counties were designated by the planning staffs on
the National Forests in 1979. Table 6 indicates that NFS-
adjacent counties in Georgia were significantly better off than
other rural counties, with higher PCI and lower
unemployment. Also, NFS-adjacent counties had higher high
school graduation rates and lower poverty rates. However,
NFS lands are in the affluent north and north central Georgia,
while the poorest region of the state, the rural southern area,
has no National Forest land.

IMPLICATIONS

These analyses suggest that timber dependent counties in
Georgia are neither better nor worse off than other rural
counties. If this were confirmed for other southern states, it
might imply that forestry rural development programs should
place priority on the most needy counties, regardless of their
timber dependency or NFS-adjacency status.

A second implication of this study is that increases or
decreases in timber dependency cannot be conclusively said
to help or hinder a rural county's economic well-being.
While it is generally believed that economic diversity, and
decreased dependency on any one industry, contributes to
economic health, the level of timber dependency in rural
Georgia counties does not appear correlated with economic
health. Therefore, the relative emphasis on wood products
sectors must depend on a more detailed assessment of the
prospects for further development in each county or region.

Increasing wood products income in a county can result from
either increased primary manufacturing or from increased
value added manufacturing. Primary manufacturing does
require, however, additional raw materials, which except for
softwood timber resources may be quite limited in Georgia.
There may be, however, some untapped hardwood resources
available for increased primary hardwood manufacturing.

Value added manufacturing is another possibility for rural
development programs. Although our results are limited,
they indicate that increased concentration of industries in
wood products sectors is not harmful to a community, and
may indeed be helpful given the relatively good standards-of-
living in most manufacturing dependent counties. One further
question that should be addressed is whether timber dependent
communities are more or less stable over time, and what the
trade-offs are between stability and economic health. A
successful rural development program should identify why a
community has not attracted secondary processing and seek to
correct any deficiencies. This may result in additional wood
products value added manufacturing, or in other types of
business or industry.

This paper has presented some limited evidence regarding the
potential for forestry related rural development programs.
Still to be answered is the question of whether Georgia is a
representative southern state, or if the conditions in other
states warrant a different approach to rural development. A
second question that we hope to address in our larger research
is whether economic diversity is correlated with rural
standards-of-living. A third as yet unanswered question is
whether aggregate rural incomes can be improved by promoting types of forest management that will increase landowner net revenues.

LITERATURE CITED


Table 1—Importance of timber to the Georgia economy, based on the 1985 IMPLAN database

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Statewide</th>
<th>Wood Products Sectors</th>
<th>Percent in Wood Products Sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total direct income ($mil)</td>
<td>65,558</td>
<td>1,590</td>
<td>2.4</td>
</tr>
<tr>
<td>Total value added ($mil)</td>
<td>96,185</td>
<td>2,239</td>
<td>2.3</td>
</tr>
<tr>
<td>Total industry output ($mil)</td>
<td>177,290</td>
<td>6,341</td>
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<tr>
<td>Total Employment</td>
<td>2,852,840</td>
<td>60,277</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Table 2—Comparison of mean per capita income (PCI) and unemployment for counties in Georgia at different timber dependency levels.

<table>
<thead>
<tr>
<th>Percent of total income from wood products sectors</th>
<th>PCI ($)/year</th>
<th>Unemployment Rate</th>
<th>Number of counties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>Mean</td>
</tr>
<tr>
<td>0 - 2.5</td>
<td>9856</td>
<td>1281</td>
<td>6.4</td>
</tr>
<tr>
<td>2.6 - 5.0</td>
<td>9890</td>
<td>1333</td>
<td>6.6</td>
</tr>
<tr>
<td>5.1 - 10.0</td>
<td>9870</td>
<td>1492</td>
<td>6.7</td>
</tr>
<tr>
<td>10.1 - 20.0</td>
<td>9008</td>
<td>1216</td>
<td>6.3</td>
</tr>
<tr>
<td>more than 20.0</td>
<td>9701</td>
<td>1615</td>
<td>6.7</td>
</tr>
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Table 3—Comparison of mean per capita income (PCI) and unemployment for counties in Georgia above different timber dependency levels.

<table>
<thead>
<tr>
<th>Percent of total income from wood products sectors</th>
<th>PCI ($)/year</th>
<th>Unemployment Rate</th>
<th>Number of counties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>Mean</td>
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<tr>
<td>&gt; 20</td>
<td>9701</td>
<td>1615</td>
<td>6.7</td>
</tr>
<tr>
<td>&gt; 15</td>
<td>9573</td>
<td>1415</td>
<td>6.9</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>9212</td>
<td>1332</td>
<td>6.4</td>
</tr>
<tr>
<td>&gt; 5</td>
<td>9550</td>
<td>1435</td>
<td>6.6</td>
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</table>
### Table 4—Comparison of timber dependent counties to other rural counties in Georgia.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Timber Dependent Counties (n = 15)</th>
<th>Other Rural Counties (n = 35)</th>
<th>Significantly different at .05 level</th>
</tr>
</thead>
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<tr>
<td>Per capita income ($/year)</td>
<td>9550</td>
<td>9866</td>
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<tr>
<td>Unemployment rate (percent)</td>
<td>606</td>
<td>605</td>
<td>no</td>
</tr>
<tr>
<td>High school graduation rate (percent)</td>
<td>58</td>
<td>58</td>
<td>no</td>
</tr>
<tr>
<td>Share below poverty (percent)</td>
<td>22</td>
<td>21</td>
<td>no</td>
</tr>
<tr>
<td>Share of housing older than 50 yrs. (percent)</td>
<td>12</td>
<td>12</td>
<td>no</td>
</tr>
<tr>
<td>Share of housing with inadequate plumbing (percent)</td>
<td>3.3</td>
<td>2.8</td>
<td>no</td>
</tr>
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</table>

### Table 5—Comparison of mean per capita income (PCI) and unemployment rates for counties in Georgia for different dependency groups.

<table>
<thead>
<tr>
<th>Dependency Group</th>
<th>PCI ($/year)</th>
<th>Std. Dev.</th>
<th>Unemployment Rate Mean</th>
<th>Std. Dev.</th>
<th>Number of counties</th>
</tr>
</thead>
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<td>Rural</td>
<td>9775</td>
<td>1334</td>
<td>6.5</td>
<td>1.9</td>
<td>121</td>
</tr>
<tr>
<td>Timber</td>
<td>9550</td>
<td>1434</td>
<td>6.6</td>
<td>2.0</td>
<td>35</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>9992</td>
<td>1332</td>
<td>6.3</td>
<td>1.7</td>
<td>52</td>
</tr>
<tr>
<td>Farming</td>
<td>8762</td>
<td>8026</td>
<td>7.1</td>
<td>2.3</td>
<td>20</td>
</tr>
<tr>
<td>Retirement</td>
<td>10959</td>
<td>1376</td>
<td>5.4</td>
<td>1.7</td>
<td>22</td>
</tr>
<tr>
<td>Federal Lands</td>
<td>10186</td>
<td>1033</td>
<td>6.4</td>
<td>2.9</td>
<td>7</td>
</tr>
<tr>
<td>Government</td>
<td>9637</td>
<td>1244</td>
<td>7.0</td>
<td>1.6</td>
<td>12</td>
</tr>
<tr>
<td>Mining</td>
<td>9607</td>
<td>806</td>
<td>6.8</td>
<td>1.9</td>
<td>4</td>
</tr>
<tr>
<td>Urban</td>
<td>13032</td>
<td>2742</td>
<td>5.7</td>
<td>1.5</td>
<td>38</td>
</tr>
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</table>

### Table 6—Comparison of National Forest System NFS-adjacent counties to other rural counties in Georgia.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>NFS-Adjacent Counties (n = 21)</th>
<th>Other Rural Counties (n = 100)</th>
<th>Significantly different at .05 level</th>
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</thead>
<tbody>
<tr>
<td>Per Capita Income (PCI)</td>
<td>10871</td>
<td>9544</td>
<td>yes</td>
</tr>
<tr>
<td>Unemployment rate (percent)</td>
<td>5.4</td>
<td>6.7</td>
<td>yes</td>
</tr>
<tr>
<td>High school graduation rate (percent)</td>
<td>61</td>
<td>57</td>
<td>yes</td>
</tr>
<tr>
<td>Share below poverty (percent)</td>
<td>15</td>
<td>23</td>
<td>yes</td>
</tr>
<tr>
<td>Share of housing older than 50 yrs. (percent)</td>
<td>10</td>
<td>12</td>
<td>no</td>
</tr>
<tr>
<td>Share of housing with inadequate plumbing (percent)</td>
<td>3.5</td>
<td>3.0</td>
<td>no</td>
</tr>
</tbody>
</table>
Figure 1. Timber Dependent Counties in Georgia (more than 5% of total income in wood products sectors).