

18 August 2021

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



Please find attached the latest WillSonn Advisory Market Trends report. In this quarter's edition, you will see that some housing indicators are starting to taper from recent highs, easing the pressure on wood product prices. As a result, lumber and panel prices have started a deep descent from recent highs. While manufacturers have enjoyed historic margins, timberland owners were largely left wanting. In this quarter's "Deeper Dive," I revisit and update my past analysis of Construction Employment and Productivity, while in the "In Case You Missed It" section, you will find a blog post from NAHB that may be useful to explain to your neighbors why wood product prices are still so high.

Finally, please note that I no longer have a land-line for my consultancy. Please use my cell number if you wish to call.

Best Regards,

Will

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MARKET TRENDS

2ND 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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Q2 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 Q2 (page 11)
- Product Prices plummet in July as builders and DIY'ers pause (page 13)
- PNW Log prices stall while Southern Log Prices tick marginally higher (page 15-16)
- PNW mills flip the script on the South as gross sawmill margins reach new highs (page 17)
- US Timberland Sales subdued in the first half of 2021 (page 18)

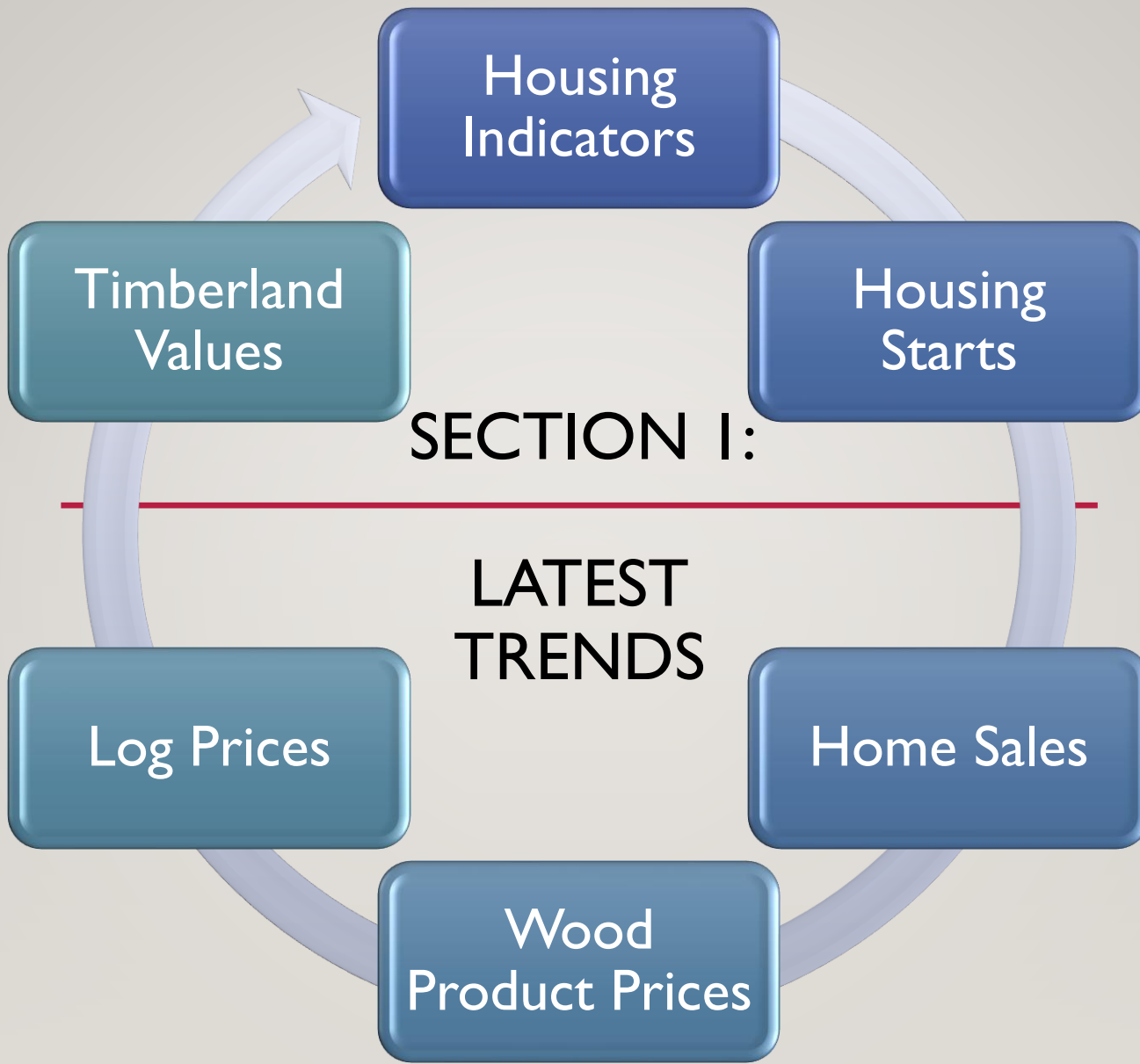
Deeper Dive

- Semi-Annual Update: Residential Construction Productivity (page 20-24)

In Case You Missed It

- NAHB: Why Builder Lumber Prices Remain High, Explained (page 26-29)

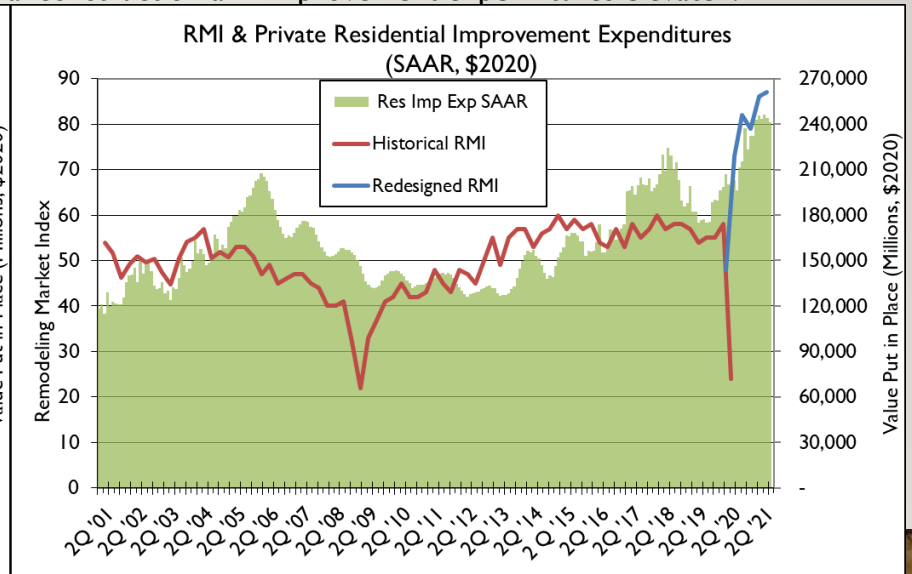
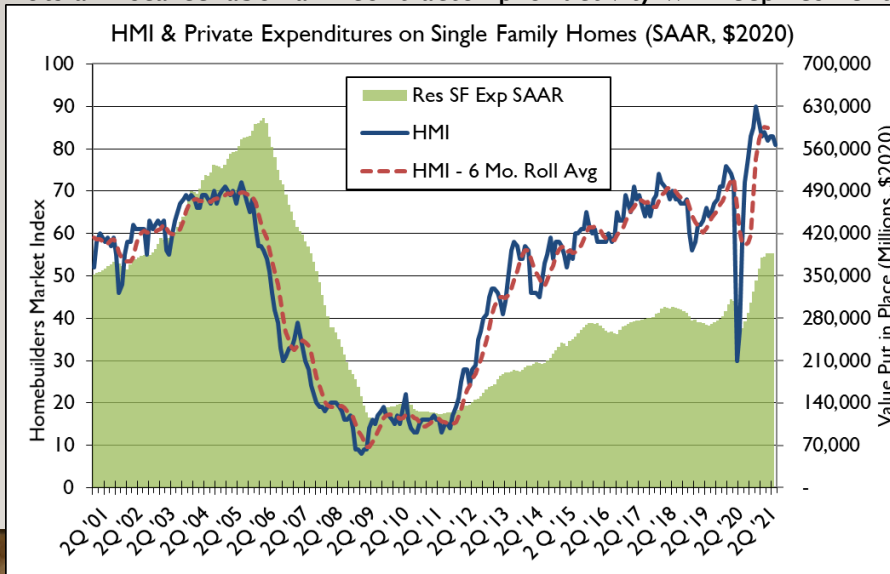
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BUILDER SENTIMENT & PRIVATE RESIDENTIAL EXPENDITURES

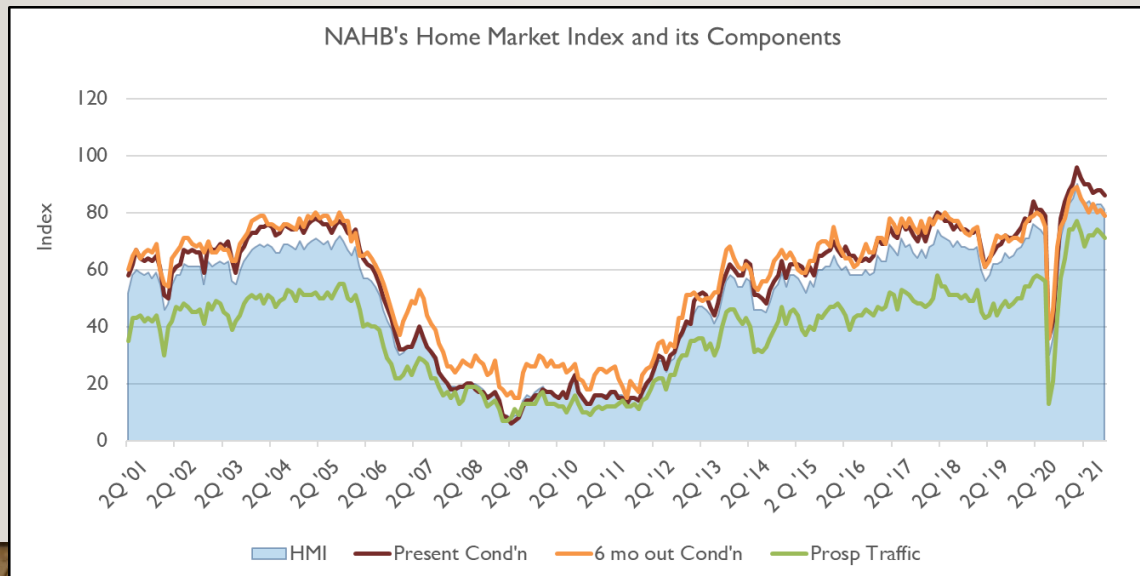
- **Recent Trends:** The Homebuilder Market Index (HMI) continued to drift lower to 81 in June since hitting an all-time high of 90 in November. Conversely, the quarterly Remodeling Market Index (RMI) notched higher in Q2 2021, posting a reading of 87, an all time high.
- Single Family New Residential Expenditures have exceeded 2020 levels by 26.9%, following a 10.0% gain in 2020. Private Residential Improvement Expenditures have continued to climb, averaging 12.6% above 2020 levels, following 2020's 17.8% increase.
- Expenditures appear to have leveled off in the first five months of 2021, and anecdotal evidence suggests remodeling demand has waned.
- **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.
- **Expectation:** In the longer-term, construction expenditures should see slower growth or even contraction as building material prices retreat from record highs and the housing market regains some pre-pandemic normalcy. 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.

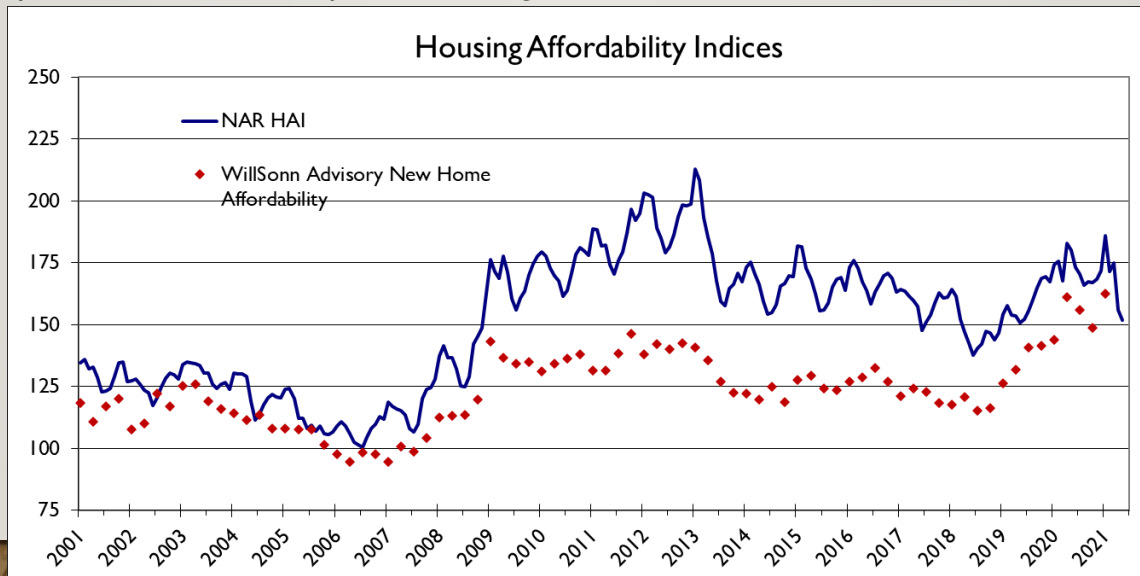


Data Sources: Census Bureau, FRED website

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 152 in May. The New Home Affordability (red diamonds), increased in the last few quarters, and sat at 162 in Q1 ‘21, rivaling NAR’s HAI for existing homes for the first time in more than a decade.
- **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; 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 .19). In fact, the highest levels of housing starts occurred when affordability was in a trough (~2006). Thus, a “fear of missing out” (or FOMO) 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.



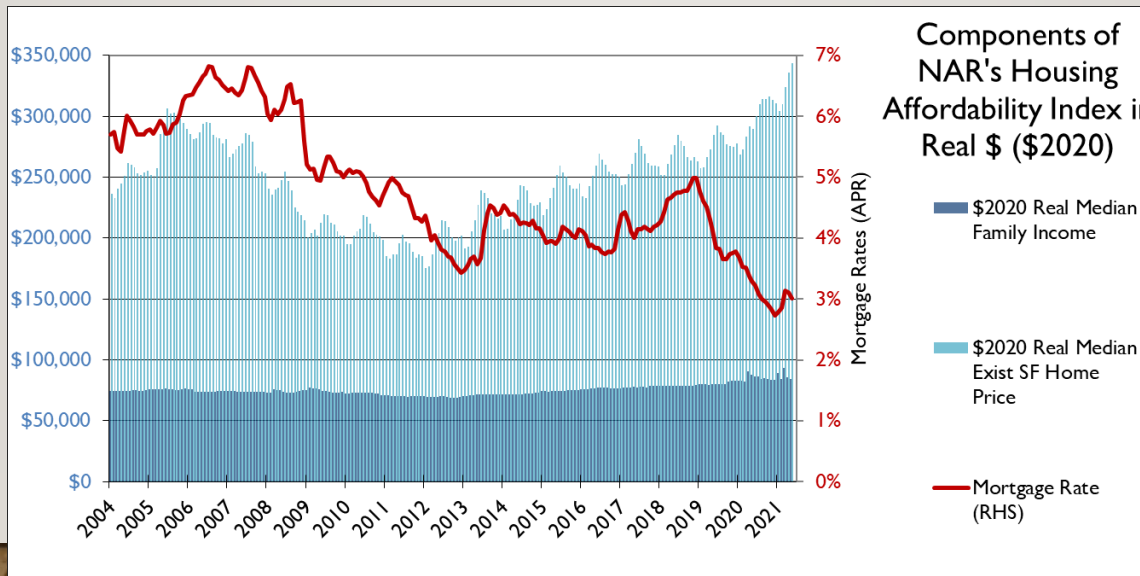
Data Sources: NAR, Census Bureau,, Dept. of Commerce

Charts & Analysis: WillSonn Advisory



BEHIND THE NUMBERS: HOUSING AFFORDABILITY

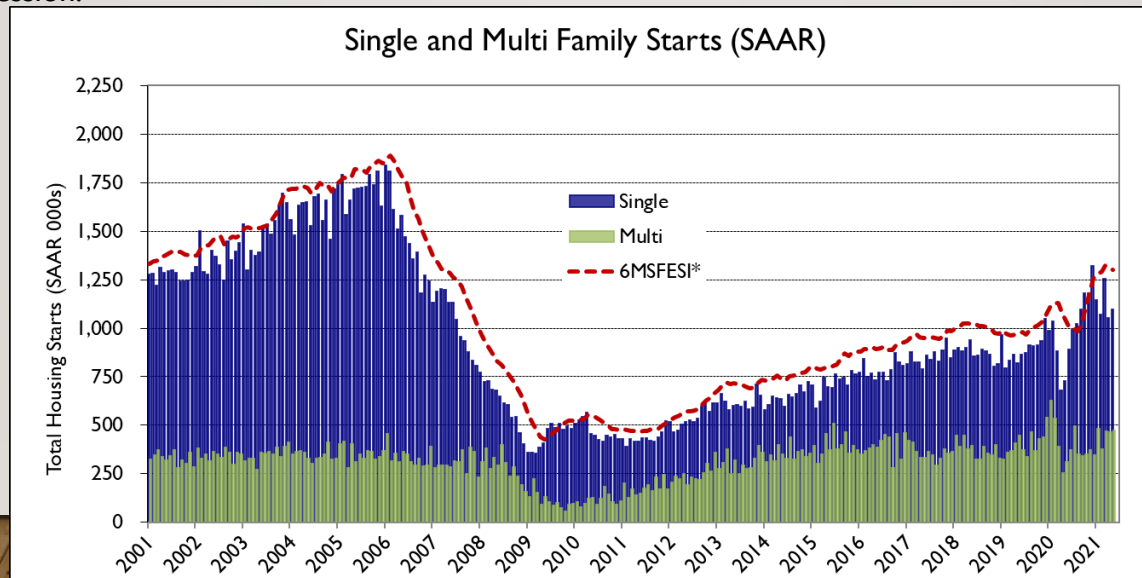
- The National Association of Realtors' Housing Affordability Index ("HAI") is based on three inputs: list prices of existing homes for sale, 30-year fixed mortgage rates and median family income. New Home Affordability uses the actual sales price of new homes, with the same income and mortgage rate 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 11% and Median Family Income is up 5.6% (with the help of stimulus payments), while Mortgage rates have declined -6%. As a result, Mortgage Payments, as a percent of Income has increased 1.5%, resulting in the lower average YTD 2021 HAI, down -2.4% from 2020's average.
- In June 2021, mortgage rates averaged 2.98%, 19 basis point higher than January 2021 and 19 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.



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

HOUSING STARTS

- Recent Trends:** Total Housing Starts averaged 1.605 million units in March-May (SAAR), 15% above 2020's pace of 1.395 million units. Year-to-date (SAAR) through May, Total Housing Starts have averaged 1.577 million units, an improvement of 13.1% versus full year 2020. YTD Single Family Starts are up 12.4%, while Multi Family Starts are up 14.5%, 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. May's 1,301,000 unit reading represents 69% 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 building 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

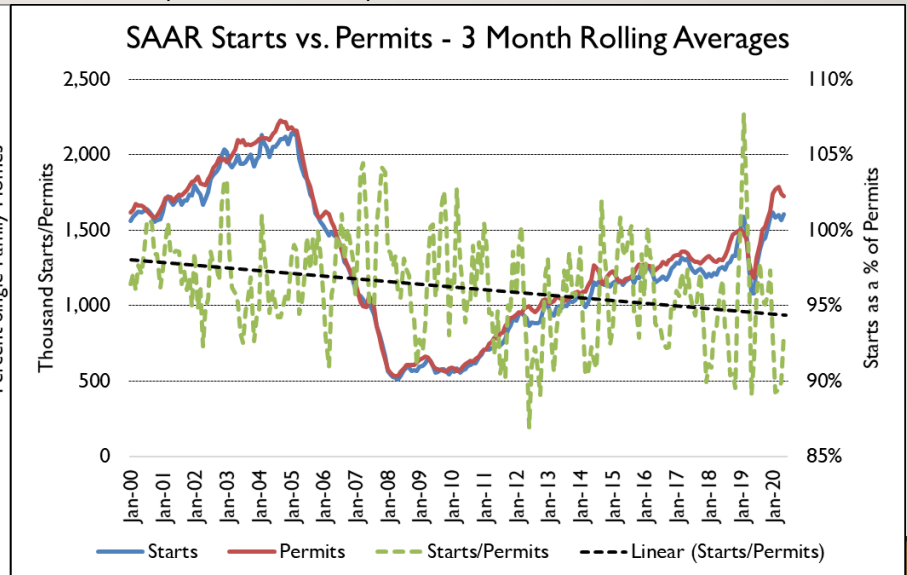
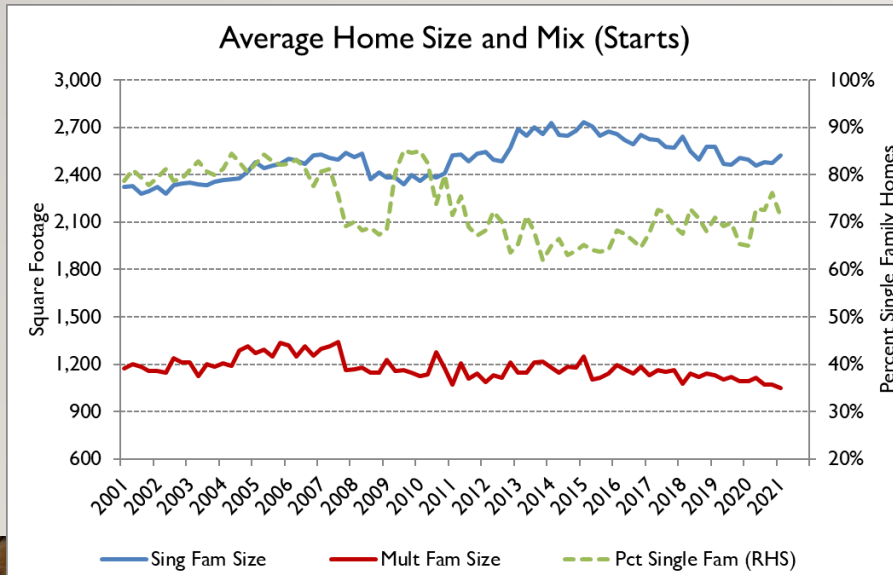


BEHIND THE NUMBERS: HOUSING STARTS

- The size of Single-Family Home Starts in Q1 2021 averaged 2,522 sq. ft., up modestly 1.8%) from 2020's average of 2,476 sq. ft. The average size of Multi-Family Units started in Q1 2021 averaged 1,048 sq. ft., down -3.6% from the 2020 average of 1,087. Single Family units made up 71% of Total Starts in Q1 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 3-month rolling average number of Permits have increased along with Starts over the prior three months (March-May) with Starts averaging 91% of Permits. The under-shoot in the past three months was particularly low. 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.

Data Source: U.S. Census Bureau

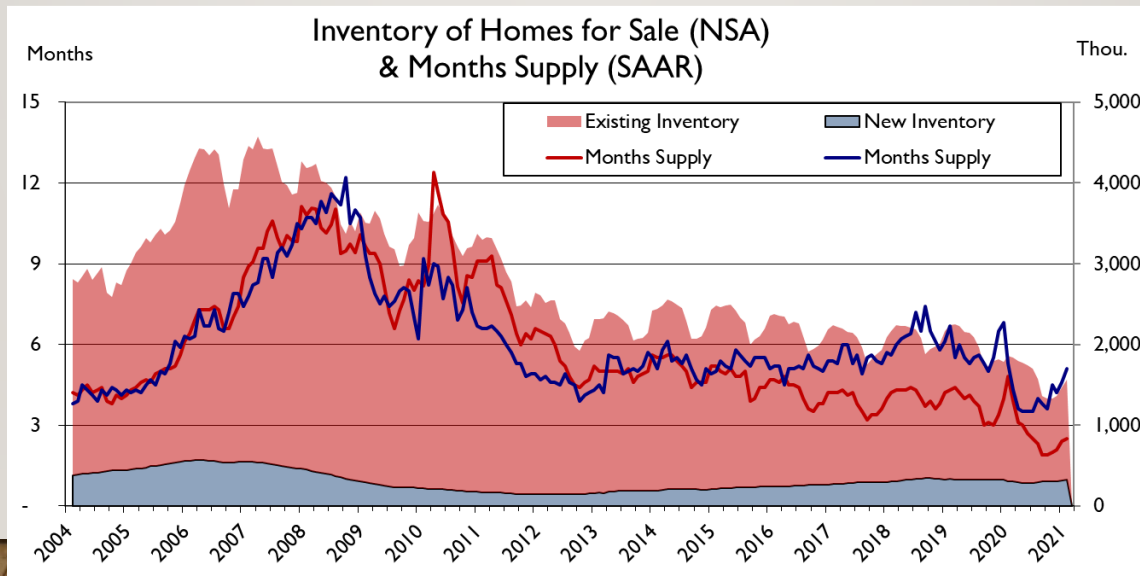
Charts & Analysis: Willsonn Advisory





PACE OF HOME SALES & INVENTORIES

- **Recent Trends:** The Inventory of Homes For Sale (Existing + New) recovered slightly to 1.56 million units in May, up 198k units from December 2020, but still down 16% (298k units) from May 2020. Separately, Existing Home Inventories are down 320k units, while New Home inventories are up 22k units, compared to May 2020. At their respective current pace of sales, there are a scant 2.5 months of sales in Existing Home inventories, and 5.1 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 are at the low end of the normal range, constrained by tighter construction and development loan standards, construction labor and a limited number of buildable lots.
- **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.

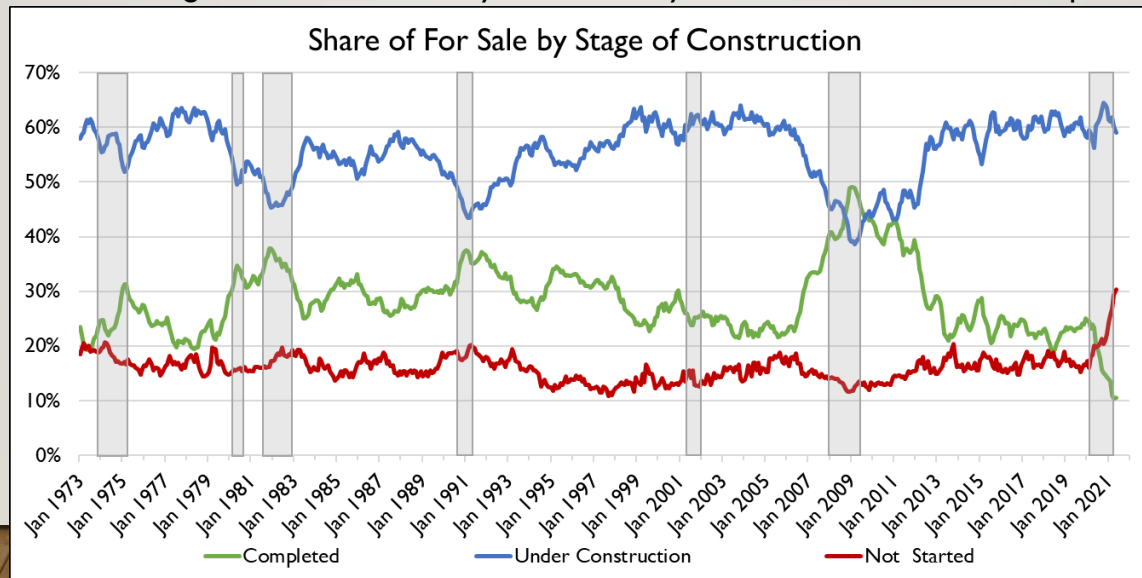


Data Source: U.S. Census Bureau, NAR

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 get stuck with more completed homes on hand).
- Of the 330,000 New units for sale at the end of May 2021, only 11% were Completed (a consecutive 47-year low), 59% were Under Construction, and 30% had Not Yet Started (also a record).
- 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 decline, 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 be delaying the start of construction as builders try to pass off the risk of high material costs to buyers, and as buyers choose to let lumber and panel prices come down.

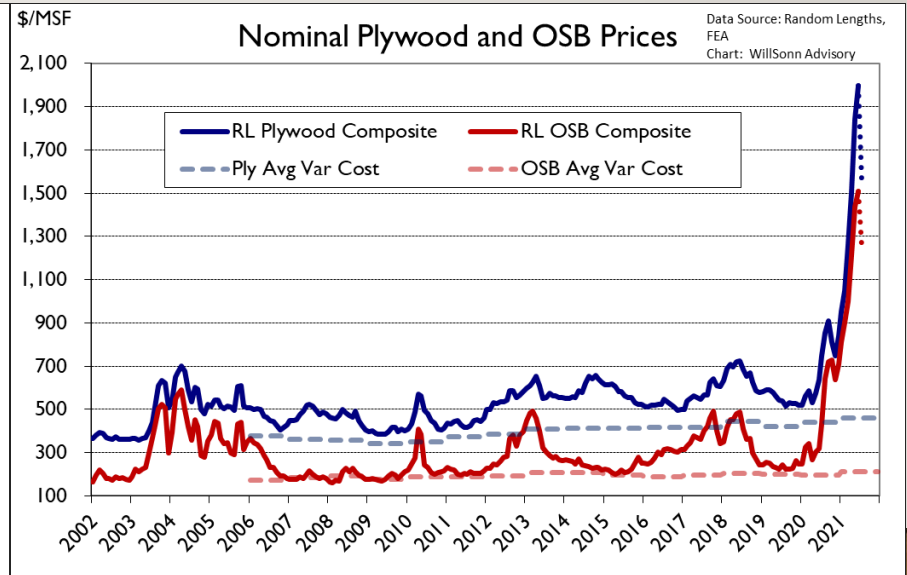
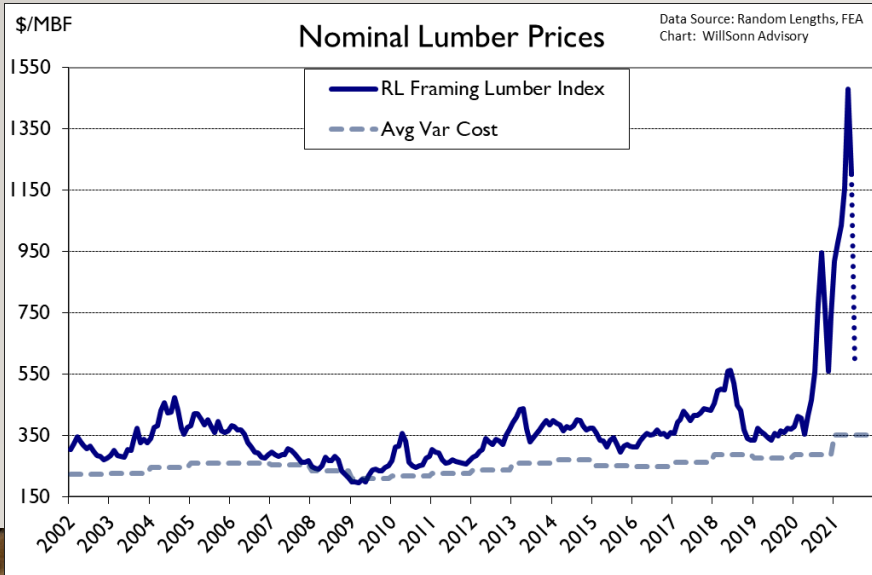


Data Source: U.S. Census Bureau, NAR
Charts & Analysis: WillSonn Advisory



WOOD PRODUCT PRICES

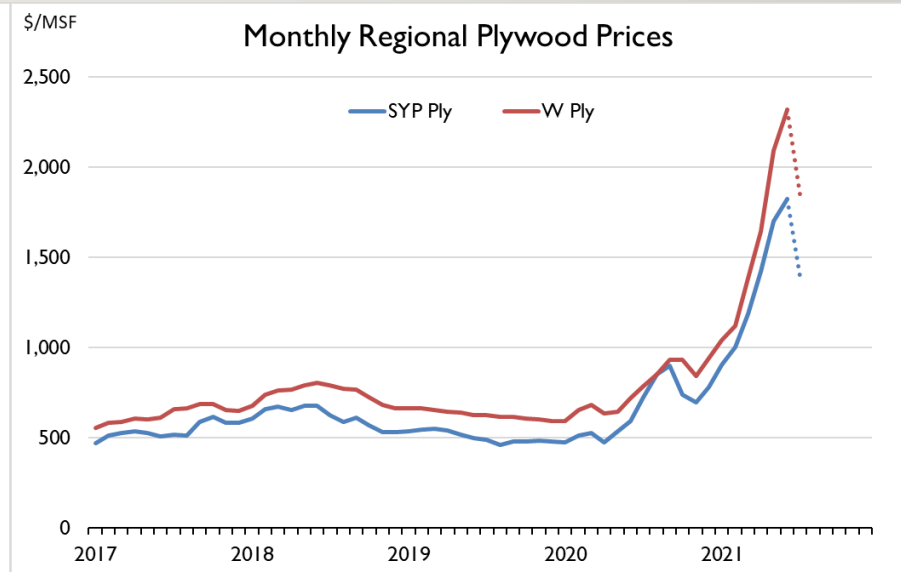
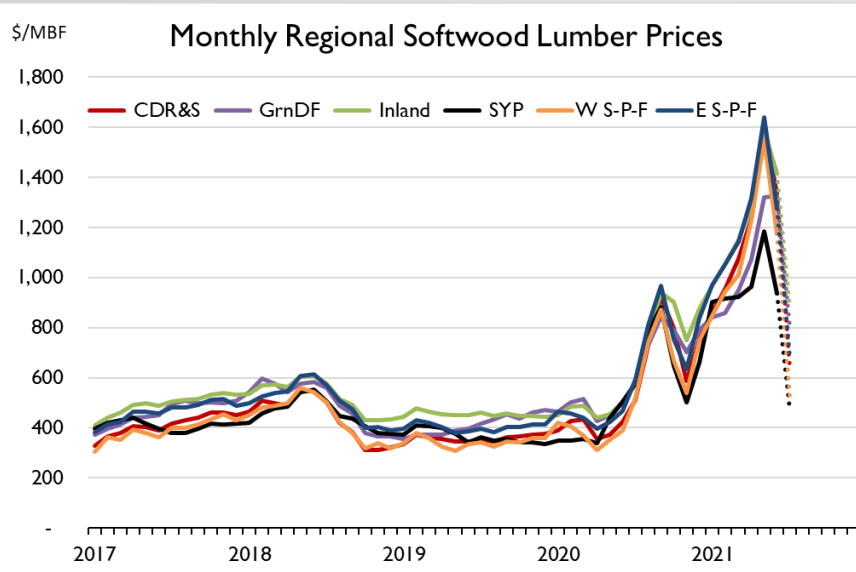
- Recent Trends:** The Random Length Framing Lumber Composite Index in Q2 2021 gained another 31% from Q1 to register 127% above Full Year 2020. Plywood pricing was up as well, rising 64% in Q2 from Q1, to a level 157% above FY 2020 levels. OSB continued to notch price gains in Q2, moving up another 53% above Q1 prices. Relative to FY 2020, Q2 OSB prices were up 193%, and fully 3.7x Q2 '20 prices.
 - The dotted line tracks to mid-July prices; Lumber has declined 61% from May's peak while Plywood and OSB are off 22% and 17%, respectively, from June peaks.
- 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 have prevailed as manufacturers and transportation sectors have faced labor constraints and some OSB capacity fell out. More recently, home center demand from DIY'ers have cratered as homeowners found other ways to spend their time and money.
- 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.





BEHIND THE NUMBERS: WOOD PRODUCT PRICES

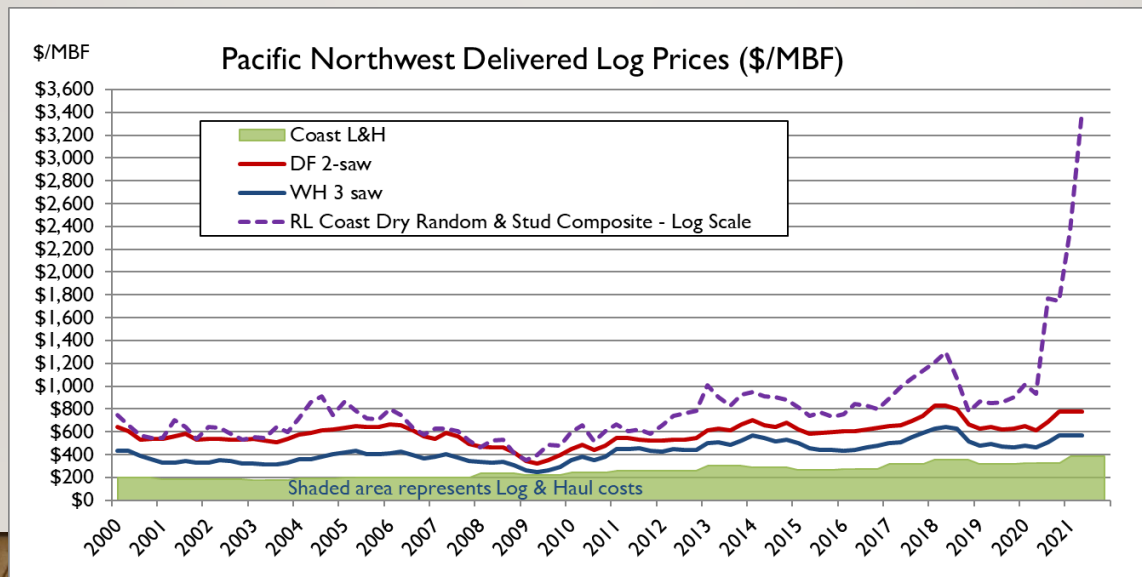
- Record prices were enjoyed by all regions in all product segments during the second quarter of 2021, but mid-July prices portend a significant downward correction
 - Regionally, Lumber prices are down 39% to 66% from May's peak while Plywood prices are down 20% to 23% from June's peak
- Regionally in Q2 2021 relative to Q1 2021
 - West Coast lumber mills saw a 44% jump in Coastal Dry Random & Stud ("CDR&S") prices and a 40% rise in Green DF prices,
 - Inland mills saw prices gain 35%
 - Southern Yellow Pine ("SYP") sawmills saw prices gain just 12% after outpacing its peers in the prior quarter.
 - Canadian components of the Random Lengths Framing Composite Index saw S-P-F prices strengthen 41% and 34% in the West and the East, respectively.
- Second quarter plywood prices were up in both regions, with Southern Plywood prices up 60% and Western Plywood up 71% during the quarter.



PNW LOG PRICES

- **Recent Trends:** Delivered log prices continued to move sideways in the second quarter and remain 13-14% above full year 2020 prices. During Q2, Douglas-fir 2saw and western hemlock 3saw log prices were essentially flat. Over the past 10 years, 2nd qtr. log prices have typically moved in the +/- 1% range, so this quarter fell in line.
- After adjustments for lumber recovery, the Random Lengths Coast Dry Random & Stud Composite price (on a log scale) gained over \$1,000/MBF (44%) after gaining more than \$600/MBF in Q1. Compared to a year ago, log prices were up 23-27% (not bad) while lumber prices were up a mind-blowing 264%.
- **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, keeping pressure on landowners to move logs at any price (and cost). The fire season in 2021 is looking to be as bad as 2020, if not worse.
- **Implication:** Simply put, mills were able to keep log prices largely in check (and profit margins at the mill)
- **Expectation:** Third quarter price movement is usually mixed, with DF 2saw gaining \$3/MBF and WH 3saw losing \$7/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.



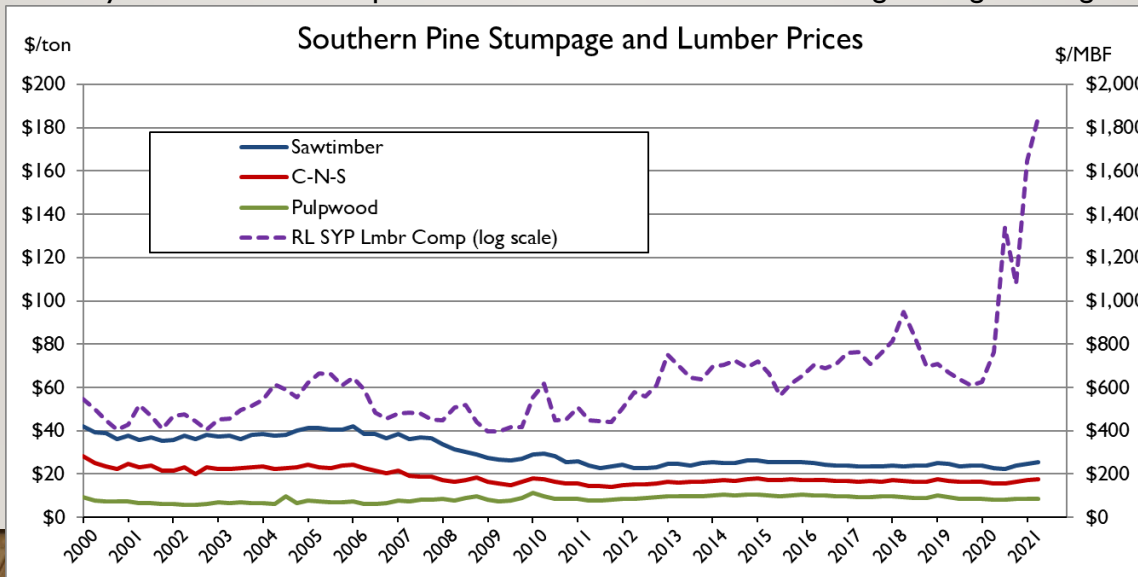
Data Source: Oregon DOF, WA DNR, Random Lengths, FEA, Log Lines

Charts & Analysis: WillSonn Advisory



SOUTHERN PINE LOG PRICES

- Recent Trends:** Second quarter Southern Yellow Pine stumpage prices continued to make small gains across the spectrum. SYP Sawtimber prices gained \$0.74/ton in the second quarter (+3%), Chip-n-saw stumpage prices were up \$0.24/ton (+1%) and pine pulpwood was up \$0.11/ton (+3%). Relative to full year 2020, second quarter PST and CNS prices are up 9-10% while PPW prices are up 4%.
- The Random Lengths SYP Lumber Composite, adjusted for lumber recovery, was up just 12% in Q2 '21 compared to Q1 '21, still 93% above full year 2020 prices.
- Explanation:** Q2 prices typically see \$0.30-\$0.75 per ton price reductions as drier weather sets in, so 2021's upward movement was a welcomed change of pace. Q2 in the South with was unseasonably wet, compounded by improved manufacturing demand, which supported an uptick in price. Despite record lumber prices and increased production, sawlogs remain plentiful in the US South.
- Implication:** Sawtimber to Pulpwood price ratios remain tight, averaging 2.9:1 in Q2, up modestly from the 2.5:1 ratio of the last few years. Unfortunately, the improved ratio comes from weaker pulpwood prices rather than materially stronger sawtimber prices. 2.9:1 is well below the bellwether ratio of >4:1, a level not seen since mid-2008!
- Expectation:** Q3 prices typically see prices slip \$0.04-\$0.30 per ton price as drier 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

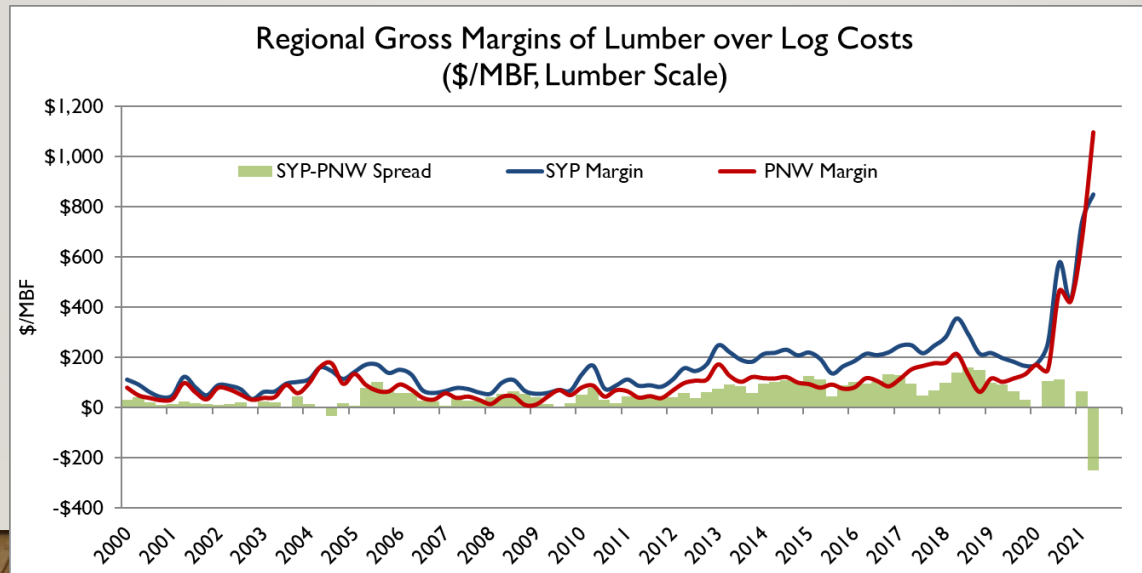
REGIONAL GROSS MARGINS

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 flipped scripts in Q2 to \$249/MBF in favor of the PNW, after favoring the South for the last 17 years. This compares to an average spread in 2020 of \$55/MBF enjoyed by southern mills. Gross margins moved upward this quarter, from \$673/MBF to \$1,099/MBF in the PNW, and from \$739/MBF to \$850/MBF in the South. Since 2013, Southern sawmills have enjoyed gross margins over \$200/MBF in 24 of the last 34 quarters, while PNW mill gross margins hit that mark only five 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 Q2 2021, Southern sawmills saw lumber price erosion set in earlier as new capacity ramped up.
- **Implication:** Manufacturing capital investments will continue to favor the US South, as the PNW advantage is expected to be short lived
- **Expectation:** I expect the spread between the PNW and South to return to the ~\$100/MBF level when lumber markets settle down. Outsized 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 (as we started to see in Q2).

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

Chart & Analysis: Willsonn Advisory



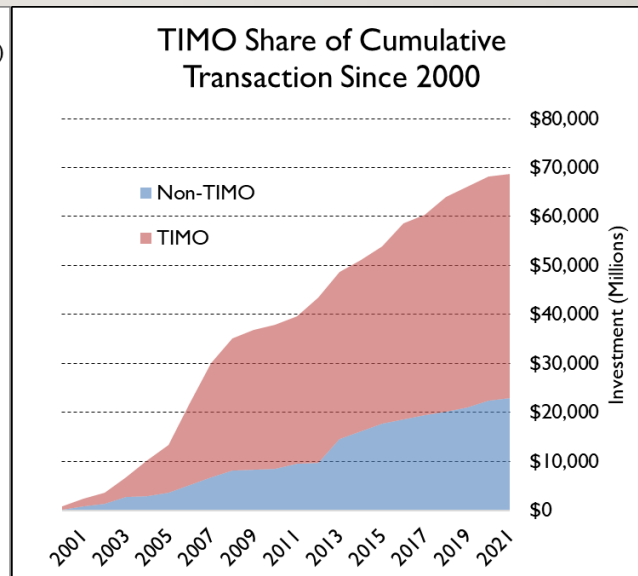
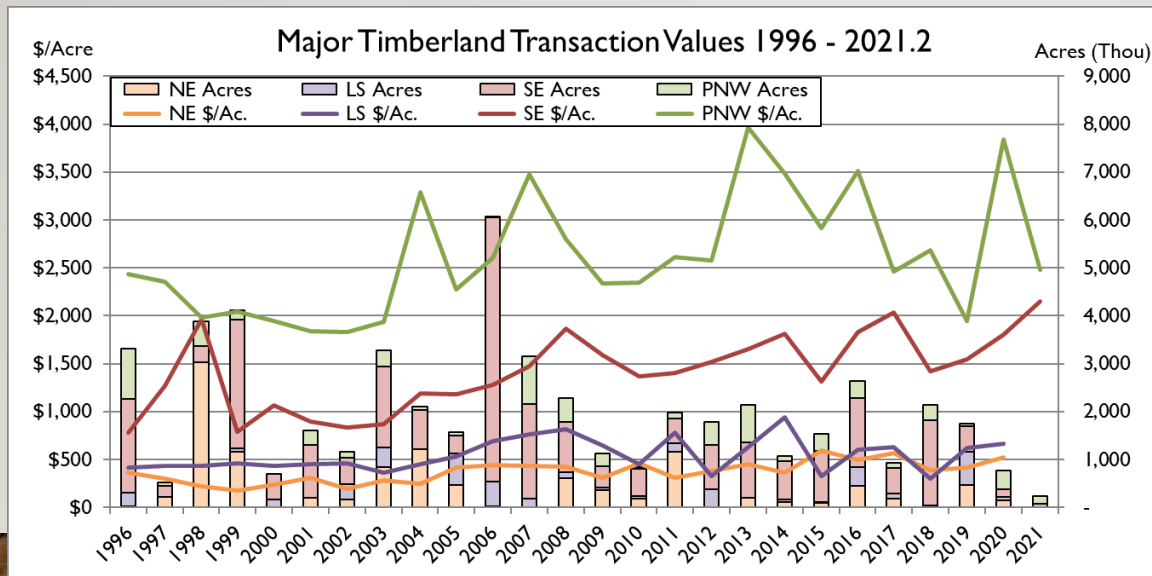
Assumptions: 67/33 weight of DF2saw and WH3saw in the PNW, and a 75/25 weight for S/T and CNS in the South (using 7.5 tons/MBF, along with FEA's estimates of Cut & Haul cost for S/T and CNS). All figures are lumber scale, and regional differences in lumber recovery factors are incorporated.



REGIONAL TRANSACTION VALUES

- **Recent Trends:** Activity in the first half of 2021 has been light, but there are a number of larger transactions in process which should bolster deal tallies for the year. To date, each of the four 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:** Values for any one property are situationally unique; prices in the Pacific Northwest turned lower as PNW sales were dominated by a large non-strategic (i.e., lower value) sale by Weyco. In the South, just a single transaction involving well-stocked lands closed in the first half of the year. 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 will 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



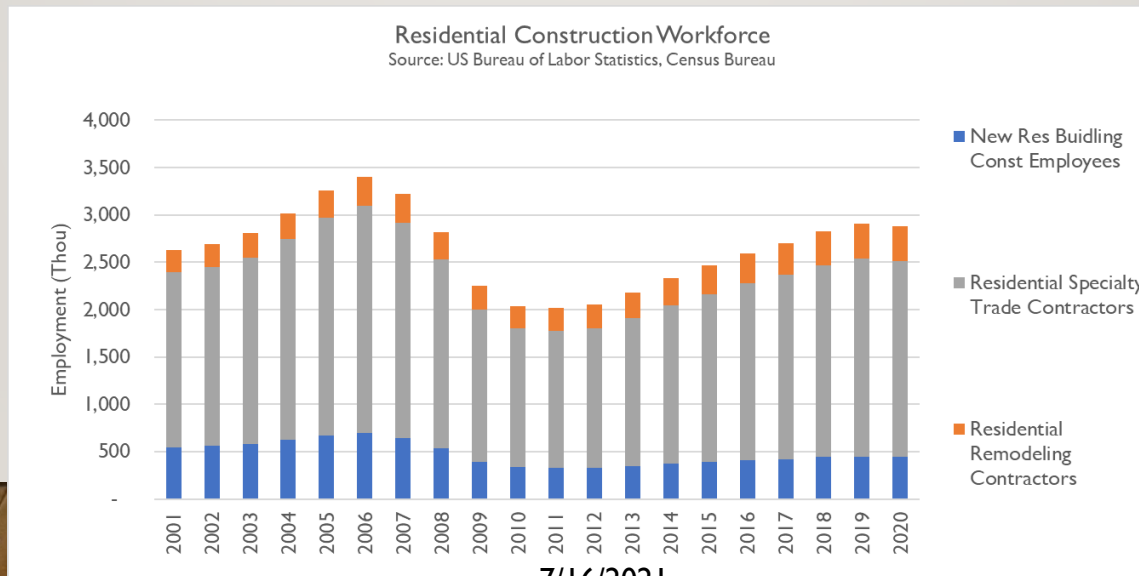


SECTION 2:

DEEPER DIVE

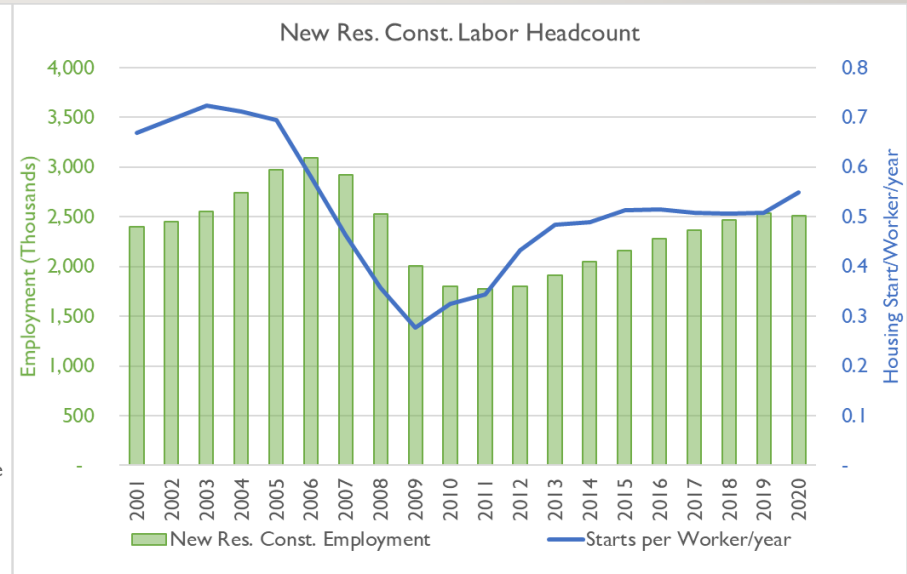
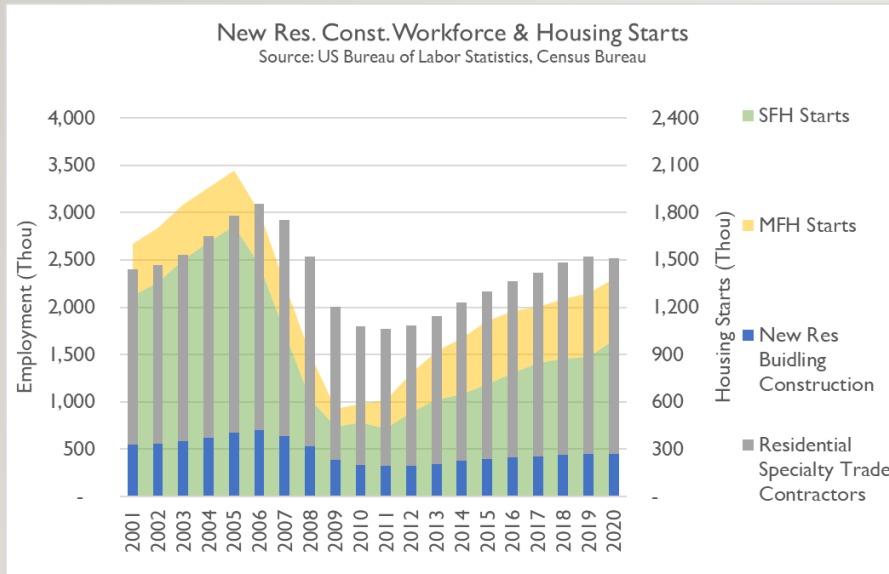
RESIDENTIAL CONSTRUCTION PRODUCTIVITY

- We continue to hear about a shortage of labor as one contributor to the prolonged recovery in Housing Starts. This claim is often bolstered by the high number of unfilled job postings. But there may be other factors at play, such as productivity. In this update of a Deeper Dive last produced two years ago, we look to see if things have improved.
- The Employment figures captured in this presentation include Residential Building Construction (NAICS 2361), which includes Single and Multi Family builders along with Remodeling contractors, and Residential Specialty Trade Contractors (part of NAICS 238), which includes plumbers, electricians, framers, roofers and other independent contractors.
 - BLS breaks out those Specialty Trade Contractors involved in Residential Construction, which excludes non-Residential contractors from NAICS 238 such as road construction workers, industrial equipment installers, etc.
 - Remodelers can also be broken out from NAICS 2361, which has been done on most charts (unless explicitly included)
- Together, workers in Residential Building Construction and Residential Specialty Trade Contractors can be thought of as the “pool” of construction workers available to both the new home and remodeling sectors, since Specialty Trade Contractors can and do work in either new home construction or remodeling. One could make a similar argument that Remodeling contractors sometimes work on new home job sites, but I suspect this is less prevalent.



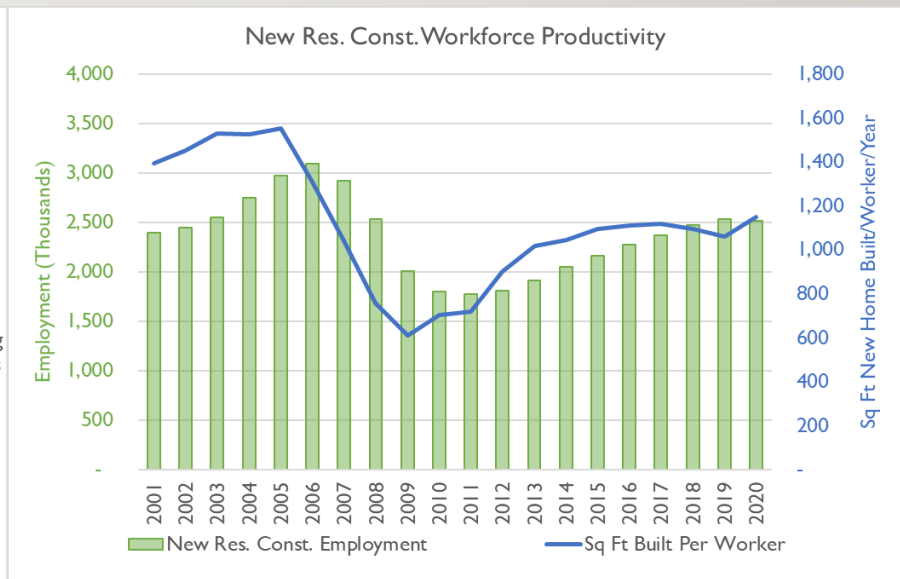
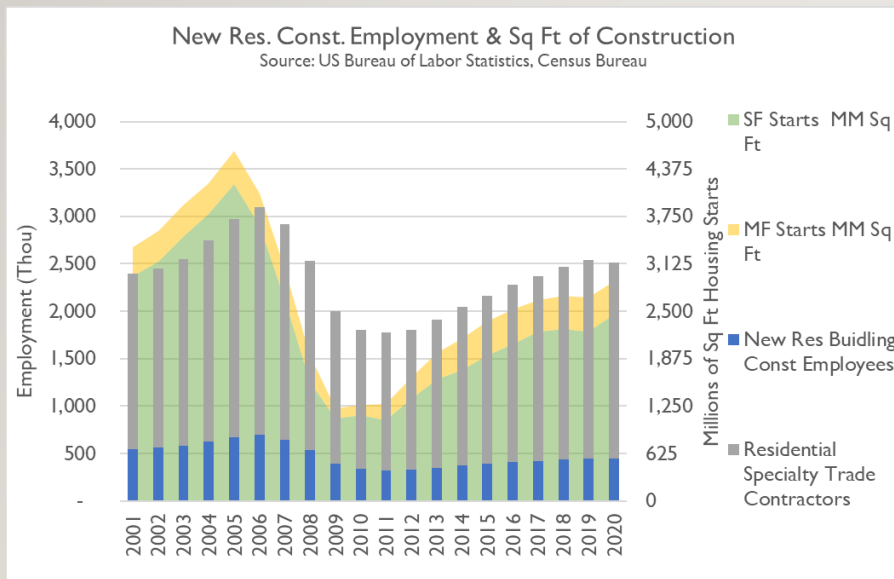
RESIDENTIAL CONSTRUCTION WORKFORCE

- The combined workforce, New Residential Building Construction plus Residential Specialty Trade Contractors (so, excluding Remodeling Contractors), shows that **Total Residential Construction Headcount in 2018-2020 (2,509,000) approximated the 2002-03 level of employment (2,499,000).**
- Housing starts in 2002-03 averaged 1.776 million units, versus 1.307 million in 2018-20.
- That translates to 0.71 start/worker/year in 2002-03 period, versus 0.52 start/worker/year in 2018-20, a 27% decline in starts per worker per year.



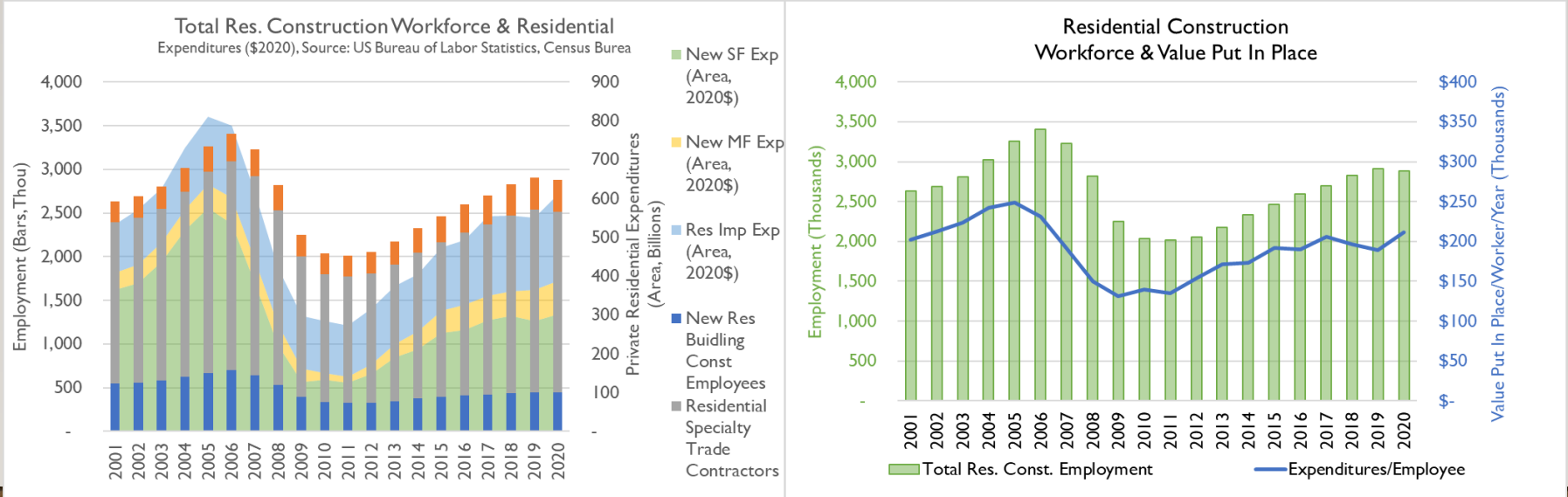
SQUARE FEET OF HOUSING CONSTRUCTION

- But Housing Starts doesn't capture the change in the size of homes. Multiplying the number of housing starts by category by their respective average sizes provides us with the total number of square feet of construction.
- The number of square feet of construction per worker per year averaged 1,100 sq ft in the 2018-2020. This compares to 1,491 sq ft in the 2002-2003 period, so a 26% decline compared to 15 years earlier.
- Despite larger houses, this is about the same decline in productivity using the simpler method of starts/worker, on the prior page.
 - The gain in Single Family home size has been offset by the higher share of Multi Family units, which made up 20% in 2002-03, vs. 30% in 2018-20
 - While the average size of a Single Family Start has grown 10% since 2002-03, Multi Family unit size has shrunk 2%



RESIDENTIAL EXPENDITURES

- The charts on the previous page do not capture Remodeling activity, which is hard to capture in any unit other than Dollars.
- Residential Construction Expenditures are expressed here in “Real” or “Constant” dollar terms, \$2020, using the Census Bureau Consumer Price Index – All Urban Index.
- Construction Expenditures per worker per year provides another measure of worker productivity that allows for the Specialty Trade Contractor participating in both sectors (new construction and remodeling) along with the Remodeling Contractors.
- Over the last three years, we spent about \$18 fewer 2020 dollars per Construction Worker, compared to the 2002-03 period (recently about \$199k/employee in 2018-20, versus \$218k/employee in 2002-03). That’s 9% lower, and the trend is pretty much flat.
 - As we keep hearing from the NAHB, non-construction costs of residential construction keep rising and quickly, items like permitting, lot prices, inspections and fees. 2020 also saw some very high materials prices that are currently in a free fall downward. Many of these costs have nothing to do with labor productivity.
- Note that in inflation adjusted dollars, Improvement Expenditures increased 43% between the two periods analyzed while Single Family Construction declined -28%. It may be that the Improvement/Remodeling sector has siphoned off a disproportionate share of the Specialty Trade workforce, thus slowing the pace of construction in new homes.



CONCLUSIONS

- It appears that the issue is less about the number of people in the building trades. It is more a matter of productivity, which comes from experience and training, or allocation, as growth in remodeling expenditures outpace new construction.
 - We have about the same number of people working in Residential Construction and Residential Specialty Trade as in the early 2000's
 - On a "Per Worker Per Year" basis, we see 27% fewer homes being started, 26% fewer square feet getting built, but only 9% fewer dollars being spent after adjusting for inflation in the 2018-20 period compared to the 2002-03 time period
 - Comparing the two time periods, we have seen the Repair & Remodeling sector's share of Residential Expenditures grow from 24% to 35%
- Factors other than those mentioned may also be at play
 - Increased regulation and labor disruptions may be slowing down permitting and inspections
 - Post Global Financial Crisis and during the Covid-19 pandemic, local government employment (including inspectors) plummeted and/or activities were curtailed
 - Probably a bigger issue with Multi-Family construction, where completion times are now over 15 months, up from 10 months in the early 2000's
 - A dearth of available, permitted lots on which to build reduces the urgency to move onto the next job
 - Conservation Easements and purchases by park districts of urban and suburban open lands further reduce the number of lots available for new housing
 - Tighter availability of development loans since the Global Financial Crisis have also kept builders working on fewer homes at a time
 - Headcount is one thing, but hours worked per day, and days worked per week may or may not be at the same level as it once was. This would certainly reduce productivity, as I have measured it.
 - Unfortunately, this data isn't available
 - In addition, there is some mixed evidence that the foreign-born workforce in construction and specialty trades has declined in recent years, but this is a figure that's hard to nail down



SECTION 3:

IN CASE YOU MISSED IT

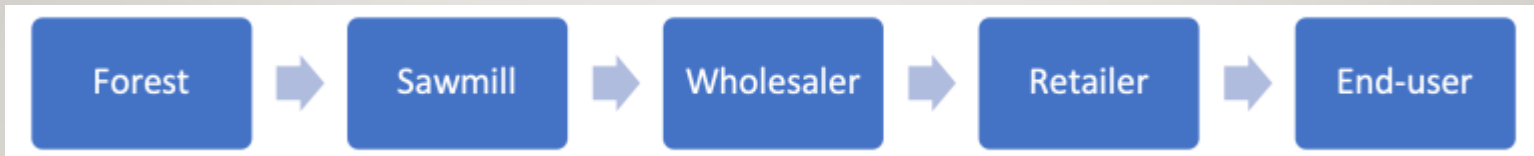
NAHB: WHY BUILDER LUMBER PRICES REMAIN HIGHER THAN HEADLINES SUGGEST

BY DAVID LOGAN ON JULY 6, 2021

[Link: Why Builder Lumber Prices Remain Higher than Headlines Suggest | Eye On Housing](#)

Lumber futures prices have decreased by 52 percent (on a front-month basis) over the past seven weeks as mill prices have fallen 48 percent over the same period.[1] In contrast, prices paid by builders since late May have declined by a fraction of that impact. The disconnect—which has always existed—is inherent to the lumber supply chain and choices that must be made at each stage.

The Lumber Supply Chain: The supply chain for dimensional lumber typically consists of five stages.



- Timber is harvested from the forest and shipped to a sawmill.
- Saw logs are cut to dimension at the mill and shipped to a distributor.
- The wholesaler delivers to lumber retailers such as lumberyards and building materials suppliers.
- Customers purchase the product to use as a production input.
- The end-user (e.g., home builder) constructs a home.

A lumber company may operate at one stage or multiple stages. In the latter case, the firm is said to be vertically integrated—such structure is commonplace in the lumber industry. For example, large lumber companies may own:

- timberlands from which they get logs,
- mills at which they cut (and may also plane) lumber, and
- a distribution network or building materials supply company.



NAHB: WHY BUILDER LUMBER PRICES REMAIN HIGHER THAN HEADLINES SUGGEST

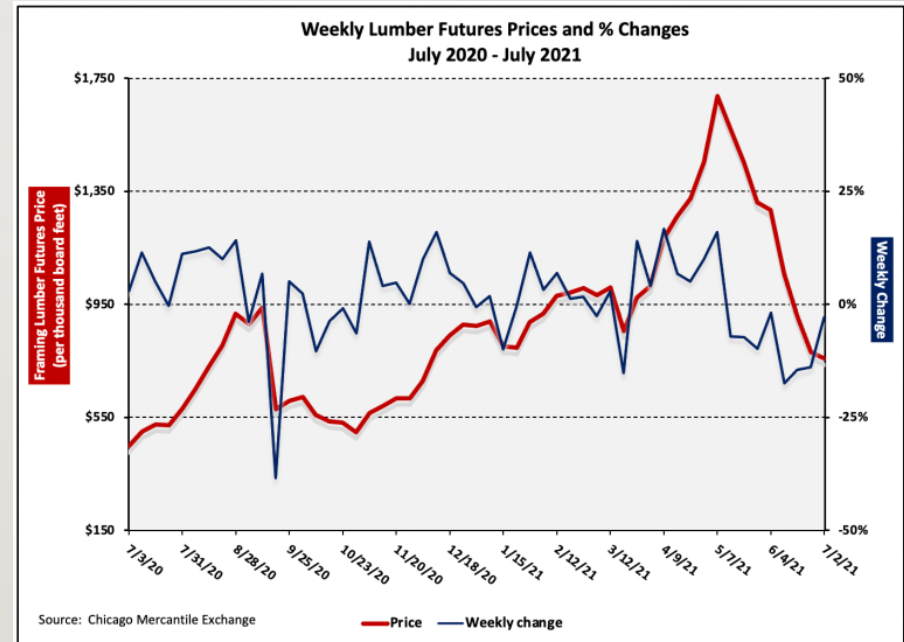
Sources of Price Timing Differences:

Coverage of the recent fall in lumber prices—usually proxied by futures in the media—began in May. Indeed, the price of July lumber futures has declined 56 percent since peaking on May 10th and by 46 percent since May 14th (the final trading day of May 2021 futures contracts).

As the price declines began grabbing headlines, however, the price of lumber packages quoted to builders held at record highs. In economics jargon, prices paid by builders—or “street” prices—were “sticky.” This dynamic is primarily due to dealers’ inventory carrying costs and potentially large differences between the price at which inventory is bought and sold.

To maintain margins, retailers and wholesalers do their best to buy low and sell high. At the very least, they try to avoid buying high and selling low, which happens to be the biggest risk in an environment of rapidly falling prices. For example, had a lumberyard quoted a client at prevailing prices two weeks ago, it would be taking a 25 percent loss relative to current pricing. Thus, a supplier that quotes clients at current market prices will consistently lose money when prices are falling.

Suppliers’ inventories will also tend to be tighter during periods of falling prices. Whatever inventory the business has on hand was expensive relative to current prices. This gives wholesalers and retailers incentive to run through that inventory while they can still get close to what they paid for it—and doing so without souring relationships with customers. And for reasons stated above, they will be “trigger shy” to buy more lumber than they are contractually obligated to provide to customers for fear of ending up with a load of inventory on which they will take a loss.





NAHB: WHY BUILDER LUMBER PRICES REMAIN HIGHER THAN HEADLINES SUGGEST

When Do Lower Prices Reach Builders?

Home builders and remodelers begin to get price relief once mill prices have substantially decreased for an extended period and/or stabilized. Note that large price decreases alone may not be sufficient. Prices must fall for long enough to materially lower a supplier's average costs after a run-up. Depending on the rate and consistency of price decreases and whether prices have stabilized at the lower level, it may take a few weeks to a couple of months for builders to see price relief on the order initially reported in the futures or cash markets.

The length of this "waiting period" varies with builder size, supplier size, and the specific builder-supplier relationship. Buying power is positively correlated with the size of a residential construction firm while the same is true for suppliers' seller power, all else equal. The relative difference in market power between the buyer and seller is crucial in determining how quickly lower prices transmit to a customer.

Personal and business relationships also influence timing. Home building is an industry that is highly dependent upon relationships both with customers as well as vendors (which is why most building materials dealers belong to their local builders association). The length and quality of a builder-vendor relationship can positively affect how soon the builder is quoted lower lumber prices.

Why Do Builders' Lumber Costs Increase with Market Prices?

In contrast to the dynamics of an environment with falling prices, higher prices reach builders with a much smaller lag when market prices are increasing. The same forces that lead to large lags relative to mill prices on the way down can help explain why builders' lumber costs may increase contemporaneously with mill prices.

Wholesalers tend to be "trigger happy" when prices skyrocket. As the cost of their inventory is low relative to cash prices during these periods, they will quote at or near current market prices. The environment is one in which wholesalers are assured to buy low and sell high.

However, wholesalers cannot predict when a bull market is going to end and buy their lumber according to how likely they believe it will last. As different buyers may have different forecasts, disparities in purchasing behavior can arise. A wholesaler that assumes lumber prices will keep rising for two months will buy more inventory than one assuming the run will last for two weeks.

Retailers generally have less buying power than wholesalers have selling power. In such a scenario, the retailer (e.g., lumberyard) is said to be a "price taker." As a result, their inventory costs tend to increase in step with market prices. These higher costs are passed on to builders in order to maintain positive operating margins. Thus, lumber retailers are less likely than wholesalers to realize outsized profits when prices are rising.



NAHB: WHY BUILDER LUMBER PRICES REMAIN HIGHER THAN HEADLINES SUGGEST

Wood supply game available online

To get a feel for the nuances and complexities of the lumber supply chain, business managers and employees can play the publicly available “Wood Supply Game” developed by Forest to Customer (FORAC). The “game” allows players to manage one or more stages of the supply chain and demonstrates how output, inventory stock level, and ordering decisions affect the flow of goods. The game also showcases the importance of information sharing among businesses at different stages. A detailed explanation of how to set up, administer, and play the online game can be found [here](#).

- [\[1\]](#) CME Group; Random Lengths; NAHB calculations.
- [\[2\]](#) Trading terminates the business day immediately preceding the 16th day of the contract month.



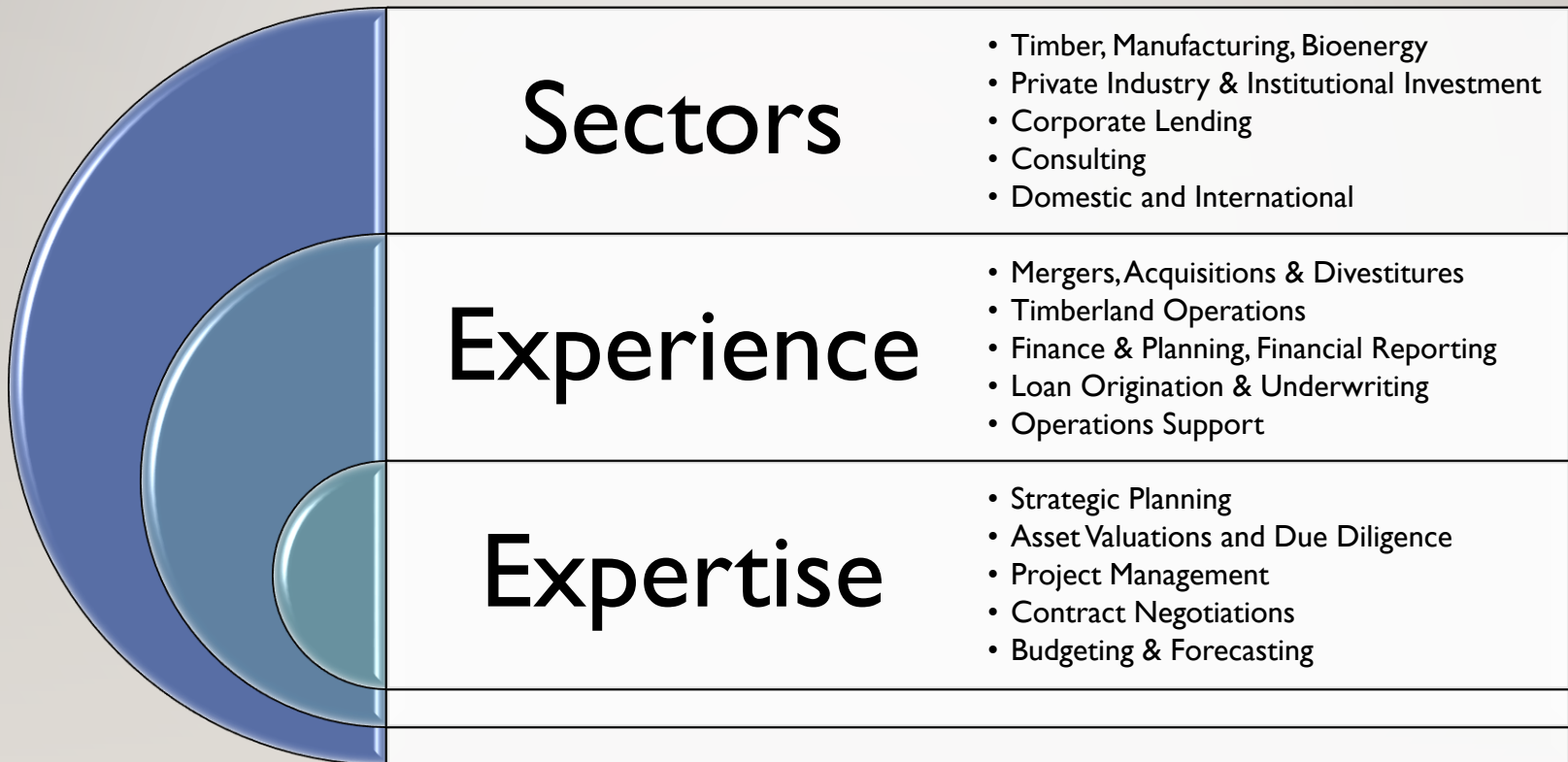
SECTION 4:

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



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



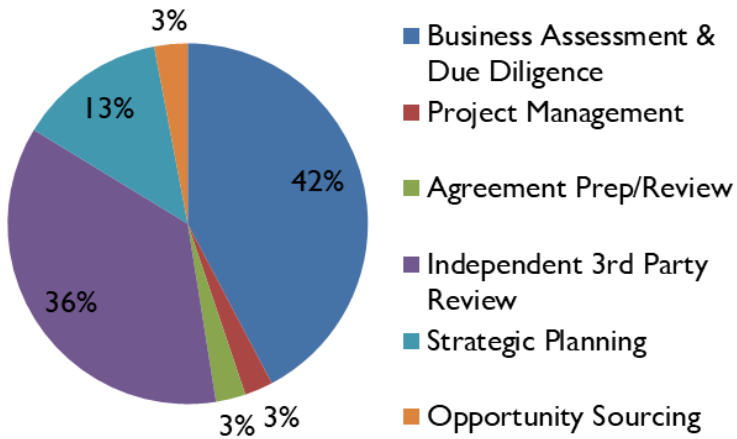
- Validate Acquisition Valuations & Due Diligence Procedures
- Evaluate Existing or Proposed Agreements or Easements
- Interpret Annual Management Plans & Appraisals
- Examine Proposed Transfers of Ownership
- Review Divestiture Timing & Strategies
- Track Investment Performance

Institutional Investor Services

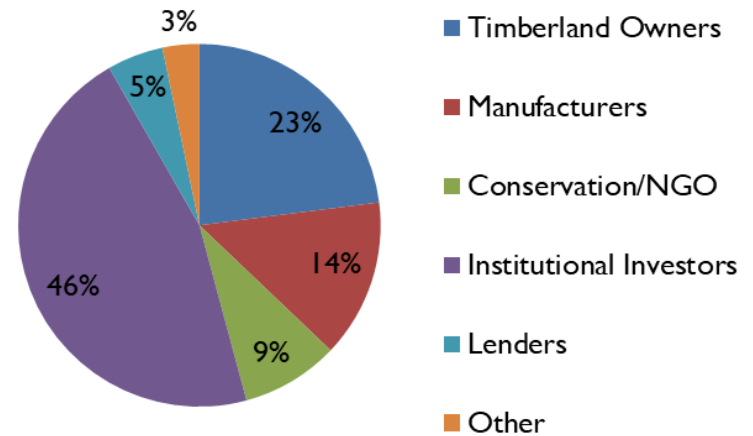


ENGAGEMENT PROFILES

Services Provided 2009-20

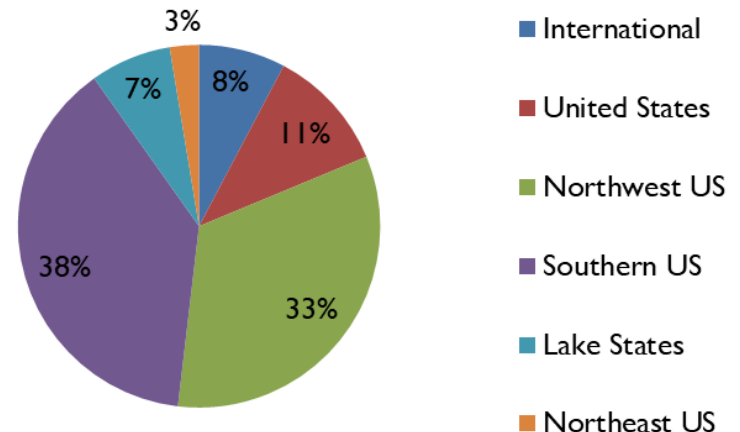


Customers Served 2009-20



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.

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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