



31 October 2021



SENT TO LSU AGCENTER/LOUISIANA FOREST PRODUCTS DEVELOPMENT CENTER - FOREST SECTOR / FORESTY PRODUCTS INTEREST GROUP



Please find attached the latest installment of my Market Trends report. Housing indicators were mixed this quarter, with lower but still elevated measures of builder sentiment and affordability, improving home inventories and home prices, and housing starts moving sideways. Product prices and mill margins corrected in dramatic fashion, but appear to have bounced off recent bottoms as the fourth quarter got underway. Timberland sale values moved lower while velocity improved, reflecting the varied quality of assets and the continued interest in the asset class. In this quarter’s Deeper Dive, I discuss the debate surrounding forest-based carbon credit markets, along with my own views, all of which I hope triggers some consideration of the issues and arguments as world leaders and diplomats converge on Glasgow, Scotland for the COP26 meeting.

Best regards and best wishes for the upcoming holidays,

Will

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MARKET TRENDS

3RD QUARTER, 2021

Perspectives on the latest market trends and indices impacting the Timber and Wood Products sectors, compliments of WillSonn Advisory, LLC



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Q3 2021 HIGHLIGHTS

Market Trends

- Builder sentiment and construction expenditures taper but remain high (page 5)
- Housing Affordability retreats on soaring home prices (page 7)
- Housing Starts continue to drift lower but still on pace to eclipse 2020 (page 9)
- New and Existing Housing Inventory levels rebound modestly in Q3 (page 11)
- Product Prices plummet in Q3 as builders and DIY'ers pause (page 13)
- PNW Log prices retreat while Southern Log Prices tick up again (page 15-16)
- Gross sawmill margins drop hard, South get back on top (page 17)
- US Timberland Sales start picking up the third quarter, pass 2020 levels (page 18)

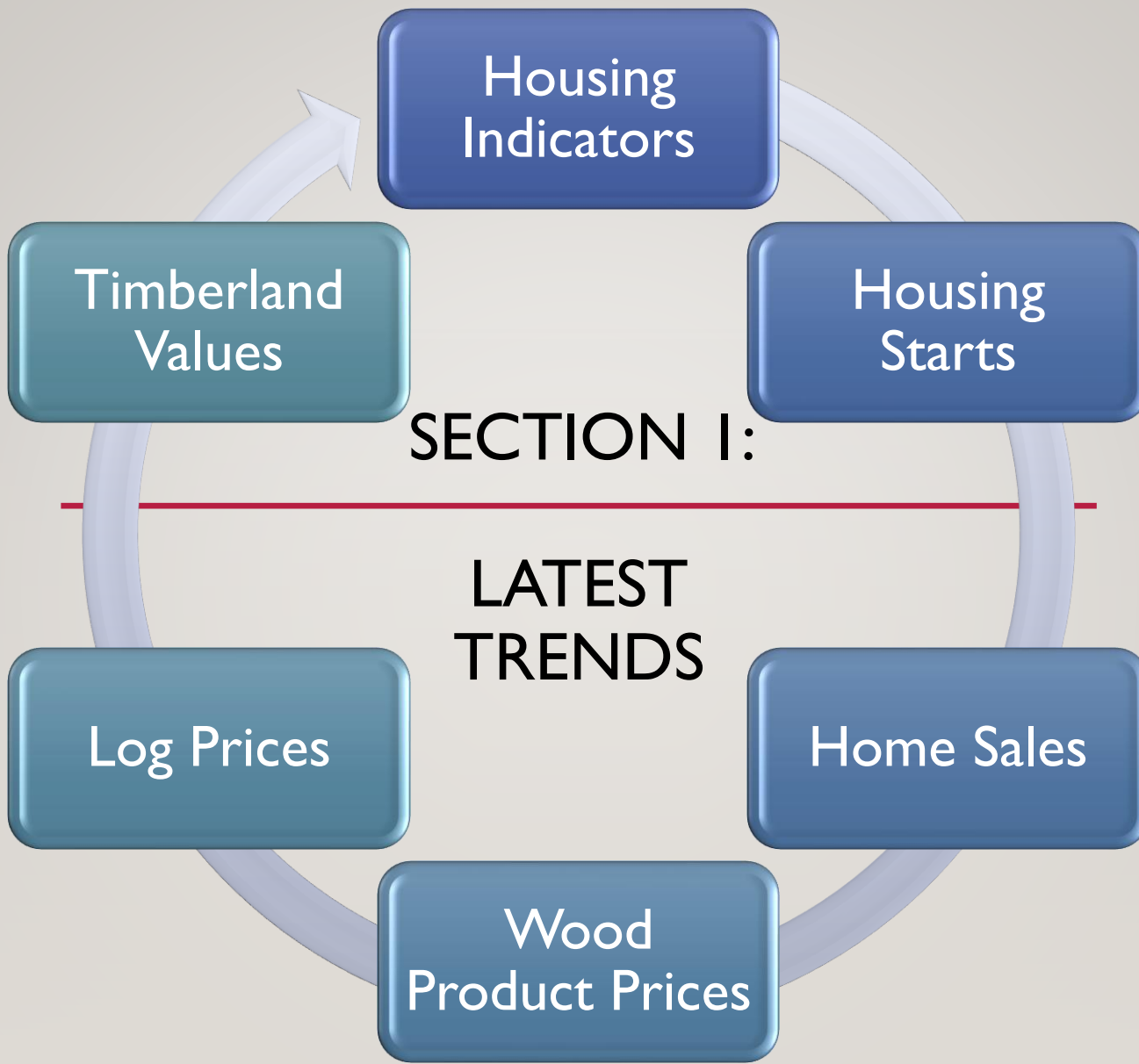
Deeper Dive

- The Debate Surrounding Forest-Based Carbon Offset Projects (page 20-27)

In Case You Missed It

- WSJ: Forests; Good Intentions but Mixed Results (page 29)

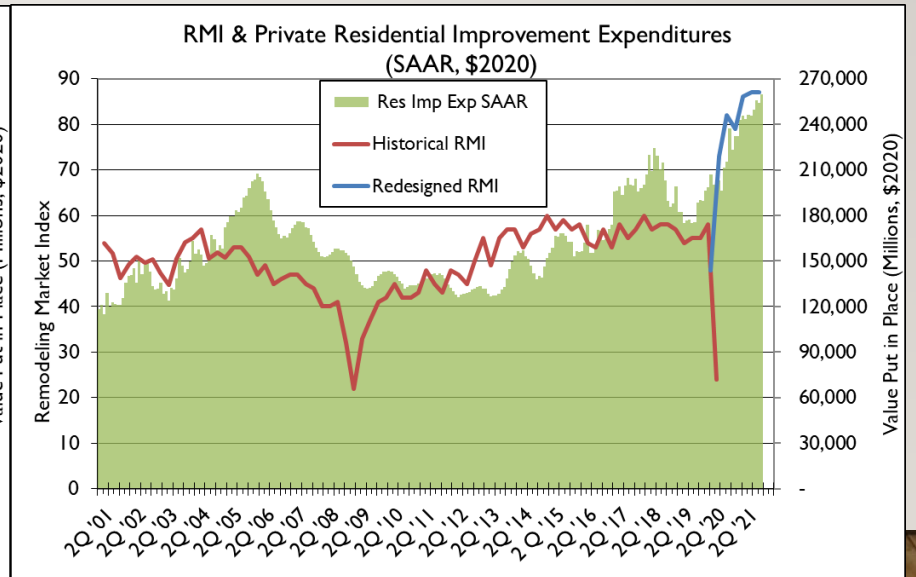
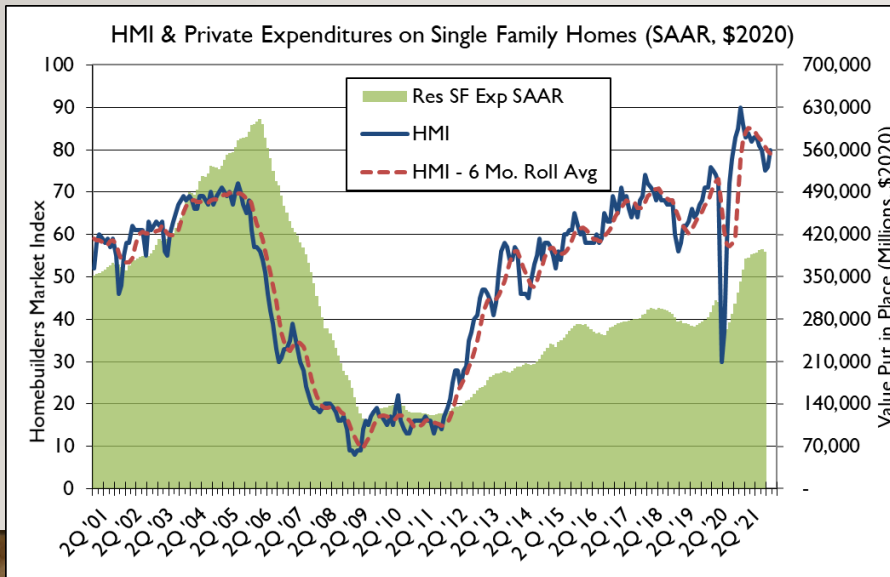
About WillSonn Advisory, LLC





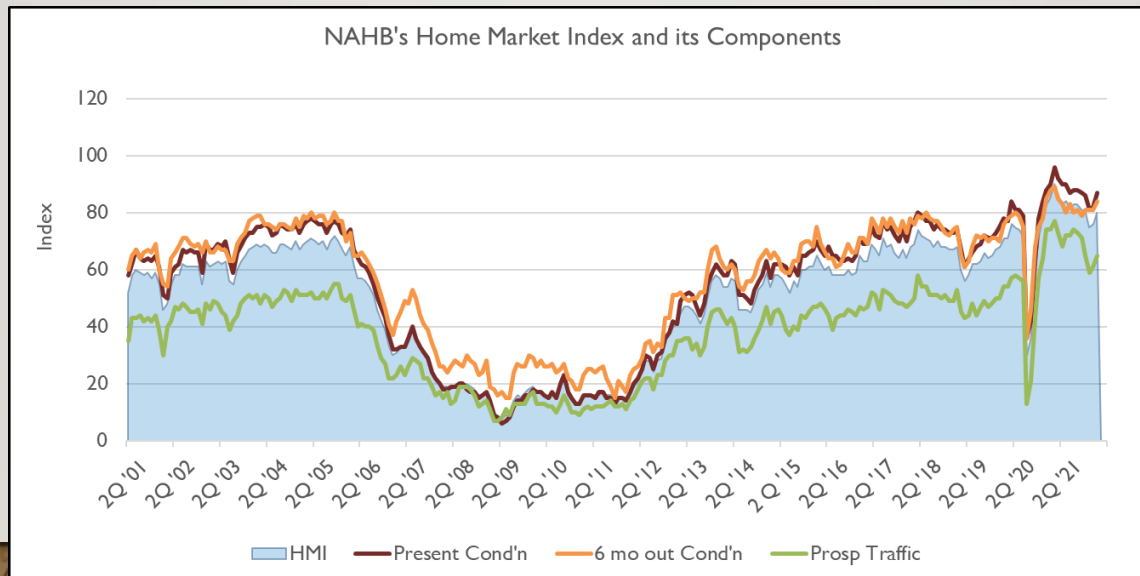
BUILDER SENTIMENT & PRIVATE RESIDENTIAL EXPENDITURES

- Recent Trends:** The Homebuilder Market Index (HMI) continued its drift lower to 80 in September, down from its all-time high of 90 in November 2020. Conversely, the quarterly Remodeling Market Index (RMI) plateaued in Q3 2021, remaining at 87, an all time high.
- Single Family New Residential Expenditures have exceeded 2020 levels by 28.1%, following a 10.0% gain in 2020. Private Residential Improvement Expenditures have continued to climb, averaging 15.3% above 2020 levels, following 2020's 17.8% increase.
- Explanation:** The quick rebound in home construction along with redirection of resources (time and money) into remodeling, pushed residential expenditures higher during the pandemic. Rising building product prices and constrained labor contributed to higher construction expenditures as well, partially offset by longer construction times and smaller home sizes.
- Implication:** Higher builder confidence generally bodes well for near to intermediate-term housing starts and therefore continued demand for building products for both construction and remodeling. Higher construction costs risk limiting the pool of qualified buyers and delays in construction.
- Expectation:** In the longer-term, construction expenditures should see slower growth or even contraction as lower building material prices make their way through the distribution channels. Constrained supply of existing homes, developed lots and scarce labor and contractor productivity will keep residential construction and improvement expenditures elevated.



BEHIND THE NUMBERS: BUILDER SENTIMENT & PRIVATE RESIDENTIAL EXPENDITURES

- NAHB's Homebuilder Market Index (HMI) and Remodeling Market Index (RMI) are measures of home builder and remodeling contractor sentiment.
 - In the chart below, you see the three components of the HMI – Present Condition, Condition 6 months out, and Prospective Buyer Traffic.
 - During the pandemic, Prospective Buyer Traffic has been much stronger than in prior good markets, both in terms of the absolute number, but also relative to the other two measures. Also note that the “6 month out” component is weaker than “Present”
- Private Construction Expenditures on Single Family Housing and Remodeling are in constant 2020 dollars (i.e., inflation adjusted)
- The monthly HMI and quarterly RMI are dispersion indices, measuring the proportion of respondents who have a positive versus negative view (neutral responses are ignored in the calculation). While a reading over 50 indicates a prevailing positive view of current and future conditions, it says nothing about the proportion in the neutral camp.
 - Note that the NAHB instituted a new RMI survey beginning in Q1 2020, such that comparisons to prior years are meaningless.

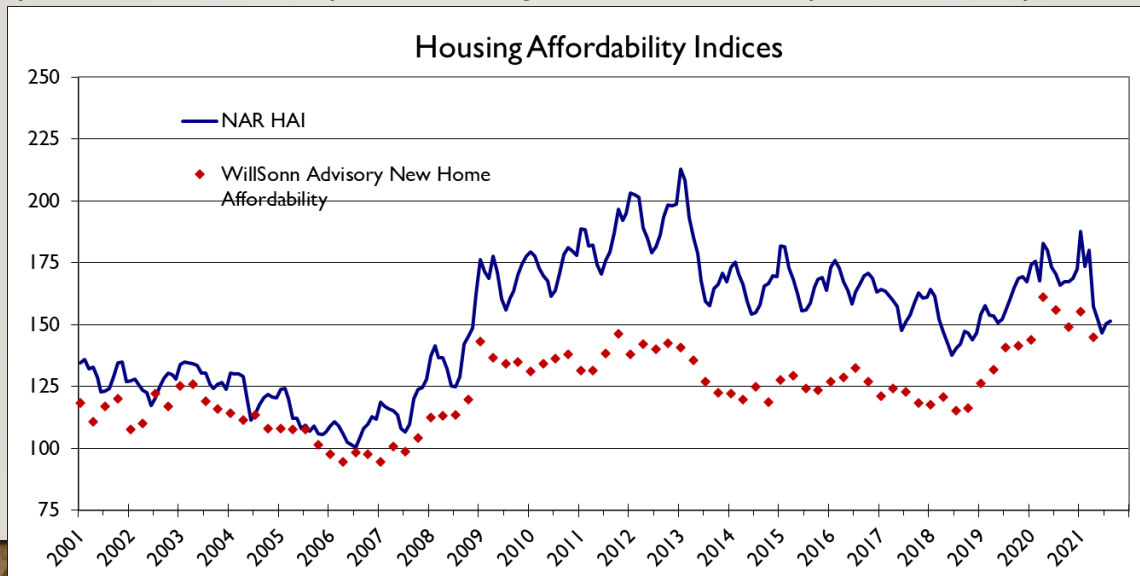


Data Sources: Census Bureau, FRED website

Charts & Analysis: WillSonn Advisory

HOUSING AFFORDABILITY

- **Recent Trends:** The Housing Affordability Index (“HAI”) (blue line) shot up in January as stimulus checks hit taxpayer bank accounts. After registering 186 in January 2021, the HAI has fallen to 151 in August. The New Home Affordability (red diamonds), increased in the last few quarters, and sat at 145 in Q2 ’21. New Home Affordability is back to pre- Housing Bust levels, relative to NAR’s HAI.
- **Explanation:** The HAI had been drifting lower in 2012-18, peak-to-peak, and trough-to-trough, as home price increases outpaced income growth. In 2019 and 2020, mortgage rates eased and income accelerated, bolstering affordability.
 - As cautioned last quarter, existing home affordability was overstated in early 2021; bidding wars pushed transaction prices above listing prices in many markets and stimulus checks artificially (and temporarily) boosted family income figures.
- **Implication:** Over the years, there is a rather weak link between affordability and housing starts (R-squared of just .19). In fact, the highest levels of housing starts occurred when affordability was in a trough (~2006). Thus, a “fear of missing out” may have spurred some home buyers to buy sooner than later, before home ownership was forever out of reach. Easy credit back then also helped.
- **Expectation:** Due to massive government stimulus and broad supply chain constraints, inflation concerns are threatening to push mortgage rates higher while thin home inventories elevate home values. Expect affordability to continue to drift lower in the coming months, but don’t worry too much about its impact on housing starts. Also don’t expect builders to pass along lower construction costs to buyers.



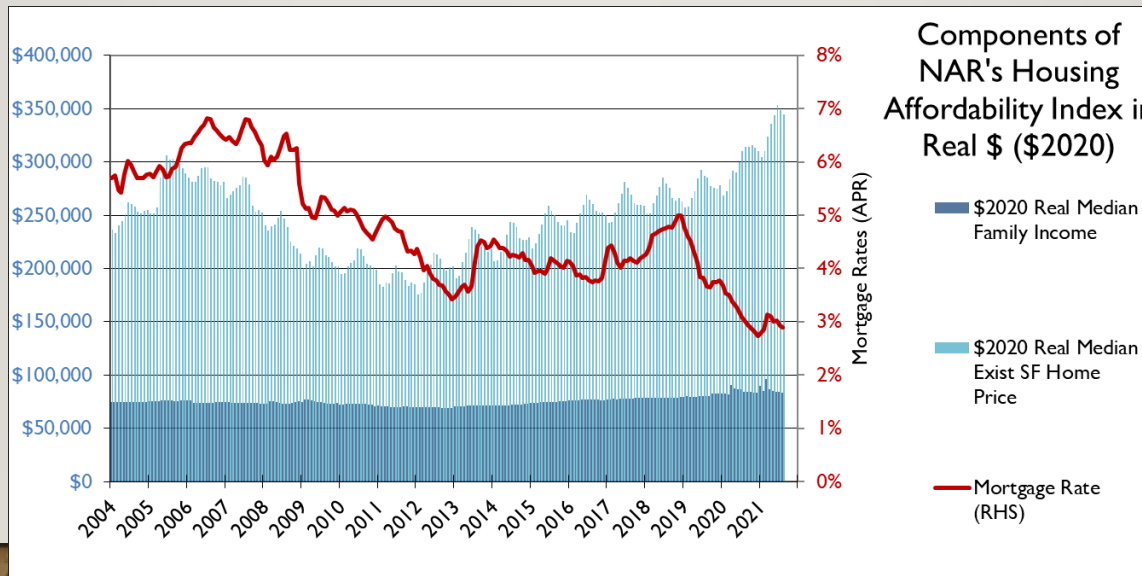
Data Sources: NAR, Census Bureau,, Dept. of Commerce

Charts & Analysis: WillSonn Advisory



BEHIND THE NUMBERS: HOUSING AFFORDABILITY

- The National Association of Realtors' Housing Affordability Index ("HAI") is based on three inputs: list prices of existing homes for sale, 30-year fixed mortgage rates and median family income. New Home Affordability uses the actual sales price of new homes, with the same income and mortgage rate figures as the HAI.
- A reading of 100 means that a family with median income would need to spend fully 25% of its monthly income on a mortgage to purchase the median priced existing home. A reading of 140 means that 25% of the median family income is 1.4 times the mortgage payment for the median priced existing home.
- This chart displays the movement in the three components of the NAR Affordability Index – home prices, mortgage rates and family income – in Real dollar terms. So far in 2021, compared to 2020, median home prices are up 15.4% and Median Family Income is up 5.8% (with the help of stimulus payments), while Mortgage rates have declined -6.4%. As a result, Mortgage Payments, as a percent of Income has increased 6.5%, resulting in the lower average YTD 2021 HAI, down -5.7% from 2020's average.
- In August 2021, mortgage rates averaged 2.89%, 10 basis point higher than January 2021 and 28 bps below the average 2020 rate. Holding home price and income steady, a 50-basis point increase in mortgage rates drives the Affordability Index down about 10 points.



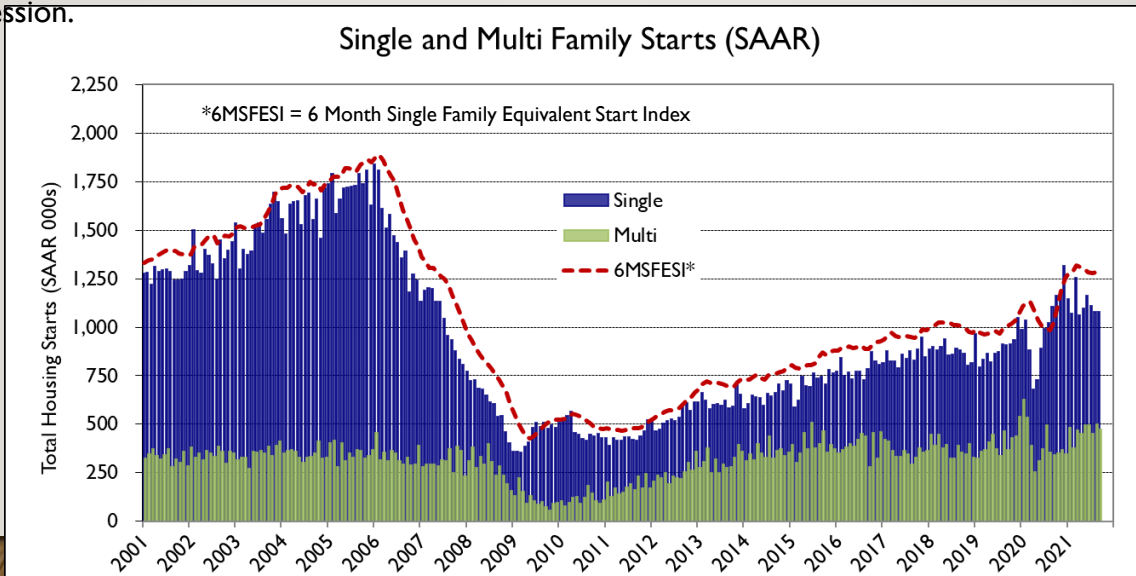
Components of
NAR's Housing
Affordability Index in
Real \$ (\$2020)

- \$2020 Real Median Family Income
- \$2020 Real Median Exist SF Home Price
- Mortgage Rate (RHS)

Data Sources: NAR, FRED
website
Charts & Analysis: WillSonn
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HOUSING STARTS

- Recent Trends:** Total Housing Starts averaged 1.566 million units in July-Sep (SAAR), 15% above 2020's pace of 1.395 million units. Year-to-date (SAAR) through September, Total Housing Starts have averaged 1.584 million units, an improvement of 13.7% versus full year 2020. YTD Single Family Starts are up 12.0%, while Multi Family Starts are up 18.6%, compared to full-year 2020.
 - The WillSonn Advisory "6 Month Single Family Equivalent Start Index," recasts a multi-family unit into a single-family unit based on relative wood use, so a better measure of Housing Start's demand for wood. September's 1,257,000 unit reading represents 67% of the 2006 peak of 1.9 million SFES's.
- Explanation:** Housing has led the economic recovery in the US during the pandemic-induced recession. Near-term demographics are supportive of a resurgence in demand for homes, both new and existing, with limited turnover of existing homes favoring new home construction. It also helps that memories of the implosion of the housing-induced recession of 2008-9 are fading over time.
- Implication:** Housing Starts account for 30%-40% of wood usage, so rising starts are directly tied to higher lumber and panel demand
- Expectation:** Housing starts are expected to continue to improve over the coming months and years, as the 2008-2018 deficit of homes built is replenished and as the price gap between new and existing homes narrows. Gains will be tempered by limits on construction labor, a scarcity of developed lots, long construction times, tighter construction financing standards, declining home size, and by the occasional recession.



Data Source: U.S. Census Bureau
 Charts & Analysis: WillSonn Advisory

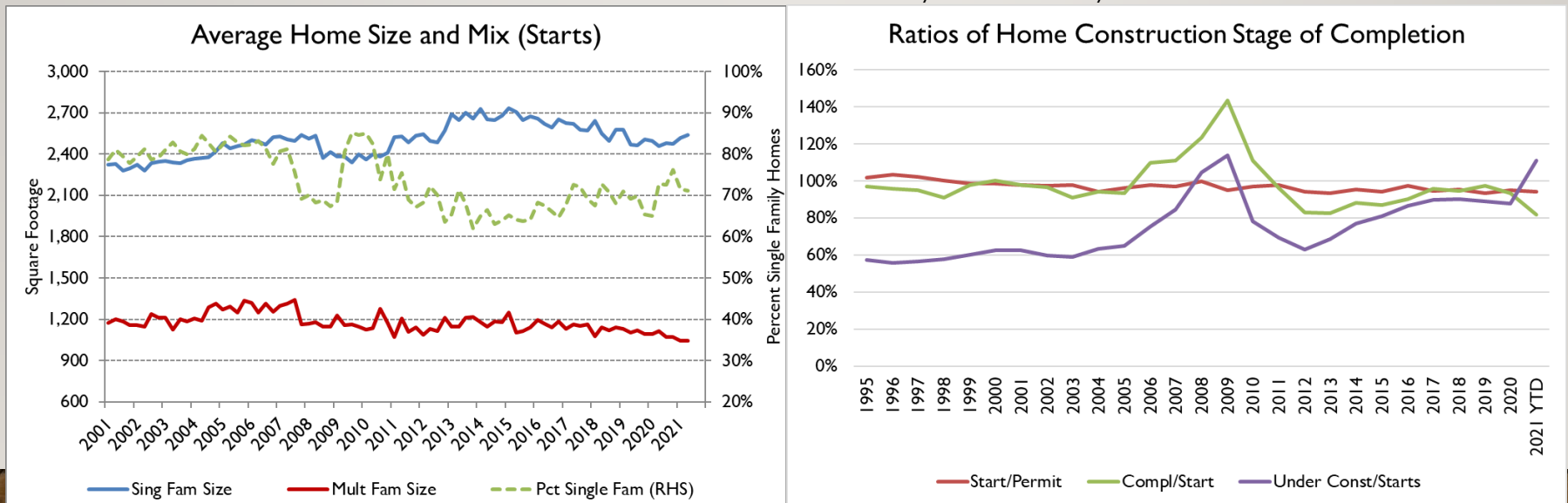


BEHIND THE NUMBERS: HOUSING STARTS

- The size of Single-Family Home Starts in the first half of 2021 averaged 2,529 sq. ft., up modestly 2.1% from 2020's average of 2,476 sq. ft. The average size of Multi-Family Units started in H1 2021 averaged 1,045 sq. ft., down -3.9% from the 2020 average of 1,087. Single Family units made up 71% of Total Starts in H1 2021, in line with 2020's 72% figure and 11 points below the pre-bust average of 82%.
- Multi-family units use approximately 2/3 as much wood per square foot of construction compared to a Single-Family Unit, and since Multi-Family Units are about half the size of Single-Family homes, I count them as a 1/3 single family equivalent.
- The Year-To-Date average number of Permits has increased along with Starts so far in 2021, with Starts averaging 94% of Permits. In the bottom right chart, you can see that the ratio of starts to permits has been declining over time, such that the old rule of thumb of ~97 Starts per 100 Permits should be lowered to 95 or lower. Also declining is the ratio of Completions to Starts (the green line), averaging just 82% YTD. The number of homes under construction relative to the number of Starts, has ballooned to 111%, up from 88% in 2020, and rivaling the peak of 114% reached in 2009. As noted earlier, the run up in construction materials, along with supply chain woes and backlogged inspections has delayed many completions in 2021.

Data Source: U.S. Census Bureau

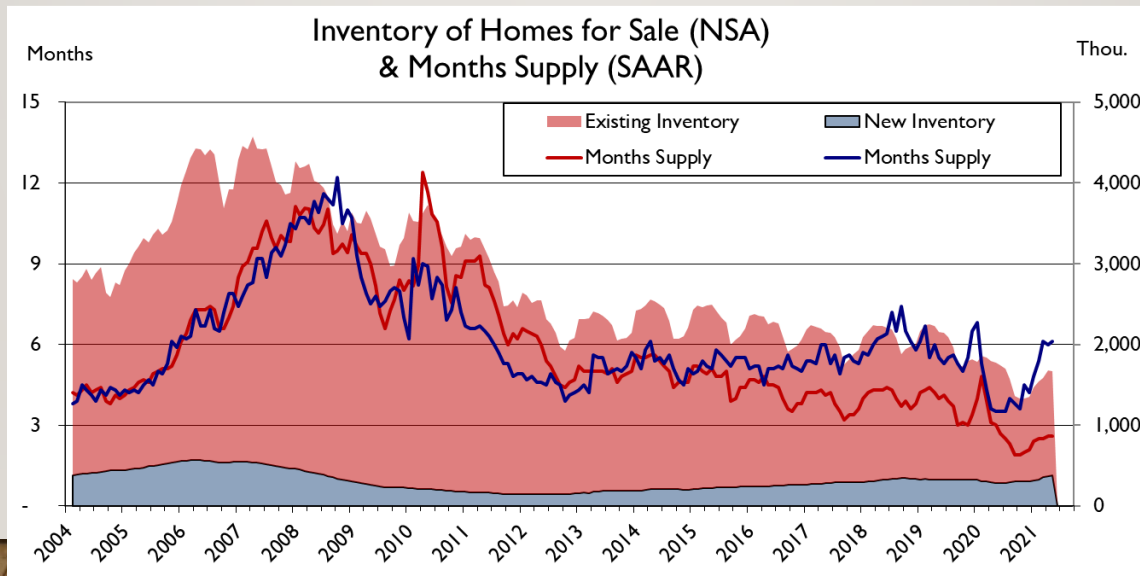
Charts & Analysis: Willsonn Advisory





PACE OF HOME SALES & INVENTORIES

- **Recent Trends:** The Inventory of Homes For Sale (Existing + New) recovered slightly to 1.67 million units in August, up 311k units from December 2020, but still down 6% (100k units) from August 2020. Separately, Existing Home Inventories are down 200k units, while New Home inventories are up 100k units, compared to August 2020. At their respective current pace of sales, there are a scant 2.6 months of sales in Existing Home inventories, and 6.2 months of sales in New Home inventories. Five or six months is normal.
- **Explanation:** The inventory of existing homes has been suppressed as homeowners have stayed put, increasing tenure from six or seven years a generation ago, to nine or ten years today. New home inventories have recently recovered to the high end of the normal range as higher home prices may be driving buyers to the sidelines or looking at existing homes as existing home inventories improve.
- **Implication:** Tighter inventories are contributing to higher home prices, which in turn limits existing homeowners' options to purchase replacement homes, a vicious cycle. While New homes are a major user of building materials, many R&R projects occur within the first couple years of ownership, so lower Existing home turnover can have a negative effect on building products demand as well.
- **Expectation:** It is unlikely (and unwise) that the US housing market would return to frothy levels of the early 2000's when mortgage standards were lax. With the prospect of rising mortgage rates in the months to come, home price growth may slow and inventories may recover as the pace of sales tapers off.

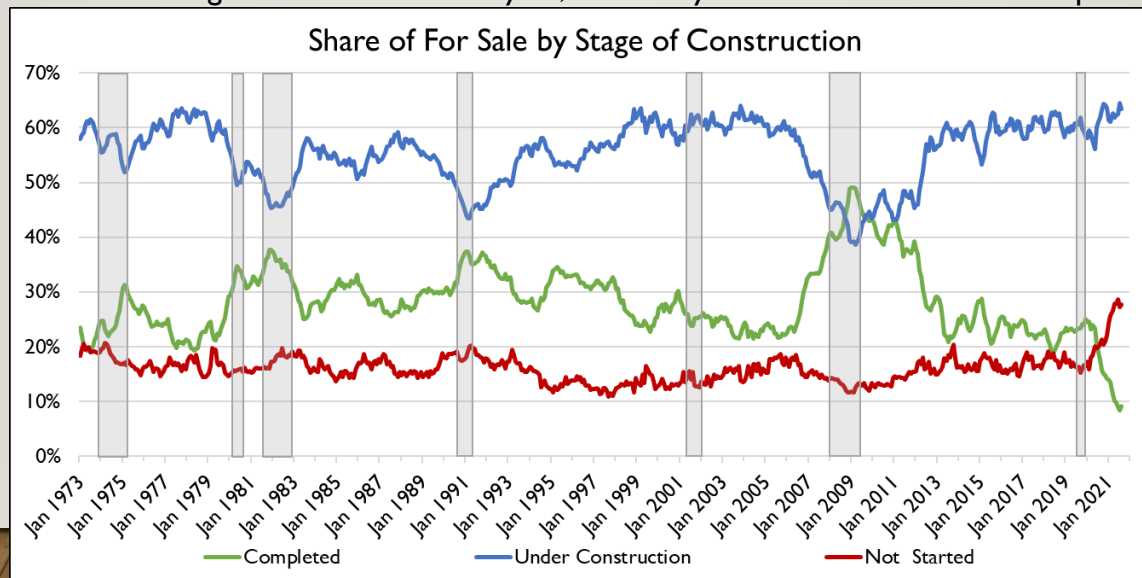


Data Source: U.S. Census Bureau, NAR

Charts & Analysis: WillSonn Advisory

BEHIND THE NUMBERS: PACE OF HOME SALES & INVENTORIES

- The inventory of New and Existing homes combines data from the National Association of Realtors (“NAR”) which provides data for Existing home sales (both single and multi-family homes), and the U.S. Census Bureau, which provides data for New home sales (single family only). Inventory figures are not seasonally adjusted. (“NSA”). Months Supply is derived from inventories and monthly sales volume and are seasonally adjusted (Seasonally Adjusted Annual Rate, or “SAAR”).
- In the chart below, I’ve plotted the share of homes for sale, by stage of construction. Also shown on the chart are the US recessions, in grey bars. What I notice in this chart is that a US recession is typically accompanied by a buildup (up to 30%+) in the share of Completed Homes for Sale and the longer the recession, the more pronounced the buildup of Completed Homes becomes. These patterns are typically mirrored by a decline in the share of homes Under Construction (as builders got stuck with more completed homes on hand).
- Of the 383,000 New units for sale at the end of August 2021, only 9% were Completed (a consecutive 47-year low), 63% were Under Construction, and 28% had Not Yet Started (just off its recent record of 29%).
- With the onset of the pandemic, and its impact on construction activity (slowed) and demand (heightened) we saw the for-sale inventory of homes Completed plummet, while the share of for-sale homes Not Yet Started climb. Thus, in the current market, we saw the share of for-sale units Not Yet Started rise to a record high. High Building product prices appear to have delayed the start of construction as builders tried to pass off the risk of high material costs to buyers, and as buyers chose to let lumber and panel prices come down.

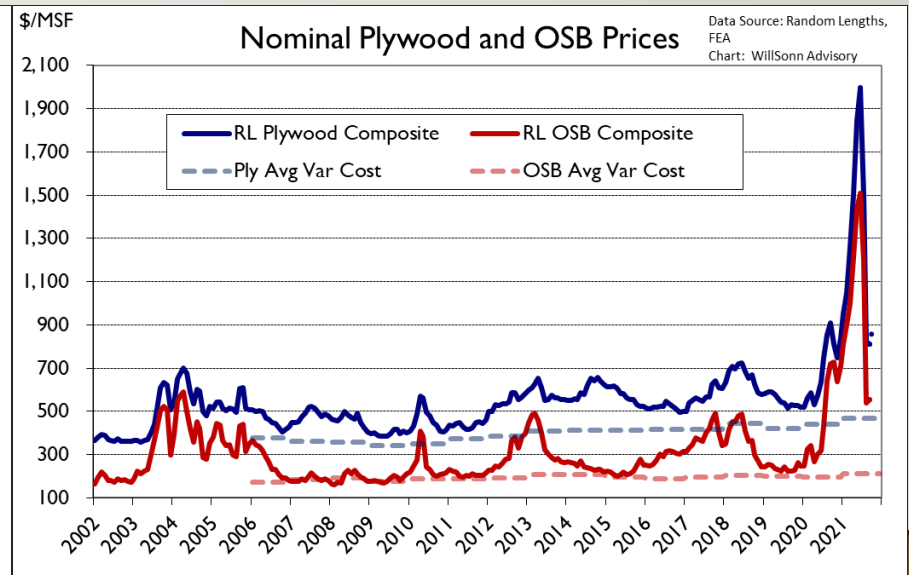
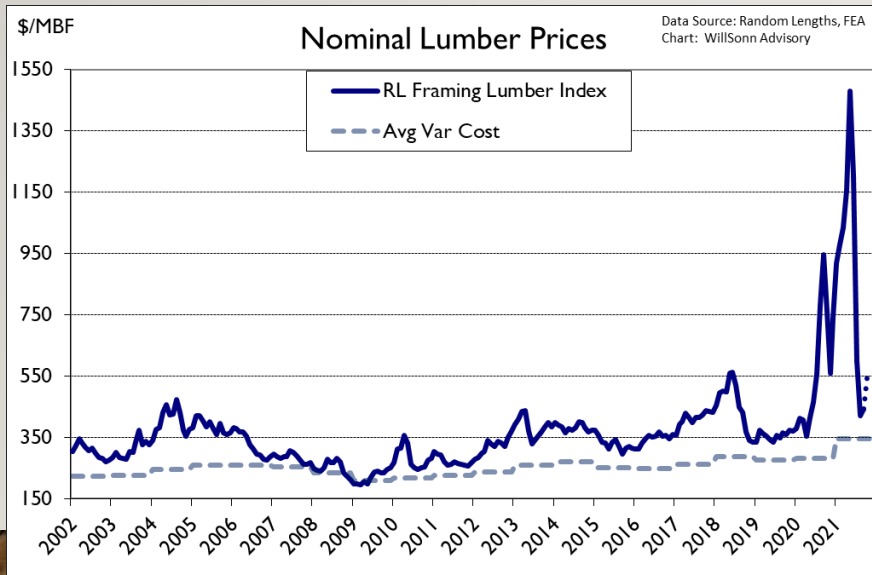


Data Source: U.S. Census Bureau, NAR
Charts & Analysis: Willsonn Advisory



WOOD PRODUCT PRICES

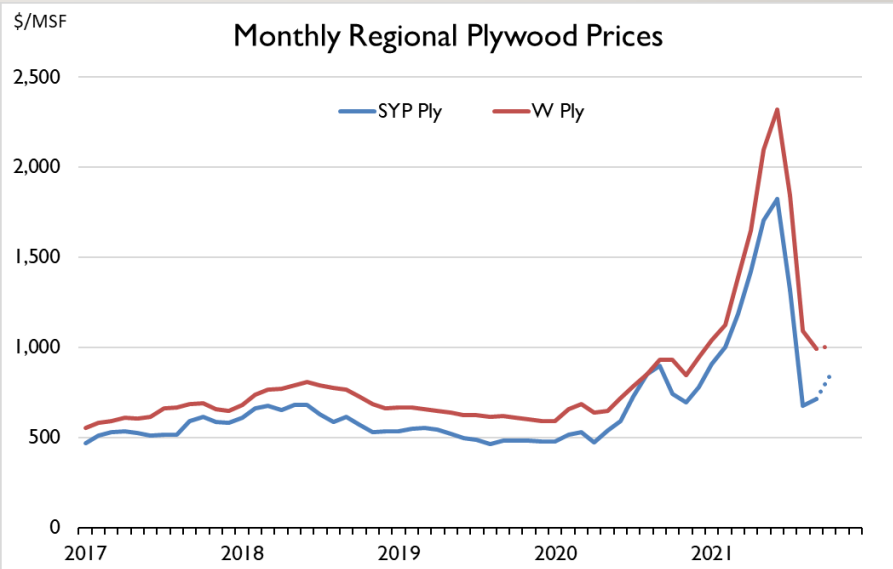
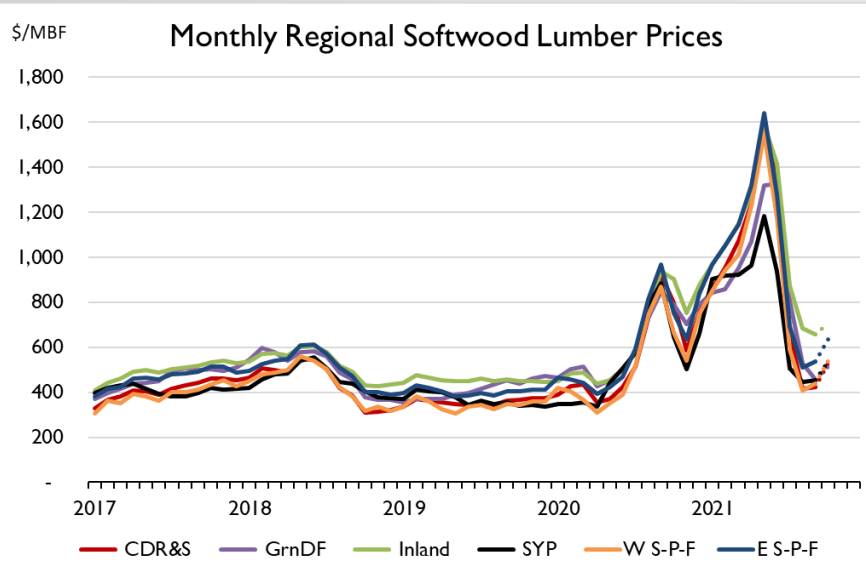
- Recent Trends:** The Random Length Framing Lumber Composite Index in Q3 2021 plummeted 62% from Q2 to register 14% below Full Year 2020 prices. Plywood pricing was down as well, dropping 41% in Q3 from Q2, though it remains at a level 51% above FY 2020. OSB also retreated in Q3, moving down 45% below Q2 prices. Relative to FY 2020, Q3 OSB prices remain up 61%.
- Explanation:** Early in the year, strong housing starts drove prices higher, only to be dashed by initial reactions to stay-at-home orders related to Covid-19. When home center demand surprised on the upside, and residential construction resumed in short order, producers fell behind in shipments. Extreme prices ensued as manufacturers and transportation sectors faced labor constraints and some OSB capacity fell out. Since June peaks, home center demand from DIY'ers have retreated as homeowners found other ways to spend their time and money, and builders delayed construction, waiting for the crazy prices to return to reality.
- Implication:** As predicted, rising cost for home builders and remodelers caused some to delay, downsize or abandon projects, reducing demand and price. Historically, high prices have traditionally brought on additional mill shifts, a surge in imports and substitution from non-wood materials, each of which have been muted during the pandemic-induced run up.
- Expectation:** As prices moderate and supply improves, builders and DIY demand should improve. Vaccinations should also ease labor constraints, allowing for higher production and easing of transportation bottlenecks.





BEHIND THE NUMBERS: WOOD PRODUCT PRICES

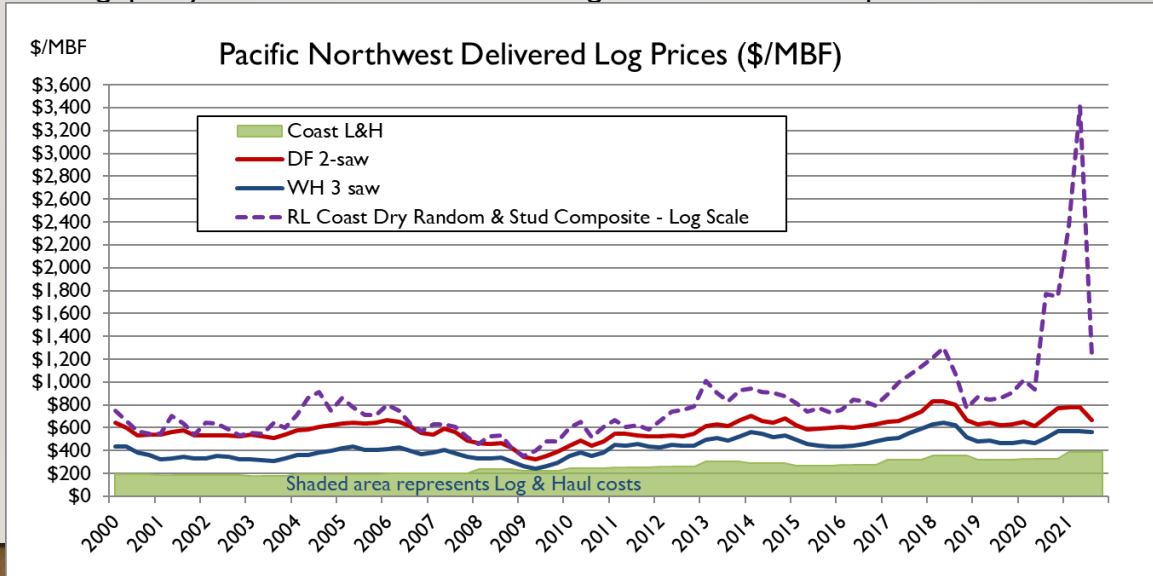
- Record prices were enjoyed by all regions in all product segments during the second quarter of 2021, but by August, all regions saw a significant downward correction
 - Regionally, Lumber September prices were down 59% to 73% from May's peak while Plywood prices are down 57% to 61% from June's peak
- Regionally in Q3 2021 relative to Q2 2021
 - West Coast lumber mills saw a 64% drop in Coastal Dry Random & Stud ("CDR&S") prices and a 52% decline in Green DF prices
 - Inland mills saw prices lose 48%
 - Southern Yellow Pine ("SYP") sawmills saw prices retreat 54%
 - Canadian components of the Random Lengths Framing Composite Index saw S-P-F prices reverse 64% and 59% in the West and the East, respectively.
- Second quarter plywood prices were lower in both regions, with Southern Plywood prices down 45% and Western Plywood down 35% during the quarter.



PNW LOG PRICES

- **Recent Trends:** Delivered log price movements were mixed in the third quarter with Douglas-fir 2saw prices down 14% (now -2% below 2020 levels) and western hemlock 3saw log prices off just -1% (but remain 11% above 2020 levels). Over the past 10 years, 3rd qtr. log prices have typically moved in the +/- 1% range, so this quarter saw exceptional movement in DF prices.
- After adjustments for lumber recovery, the Random Lengths Coast Dry Random & Stud Composite price (on a log scale) lost over \$2,000/MBF (-64%) after gaining more than \$1600/MBF in Q1 and Q2 combined. Compared to the third quarter of 2020, Q3 2021 log prices were mixed (DF down 3%, WH up 10%) while lumber prices were off -31%.
- **Explanation:** Despite high end-use demand in the midst of constrained production, western mill throughput of logs has been only modestly higher. Extensive fires throughout the West in 2020 resulted in extensive salvage operations in 2021, keeping pressure on landowners to move logs at any price (and cost). Thankfully, the 2021 fire season (6.5 M acres YTD) has not been quite as bad as 2020.
- **Implication:** Simply put, mills were able to keep log prices largely in check during the historic run-up in product prices
- **Expectation:** Fourth quarter price movement is usually mixed, with DF 2saw gaining \$12/MBF and WH 3saw losing \$2/MBF over the past 10 years. Supply chains will likely remain choppy as access in the forest is limited in the short-term, and salvage operations raise costs and volumes and lower log quality in the intermediate term. Log & Haul costs are expected to run 15-20% higher in 2021.

Historically, with about a one-quarter lag, western lumber prices have been the primary driver in West Coast domestic log pricing, though changes in supply and export log prices do exert some influence.

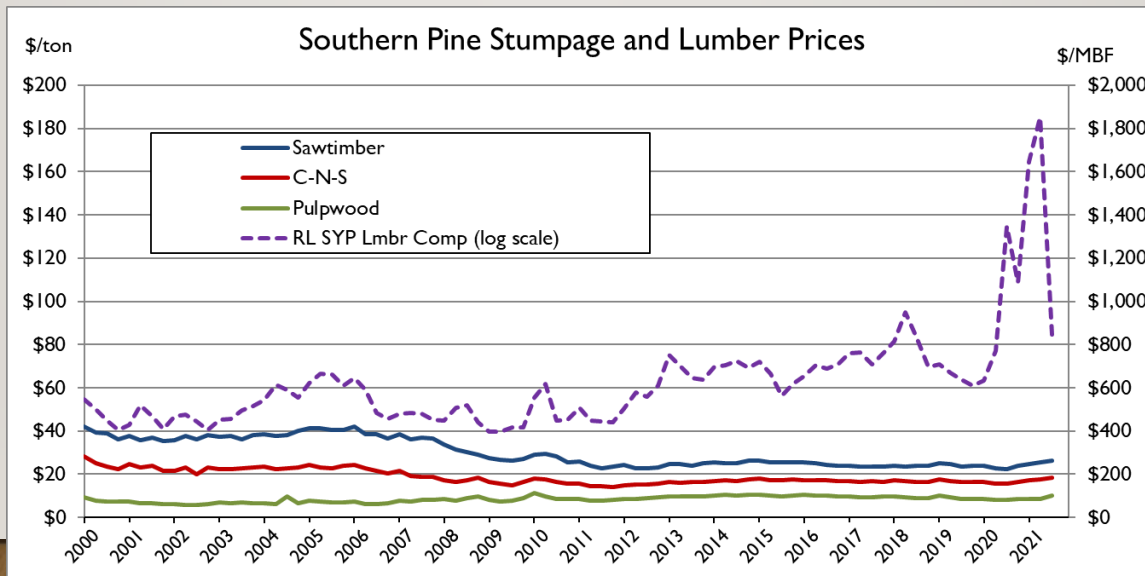


Data Source: Oregon DOF, WA DNR, Random Lengths, FEA, Log Lines

Charts & Analysis: WillSonn Advisory

SOUTHERN PINE LOG PRICES

- **Recent Trends:** Third quarter Southern Yellow Pine stumpage prices made additional small gains across the spectrum, with big movement in pulpwood. SYP Sawtimber prices gained \$0.83/ton in the third quarter (+3%), Chip-n-saw stumpage prices were up \$0.66/ton (+4%) and pine pulpwood was up \$1.35/ton (+15%). Relative to full year 2020, third quarter PST and CNS prices are up 12-14% while PPW prices is up 20%.
- The Random Lengths SYP Lumber Composite, adjusted for lumber recovery, took a 54% hit Q3 '21 compared to Q2 '21, and now sits -12% below full year 2020 prices.
- **Explanation:** Q3 prices typically see small price reductions (<\$0.50/ton) as drier weather sets in, so 2021's upward movement was certainly a welcomed change of pace. Q2 and Q3 in the South was unseasonably wet, compounded by improved manufacturing demand, which supported the uptick in price. Despite record lumber prices and increased production, sawlogs remain plentiful in the US South.
- **Implication:** As a result of the price movement, Sawtimber to Pulpwood price ratios loosened a bit with the outsized gains in pulpwood, averaging 2.6:1 in Q3, on par with the 2.5:1 ratio of the last few years. With ratios below 4:1, landowners are less inclined to grow sawtimber.
- **Expectation:** Q4 prices typically see prices gain \$0.20-\$0.55 per ton price as wet Fall weather sets in. My longer-term view has not changed; SYP sawtimber prices will remain under pressure for an extended period as plentiful inventory on the stump, slowly improving housing starts, increased plantation productivity, and incremental improvements in mill recoveries all work against significant gains in southern log prices.



Data Source: Timber Mart South, Random Lengths, FEA

Charts & Analysis: WillSonn Advisory

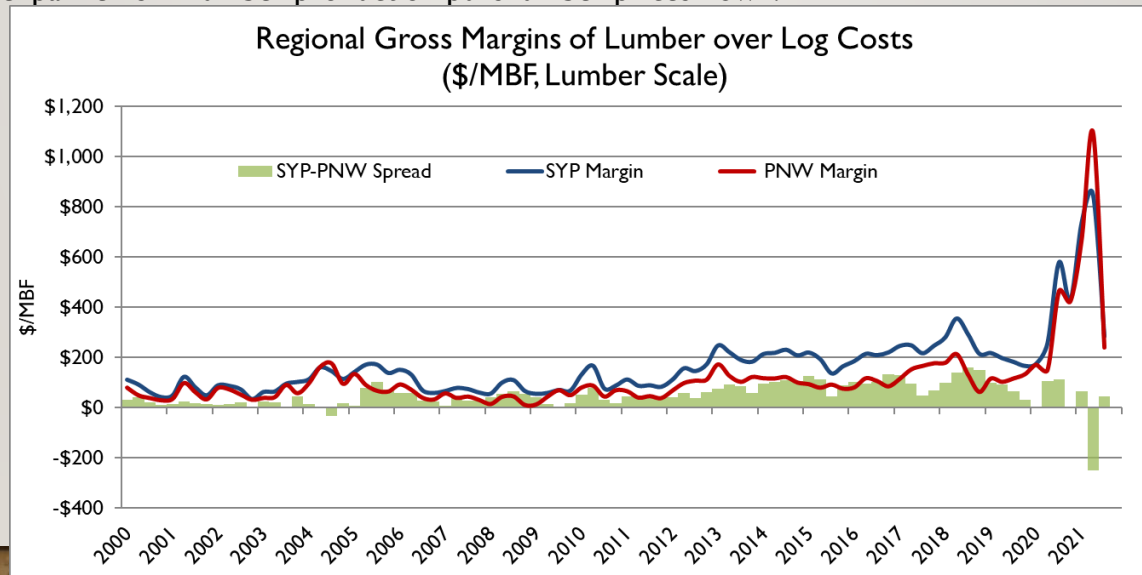
REGIONAL GROSS MARGINS

Sawmill Gross Margins (lumber price minus delivered raw material costs) in the Northwest and South were derived from the figures on the previous two pages. The difference between the two regions is the “spread.”

- Recent Trend:** The gross margin spread between Southern and PNW sawmills righted itself in Q2 to \$44/MBF in favor of the South, after favoring the PNW last quarter. The \$44/MBF spread compares to an average spread in 2020 of \$55/MBF enjoyed by southern mills. Gross margins moved down this quarter, from \$1,099/MBF to \$242/MBF in the PNW, and from \$849/MBF to \$286/MBF in the South. Since 2013, Southern sawmills have enjoyed gross margins over \$200/MBF in 25 of the last 35 quarters, while PNW mill gross margins hit that mark only six times.
- Explanation:** Since 2012, log export markets and declining Interior BC lumber production pushed PNW log prices to historical highs. In the South, persistent excess inventories of mature sawtimber on the stump have kept downward pressure on log prices, even as lumber prices improved. In recent years, Southern sawmills has seen some lumber price erosion creep in as new capacity has ramped up.
- Implication:** Manufacturing capital investments will continue to favor the US South as its margin advantage persists
- Expectation:** I expect the spread between the PNW and South to return to the \$50 to \$100/MBF range when lumber markets settle down, in favor of the South. These spreads will persist until standing sawtimber inventories are worked down in the South over the next several years, or until expanded SYP lumber production pulls lumber prices down.

Data Sources: Timber-Mart South, Random Lengths, FEA, Oregon DOF, WA DNR

Chart & Analysis: Willsonn Advisory



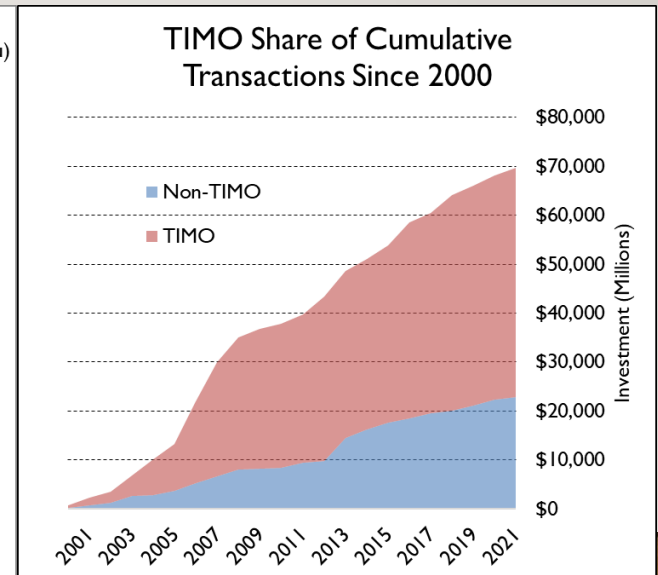
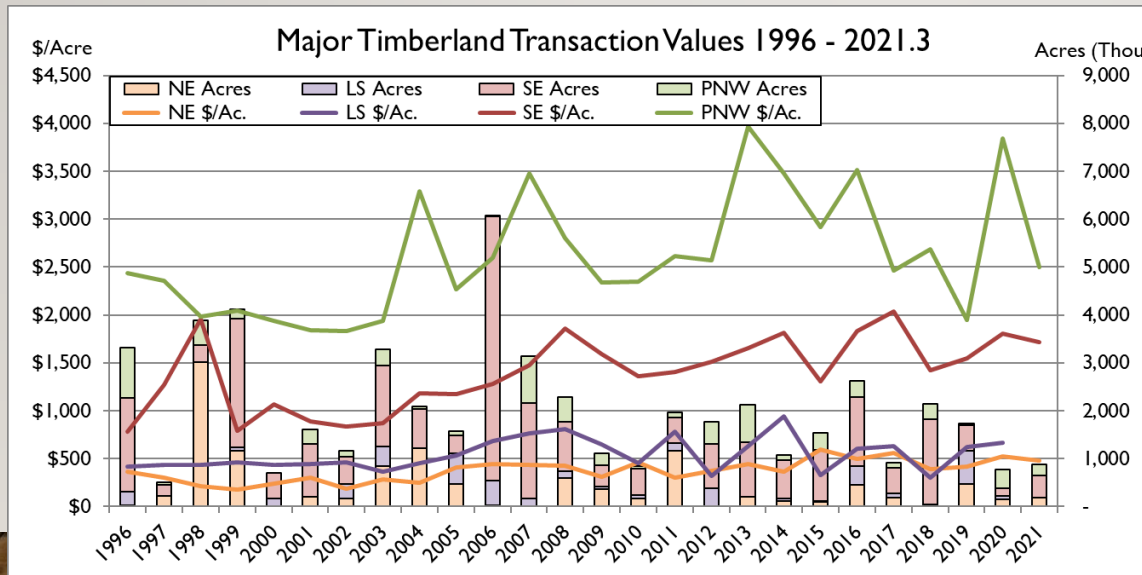
Assumptions: 67/33 weight of DF2saw and WH3saw in the PNW, and a 75/25 weight for S/T and CNS in the South (using 7.5 tons/MBF, along with FEA's estimates of Cut & Haul cost for S/T and CNS). All figures are lumber scale, and regional differences in lumber recovery factors are incorporated.



REGIONAL TRANSACTION VALUES

- **Recent Trends:** Activity through Q3 of 2021 has been decent at \$1.48 B on 888,000 acres, but there is as much as another 1.5 million acres in process which should bolster deal tallies for the year. Year-to-date, 38% (by dollar) of transactions have been made by integrated lumber producers.
- By investment sector, Timberland Investment Management Organizations (“TIMOs”) have funded 67% of the acquisitions from 2016 to 2021, well above the 25% captured in the 2013-2015 period. By comparison, TIMO buyers acquired 78% of US timberlands sold (by dollar) in the previous 13 years (2000-2012).
- **Explanation:** Prices in the Pacific Northwest turned lower as PNW sales were dominated by a couple large non-strategic (i.e., lower value) sale by Weyco and Roseburg. Long-term upward price movement in the 1996-2006 period reflected increased deal competition, discount rate compression and increasing use of “optimization” models in timberland valuations.
- **Implication:** As discount rates used to calculate timberland values decline, expected cash-on-cash returns to decline, all other things being equal. Optimization models used to schedule harvests and merchandize logs are “best-case scenarios,” less likely to be realized.
- **Expectation:** In the near-term, integrated producers may continue to invest outsized lumber profits in timberlands. Longer-term, discount rates appear stable, but may rise as long-term borrowing costs increase, which could result in lower valuations.

NE: Northeast LS: Lake States SE: Southeast PNW: Pacific Northwest Not Shown: Appalachia and Inland Northwest Data Source: TMS, TMR, Press Releases Charts & Analysis: Willsonn Advisory





SECTION 2:

DEEPER DIVE



THE DEBATE SURROUNDING FOREST-BASED CARBON OFFSET PROJECTS

EXPLORING THE STRENGTHS AND WEAKNESSES OF BOTH
SIDES OF THE DEBATE



INTRODUCTION

- Carbon offset projects based on forestry have gotten a lot of attention over the past few years
 - We've seen articles in the press both extolling forestry's benefits in capturing and storing carbon, and we've seen articles raising concerns about the process, criteria and motivations underpinning the way carbon projects are designed, calculated, purchased and sold.
 - With every passing year, as the focus on limiting climate change becomes sharper and as the impacts from climate change that have already occurred become clearer and more daunting, the number of carbon offset arrangements has grown and the tone of the debate has gotten more acerbic.
- Over the course of the last decade, I have had the opportunity
 - To listen to carbon project owners (the folks who own the timberland, enter into carbon projects, and sell carbon credits), at industry conferences and during one-on-one conversations.
 - To speak (and debate) with Carbon Project developers in an effort to understand the mechanics and rationale underpinning carbon projects.
 - More recently, to invest my time reading peer-reviewed academic journal articles on forest-based carbon strategies and value, reading white papers proposing new carbon credit structures, reading both sides of arguments aired in the national press, and even reading a few carbon project proposals.
 - To think long and hard about what role I want to have in the forest-based carbon offset markets, not only as a consultant to the timber industry, but as a consumer of goods acquired from companies purchasing carbon credits to offset their emissions, as a steward of the environment employing my education, experiences, knowledge and judgement for the benefit of my fellow citizens with a different set of experiences and knowledge, and as a parent and grandparent who is concerned about the challenges our country and world will face as a result of climate change, in the years after I am long gone.
- The purpose of this quarter's deep dive is to share with the reader, in a purposely non-technical and balanced way, what I view as fundamental criteria for any carbon offset program and to present some of the arguments for and against forest-based carbon offsets.

FUNDAMENTAL CARBON OFFSET CRITERIA

- **Additionality** – the reduction in carbon emissions would not have occurred in the absence of a market for offset credits
 - Also known as the “not business as usual” test, it asks if the carbon project has caused the project owner to change his/her actions so that more carbon is stored or captured as a result of implementation of the carbon project.
 - The Additionality requirement can be achieved by ensuring that the activity is not otherwise legally required, that the project is financially unattractive in the absence of the carbon project, and by demonstrating that the proposed project is better than common practices.
- **Avoids Overestimation, which can occur by**
 - Overestimating the baseline (aka Common Practice) for regional timber inventories and forest carbon levels.
 - Underestimating actual emissions (this can take the form of harvest, growth, and mortality estimates, etc.).
 - Failing to sufficiently account for Leakage (where reduced harvests by the project owner are replaced by increased harvests somewhere else or causes reduced storage of carbon in wood products).
 - Overestimation can be avoided by precisely and accurately defining baselines, emissions and leakage, and rigorous monitoring and verification requirements by independent third parties.
- **The carbon emission reduction is Permanent**
 - CO₂ emitted into the atmosphere will eventually be removed, but 25% will persist for hundreds or thousands of years.
 - More importantly (in my view) is that in the context of a carbon offset (i.e., a substitute for actually reducing CO₂ emissions), an avoided CO₂ emission is permanent, so shouldn't a carbon offset be permanent (or close to permanent) as well?
 - Buffer pools (e.g., setting aside 20% of the credits in case there is a forest fire on part of the project area) is one tool to insure (but not ensure) permanence. Commitments for 100 years (as opposed to 30-40, or even one year) also provides a higher degree of permanence (who knew that “permanent” was actually a continuum?).
- **There are other important standards that some carbon registries impose, but I view the three above as the most common and relevant to a discussion about forest-based carbon projects.**

Broekhoff, D., Gillenater, M., Colbert-Sangree, T., and Cage, P. “Securing Climate Benefit: A guide to Using Carbon Offsets.” Stockholm Environment Institute & Greenhouse Gas Management Institute November 13, 2019



SOME ARGUMENTS FOR AND AGAINST FOREST-BASED CARBON PROJECTS ^(1,2,3,4,5)

ARGUMENTS FOR

- Forest-based carbon offsets offer significant large-scale opportunities to mitigate CO₂ emissions, unlike small one-off opportunities in other sectors.
- Improved Forest Management plans, usually in the form of longer rotations and higher stocking levels, provide co-benefits such as increased timber for the wood products industry, wildlife habitat, clean water and richer soils. These co-benefits more than make up for any shortcomings in the math surrounding credit calculations.
- Land managers have a fiduciary responsibility to maximize the returns from forestry (by selling carbon credits), even as they admit that they aren't doing anything (or very little) different from what they were doing or going to do anyway.
- Making an enforceable 100-year commitment, even if it is to do what you are already doing, is worth something because who knows what the next generation or next owner will do.

REBUTTALS

- Forest-based carbon offsets do offer scale opportunities, but it only works if the projects are truly additional, accurately estimated, permanent and enforceable. The growing popularity of shorter-term voluntary market offsets is providing lower-quality credits that buyers simply can't understand (imperfect and asymmetric information).
- Yes, longer rotations and higher stocking levels can provide more timber volume in the long term, along with all the ancillary benefits noted, but that does not excuse the faulty math, and those ancillary benefits are irrelevant when we are focused on trying to reduce CO₂ emissions to limit the impacts of climate change, at this critical juncture.
- Claiming a fiduciary responsibility for misdirecting carbon mitigation funds into the owner's pockets and away from more impactful carbon projects because the protocols allow it, or they can get away with it, does not make it either ethical or moral to do so (see Lessons From The Past). This is simply shifting blame away from those who choose to exploit the weaknesses for personal gain towards those tasked to design the protocols. At some point, folks have to take responsibility for their own actions, and how those actions impact society.
- Yes, a 100-year commitment in the regulated market is worth something, but many of the recent carbon projects launched or currently in the pipeline are developed for the less rigorous voluntary market, lasting just 30 or 40 years, and some are even trying to claim and sell carbon credits for a 1-year harvest deferral.



SOME ARGUMENTS FOR AND AGAINST FOREST-BASED CARBON PROJECTS (1,2,3,4,5)

ARGUMENTS AGAINST

- Forest-based carbon offsets do not offer permanent reductions in CO₂, at best they are temporary, because as trees get older, carbon capture slows, and as more timber is harvested, more carbon is emitted.
- Forest-based carbon offsets divert carbon mitigation funds away from more worthy projects with more impactful results, and drive down the value of carbon credits in general through oversupplying the market with credits.
- The vast majority of carbon projects are paying landowners for doing what they were going to do any way, so there really is no Additionality.
- Leakage is grossly under-accounted for (20% under CARB protocols), when there is evidence that it should be 80% or higher.
- Because baseline inventory levels (aka common practice) are broad regional averages, landowners with average stocking levels within their area can appear to have above average stocking levels for purposes of claiming carbon credits when they really don't. This leads to a form of adverse selection.

REBUTTALS

- While carbon capture may be slow, carbon storage persists. Though forests do not offer a permanent (perfect) offset to CO₂ emissions, they may delay carbon emissions until better technology is developed. Delaying a warming climate is an important tactic in the strategy to limiting global warming.
- While there may be more worthy projects, these projects tend to be smaller in scale and face their own set of challenges. Often, forest-based carbon project credits are typically discounted, while more “worthy” projects are priced higher, and that is okay.
- While project owners may not be changing their behavior, they are ensuring that for the duration of the project, their behavior will not change for the worse, i.e., harvesting will not increase and/or carbon stocks will not decline, so they are selling the optionality.
- Leakage may be higher than 20%, but not as high as 80% which falsely assumes that all of the carbon in the forest resides in the merchantable portion of live trees, when in fact, a substantial portion resides in roots, tops, bark, ground litter and soil. The 20% used strikes a balance for the need to create an incentive for landowners to enroll high-stocked properties into carbon projects (by not over-penalizing them with high leakage factors) with the reality that some leakage will likely occur.
- Regardless of any potential shortcomings on how baseline inventories are calculated, ensuring that a property stays above some baseline for 100 years has value. In order to have smaller, more targeted baselines, with the same statistical precision, more inventory plots are needed – we use the best data we have.

LESSONS FROM THE PAST

- “Those who cannot remember the past are condemned to repeat it” *George Santayana, philosopher*
 - Renewable Fuels subsidies paid to the Pulp & Paper industry – In 2005 and 2006, the pulp industry exploited a loophole in legislation intended to promote the development and use of renewable fuels, by mixing a little bit of diesel fuel to their long-established practice of burning black liquor. After the abuse was exposed, the subsidy loophole was closed.
 - Black liquor, a by-product of the pulping process, was burned as a fuel source and as a means of recovering chemicals used in the pulping process.
 - In the 1980’s and 1990’s, the timber industry was widely pilloried for its large clear cuts and its disregard for stream and soil quality and habitat management. This led to state regulations and Best Management Practices requiring harvesting buffers on streams, limiting clear cut size, and improving road construction and maintenance practices (among other forest practices) and the emergence of expensive certification protocols like SFI and FRC.
 - Scrutiny of “Organic” labeling has invited government review of claims used for marketing purposes, the legitimate as well as the unsubstantiated or inflated. It is not hard to imagine that claims of “Carbon Neutrality” and “Net-zero emissions” will come under similar scrutiny.
 - Reputations will be tarnished for any organization found to have abused or inflated their claims or poor underwriting.
 - A separation of powers and the avoidance of conflicts of interest have long been important tenets of program legitimacy
 - Is it good for the carbon mitigation industry to have the carbon project developer also be the verifying entity or the project owner, to have the carbon developers earn their fees through a percentage of the carbon sales, or to have carbon credit buyers provide service directly to (and profit from) the project developers?
 - Even the appearance of conflicts of interest like the ones listed above threatens to undermine the legitimacy of any carbon project, even those that are genuinely effective at mitigating CO₂ emissions.
- The most palatable rules and regs are often those designed when multiple stakeholders are involved; look at the Forest and Fish guidelines enacted in Washington State, developed collaboratively by the timber industry, academia, government agencies and environmental organizations – another lesson from the past.
 - To be sure, there are some organizations that do a much better job of not only following the letter of the carbon registry protocols, but the spirit of those protocols in pursuit of real carbon mitigation goals.
 - Maybe it’s time that these better performing organizations improve transparency, push for reforms, encourage their less principled colleagues to do better, and call out those who abuse the market.



CONCLUDING COMMENTS

- Despite my own personal views below, I have tried to be balanced and unbiased in the information and perspectives provided on the previous pages so that my readers can get exposed to both side of the debate, and make up their minds for themselves
 - For those readers who want to gain a more in-depth understanding of the forest-based carbon credits, please refer to the list of articles, guides and presentations that I found useful in understanding both sides of the debate.
 - I have also assembled a stand-alone, more detailed presentation, available upon request at no charge
 - And of course, I would welcome the opportunity to speak with any reader that wants to discuss anything in this material
- **Most of you who know me, you know where I stand when it comes to forest-based carbon offsets.**
 - Without exception, the companies I've spoken to (or have heard from the dais) have said that their harvesting and forest management activities have not changed as a result of selling carbon credits – failing the Additionality requirement
 - To make matters worse, many of the areas encumbered by carbon projects are the same (purposely targeted) areas encumbered by Conservation Easements (aka, double dipping), restricted by state BMPs, have proven themselves to be otherwise uneconomical to harvest, or which need to be harvested slowly to match market absorption and ensure forest regeneration.
 - Leakage rates are surely higher than the 20% used in CARB protocols and justifying the 20% rate to encourage enrollment does not satisfy me.
 - The short-term commitments used in the voluntary market are simply insufficient and dilute the value of “better” carbon credits. California’s protocols, while imperfect, prohibits double dipping and have an enforcement mechanism that enhances their legitimacy.
 - Carbon developers and/or sellers are exploiting the asymmetry of information between credit sellers, developers, and buyers. That said, credit buyers bear some responsibility to be smarter about what they are buying. Conflicts of interest are evident.
 - I do believe that there can be good and worthy forest-based carbon offset projects, but they have to be genuine
 - I certainly think that forestland owners deserve to earn better returns for not only the timber that they grow, but for the benefits they provide to the environment, but doing so under false pretenses is not the right way to do it. That's what conservation easements and sales of timberland to conservation organizations achieve. Simply put, carbon mitigation funds should go towards genuine carbon mitigation projects. This is no time to be greedy or hide behind “fiduciary responsibility”
 - As a result of my views, I have not and will not support a client’s effort to pursue carbon credits unless they are committed to meeting the core standards of Additionality, Permanence, and appropriate Estimations including sufficient Leakage factors.



CITATIONS/FURTHER READING

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4. Haya, Barbara; “*Policy Brief: The California Air Resources Board’s U.S. Forest Offset protocol underestimates leakage*” U.C. Berkley, May 7, 2019
5. California Air Resources Board presentation; “*U.S. Forest Offset Projects*,” May 30, 2019 (written, in part, to refute conclusions in the Haya Policy Brief above)
6. Pohjola, J; Laturi, J; Lintunen, J and Uusivuori, J, “*Immediate and long-run impacts of a forest carbon policy—A market-level assessment with heterogeneous forest owners*,” Journal of Forest Economics, April 30, 2018
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10. Smith, James E.; Heath, Linda A.; Skog, Kenneth E.; Birdsey, Richard A. 2006. “*Methods for calculating forest ecosystem and harvested carbon with standard estimates for forest types of the United States*.” Gen. Tech. Rep. NE-343. Newton Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 216 p.



SECTION 3:

IN CASE YOU MISSED IT



OPINION | LETTERS

Forests: Good Intentions but Mixed Results

Carbon projects on existing “working forests” are an inefficient use of carbon-emission-mitigation funds.

June 9, 2021 2:42 pm ET

My Letter to
the Editor,
Wall Street
Journal,
published on-
line on June 9,
2021, and in
print on June
10, 2021

U.S. forests are great at capturing carbon in the atmosphere and storing carbon in long-lived products such as lumber and plywood. However, according to regulators, carbon offsets are supposed to be 1) real, 2) permanent, 3) verifiable, and, most important, 4) additional to a business-as-usual scenario. Forest-based carbon credits perform poorly by three of these metrics. As “[Carbon Market Pays Pine Growers Not to Cut](#)” (Business & Finance, April 21) points out, most if not all large-scale forest-based carbon projects are paying forest landowners to do something that they are already doing, thus failing to meet the “additionality” criterion. Furthermore, trees are too easily substituted in a sawmill, so a harvest deferral by one landowner will simply be met by an acceleration by another.

Forest-based carbon projects typically call for less-frequent harvest cycles. In most industrial forests in the U.S., and in the U.S. South in particular, more carbon is captured by faster-growing younger trees, and the rate at which carbon is stored plateaus rather quickly when both storage in the forest and in wood products are counted. Therefore, the “real” criterion also isn’t met. The suggestion that one-year harvest deferrals offer substantive carbon capture and storage benefits is questionable at best, and clearly fails to meet the “permanent” criterion.

Finally, carbon projects on existing “working forests” are an inefficient use of carbon-emission-mitigation funds, which would be better spent on reducing smokestack emissions, funding renewable-energy development or planting otherwise unforested land, among other more worthy endeavors.

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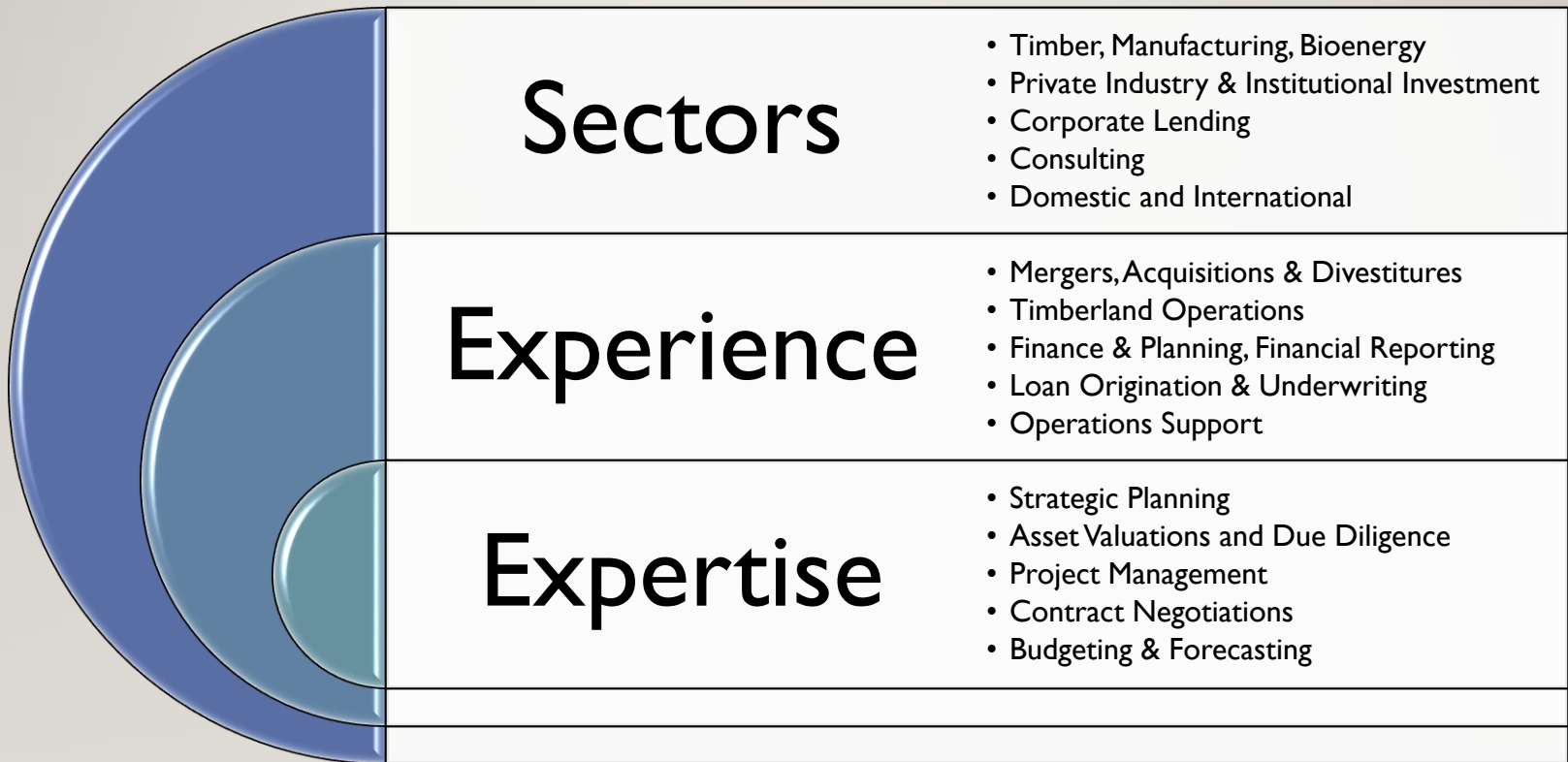
SECTION 4:

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Strategic Planning & Business Restructuring Services



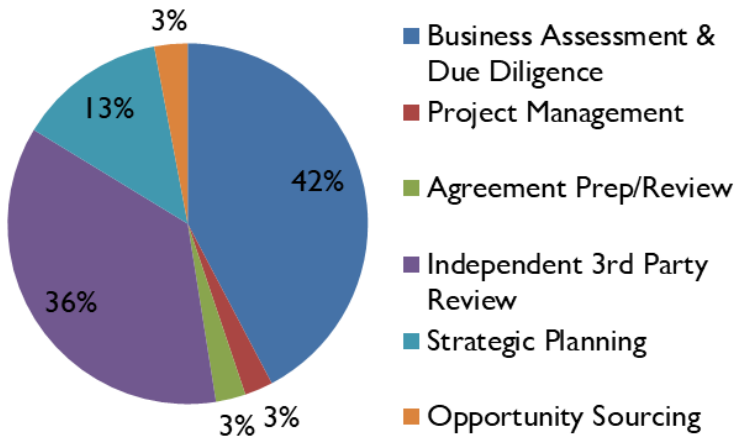
- Validate Acquisition Valuations & Due Diligence Procedures
- Evaluate Existing or Proposed Agreements or Easements
- Interpret Annual Management Plans & Appraisals
- Examine Proposed Transfers of Ownership
- Review Divestiture Timing & Strategies
- Track Investment Performance

Institutional Investor Services

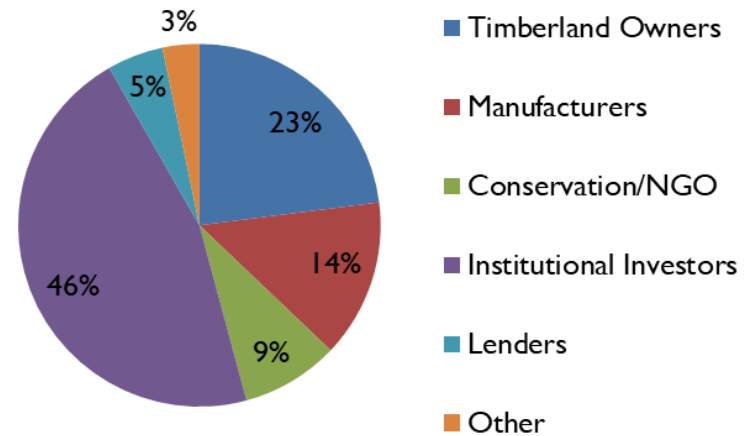


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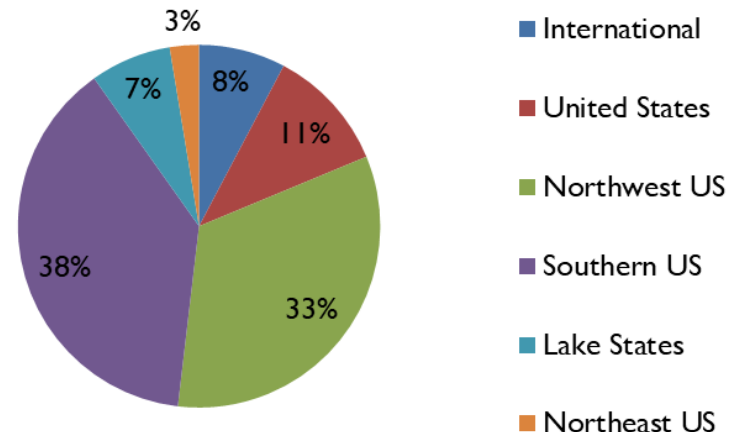


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Regions Covered 2009-20





I look forward to receiving any comments or questions you may have and would welcome the opportunity to serve your consulting needs.

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