■ Except during very brief periods, total timber production grew between 1962 and 1998. ■ Between 1998 and 2002, total timber production declined by about 9 percent, back to 1995 levels. ■ Prices for softwood products declined between 1998 and 2004. For softwood pulpwood, the price decline was dramatic. By 2004, inflation-adjusted prices for softwood pulpwood had fallen to their lowest levels since 1997. ■ Prices for hardwood products had not turned downward through 2004. ■ Based on price and quantity patterns, we identify three phases of development in southern timber markets: a moderate growth phase from 1977 to 1986, a rapid growth phase between 1986 and 1998, and an adjustment phase between 1998 and 2004. ■ The moderate growth phase was characterized by expanding demand and supply. The rapid growth phase was dominated by growth in demand, which outstripped supply growth for wood products. The adjustment phase was dominated by declines in demand. ■ During the rapid growth period, hardwood sawtimber prices grew steadily but output grew only slightly. This suggests a possible contraction of available hardwood sawtimber inventories and supply. ■ Consumption of lumber in the United States has grown at a lower rate than housing starts, indicating some substitution away from lumber as a building material. ■ Both nonwood and engineered wood products have substituted for lumber in many applications. For example, the share of floors, walls, and roofs made with wood is about constant but there is a shift toward greater use of engineered wood products. ■ Electronic media are substituting for paper. ■ A majority of pulping capacity in the United States is located in the South, but this share has declined since the mid-1990s. ■ Pulping capacity in the South, an indicator of long-term demand, has declined by 16 percent since 1998. ■ Increasing world demand for paper products is leading to expansion in paper production capacity in countries other than the United States. ■ Shifts in capacity indicate that the United States has lost some of its comparative advantage for producing paper for the world market. Possible causes of this decrease in comparative advantage are disadvantageous resource and labor costs and location of the United States relative to major world demand centers. ■ Overall, there is no indication that domestic demand for southern pulpwood will increase. ■ Softwood lumber production capacity in the South has increased steadily in recent years (1997–2003). ■ Softwood lumber

The U.S. South's Timber Sector in 2005:

A Prospective Analysis of Recent Change

David N. Wear, Douglas R. Carter, and Jeffrey Prestemon

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This first update of the Southern Forest Resource Assessment published in 2002 was produced in collaboration with the Southern Group of State Foresters.

Cover photo: A beautiful spring day in the Southeastern United States is seen in this SeaWiFS image. Several smoke plumes are visible including a rather large one that originates in Georgia, midway between the Savannah and Altamaha rivers. A good-sized plume of turbid water can also be seen flushing out of Mobile Bay. Photo courtesy of the SeaWiFS Project, NASA/Goddard Space Flight Center, and ORBIMAGE.

January 2007

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W.T. Weaver Blvd.
Asheville, NC 28804

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The U.S. South's Timber Sector in 2005: A Prospective Analysis of Recent Change

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Abstract—Forest product markets are an important part of rural economies of the U.S. South, but recent changes in timber markets have raised questions about the future. Several factors have altered forest products markets since the late 1990s, including industry consolidations and associated changes in land ownership, changes in domestic consumption patterns and international trade patterns, and depreciation and closure of older processing facilities. The focus of this assessment of timber markets is on understanding how these and other demand and supply factors have affected the markets for various timber products. Our findings suggest that the demand for domestically produced timber products has declined somewhat in the United States, as domestic demands as well as exports have fallen. At the same time, the supply of domestically produced timber products has continued to expand since the late 1990s. The net result of these demand and supply changes may be (a) a decline in timber product output and (b) a disproportionately strong decline in associated prices. An evaluation of investment of wood products firms in manufacturing capacity within the region provides insights into future production potential. Paper production capacity has declined since the late 1990s, while lumber production capacity has remained near 1990s levels. Indications are, therefore, that demand for pulpwood to produce paper may not rebound to late 1990s levels in the foreseeable future. However, persistent low prices for softwood pulpwood could indicate long-term opportunities for the manufacture of other products from this product class. Long-term demand for solid wood products appears strong, signaling that a relatively favorable investment climate should exist in this part of the forest sector.

Keywords: Demand and supply factors, forest products markets, investment climate, long-term demand, paper production capacity.

Introduction

Timber production in the Southeastern United States has grown both in absolute terms and relative to that in other regions of the country since the 1970s. Over this period, the South has demonstrated strong comparative advantage in producing a renewable timber resource as management has shifted from mining of volunteer second-growth forests to intensive plantation forestry. Today, forest products remain an important part of southern rural economies, but recent changes in timber markets have raised questions about the future. This report examines these changes and assesses their implications for the future.

The coincidence of several factors has altered forest products markets since the late 1990s. Industry consolidations changed land ownership across a large portion of the region's most productive timberland. Changes in domestic consumption patterns, coupled with shifts in international trade, shifted timber demands. Depreciation and closure of older processing facilities, especially in the paper industry, has accentuated many of these factors and changed the spatial arrangement of timber markets within the region. These developments have led many in the forestry community to conclude that the future of timber markets in the United States in general, and in the South in particular, is one of decline.

At the same time, other developments seem to bode well for southern forest products industries. Production of newer, engineered wood products continues to grow. Timber supply is strong and appears to have expanded throughout the 1990s in spite of competing land use pressures. Intensive forest management continues to expand yields and the potential for growth appears to persist. Indeed, long-run forecasts of general economic and timber market activity predict expanding domestic timber demand over the coming decades. Any expansion in timber production is expected to be concentrated in the South. Forecasts reported in the "Southern Forest Resource Assessment" (Wear and Greis 2002) and the 2000 RPA timber assessment (Haynes 2003) suggest that southern forest landowners, facing strong future markets, will continue to invest in and expand their timber production capacity.

The objective of this report is to provide an assessment of long-run trends and recent (5-year) changes in timber markets in the Southern United States. Such an assessment is necessary to reconcile the recent decline in prices and production of some wood products and long-run optimism about the prospects for timber demand and productivity in the South. This assessment relies strictly on the interpretation of historical data and not on forecasting models. The focus is exclusively on understanding the most recent historical experience and placing it in the context of other developments in world markets for wood products.

This report is organized as follows. We start by charting the most basic timber market indicators: price and harvest quantity. Patterns of change in price and quantity provide insights into overall market direction. We then explore a set of factors that affect the demand for timber products, including domestic conditions and forest products trade. This analysis of demand is followed by an analysis of timber supply fundamentals, which focuses on land use, forest investment, and timberland ownership. We conclude

by synthesizing these findings and discussing implications for the future of southern timber markets.

Recent Trends in the Timber Sector

Our objective in this section is to show how timber markets have changed in the U.S. South since detailed records have been kept, with emphasis on the most recent changes. Our approach is to use timber harvests and prices as compact, summary indicators of the sector's evolution over time. We begin by examining how harvest quantities and then prices have changed. We put these changes into context by decomposing quantity and price changes into their root causes, shifts in supply and demand.

Harvest Quantities

Forests in the U.S. South yield a variety of hardwood and softwood timber products. Softwood products constituted 69 percent of harvest output in 2001, the latest year for which comprehensive data are available (fig. 1). Saw logs and pulpwood products accounted for 41 and 42 percent of total harvest, respectively. Softwood saw logs are the largest product class (30 percent), followed by softwood pulpwood (27 percent) and hardwood pulpwood (15 percent). These three product classes represented roughly 72 percent of harvests in 2001 and have represented at least 68 percent of harvests since the 1970s (fig. 1).[1]

Timber harvests from southern forests trended strongly upward during the last half of the 20th century (fig. 1). Between 1962 and 1996, annual harvesting more than doubled from about 4 billion cubic feet to almost 10 billion cubic feet, while the product mix remained relatively constant. Pulpwood's share of production ranged from 39 to 44 percent and softwood's share ranged from 64 to 71 percent of production, with no consistent trends.

Charting total production on an annual basis reveals that growth in harvests for all products was very steady, with only a few exceptions (fig. 2). For example, output dipped during a brief recession in the mid-1970s. Growth in harvests was at its strongest from 1982 through 1998, with output expanding at a rate of 3.3 percent per year. After this long period of strong growth, total harvest quantity fell by approximately 9 percent between 1998 and 2002. Harvest quantity in 2002 was approximately equal to that in 1995. This represents the largest and longest downturn in harvesting over the historical period (1952–2002).

Trends in the three largest product classes (fig. 3) show that the harvest decline between 1998 and 2002 was largely explained by reductions in pulpwood production. Softwood and hardwood pulpwood harvests declined by 11 and 21 percent, respectively, while softwood sawtimber harvests were stable. We are unable to construct an annual time series of hardwood saw-log production (the fourth largest product class) using a comparable technique, but the periodic data (fig. 1) suggest that hardwood sawtimber harvests were relatively stable over this period.

Timber Prices

Timber prices can be considered an indicator of the scarcity of timber as

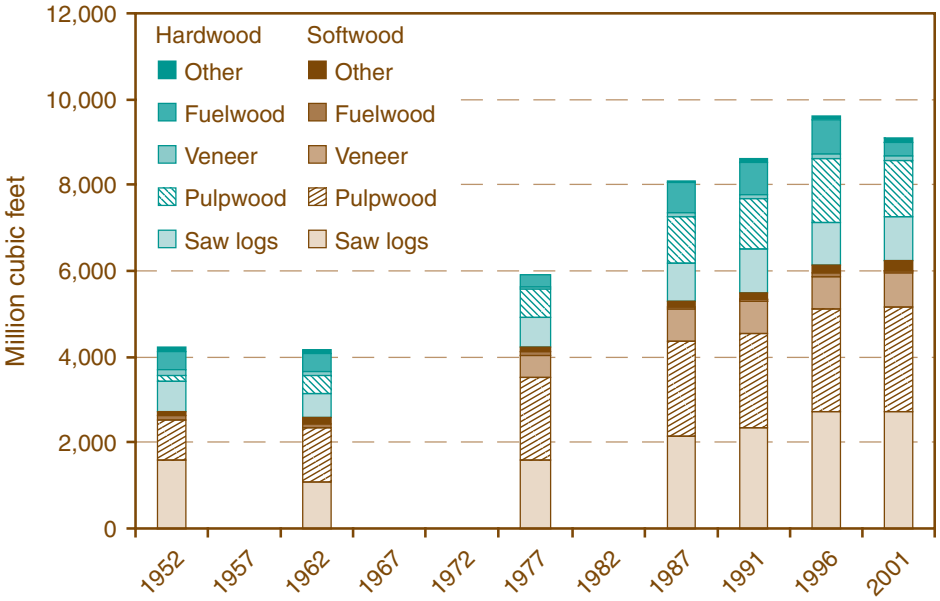

Figure 1—Roundwood harvests in the U.S. South by product. (Sources: U.S. Department of Agriculture Forest Service timber product output reports.)

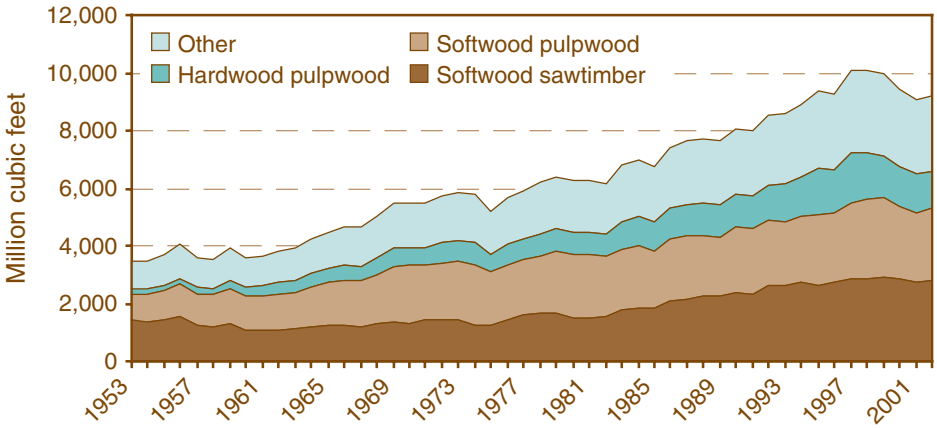

Figure 2—Roundwood production in the U.S. South, all products. (Sources: U.S. Department of Agriculture Forest Service timber product output reports and see appendix for explanation of interpolation procedures.)

[1] Harvest quantity data are derived from U.S. Department of Agriculture Forest Service timber product output reports. (See appendix for details on data sources.)

an input to production. If stumpage prices are increasing, then timber is becoming relatively more scarce. Conversely, falling stumpage prices indicate that timber is becoming more abundant relative to demands for its use. Prices for various wood products demonstrated a variety of trends between 1977 and 2004, the period for which we have comprehensive data, indicating an evolving story regarding the scarcity of these natural resources.[2]

Between 1977 and the late 1980s, timber prices were flat to declining for hardwood and softwood products (fig. 4). Softwood sawtimber prices declined very slightly between 1977 and 1991 and softwood pulpwood prices were essentially flat between 1977 and 1989. Hardwood pulpwood prices likewise were flat between 1977 and 1988. (Our price series for hardwood sawtimber begins in 1992.) No indications of increasing scarcity were apparent through the late 1980s, while harvests grew at moderate rates (fig. 3).

Price patterns for these products started changing substantially between 1989 and 1992 (fig. 4). Real-dollar prices turned upward for all four products and increased through 1997 or 1998. Between 1988 and 1998, hardwood pulpwood prices increased at an average annual rate of 12 percent, softwood pulpwood at 5 percent, and softwood sawtimber at 8 percent. Hardwood sawtimber prices increased at a rate of 6 percent (over the period 1992–98). Price data, therefore, indicate increasing scarcity for all timber products over this decade.

Between 1998 and 2004, hardwood pulpwood and sawtimber prices leveled off, and softwood sawtimber prices declined, returning to 1994 levels by 2004. Softwood pulpwood prices have, however, followed a decidedly different pattern. Prices for this product fell to less than one-half of their 1998 level and in 2004 were at their lowest levels for the period examined (1977–2004).

[2] To examine price trends we have constructed regional price indices based on prices reported by Timber-Mart South for all regions of the South. Throughout this paper we report prices in real terms, adjusted for inflation using the Consumer Price Index price deflator with 2004 as the value basis. We use indices of timber prices to allow easier comparisons among product types. When indices are used, we define 1952 as the base year, i.e., the index is set equal to 1 in 1952, and apply the indexing to the real prices described above.

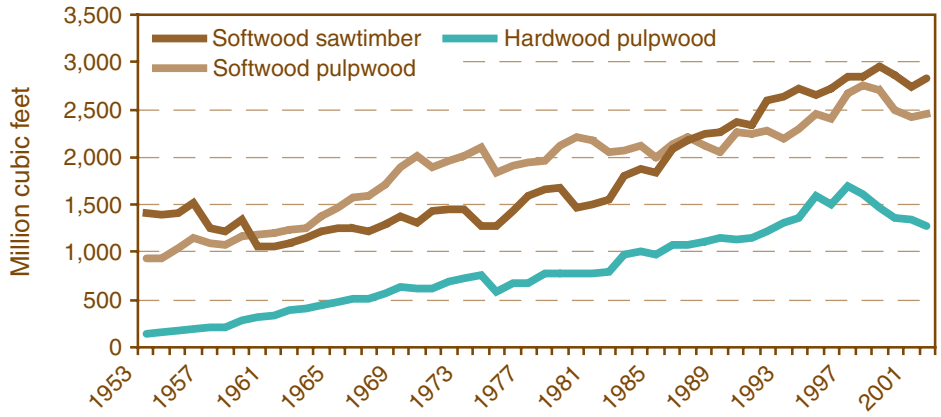

Figure 3—Roundwood production in the U.S. South, selected products. (Sources: U.S. Department of Agriculture Forest Service timber product output reports and see appendix for explanation of interpolation procedures.)

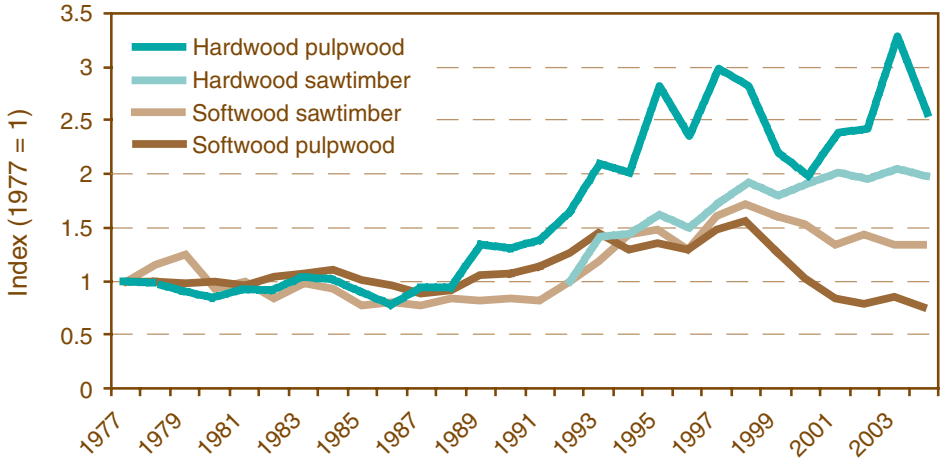

Figure 4—Real stumpage prices in the U.S. South by product. (Source: Timber Mart-South.)

Summary of Changes

Changes in both harvest quantities and timber prices since 1998 suggest that the timber market is in the midst of a transition. Prices have declined from their peak levels but remain relatively strong for hardwood products and softwood sawtimber. However, these moderate declines and a precipitous decline in softwood pulpwood prices suggest that returns to timberland owners are now substantially lower than they were in the 1990s, when these returns peaked. Especially for softwood pulpwood, these patterns suggest a strong contraction in pulpwood demand coupled with stable to expanding supplies of standing timber.

Looking jointly at price and harvest changes for the three largest product classes in the South (figs. 5, 6, and 7), we can define three distinct periods of development between 1977 and 2002:

Moderate growth phase

1977–86: During this period, harvests of all products increased at a moderate rate while timber prices stayed constant or even declined for all three of the major products. These trends are consistent with expansion of both supply and demand for the products.

Rapid growth phase

1986–98: During this period, harvests of pulpwood and softwood sawtimber continued to increase but at a faster rate than between 1977 and 1986. Prices for these products also increased during this period, and at a higher rate than prices for

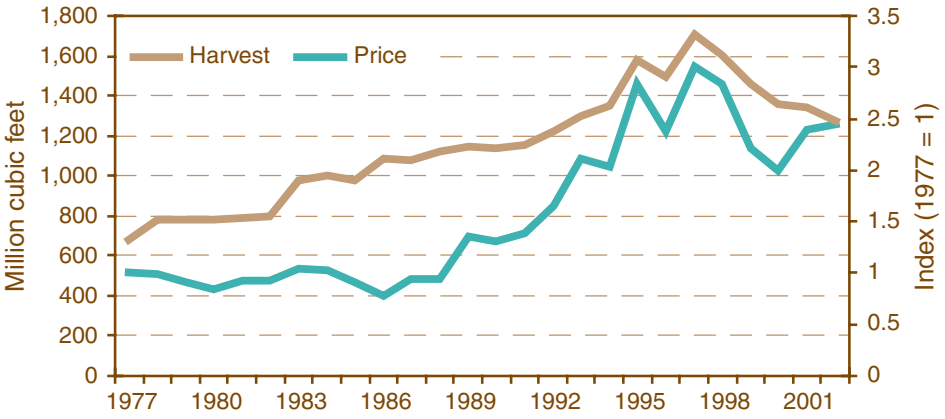

Figure 5—Hardwood pulpwood harvest and price in the U.S. South. (Sources: Timber Mart-South and various Resources Planning Act timber product output reports.)

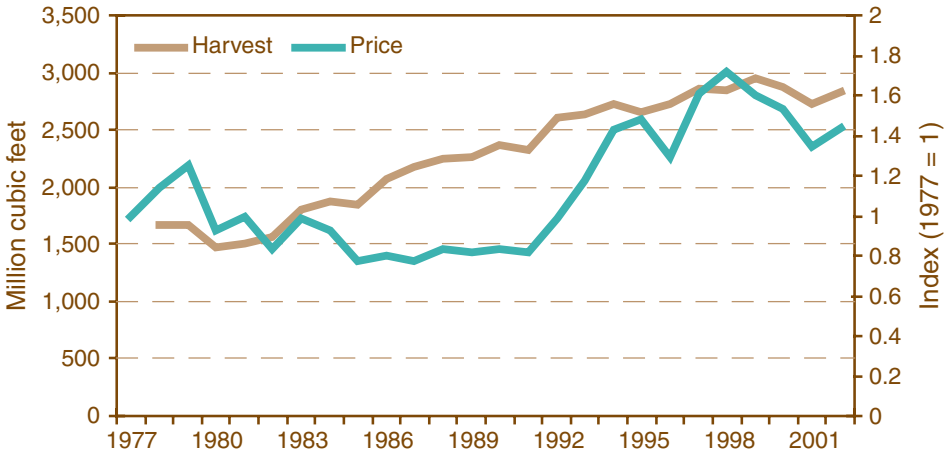

Figure 6—Softwood sawtimber harvest and price in the U.S. South. (Sources: Timber Mart-South and various Resources Planning Act timber product output reports.)

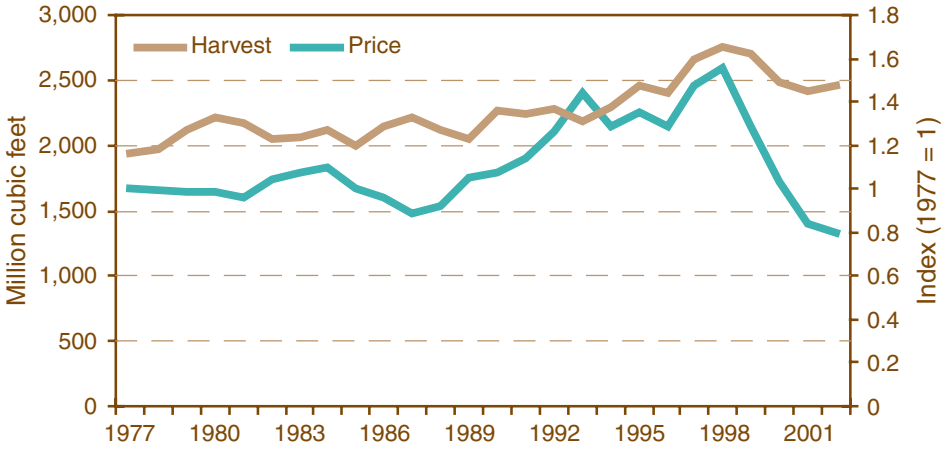

Figure 7—Softwood pulpwood harvest and price in the U.S. South. (Sources: Timber Mart-South and various Resources Planning Act timber product output reports.)

harvests. This pattern of change is consistent with a strong expansion in timber demand but doesn't provide conclusive evidence of changes in timber supply. It is consistent, however, with demand expanding faster than supply. In contrast, hardwood sawtimber production was stable, with increasing prices signaling a tightening of hardwood saw-log supplies.

Adjustment phase

1998–2002: During this period, both harvests and prices declined for pulpwood products. These patterns of change are consistent with a strong contraction in the demand for pulpwood. For softwood sawtimber, harvests leveled off with declining prices. This is consistent with an expansion in sawtimber supply, coupled with a decline in demand. Limited data for hardwood sawtimber indicate that harvests and prices were stable over this period.

In subsequent sections of this paper, we examine various demand and supply factors that have likely influenced markets for timber products in the South, with attention focused on evaluating changes that occurred during the adjustment phase (1998–2002).

Key Observations—Recent Trends

- Except during very brief periods, total timber production grew between 1962 and 1998.
- Between 1998 and 2002, total timber production declined by about 9 percent, back to 1995 levels.
- Prices for softwood products declined between 1998 and 2004. For softwood pulpwood, the price decline was dramatic. By 2004, inflation-adjusted prices for softwood pulpwood had fallen to their lowest levels since 1997.
- Prices for hardwood products had not turned downward through 2004.
- Based on price and quantity patterns, we identify three phases of development in southern timber markets: a moderate growth phase from 1977 to 1986, a rapid growth phase between 1986 and 1998, and an adjustment phase between 1998 and 2004.

- The moderate growth phase was characterized by expanding demand and supply. The rapid growth phase was dominated by growth in demand, which outstripped supply growth for wood products. The adjustment phase was dominated by declines in demand.
- During the rapid growth period, hardwood sawtimber prices grew steadily but output grew only slightly. This suggests a possible contraction of available hardwood sawtimber inventories and supply.

Demand Factors

Demand is an economic concept that relates the consumption of a commodity to its price. Elementary economic theory indicates that less of a commodity is consumed at a higher price and that charting all the possible price-consumption combinations defines a demand curve. This curve, however, can be repositioned based on many factors other than the commodity's price, e.g., income, prices of substitutes for the commodity, and changing tastes. Here we examine demands for timber products by examining various factors that can reposition the demand relationships. We look closely at substitution possibilities, production capacity, and international trade as indicators of changes in domestic demand.

Wood products are one of the many commodities that are used to produce final consumer products such as homes or paper and related products. Therefore, the demand for wood products is derived from the demand for final products into which they are a material input. Wood products compete with other construction inputs such as concrete, steel, aluminum, plastics, or other fibers. We therefore need to account for these commodities when evaluating changes in wood products markets. We also need to account for the emergence of engineered wood products, such as oriented strand board (OSB), which can utilize smaller diameter trees, as substitutes for traditional wood products.

In this section, we examine the structure of demand for timber in the South. We start by examining the position of wood products relative to competing commodities in the United States. This includes an examination of trends in substitution and in the prices of substitute products. We then examine the demand for timber derived from domestic demand for solid wood products. Here, we focus on sawtimber and pulpwood products and use domestic production capacity as an indicator of medium to long-run demand. We close this section on demand by examining international trade including exports and imports of final goods and raw materials.

Competing Nonwood Products

The potential for substitution between timber and other materials depends upon the level of technology and relative prices of alternative material inputs. For instance, the possibility for substitution away from wood to produce paper and paper-related products is low because there are currently no economically viable and widely available substitutes for wood fiber. However, the potential for substitution among alternative materials in building construction is much higher.

Even during the rapid growth phase described earlier, the use of lumber in the United States did not grow at the same rate as housing starts. Increasing prices of timber relative to steel and cement allowed for substitution away from lumber and toward these other materials during the last few decades of the 20th century. Very recent large upturns in cement and steel prices may portend a moderating or reversal of this substitution of raw materials. Although many factors contribute to price differences among raw materials, energy prices will have a strong influence on the future competitive position of wood. Generally, energy costs associated with production of steel and cement are higher than those associated with production of solid wood construction inputs. It is therefore possible that recent upsurges in energy prices could have a positive influence on demand for domestically produced construction wood, relative to its substitutes.

Changing shares of construction inputs reflect shifting prices of nonwood and wood substitutes relative to solid wood inputs. Fleishman and others (1999) report that lumber lost market share in the construction market between 1995 and 1998, with the share in wall framing down from 93 to 83 percent. Most of the lost share in the lumber market could not be attributed to nonwood substitutes. Instead, most replacement has been by engineered wood products—laminated beams, wood I-joists, and laminated veneer lumber (LVL) (fig. 8)—with some share also captured by steel, reinforced concrete, and wood-plastic lumber. LVL especially captured increasing market share between 1991 and 2004, with

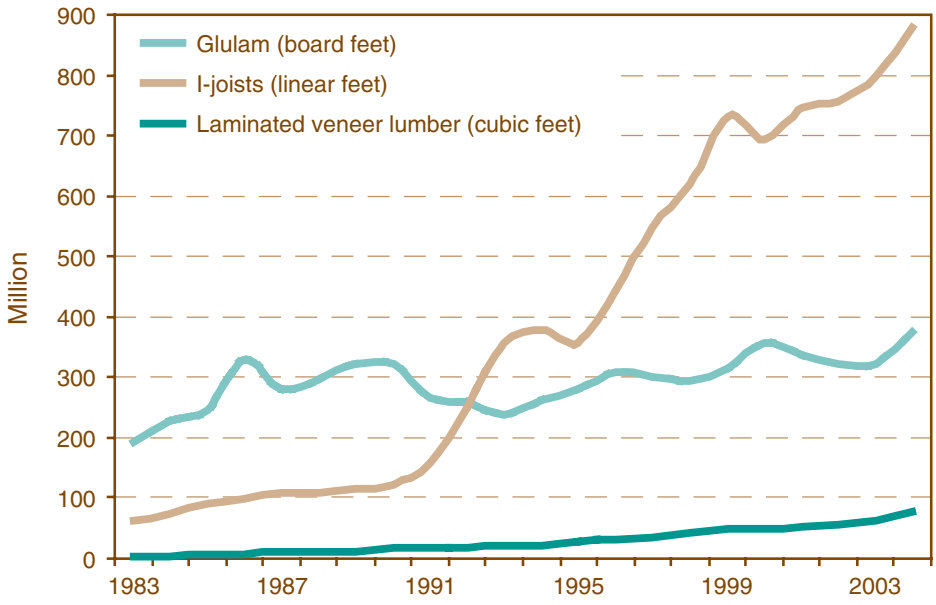

Figure 8—Engineered wood products production. (Source: The Engineered Wood Association.)

no decline in its rate of growth (fig. 8). Lumber has also lost market share in roof and floor applications (Fleishman and others 1999). The decline of market share of lumber during the 1990s can be attributed mainly to improvements in engineered wood product quality, declining quality of lumber, and perceptions that lumber is not as environmentally friendly as some alternative construction materials.

Substitution away from forest products is only one explanation of reduced market share for domestically produced forest products (Fleishman and others 1999; Zhang and Buongiorno 1997, 1998). Imports, technological change, and evolving consumer preferences are also determining factors. In the paper sector, for example, information technology continues to shift news provision from newspapers and toward electronic media, with important implications for paper demand. In addition, declines in demand for softwood pulpwood products such as unbleached kraft pulp are partially due to recent steep declines in paper bag manufacture and consumption domestically.

Domestic Demands

Pulp and Paper Sector

Hardwood and softwood pulpwood make up 42 percent of the timber consumed in the South. The region's paper mills are concentrated in a few areas in which plentiful water is available. These areas include southeastern Georgia, northeastern Florida, and southern Alabama and Mississippi. Concentration of paper production capacity organizes the demand for pulpwood within the South—demand for pulpwood is strongest in the vicinity of mills and weakens with distance from the mill gate (fig. 9). While satellite chipmills distributed the demand for pulpwood over more of the region during the 1990s, pulpwood markets are still much more concentrated geographically than markets for solid wood products.

Raw material utilized for production of paper products consists of pulpwood and pulpwood residuals from other wood product manufacturing. The utilization of recycled fiber has become increasingly important in the production of paper products. Ince (2000) shows that recycled material

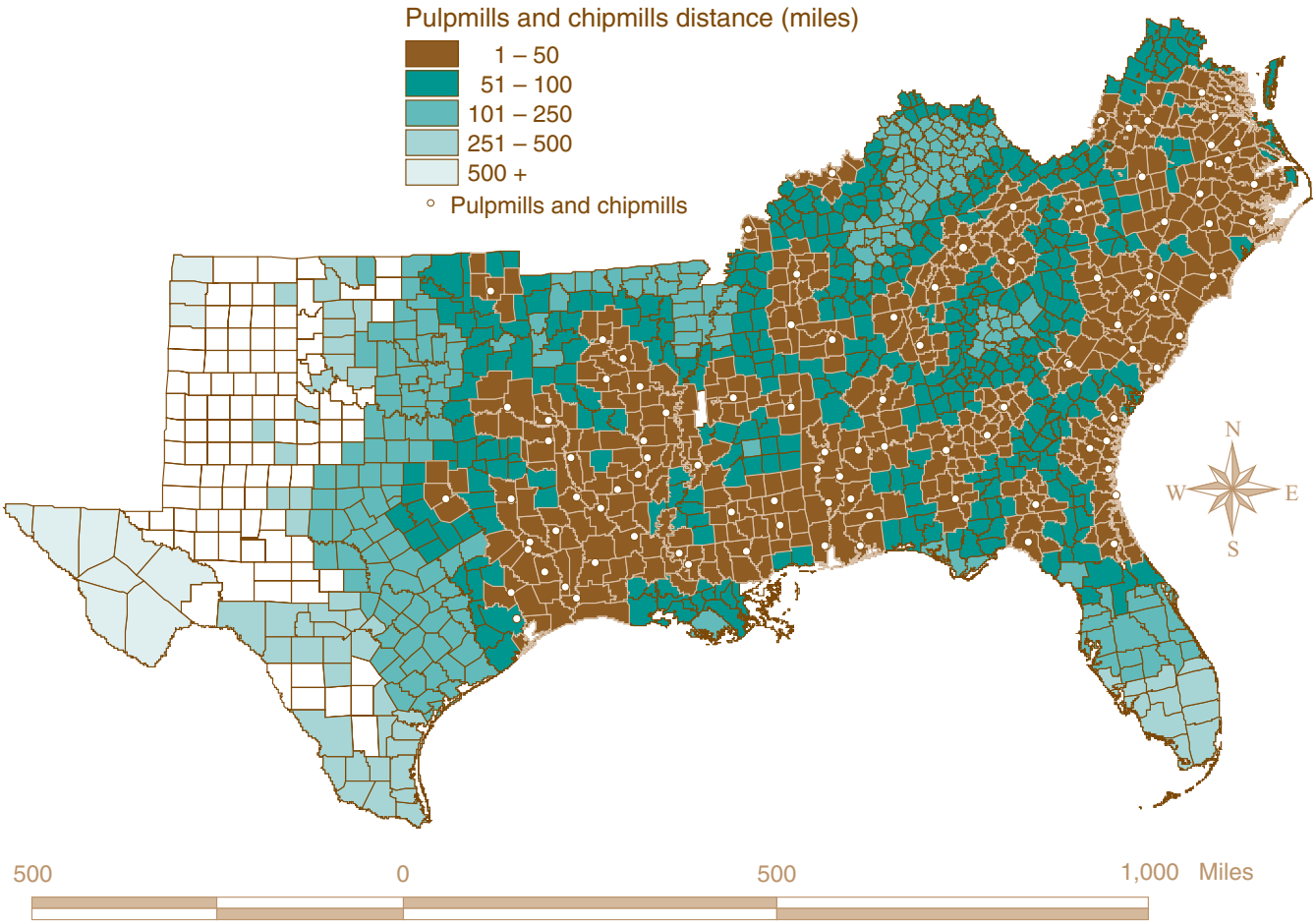

Figure 9—Distance in miles by county from the forested center of the county to the closest pulpmill or chipmill. White dots are pulpmills and chipmills within the Southern States. Note that the universe of all pulpmills and chipmills within the United States and a circuity factor of 1.4 were used in the distance calculation. (Source: R. Huggett, preliminary findings, economics of biomass removals, U.S. Department of Agriculture Forest Service, Research Triangle Park, NC.)

comprised 23.9 percent of total fiber used in the U.S. paper sector in 1985 to 37.9 percent in 1998. This has resulted in a relative drop in the demand for virgin wood fiber. He also finds strong indications that the amount of recycled material used in U.S. paper manufacture has perhaps reached a maximum, especially given strong export demand for recovered paper. So it is likely that expanding use of recycled material mitigated demand and price increases during the rapid growth phase but that changes in demand for recycled material have not been a major influence in the adjustment phase.

Pulping capacity within the region defines the upper limit of the demand for pulpwood. Because capacity expansion requires an enormous commitment of capital (construction of a typical paper mill costs approximately $2 billion), trends in capacity provide a strong indicator of current and anticipated demands for pulpwood within the region. In this section, we examine dynamics in pulping capacity and the implications for derived demand for pulpwood in the region.

For several decades, the United States has produced more wood pulp than any other nation. Through 1998, total U.S. pulpmill capacity, and the share of U.S. pulpmill capacity located in the South, trended upward (fig. 10). Since 1998, U.S. pulping capacity has declined slightly while southern capacity had dropped by about 16 percent by 2003 (fig. 11). These declines in domestic capacity occurred as other countries expanded their capacity. For example, Sweden, Finland, Chile, and Brazil increased their capacity between 1995 and 2002 (figs. 12 and 13). While the United States and the South continue

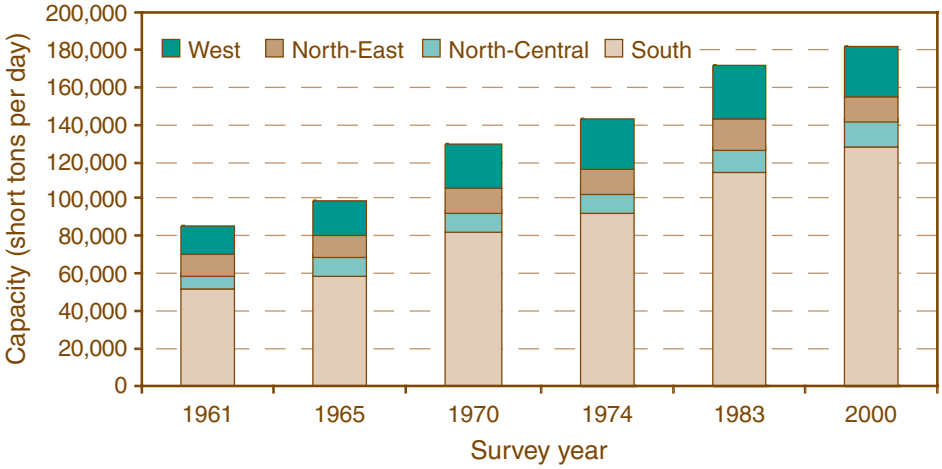

Figure 10—U.S. pulp output processing capacity, 1961–2000. (Source: Smith and others 2004.)

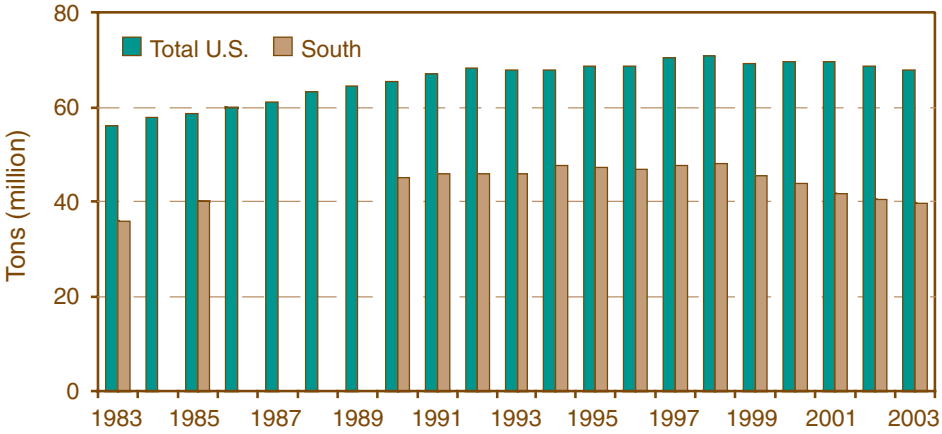

Figure 11—Pulpmill capacity in the United States and the U.S. South, 1983–2003. (Sources: Forest Resources Association; U.S. Department of Agriculture Forest Service, Southern Research Station; Pulp & Paper North American Factbook; and Timber Mart-South.)

to lead the world in pulpwood production, their share of worldwide capacity has declined since 1991. By 2003, Southern U.S. pulp capacity had approximately returned to its 1985 level.

New pulpmill capacity and pulp production is feeding increased worldwide demand for paper products, especially in Asia. With level to declining capacity in the United States, it is clear that new capacity is being developed in other countries. There is no evidence of expansionary activity in pulp and paper manufacturing in the Southern United States. These changes are likely explained by shifts in comparative advantage relative to several factors, including labor costs, raw materials costs, and proximity to final product markets.

Manufacturing costs in kraft linerboard mills in the United States and abroad (fig. 14) provide an example of differences in comparative advantage. The U.S. South is competitive in this market compared to the U.S. West, Canada, and Europe, but lags behind Latin American countries (primarily Brazil and Chile) in its cost structure.

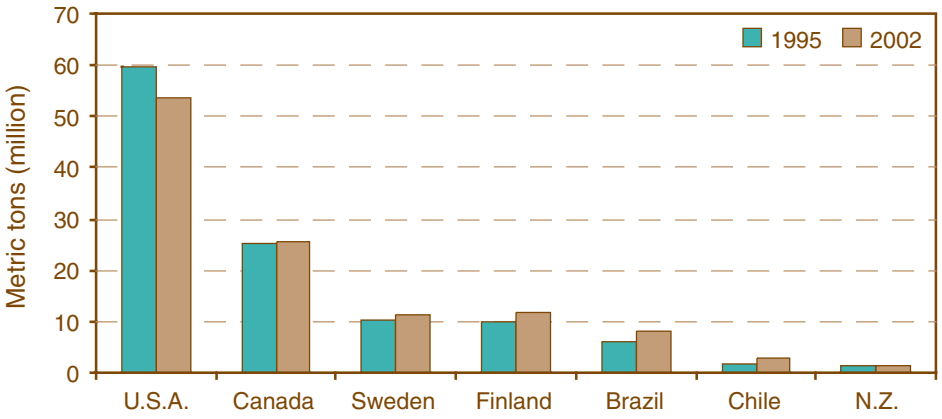

Figure 12—Pulp production for various countries, 1995 and 2002. (Sources: Pulp & Paper International and Paperloop.com.)

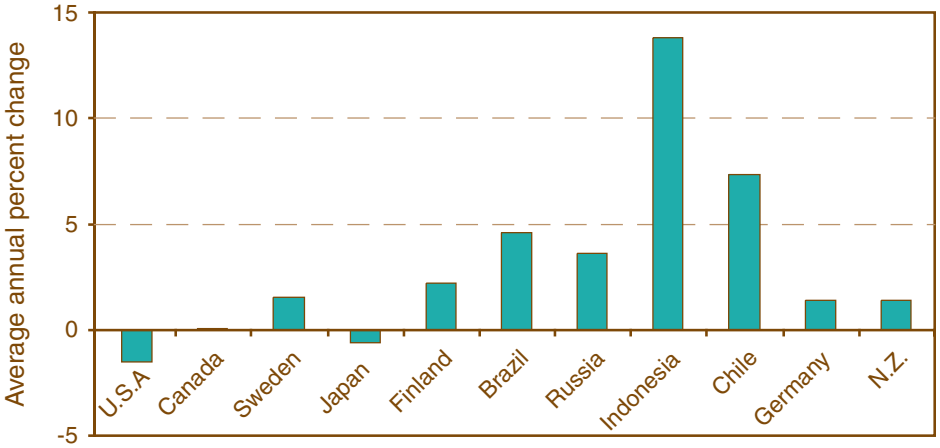

Figure 13—Average annual rates of change in pulp production for various countries, 1995 to 2002. (Sources: Pulp & Paper International and Paperloop.com.)

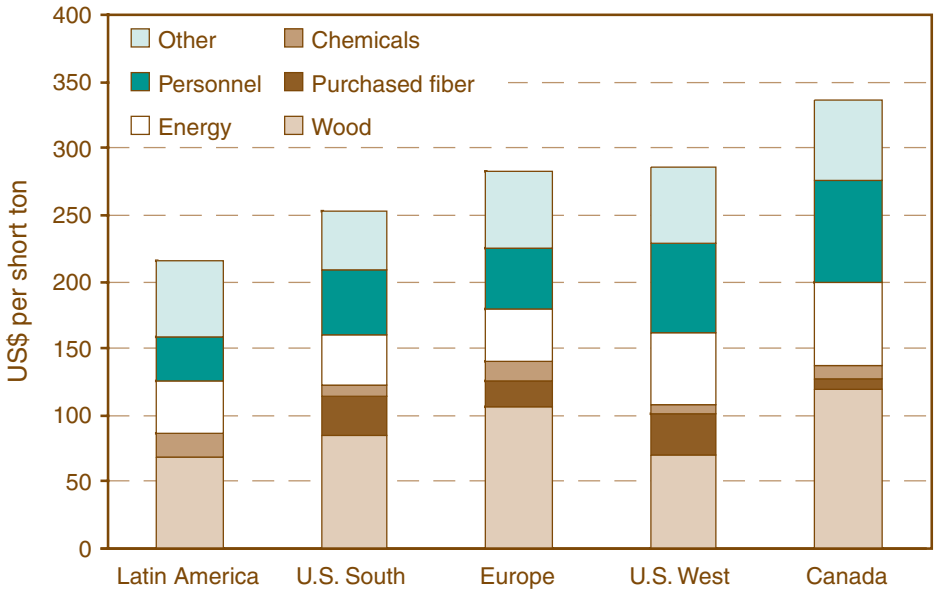

Figure 14—Kraft linerboard mills manufacturing costs, 2003. (Source: Jaakko Poyry Management Consulting.)

Fiber and labor costs are significantly higher in more industrialized countries than in South America. The U.S. South retains comparative advantage because of its proximity to U.S. demand centers, i.e., because of lower transportation costs, but labor and wood input cost differentials make Latin American producers viable competitors.

In 1995, 1999, and 2004, both Brazilian and Chilean producers could deliver both coniferous and nonconiferous (mostly eucalyptus) pulpwood to mills at substantially lower cost than could producers in the U.S. South (figs. 15 and 16). In 2004, delivered fiber costs were 24 and 27 percent less in Brazil and Chile, respectively, for coniferous pulpwood, and were 21 and 27 percent less for nonconiferous pulpwood. Price differentials are not static, however, and prices in Brazil and Chile have risen since 1999, relative to those found in the Southern United States. The comparative advantage held by these nations would decrease if this trend were to continue.

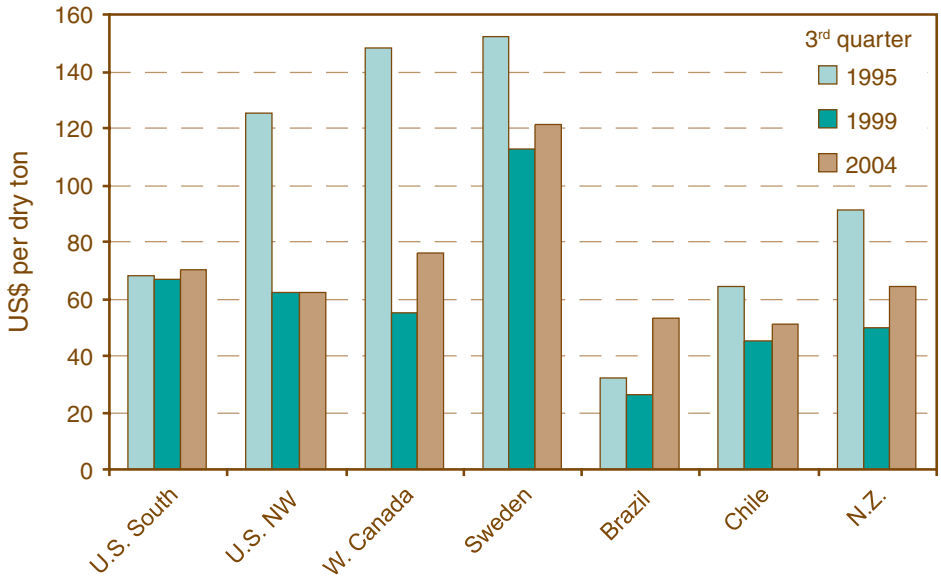

Figure 15—Delivered coniferous pulpwood prices. (Source: Wood Resources International.)

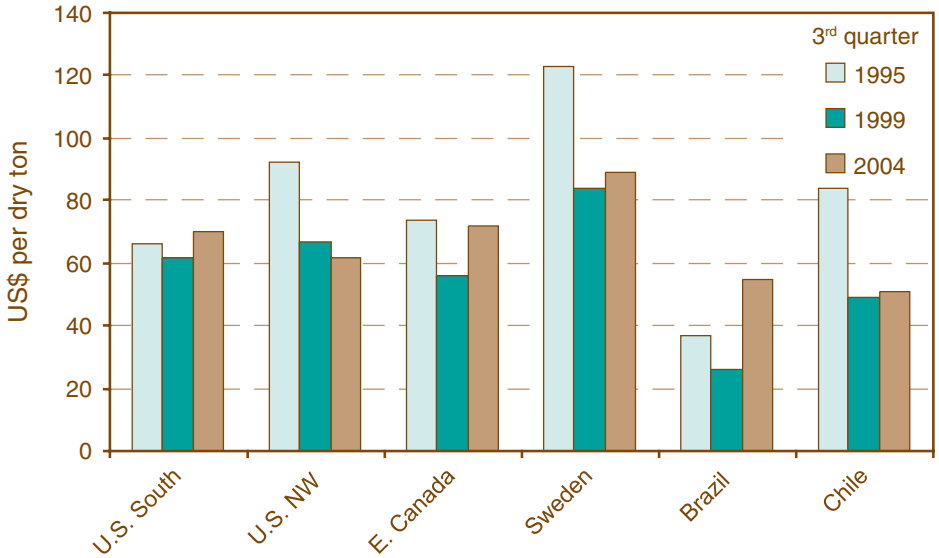

Figure 16—Delivered nonconiferous pulpwood prices. (Source: Wood Resources International.)

Solid Wood Sector

The large majority of the solid wood produced in the region goes into lumber and panel products. Panel products and lumber utilize about 46 percent of fiber products generated in the South. The region's lumber mills, unlike its pulp and paper mills, are widely dispersed (fig. 17).

Unlike southern pulpwood capacity, southern softwood sawmill capacity has not declined. Softwood sawmill capacity remained stable or increased slightly between 2000 and 2003 (fig. 18), even as capacity in the Western United States declined. Comparable data are not available for hardwood lumber capacity in the South, but sustained production and prices generally do not signal declines in capacity.

Southern panel capacity expanded significantly in the 1990s (fig. 19). Southern pine plywood, which dominated panel production through the 1970s, peaked in the 1990s and has since declined. Capacity for producing OSB and medium-density fiberboard grew strongly through the 1990s. More recent data indicate that although southern panel production has remained stable, OSB production has continued to grow (fig. 20). Expanding OSB capacity coupled with declining plywood capacity indicates increasing demand for less expensive, small-diameter timber, especially compared to demand for the veneer logs used in plywood production.

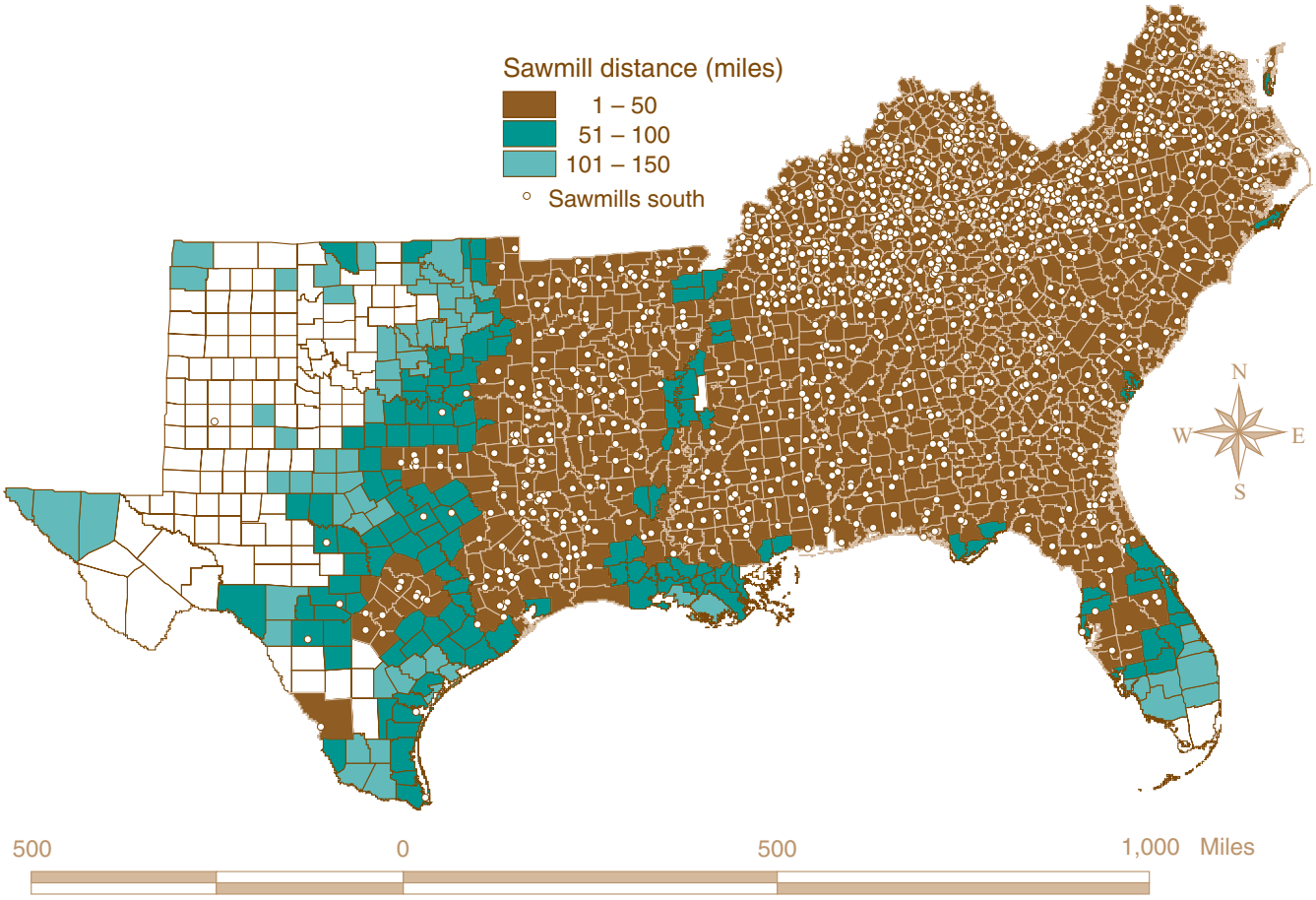

Figure 17—Average distance in miles by county from the forested center of the county to the closest five sawmills within 150 miles. White dots are sawmills within the Southern States. Note that the universe of all sawmills within the United States was used in the distance calculation. (Source: R. Huggett, preliminary findings, economics of biomass removals, U.S. Department of Agriculture Forest Service, Research Triangle Park, NC.)

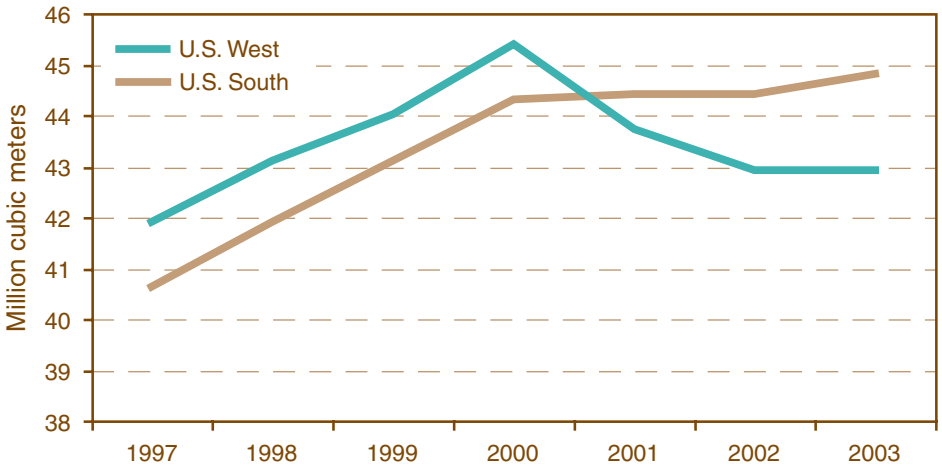

Figure 18—Softwood sawmill capacity. (Source: Spelter and Alderman 2003.)

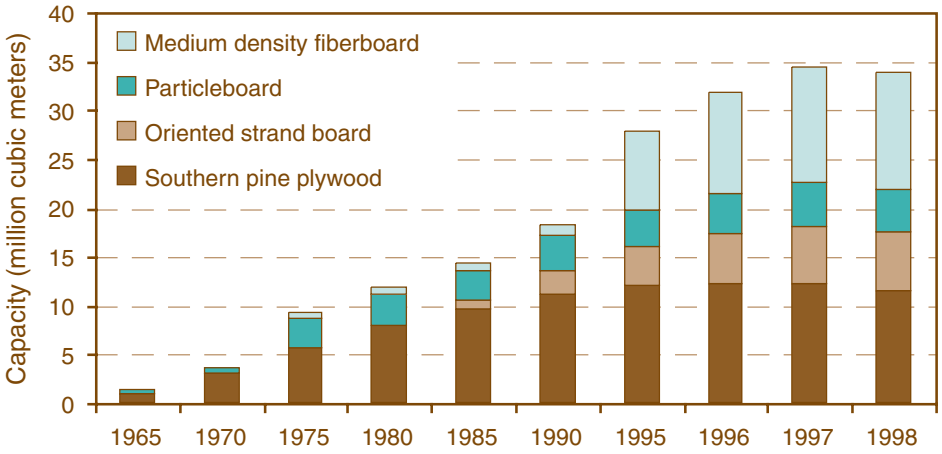

Figure 19—Panel capacity in the U.S. South. (Source: McKeever and Spelter 1998.)

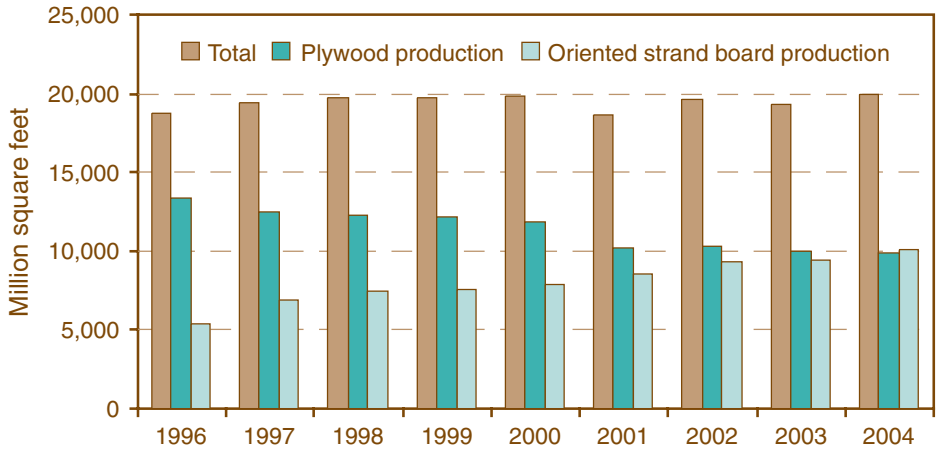

Figure 20—Southern panel production. (Source: The Engineered Wood Association.)

International Trade in Wood Products

The United States is both the world's largest importer and producer and the second largest exporter of wood products. Imports and exports of both raw and value-added wood products can directly affect domestic demand for timber. Increasing forest product imports may correspond with reduced demand for domestically grown timber, thus helping to depress domestic stumpage prices both in the short and long run. In this section we examine exports and imports for both raw materials and finished wood products.

Trade in wood products needs to be viewed in the context of international economic conditions. While there are many reasons for changes in trade flows, the increase in imports and expanding overall U.S. trade deficit in forest products during the 1990s may have been related to the rising value of the U.S. dollar relative to foreign currencies during that same period (fig. 21). Economic doctrine suggests that exports increase and imports decrease when a domestic currency weakens relative to currencies of a nation's trading partners. Since 2002, the value of the dollar relative to the value of other currencies has declined, which suggests that the comparative position of U.S. manufacturers may be improving. However, changes in exchange rates take time to play out in terms of trade flows, and some evidence suggests that exchange rate shifts make little difference in the long run in forest products trade, as other costs of production and supply-and-demand factors adjust to accommodate them (Uusivuori and Buongiorno 1991). It is too early to say definitively how recent weakening in the dollar will affect forest products trade.

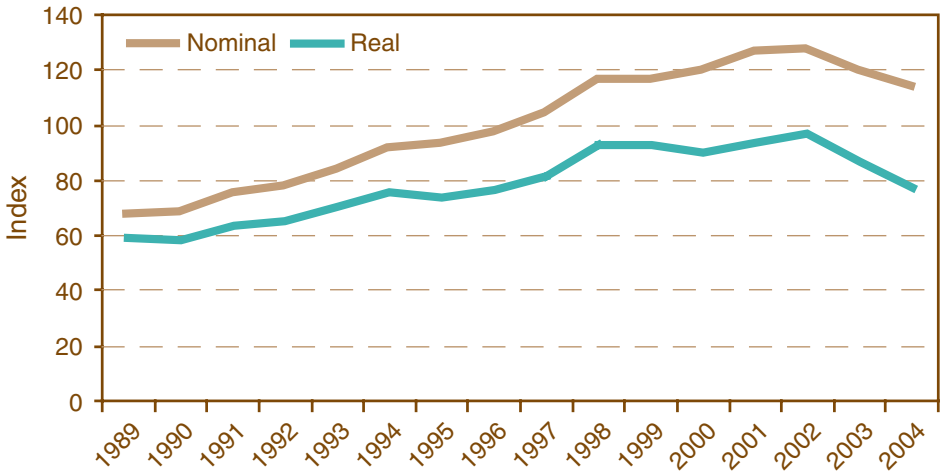

Figure 21—U.S. broad dollar index. (Source: United States Federal Reserve.)

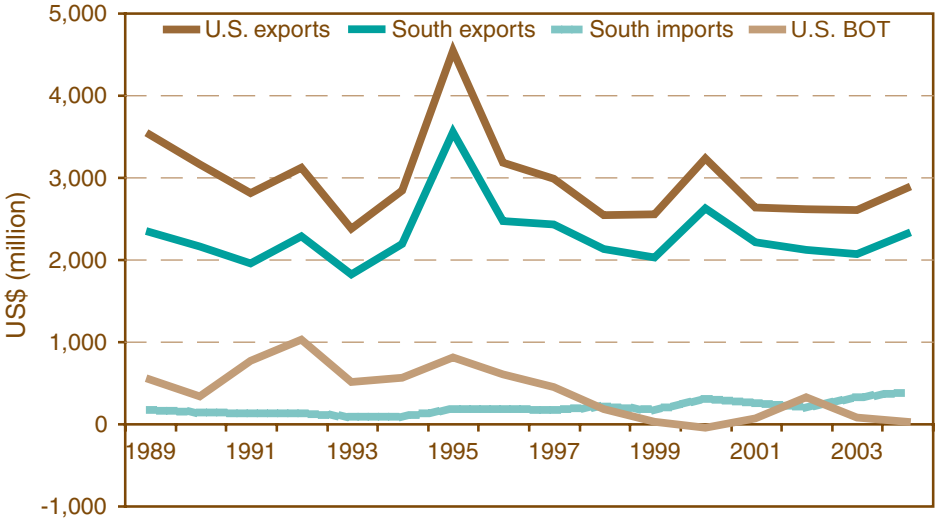

Figure 22—U.S. trade in wood pulp and the balance of trade (BOT). (Source: U.S. International Trade Commission.)

Raw Material Trade

Wood pulp—The value of wood pulp imports and exports demonstrated a cyclical pattern with no strong trends between 1989 and 2003 (fig. 22). The U.S. balance of trade in wood pulp has been roughly even in recent years, i.e., imports have equaled exports. However, U.S. southern ports exported approximately seven times what was imported. Between 1989 and 2003, Canada was the largest and Brazil the second largest source of wood pulp imported into the United States (fig. 23). For producers in the U.S. South, the level of Brazilian imports—primarily hardwood pulp—factors mostly into local markets, and these imports are used to meet specific furnish demands. Brazilian imports into southern ports have risen sharply since the early 1990s (figs. 24 and 25). Still, overall imports into Southern States in 2004 only accounted for between 2 and 3 percent of total southern wood pulp consumption.

Wood chips—Unlike patterns of trade in wood pulp, patterns of trade in wood chips have changed substantially since the late 1980s. Until 2003, Canada was the leading source of wood chips imported into the United States, providing chips for Northern U.S. producers. However, after peaking in 1997, Canadian wood chip sales to the United States have declined to less than one-third of their peak level (fig. 26). Producers in the southern hemisphere have also supplied wood chips to the United States at various times. In the mid-1990s Chile provided as much as one-third of total wood chip imports into the United States. In 2004, imports from Brazil increased more than fivefold compared to 2003, and Brazil became the largest supplier of wood chips imported into the United States. Imports from Brazil are delivered mainly to Southern U.S. ports (figs. 27 and 28). Southern chip imports in 2004 represented only about 0.9 percent of total southern pulpwood consumption and about 3 percent of total southern

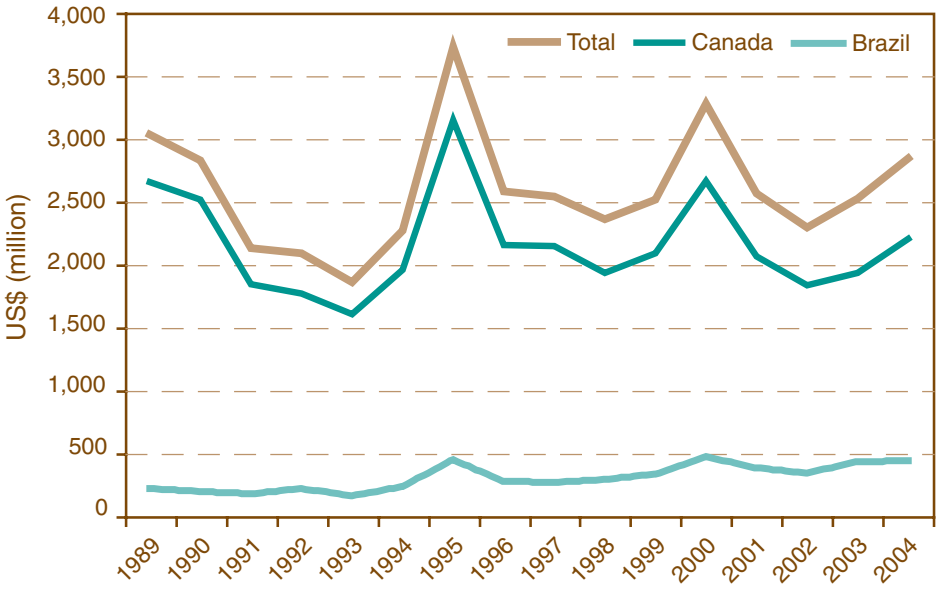

Figure 23—Wood pulp imports into the United States. (Source: U.S. International Trade Commission.)

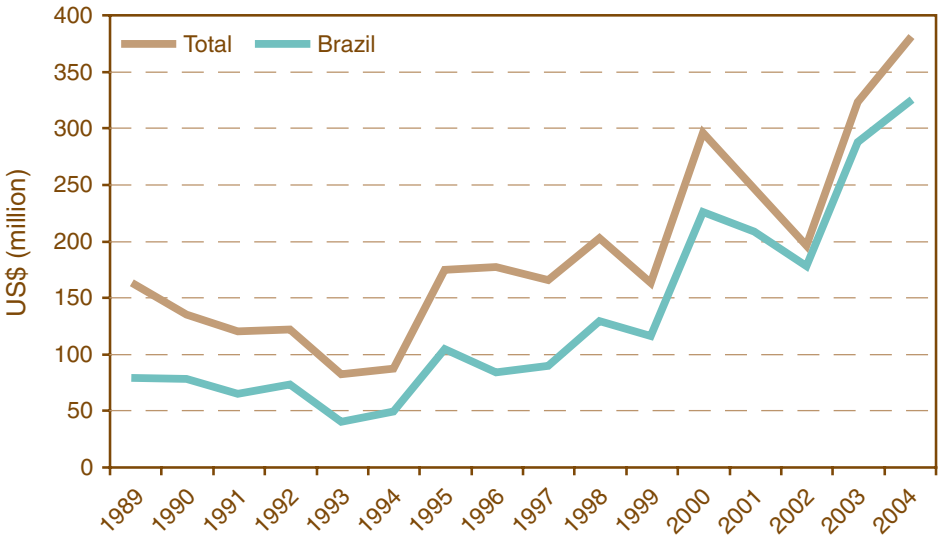

Figure 24—Wood pulp imports into southern customs districts. (Source: U.S. International Trade Commission.)

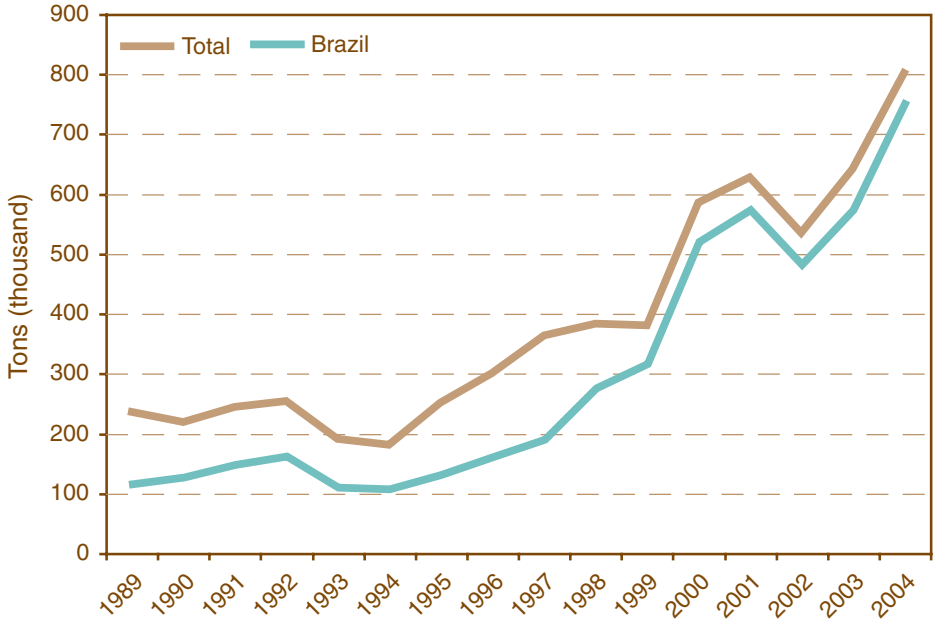

Figure 25—Wood pulp imports into southern customs districts. (Source: U.S. International Trade Commission.)

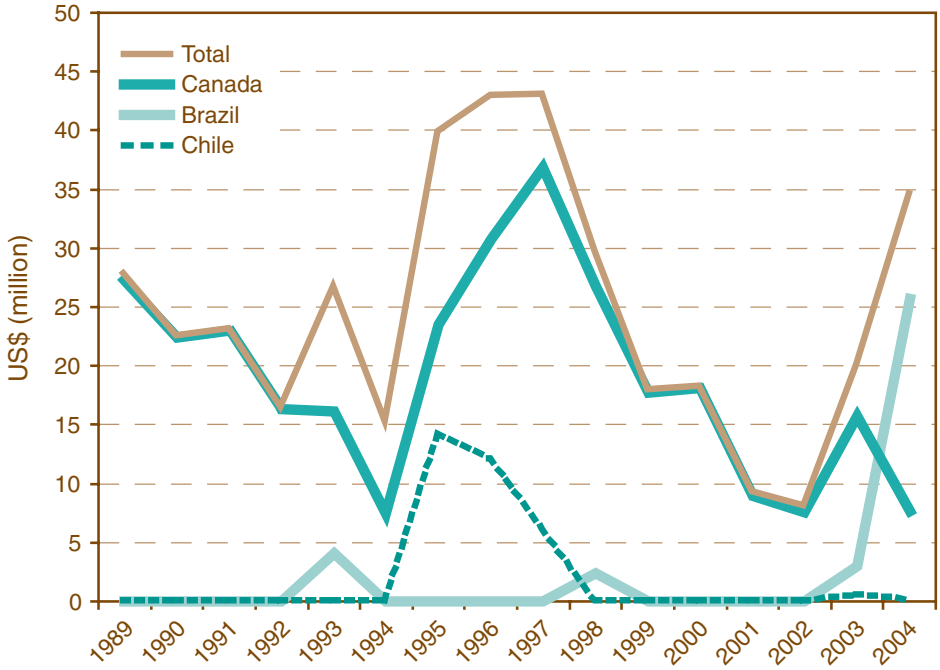

Figure 26—Wood chips imports into the United States. (Source: U.S. International Trade Commission.)

hardwood pulpwood consumption. Most of these imports enter the United States at Mobile, AL, and a few ports in Florida, so localized impacts on hardwood markets near these ports could be significant.

The surge in Brazilian chip imports is the expected response to domestic price increases resulting from local scarcity of hardwoods. In addition, eucalyptus chips, a highly preferred fiber source for some paper grades, may be preferred over native hardwoods. The extent to which hardwood chip imports from South America might increase over the coming years is unknown. However, it is likely that prices of chip imports from South America now define a ceiling for domestic hardwood stumpage prices in certain areas of the South.

Since the beginning of our time series on wood chips, 1989, the United States has had a large trade surplus in wood chips (fig. 29), i.e., exports have far exceeded imports. Since 1999, however, the trade surplus in wood chips has fallen steadily, from around $515 million in the mid-1990s to $126 million in 2004.

Roughly 80 percent of wood chip exports from the United States have been shipped to Japan; the remainder flows to Canada (fig. 30). While exports to Canada have increased somewhat in recent years, exports to Japan have fallen off dramatically. Between 1991 and 2002, nearly all of the wood chips exported from Southern U.S. ports were shipped to Japan (figs. 31 and 32). Exports of wood chip exports from southern ports essentially ceased by 2002.

This decline in southern chip exports—primarily hardwood chips—to Japan was equivalent to 5 percent of total southern pulpwood production in 2003 and nearly 16 percent of southern hardwood pulpwood production. Most of the imports and exports of wood chips into and out of southern ports have been through Mobile, AL, and we might expect the economic impacts of demand shifts to radiate outward in declining fashion from this port of entry.

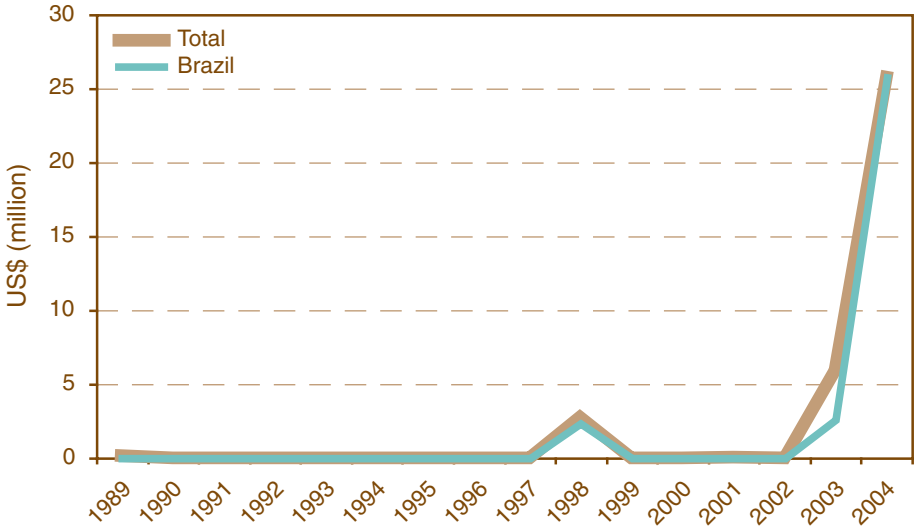

Figure 27—Wood chips imports into southern customs districts in dollars. (Source: U.S. International Trade Commission.)

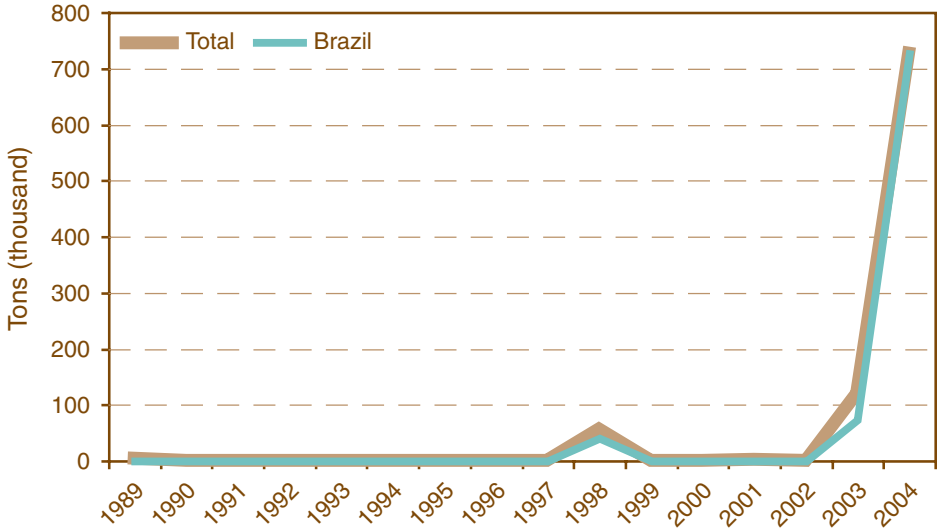

Figure 28—Wood chips imports into southern customs districts in tons. (Source: U.S. International Trade Commission.)

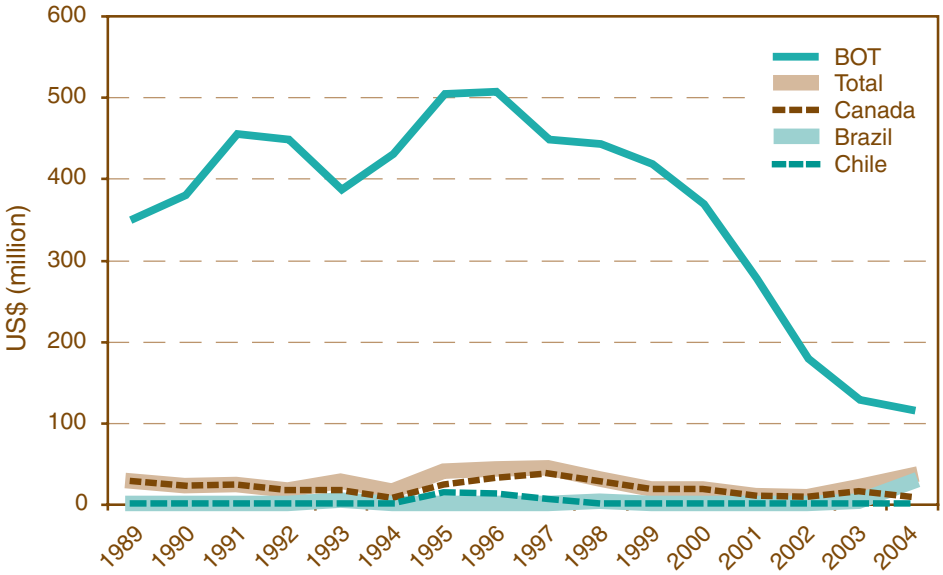

Figure 29—Wood chips imports into the United States and the balance of trade (BOT). (Source: U.S. International Trade Commission.)

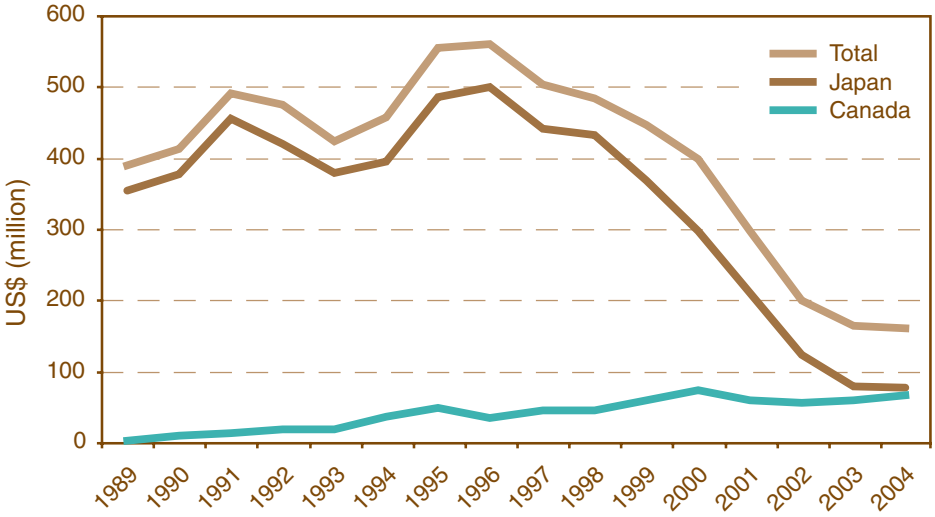

Figure 30—U.S. wood chips exports. (Source: U.S. International Trade Commission.)

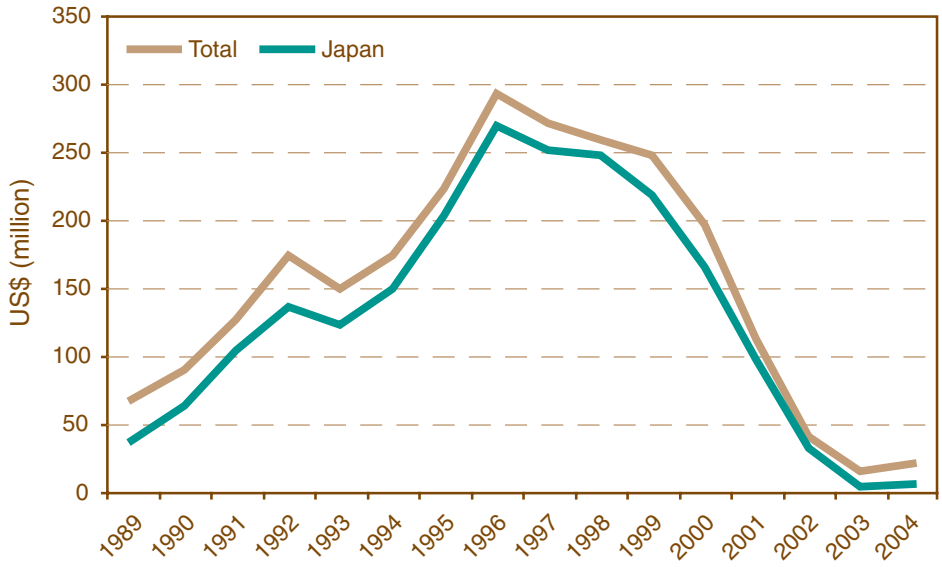

Figure 31—U.S. wood chips exports from southern customs districts in dollars. (Source: U.S. International Trade Commission.)

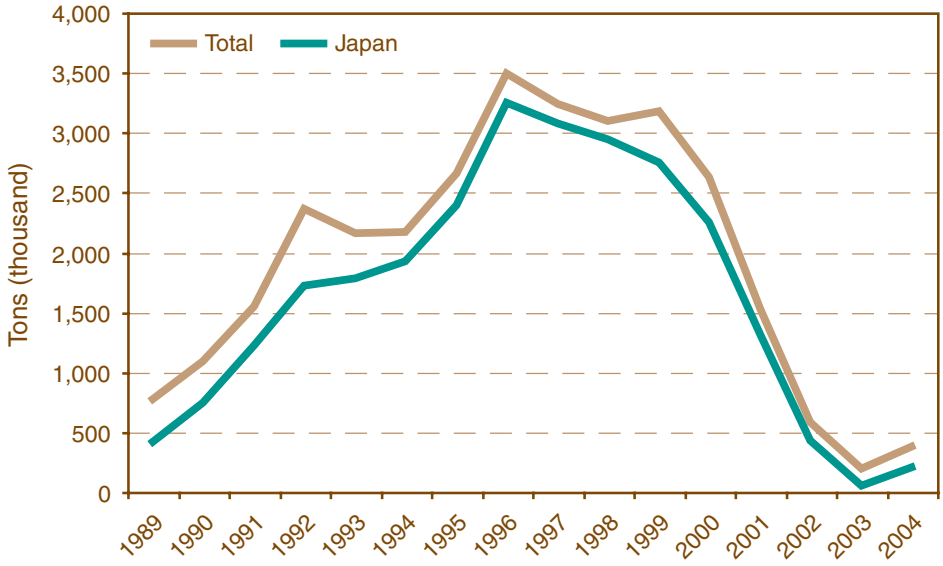

Figure 32—U.S. wood chips exports from southern customs districts in tons. (Source: U.S. International Trade Commission.)

Final Products Trade

Lumber—The United States is a large net importer of softwood lumber, and the vast majority of its lumber imports are from Canada (fig. 33). Lumber imports from South America, although relatively small between 1989 and 2004, have been rising steadily. The United States exports some lumber, but the balance of trade favors imports, and the trade deficit is growing (fig. 33).

The importation of lumber from Canada has an important influence on domestic timber markets, but the effects on southern markets are likely to be indirect. Lumber from Western Canada more directly substitutes for lumber of species that grow in the Western United States (Nagubadi and others 2004). The lumber products that are now imported into the United States are generally not directly substitutable for treated lumber produced in the South.

As it is in overall timber products, the United States is the world's largest producer (60 percent) and its largest consumer (52 percent) of temperate hardwood lumber. About 8 percent of domestic production is exported to various countries. Hardwood lumber is a much more heterogeneous commodity than softwood lumber, so its production and trade serves a wide variety of end uses, from flooring to furniture to shipping pallets. Aggregate data provide only a very general description of trends in this sector. Also, we cannot split out trade data for the Southeastern United States, so we use data for the United States as a whole to evaluate hardwood lumber market changes. Note that about 10 percent of hardwood exports are from the Pacific Northwest [especially red alder (*Alnus rubra* Bong.)] and about 90 percent are from the Eastern United States.

Exports of hardwood lumber increased from about 2 million m^3 in 1989 to just over 3 million m^3 in 2004 (fig. 34). North America is the destination for the greatest share of hardwood lumber produced in the United States, followed by East Asia and the 25 countries of the European Union. All other countries together receive about 10 percent of hardwood exports from the United States. The distribution of exports among these destinations has changed somewhat since 1989, with shipments to Europe declining and shipments to other countries in North America, i.e., Canada and Mexico, increasing substantially (fig. 34). Shipments to East Asia have been essentially constant in aggregate, with a changing mix of destinations. Specifically, shipments to China have increased by a large amount since the 1990s while shipments to other countries in Asia have declined by a comparable amount.

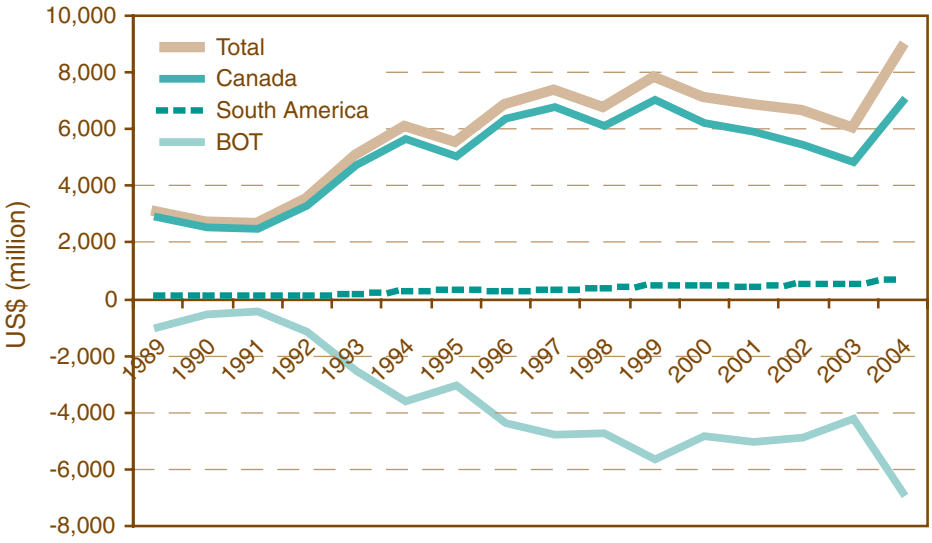

Figure 33—Sawnwood imports and the balance of trade (BOT). (Source: U.S. International Trade Commission.)

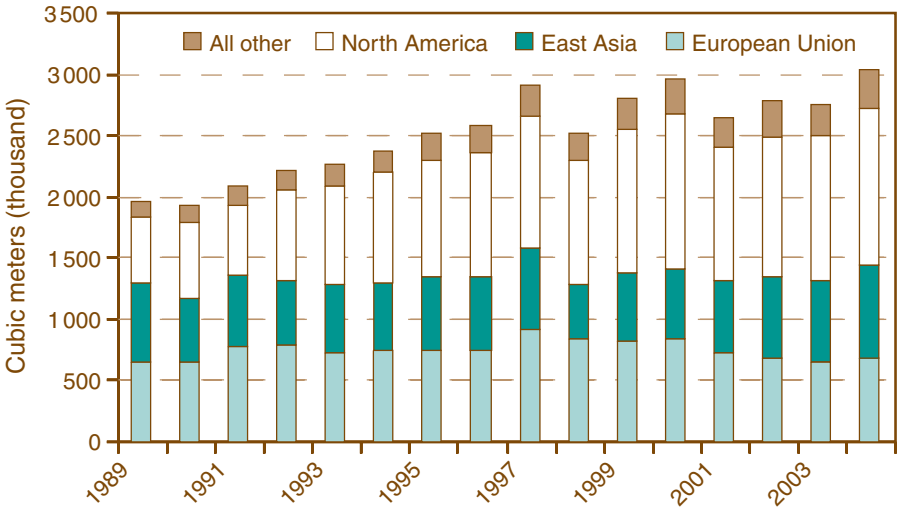

Figure 34—Exports of U.S. hardwood lumber to various regions (1989–2004). Source: Foreign Agricultural Service web site (www.fas.usda.gov).

Southern exports of softwood lumber have been relatively small and have declined over the last decade (fig. 35). Softwood lumber exports in 2004 were only about one-third the amount exported in 1992. Southern softwood lumber exports account for only between 1 and 2 percent of total southern softwood lumber production.

Panels—Trade in panel products is weighted toward imports. For example, the United States imported about 15 percent of plywood consumption and 38 percent of OSB consumption in

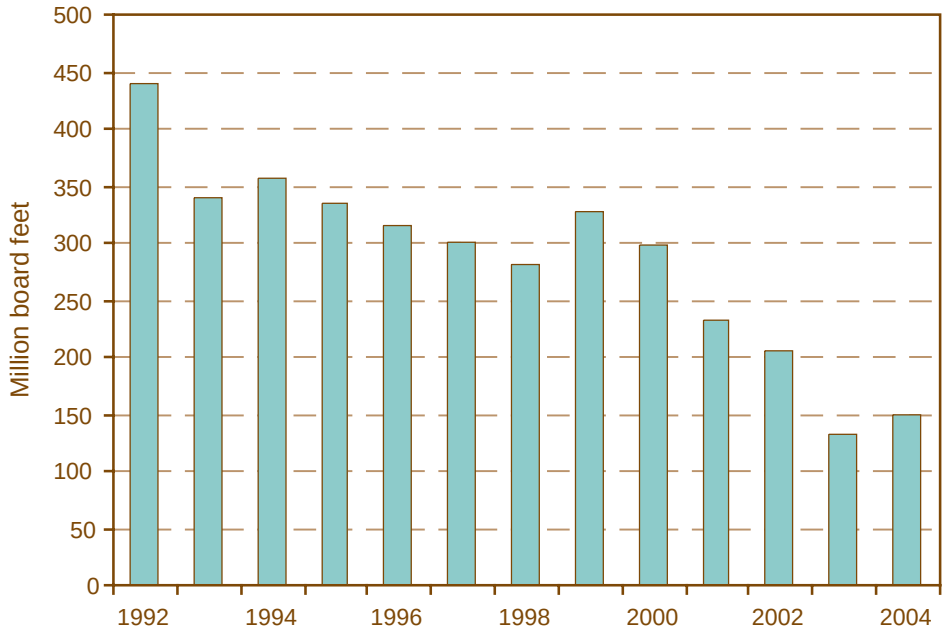

Figure 35—U.S. lumber exports from southern customs districts. (Source: U.S. International Trade Commission.)

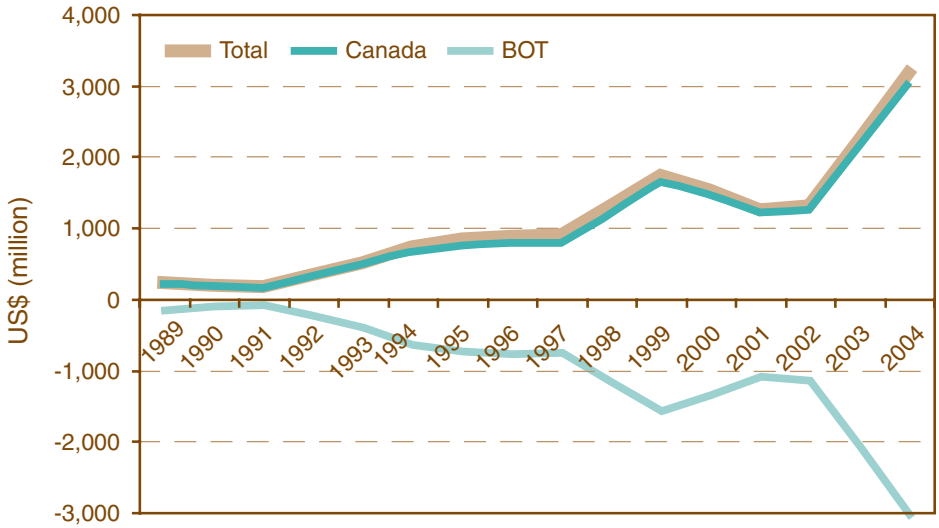

Figure 36—Particleboard, oriented strand board, and wafer board imports and the balance of trade (BOT). (Source: U.S. International Trade Commission.)

1999 (Spelter 2001). Nearly all of these panel imports came from Canada. Particleboard, wafer board, and OSB imports from Canada grew strongly in recent years, increasing from $1.53 billion in 1999 to $3.16 billion in 2004. U.S. exports in this category are negligible (fig. 36).

OSB markets are in a period of rapid expansion, and new mills in Canada and the United States are planned (Spelter 2001). North America will continue to dominate world production in this commodity class, but the trade balance within North America—especially between Canada and the United States—could change as the sector expands. A decline in pulpwood demand in the South may give the United States additional comparative advantage for the siting of new North American mills.

Key Observations—Demand

- Consumption of lumber in the United States has grown at a lower rate than housing starts, indicating some substitution away from lumber as a building material.
- Both nonwood and engineered wood products have substituted for lumber in many applications. For example, the share of floors, walls, and roofs made with wood is about constant but there is a shift toward greater use of engineered wood products.
- Electronic media are substituting for paper.
- A majority of pulping capacity in the United States is located in the South, but this share has declined since the mid-1990s.
- Pulping capacity in the South, an indicator of long-term demand, has declined by 16 percent since 1998.
- Increasing world demand for paper products is leading to expansion in paper production capacity in countries other than the United States.
- Shifts in capacity indicate that the United States has lost some of its comparative advantage for producing paper for the world market. Possible causes of this decrease in comparative advantage are disadvantageous resource and labor costs and location of the United States relative to major world demand centers.
- Overall, there is no indication that domestic demand for southern pulpwood will increase.
- Softwood lumber production capacity in the South has increased steadily in recent years (1997–2003).
- Softwood lumber production capacity in other regions of the United States outside of the South has declined.
- There is no indication of declining demand for softwood sawtimber and some indication of increasing demand.
- Expansion in panel capacity indicates ongoing strong demand for low-quality hardwood and softwood material for engineered wood panels.
- Wood pulp imports are a relatively small portion of wood products consumption in the South (between 2 and 3 percent).

- Although small, wood pulp imports to southern customs districts, and especially imports from Brazil, have increased since 1998.
- Up to 8 percent of domestic demand for pulpwood has been displaced by changes in trade, the majority (5 percent) by loss of wood chip export markets.
- Almost all lumber imports are from Canada, with a small but increasing share from South America.
- Imports from Canada do not displace demand for treated southern pine lumber.
- Exports of southern pine lumber are very small and have declined substantially since 1998.

Supply Factors

Timber supply defines how landowners deliver timber to market in response to timber prices and, in the longer run, a variety of other signals. Several factors make it difficult to analyze the timber supply situation. These factors include the long production period involved in growing trees, the multiple benefits that landowners can derive from standing forests, and constant change in the land base from which timber is produced. It is tempting to think of supply as simply the relationship between harvests and prices or, even more simply, the amount of standing timber inventory, but these other factors need to be accounted for. In this section, we examine several factors that influence supply. We start by examining the area of timberland in the South, focusing especially on recent trends in and projections of forest area. We then examine the structure of timberland ownership in the region, which in many ways describes the management intent applied to the timberland base. Next we evaluate changes in inventory over time and investment activities that provide insights into future changes in production.

Competing Uses of Land

The area of timberland provides the starting point for an analysis of timber supply. Total timberland area within the South was relatively stable throughout much of the 20th century, with about a 5-percent reduction in the 1970s tied to agricultural expansion (fig. 37). This stability in overall area reflects many offsetting changes, as land has shifted from marginal agricultural uses to forest cover at about the same rate as forests have been converted to developed uses. Changes have not been distributed across the region evenly. Since the 1950s, forest losses tied primarily to agricultural expansion were concentrated in Texas, Florida, Oklahoma, Louisiana, and Arkansas. Alabama, Georgia, Mississippi, and South Carolina saw the largest gains in forest area over this period. Modest changes were observed for the remaining States (fig. 38).

Research conducted for the "Southern Forest Resource Assessment" (Wear and Greis 2002) indicates that the South's forests have been and will continue to be subjected to strong pressure resulting from population and economic growth in the region. Future losses of forest area are, therefore, projected to be greatest in areas where growth is most rapid: the Southern Appalachian Piedmont in the Carolinas and Georgia. Other areas of projected high forest loss include counties located along the Atlantic and Gulf of Mexico coasts (including nearly all of Florida), the Southern Appalachian Mountains, and zones surrounding

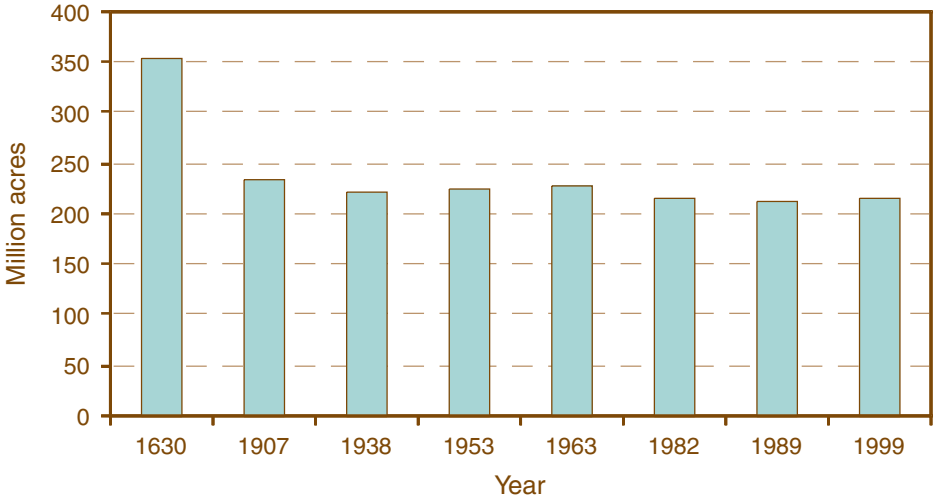

Figure 37—Total timberland area in the South.

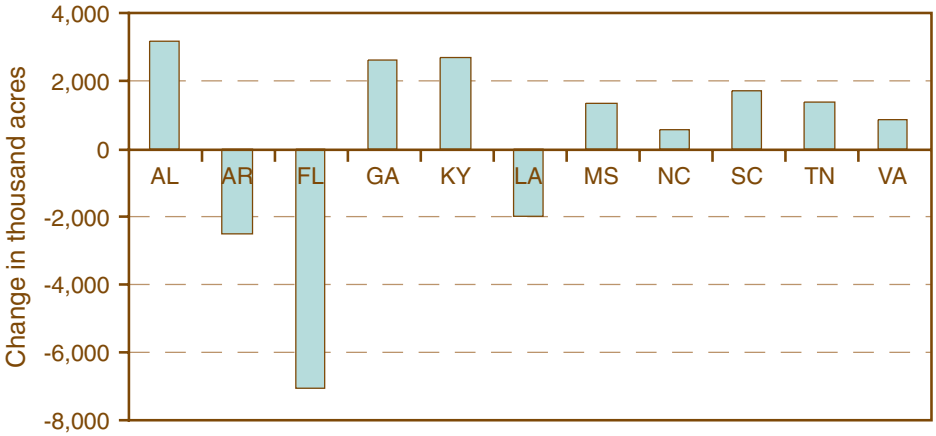

Figure 38—Change in forest area 1945–92 by State. (Source: U.S. Department of Agriculture Forest Service, Forest Inventory and Analysis survey data.)

some metropolitan areas, including Washington, DC, Birmingham, AL, and Nashville, TN. About 12 million acres are projected to be lost to urbanization between 1992 and 2020 and another 19 million acres between 2020 and 2040, continuing trends observed in the 1990s (fig. 39).

The total change in timberland area depends on whether rural areas of the South will experience increases in forest. While urbanization could eliminate about 12 percent of current forested areas in the region by 2020, forecasts of forest investment indicate that nearly the same amount of land might be converted from crop and pasture to forest uses over the same period. The key factors in determining this change are the relative returns to agricultural and forest uses. Moderate increases (about 0.5 percent per year) in timber prices combined with unchanging agricultural returns would yield a "no net loss" scenario for forestland. Unchanging prices for both agricultural and forest products yield no offsetting gains in forests from agricultural land and, therefore, a net loss of about 31 million acres by 2040. Changes in agricultural policy could also affect this margin. Decreases in agricultural subsidies could lead to increases in forestland uses.

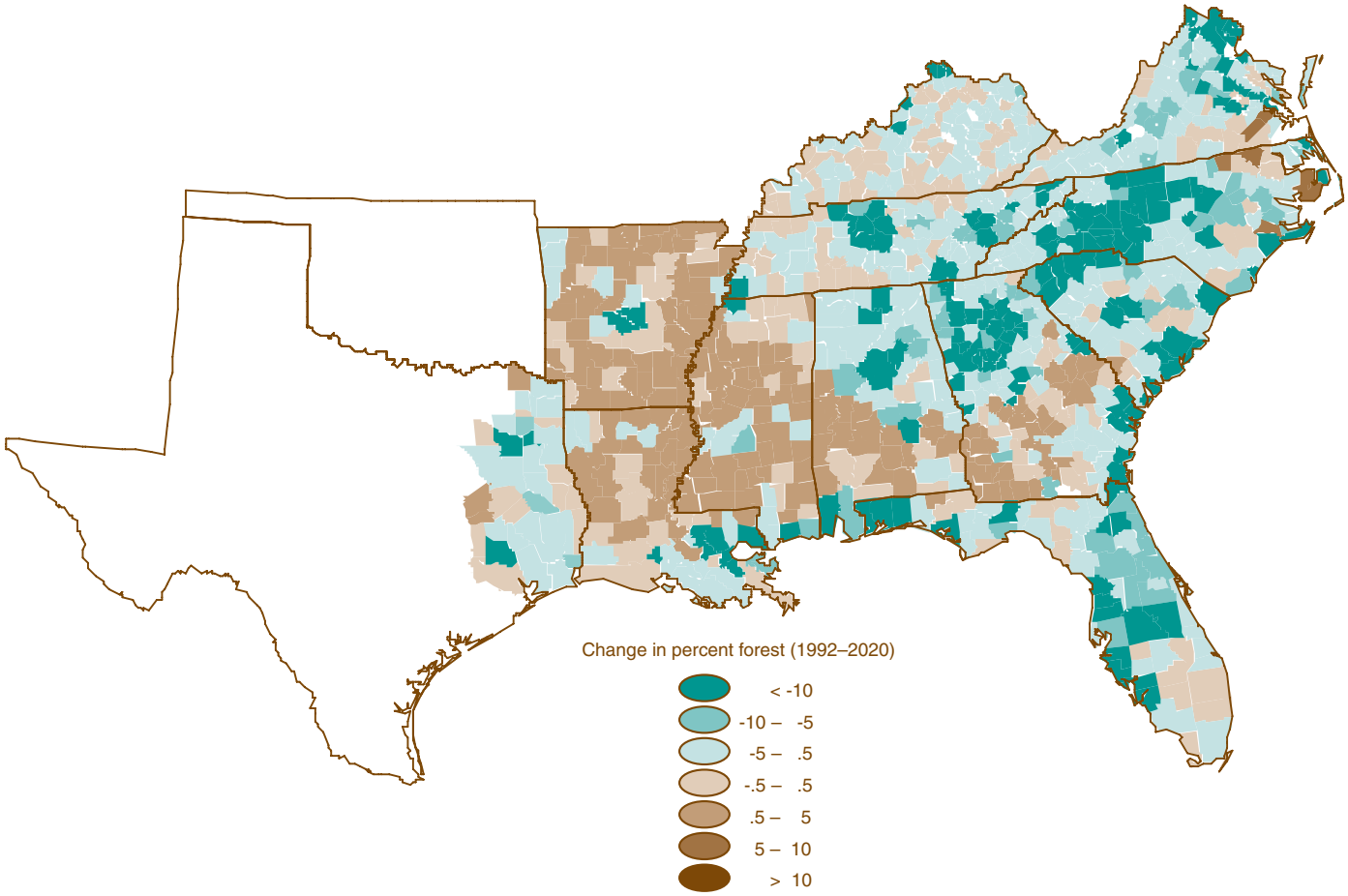

Figure 39—Projected change in percent of forest between 1992 and 2020 by county in the Southeastern United States. (Source: Wear and Greis 2002.)

Timberland Area

Forestland use can be split into two distinct subcategories based on forest origin and management type. Naturally regenerated forests, consisting of natural pine, mixed pine-hardwood, and various hardwood forest management types, can be viewed as largely a residual land use—most were not established with the intent of producing timber, and are located where neither development nor agricultural uses could be justified. Forest plantations are the other major subcategory of timberland. Establishing these forests requires a direct application of financial capital, which generally implies intent to harvest timber at some time. Plantation forestry, which has been limited to pine species in the South, is an agricultural style of forest management that is displacing harvests from naturally regenerated stands.

Pine plantations have expanded steadily, from practically none in 1950 to more than 30 million acres in the late 1990s (fig. 40). They now account for about 16 percent of all timberland. On a per-acre basis, these forests can produce up to three times the quantity of timber products that naturally regenerated forests produce. Perhaps the strongest signal of the market's perspective on future timber supplies is current efforts to establish and intensively manage pine plantations.

Steady gains in the price of hardwood pulpwood over the past 25 years (fig. 41) have not triggered investment in hardwood plantations. This indicates that current and anticipated prices are not high enough to justify the capital costs of establishing these plantations. This can be explained either by strong supplies of hardwood timber from naturally regenerated forests, limited growth rate improvements for hardwood plantations compared to naturally regenerated hardwood forests or competing planted pine investments, the unavailability of a profitable technology for intensive management of hardwoods, or the ready availability of low-cost hardwood chips, e.g., from South America.

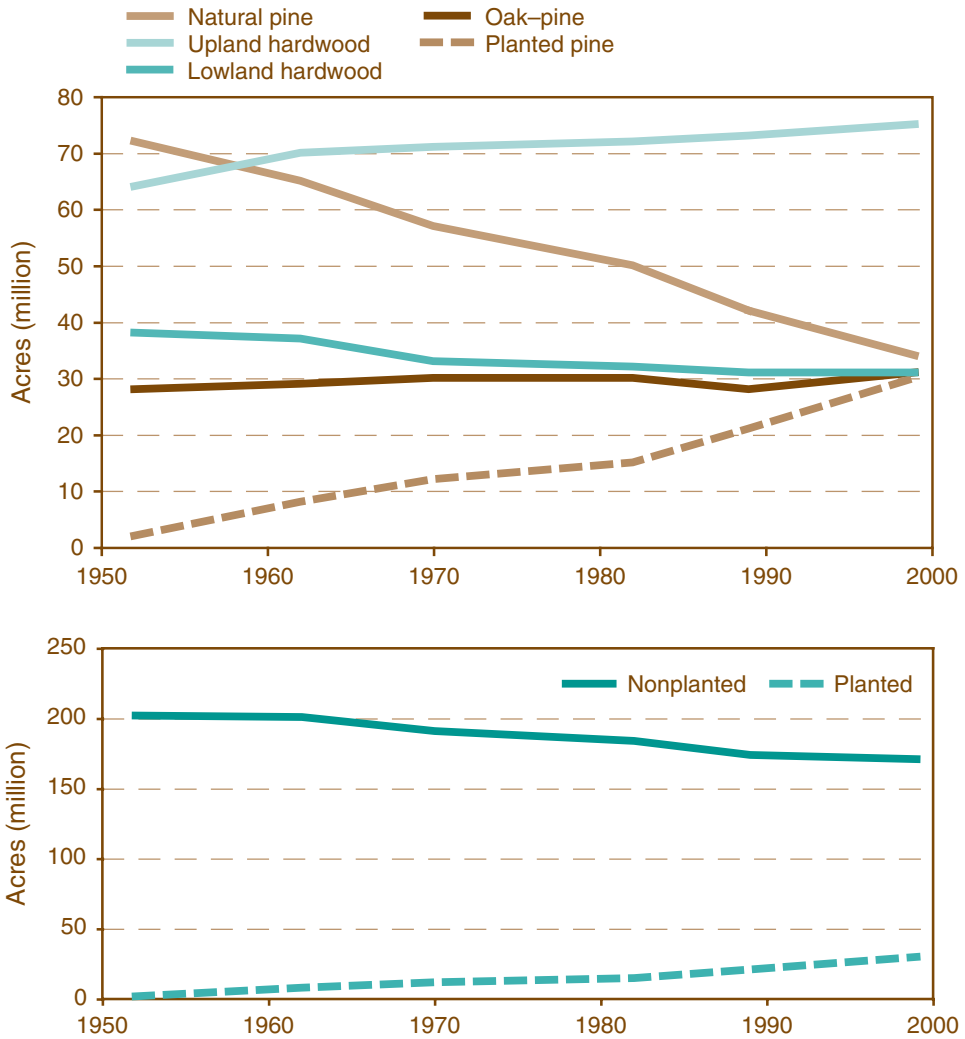

Figure 40—Acres by forest management type. (Source: U.S. Department of Agriculture Forest Service, Forest Inventory and Analysis data summarized by Conner and Hartsell 2002.)

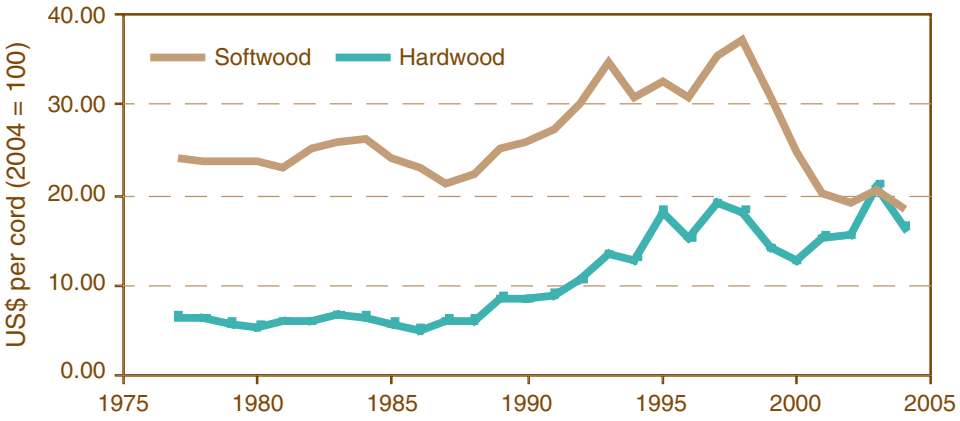

Figure 41—Real prices of hardwood and softwood pulpwood in the U.S. South. (Source: Timber Mart-South.)

Timberland Investments

Investment can be thought of as the dedication of today's capital to tomorrow's production. In forestry, there are two principal types of investment. One is the investment of financial capital in forest establishment and direct management activities such as site preparation and precommercial thinning. The other is simply the decision to let forests grow. This latter type of investment in forest growing represents a much higher capital cost than direct investments (Wear 1994). Still, tree planting is a strong indicator of the degree of expansionary investment in the forest sector and, therefore, of how private landowners perceive future markets.

Planting in the South appears to be strongly influenced by market signals, i.e., anticipated returns to the planting investment (see Newman and Wear 1993). However, it has also been influenced by governmental programs that reduce the costs of forest establishment for nonindustrial forest owners. Federal programs have encouraged tree planting on nonindustrial private forest lands with the objective of enhancing future timber supplies (for example, the Forestry Incentives Program) or achieving conservation objectives by planting agricultural fields (for example, the Conservation Reserve Program, or CRP). In addition, several States have employed similar tree planting programs for private landowners.

Tree planting in the South grew from essentially none in 1945 to an average of between 1.5 and 2 million acres per year in the 1990s (fig. 42). The pattern of tree planting shows distinct spikes in the 1960s and 1980s corresponding to the Soil Bank and CRP tree planting programs, respectively. These programs were restricted to nonindustrial private forest lands. Except during these two periods, tree planting has been dominated by forest industry and concentrated on the 20 percent of timberland controlled by this ownership. In the period between the Soil Bank and CRPs, the industry share of planting rose to about 70 percent of the total. Since the CRP, industry planting has constituted about 50 percent of total planting.

Tree planting has two components. One is the replacement of harvested plantations. There is a strong incentive to replant harvested plantations since a decision to postpone planting after harvest allows for natural regeneration and, therefore, increased costs for any delayed planting. The other component is expansionary investment—that is, the establishment of new tree plantations on agricultural fields or where naturally regenerated stands have been harvested.

By comparing tree planting with changes in the inventory of plantations in the South, we can estimate the amount of expansionary investment implied by planting activities (fig. 43). Expansionary investment dominated planting through the Soil Bank period and up to 1970. Throughout the 1970s and 1980s, however, replacement investment far exceeded the amount of expansionary investment as the first wave of plantations came on line for harvesting. Expansionary investment started to grow again in the early 1980s and reached about 1 million acres per year in the late 1980s. It remained at this level through the 1990s. Total tree planting fell by about

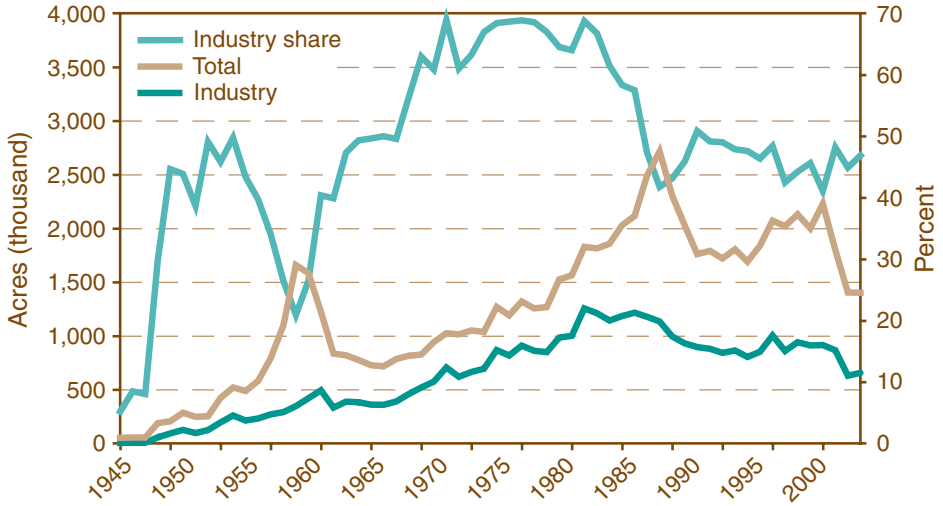

Figure 42—Total area planted in trees in the U.S. South, all ownerships (industry, nonindustrial private, and public) and the industry ownership. [Sources: 1945–99: Robert F. Moulton (2000); 2000–04: Steve Chapman, Georgia Forestry Commission (2005).]

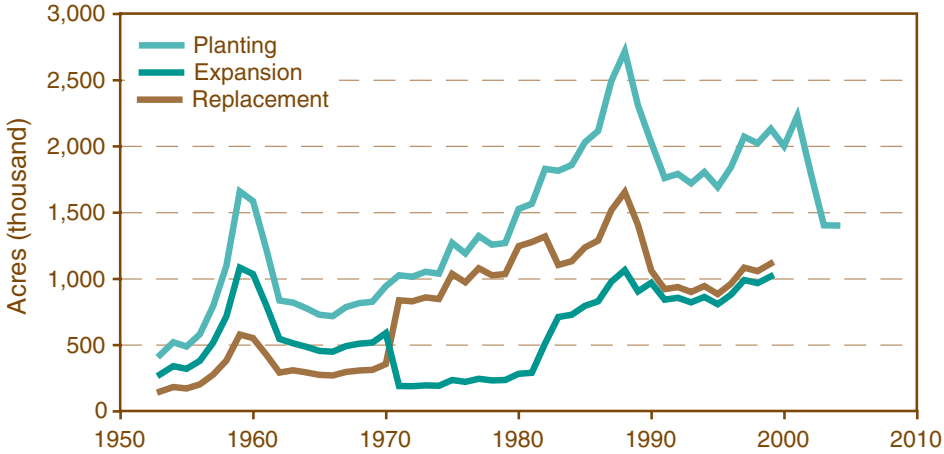

Figure 43—Total tree planting in the U.S. South with estimates of both expansion and replacement planting (see appendix).

30 percent between 2001 and 2004, suggesting a reduction in the amount of expansionary investment, perhaps back to the levels observed in the late 1970s.[3]

Investment levels correspond with market patterns described earlier. During the growth phase, between 1986 and 1998, landowners sustained the highest levels of market-driven investment, both in terms of total investment and expansionary investment. With the onset of the adjustment phase, tree planting fell substantially. The amount of this decline is roughly equivalent to the level of expansionary investment, which suggests that forest investment has fallen to a level roughly equal to replacement investment. At a minimum, we can say that expansionary investment was at relatively low levels in 2003 and 2004.

Because timber growing is a very lengthy process, the expansionary investment activity that characterized the 1986–98 growth phase will likely result in an increase in the inventory of standing timber for a long time to come. Hence, even with the slowdown in investment that began in 2002, the supply of softwood products, especially softwood pulpwood, should continue to grow.

Land Ownership Changes

Research into the economics of timber management has identified important distinctions between different ownership groups (e.g., Newman and Wear 1993, Pattanayak and others 2004). In particular, these studies have documented more productive management focus on forest industry lands compared to all other ownerships. As a result of investment patterns described in the previous section, the 20 percent of timberland managed by industry in the late 1990s contains more than 60 percent of the region's plantations. In effect, management on industry lands has been the most responsive to timber scarcity signals since 1970.

Changes in the wood products sector since 1999 have initiated a restructuring of forest capital whose implications for timber supply are not yet understood. Forest industry ownership, which stood at about 40 million acres in 1999, may have fallen to about 20 million acres in 2005.[4] An extension of ongoing trends and plans announced by wood products firms suggest that very little timberland may be owned by the forest products industry by 2010.

Sales of forest industry land may have several causes and implications. Some of these forests simply have much higher value in a developed use, and their sale is just a part of the general urbanization process described earlier. A recent study (Wear and Newman 2004) indicates that in 2002, about 6 to 7 percent of industry timberland in Georgia was in a land value class that could not be sustained by timber production alone, i.e., a conversion class. By the year 2010, 25 percent of Georgia timberland will be in the conversion class if the population grows as expected (fig. 44). These estimates are consistent with land use projections from the "Southern Forest Resource Assessment" (Wear and Greis 2002).

Who will own the timberland that is not converted to another use and how will that timberland be managed? Much of the most productive timberland is being sold to timber investment management organizations (TIMOs), which act largely as fiduciaries when timberland is used as an investment instrument. Many of these investments are held by pension funds and are tied to closed-end and other funds that tend to trade frequently. The implication of greater TIMO ownership seems to be a more rapid turnover in forest ownership and the potential for ongoing parcelization of timberland ownership into smaller sized properties.

TIMOs have strong incentives to maximize returns and will draw capital to forest investments in strong markets. It seems clear, however, that management will be characterized by a shorter time horizon and that timber inventory and timber supply could be less stable with this large-scale change in forest ownership.

Another implication of industry divestiture is the greater reliance by industry on timber produced by private landowners and the TIMOs. This could increase the price sensitivity of the timber owning sector to demand changes, increasing the volatility of timber prices. Furthermore, given that industry has historically accounted for a large share of the increase in pine plantation area, the divestiture of these lands by industry could foretell a continued lower rate of pine plantation growth. As Prestemon and Abt (2002) indicate, reduction in the rate of pine plantation expansion is connected to greater total forest losses in the long run.

Finally, we might speculate that the loss of industry ownership in the South could lead to reduced investment in timber growing research and development. The consequences of such a pullback are difficult to foresee but may leave the United States in a worse position to compete globally in the long run, if other countries maintain or increase their research into timber production technologies.

Key Observations—Supply

- Timberland area within the South was relatively stable through the 20th century.
- Ongoing urbanization is focused in the Piedmont and along the coasts. Forest loss is projected by recent research to be highest in the Southeast (from Virginia to Florida).
- Agricultural prices are such that increased timber prices or a reduction in agricultural subsidies could lead to an expansion of pine plantations on agricultural lands.
- Timber sector studies project that the South could experience changes ranging from no net loss of forest to a net loss of 31 million acres by 2040 (16 percent of forests), depending on the future price of timber.
- In spite of strong growth in prices of hardwood pulpwood, there has been little investment in hardwood production, i.e., hardwood plantations.

[3] We do not have a definitive estimate of expansionary investment since 1999 because comparable inventory estimates of plantation area are not available. However, planting rates fell much more than the rate of harvest, indicating a strong contraction in expansionary investment.

[4] Clutter, M.; Mendell, B.; Newman, D. [and others]. Strategic factors driving timberland ownership changes in the U.S. South. Manuscript in preparation. Author can be reached at The Center for Forest Business, University of Georgia, Athens, GA 30602.

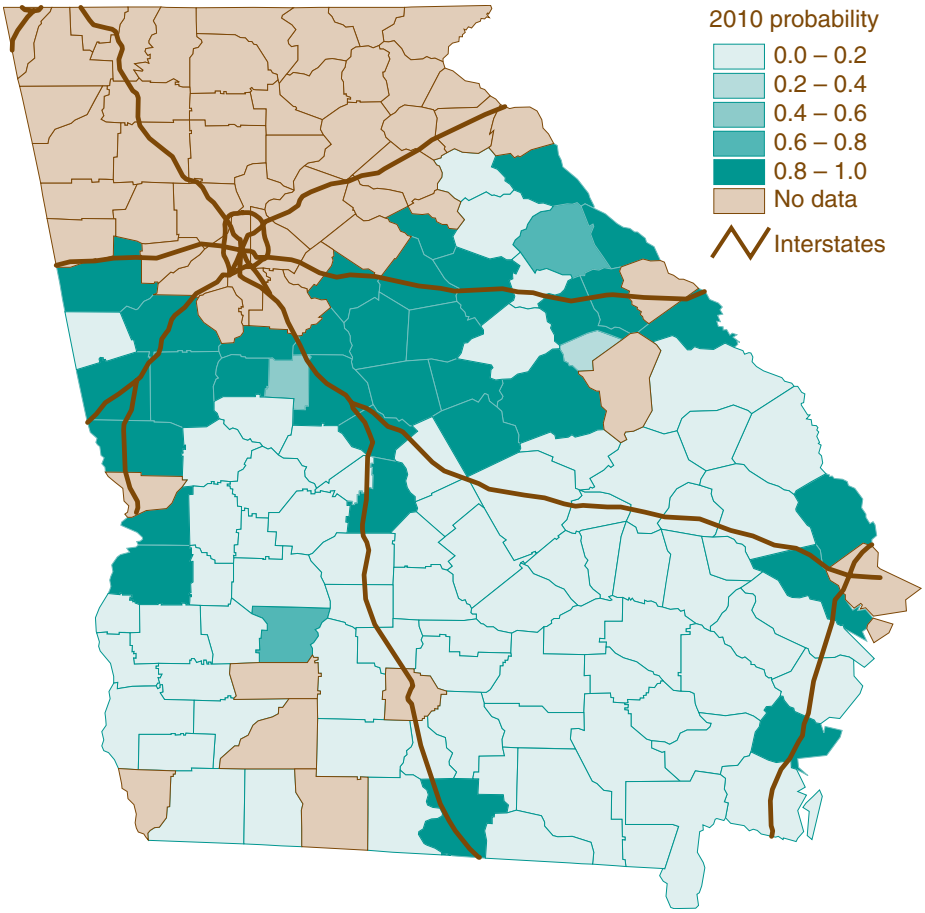

Figure 44—Forecast of the percent of industry timberland in a land conversion-value class in Georgia, 2010. (Source: Wear and Newman 2004.)

- If planting that was subsidized under the Soil Bank and CRPs is not counted, planting of pines increased at a steady rate between 1945 and 1998.
- Except during the Soil Bank and CRP periods, industry has done a disproportionately high share of tree planting (45 to 70 percent of planting with only about 20 percent of timberland).
- Tree planting has served as both replacement and expansionary investment. In the 1990s, levels of expansionary and replacement investment were each about 1 million acres per year.
- Recent declines in planting indicate a reduction in expansionary investment since the late 1990s.
- The supply effects of recent reductions in expansionary investment will not be felt for some time.
- Forest products firms, which hold a disproportionately high share of the forest capital, have been selling much of their lands, about 50 percent by 2005, compared to 1999 levels.
- Some industry land sales are explained by urbanization pressures, but most of the land sold is expected to remain in timber production in the near term.
- The shift toward TIMO management may entail more parcelization and fragmentation of timberland ownership. The shift may also lead to a less stable supply of timber, more volatile timber prices, and a slower rate of increase in the area of pine plantations.
- Divestiture of industry lands could lead to lower overall investments in timber research and development, leaving producers in the U.S. South less able to compete against foreign producers in the long run.

Conclusions and Implications

Our focus in this assessment of timber markets in the Southeastern United States has been on understanding the demand and supply factors that have played out in the markets for various timber products. Below, we synthesize our findings into a listing of the significant forces driving change in markets for timber products in the South.

1. The demand for domestically produced timber products has shifted downward in the United States. Consumption of solid wood products has not grown at the same pace as housing starts, and the per capita consumption of paper has declined over the past 10 years, after being relatively stable for many years. These declines in domestic production and per capita consumption of some timber products have been coupled with a substantial decline in the off-shore demand for U.S.-produced timber products. Exports of wood chips fell from its peak in 1998 to nearly zero exports in 2003.

2. The supply of domestically produced timber products has continued to expand outward since the late 1990s. Timber supply is a function of the amount of land dedicated to forest growing and the intensity of management. The area of timberland has remained fairly constant since the 1970s, and the area of intensively managed (planted) forests continued to expand through the 1990s (that is, expansionary investment continued even after production and prices fell). Because timber is a long-lived asset, supply could continue to move outward and dampen prices for years. The effects of recent declines in planting may not be felt for several more years.

3. Fundamentals of economics indicate that a substantial downward shift in demand coupled with a constant to increasing supply leads to (a) a decline in output and (b) a disproportionately strong decline in prices. This is exactly what has been observed in pulpwood markets—especially softwood pulpwood markets—since 1998.

4. An evaluation of investment of wood products firms in manufacturing capacity within the region provides insights into futre production potential. Capacity for lumber production has remained strong, while capacity for paper production has declined since the late 1990s. Indications are, therefore, that demand for pulpwood to produce paper may not rebound to early 1990s levels in the foreseeable future. Long-term demand for solid wood products appears strong, however.

5. Persistent low prices for softwood pulpwood may indicate opportunities for the manufacture of other products from this product class. Indeed, several firms have recently announced plans to build plants to produce OSB in many of the areas where pulpmills have closed. Announced plants are not always built, but the number of announcements indicates that expansion in this sector will provide additional demand for pulpwood in the next 5 years.

6. Upward pressure on hardwood pulpwood prices and downward pressure on softwood pulpwood prices combine to provide incentives to shift industrial production toward utilization of softwoods. Indeed, after a long period of substituting hardwood for softwood in paper production, we might expect to see an increase in the share of softwood inputs.

7. Imports of hardwood chips into the South remain relatively small compared to the total consumption. However, it appears that if hardwood chip prices rise above thresholds already reached in parts of the region, e.g., in Florida, then imports from South America become a viable alternative to domestic production. The existence of this backstop supply of plentiful eucalyptus chips indicates that future hardwood pulpwood prices may have a ceiling in the region.

Concerns about southern timber markets have necessarily shifted from a focus on supply issues to a focus on demand issues. Forest investment, driven by both market forces and tree-planting programs, has produced plentiful and sustainable timber supplies and supported a more than doubling of timber production over a 30-year period. Forecasting models (e.g., Prestemon and Abt 2002) indicate that the region can readily supply even more timber. While some uncertainties regarding supply may be indicated by the divestiture of forest industry lands, they are at least partially quelled by a surge of investment capital into the sector from pension funds and other sources.

The big question is, how will demand respond in the future? We find little evidence that there will be a strong rebound in demand for pulpwood for paper production or a return of chip export markets. Increased production of OSB and other engineered wood products may increase demand for pulpwood-sized materials, but this effect has not yet fully offset declines in demand from the paper sector. This means that softwood pulpwood prices are not likely to rebound to mid-1990s levels anytime soon. Emergence of biomass energy markets may affect demand in the future but this is highly uncertain at this time.

Acknowledgments

The research reported here was supported by the Southern Group of State Foresters and the U.S. Department of Agriculture Forest Service through the Southern Region and the Southern Research Station. The issues addressed in this report were initially raised by an expert panel convened to examine changes in timber markets in the U.S. South. Members of the expert panel were: Robert Abt, North Carolina State University; Douglas Carter, University of Florida; Michael Clutter, University of Georgia; Jim Gan, Texas A&M University; Ian Munn, Mississippi State University; David Newman, University of Georgia; Jeff Prestemon, Forest Service; Jacek Siry, University of Georgia; and David Wear, Forest Service.

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Appendix:
Data Notes

Throughout this report, we document the sources of data upon which discussions are based. In this section we document cases where additional analysis was applied to the published data.

Recent Trends in the Forest Sector

Harvest quantities

Roundwood output for the U.S. South is taken from the U.S. Department of Agriculture Forest Service Timber Product Output system maintained by the Forest Inventory and Analysis Research Work Unit. Reports of roundwood output for the region have been developed for the RPA National Inventory Database for the years 1952, 1962, 1977, 1981, 1996, and 2001 (see, e.g., Smith and others 2001, 2004). Comparable annual pulpwood production data have been compiled for the region (see, e.g., Johnson and Steppleton 2005). We constructed an annual series of softwood saw-log production by interpolating between the RPA reporting years based on the production of softwood lumber within the region.

Prices

We constructed price indices by product class for the U.S. South based on prices reported for substate regions by Timber Mart-South. The index is an average weighted by inventory volumes of the respective regions. Prices are adjusted for inflation by the consumer price index for all urban consumers.

Demand Factors

No entry for this section.

Supply Factors

Tree planting data—area of planting activity—were obtained from various reports (see Prestemon and Abt 2002 for a compilation) and personal communications with analysts who have tracked the data for the final 4 years of the time series.[1] To separate expansion from replacement investment, we compared planting with changes in the inventory of plantations reported for various years in Conner and Hartsell (2002). The increase in reported plantations was assumed to equal the amount of expansionary investment for the period. This amount was assigned to individual years for the period based on gross planting. The remainder (total planting minus expansionary investment) was defined as replacement investment.

[1] Personal communication. 2005. S. Chapman, Georgia Forestry Commission, Macon, GA.

Wear, David N.; Carter, Douglas R.; Prestemon, Jeffrey. 2007. The U.S. South's timber sector in 2005: a prospective analysis of recent change. Gen. Tech. Rep. SRS-99. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 29 p.

Forest product markets are an important part of rural economies of the U.S. South, but recent changes in timber markets have raised questions about the future. Several factors have altered forest products markets since the late 1990s, including industry consolidations and associated changes in land ownership, changes in domestic consumption patterns and international trade patterns, and depreciation and closure of older processing facilities. The focus of this assessment of timber markets is on understanding how these and other demand-and-supply factors have affected the markets for various timber products. Our findings suggest that the demand for domestically produced timber products has declined somewhat in the United States, as domestic demands as well as exports have fallen. At the same time, the supply of domestically produced timber products has continued to expand since the late 1990s. The net result of these demand-and-supply changes may be (a) a decline in timber product output and (b) a disproportionately strong decline in associated prices. An evaluation of investment of wood products firms in manufacturing capacity within the region provides insights into future production potential. Paper production capacity has declined since the late 1990s, while lumber production capacity has remained near 1990s levels. Indications are, therefore, that demand for pulpwood to produce paper may not rebound to late 1990s levels in the foreseeable future. However, persistent low prices for softwood pulpwood could indicate long-term opportunities for the manufacture of other products from this product class. Long-term demand for solid wood products appears strong, signaling that a relatively favorable investment climate should exist in this part of the forest sector.

Keywords: Demand and supply factors, forest products markets, investment climate, long-term demand, paper production capacity.

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