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WHEN WILL SOUTHERN SAWLOG MARKETS RECOVER?
Shaping Expectations of Timberland Investments in the U.S. South

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Executive Summary

Some timberland investors have expressed measures of concern that softwood sawlog markets in the U.S. South, the largest investable timberland region in the world, have languished since the fallout of the U.S. housing market in 2007. This extended downturn in southern sawlog markets is important to investors because timber prices are a significant driver of timberland returns.

The depressed sawlog market in the South is the result of harvest rates falling below growth rates. Sawtimber harvests across the South went from 21 billion board feet (bbf) in 2006 to 13.7 bbf in 2009, a 35 percent drop, and remained 21 percent below the peak as recently as 2017. However, biological growth in the commercial forests of the South has been adding 18 bbf of sawtimber every year. Because biological growth has been outpacing harvest levels, the standing inventory of sawtimber in the South has grown. This has created a surplus of wood, which has kept prices depressed in recent years.

Despite the long period of anemic pricing for pine sawtimber, there is reason for optimism – particularly for owners of southern timberland assets. This is primarily because domestic demand for lumber is rising and the two other, major softwood-producing regions of North America, the U.S. Pacific Northwest and western Canada, have limited ability to respond. This is positioning southern timberland owners and manufacturers of solid wood products with operations in the U.S. South to capture greater amounts of market share. This opportunity largely is being driven by a wave of capital investments that have been made in the South by major lumber and building products manufacturers, which have sought to significantly expand their regional output capacity.

As southern sawmills increase their production, sawlog harvest rates in the South will be pushed above regional timber growth rates. Consequently, the inventory of sawtimber available on the stump in the South will decline gradually and bring greater balance to the region's supply and demand equation. This assessment can be quantified by using an econometric model that relates the ratio of timber removals and growth rates (an indicator of supply) to prices. Based on such an analysis, TIR projects that rising harvest levels will lift southern pine sawtimber prices from an average of \$24 a ton in 2017 to the 40-year average price of \$44 a ton within the next four to seven years. This will represent a potential increase of more than 80 percent. As would be anticipated, discreet micro-markets across the South will see their gains vary depending on the local availability of standing timber inventory and the composition and output capacity of their surrounding mill bases.



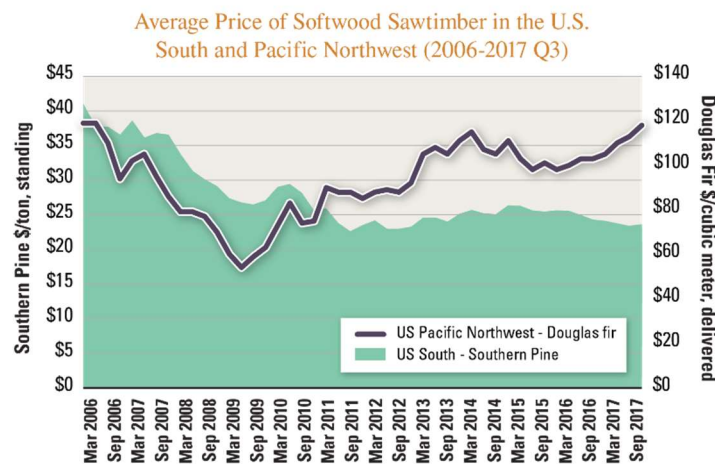
Timberland investors can take advantage of these developing market dynamics by (a) adjusting the regional allocation of their timberland holdings to include a greater percentage of southern assets; (b) increasing their allocations to timberland, in general, within their real assets portfolios; (c) adjusting the timing of dispositions and harvests on their forest holdings in the South; and (d) emphasizing the growth of sawtimber within their southern plantation assets.

Introduction

The U.S. South¹ is the largest investable timberland region in the world. Of the US\$48 billion invested in forest assets with professional timberland investment management organizations (TIMOs) worldwide in 2017, 44 percent of these investments were located in the U.S. South.² Of the US\$15.5 billion of large timberland properties that exchanged hands in the United States over the past five years (through 2016), close to half, or assets valued at approximately US\$6.9 billion, were located in the U.S. South.³

Given the U.S. South's prominent role in the timberland asset space, a number of timberland investors have expressed concern in recent years that the region's wood markets generally have languished for much of the last decade. As the chart below illustrates, the average stumpage price of pine sawtimber – the bellwether timber product in the South – fell from a cyclic high of \$41 per ton in 2006 to a low of \$22 per ton in 2011. This represented a dramatic drop of 46 percent. Furthermore,

Figure 1. Average price of standing Southern sawtimber in the U.S. South and delivered Douglas fir sawtimber in the U.S. Pacific Northwest. Sources: Timber Mart-South, Wood Resource Quarterly



prices have barely risen from their low points in the six years since (Figure 1). In contrast, the price for Douglas fir, the bellwether softwood timber specie found in the U.S. Pacific Northwest, has already recovered to the previous cyclic high of \$118 per cubic meter. The

¹ The South comprises the states of Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Louisiana, Missouri, North Carolina, South Carolina, Tennessee, Texas and Virginia.

² TimberLink, survey of timberland investment management organizations (TIMOs), June 2017

³ Sources: *Timber Mart-South* and *RISI's Market News Quarterly*



average pricing difference in the two regions is largely attributable to the Pacific Northwest's ability to capitalize on strong exports to Asian markets, particularly China. The South, on the other hand, lacked competitive access to these regions of the world.

This extended downturn in southern sawlog markets has been important for investors because timber prices are a significant driver of timberland returns. Not surprisingly, weak log markets in the South have hurt timberland investment performance in the region. The one-year, three-year and five-year performance of institutional timberland investments in the South through the third quarter of 2017 trailed both the United States composite and the second largest timberland investment region, the U.S. Pacific Northwest.

Table 1. Trailing one-year, three-year and five-year time-weighted total returns of timberland investments in the U.S. South, U.S. Northwest and the entire United States, as measured by the National Council of Real Estate Fiduciaries (NCREIF) Timberland Property Index.

Period Ending 2017 Q3	U.S. South	U.S. Northwest	United States (All Regions)
One-Year	2.89%	5.18%	3.28%
Three-Year	5.04%	6.87%	5.24%
Five-Year	6.23%	10.55%	7.13%

It is therefore understandable that some investors have asked why southern log markets have remained depressed for so long and whether this will continue into the future. The trajectory of southern pine sawtimber markets is among the considerations many institutional investors are analyzing as they assess how best to adjust their hard-asset strategies. Given the prevailing circumstances, in some cases, investors are asking whether divesting of southern timberland makes sense. Alternatively, others are assessing whether it would be advisable to allocate even larger amounts of capital in the South based on the expectation that a significant sawtimber market recovery eventually will occur.

In this paper, we address three topics relating to these issues. First, we explore the reasons sawtimber markets in the South have been depressed for so long. Next, we provide a case for sawtimber prices returning to historically normal levels during the upcoming decade. Finally, we offer an assessment of how timberland investors can better position themselves to capitalize on the future market upswing that we believe will occur.



The Cause of the South's Long Period of Weak Sawtimber Prices

There is a simple explanation for why softwood sawlog prices fell dramatically in the late 2000s and have yet to recover: *supply outpaced demand*.

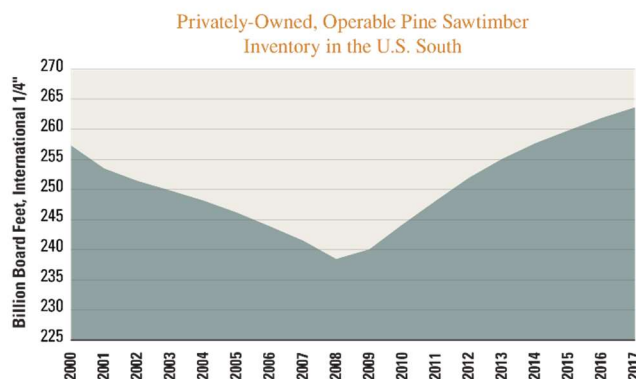
When the U.S. housing "bubble" broke during onset of the Great Financial Crisis in 2007, annual housing starts fell from 1.8 million in 2006 to 0.55 million in 2009. New home construction activity effectively dropped by two-thirds in a span of three years. As the housing market declined to record lows, demand for lumber also contracted dramatically. As sawmills cut production in response to this slackening demand, sawtimber harvests across the South went from 21 billion board feet (bbf) in 2006 to 13.7 bbf by 2009; a 35 percent drop. However, biological growth in the commercial forests of the South continued to add about 18 bbf of sawtimber each year. In other words, 4.2 bbf more pine sawtimber was grown than removed in 2009. Even as recently as 2017, growth outpaced harvest by 1.5 bbf (Figure 2).

Figure 2. Price and net removals (harvest over growth) of privately-owned operable pine sawtimber inventory in the U.S. South. A value above zero means inventory is declining. A negative value means inventory is increasing. Net removals include wood lost due to land-use conversion. Source: RISI.



In short, the depressed sawlog market in the South is the result of harvest rates falling well below growth rates for an extended period. If timber grows faster than harvest rates, inventory builds up (Figure 3), which, in turn, leads to a surplus of sawtimber growing in the vast pine plantations of the South. By some estimates, two years' worth of annual harvest has accumulated "on the stump" since 2008. Given this excess supply, sawlog prices in the region have not responded as quickly as might have been expected to the increasing activity in the housing market in recent years, or to the improving health of the economy in general. However, forest economists largely agree that this is a temporary condition.

Figure 3. Standing inventory of pine sawtimber on operable, privately-owned timberland in the U.S. South. Source: RISI.





A Case for a Recovery in Southern Pine Sawtimber Prices

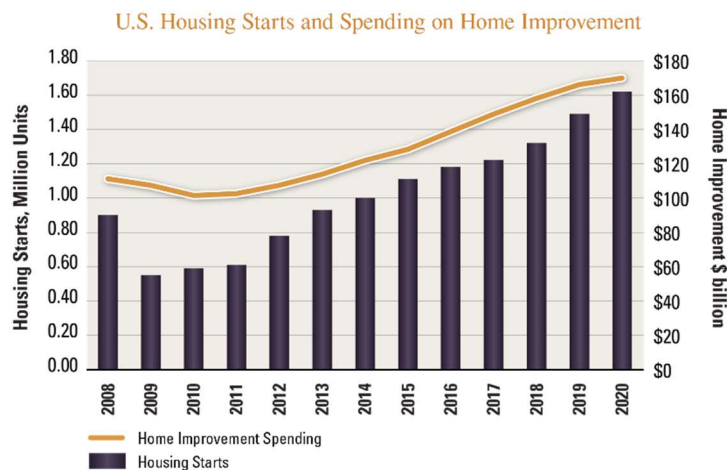
Despite the long period of anemic pricing for pine sawtimber across the South, there is reason for optimism. This argument can be summarized as follows:

Domestic demand for lumber is rising. Meanwhile, the Pacific Northwest and Canada will be limited going forward in their ability to respond to that rising demand. This will make it possible for the South to capture a larger share of the lumber market. In anticipation of this trend, significant capacity investments in the South by solid-wood product manufacturers based in the U.S., Canada and even Europe have positioned the entire region to ramp up production. As sawmills in the South increase their output, sawtimber harvest rates will be pushed above growth rates, which will cause inventory (i.e., supply) to fall back down to more balanced levels. In turn, pine sawtimber prices will recover to historic norms. The analyses below provide more insight on the rationale for this market thesis.

Positive Long-Term Fundamentals for Lumber

The U.S. economic expansion has generated slow, but sustained gains in employment. With unemployment rates near record lows, wages are finally seeing real gains above the rate of inflation. Meanwhile, "Millennials" (those born between 1980 and 2000), which are the largest generational population group since the "Baby Boomers," are entering the key 25-35-year age range, when most individuals transition from rental housing to home ownership. To summarize the combined impact of these trends, demographic and economic fundamentals support the expectation of continuing gains in new home construction (Figure 4) in future years. Furthermore, consumer spending on home repair and remodeling activities, which are other major drivers of demand for lumber and building products, also are expected to increase in the coming years.

Figure 4. Historic and forecasted starts of new construction of privately-owned homes and total spending on home repair and remodeling in the United States. Source: RISI.



As the level of annual housing starts breaks 1.5 million and home improvement spending exceeds \$160 billion, softwood lumber usage in the U.S. will likely surpass 55 billion board feet. That would represent a 12-



percent increase over 2017 levels (Figure 5). However, not all regions are equally well positioned to respond to this growing demand for lumber.

British Columbia, the leading lumber producing province in Canada, will see declines in its regional productive capacity in the years ahead. The mountain pine beetle infestation that ravaged the province's forests more than a decade ago resulted in significant losses within its lodge pole pine resource. As salvage operations involving beetle-damaged trees gradually decrease, pine harvest rates in British Columbia

inevitably will decline over the next two decades. Canadian lumber companies, recognizing the diminishing resource in their backyard, have shifted their capital investments away from British Columbia and towards the U.S. South where softwood resources are plentiful.

Concurrently, the U.S.

Pacific Northwest is harvesting 10 billion board feet of softwood sawtimber a year, which is close to the region's limit of annual growth on privately-owned timberland. Effectively, the Pacific Northwest is close to its maximum sustainable yield, and therefore the region has limited potential to increase harvest rates any further

Amid the rising demand for lumber, but constrained supplies from Canada, lumber prices have climbed to levels not seen since the peak of the U.S. housing bubble in 2006 (Figure 6). In addition, many forest economists expect lumber prices to remain elevated.

Figure 5. Forecasted softwood lumber demand in the United States and production in the Canadian province of British Columbia. Canada has historically supplied one-third of the lumber consumed in the U.S., and British Columbia is the dominant lumber producing region in Canada. Sources: RISI, FEA

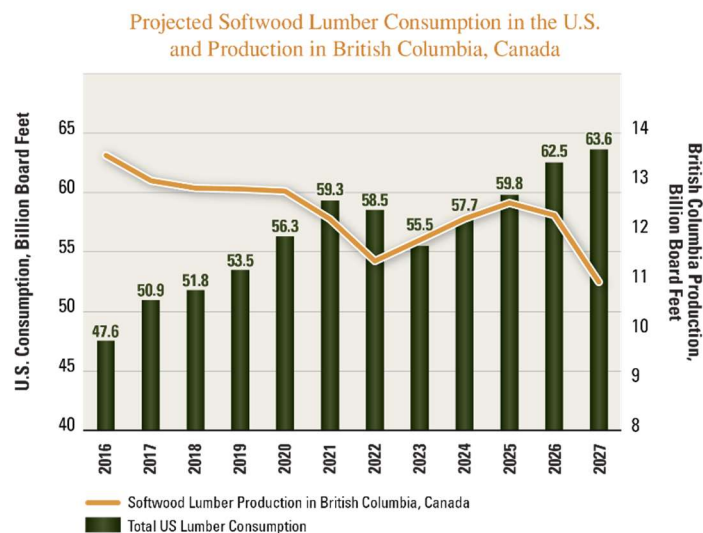
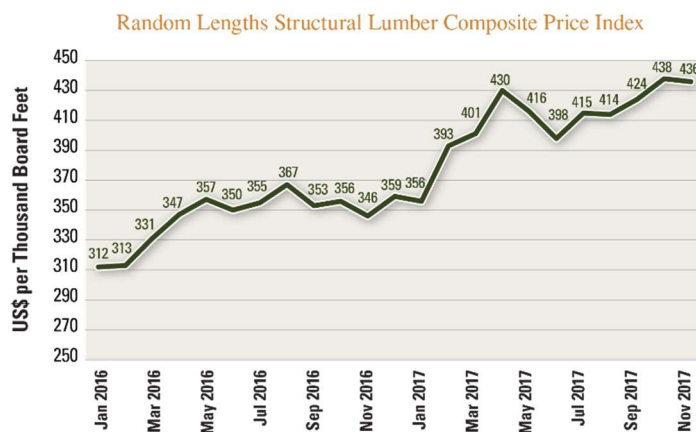


Figure 6. Spot price of structural lumber in the United States, as tracked by Random Lengths.





Strong Mill Profitability Attracted Mill Investments Across the South

Amid the robust market for lumber, the U.S. South has emerged as the most cost-competitive production region in North America (Figure 7). The low-cost fiber resource has allowed southern sawmills to achieve operating margins that are

among the most attractive in the world (Figure 8).

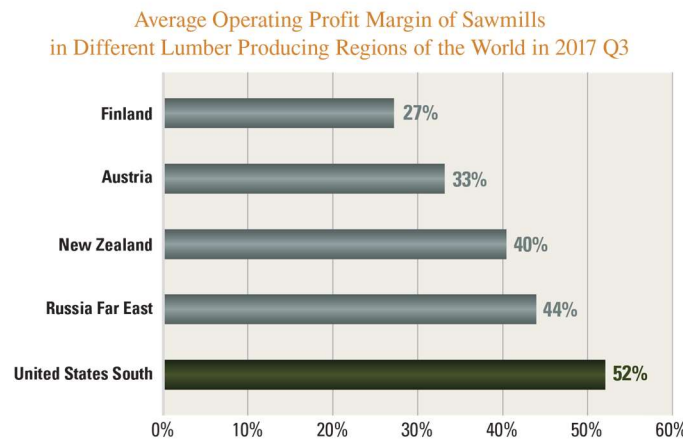
Naturally, high rates of profitability have attracted a wave of investment by lumber manufacturers across the U.S. South (Figure 9). Sawmill capacity has already exceeded the previous peak seen before the U.S.



Figure 7. Average price of softwood sawlogs, delivered to the mill, for the four major softwood producing regions in North America. Source: Wood Resource Quarterly 2017 Q3

housing crisis, and capacity will continue to expand over the next several years, adding, by one estimate, an additional 2.5 billion board feet, or 11.5 percent, to the existing 21.3 billion board feet in place in 2017.⁴

Figure 8. Average operating profit margin of sawmills as a percentage of lumber revenue for different lumber producing regions in the world during 2017 Q3. Source: Wood Resource Quarterly, 2017 Q3



Given the strong mill expansion that has occurred in the region, the South is well positioned to capture market share in North America from other lumber-producing areas, including the Pacific Northwest and British Columbia (Figure 10). By 2020, when the U.S. is projected to consume

58 billion board feet of lumber, the South is expected to supply 36 percent of this demand, compared to 25 percent from the Pacific Northwest, 14 percent from British Columbia, and 15 percent from Eastern Canada.

⁴ Capacity estimate by Forest Economic Advisors (Dec. 6, 2017)

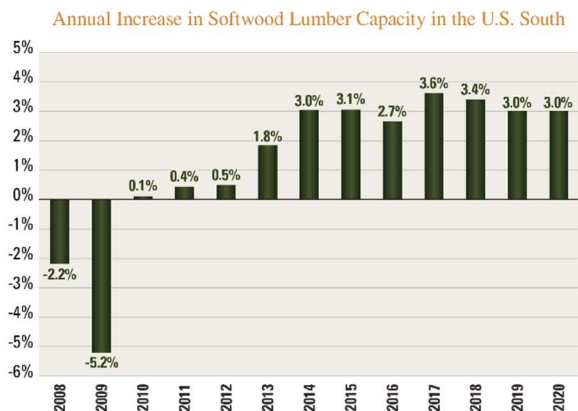


Figure 9. Annual addition of active sawmill capacity to produce softwood lumber in the U.S. South. Source: RISI

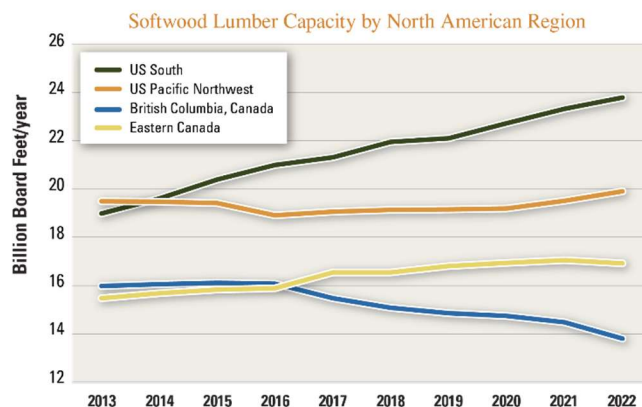
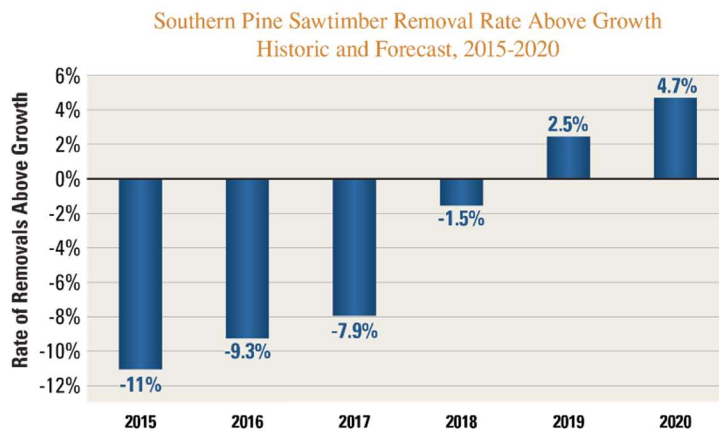


Figure 10. Historic and forecasted softwood lumber capacity by the four major timber producing regions in North America. Source: Forest Economic Advisors

Growing Lumber Production Will Support Higher Sawtimber Prices

This higher rate of lumber production in the South will cause harvest rates to eventually exceed growth rates (Figure 11). Assuming this trend continues, TIR expects the region's surplus sawtimber inventory to be eliminated by 2019, which will result in significant price appreciation.

Figure 11. Historic and forecasted removal rate of pine sawtimber over (or below) net growth of privately-owned operable timberland in the U.S. South. Source: RISI



Estimating the Timing of the South's Sawlog Price Recovery

Based on the prior analysis, TIR believes the key drivers are in place for sawtimber prices to improve dramatically in the South. Amid steady gains in domestic lumber consumption, the region has received significant investments in new capacity, which will cause its production rates to outpace those of other timber regions in North America. Furthermore, there will be enough of an increase in production to tighten



the timber supply, which will put upward pressure on sawtimber prices across much of the region. The question for timberland investors, therefore, is not whether sawtimber demand and pricing will increase, but when.

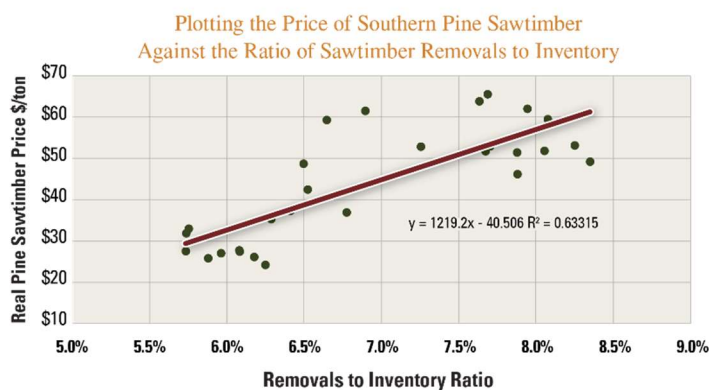
Creating a Market Supply Model to Predict Future Price Trends

As any economist recognizes, gazing into a crystal ball in an effort to fully predict market behavior is an exercise fraught with risk and uncertainty. However, there are analytical tools available that can provide some measure of guidance. One approach in this instance is to examine the historical relationship between sawtimber supply and prices to infer how prices may move as demand for sawtimber increases in the coming years.

There are two ways to measure timber supply with the data available. One metric is a removals-to-inventory ratio. A small ratio between removals and inventory indicates that wood availability is high relative to harvest rates. Log prices tend to fall when wood availability is high. Likewise, a high ratio of removals to inventory indicates that wood availability is low compared to ongoing or anticipated rate of harvest, which typically leads to higher prices.

The second option for conducting an analysis of supply metrics is to study the removals-to-growth ratio. When this ratio falls below one (<1.0), biological growth of sawtimber has outpaced the rate of harvest. Under such circumstances, inventory accumulates, leading to excess supply and lower pricing. Likewise, a ratio above one (>1.0) points to timber being harvested faster than it is being regenerated, which can result in a tightening supply and higher sawtimber pricing.

Figure 12. Plot of the price of southern pine sawtimber against the removals-to-inventory ratios for pine sawtimber on private operable timberland in the South. Prices are adjusted for inflation, equal to the 2017 value of the U.S. dollar, as measured by the U.S. Consumer Price Index (CPI). Linear regression is applied to the plot. Sources: US Census Bureau, RISI

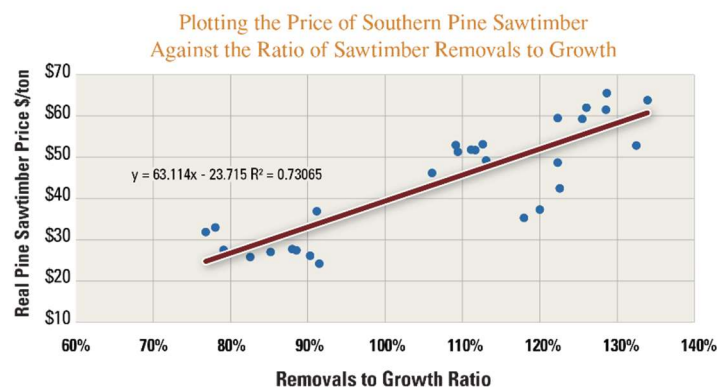


In reference to the current market circumstances, TIR tested both supply measure methodologies using pine sawtimber inventory and pricing data from 1990 through 2017. We then applied a linear regression equation

to both sets of data. The results are graphed in Figures 12 and 13, respectively. Both charts illustrate that there is a well-defined relationship between demand, inventory levels, growth rates and pricing. In short, the periods when prices were the highest corresponded to those periods when rates-of-removal to inventory, and rates-of-removal to growth, also were high.



Figure 13. Plot of the price of southern pine sawtimber against the removals-to-growth ratios for pine sawtimber on private operable timberland in the South. Prices are adjusted for inflation, equal to the 2017 value of the U.S. dollar, as measured by the U.S. Consumer Price Index (CPI). Linear regression is applied to the plot. Sources: US Census Bureau, RISI



Both supply metrics offer statistically meaningful relationships with sawtimber prices. Between the two, the removals-to-growth metric is the more reliable analysis because it has an R-square (R^2) value of 0.73 as compared to the removals-to-inventory metric, which has an (R^2) value of 0.63. In other words, the removals-to-growth metric can explain 73 percent of the price movement of pine sawtimber markets while the removals-to-inventory metric can explain 63 percent.

Projecting When Prices Will Return to Historic Average

Using the removals-to-growth supply model, we have a tool that enables us to make market projections and answer the question: “What level of sawtimber demand would push prices back to historic norms?” Over the past 40 years, since 1977, the real price of southern pine sawtimber (in inflation-adjusted 2017 dollars) averaged \$44 per ton. Using the model at hand, projections of sawtimber demand and supply could provide estimates of sawtimber prices. For that purpose, we relied on the specialized expertise of the two, leading, timber-forecasting groups, RISI and Forest

Table 2. Estimate of the year, level of housing starts, and the necessary softwood lumber production in the South when southern pine sawtimber prices reach the historic average of \$44 per ton (in 2017 collars). The forecast is based on the linear regression model that links the harvest-to-growth ratio of southern pine sawtimber with the price; the model is then fed through RISI’s and FEA’s projections.

Southern Pine Sawtimber Market	With RISI Projections	With FEA Projections
Year Price Hits Historic Average	2024	2021
Associated Housing Starts	1.8 million	1.6 million
Necessary Lumber Production	22 billion board feet	22 billion board feet

Economic Advisors (FEA). By plugging RISI’s and FEA’s harvest and growth projections into our model, we were able to generate price forecasts.

Using RISI’s projections, pine sawtimber prices would recover from \$24 a ton in 2017 to the historic average price of \$44 by the year 2024. That would amount to an 80-percent increase in seven years. FEA’s projection showed an even faster recovery to the same level by 2021 (Table 2). These assessments are based on the assumption that U.S. housing starts reach 1.6 to 1.8 million units during these time periods and that lumber production in the South reaches 22 million board feet during the same periods.



As would be expected, different micro-markets across the South would see their progress vary under these two scenarios depending on the availability of standing timber in each wood basket and the composition and capacity of the surrounding mill infrastructure.

Conclusions and Recommendations

While TIR does not recommend that the forecast contained in this white paper be viewed as an exact prediction of future sawtimber market behavior in the South, we do believe the work provides a measure of perspective that timberland investors can use as guidance as they assess their investment strategies. From our standpoint, the primary takeaway is that we can reasonably expect to see South-wide pine sawtimber prices exceed \$40/ton, in current real dollars, in less than a decade. This would represent a \$20/ton jump – or an increase of 66 percent – over the South-wide average of \$24/ton. Assuming pine sawtimber prices reach or exceed \$40/ton is based on the thesis that the housing market will surpass 1.5 million starts and lead to softwood lumber production in the South reaching a level of 22 billion board feet. At that point, sawtimber removals and growth in the region would reach level parity (i.e., 1:1 ratio) with supply and demand achieving balance.

There is an old adage that *investments should not be made through the rear-view mirror*. In other words, investment strategy should not be based simply on recent, past performance. Successful investors recognize and anticipate how economic and market trends will alter the future investment environment and this logic is applicable to the timberland asset space today as it is to any other.

During the last eight years, through 2017, sawtimber prices in the U.S. South remained depressed while those in the Pacific Northwest reached new highs on the strength of robust export markets. This was the primary reason institutional timberland investments in the Pacific Northwest outperformed the NCREIF timberland benchmark while those in the South underperformed relative to it. However, while this performance might lead some to conclude that the Pacific Northwest is the best bet for generating competitive timberland investment returns in the future, shifting market conditions paint a very compelling picture for why the U.S. South will be an attractive destination for invested capital over the next decade.

TIR sees several, important economic and market forces coalescing to drive a robust recovery of sawtimber values in the South. Being the lowest-cost producer of lumber, the South has attracted more than \$1.5 billion in new capital investments from lumber and building products manufacturers since the 2007 Recession. As a result, through 2017, sawmill capacity in the region had risen by 16 percent after hitting a low of 18.3 billion board feet in 2009. In addition, regional manufacturing capacity is expected to rise an additional 15 percent over the next five years. As rates of housing construction increase amid stabilizing employment conditions and



continuing demographic growth, the South's lumber output is expected to expand by 30 percent by 2024 (over 2017 levels). This will be sufficient to cause sawtimber harvest rates to eclipse timber growth rates. Using a simple econometric model that analyzes the ratio between rates of timber removal and rates of timber growth and prices, TIR has reason to believe that southern pine sawlog prices eventually could rebound to historic average levels during the coming decade.

Based on this thesis, astute timberland investors can position themselves to capitalize on the anticipated turnaround of southern wood markets by doing the following:

- **Adjusting the Geographic Allocation of their Timberland Portfolios:** Based on the expectation of significant price appreciation occurring in the South, investors may want to increase their exposure to timberland in the region while placing less emphasis on owning forest assets in other areas that are currently viewed as being at or near peak levels.
- **Increasing Their Exposure to Timberland Relative to Other Real Assets:** Improved performance in the U.S. South would improve timberland's standing in a portfolio relative to other real assets, such as farmland, energy, infrastructure and real estate. Consequently, investors may want to explore increasing their exposure to timberland instead of expanding their participation in some of these other hard asset categories.
- **Adjusting the Timing of Dispositions and Harvests:** For investors that already hold southern timberland assets in their portfolios, an increase in sawtimber prices over the next five to ten years may mean that, in certain cases, delaying timber harvests, or the disposition of southern timberland properties, may enable them to capture better returns over the long term than otherwise might be possible.
- **Adapting One's Product Mix to Grow More Sawtimber:** Finally, if sawtimber prices are expected to increase at a faster rate than other grades of timber, investors may want to adjust the silviculture (i.e., the care and management of commercial forests) of their southern pine plantations to put more emphasis on sawtimber growth and harvest.



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