Millennials, Housing, and the Timber Demand Recovery
Executive Summary

The U.S. lumber market is closely tied to U.S. housing starts which have been slow to recover after reaching historic lows during the Great Recession. In this research, we outline our more conservative housing and lumber demand outlook than the consensus, and how the changing nature of timberland ownership has impacted timberland values. In the near term, we expect lumber demand to remain below the historical average, but we make the case for a more positive outlook for both lumber demand and the timberland asset class over the medium and long term, given our expectation for Millennials to eventually migrate to the suburbs, the long-term expected supply deficit of timber, and the emergence of non-housing demand drivers.

Structural shift in demand for owner occupied single-family housing

We anticipate housing starts will reach 1.50 million by 2020, which is well below the consensus forecast of 1.78 million starts. This below consensus view is based on our analysis of the millennial generation and changes in the availability of credit for home purchases.

<table>
<thead>
<tr>
<th>Generation</th>
<th>Age Range</th>
<th>Born Between</th>
<th>Population (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millennial</td>
<td>14-32</td>
<td>1983-2001</td>
<td>83</td>
</tr>
<tr>
<td>Generation X</td>
<td>33-50</td>
<td>1965-1982</td>
<td>74</td>
</tr>
<tr>
<td>Baby Boomers</td>
<td>51-69</td>
<td>1946-1964</td>
<td>75</td>
</tr>
<tr>
<td>Silent Generation</td>
<td>70-87</td>
<td>1928-1945</td>
<td>29</td>
</tr>
</tbody>
</table>

Source: MetLife & U.S. Census Bureau

Most millennials too young to buy a home

Plummeting homeownership rates among Millennials are often cited as a key contributing factor to the slow housing recovery. Approximately 90% of the Millennial generation has not yet reached the median age of first home purchase (Figure 1). The average age of a Millennial in 2015 was 23 years. In 2014 the median age of first time homebuyers was 31 years¹, suggesting we are just too early in the housing recovery cycle to count on a Millennial-driven recovery. Data from Zillow shows that the median age of first time homebuyers has also increased over time, a trend Millennials are unlikely to reverse.

Although the revitalization of the nation’s urban centers is impossible to deny and the Millennial generation is often associated with this trend, it is far less clear whether or not Millennials are wedded to their urban lifestyle. Our research suggests that while a portion of the generation may become...
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permanent urban residents, most will follow generations past into the suburbs. This is not likely to occur until the majority of Millennials reach the first time home buyers age of 31, which is just outside of the five-year time horizon discussed in this document.

### Homeownership rates not rising among those ages 35-44

More peculiar than current homeownership trends among Millennials is the drop and lack of recovery in the homeownership rates in those aged 35-44 (a subset of Generation X). In 2014, this group had average household incomes and marriage rates that were 28% and 45% higher than 25-34 year-olds, respectively. These characteristics suggest those aged 35-44 should have a homeownership rate higher than 60%. The homeownership rate for this group peaked near 70% in 2005 and was 60% in 2014. Those aged 35-44 today were 25-34, 10 years ago when home prices were at their peak. If these households previously owned a home and subsequently lost that home, it would be difficult for them to obtain financing today, which may keep them out of the housing market over our forecast horizon.

### Credit availability remains a constraint

By historical standards, credit availability for home purchases continues to be constrained. Table 2 lists the percentage of conventional mortgages approved with FICO scores below 720, Debt to Income (DTI) ratios that were greater than 43, and Loan to Value (LTV) ratios that were greater than 80%. The percentage of mortgages approved with low FICO scores and high DTI ratios have increased, but remain low compared to historical levels. Although higher leveraged loans have increased, those with lower FICO/DTI scores will likely face obstacles in securing financing for a home purchase.

One of the contributing factors to constrained credit availability is the decline of Non-Agency Residential Mortgage Backed Securities (RMBS). These securities were a major source of financing for borrowers who could not meet the requirements of a conventional lender prior to the financial crisis. According to Securities Industry and Financial Markets Association, Non-Agency RMBS issuance peaked in 2005 and is nearly nonexistent today.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>FICO &lt;720</th>
<th>DTI &gt;43</th>
<th>LTV &gt;80</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006-2007</td>
<td>38%</td>
<td>N/A</td>
<td>23%</td>
</tr>
<tr>
<td>2008-2009</td>
<td>22%</td>
<td>25%</td>
<td>27%</td>
</tr>
<tr>
<td>2010-2011</td>
<td>15%</td>
<td>18%</td>
<td>19%</td>
</tr>
<tr>
<td>2012-2013</td>
<td>17%</td>
<td>12%</td>
<td>33%</td>
</tr>
<tr>
<td>2014-2015</td>
<td>23%</td>
<td>16%</td>
<td>41%</td>
</tr>
</tbody>
</table>

Source: Morgan Stanley
Lumber recovery muted by lack of demand for owner occupied single-family housing

Homeownership rates are at 36-year lows. Single-family housing starts, one of timber’s largest demand drivers, decreased precipitously from a high of 1.72 million in 2005 to a low of 0.44 million in 2009, before rising to 0.71 million in 2015 (Figure 2). The long-run average of total housing starts is 1.50 million, more than double the current rate. Since the end of the housing boom in 2006, weak demand for single-family homes has delayed a recovery in the lumber market.

At the end of 2015, lumber prices were nearly 20% below their 2004 peak. New residential construction and residential improvements accounted for 38% and 32% of U.S. lumber consumption, respectively, in the 2000-2014 period, and peaked at 50% in 2005. Since it takes three times the amount of lumber to build a single-family unit compared to a multifamily unit, a recovery in the single-family housing market is needed for a recovery in the lumber market.

Although sometimes used interchangeably with timber, lumber refers to wood that has been processed and cut to length (e.g. a 2x4) while timber refers to rough stock wood that has not been processed or shaped. Later in this document we also refer to stumpage prices. Stumpage is the price a landowner receives in exchange for the right to harvest timber, and serves as a proxy for a landowner’s wood revenue.

**Figure 2 | Muted Single-Family Housing Demand**

![Graph showing housing starts, log exports, and lumber price over time](source: Randomlengths and FEA)
Lumber prices, as measured by the Random Lengths Lumber Composite Price Index, fell 25% between 2005 and 2009 (Figure 2). Prices saw a recovery after 2009 as many lumber mills exited the industry in response to reduced demand and Russia, then the largest log exporter in the world, implemented export tariffs on raw logs. With the world’s largest log exporter out of the market, the U.S. started to export lumber to China, prompting lumber prices to rise 42% between 2011 and 2013. Since 2014, Chinese demand for forest products has waned as the country faces excess housing supplies and economic growth has slowed.

**Timberland investors driven by capital appreciation**

Since timberland returns are comprised of capital appreciation returns in addition to operating returns, lumber prices are not reliable predictors of returns to timberland owners. For timberland investments, capital appreciation has historically comprised roughly two thirds of the timberland’s total return. Figure 3 plots quarterly timberland values (from NCREIF’s Timberland Index) relative to sawtimber stumpage prices in the U.S. South.\(^4\)\(^5\)

The slow recovery of the U.S. housing market has hurt lumber demand and prices. For example, sawtimber stumpage prices in the U.S. South are 32% below average pre-recession values. Lumber mills in this region have limited exposure to export markets, leaving U.S. residential construction as their primary demand driver. Interestingly, timberland values continued to rise over this period, which is indicative of other factors at play.

Separating Figure 3 into pre and post-recession regimes shows the post-recession sawtimber stumpage prices adjusted to a "new normal" of 32% below pre-recession levels due a lack of demand from housing. However, timberland values are 50% above pre-recession levels. It is surprising that timberland values have not adjusted lower given the decline in stumpage prices. The nature of timberland ownership in the U.S., its long investment horizon, and nearly a decade of historically low interest rates help to explain this apparent disconnect.

Prior to the 1980’s, vertically integrated forest products companies, which were primarily structured as corporations, owned U.S. timberland. The REIT Act of 1960 incentivized these corporations to remove large real estate holdings from their balance sheets and allow investors to carry these assets through more tax efficient structures (REITs or TIMOs\(^6\)). The first timberland funds were launched during the 1980’s and timberland assets under management amounted to roughly $1 billion. Today over thirty funds...
manage more than $57 billion\(^7\) of timberland assets for investors who cite the long term investment horizon, low correlation with the general economy, biological growth regardless of economic conditions, and a relatively stable stream of cash flows\(^8\) as appealing characteristics of the asset class.

Given the importance of the appreciation element to total returns and the long investment horizon of timberland investors, lower periodic operating returns could be outweighed by the potential for capital appreciation of the underlying asset. Global income growth and the rising timber deficit in densely populated Asia are often cited as supporting the potential for continued appreciation of land values.

**Housing Starts forecast below consensus**

As lumber mills in the U.S. South shift their focus back to the domestic market, lumber demand will depend largely on the demand for single-family homes. The consensus\(^9\) believes total housing starts will reach 1.78 million in 2020. Our view is that total housing starts will reach only 1.5 million in 2020 (Figure 4). Historically low housing inventories and improving conditions will motivate homebuilders to increase output, but not to the extent the market anticipates. We believe that the primary headwind to a fast recovery in housing starts is that the homeownership rate will remain below the historical average of 65% through 2020. This is due to continued credit availability constraints and its impact on the 35-44 year age cohort as well as the Millennial generation delaying homeownership.

**Three scenarios for housing starts**

We forecasted domestic lumber demand from housing starts under three scenarios where the average proportion of single-family and multifamily starts are above (75%), below (69%), and equal to (72%) the long-term average. Our assumptions for calculating lumber demand are that the average size of a single family and multifamily housing unit is 2,500 sq ft and 1,200 sq ft, respectively, and that on average 5.88 and 4.05 board feet are required to build one square foot of single family and multifamily units, respectively.

**High multifamily starts cooling lumber demand**

Our results (Table 3) show that regardless of the scenario, a significant improvement in domestic lumber demand will occur over our forecast horizon but will not return to 2006 levels. Additionally, every scenario is below the 15 year average of 17,456 million board feet. If the trend of more multifamily housing starts (below average scenario) is truly representative of a shift in preferences, and our estimates of the proportion of multifamily and single-family starts are correct, lumber mills could
face demand that is on average 251 (16,197 - 15,946 = 251) million board feet lower per year relative to the return to the long-term average scenario. Overall, MetLife’s expectation for housing starts results in 10,296 million board feet (91,280 - 80,984 = 10,296) less demand over the five-year forecast than the consensus view as a result of the slower growth in housing starts.

Absent a recovery of the single-family home market in the U.S., there are limited prospects for a major demand boost in the near term. This presents downside risk for lumber and U.S. South sawtimber stumpage prices through 2020, as roughly six million acres of southern yellow pine (SYP) forest will reach maturity in the next five years, and roughly three million acres are beyond economic maturity.10 If the housing market continues its slow growth rate, much of the six million acres of SYP forest will have to be harvested (assuming the landowner does not choose to let the inventories exceed economic maturity), increasing supplies and pressuring prices lower. The pace of the housing recovery will largely dictate whether or not the industry will have to harvest excess inventories.

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Cumulative &amp; Average Lumber Demand (Million Board Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario (% Single-Family to Multifamily Starts)</td>
<td>Cumulative Demand in Board Feet 2016-2020</td>
</tr>
<tr>
<td>15 year</td>
<td>N/A</td>
</tr>
<tr>
<td>2006</td>
<td>N/A</td>
</tr>
<tr>
<td>2009</td>
<td>N/A</td>
</tr>
<tr>
<td>Consensus Forecast</td>
<td>Above Average (75%)</td>
</tr>
<tr>
<td></td>
<td>Average (72%)</td>
</tr>
<tr>
<td></td>
<td>Below Average (69%)</td>
</tr>
<tr>
<td>MetLife Forecast</td>
<td>Above Average (75%)</td>
</tr>
<tr>
<td></td>
<td>Average (72%)</td>
</tr>
<tr>
<td></td>
<td>Below Average (69%)</td>
</tr>
</tbody>
</table>

Source: Moody’s Analytics, Forest Economic Advisors, Bloomberg, and MetLife

Still a compelling asset class

A recent World Wildlife Fund study estimates planted forests must increase at an annual rate of 2.4% to meet global timber and wood fiber needs and to offset deforestation impacts.11 In addition, new, non-housing demand drivers for wood products are materializing. The use of wood pellets as an alternative and carbon-neutral fuel source has led several nations to encourage the use of wood pellets as renewable energy targets and policies take effect. A 2014 RISI study12 estimates global wood pellet demand will more than double, from 23 million metric tons in 2014 to 50 million metric tons in 2024.

This outlook is particularly favorable for U.S. producers; U.S. timberlands are mostly privately owned and are therefore not subject to the same restrictions seen in other countries with greater public ownership. British Columbia faces a timberland supply reduction due to the mountain pine beetle infestation in Canada, which has killed roughly half of the lodgepole pine inventory in the province since 1990.13 This supply reduction likely explains the increased presence of Canadian lumber companies in the U.S. South. Today there are over 35 Canadian-owned saw mills in the U.S. South compared to two in 2005. A slowdown in the annual acreage growth of planted forests, supply issues in British Columbia, and new global demand drivers suggests the potential for a supply deficit in the future, which is a bullish factor for the U.S. lumber industry and the timberland asset class.
Conclusion

Lumber and U.S. South sawtimber stumpage prices were severely impacted by the Great Recession but timberland values have been relatively immune to lower lumber prices due to the shifting nature of timberland ownership, low interest rates, and the investor’s focus on the appreciation component in timberlands total return. Although economic conditions continue to improve, housing starts will grow slowly through 2020 due to our expectation of homeownership staying below the long-term average of 65%. The Millennial and 35-44 age groups demographic characteristics, housing preferences, and credit constraints will keep the homeownership rate below this level, slowing the speed of the recovery in housing starts. This suggests downside risk for stumpage prices in the U.S. South as the region faces an inventory overhang which is at risk of exceeding economic maturity within the next five years. However, global planted forest acreage growth has slowed and is below the estimated rate to sustainably meet increased global demand, suggesting a future supply deficit that will be compounded in the late 2020s by the migration of Millennials to the single-family market. We believe the U.S. timberland asset class is particularly well positioned to meet the world’s increased demand for wood and wood fiber, making investments in this sector attractive for investors with long-term horizons.
Endnotes

1 Data from the National Association of Realtors
2 Data from Forest Economic Advisors
3 Sawtimber is harvested from larger, more mature trees, and used to produce lumber
4 The southern yellow pine (SYP) forests of the U.S. South account for 71% of the 13.3 million acres of institutional timberland tracked by NCREIF and are a major supplier of lumber for residential construction in the U.S. Because of its importance to, and dependence on U.S. housing, our analysis focuses on this region.
5 NCREIF timberland values are based on appraisals. Appraisal valuations tend to lag the market because they are based on past comparable transactions. Additionally, a 2016 study by Mei found that timberland liquidity decreased during the great recession, and that appraised values reported in the NCREIF Timberland Index over this period were greater than actual transaction prices. It is likely that the Index does not accurately reflect actual land values during economic downturns and that land values during the Great Recession were overstated. Sawtimber stumpage prices began tracking the Index again in 2010 but remain well below pre-recession levels.
6 Real Estate Investment Trusts or Timber Investment Management Organizations
8 Stumpage price variability is mitigated by recreational income (hunting leases), mineral rights and easement income, and opportunistic dispositions of timberland tracts.
9 Moody’s Analytics, Forest Economic Advisors, JP Morgan, Barclays, Fitch, and RISI
10 Peter Barynin. March 2016. RISI Forest Investment Conference
12 RISI. 2015. Global Pellet Demand Outlook Study
13 Natural Resources Canada
About MetLife Agricultural Finance

MetLife Agricultural Finance ranks among the most active private agricultural, agribusiness and timberland mortgage lenders in North America, with a total agricultural mortgage portfolio of $13.6 billion*. We specialize in providing fixed and variable rate mortgage financing for a full range of capital needs.

Whether you’re looking to re-amortize your term debt, expand your operation or refinance an existing mortgage, MetLife can tailor a loan to fit your needs. Our regional network keeps us close to our markets and better positioned to serve your immediate and long-term mortgage financing.

For more information, please visit us at www.metlife.com/ag.

*Includes MetLife general account assets as of 3/31/16.

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