



Core US Timberland

Timberland Investment Group

2017

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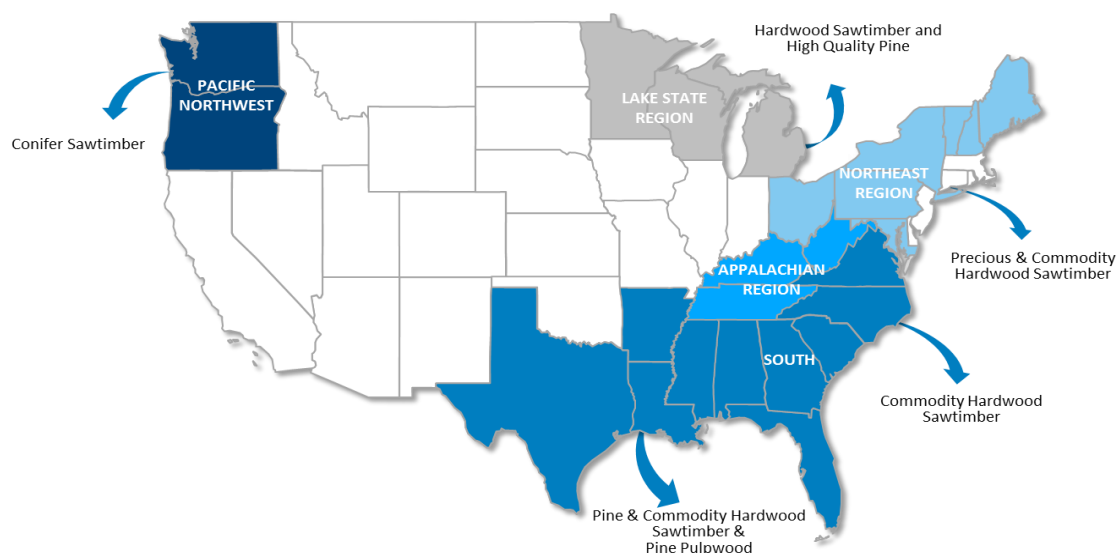
Executive Summary

BTG Pactual's Timberland Investment Group ("TIG") believes that long-term exposure to core United States (US) commercial timberlands can be an important element of a diversified institutional timberland portfolio. An effective US core timberland investment strategy will consider the structure of the US forest resource and the US forest products industry, developments in the role of institutional investors in US commercial timberlands, and key factors affecting US timberland and forest product markets.

US Forest Resource Base and Forest Products Industry

The US is the world's leading timber producer, and contains approximately 521 million acres of commercial timberland, defined by the US Forest Service as timberland that is capable of yielding merchantable timber. In aggregate, the US supports over 27 million metric tons ("MT") of commercial growing stock inventory. Softwood species comprise about 14 million MT (51.3%) and hardwood species comprise about 13 million MT (48.7%)¹. With the exception of tropical and short rotation hardwood species (such as teak and eucalyptus), US commercial timberlands supply all major forest product end-markets including sawnwood, structural panels, pulp and paper products, high quality furniture, flooring, and energy. With softwood lumber production capacity of 41.1 billion board feet ("bbf") and shipments of 31.4 bbf, the US is the largest softwood lumber producing country in the world and one of the largest global producers of wood panels, softwood market pulp, and woodchips.

Figure 1: US Forest Resource Base



Source: TIG Analysis

¹ The US Forest Service reports inventory in metric tons. To convert: for softwood, each metric ton is equivalent to 0.153 thousand board feet; for hardwood, each metric ton is equivalent to 0.125 thousand board feet.

Key Factors Affecting Institutional Timberland Markets in the US

TIG believes that there are six key factors affecting institutional timberland markets in the US in the near-to-medium term:

- 1) US housing.** Post Great Recession, the US housing market has been on an upward, although somewhat uneven, trend to its historical average, resulting in lower than historically average wood and timber consumption.
- 2) US South pine inventories.** The standing inventory of softwood sawtimber in the US South has increased over the past 10 years as many timberland owners deferred harvests during the Great Recession in anticipation of a more robust housing environment and higher sawlog pricing.
- 3) Expansion of Canadian lumber producers into the US South.** Canadian sawmill operators have expanded into the US South to benefit from the ongoing modest housing recovery and a wide spread between lumber and log prices. A declining timber supply in Canada has also encouraged Canadian lumber producers to move to the US South.
- 4) Declining Canadian timber supply.** Given declining timber supply in Canada stemming from the Mountain Pine Beetle in British Columbia and reduced annual allowable cut in Eastern Canada, demand for US timber will likely increase.
- 5) Pacific Rim softwood log and lumber demand.** Unlike other regions, the US Pacific Northwest has the ability to export logs and lumber to Asia given its proximity to those markets which has resulted in higher wood demand. There also will likely be increased wood demand from the Pacific Northwest due to western Canada's timber supply problems.
- 6) Growing hardwood lumber markets.** While Europe had been the primary market of US precious hardwood exports, China and Southeast Asia have emerged to dominate the hardwood lumber trade, resulting in greater exports of commodity hardwoods.

Investment Strategy

TIG believes that an effective US timberland investment strategy will focus on a diversified portfolio of properties, located in deep and diverse market baskets, and that seek to take advantage of the trends in timber supply, demand and inventories described above. Specifically, TIG is focused on:

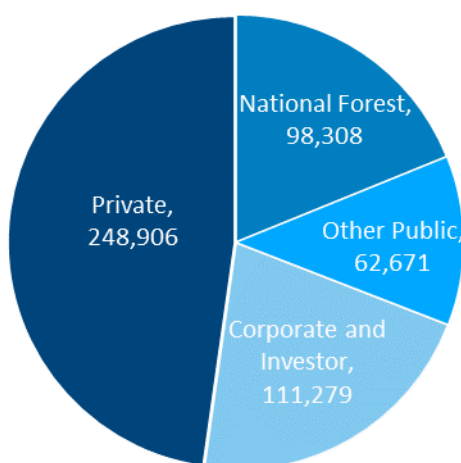
- Pre-merchantable pine plantations in the US South.
- Commodity hardwood forests in Eastern Hardwood Regions.
- Younger, intensively managed Douglas-fir and whitewoods in the US Pacific Northwest.

The US Timberland Resource

Compared to many other countries, the US has a notable amount of forest cover. The US has a total land area of nearly 2.3 billion acres of which 766 million acres (33.9%) are forested land. Within forested land, around 521 million acres (68.0%) are considered commercial timberland by the USDA Forest Service (non-reserved forests capable of yielding merchantable timber). An additional 245 million acres of reserved and “other” forests provide watershed protection, wildlife habitat, recreational demand, and other goods and services.

The 521 million acres of US commercial timberland is held by a variety of private and public entities. The majority (48%) is privately owned by non-corporate entities, primarily small, independent land owners, many of whom may not actively manage their timberland for commercial production. Corporate entities including institutional investors account for the second largest ownership category, followed by National Forests (19%) and other public ownerships (state forests, wilderness areas, other federal and Native American-owned lands, etc.). Public ownership tends to be concentrated in the western US, while private timberland ownership is highest in the South. The South also has by far the largest area of private corporate ownerships which includes the holdings of institutional investors.

Figure 2: Ownership of Commercial Timberland in the United States 2012 (000s acres)



Source: USDA Forest Service

In aggregate, the US supports over 27 million metric tons (“MT”) of commercial growing stock inventory with softwood species comprising about 14 million MT (51.3%) and hardwood species comprising about 13 million MT (48.7%)². The US supports some of the most diverse forest resources in the world, growing a large number of

² The USDA Forest Service reports data in cubic feet. The present analysis assumes a softwood conversion ratio of 38.8 cubic feet per MT and a hardwood conversion ratio of 31.8 cubic feet per MT.

species to serve a wide spectrum of end-markets. In the Pacific Northwest, Douglas-fir is the dominant commercial species, representing 54% of growing stock followed by western hemlock at 14%. In the US South, loblolly and shortleaf pines dominate, followed by longleaf and slash pines. In the North region (including the Northeast and Lake States), there is a mixture of softwoods and hardwoods, with softwoods comprising 19% of the growing stock and hardwoods comprising 81%. Dominant softwood species include white and red pines while dominant hardwood species include soft and hard maple and select white oaks. Nearly 40 different species groups are distinguished by the US Forest Service inventory system.

Commercial timber in the US is utilized in all major forest product end-markets from sawnwood and structural panels, through softwood and hardwood pulp and paper products, to high quality furniture and flooring, and utility post and pole markets. No other timberland investment geography offers the depth and diversity of the US forest products market.

Table 1: End Market Breakdown by Region

Region		South	Pacific Northwest	Eastern Hardwood Regions		Value
Primary Species		Pine, Oak, Yellow Poplar, Mixed Hardwood	Douglas Fir, Whitewoods	Utility: White and Red Oak, Yellow Poplar, Aspen	Precious: Cherry, Hard Maple, Ash	Market Size (US\$ bn)
Primary End Market Exposure	Industrial Timber	●	●	●		US\$ 25+
	Structural Lumber	●	●			US\$ 15-20
	Wood Pulp	●	●			US\$ 5-10
	OSB / Plywood	●	●	●		US\$ 5-10
	Flooring	●		●	●	US\$ 5-8
	Furniture			●	●	US\$ 5
	Composite Panels	●		●		US\$ 3-5
	Biomass	●		●	●	US\$ 1-1.5
Primary Export Market Exposure	Europe	Wood Pulp, Biomass, Flooring		Logs, Flooring, Furniture	Logs, Flooring, Furniture	
	Asia	Wood Pulp	Structural Lumber, Logs, Wood Pulp	Logs, Flooring, Furniture	Logs, Flooring, Furniture	

Source: USDA Forest Service; American Home Furnishings Alliance; Flooring Cover Weekly; RISI; TIG Analysis; Market value represents annual sales

The US Forest Products Industry

The world's production of industrial roundwood in 2015 has been estimated by The Food and Agriculture Organization ("FAO") of the United Nations to be 1.844 billion MT in 2015³. Of this, 51% or 939 million MT is

³The FAO reports data in cubic meters. The present analysis assumes a softwood conversion ratio of 1.1 cubic meters per MT and hardwood conversion ratio of 0.9 cubic meters per MT.

conifer or softwood, and 49% or 905 million MT is non-conifer or hardwood. The FAO reports US industrial roundwood production at 355.9 million MT or 19% of the world total.

More specifically, the FAO estimates US softwood industrial roundwood production at 241.5 million MT (26% of the world total) and hardwood production at 114.4 million MT (13% of the world total). Based on FAO data and our own calculations, we estimate 2015 industrial roundwood production by end-product sector in the US as follows:

Table 2: US Roundwood Production (000s m³)

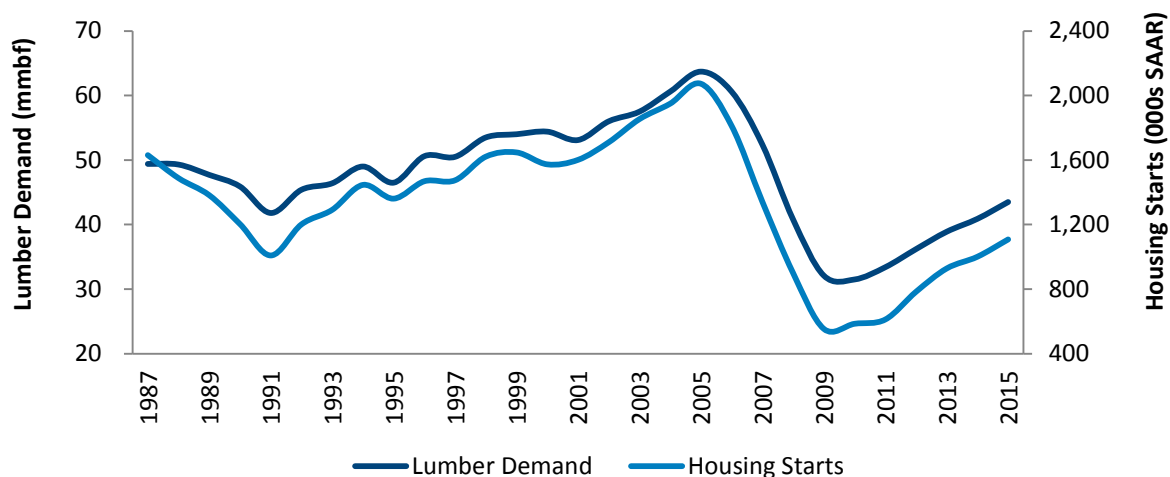
Product Sector	Softwood	%	Hardwood	%
Wood Pulp	151,675	50.0	26,169	21.3
Lumber	108,670	35.8	45,138	36.8
Plywood/OSB	30,446	10.0	4,652	3.8
Other Industrial Wood	4,005	1.3	10,899	8.9
Total Industrial Wood Use	294,796	97.2	86,858	70.7
Wood Fuel Use (Includes Firewood/Pellets)	8,431	2.8	35,914	29.3
Total Roundwood Use	303,227	100	122,772	100

Source: FAO; TIG Analysis

US Lumber

With softwood lumber production capacity of 41.1 bbf and shipments of 31.4 bbf, the US is the largest softwood lumber producing country in the world. US softwood lumber consumption is primarily driven by housing starts (as shown in Figure 3) with each single family housing start utilizing around 15,000 board feet of lumber and each multi-family start utilizing around 5,000 board feet. Since the Great Recession, there has been an increase in the proportion of multi-family starts. Repair and remodeling also drives softwood lumber consumption. Hardwood lumber is used in cabinets, furniture, flooring, moldings, and other millwork.

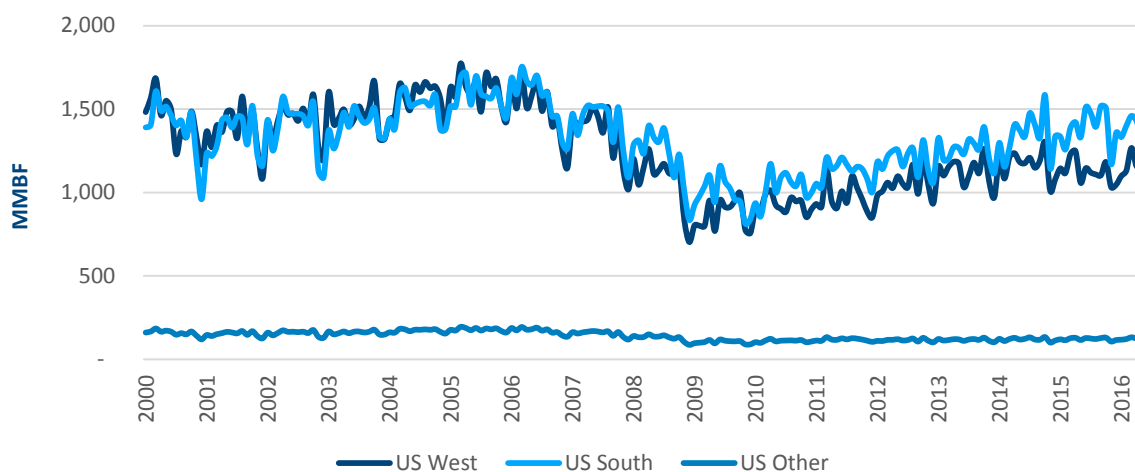
Figure 3: US Housing Starts vs. Lumber Demand



Source: US Census Bureau; RISI

The Pacific Northwest's forest economy is more highly concentrated in softwood lumber production than is the US South. Given the higher operating cost structure in the Pacific Northwest and higher quality species such as Douglas-fir and whitewoods (which are used mainly in construction), the industry is focused on production of value-added products such as lumber. In the US South, logging costs are lower, private ownership dominates, and there is greater proximity to major population centers and port access to Europe. As a result, the southern forest products industry can afford to provide roundwood products to a wide range of end-markets.

Historically, the Pacific Northwest and US South have contributed roughly equally to total US lumber production. However, since the Great Recession, lumber production in the US South has slightly overtaken production in the Pacific Northwest (see Figure 4), partly as a result of competitive production costs and resource availability.

Figure 4: US Lumber Production by Region

Source: RISI

Wood Pulp

Wood pulp is an intermediate product in the paper production chain and can be generated from wood chips (e.g., roundwood converted into chips) or from sawmill residuals, a byproduct of other primary processing. The structurally strongest wood pulp is typically bleached or unbleached softwood kraft pulp (“BSK” or “UBSK”) which is commonly used in packaging materials and paper, and produced from softwood species such as pine, spruce, and fir, and is predominantly produced in the northern hemisphere. RISI estimates global BSK and UBSK production in 2015 at 69.1 million MT, nearly evenly divided between bleached and unbleached grades. The US is the world’s largest producing region for this grade of pulp with 2015 production estimated by RISI at over 31 million MT, or 46% of the world total.

Table 3: Global Paper Grade Wood Pulp Production

Paper Grade BSK/UBSK Wood Pulp Production for 2015 (000 MT)			
Region	BSK	UBSK	Total
US	11,975	19,587	31,562 (46%)
Nordic	7,917	3,080	10,997 (16%)
Canada	6,649	596	7,245 (10%)
Russia/EE	2,312	3,217	5,529 (8%)
LatAm	2,574	2,878	5,452 (8%)
ROW	3,275	5,025	8,300 (12%)

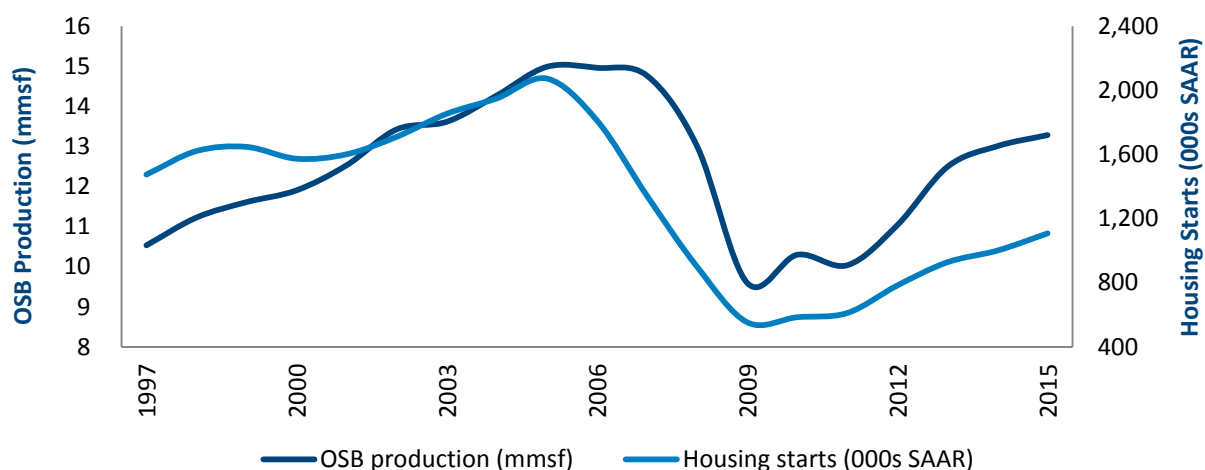
Source: RISI

Market pulp refers to pulp that is not used by integrated pulp and paper companies in their own operations, but is instead sold in the open market. Hardwood market pulp represents around 49% of global market pulp consumption while softwood market pulp comprises around 39%. The remainder is comprised of mechanical pulp (7%), unbleached kraft pulp (4%), and sulfite pulp (1%). Since 2000, global market pulp consumption has grown from 43.3 million MT to over 62 million MT, a compounded annual growth rate (“CAGR”) of 2.5%, and market pulp capacity has grown from 46.8 million MT to 69.3 million MT, a CAGR of 2.6%.

Wood Based Panels

Wood based panels consist of two primary grades: Structural (Plywood and Oriented Strand Board (“OSB”)), and Non-Structural (particleboard, medium density fiberboard (“MDF”), and insulation board). Panels are predominantly used in new home construction and repair and remodel with specific applications in structural sheathing, subflooring, underlayment, webstock for I-beam floor joists, furniture stock, and other building components. In 2015, US OSB capacity was around 16 billion square feet (“bsf”) while demand from US mills was around 14 bsf. In plywood, capacity was around 11 bsf while demand from US mills was around 9 bsf.

Figure 5: US Housing Starts vs. OSB Demand



Source: US Census Bureau; RISI

OSB has a raw materials cost advantage over traditional plywood as OSB can be manufactured from younger, less expensive pulpwood logs, while providing comparable performance. For this reason, OSB has gained market share from plywood in most home construction markets, with OSB production exceeding plywood production for the first time in 2000. As seen in the above chart, OSB demand is closely associated to US housing starts. At present, OSB represents around 64% of the structural panel market.

As Figure 6 illustrates, there are more than 50 OSB mills in North America, with around 35 mills in the US, of which 28 are situated in the US South. Mills in the US South utilize pine pulpwood as a raw material, while northern mills utilize both softwood species and low density hardwood such as Aspen. Therefore, TIG believes that the concentration of OSB operations in the US South will provide additional markets for small diameter pine throughout the region, and a diversifying end market for pine thinnings and top wood.

Figure 6: North American OSB mills



Source: Forest Economic Advisors; TIG Analysis

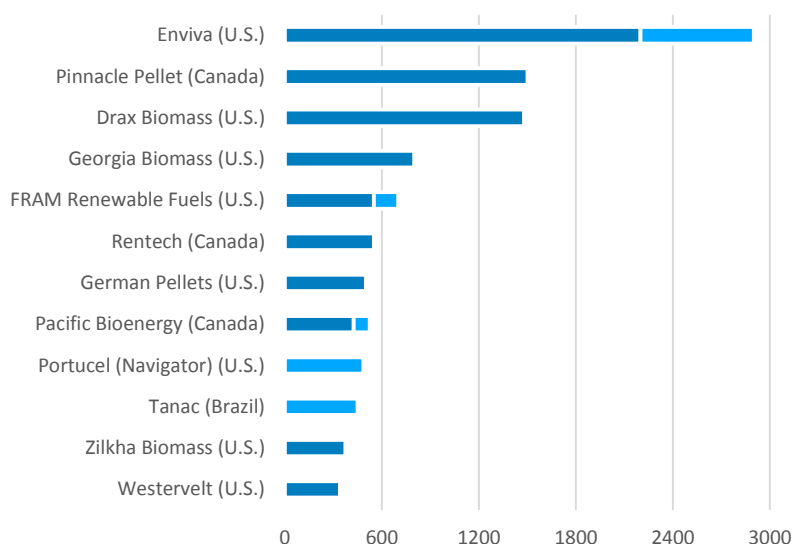
Other Segments: Pellet Plants in the US South Have Tightened Pulpwood Supply/Demand Dynamics

Over the last decade, pulpwood demand in the US South has benefited from an expansion of fuelwood pellet manufacturing. Fuelwood pellet demand is driven by European energy policy, which prescribes renewable energy targets for European Union (“EU”) members to achieve by 2020. Specifically, these policies require a 20% reduction in greenhouse gases, a 20% increase in renewable energy, and a 20% increase in energy efficiency. One of the alternatives available to established utilities to help meet these targets is the replacement of coal with fuelwood pellets in base-load power plants. The vast majority of fuelwood pellets currently manufactured in the US South are being exported to converted coal burning power plants within the EU. Wood pellet usage is also expected to increase in Japan and South Korea as those countries increasingly target renewable energy. In Japan, the country is trying to lessen its reliance on nuclear energy and imported fossil fuels while South Korea is targeting 10% of its power generation from renewable sources by 2024.

The global wood pellet market can be broken down into two separate markets: industrial and residential/commercial. Industrial pellet demand (around 14 million MT) is driven by electricity generators and utility-scale combined heat and power (“CHP”) plants whereas residential/commercial (around 15 million MT) is used for home and office heating. Growth in the broader pellet market is largely driven by growth in industrial pellet demand. Residential/commercial pellet demand is growing more modestly. For example, industrial pellet demand increased 41.7% to 13.6 million MT in 2015 from 9.6 million MT in 2013 while residential/commercial pellet demand increased 13.7% to 14.9 million MT in 2015 from 13.1 million MT in 2013 per Hawkins Wright.

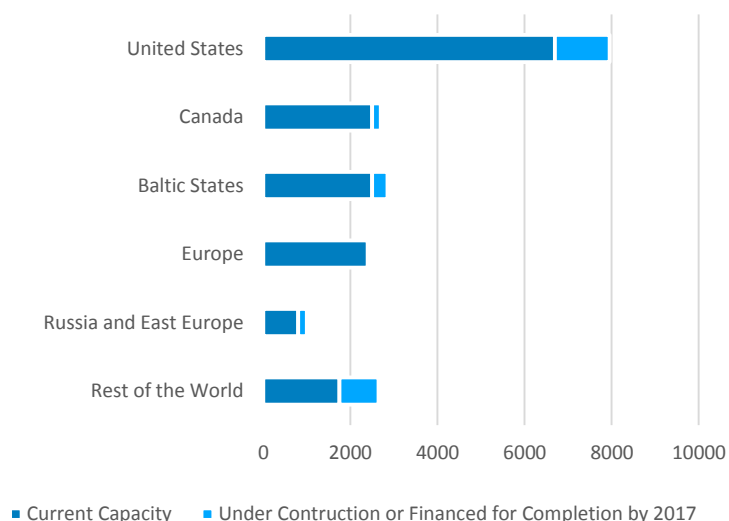
While pellet demand in the US tends to be dictated by home heating, the market in the EU tends to be both residential and industrial, although the industrial market is the primary recipient of government subsidies.

Figure 7: Worldwide Industrial Pellet Producers (000 MT per year)



Source: Enviva December 2016 Investor Presentation; (1) German Pellets is in bankruptcy and has successfully auctioned its Louisiana pellet facility to Drax. However, the auction process for its Texas pellet plant has been postponed.

Figure 8: Regional Production (000 MT per year)

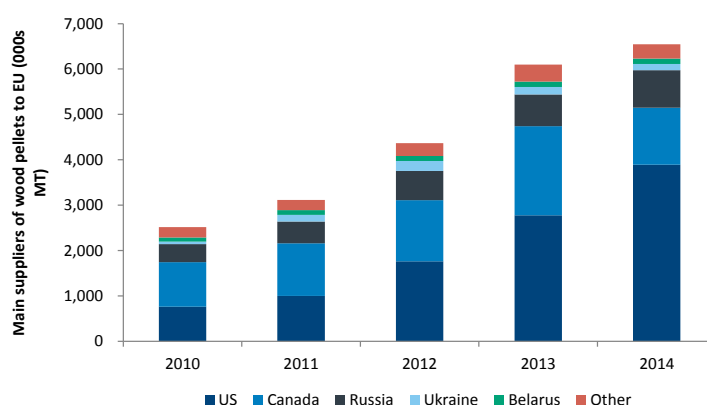


Source: Enviva December 2016 Investor Presentation

Wood pellets have become an increasingly traded global commodity as local sourcing has proven challenging in many countries. While around 50% of the global trade takes place within and amongst EU members (the EU produces around 50% of its own needs), the US, Canada, and Russia are significant exporters to the EU, which is responsible for around 70-80% of total global demand.

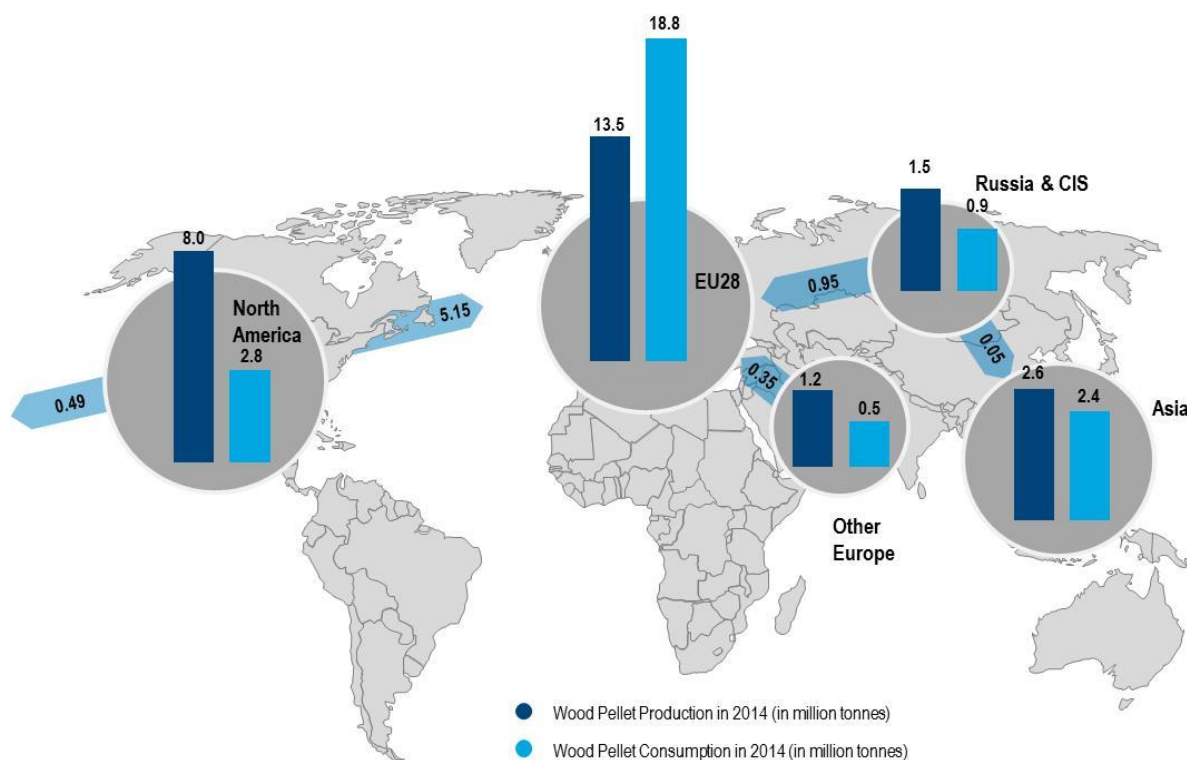
Specifically, the US South has been able to capitalize on its favorable softwood fiber position, as softwood fiber is the preferable furnish for wood pellets. Further, cheap, abundant residual wood supply from sawmill operations, as well as an abundant, low grade pulpwood supply with relatively low transportation costs supports export pellet production. In 2014, the US comprised around 60% of wood pellet exports to the EU. Since 2010, export wood pellet demand to the EU from the US has increased at a 38.5% CAGR.

Figure 9: Main Suppliers of Wood Pellets to EU (000 MT per year)



Source: USDA Foreign Agricultural Service Global Agricultural Information Network – EU Biofuels Annual 2015

Figure 10: World Production / Consumption and Tradeflows of Pellets in 2014



Source: EPC Survey; Hawkins Wright; FAO; AEBIOM Statistical Report 2015

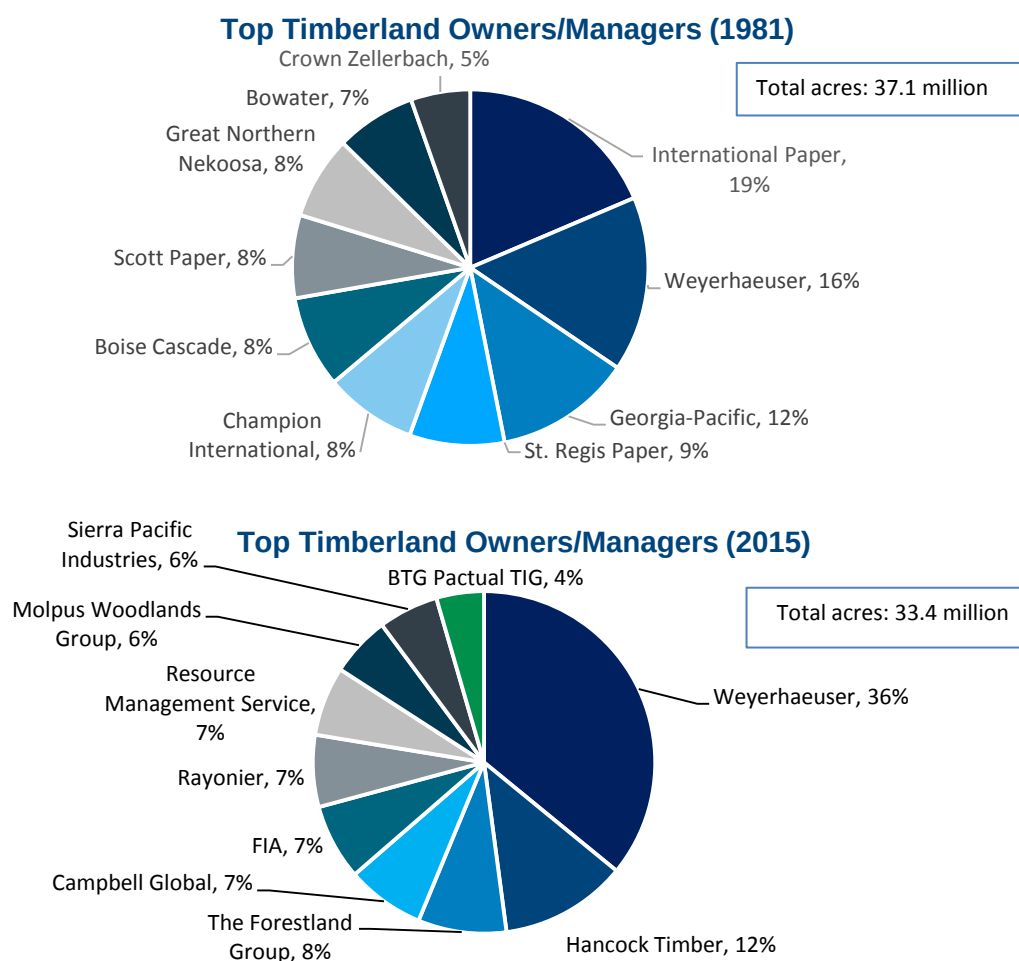
Continued growth of the fuelwood pellet industry is likely to depend on policy, rather than economics, as the current availability of cheap fossil fuels works against the economic use of wood as an industrial scale energy source. The global push to reduce the use of fossil fuels is expected to support existing fuelwood pellet capacity in the US South and potentially lead to the installation of additional pellet production capacity. The combined demand for residuals from the wood pulp and non-structural panel industries in the region is expected to continue to support the price of residuals to the point where sourcing low grade roundwood for pellet production remains a viable option. Therefore, TIG believes that demand for smaller diameter pulpwood from non-housing related industry sectors will be strong in the near-to-medium term.

Institutional Timberland Investment in the US

Change in Ownership of Commercial Forests

BTG Pactual's Timberland Investment Group ("TIG") traces its history back to 1981 when First National Bank of Atlanta began investing in timberland. Beginning in the late 1990s, the interest in owning timberland gained further traction as integrated paper/forest companies including Georgia-Pacific, Louisiana-Pacific, International Paper, MeadWestvaco (now WestRock) and Temple-Inland (eventually purchased by Georgia-Pacific, West Fraser, and International Paper) divested their timberland holdings from their paper and wood products converting businesses. Some of the acres were divested to more streamlined companies such as timber REITs, but the majority of holdings were sold in the mid-2000s to timberland investment management organizations ("TIMO") that source, acquire, and manage timberlands on behalf of institutional capital.

Figure 11: Change in top Timberland Owners / Managers



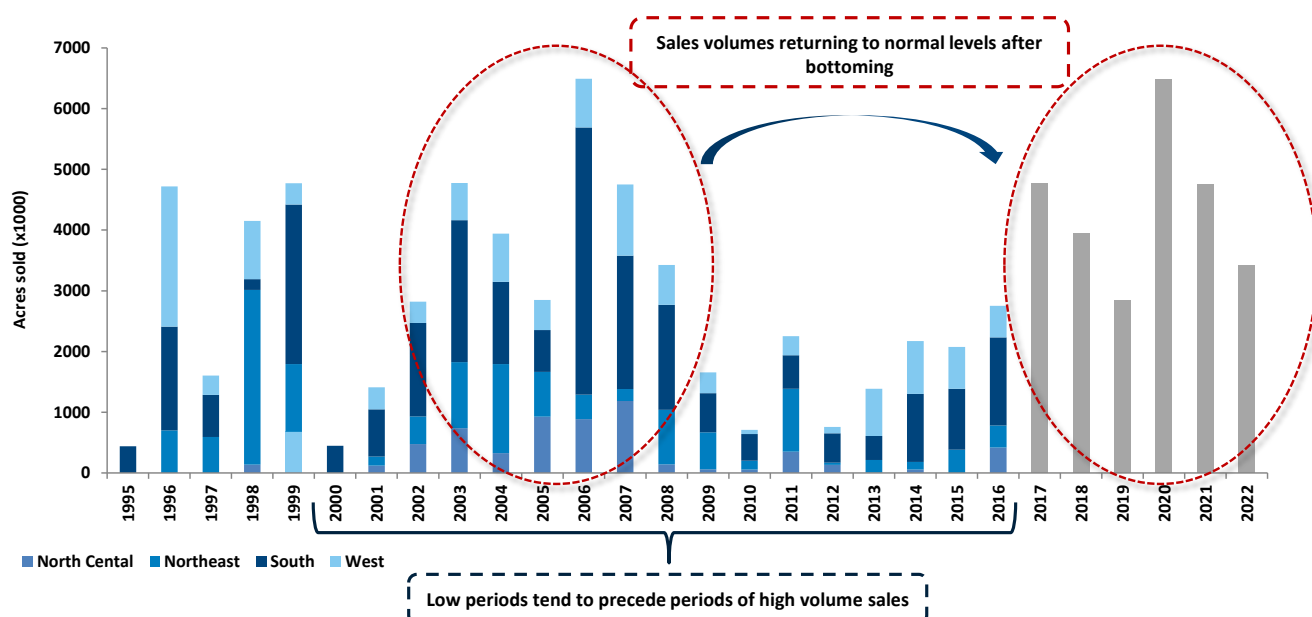
Source: TimberMart-South; Note: (1) Weyerhaeuser reflects both legacy Weyerhaeuser and Plum Creek, which Weyerhaeuser acquired in February 2016

US Timberland Market Liquidity

The US timberland market is the most liquid in the world as evidenced by the number of transactions. Since 2000, a total of 45 million acres have transacted for over US\$ 51 billion equating to an annual average of 2.65 million acres at an average price of around US\$ 1,150/acre. Even during the Great Recession the US timberland market was active with 3.4 million acres and 1.7 million acres transacting in 2008 and 2009, respectively, at average prices of US\$ 1,515/acre and US\$ 1,256/acre, respectively.

As described above, institutional investment in timberland accelerated in the late 1990s, and peaked in the mid-2000s. Many of these properties were acquired by closed-end fund vehicles with 10-12 year terms. TIG believes that a large volume of properties that were acquired in 2005-2008 are likely to come into the market between 2015 and 2020 as these funds are liquidated.

Figure 12: Timberland Acres Sold in the Past 10 Years and Hypothetical Forecast for next Six Years



Source: RISI; analysis performed by BTGPactual. There is no guarantee that the cyclical pattern presented above will occur again.

Key Factors Affecting Institutional Timberland Markets in the US

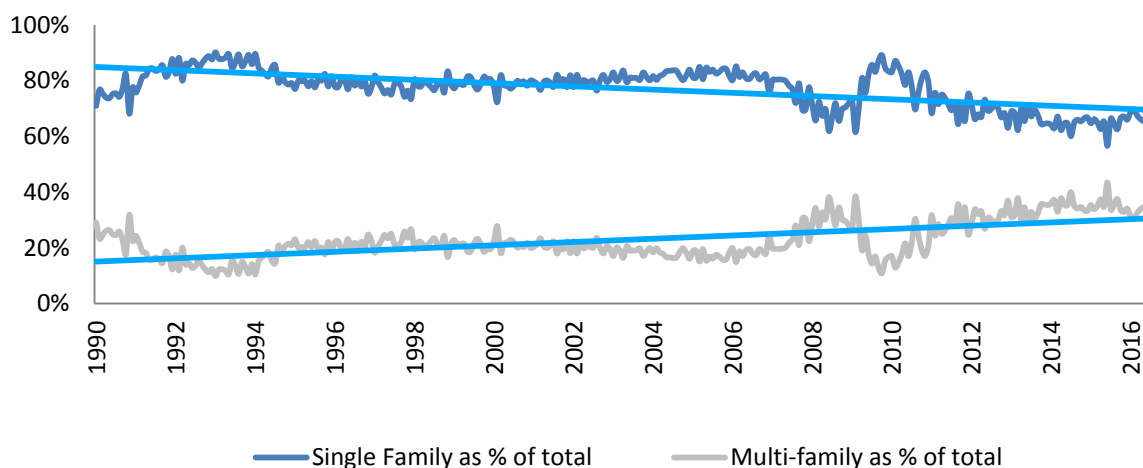
The following are several of the most important macro-trends that TIG believes will impact US institutional timberland portfolios in the near- and mid-term.

Housing

Post Great Recession, the US housing market has been on an upward, although somewhat uneven, trend to its historical average. This slower, inconsistent trajectory back to a more normalized level of housing starts has resulted in lower wood products consumption than what has occurred in prior housing recoveries. In 2015, total US housing starts were 1.108 million (single-family starts of 713,000) resulting in US lumber demand of 43.5 bbf and US panel demand of 27.3 bsf. During more normalized housing environments (e.g., 1994-1997) when housing starts were around 1.4-1.5 million, US lumber demand was around 49 bbf and US panels demand was around 31.5-32.0 bsf.

Part of the reason for this lower demand is that there is a greater degree of multi-family housing today than in the past. In March 2017, multi-family starts accounted for around 32.4% of the total versus 23.0% since 1990. On average, a multi-family unit utilizes around 30-40% of the wood used in a single-family home, given shared walls and exteriors. The increase in the proportion of multi-family starts could be a sign that potential homeowners, particularly those who are at the point of buying their first homes, prefer to rent rather than own. Other factors may include a trend of home buyers choosing to live a more urban, “multi-family” lifestyle rather than a “single family” suburban lifestyle. This trend may also indicate that home prices, which continue to increase, and lending standards, which remain tight, may be keeping many first-time buyers out of the market.

Figure 13: Historical Single-family and Multi-family Housing Starts



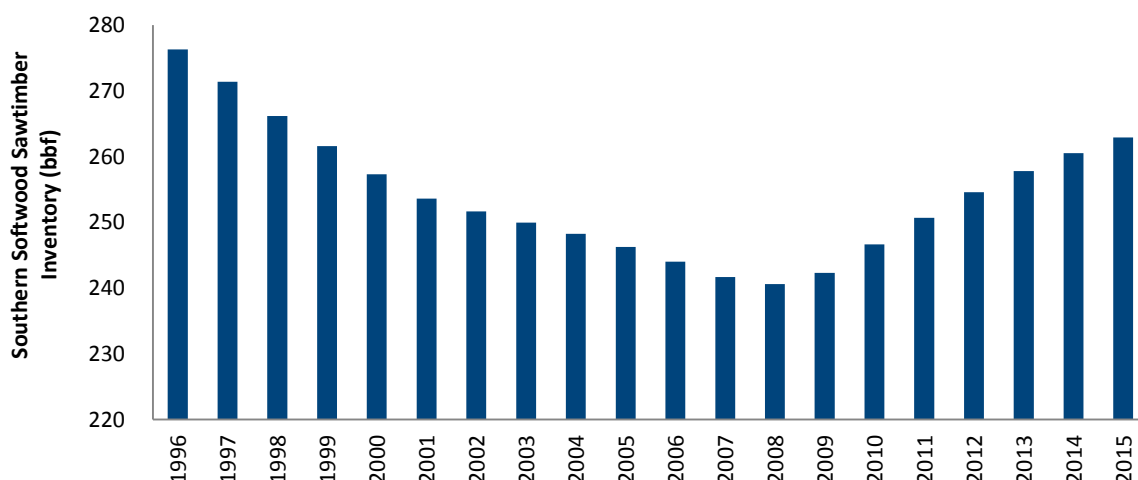
Source: US Census Bureau

There is also a trend of growing use of engineered wood products in home construction. Engineered wood is manufactured by binding wood strands, particles, fibers, veneers or boards of wood together with adhesives (e.g., resins) to form larger composite materials. These products tend to have improved structural characteristics versus traditional lumber and use wood fiber more efficiently. As a result, I-joists are replacing 2x10s and 2x12s as floor joists. The key implication here is that the growing use of engineered products increases demand for smaller diameter roundwood as opposed to larger diameter logs as a primary raw material.

Pine Sawtimber Inventories

Since the Great Recession, the standing inventory of softwood sawtimber has increased as many owners deferred harvests in anticipation of higher lumber demand (and thus higher sawlog prices) once the economy recovered. In particular, in the US South, inventory on the stump has grown by around 21 bbf since 2009 per RISI. Another recent inventory estimate by the US Forest Service identifies a buildup of as much as 60 bbf between 2009 and 2015. This compares to an annual harvest of around 14 bbf per RISI. As housing continues on its slow upward march, this inventory continues to build and has the potential to constrain increases in sawlog pricing, even if housing begins to grow at a more rapid pace.

Figure 14: Southern Sawtimber Inventories



Source: RISI

The accumulation of softwood sawtimber inventory has been less pronounced in the Pacific Northwest given log and lumber export markets which support regional demand for sawtimber despite the modestly growing US housing market (see “Housing” above).

Overall, the impact of this inventory accumulation could be a delayed price response to improving sawlog demand as housing improves. The “overhang” has grown so large that several years of starts at or in excess of 1.5 million units might be needed to begin to tighten the supply/demand dynamics of the US South. As a result, an investment strategy that focuses on pre-merchantable timberland assets might perform better than a strategy

based on the acquisition of properties heavily stocked with sawtimber volume, especially if a buyer is able to purchase assets toward the lower bound value of the “holding premium” (difference between discounted cash flow value and immediate liquidation value) of pre-merchantable timber. Simply put, the goal of this strategy would be to purchase assets as cost-effectively as possible in order to capture the upside from organic growth.

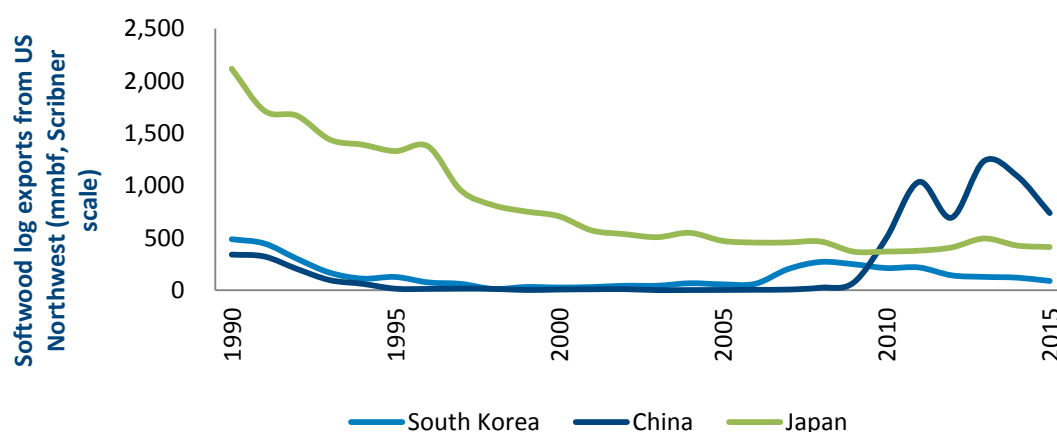
Pacific Rim Softwood Log and Lumber Markets

Unlike the US South which has few export opportunities at present and higher phytosanitary constraints, the Pacific Northwest has the ability to export logs and lumber to Asia given its proximity to those markets and lower phytosanitary constraints. China generally uses wood for industrial applications like pallets and concrete forms, while Japan has demand for high-quality logs (e.g., Douglas-fir for structural applications; western hemlock for its construction industry). South Korea imports logs primarily for its plywood and sawmilling industries.

In the early 1990s, the Pacific Northwest was exporting around 2-3 bbf per year of softwood logs to Japan, China, and South Korea per the USDA Forest Service. Conditions began changing in the mid / late 1990s due to: 1) declining sales from federal and state lands set aside for the protection of Threatened and Endangered Species; 2) lower Japanese demand for logs after the Asian economic crisis of the late 1990s lowered Japanese housing demand and increased Japanese consumer price sensitivity; and 3) globalization of wood markets which resulted in increased competitiveness from other regions, such as New Zealand, Russia, Scandinavia, and Chile.

Softwood log export activity started to increase again in the mid-2000s, particularly as China’s economy went through a period of rapid urbanization facilitated by government policies. Log exports to China increased to around 1 bbf in 2011 before peaking around 1.3 bbf in 2013. Since then, log exports to China have somewhat softened as China’s economy cooled. In 2015, softwood log exports to China were around 813 million board feet, down almost 35% year-over-year. In aggregate, Pacific Northwest softwood log exports declined around 21% year-over-year in 2015.

Figure 15: Softwood Log Exports from the US



Source: USDA Forest Service

Although we believe that log exports to China will continue to dominate the Pacific Rim trade, we also recognize a shift in demand from logs to finished lumber in the region. This shift could provide a unique opportunity for the US Pacific Northwest, as western Canada's timber supply problems could prevent it from remaining a significant supplier to this off-shore market.

Timber Supply in Canada

Canada has historically provided around 35-40% of all the lumber used in the US. This share is expected to decline by 10-15% as a result of a reduction in Canadian timber supply due to mortality associated with the Mountain Pine Beetle. According to the government of British Columbia, since the early 1990s, the Mountain Pine Beetle has been attacking lodgepole pine in British Columbia and has killed about 50% of the commercial lodgepole pine in the province, impacting an area of over 43 million acres. British Columbia has increased harvest levels to try and salvage the remaining timber, much of which is then shipped to China to be used for industrial applications. Currently the Mountain Pine Beetle has expanded beyond its historic range and moved into northern British Columbia and eastward in the boreal forest of north-central Alberta. The pine beetle is also now attacking jack pine, a prevalent species of the boreal forest.

Given the depleted Canadian timber resource and its inability to be used in structural framing, the Pacific Northwest and US South will have to compensate for this lumber shortage and increase production as the US housing market continues to improve. The ability of western Canada, a significant player currently, to export softwood lumber to the Pacific Rim market will also be diminished, resulting in greater market opportunities for the US Pacific Northwest.

Separately, in Eastern Canada, the government of Québec reduced the annual allowable cut by 20% in the mid-2000s to address historic overharvesting. As the harvest volume has declined, a number of sawmills, pulp mills, and paper mills have permanently closed.

Canadian Lumber Producers Have Been Expanding Operations into the US South

Over the last several years, a number of large Canadian lumber producers including West Fraser, Interfor, and Canfor have acquired sawmill operations in the US South. These expansions afford these companies the ability to benefit from the modest ongoing US housing recovery and a potential widening spread between lumber and log prices given the timber inventory overhang in the US South. Further, given the proximity to end markets, these companies should also benefit from lower freight costs and avoidance of potential US anti-dumping and countervailing duties (on their US mills) associated with the expiration of the Softwood Lumber Agreement.

Table 4: Recent Canadian Expansions into the US South

Acquisition Date	Buyer	Seller	Sawmills	Capacity (million board feet ["mmbf"])
2015	Interfor	The Price Companies	Monticello, AR	100
2015	Interfor	Simpson Lumber	Tacoma, WA; Longview, WA; Meldrim, GA; Georgetown, SC	750
2014	Interfor	Tolleson Ilim Lumber	Perry, GA; Preston, GA	450
2013	Interfor	Keadle Lumber Enterprises	Thomaston, GA	80
2013	Interfor	Rayonier's lumber business	Baxley, GA; Swainsboro, GA; Eatonton, GA	360
2014	West Fraser	Bibler Brothers	Russellville, AR	160
2014	West Fraser	Travis Lumber	Mansfield, AR	150
2015	Canfor	Anthony Forest Products	Eldorado, AR	150
2015	Canfor	Southern Lumber Co	Hermanville, MS	90
2015	Canfor	Balfour / Beadles Lumber Company	Thomasville, GA; Moultrie, GA	210
2013	Canfor	Scotch & Gulf Lumber	Mobile, AL; Fulton, AL; Jackson, AL	440

Source: TIG Analysis

Canadian investment in new US South sawmilling capacity could improve the speed and magnitude of a price response for southern sawtimber once housing demand more notably improves. Historically, Canadian lumber producers typically have used circular sawmill technology in Canada because it is faster with smaller diameter wood that is the common resource in Canada. In all likelihood, these producers will continue to employ similar technology at that mills they've acquired in the US South.

Growing Hardwood Lumber Markets

The United States is the world's largest hardwood lumber exporter. During the 20th century, exports were dominated by the export of precious hardwoods to European furniture producers, including such species as cherry, ash, maple and walnut. Early in the 2000s China and southeast Asia emerged primarily as buyers to dominate the hardwood lumber trade, and shifted demand toward more commodity hardwoods such as red and white oak, and yellow poplar. Importantly, Asia's emergence has translated into more pronounced demand for hardwood lumber, which has been captured by US timberland owners. In fact, the US is the largest exporter of temperate hardwood lumber in the world, and the largest supplier of primarily commodity hardwoods to the Chinese market. Looking ahead, there is the potential for commodity hardwood lumber demand to remain strong in light of continued growth of the Asian market, and continued pressure on tropical hardwood lumber suppliers in Asia, Africa, and Latin America to provide sustainably managed lumber products.

Investment Strategy

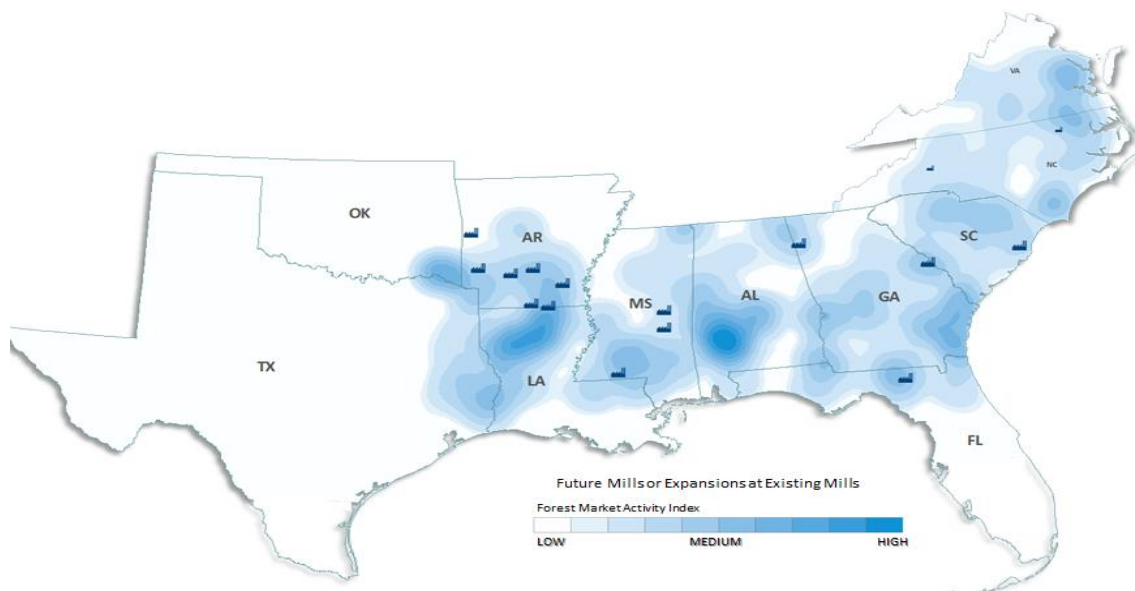
TIG favors a US investment strategy that seeks to take advantage of the aforementioned trends in timber supply, demand, and inventories. Although our approach is geographically diversified such that assets will be acquired in all major timberland regions of the US, we will emphasize certain sub-regions, species and age-classes to take advantage of investment opportunities we see materializing over the next 5-10 years. Specifically, the strategy will focus on: 1) pre-merchantable pine plantations in the US South, 2) commodity hardwood forests in Eastern Hardwood Regions, and 3) young, intensively managed Douglas-fir and whitewood planation forests in the Pacific Northwest. Each is discussed below.

Pre-Merchantable Pine Plantations in the US South

As mentioned previously, recent estimates of softwood sawtimber being “stored on the stump” in the US South range from 21 bbf to as much as 60 bbf. An increase in housing starts from 1.2 million to 1.5 million per year increases the use of structural lumber and panels by approximately 4.3 bbf or roughly 8.6 bbf of logs. Therefore, it could take anywhere from 3-7 years to work off the excess sawtimber inventory to the point that prices begin to respond to increasing demand, assuming no other conditions change, that US housing ultimately normalizes at 1.5 million housing starts, and that all 8.6 bbf of logs come exclusively from Southern timberland sources. In light of the current oversupply, a near-term rebound in pine sawlog stumpage prices in the US South would seem unlikely.

In contrast, pine plantations were heavily thinned during the recession, and demand for smaller diameter timber may be very strong due to demand from: 1) the pine-based pulp industry which remains globally competitive and export oriented, 2) pellet manufacturers, 3) OSB manufacturing and new small-sawlog sawmill operations which have recently been built in the region. As a result, timberland heavy to smaller diameter timber stands may be better priced than tracts heavy to ready-to-cut sawtimber, and pricing of smaller diameter wood may be relatively stronger over the next 5-10 years as a result of the current sawtimber supply/demand imbalance.

Figure 16: US South Heat Map and Future Sawmills or Expansions at Existing Mills



Source: UGA: CFB (Center For Forest Business); TIG Analysis

Based on this work, we are targeting an allocation of 45% of our US investment portfolio to pine plantations in the US South, with an emphasis on pre-merchantable and early merchantable stands. We are also focusing on areas within the South that offer excellent growth characteristics, deep markets, and expanding sawmill capacity.

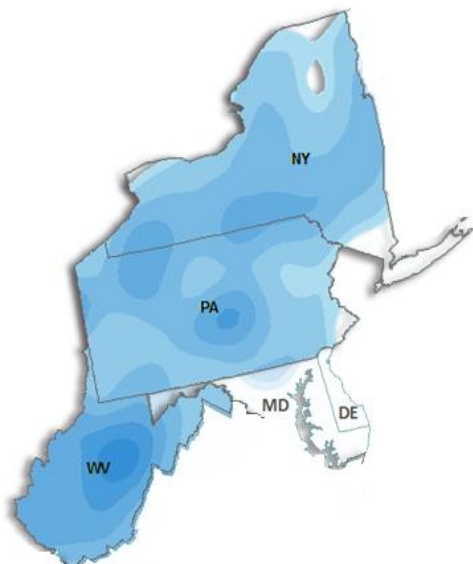
Commodity Hardwood Forests in Eastern Hardwood Regions

The US is by far the largest hardwood lumber exporter in the world, with 2015 exports reported at around 1.5 bbf or 17% of the world total (per the FAO). The next largest hardwood lumber exporter is Thailand (11%), followed by Malaysia, Russia, and Laos.

The emergence in the last decade of Asia as the primary destination for hardwood lumber exports (thereby replacing Western Europe) has also changed the species mix of exports. While “precious hardwoods” such as cherry, walnut, and ash have the highest value on a per m³ basis, more commodity hardwood species such as white and red oak and yellow poplar now make up the majority of the temperate hardwood lumber trade. White and red oak and yellow poplar accounted for nearly 60% of US hardwood lumber exports in 2016 (USDA FAS).

Hardwood lumber is primarily exported from the eastern US ports of Norfolk, New York, Baltimore, Charleston and Savannah. Proximity to these ports, or rail links to these ports, increases export exposure and net stumpage prices for exports. The largest concentration of commodity hardwood species is found in the Mid-Atlantic states and southern Appalachians.

Figure 17: Eastern Hardwood Regions Heat Map

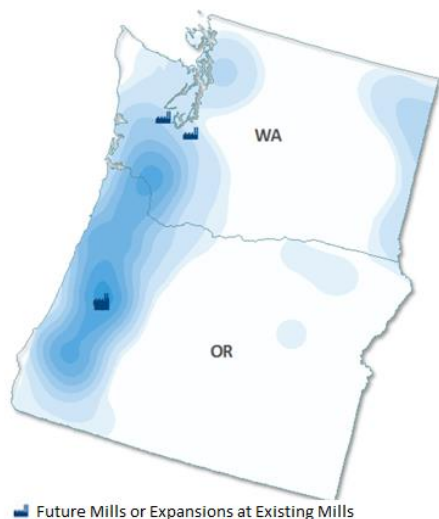


As a result, hardwood investments in Eastern Hardwood Regions would seem likely to have the highest exposure to export markets, as well as retain the desirable characteristics of hardwood timberland investments which include multiple income streams (hunting lease and small tract sale income), low property management costs, and low timberland investment return correlations with softwood timber markets in the US South and US Pacific Northwest.

We are targeting an allocation of 30% of our US investment portfolio to establishing a position in Eastern Hardwood Regions of the US. Other eastern hardwood opportunities will be considered, but the intent is to position the portfolio to take advantage of the hardwood lumber drivers that have been identified through our analysis.

Younger, Intensively Managed Douglas-fir and Whitewoods in the US Pacific Northwest

Figure 18: Pacific Northwest Heat Map



The US Pacific Northwest has the smallest area of privately held timberland in the US due to large government holdings in the region. TIG believes that there is less of a sawtimber inventory overhang in this region despite a modestly improving US housing market as softwood log and lumber exports to the Pacific Rim increased from approximately 680,000 m³ in 2007, to over 6 million m³ in 2014 per the FAO.

In particular, TIG expects demand for softwood lumber imports in the Pacific Rim to continue to increase, though at a more moderate pace. The US has been a minor player in this market (exports to China in 2014 were around 1.1 million m³ per the FAO) but could play a more significant role as western Canada reduces its exports (Canada exported 7.5 million m³ of softwood lumber to China in 2014), and significant additional lumber production capacity would seem unlikely from New Zealand, Chile or Australia. The US Pacific Northwest will largely be competing with Russia for incremental demand in the Pacific Rim softwood lumber market over the next five years.

Source: UGA: CFB (Center For Forest Business); TIG Analysis

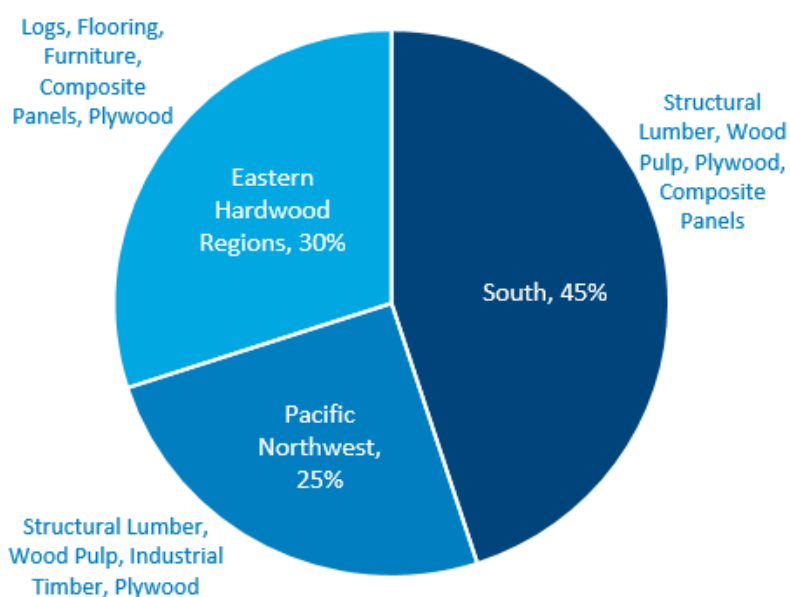
The “pine beetle” epidemic has had a devastating effect on the softwood forests of western Canada. Although exact timber availability projections vary, it is clear that there will be a significant reduction in the availability of softwood timber in this region for several decades as the forests recover from the insect infestation. This will impact not only western Canada’s ability to participate in Pacific Rim markets, but also its ability to service western US lumber.

We are targeting an allocation of 25% of our US portfolio to US Pacific Northwest properties heavy to pre-merchantable and younger timber to take advantage of a modest rebound in lumber demand from the US housing market, the declining ability of western Canada to export softwood lumber into the western US market, and a moderately growing softwood lumber market in the Pacific Rim.

TIG's Proposed Investment Allocation

TIG's proposed initial investment allocation for a portfolio is seen below. Given targeted nominal, gross returns between 7.0% and 7.5% for each timber region, TIG believes that a blended target return is 7.1%. This allocation not only provides geographic diversification, but also provides diversity in terms of roundwood products (logs, lumber, composite panels, and wood pulp), and exposure to export markets for softwood lumber (Pacific Northwest) and hardwood lumber (Eastern Hardwood Regions).

Figure 19: Proposed Investment Allocation

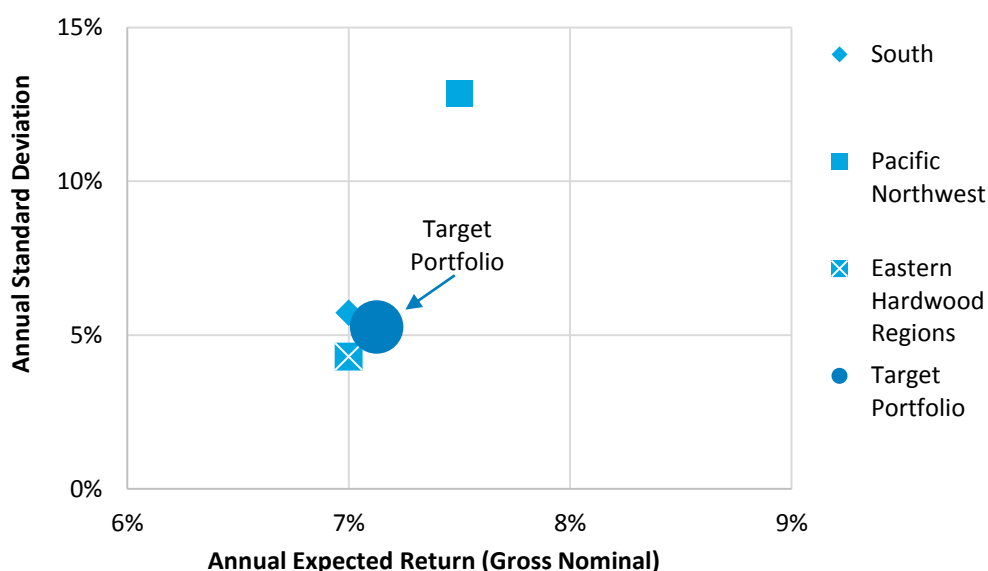


Source: TIG Analysis

Risk / Return for Targeted Regions

To determine an appropriate rate of return, we analyzed regional quarterly National Council of Real Estate Investment Fiduciaries ("NCREIF") returns and the covariance of those returns by region over the last decade. The annual standard deviation of nominal, gross returns in the South was around 5.7%, in the Pacific Northwest was around 12.9%, and in Eastern Hardwood Regions was around 4.3%. Based on regional returns and covariance of returns, the annual standard deviation of a theoretical portfolio is around 5.3%.

Figure 20: Risk / Return for Targeted Regions



Source: TIG Analysis

Conclusion

TIG believes that exposure to core US commercial timberlands should be a necessary part of a diversified institutional timberland portfolio. Given unique regional and end market dynamics in key timberland markets throughout the US, we have designed a strategy that capitalizes upon these different drivers. Based on our analysis, we are targeting: 1) pre-merchantable pine plantations in the US South, 2) commodity hardwood forests in Eastern Hardwood Regions, and 3) young, intensively managed Douglas-fir and whitewood planation forests in the Pacific Northwest.

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