



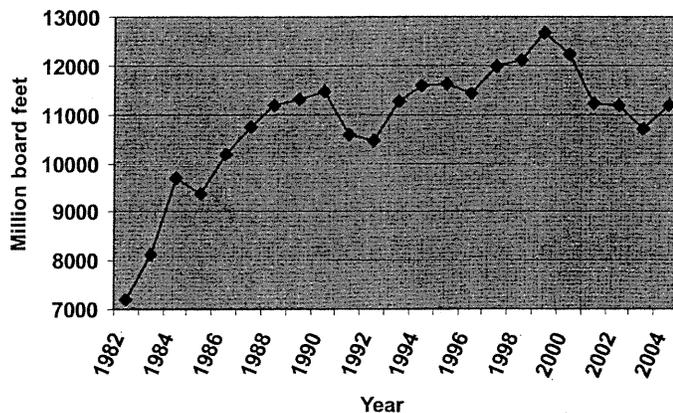
What Do Regional Changes in Lumber Production Tell Us About Future Competitiveness?

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Between 1984 and 1999 Eastern hardwood lumber production increased by nearly 3 billion board feet (*Figure 1*). More amazingly, hardwood lumber production in the 1990's was 10 percent higher than the previous peak period of 1904 to 1913. Since 1999, the hardwood lumber industry has suffered through four years of declining production and demand before experiencing a small increase in 2004. However, the increases and decreases in Eastern hardwood lumber production have not been uniform among states and regions.

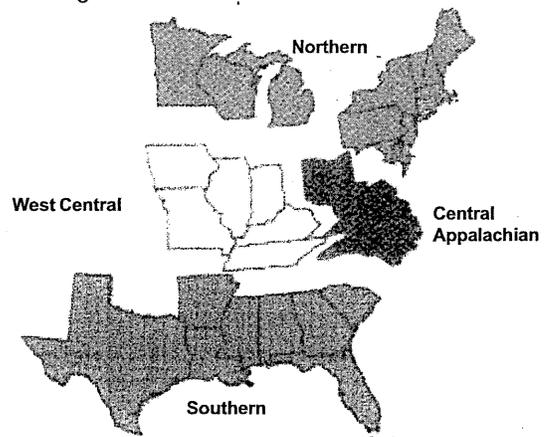
Figure 1 - Eastern hardwood lumber production 1982 to 2004



Recognizing regional differences in hardwood lumber production is important because the hardwood industry is, in reality, a collection of individual mills that have access to different timber species and markets. Furthermore, the demand for and relative price of specific species have changed continually over the last 20 years. Understanding how prices, markets, and timber availability have influenced regional hardwood lumber production over the last two decades may be useful when assessing future competitiveness of these regions. However, defining hardwood regions is difficult because lumber production data is developed on a state basis but the hardwood resource and markets can vary dramatically within a state and have changed

over time. In this paper, I will examine changes in lumber production in the Northern, West Central, Central Appalachian, and Southern hardwood regions (*Figure 2*). These regions have been delineated based on forest composition or species mix.

Figure 2 - Delineation of Northern, Central, and Southern hardwood regions



Regional Differences in the Timber Resource

The states in the Northern region contain significant quantities of softwood timber, but over two-thirds of the regional sawtimber inventory is hardwood species. Hard maple, soft maple and select red oak (mainly Northern red oak) are the most plentiful species within this region. Cooler temperatures and slower rates of growth contribute to relatively small average diameter of timber in this region; however, slow growth rates also result in lumber with high ring count, smooth texture, and other appearance attributes that have commanded higher prices. Currently the Northern region contains approximately 29 percent of the Eastern hardwood sawtimber inventory.

The composition of forest in the West Central region is overwhelmingly hardwood (*Table 1*) with true white oak and black oak being predominant. Many states in the Central regions also contain small quantities of hard



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Table 1 – Regional characteristics of the sawtimber inventories

Tentative	North	West	Central Appalachian	South
Proportion hardwood (percent)	66.8	91.1	77.5	46.6
Average Diameter (inches)	16.5	18.1	18.4	18.8
Total volume (Billion bf)	314.6	226.4	253.0	290.0
Composition of hardwood inventory (percent)				
Select white oak	5.4	17.7	11.3	9.5
Other white oak	2.1	8.3	7.8	7.6
Select red oak	13.0	7.0	8.0	5.7
Other red oak	4.7	16.0	10.5	26.8
Hard maple	14.8	3.5	3.2	0.2
Soft maple	17.0	4.2	7.4	2.9
Yellow-poplar	2.2	11.0	22.2	7.3
Sweet/Black gum	0.3	2.8	6.8	21.8

and soft maple. The average diameter of the sawtimber in this region is larger than in the Northern region but smaller than in the Southern region. However, the ring count, texture, and color of the lumber produced in this region varies among and within individual states. The West Central region contains approximately 21 percent of the Eastern hardwood sawtimber inventory.

Yellow poplar, red oak and white oak are the most abundant species in the Central Appalachian region. This region also contains small quantities of hard maple and a growing supply of soft maple. The average diameter of timber in this region is relatively high because of the presence of yellow poplar and numerous oak species that regenerated before 1950. This region contains 23 percent of the Eastern sawtimber volume.

The Southern region contains nearly equal amounts of hardwood and softwood sawtimber. This region contains relatively large quantities of mixed red oak species, mixed gum species and yellow poplar. Warmer temperatures allow timber to grow faster in this region as reflected in the relatively high average diameter (**Table 1**). However, faster growth causes lower ring counts and grainy textures. The Southern region contains over 27 percent of the Eastern hardwood sawtimber inventory.

Shifts in Regional Lumber Production

Because of the cyclical nature of hardwood lumber production it is important to examine changes in production between similar periods within this cycle. *Table 2* examines regional changes in lumber production between three peak production periods, 1984, 1990, and 1999 and between the most recent major peak (1999) and low point (2003).

Between 1984 and 1990 hardwood lumber production increased by 1.8 billion board feet but nearly 50 percent of this increase occurred in the West Central hardwood region (**Table 2 and Figure 3**). The driving factor behind these increases was increased demand for red oak by domestic furniture, cabinet and millwork manufacturers and increased international and domestic demands for white oak. The white oak in portion of Indiana, Illinois, Kentucky, and Tennessee was highly desired by European and Japanese buyers.

While lumber production increased in the Northern region, over two-thirds of this increase occurred in Pennsylvania. Lumber production also increased in the Central Appalachian region with North Carolina and Ohio exhibiting the largest increases. The driving factor behind these increases was demand for red oak and white oak in domestic and international markets.



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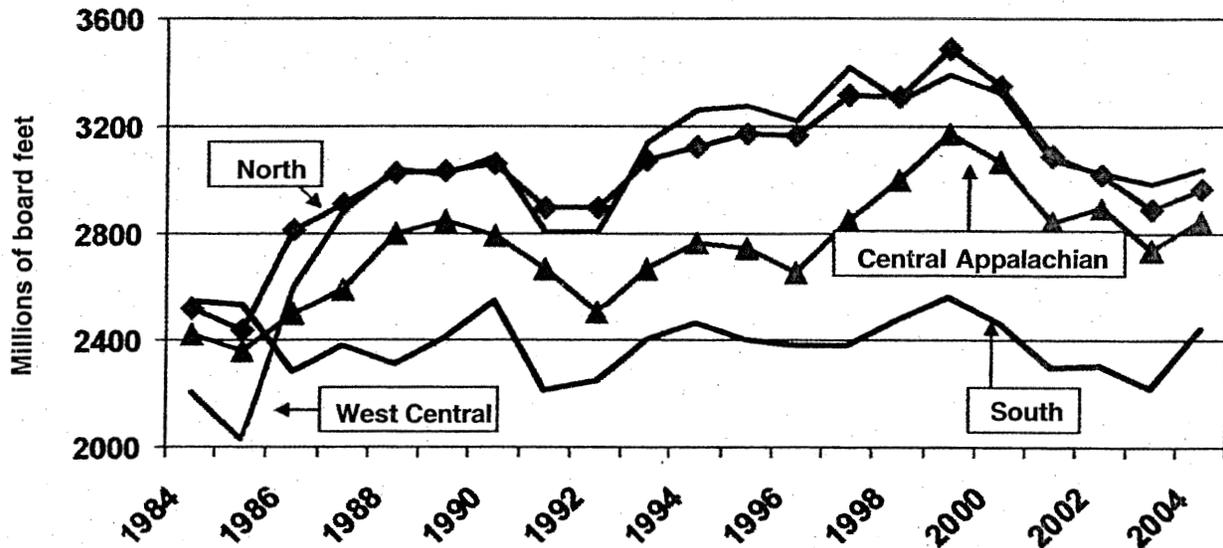
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Table 2 - Regional changes in hardwood lumber production 1984 to 1990, 1990 to 1999, and 1999 to 2003

	1984 to 1990		1990 to 1999		1999 to 2003	
	Volume	Relative	Volume	Relative	Volume	Relative
	(MMbf)	(Percent)	(MMbf)	(Percent)	(MMbf)	(Percent)
North	536	21.3	432	14.1	-605	-17.3
West Central	882	39.9	301	9.7	-408	-12.0
Central Appalachian	369	15.2	381	13.6	-439	-13.8
South	2	0.0	18	0.1	-339	-13.2
Total Eastern U.S.	1,789	18.5	1,132	9.9	-1,791	-14.2

Figure 3 - Hardwood lumber production in the Northern, Central and Southern regions, 1984 to 2004



During this period the Central Appalachian region and Pennsylvania had considerable quantities of larger diameter red oak with the ring count and other physical characteristics desired by the market. Since this period, relative oak sawtimber inventory in Pennsylvania has declined from 43 to 33 percent and maple volume has increased.

ing in the late 1980s, Southern lumber production was stagnating. In the 1950's and 60's, much of red oak lumber produced in this region was used in the production of flooring and crossties. During the 1980's, flooring production remained at low levels and there was relatively few new domestic or international markets for Southern oak and gum species.

While lumber production in other regions was expand-
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Between 1990 and 1999 Eastern US hardwood lumber



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production rose by over 1.1 billion board feet. While red oak demand by the furniture, cabinet, and millwork producers remained stable, exports of white oak to Europe and Japan declined. In contrast, demand for maple by domestic and international users increased during this period and flooring producers emerged as a major consumer of lower and mid grade red and white oak. The strong demand for red oak and maple caused lumber production to increase in all regions with the greatest increase occurring in the maple rich Northern region.

Eastern US hardwood lumber production declined by nearly 1.8 billion board feet between 1999 and 2003, with a third of this decline occurring in the Northern region. The decline in Northern production was unexpected given the high price of maple during this period. However, maple is just one component of the Northern forests and while maple production increased, production of red oak and other species have decreased. Furthermore, timber costs in the Northern region increased more over the last 20 years than in other regions.

Lumber production in the West Central and Central Appalachian decreased as domestic demand for furniture and pallet lumber decreased, but demand for flooring lumber slightly increased. The continual demand for red oak by the flooring market cushioned the decline in lumber production in the Southern region, but the reduced demand for framestock and other products used by domestic consumers ultimately resulted in reduced Southern production as well.

Regional Competitiveness in a Changing Market

The brief analysis presented above demonstrates that regional shifts in hardwood lumber production result from an interaction of the composition and attributes of the sawtimber inventory and changing demands. Many of the changes in demand over the last 20 years would have been difficult to project and these changes will continue to be unpredictable. However, there are several known aspects about the hardwood resource and market that can provide *generalized* regional strategies for maintaining competitiveness. Still, it must be emphasized that these strategies are generalizations and that *individuality* has always been the saving grace of long term survival in the hardwood lumber

industry. If too many adjacent mills adopt identical strategies, then a specific portion of the timber base will be heavily utilized (and increase in price) while other portions will go underutilized.

In the Northern region, cooler temperatures have resulted in slower growing timber, smaller diameter logs, and lumber with attributes that are valued in the market. The down side of these attributes is that the timber in this region has become relatively expensive and the purchasers of lumber produced in this region have been more selective about what they want at what price. The combination of high timber costs and high price lumber means the North's comparative advantage is in the production of higher value products selected for color, ring count, and other desirable growth characteristics and continual separation of products based on these factors. This means developing and maintaining higher value markets and sorting lumber to match lumber to customers' needs.

In general, the Southern timber resource grows relatively fast resulting in larger logs. The downside of this biological abundance is lumber with less desirable appearance characteristics that tend to command lower prices per MBF compared to other regions. The upside is that larger logs with less discerning features allow for economies of scale in production and distribution. The combination of relatively low timber prices and economies of scale means that the Southern mills are more competitive in the production of commodity products. However, these products are most vulnerable in a changing world market that focuses on the low cost commodity approach to manufacturing. Methods of reducing costs must continually be considered and, whenever profitable, sorting for specific customers can increase revenues.

The West Central and Central Appalachian regions have the most variable comparative advantage. Most states in these regions have large volumes of commercially viable species in relatively close proximity to one another. Mills in these states can produce a wide variety of products and can use some blend of Northern product separation and Southern commodity strategies depending on the value and quality of the timber available. A mill operating in the high mountains of West Virginia may adopt the Northern strategy while a mill operating in Southwestern Tennessee may opt for a Southern strategy.