MARKET TRENDS

3RD QUARTER, 2023

The latest market trends and indices impacting the Timber and Wood Products sectors.

Compliments of WillSonn Advisory, LLC

DISCLAIMERS

- The information provided in this presentation is for general informational purposes only. All information included herein is provided in good faith, however WillSonn Advisory, LLC makes no representations or warranties of any kind, express or implied, regarding the accuracy, adequacy, validity, reliability, availability, timeliness, or completeness of any information. This information has not been formally peer reviewed.
- WillSonn Advisory is not liable for any damages or losses arising from the use of any materials contained in this presentation, or any action, inaction, or decision taken as a result of the use of this information.
- The materials contained herein comprise the views of WillSonn Advisory, and do not constitute legal or other professional advice. You should consult your professional advisers for legal or other advice.
- The information in this presentation material may contain copyrighted material or be compiled from copyrighted material, the use of which may not have been specifically authorized by the copyright owner. This presentation material is being made available in an effort to illustrate trends and explain issues relevant to individuals interested in the Timber and Wood Products Industry and is being distributed without profit for educational purposes. In such cases, original work has been modified, reformatted, combined with other data or only a portion of original work is being used and could not be used to easily duplicate the original work. This should constitute a fair-use of any such copyrighted material as provided for in Title 17 Chapter 1, Section 107 of US Copyright Law.

Q3 2023 HIGHLIGHTS

Market Trends

- Builder sentiment shifts lower, spending remains anemic (page 5-6)
- Housing Affordability tests new lows as mortgage rates increases continue to outpace income and home price (page 7-8)
- Total Housing Starts down YOY as Multi-Family dives in August (page 9-10)
- Inventory of Homes for Sale continue decline, 12% lower YOY (page 11-12)
- Wood Products notch gains in Q3, though drifting lower at end (page 13-14)
- Most log grades drift lower again this quarter (page 15-16)
- Gross sawmill margins mixed, South:PNW spread narrows (page 17)
- US Timberland Sales through September at 10% of 2022's pace (page 18-19)

Deeper Dive

- Timberland Values in a Changing Interest Rate Environment (page 21-31)

In Case You Missed It

- The Global Land Squeeze: Managing the Growing Competition for Land (page 33)

About WillSonn Advisory, LLC

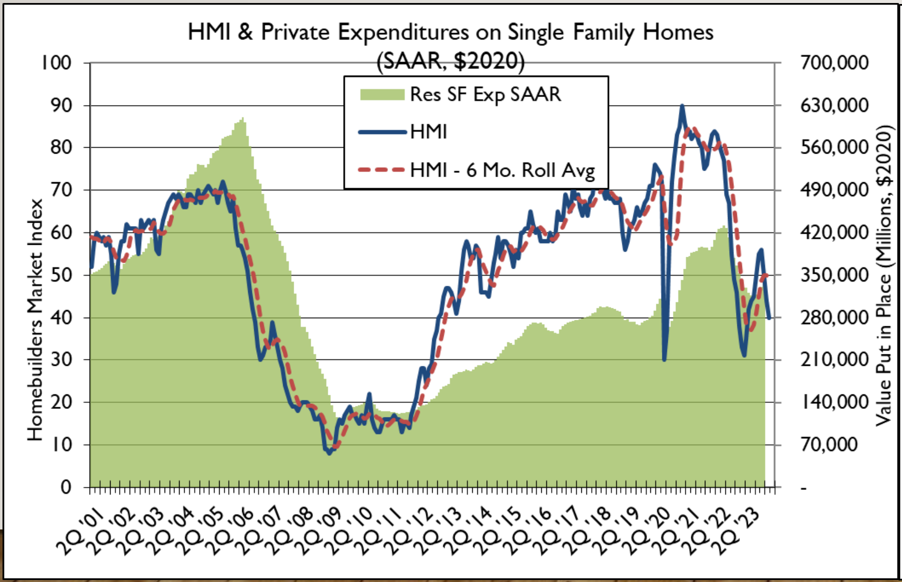
SECTION 1:

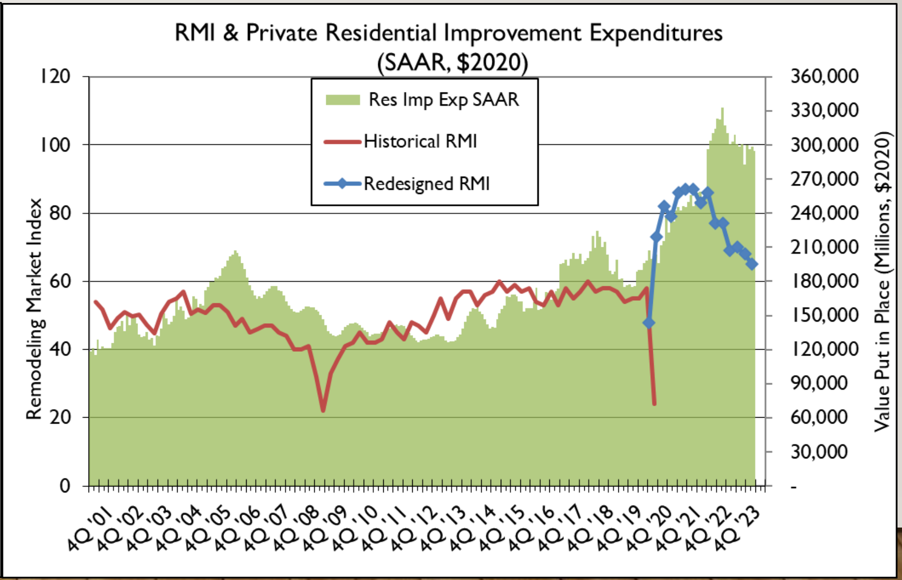
LATEST TRENDS

- Housing Indicators
- Housing Starts
- Home Sales
- Wood Product Prices
- Log Prices
- Timberland Values

BUILDER SENTIMENT & PRIVATE RESIDENTIAL EXPENDITURES

- **Recent Trends**: The Homebuilder Market Index (HMI) ended Q3 2023 with a reading of 40, 16 points lower than July 2023, though up 9 points from the December 2022 reading. The Remodeling Market Index (RMI) drifted lower to 65 in Q3 2023.
- YTD 2023 Real Expenditures on Single Family New Residential are -17.5% below full-year 2022 expenditure levels, following flat expenditures in 2022. YTD 2023 Real Expenditures on Private Residential Improvement slid -5.0% below 2022 levels, following 2022's 24.3% increase.
- **Explanation**: Homebuilder sentiment moved lower as mortgage rates resumed their upward trajectory. Higher interest rates, declining building material costs and weak housing starts have dampened construction expenditures.
- **Implication**: Improving builder confidence generally bodes well for near to intermediate-term housing starts. Higher mortgage costs risk limiting the pool of qualified buyers. As suggested previously, competition from pre-pandemic consumer interests (e.g., travel, eating out, a.k.a. "revenge spending"), along with elevated borrowing costs may moderate remodeling activity for a few more quarters.
- **Expectation**: Eventually, builder sentiment and construction expenditures should begin to improve when housing recovers, and with it, improving building material prices and stable to declining mortgage rates. However, constrained supply of existing homes for sale, a dearth of developed lots, scarce labor and lower contractor productivity will keep residential expenditures in check in the near-term.

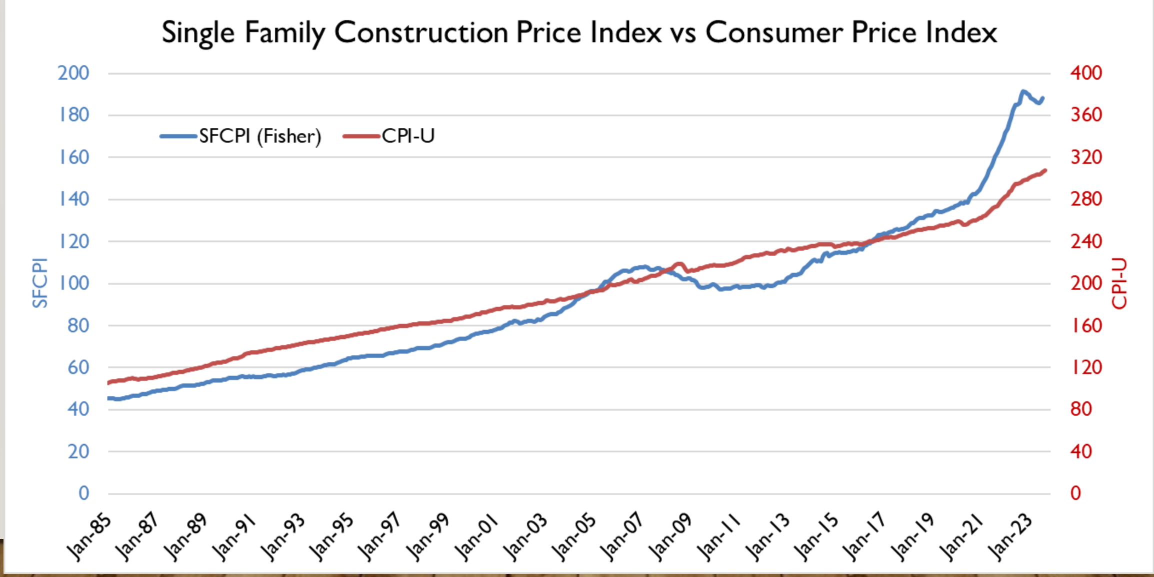




Data Sources: Census Bureau, NAHB, Dept. of Commerce Charts & Analysis: WillSonn Advisory

BEHIND THE NUMBERS: BUILDER SENTIMENT & PRIVATE RESIDENTIAL EXPENDITURES

- **On the previous page**, NAHB's Homebuilder Market Index (HMI) and Remodeling Market Index (RMI) are measures of home builder and remodeling contractor sentiment.
- 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). A reading over 50 indicates a prevailing positive view of conditions.
  - Note that the NAHB instituted a new RMI survey beginning in Q1 2020, such that comparisons to prior years are meaningless.
- Private Construction Expenditures depicted on Single Family Housing and Remodeling are in constant 2020 dollars, (i.e., inflation adjusted) using the Consumer Price Index – All Urban Consumers.
- **In this chart**, I show the Single Family Construction Price Index (SFCPI), produced by the Census Bureau, which reflects the cost of construction, including labor, materials, and permitting, but excludes the cost of land and other non-construction costs. This index also holds the characteristics of homes under construction constant, so it does not reflect cost changes due to increasing or decreasing house size or amenities.
  - Since 2012, it is clearly visible that the Single-Family Construction Price Index has far outpaced overall inflation, at a pace almost 3 times as fast, increasing 89%, compared to 31% for the CPI-U index.

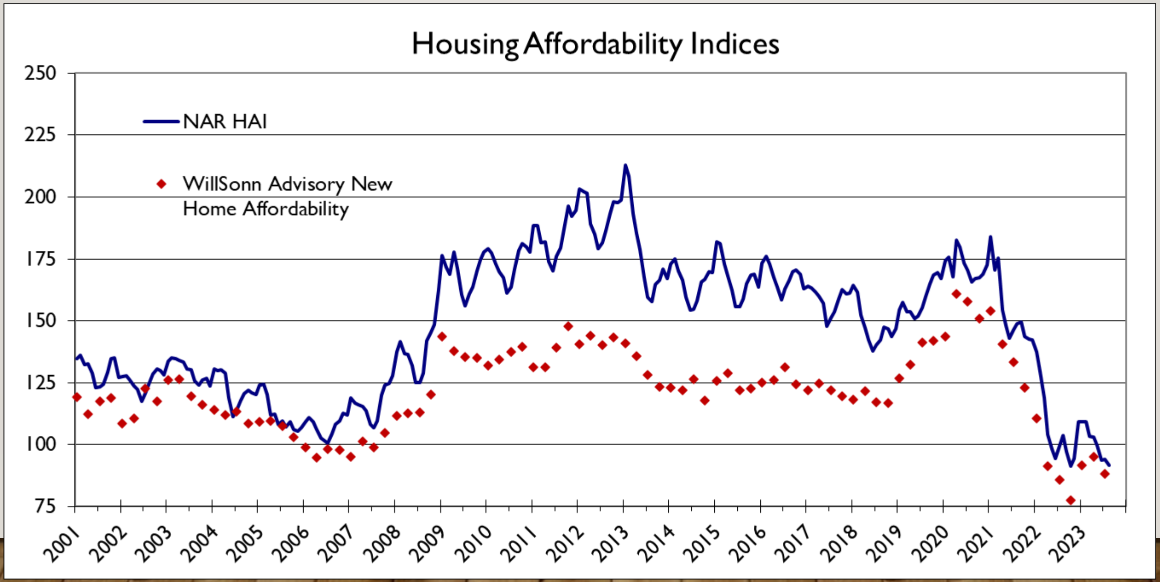


Data Sources: Census Bureau, FRED website

Charts & Analysis: WillSonn Advisory

HOUSING AFFORDABILITY

- **Recent Trends**: The Housing Affordability Index ("HAI") (blue line) remained below 100 in Q3 2023, registering 91 in August. The New Home Affordability (red diamonds) inched edged lower to a reading of 88 in 3Q '23, though still above the record low of Q4 2022.
- **Explanation**: In 2019 and 2020, mortgage rates eased and median family income accelerated, bolstering this measure of affordability, but soaring home prices in 2021and 2022, and now, elevated mortgage rates and lagging income gains, are pushing affordability lower.
  - As cautioned last year, existing home affordability was overstated in late 2020/early 2021; bidding wars pushed transaction prices above listing prices in many markets and three 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 .17). 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 early 2000's also helped.
- **Expectation**: The battle to temper inflation will continue to keep mortgage rates higher while thin existing home inventories will keep home values elevated. Expect affordability to continue to remain under pressure in the coming months, but don't worry too much about its direct impact on housing starts. Also don't expect builders to pass along lower building material costs to buyers as lumber and OSB prices ease; rising labor costs, lot prices and permitting costs are eating away at the added margin.

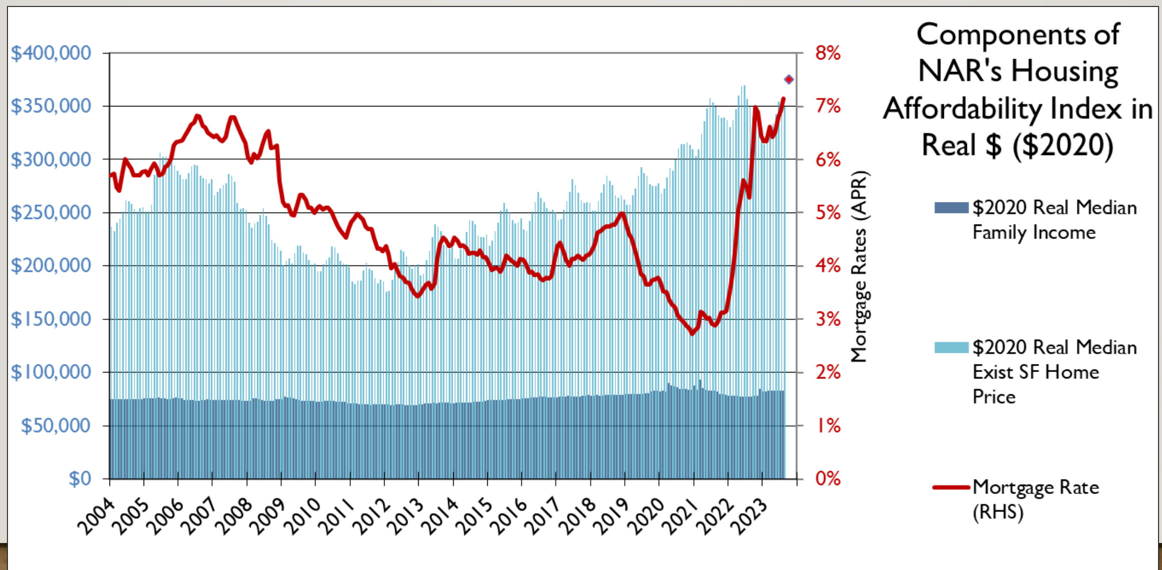


Data Sources: NAR, Census Bureau,, Dept. of Commerce

Charts & Analysis: WillSonn Advisory

BEHIND THE NUMBERS:
HOUSING AFFORDABILITY

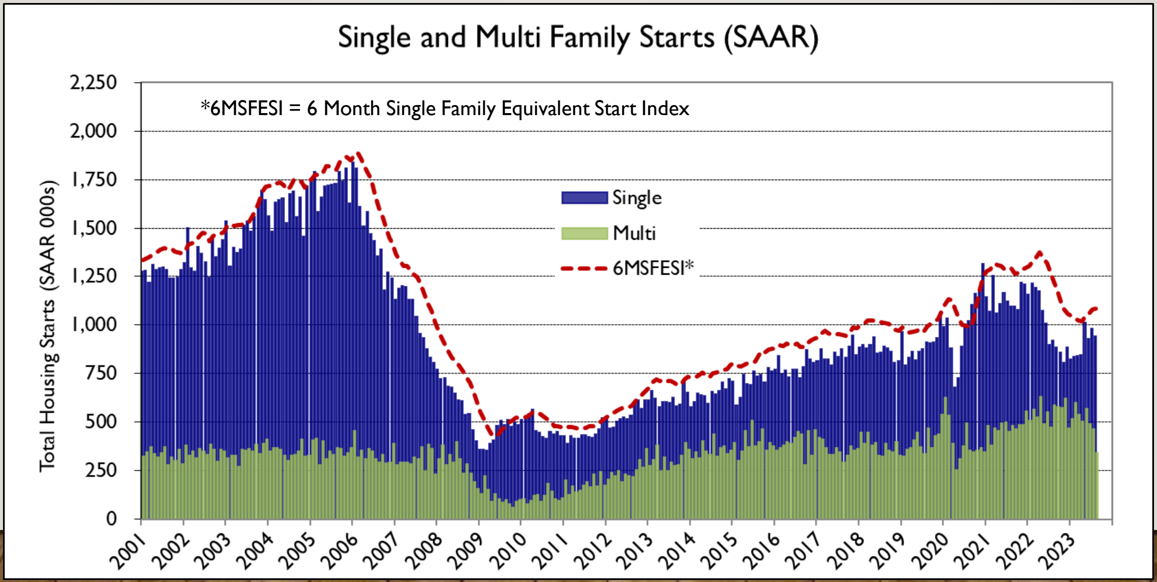
- **On the previous page**, the National Association of Realtors' Housing Affordability Index ("HAI") is based on three inputs: <u>list</u> prices of <u>existing</u> homes for sale, 30-year fixed mortgage rates and median family income. WillSonn Advisory's New Home Affordability uses the <u>actual</u> sales price of <u>new</u> 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.
- **The chart below** displays the movement in the three components of the NAR Affordability Index – home prices, mortgage rates and family income – in Real dollar ($2020) terms. Adjusted for inflation, YTD 2023 compared to 2022, median real home prices declined -2.8% while real Median Family Income gained 5.7% (*Note: new Census Bureau estimates of Median Family Income were recently adjusted upward, retroactive to 1/1/2023*). But with average mortgage rates 23% higher, Mortgage Payments for the median priced home were 19% higher than 2022, eating up an increasing proportion of family income. All of this resulted in a declining Affordability Index.
- In the August 2023, mortgage rates averaged 7.15%, 186 basis point higher than August 2022. Holding home price and income steady, a 50-basis point increase in mortgage rates drives the Affordability Index down about 10 points. 30-year Fixed Rate Mortgages have continued to climb to 7.5% in early October 2023, so another decline in affordability is expected in the near-term.



Data Sources: NAR, FRED website
Charts & Analysis: WillSonn Advisory

HOUSING STARTS

- **Recent Trends:** Through August 2023 Housing Starts registered 1.404 million units, compared to 2022's total of 1.554 million units. Single Family Starts for the year are down -16% while Multi Family Starts were down -6%, compared to 2022. August's preliminary reading of 1.283 million units is well below the recent peak of 1.805 million units registered in April 2022.
    - 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. August's 1,086,000 unit reading moved higher from its recent low of 1,019,000 in April, now at 58% of the 2006 peak of 1.9 million SFES's.
- **Explanation**: Higher home prices alone were a threat to sustained gains in Housing Starts. Coupled with elevated interest rates, Family Income gains have been more than offset, keeping aspiring homeowners in the rental market and shifting the market from single to multi-family construction (and pushing rents higher).
- **Implication**: Housing Starts typically account for 30%-40% of wood usage, so as housing goes, so goes lumber and panel demand.
- **Expectation**: With a recession looking less likely and/or severe, Housing starts are expected to slowly improve over the next few quarters. In the longer-term, we can expect housing to continue to gain steam as the housing deficit is replenished and as existing home availability remains tight. Gains may be tempered by limits on construction labor and developed lots, and tight lending standards.

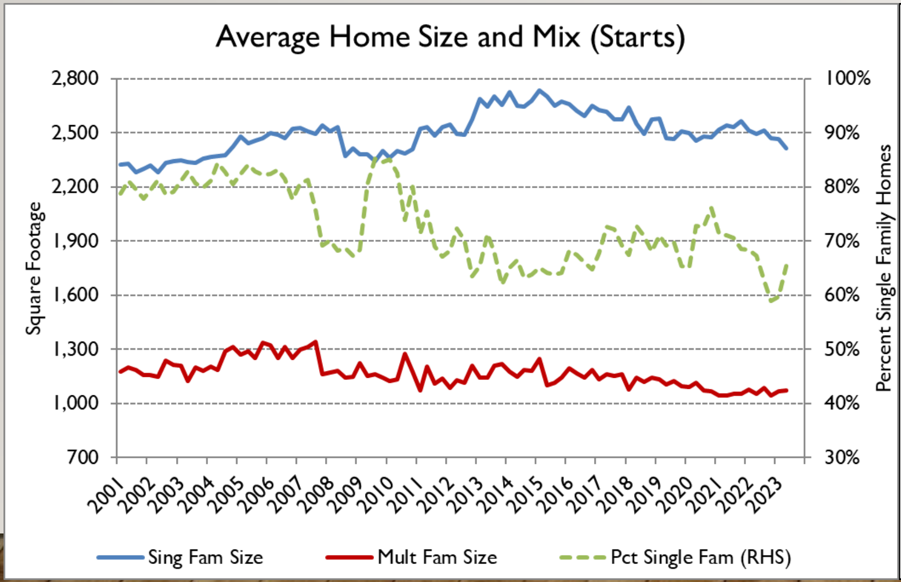


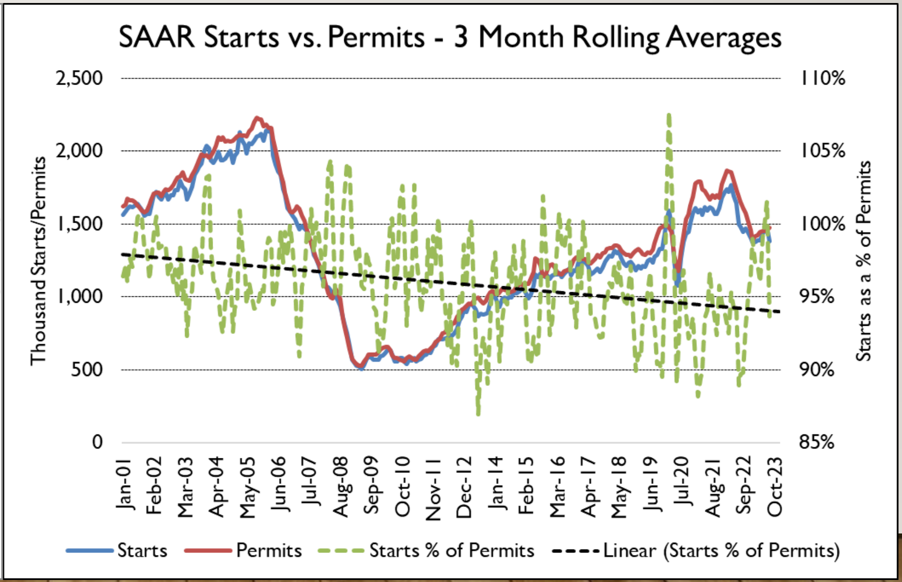
Data Source: U.S. Census Bureau
Charts & Analysis: WillSonn Advisory

BEHIND THE NUMBERS: HOUSING STARTS

- For the **Single-Family Equivalent Start Index** on the previous page, 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.
- On the **bottom left chart**, you can see that the size of Single-Family Home Starts continue to trend smaller in 2023, averaging just 2,436 sq. ft., -2.6% smaller than 2022's average of 2,500 sq. ft. The average size of Multi-Family Units started in the first half of 2023 averaged 1,069 sq. ft., essentially unchanged from the 2022 average of 1,066 sq. ft. The share of Single Family starts has moved higher to the 65% range in the last quarter, on par with 2022 and 5 points lower than 2021 and 17 points below the pre-bust average of 82%.
- The ratio of Starts:Permits has improved in the first 8 months of 2023, averaging 98%, compared to 93% in 2022. In the **bottom right chart**, you can see that the ratio had been declining over time, such that the old rule of thumb of ~97 Starts per 100 Permits came into question, suggesting 95% or lower may be more appropriate. Tightening builder credit since the housing-led Great Recession of 2008-09, along with volatile building material prices, were likely contributing factors. When starts regain momentum, I expect the ratio to steady itself in the mid-90's percent range.

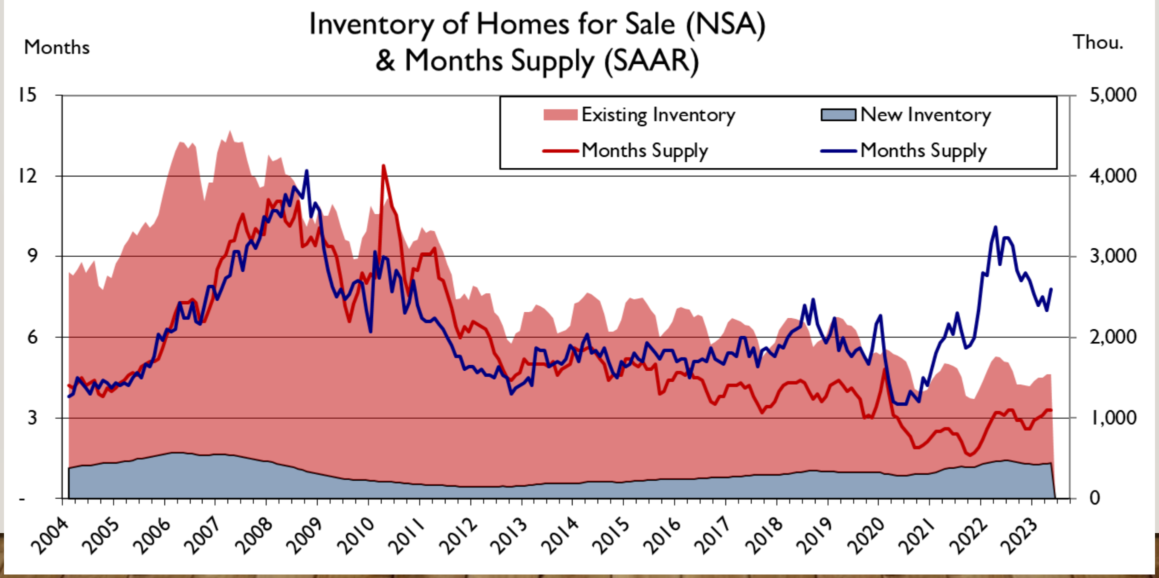
Data Source: U.S. Census Bureau Charts & Analysis: WillSonn Advisory





PACE OF HOME SALES & INVENTORIES

- **Recent Trends**: The Inventory of Homes For Sale (Existing + New) moved higher to 1.543 million units in August, up 128,000 units from December 2022, but -12% (204k units) from August 2022. Separately, Existing Home Inventories are down 180k units, while New Home inventories are down 24k units, compared to August 2022. At their respective current pace of sales, there are a scant 3.3 months of sales in Existing Home inventories, and an excessive 8.3 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 thirteen years today. Elevated mortgage rate and higher home prices are impediments to turnover of existing homes. New home inventories have surpassed the high end of the normal range as poor affordability has pushed buyers to the sidelines.
- **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 from the repair and remodel sector as well.
- **Expectation**: It is unlikely that the US housing starts will return to basement levels of the late 2000's when lax mortgage standards in the early 2000's torpedoed the housing sector. As expected, with rising mortgage rates, we are beginning to see lower levels of home sales and new home inventories rebuilding. At a minimum, a slower pace of home price growth is expected, and possibly price declines in some markets.

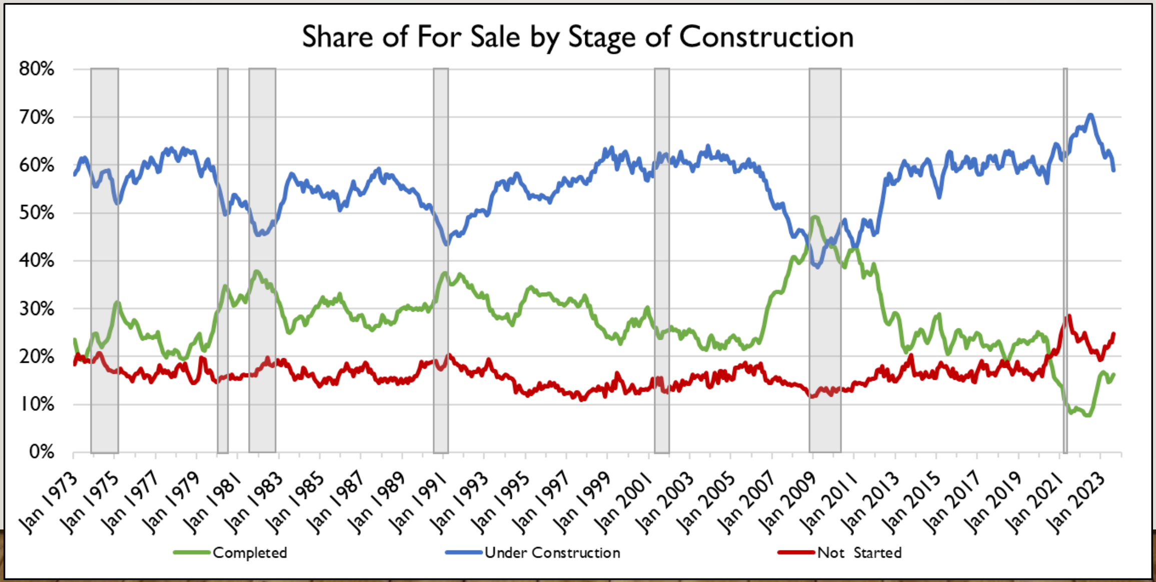


Data Source: U.S. Census Bureau, NAR

Charts & Analysis: WillSonn Advisory

BEHIND THE NUMBERS: PACE OF HOME SALES & INVENTORIES

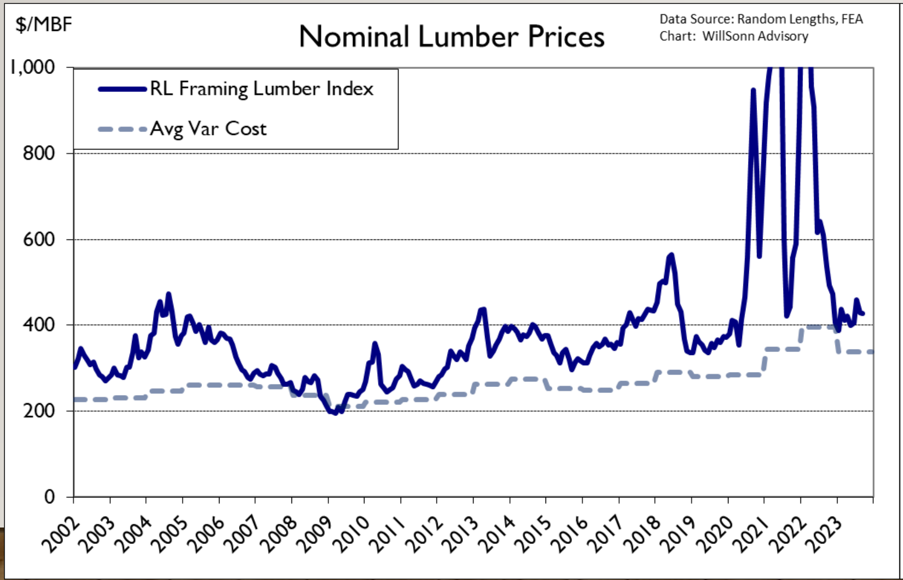
- **On the prior page, t**he inventory of New and Existing homes combines data from the National Association of Realtors ("NAR") which provides data for Existing home sales (both single and multi-family homes), and the U.S. Census Bureau, which provides data for New home sales (single family only). Inventory figures are not seasonally adjusted ("NSA"). Months Supply is derived from inventories and monthly sales volume, which are seasonally adjusted (Seasonally Adjusted Annual Rate, or "SAAR").
- **In the chart below**, I've plotted the share of New 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 get stuck with more completed homes on hand). If a typical recession is coming, there is a lot of change needed for Completed home and Under Construction shares.
- Of the 443,000 New units for sale at the end of August 2023, only 16% were Completed (double the recent 47-year low of 8%), 59% were Under Construction, and 25% had Not Yet Started (down from its recent record of 29%, but still elevated).
- With the onset of the pandemic, and its impact on construction activity (slowed) and demand (heightened) we saw the inventory of homes Completed plummet, while the share of homes Not Yet Started climbed. Higher mortgage rates and building product prices in 2022 and 2023 drove demand for new homes lower, allowing inventory of Completed homes to begin to recover.

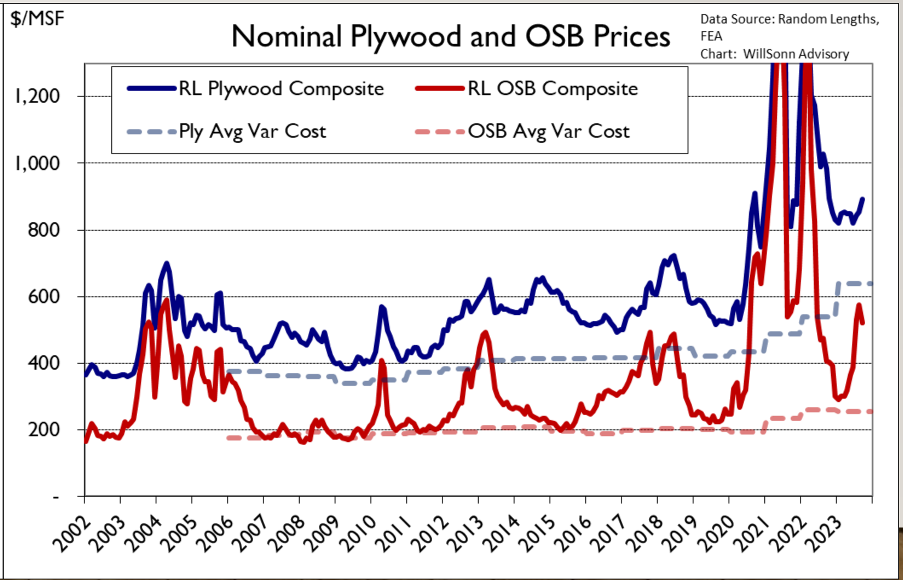


Data Source: U.S. Census Bureau, NAR
Charts & Analysis: WillSonn Advisory

WOOD PRODUCT PRICES

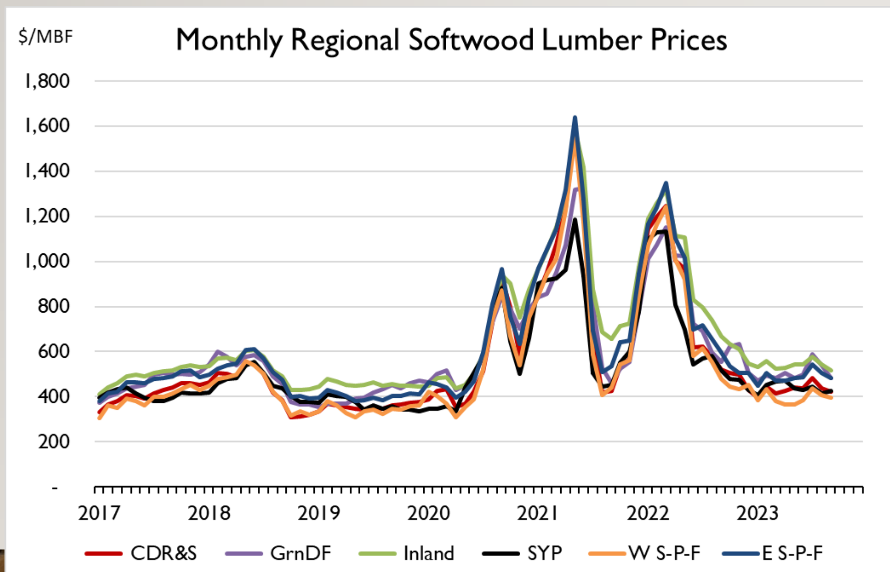
- **Recent Trends**: The Random Length Framing Lumber Composite Index in Q3 2023 bounced back, rising 7% from Q2, though -44% below Full Year 2022 prices. Panel prices rebounded as well. Q3 Plywood pricing ticked up 3% from Q2, though -22% below FY 2022. OSB prices shot up 49% in Q3 from Q2, down -23% from FY 2022 prices. Only softwood plywood remains at or above its historical peaks prior to the pandemic.
- **Explanation**: A cooling off of the housing sector has helped bring prices down (and relative price stability) compared to the extreme prices seen during the pandemic when manufacturers, construction and transportation sectors wrestled with periodic labor tightness, rising labor and volatile fuel costs, covid-related work absences and spot capacity closures for multiple quarters.
- **Implication**: As predicted, when building material prices became excessive, some buyers delayed, downsized or abandoned projects, reducing demand and thus price. Historically, high prices would spur additional mill shifts, a surge in imports and substitution from non-wood materials, each of which have been muted through the Covid-19 pandemic. Rising interest rates are now having a ripple effect.
- **Expectation**: As product prices moderate and supply improves, builder and DIY demand should stabilize. It was hoped that an end to pandemic safety protocols would also ease labor constraints, allowing for higher production and easing of transportation bottlenecks. However, labor remains tight, and elevated interest rates and energy costs will suppress demand and margins for a while longer.

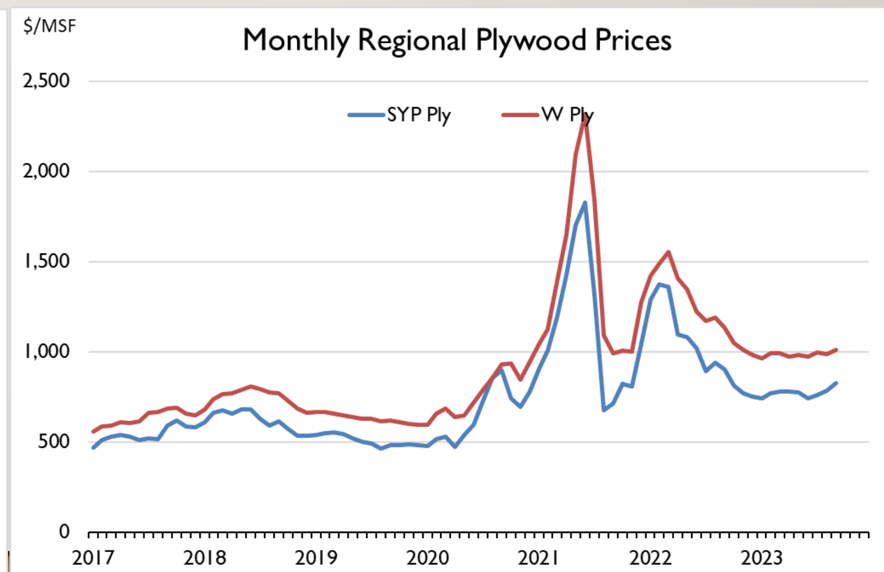




BEHIND THE NUMBERS: WOOD PRODUCT PRICES

- Most US regions saw small gains in product prices during the third quarter of 2023, while SYP registed a small decline.
- Regionally in Q3 2023 relative to Q2 2023
  - West Coast lumber mills saw a 3% gain in Coastal Dry Random & Stud ("CDR&S") prices and flat Green Douglas-fir prices.
  - Inland sawmills saw prices rise a meager 1% in Q3.
  - Southern Yellow Pine ("SYP") sawmills saw prices slip 4% in Q3.
  - Canadian components of the Random Lengths Framing Composite Index saw S-P-F prices gain 11% in the West and 6% in the East.
- Third quarter plywood prices gained modestly in both regions, on par with Lumber. Southern Plywood prices were up 3% while Western Plywood was up 2% in the third quarter relative to the second.

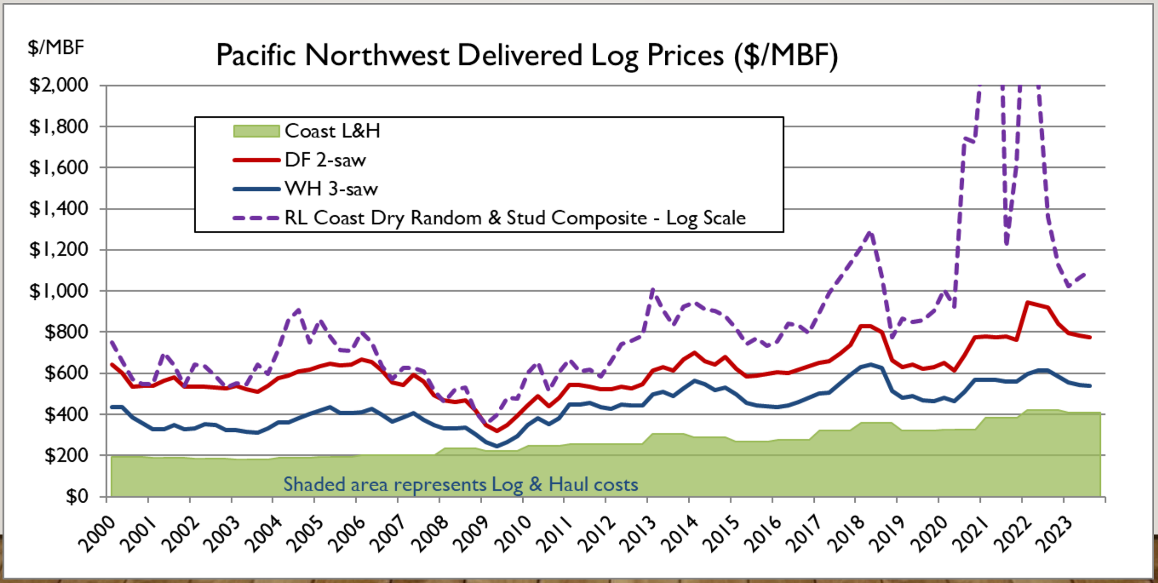




PNW LOG PRICES

- **Recent Trends**: Delivered log prices continued to drift lower in the third quarter with Douglas-fir 2saw and western hemlock 3saw log prices were off -1% (15% and 11% below 2022 levels, respectively). Over the past 10 years, 3rd quarter DF log prices have typically gained 1% while WH prices lost -1%, so this quarter's movement was not too far off.
- After adjustments for changes in lumber recovery, the Random Lengths Coast Dry Random & Stud Composite price (on a log scale) recovered $33/MBF (3%) during the third quarter.
- **Explanation**: With lower demand from housing and the R&R markets, western mill output has declined, and with it, log consumption. While fire activity increased in the 3rd quarter, PNW losses were lower than recent years. Weaker lumber prices and more normal logging conditions are now undercutting log sellers' pricing power, though log prices remain elevated.
- **Implication**: As a result, mills have been able to keep a lid on log prices so far through 2023.
- **Expectation**: Over the past 10 years, fourth quarter DF 2saw log prices usually inch up $3/MBF while WH 3saw typically see prices slip -$3/MBF. Lumber markets remain under pressure, and Log & Haul costs are expected to ease in 2023 due to reduced salvage and lower diesel prices. With six quarters of moderating lumber prices behind us, home construction still lagging, and a relatively mild fire season in 2023, delivered western log price are expected to remain under pressure until fundamentals change.

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.

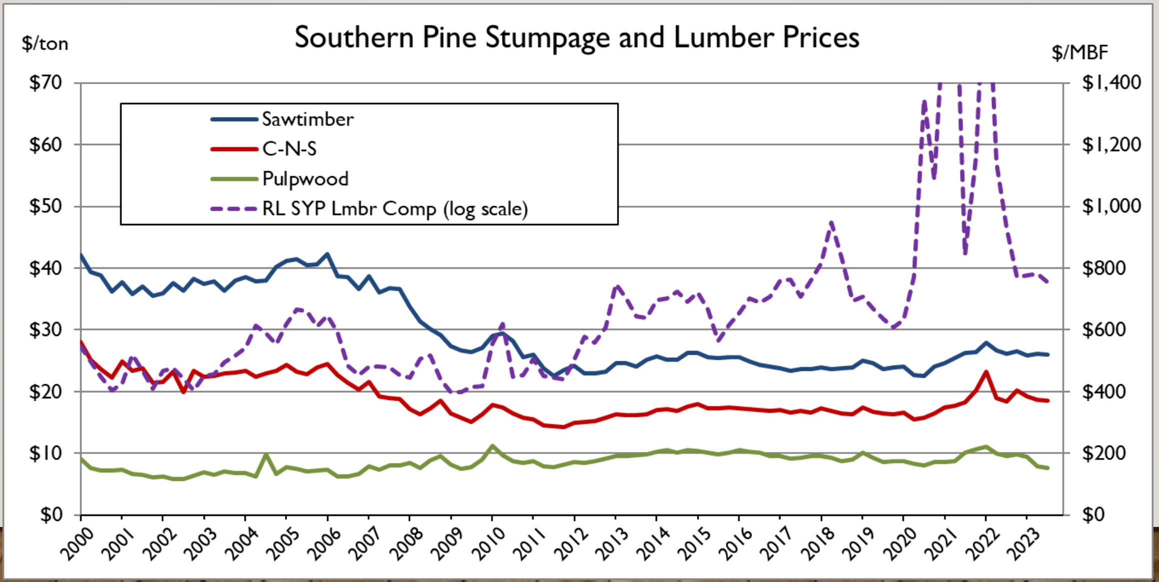


Data Source: Oregon DOF, WA DNR, Random Lengths, FEA, Log Lines

Charts & Analysis: WillSonn Advisory

SOUTHERN PINE LOG PRICES

- **Recent Trends:** Southern Yellow Pine Sawtimber prices edged lower $0.09/ton in Q3 (<1%), Chip-n-saw stumpage prices pulled back $0.21/ton (-1%) and pine pulpwood gave up $0.29/ton (-4%). Relative to full year 2022, third-quarter 2023 PST was down -3%, CNS was down -8%, and PPW is off -25%.
- The Random Lengths SYP Lumber Composite, adjusted for lumber mill recovery, drifted lower, losing $29/MBF, or -3% in Q3 '23 compared to Q2 '23, now registering 36% below full year 2022's prices.
- **Explanation**: SYP Stumpage prices typically move a bit lower as Summer logging conditions expand logging access. The big story in 2023 has been the dramatic drop in pulpwood prices, as mounting pulp mill closures, growing sawmill residual output and declining market pulp prices converged to undercut pulpwood prices. Despite growth in southern lumber capacity, sawlogs remain plentiful in the region.
- **Implication**: Sawtimber to Pulpwood price ratios were 3.4:1 in Q3, its highest ratio since 2009, though still weak. Ratios below 4:1 undercut landowner incentives to grow sawtimber.
- **Expectation**: Q4 markets typically see prices move higher, $0.20 to $0.50 per ton, as Fall rains limit logging access. Even though 2022 Sawlog prices hit a 12-year high (and CNS a 15-year high), my longer-term view has not changed; SYP sawtimber prices will remain under pressure for an extended period as plentiful inventory on the stump, modest gains in 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

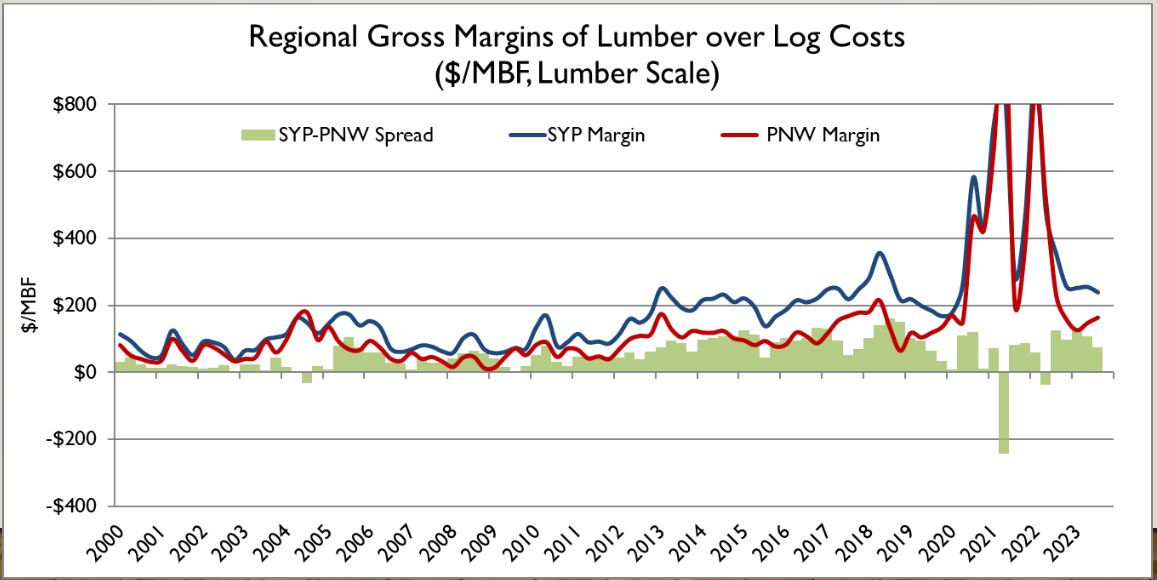
REGIONAL GROSS MARGINS

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 in margins between the two regions is the "spread."

- **Recent Trend:** The gross margin spread between Southern and PNW sawmills remained at new-normal levels in Q3 at $75/MBF in favor of the South, down from $107/MBF in Q2. The $107/MBF spread compares to an average spread in 2022 of $62MBF enjoyed by southern mills. Margins in volatile 2021 were at parity (on average). Gross margins in the PNW expanded this quarter, from $147/MBF to $164/MBF in the PNW, while they narrowed in the South, from $255/MBF to $239/MBF. Over the past 10 years, Southern sawmills have enjoyed gross margins over $200/MBF in more than 75% of the time, while PNW mill gross margins hit that mark 25% of the time.
- **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 sawtimber prices, even as lumber prices improved. Both regions saw gross margins balloon (twice!) during the pandemic-fueled run-ups in lumber prices.
- **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 settle in the $100/MBF range as lumber markets stabilize, 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

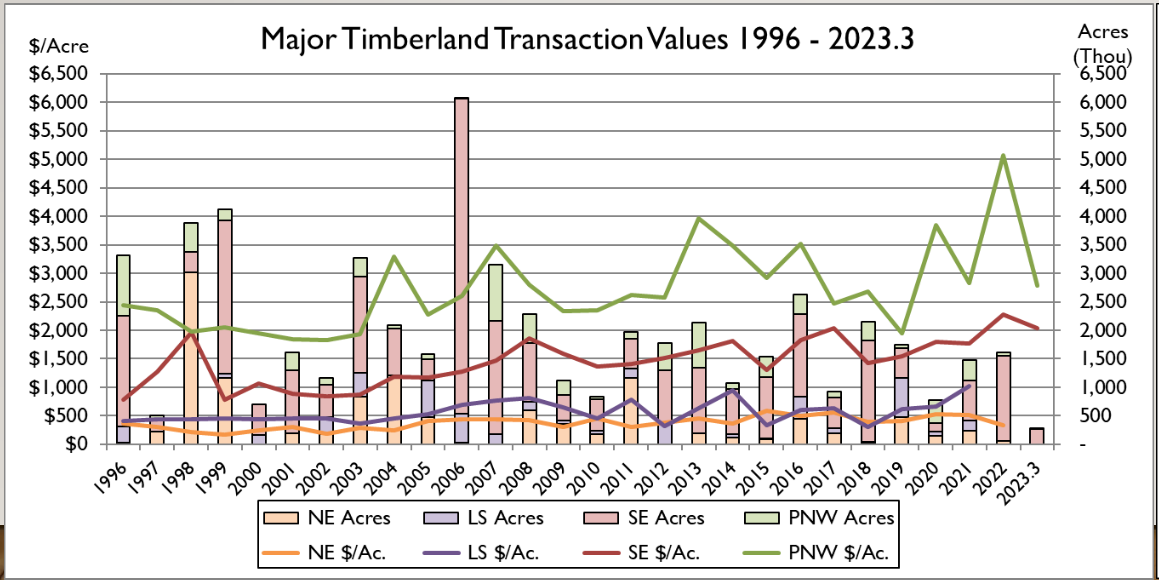


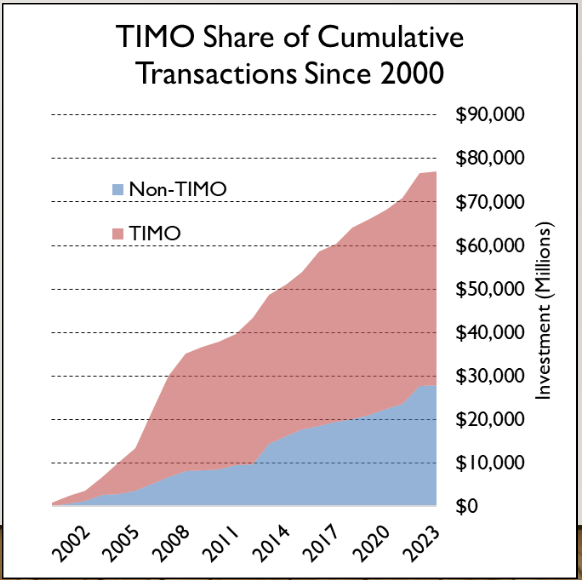
Assumptions: 67/33 weight of DF2saw and WH3saw in the PNW, and a 75/25 weight for S/T and CNS in the South (using 7.5 tons/MBF, along with FEA's estimates of Cut & Haul cost for S/T and CNS). All figures are lumber scale, and regional differences in lumber recovery factors are incorporated.

REGIONAL TIMBERLAND TRANSACTION VALUES

- **Recent Trends**: Timberland sales through the first three quarters of 2023 totaled $562 million on 272,000 acres, with another +/- 41,000 acres sold at undisclosed values. All but one sale has been in the US South. In 2022, 3.4 million acres sold for a total of $5.7 billion – we are at ~10% of 2022's pace through nine months of 2023.
- By investment sector, Timberland Investment Management Organizations ("TIMOs") funded 75% of the acquisitions in YTD 2023, up from 2022. Since 2016, TIMO's have funded 56% of all transactions (by value). From 2013-15, TIMO buyers acquired 25% of US timberlands sold (by dollar), compared to 78% in the previous 13 years (2000-2012).
- **Explanation**: The REITs took advantage of record lumber prices and/or record PNW log revenues to fund acquisitions in the South in 2013-15 and again in 2020-22. With narrower mill margins, the TIMO's have stepped back in.
- **Implication**: Rising asset values during periods of rising interest rates narrow the implied equity risk premium being paid for timberlands. Since owning timberlands is obviously more risky than holding government bonds, there must be some other value component forcing valuations higher, such as Carbon plays or rosy price expectations. **See this quarter's Deeper Dive**.
- **Expectation**: REITs may continue to reinvest outsized profits in timberlands if prices rebound again, but that seems unlikely in the near-term as housing languishes. More likely, higher borrowing costs will more than offset Carbon sales, leading to more modest valuations.

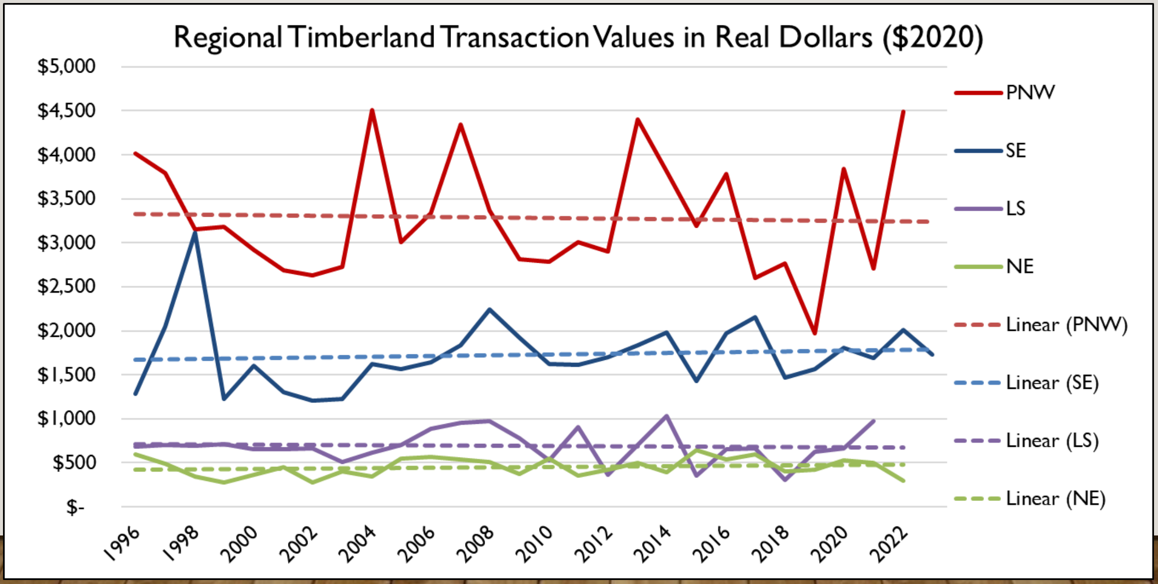
NE: Northeast LS: Lake States SE: Southeast PNW: Pacific Northwest Not Shown: Appalachia and Inland Northwest Data Source: TMS, TMR, Press Releases Charts & Analysis: WillSonn Advisory





BEHIND THE NUMBERS: TRANSACTION VALUES IN REAL $'S

- In real dollar terms, the PNW trendline has drifted lower (~$80/acre) over the past 25 years, equivalent to a negative compound annual growth rate ("CAGR") of -0.1%
  - Some transactions in recent years have included lands in lower-value subregions. In addition, modest gains in productivity were likely offset by increased regulation limiting harvestable acres and/or volume.
  - The 2022 value shown on the previous page reflected two transactions, likely understating the downward trend.
  - The single 2023 transaction reflected on the previous page is not shown.
- In the South, the real dollar trendline value has increased ~$125/acre over the past 26 years, a positive CAGR of 0.27%
  - Private softwood growing stock volumes are 32% higher (USFS: 2017 vs 1997), accounting for much of the increase in value. In addition, assumed near-term recoveries in stumpage prices have typified underwriting for years, despite evidence to the contrary.
- The Lake States real dollar timberland value trend through 2021 lost ~$30/acre (CAGR of -0.19%) while the value trend in the Northeast through 2022 gained ~$60/acre (a CAGR of 0.49%).
  - Both of these regions saw significant pulp mill contractions and modest gains in standing inventory, yet took different trajectories.
  - Conservation easements have been prolific in the Lake States, a possible factor as encumbered lands are subsequently sold.



SECTION 2: DEEPER DIVE

TIMBERLAND VALUES IN A CHANGING INTEREST RATE ENVIRONMENT

BACKGROUND

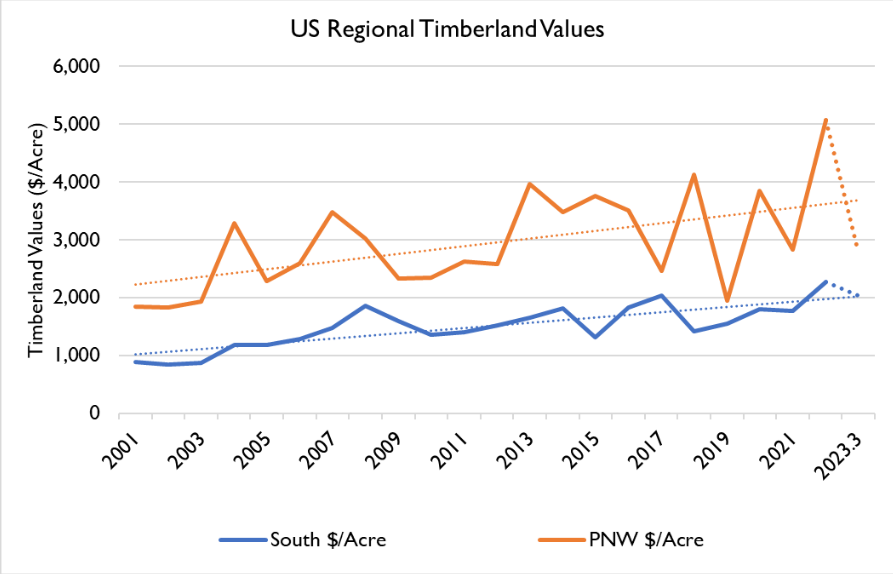
- In late 2017, I published a Deeper Dive exploring Operating Cash Flows and Timberland prices in the US South and Pacific Northwest.
  - I examined the period between 2001 through 2017, with a focus on the first and last 5-year periods.
  - At the time, I concluded that timberland buyers, in addition to using lower discount rates, were also building in material gains in growth and log price, in order to pay for what appeared to be unreasonably high timberland valuations.
- Last quarter, I asked readers for ideas for the next Deeper Dive. A couple folks responded with related questions:
  - Will we "ever see a return to normalcy from today's irrational exuberance for timberland?"
  - What is "the impact of the rising interest rate environment on discount rates and hence valuations?"
- In this quarter's Deeper Dive, I've updated and refined my earlier analysis, and offer an outlook of where timberland values may be headed over the next few years (or, as the first questions suggests, should be headed).
- In addition to mining my own data collections, I have also drawn figures from a number of outside sources, including Log Lines, Timber Mart-South, Forest Economic Advisors ("FEA"), the Bureau of Labor Statistics ("BLS") and the Federal Reserve Economic Data ("FRED") websites, as well as cost survey data from Auburn University/Forest Landowners Assoc., and the Forest Biometrics Research Institute ("FBRI").
  - I am grateful to these organizations for making this information available and encourage my readers to support them.
  - Please see the Disclaimers page. Any mistakes or misapplications of outside data are my own.

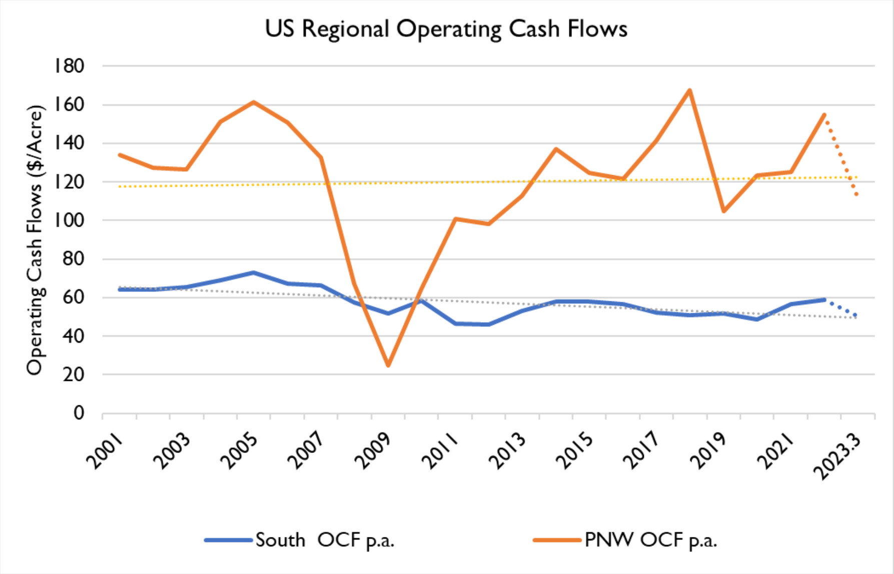
MAJOR ASSUMPTIONS

- Harvest Yields
  - In the US South, I assumed between 2002 and 2022, average site productivity gradually improved from Site 70 to Site 75 across a mixture of physiographic regions as well as both Loblolly and Slash pine.
  - In the Pacific Northwest ("PNW"), I assumed harvest yields associated with site 120 ground, and a 62/32/6 mix of Douglas-fir, White woods and Red alder of various grades. Site 120 may be a bit generous.
- Proportion of productive land
  - I assumed that a portion of properties in each region was not available for timber production, necessary to "dilute" the values of productive lands, when comparing to actual transaction values.
    - Non-productive lands would include road and transmission ROWs, Stream-side/Riparian Management Zones, and any other lands not in active timber production.
    - I assumed 25% non-productive lands in the South, 15% in the PNW.
- Operating Costs
  - Silviculture and reforestation costs were based on FBRI (PNW) and Auburn University (South) survey data, with inflators based on CPI, Labor and/or Diesel price as needed to backcast.
    - Cost and Trends of Southern Forestry Practices - Forest Landowners
    - PowerPoint Presentation (forestbiometrics.org)
    - Consumer Price Index for All Urban Consumers: All Items in U.S. City Average (CPIAUCSL) | FRED | St. Louis Fed (stlouisfed.org)
    - Employment Cost Index: Wages and Salaries: Private Industry Workers (ECIWAG) | FRED | St. Louis Fed (stlouisfed.org)
    - US Diesel Sales Price (GASDESM) | FRED | St. Louis Fed (stlouisfed.org)
  - Management and other operating costs were derived from WillSonn estimates, inflated using these same inflators.

VALUES USED IN THIS ANALYSIS

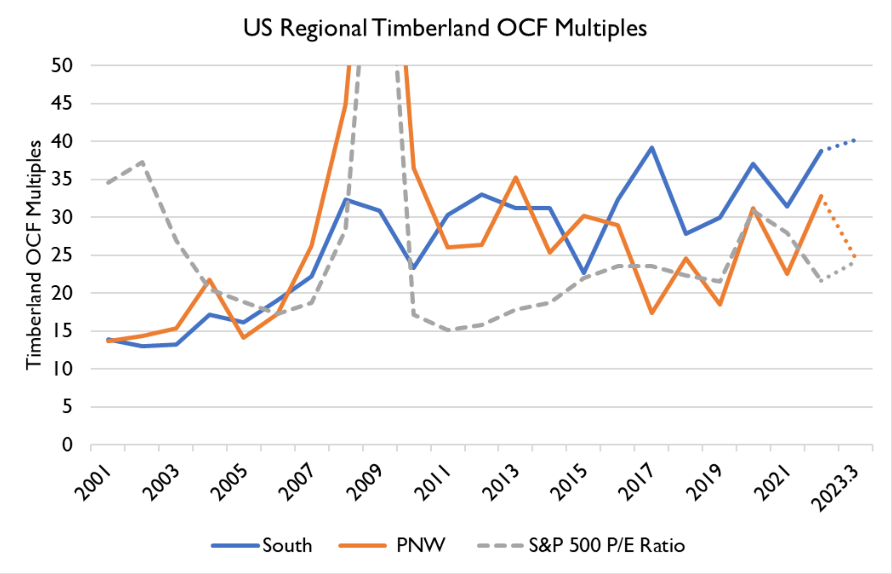
- Timberland prices (Nominal) in both regions have increased between 2001 and 2023 at a compound annual growth rate ("CAGR") of 3.2% in the US South and 2.3% in the PNW.
  - During this time period, inflation (CPI-U) was 2.5%.
- At the same time, Operating Cash Flow ("OCF") has not kept pace in either region.
  - OCF was calculated by subtracting Operating Expenses (which include management and road maintenance costs, silviculture, reforestation, and state and local taxes) from Revenues (harvest volume times net stumpage price).
  - In the US South, OCF actually declined at a CAGR of 1.3%, due primarily to stagnant log prices and rising costs during this period.
  - In the PNW, OCF increased only modestly, at a CAGR of 0.2%, as log prices barely outpaced operating expenditures.
- Despite disappointing OCF returns, Timberlands were able to increase in value because discount rates used to discount future cash flows also declined over this period.

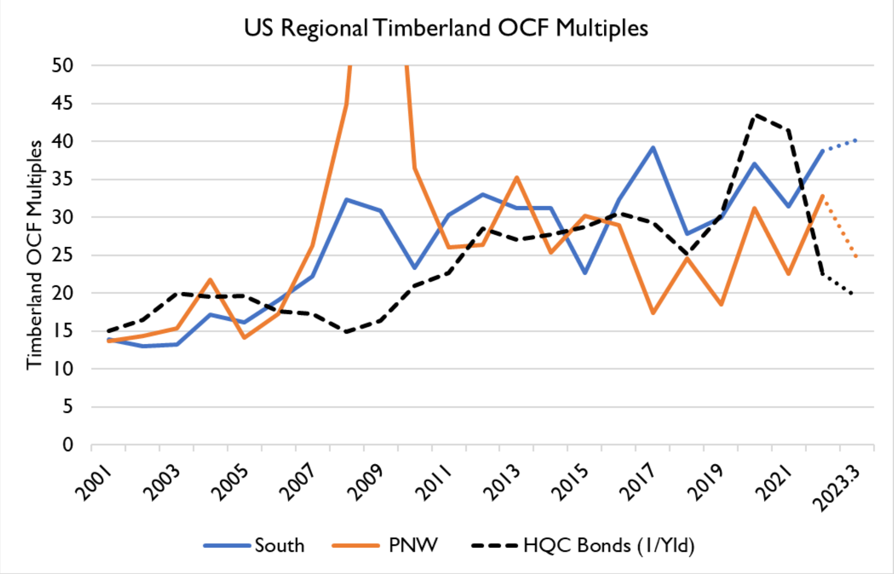




TIMBERLAND OCF MULTIPLES

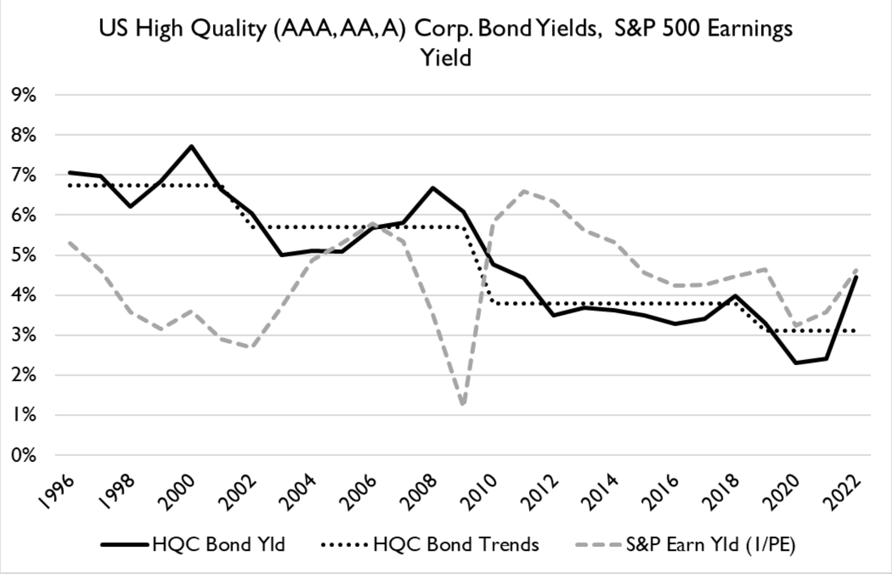
- OCF multiples are simply Timberland Values divided by Operating Cash Flows.
- In 2017, I compared the Timberland OCF Multiples to the S&P 500 Price/Earnings ratio, thinking it may be a reasonable reference point for timberland investors.
  - However, the S&P 500 P/E ratio wasn't informative about the discount rate investors might use with timberlands.
  - Additionally, P/E ratios are short-term and backward looking, and can be volatile as earnings or investor sentiment shift.
- In this year's analysis, I also considered High Quality Corporate Bonds ("HQC Bonds").
  - HQC Bonds include AAA, AA, and A rated 10-year issuances, with yields based on par values 10-Year High Quality Market (HQM) Corporate Bond Par Yield (HQMCB10YRP) | FRED | St. Louis Fed (stlouisfed.org).
  - Calculating the inverse of HQC Bond yields provides us with a comparable Multiple for HQC Bonds.
  - The HQC Bonds appear to be a better fit with Timberland OCF multiples and may also be more informative about discount rates for timberlands – they are each forward looking and longer-term assessments.

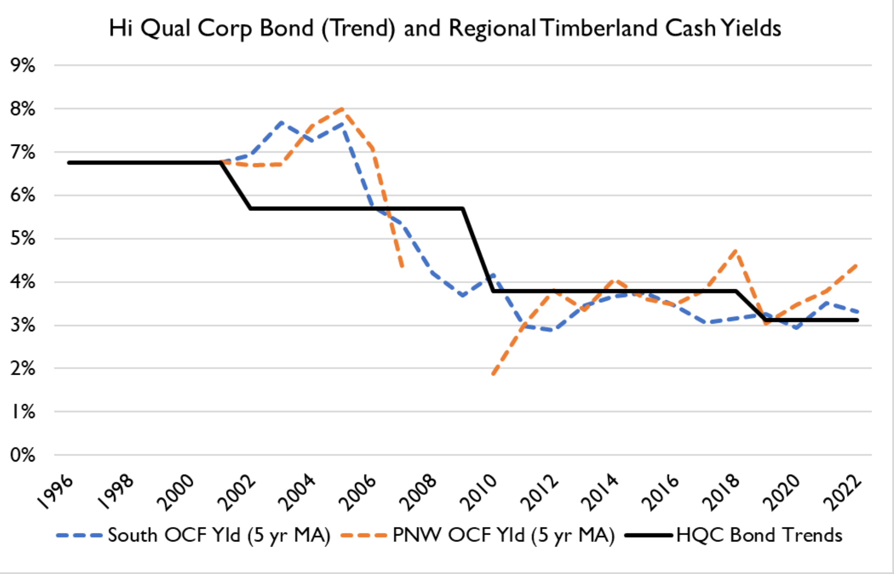




ASSESSING THE BEST OPTIONS

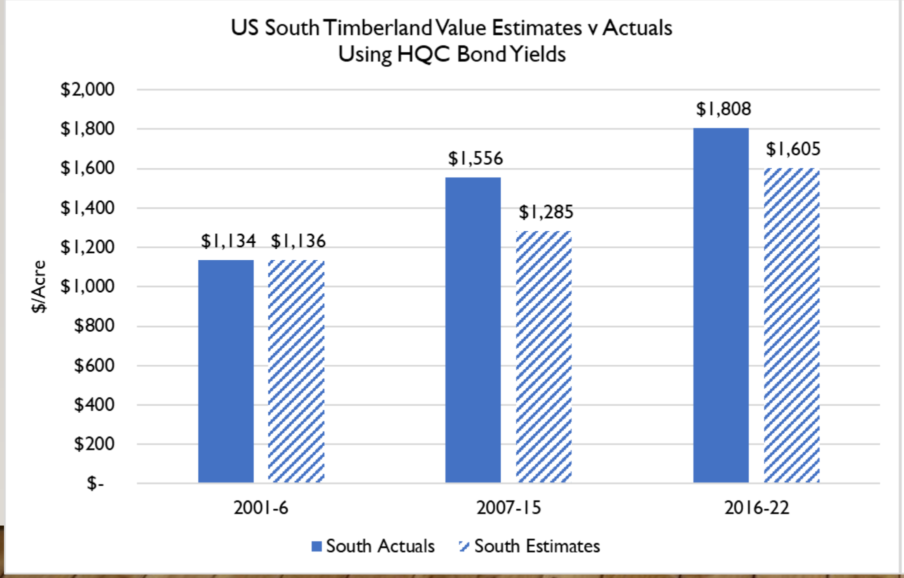
- To test my observation, I regressed regional OCF Multiples and regional OCF Yields (the inverse of multiples), against Multiples and Yields for the S&P 500 and HQC Bonds.
  - No one variable (S&P 500 or HQC Bond) performed very well for both regions.
  - Removing the 2008 and 09 data points from the PNW (when log prices plummeted) did boost the HQC Bond performance.
- I then looked at a Trend version of the HQC Bond Yield (the dotted black line, lower left chart).
  - The HQC Bond Trend line captures 86% of the variation in the annual data (the solid line).
  - Coefficients of Determination ("R^2's") moved higher, to .56 in the South and .50 in the PNW (excluding 2008 and 2009).
- Finally, I looked at regional timberland OCF yields based on a 5-year Moving Average of purchase prices, regressed against the HQC Bond Yield Trend line (lower right chart).
  - R^2's increased further, to .67 in the South and .70 in the PNW – now we're cooking.

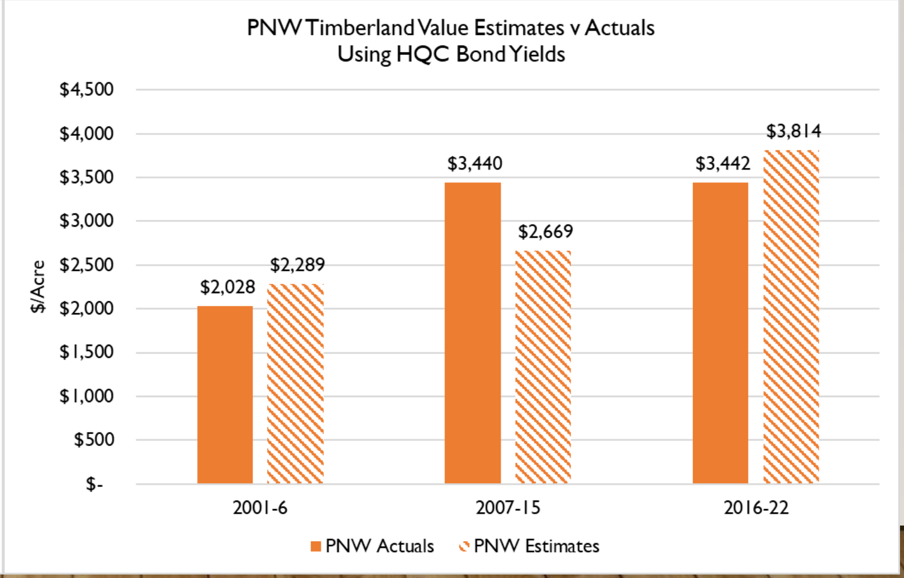




TIMBERLAND VALUES

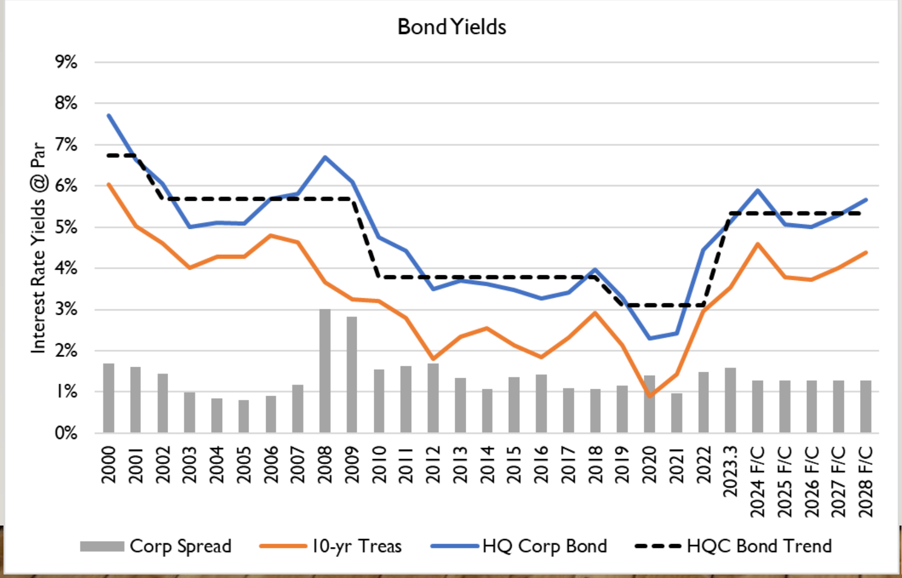
- I used the HQC Bond Trend interest rates as a proxy for Real Discount Rates used by Timberland Buyers, for each of the three periods examined.
  - 5.9% for the For 2001-06 period, 4.4% for the 2007-15 period, and 3.4% for the 2016-22 period.
  - While 3.4% may seem low to some, it does help explain the apparent run up in timberland values since 2016, beyond what timberland OCF 's (and appraisers' discount rates) would suggest was reasonable.
- In general, the trends in the estimated timberland values (using my estimates of OCF and HQC Bond Yields) mirrored the trend in Actual timberland values.
  - Immediately following the 2008-09 Great Recession (so, the 2007-15 period), buyers in both regions likely forecasted faster recoveries in log prices, compared to what actually occurred, thus the lower "Estimated" values vs. "Actuals."
  - In the 2016-22 period, optimism around future log price increases remained in the South as timber inventories continued to build. In the PNW, timber supply and demand were more in balance, so prices firmed and optimism waned.

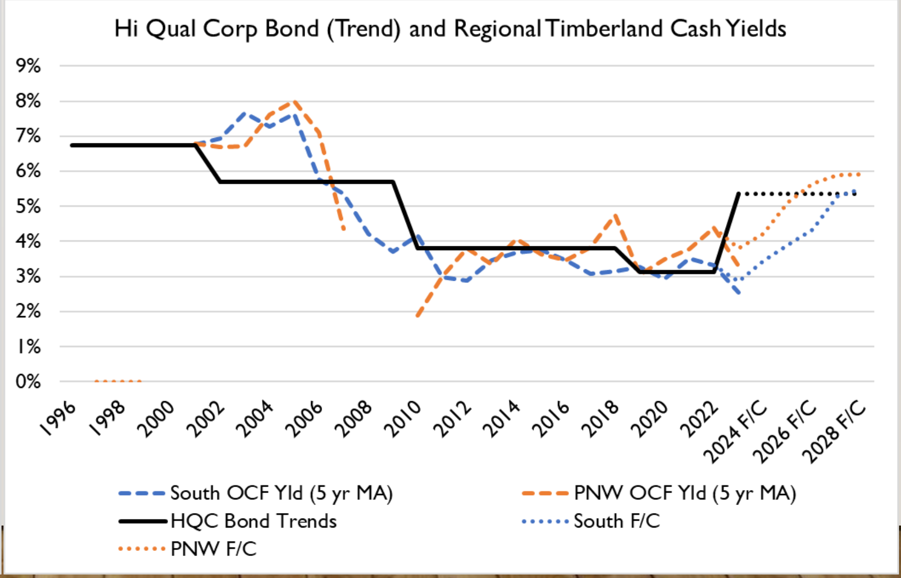




WHERE THINGS MAY BE HEADED

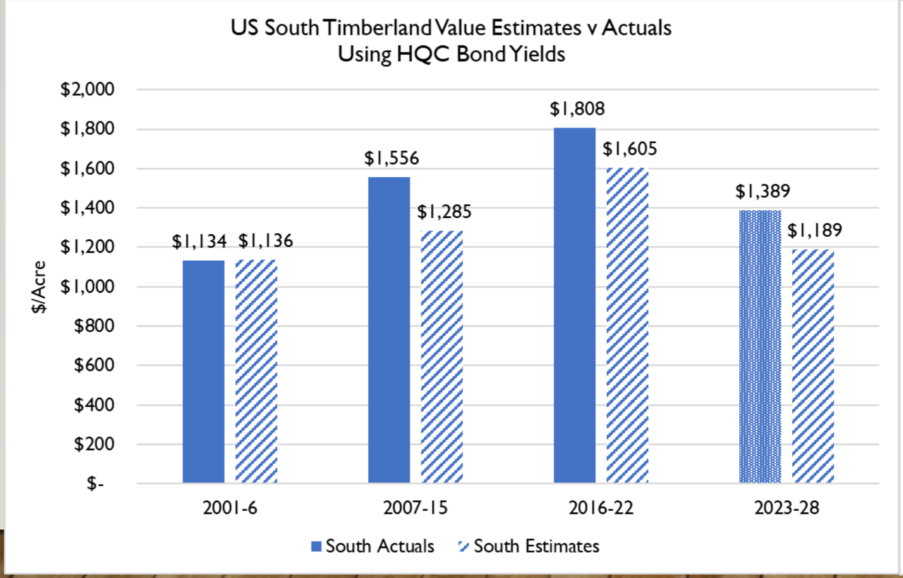
- I used a consensus forecast of 10-year US Treasuries (10-Year Treasury Bond Forecasts | econforecasting.com) to project HQC Bond rates for the 2024-28 period, by adding the average spread (129 bps) observed over 22 of the last 24 years (lower left chart).
  - This resulted in an estimated HQC Bond rate of 5.3% for the 2023-28 period, a 190 bp increase over the 2017-22 period.
  - The Federal Reserve has stated that we should expect interest rates to remain "higher, longer." This consensus forecast, which includes forecasts from the CBO, Fannie Mae, the latest Wall Street Journal survey, and the Federal Reserve seems to reflect that warning.
- I applied FEA's log price forecast, net of my estimates of Operating Expenditures, to project Operating Cash Flow Yields through 2028 (lower right chart).
  - I also used FEAs forecasts for CPI and Wages and Oil prices to project inflation rates applied to Operating Expenditures.

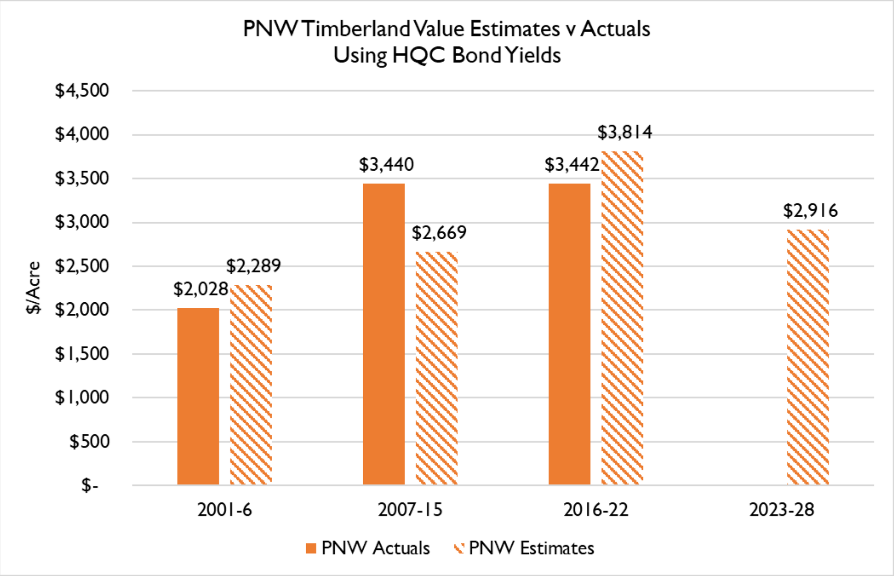




PROJECTED TIMBERLAND VALUES

- In a rational market, discount rates used by timberland buyers would increase along with HQC Bond yields, more than offsetting significant increases in Operating Cash Flow Yields, with the result of lower timberland values in both regions.
- In the US South I expect to see persistent optimism around a recovery in southern pine log values (warranted or not), resulting in a value of $1,389/acre.
  - I added $200/Acre to the 2023-28 Estimate (the left-hand bar is really just a manually adjusted estimate, not an "actual").
- In the PNW, I think timberland buyers may be reluctant to underwrite even higher OCF's than I show on the previous page, and may even temper their outlook.
  - Accordingly, even the reduced value, $2,916/acre, down almost $500/acre from the 2016-22 period, could be optimistic.





WHAT THIS ANALYSIS MAY BE MISSING

- I suspect few if any timberland buyers of the past six years will admit to using a 3.4% hurdle rate.
  - In addition to forecasts for rising timber prices and improved harvest yields and grade mix, many acquisition pro forma included contributions from HBU sales and more recently, carbon offset sales, to name a couple other revenue sources.
    - These sources may have contributed to projected Operating Cash Flows above those suggested by this analysis.
  - For others, hurdle rate compression (lower prevailing discount rates at the time of sale, versus when the timberlands were purchased) helped boost returns when the assets are sold.
    - Gains achieved at the time of the sale of timberlands (a.k.a., capital appreciation) have not been factored into my OCF Yield estimates.
  - As discussed in past Deeper Dives, three layers of compounding optimization (what I call Optimization Cubed) embedded in acquisition projections have boosted pro forma investment returns well beyond reasonable expectations of performance.
    - Briefly, timber inventories use simplified and often generous merchandising specifications with no grade fall-down, growth models assume uniform success of target species on 100% of acres harvested, and LP harvest schedulers have limited constraints and perfect knowledge of the future when generating optimized harvest schedules.
- In any one year, the specific timberlands sold may have been above or below average quality and/or stocking (what I believe I used in my analysis), which contributes to volatility in apparent timberland values, and thus increases uncertainty.
  - More recently, a growing number of properties have had above-average stocking, particularly in the US South, where some sellers recognized they were better off selling overstocked lands to capture a buyer's view of future pricing gains, rather than selling mature timber into a depressed or stagnant log market. Smart.
  - To be sure, overall stocking has been higher in the US South because of improvements to productivity, but I built that into my analysis.
  - I also tried to address the variation in stocking or site quality from property to property, from one year the next, by using 5-year moving averages of timberland values when calculating annual OCF returns as a percent cash yield.

VARIOUS RISKS TO THE PROJECTIONS

- There will likely be headwinds that mute the rise in discount rates or cause it to be more gradual.
  - Resistance by sellers to accept lower values (more no-sales).
  - Reluctance by buyers to raise discount rates in fear of losing out on deals.
  - Reticence by both sellers and buyers to "set the market" used in all of those annual appraisals.
  - Remaining pre-2023 target returns embedded in unfulfilled investment commitments.
- Thinking back to the Capital Asset Pricing Model ("CAPM"), this analysis implies that buyers/investors may view 1.3% as an adequate equity risk premium ("ERP") for timberland investments.
  - CAPM states that the Expected Return from an Equity Investment = Risk-Free Rate + (Industry Beta*Equity Risk Premium)
  - Historically, ERPs (the spread between the risk-free rate (US Treasuries) and the returns of the S&P 500) have ranged from 2% to 8% with a 30-year average typically in the 5% to 6% range.
  - This analysis implies that investors view timberlands as having a *Beta* (a sector's relative risk to the market as a whole) significantly below one (1.0).
  - I've also seen plenty of commentary that investors should not expect to see future stock market returns matching what we saw over the past decade, as economic growth slows, interest rates rise and equity markets return to more reasonable valuations (P/E ratios).
    - This would have the impact, along with higher interest rates, of narrowing the ERP. A lower ERP (even with a modestly higher *Beta*) would mute the impact of rising risk-free rates.
- As the impacts of climate change become more pronounced (frequency, duration and severity of hurricanes, droughts, fires, floods, etc.), investors may rethink their views of the inherent risks of timberland investments going forward (i.e., raise their ERP requirements).
  - The obvious region affected would be the PNW with its rising fire incidence. But the US South is not immune from climate change's impacts, with stronger hurricanes wreaking havoc further inland, flooding and rising water tables, and prolonged droughts.
- If the consensus forecast, that interest rates will remain "higher longer," does not play out, a gradual move towards higher discount rates and lower timberland values could be abbreviated or avoided altogether.

FINAL COMMENTS

- So, to address the questions posed by your fellow readers, I offer the following:
  - ***Will we "ever see a return to normalcy from today's irrational exuberance for timberland?"***
    - We <u>should</u> see prices retreating as a result of a ~2% increase in the 10-year borrowing rates expected for an extended period (higher and longer). However, the headwinds mentioned on the previous page will likely prolong that process.
    - With that said, it isn't clear if the prices of the 2016-22 period reflected "irrational exuberance." If investors return expectations were closer to High Quality Corporate Bond yields, rather than the discount rates that we are used to seeing in appraisals (in the 5% range), maybe "unwarranted low return expectations" might be a better term than "irrational exuberance"
    - It is also worth pointing out that over the past decade, in nearly every timberland appraisal I have seen, the appraisers' value using a Discounted Cash Flow approach has been consistently below their values using a Market Comparable approach and Sum of the Parts approach. It seems to me that appraisers have simply been overstating market discount rates, since their harvest and price projections generally appeared to have been in line with the market.
  - ***What is "the impact of the rising interest rate environment on discount rates and hence valuations?"***
    - All other things being equal, going from a 3.4% to 5.3% discount rate reduced the projected transaction values during the 2023-28 period by 57%.
    - Applying 3.4% discount rate to the 2023-28 OCF estimates, Southern timberlands would be valued at $1,865/acre (before the $200/acre bump) and PNW timberlands would be valued at $4,577/acre.
    - If prices persist at the 3.4% discount rate level, and the forecast for 10-year Treasuries plays out (averaging 4.1% in the 2023-28 period), buyers would be signaling that they view timberland investments as <u>less</u> risky than US Treasuries (by 70 bps), a rather absurd assertion. I certainly would not want my retirement savings managed by these investors.
- I hope you've found this Deeper Dive interesting and would welcome any comments or feedback.

SECTION 3:

IN CASE YOU MISSED IT

THE GLOBAL LAND SQUEEZE: MANAGING THE GROWING COMPETITION FOR LAND

- Over the past couple months, I have volunteered my time participating in a technical working group, offering my voice, expertise and perspectives, in the development of carbon reporting standards for companies that seek to report Carbon removals (e.g., timber REITs, wood products manufacturers, home builders).
  - The guidelines, among other objectives, are intended to establish ground rules for reporting Carbon removals from timberlands, for both Scope 1 (direct) and Scope 3 reporting (indirect, in a company's upstream and downstream supply chain).
  - The efforts to establish carbon reporting standards are being led by the World Resource Institute ("WRI") in conjunction with the World Business Council for Sustainable Development ("WBCSD").
- As part of my continued efforts to understand a broad range of perspectives, I came across a document prepared by a research team at WRI, *The Global Land Squeeze: Managing the Growing Competition for Land.*
  - It is a rather lengthy document (176 pages, ~10 MB), but one that is worth reading, in my opinion.
  - I found it useful to help me wrap my head around the competing interests and tradeoffs required to meet the multi-faceted demands on the earth's land base during a time of rising concentrations of carbon dioxide in the atmosphere.
  - The most notable competition is the need to feed and house a growing global population while at the same time, increase removals of atmospheric carbon through enhanced forest management activities (including afforestation and the establishment of faster growing plantations).
  - If your time is limited, I recommend reading Chapter 1: Introduction, Chapter 4: Potential Implications of Policies that Increase Land-Use Demands, and Chapter 5: GHG Consequences of Using Wood for Construction.
- You can download the report using this link: The Global Land Squeeze: Managing the Growing Competition for Land | World Resources Institute (wri.org)

SECTION 4:

ABOUT WILLSONN ADVISORY, LLC

CRITICAL EXPERIENCE FOR CRITICAL ENDEAVORS

WillSonn Advisory brings senior management experience, across multiple sectors of the wood products industry, with expertise in leading an array of strategic initiatives.

Sectors

- Timber, Manufacturing, Bioenergy
- Private Industry & Institutional Investment
- Corporate Lending
- Consulting
- Domestic and International

Experience

- Mergers, Acquisitions & Divestitures
- Timberland Operations
- Finance & Planning, Financial Reporting
- Loan Origination & Underwriting
- Operations Support

Expertise

- Strategic Planning
- Asset Valuations and Due Diligence
- Project Management
- Contract Negotiations
- Budgeting & Forecasting

WILLSONN ADVISORY SERVICES

- Timberland & Mill Valuations
- Acquisition "Post-Mortem" Audits
- Conversion of Acquisition Pro Forma to Lender Financial Projections
- Acquisition and Operational Due Diligence
- Development of Company Enterprise Valuations
- Incorporating Economic Forecasts into Business Plans

Business Assessments & Due Diligence Services

- Acquisition and Divestiture Process Management
- Conduct Regional or Global Market Studies
- Plan and Oversee Inventory & GIS Projects and/or Audits
- Independent Review of Harvest Flow Projections and Processes
- Prepare Offering Memorandums and Prospectuses

Project Management Services

- Fiber/Log Supply Agreements
- Purchase & Sale Agreements
- Timber Deeds and Leases
- Conservation Easements & Carbon Projects
- Service and Offtake Agreements
- Joint Ventures & Partnerships
- Contract Negotiating Strategies

Contract Structuring and Negotiation Services

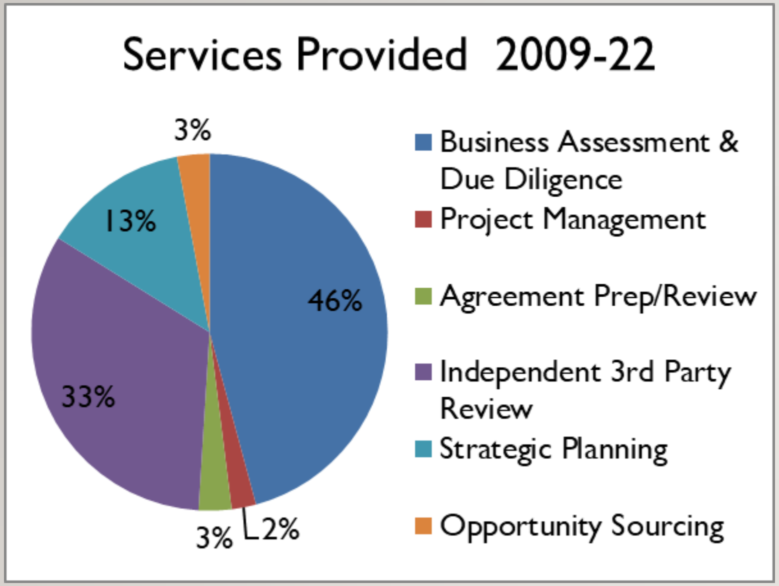
- Strategic Plan Process Design, Facilitation and Documentation
- Company Specific Price, Supply and/or Demand Forecast Development
- Contingency Plan Development and Monitoring
- Financial Planning and Capital Restructuring
- Work-out Strategy Development
- Capital Investment Assessments

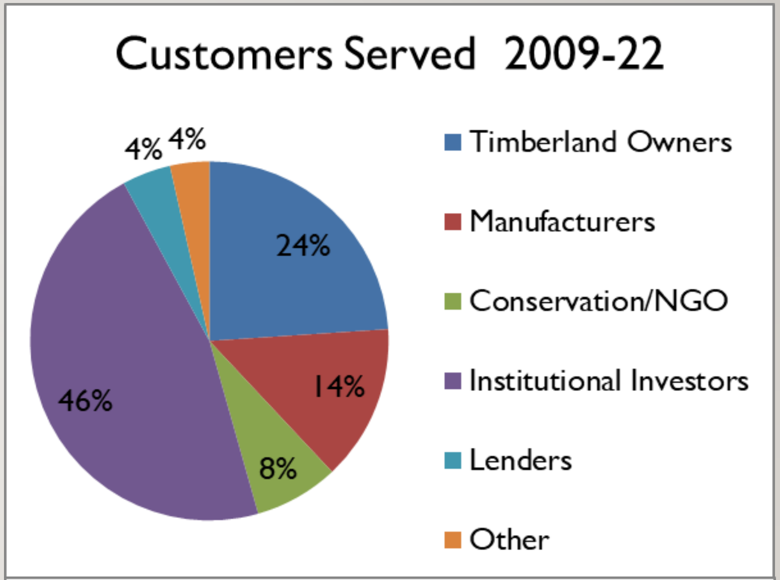
Strategic Planning & Business Restructuring Services

- 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

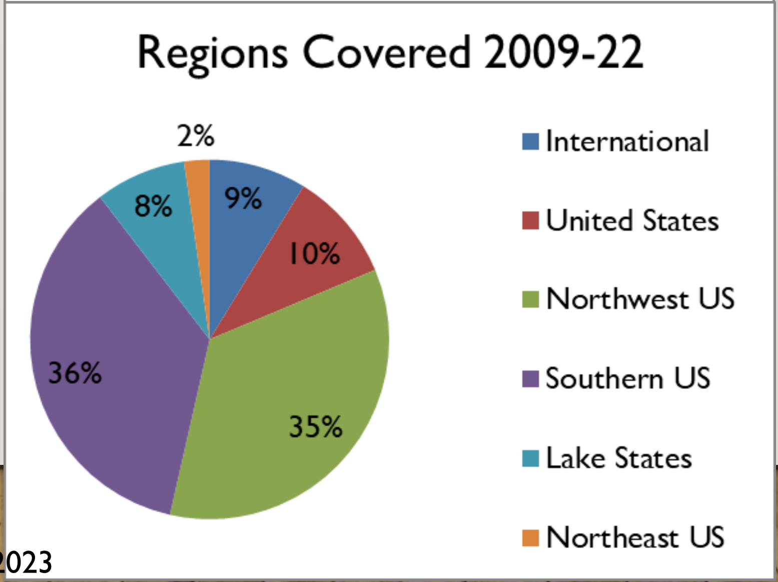
Institutional Investor Services

ENGAGEMENT PROFILES





Since 2009, Will Sonnenfeld has provided a broad range of consulting services to dozens of clients across the full spectrum of industry sectors, in all regions of the US and abroad.



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

William E. Sonnenfeld, Principal

WillSonnAdv@outlook.com
Cell: (206) 445-2980

PO Box 4706
Rollingbay, WA 98061-0706