Prentiss & Carlisle

LANDOWNER update

3rd Quarter 2017

Industry News

- ***N.H. loggers struggle as low-grade wood loses its value*** (Jun 14th)
  The market for low-grade wood is collapsing, and taking some loggers down with it. The New Hampshire logging industry has been hit by the closure of paper mills and biomass power plants that traditionally bought the parts of trees that can't be turned into lumber. Without a market for low-grade wood, loggers say they often don't bid on jobs because they can't make a profit from just high-grade wood.
  — Concord Monitor

- ***B.C. wildfires force shutdown of forestry mills*** (Jul 11th)
  Wildfires in British Columbia have forced the shutdown of several forestry operations in areas near the blazes, adding further uncertainty to an industry already hit by U.S. duties on Canadian softwood lumber. West Fraser Timber Co. Ltd., Canada's largest forestry firm, temporarily shuttered mills at three of its locations this week, disrupting production of lumber and plywood.
  — The Globe and Mail

- ***LePage takes aim at alleged abuse of woodland tax breaks*** (Jul 26th)
  Gov. Paul LePage has ordered the Maine Forest Service to work with municipal officials to review properties enrolled in the state's tree growth tax program to root out potential abuses. LePage and others have said they believe the program is being misused or even abused by some woodland owners.
  — Press Herald

Industry Overview

Forestland Operations

With some small exceptions, this summer has been one marked by excellent operating conditions throughout the northeastern forest. Despite a wet spring and rains early on in the 3rd quarter, particularly in the western regions, by early July the forest had dried itself out and our crews were in full production mode. Our in-woods roads have held up well and as a result our trucking of timber to the marketplace has been operating smoothly with few restrictions.

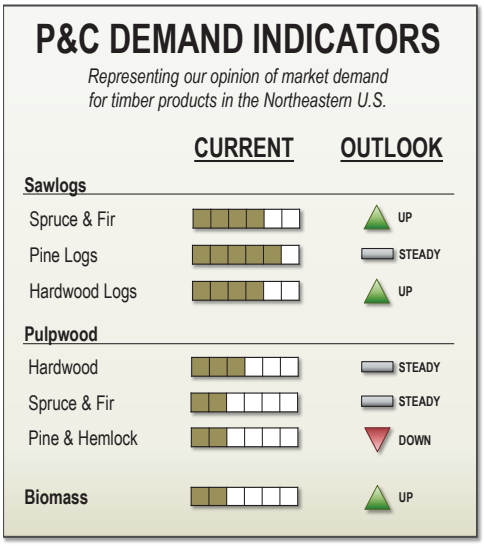
As a result of the good weather, most of our volume commitments have been fulfilled and all signs appear to point to achieving our budgeted targets. Now is the time when we return to analyzing our client budgets in the context of a full year and we zero in on the upcoming year-end. This is also the quarter when we start planning the all-important winter operations, getting commitments from logging contractors and planning for the year ahead.

The morning sun begins to rise as a trucker waits for his truck to be loaded in northern Maine.

The prevailing dry conditions combined with news from the forests in the western U.S. and Canada, have prompted some of our clients to inquire about the risk of fire in the forests of the northeast. Thankfully, we have been able to avoid the devastating wildfires that have ravaged areas of the west. Although almost every year we have a fire on our management that needs control & containment, the mixed wood stands that dominate most of our forest don't tend to support the quick spread of fires. When one does break out, the damage is often limited to the understory and on just a few acres.

Forest Product Markets

Timber markets in the northeast are generally full, and staying topped-off due to the good weather we've had region-wide. Deliveries to mill facilities have been consistent and steady, except for a few occasional planned production outages at some of our larger customers. Pricing for most forest products appears to be stable as well, despite the flush market. There are two primary concerns that should be on veteran wood buyers' minds this time of year. First, fall is coming and the wet weather often serves to delay or disrupt their timber supply chain. Second, the premium logging conditions throughout the summer could have many landowners reaching their annual allowable harvests early, causing them to pull back on deliveries. If either of these conditions persists, raw material inventories could begin to dwindle.



Although formal quotas haven't been in place for most products, mills do closely monitor the volume being delivered by suppliers. Mills have been careful to emphasize to loggers and landowners the importance of metering out deliveries to achieve consistent inflows. It is an informal system at most mills, and it appears to be working well – the general rule, of course, being: "don't surprise the wood buyer".

Pulpwood Products

Regional softwood pulpwood markets remain limited and demand for the product is correspondingly thin. That said, it's been surprisingly consistent -- we are able to move a predictable but small amount of spruce, fir, and hemlock pulpwood on a weekly basis. Currently there is an abnormally high inventory locally of hemlock pulpwood that has been built up in the region, and so demand for hemlock pulpwood is likely to be extremely limited in the coming quarters. Three of our remaining pulp mills consume hemlock, but it is a very small component of their pulp "recipe". Both hemlock and spruce & fir pulpwood markets are likely to get even tighter when the fervent pace of production kicks up this winter. We are also entering a period of some seasonal maintenance shutdowns at two large regional pulp mills, which will have a temporary effect on demand in the marketplace and will need close attention and careful management from both wood buyers and wood suppliers.

Lack of consumption of softwood have left loggers and landowners scratching their heads about what to do with the small amount of pulpwood that is naturally produced in a harvest. It can always be brought back into the forest to stabilize the ground, and in fact that has always been the first priority for our crews. In recent years, as regional market demand has waned, there has been continued anticipation within the industry about a new entrant into the market to pick up the available volume. Indeed, there have been some false starts, both high profile and behind the scenes. The most recent discussions have centered around the export of hemlock chips to Europe and Asia through Maine's deep water ports, however the economics & logistics of these projects are complex and have not yet proven themselves viable at a large scale. Because of the sheer availability and lack of softwood pulpwood consumption, Maine is well-positioned to be a player in this space, and we anticipate that the energy around these types of market expansion projects to continue.

- ***Tougher than steel: Japan looks to wood pulp to make lighter auto parts*** (Aug 14th)
  Japanese researchers and auto component makers say a material made from wood pulp weighs just one fifth of steel and can be five times stronger. The material - cellulose nanofibres - could become a viable alternative to steel in the decades ahead, they say, although it faces competition from carbon-based materials, and remains a long way from being commercially viable.
  — *Reuters*

- ***Invasive earthworms at the root of sugar maple decline*** (Aug 14th)
  A new study suggests that non-native worms are eating up the forest floor, causing sugar maples to die back and perhaps harming other forest dwellers. Predictions are that within 100 years, 95 percent of our sugar maple forests will be invaded by earthworms, and there's no "worm-icide".
  — *Phys.org*

- ***Carbon offsets really do help lower emissions*** (Aug 15th)
  A new study examining the efficacy of paying to preserve forests finds that carbon offsets do produce genuine emissions reductions. The study examines California's carbon offset program which allows businesses to fund forest preservation in lieu of turning in some of their allowances under the state's cap-and-trade system for greenhouse gases.
  — *Scientific American*

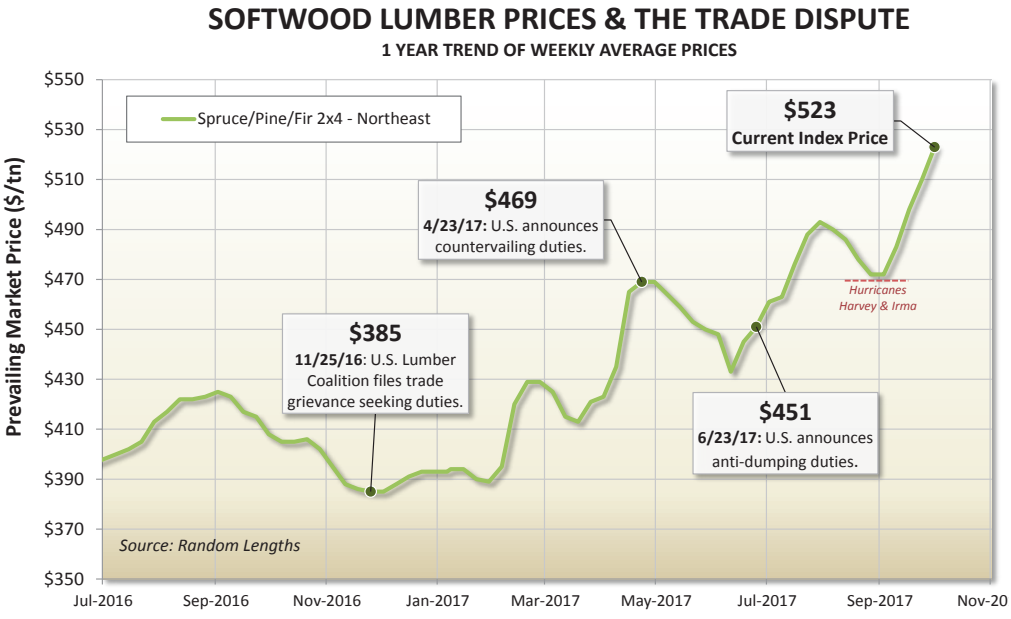
Pulpwood inventories at the various hardwood consumers is relatively high due to the weather, but consumption of the material has also been high for the last few quarters. Because of the large volumes and high consumption, inventories can swing incredibly quickly and buyers must stay on top of things. To keep sourcing costs down, mills obviously prefer to acquire as much material as local to the mill as possible, however that rarely is enough to consistently supply a big consumer like a pulp mill. Consequently, we have seen some hardwood mills stretching out further more recently in order to augment their supply.

We are seeing mills getting increasingly specific about their species mix, in an effort to optimize their processes and maximize their yields. Historically, hardwood pulp has been sold in a mixed fashion with nearly all northern hardwood species being acceptable most of the time. More recently however, these mills are requesting species to be delivered in sorted loads -- a trend that, if it persists, will complicate in-woods sorting procedures. Moreover, what might be acceptable at one mill might not be acceptable at another, which will require close coordination between logging contractors and foresters. Similarly, OSB and panelboard manufacturers – also hardwood consumers -- are the same way, getting more and more technical with which species they will accept.

Sawn Products

Softwood

Regional demand for spruce & fir sawlogs continued to strengthen through the quarter, and we are seeing that begin to translate into upward price adjustments. Dimension lumber sawmills – a high-volume business -- report strong and steady demand for their products and are working to improve their output by adding or lengthening shifts. Log deliveries to sawmills have increased as a result of this demand, but consumption and output have also increased. Although finished lumber inventories appeared high early in the quarter, sawmills are having no problem moving their products and seem to have confidence in their short term outlook. As their lumber prices have gone up so generally have profits, and that could work very well except that their production of byproducts – chips, shavings, and sawdust – have also gone up. With the weak demand at softwood pulp facilities, sawmills are having a difficult time selling this material. This will likely serve to constrain regional production growth, and may even act as an upper limit to it, over the next few years.



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- ***Maine company seeks to produce innovative wood-fiber insulating boards*** (Aug 17th)
  Maine's glut of softwood fiber created by closed paper mills makes the state an ideal location for a factory that can produce insulation board from wood. GO Logic, a Belfast architectural and construction firm, which specializes in energy-efficient buildings, says it's negotiating with undisclosed companies that make wood-based insulation board in Europe, where the product already is in commercial use. The goal is to have a plant operating in Maine within two years.
  — Press Herald

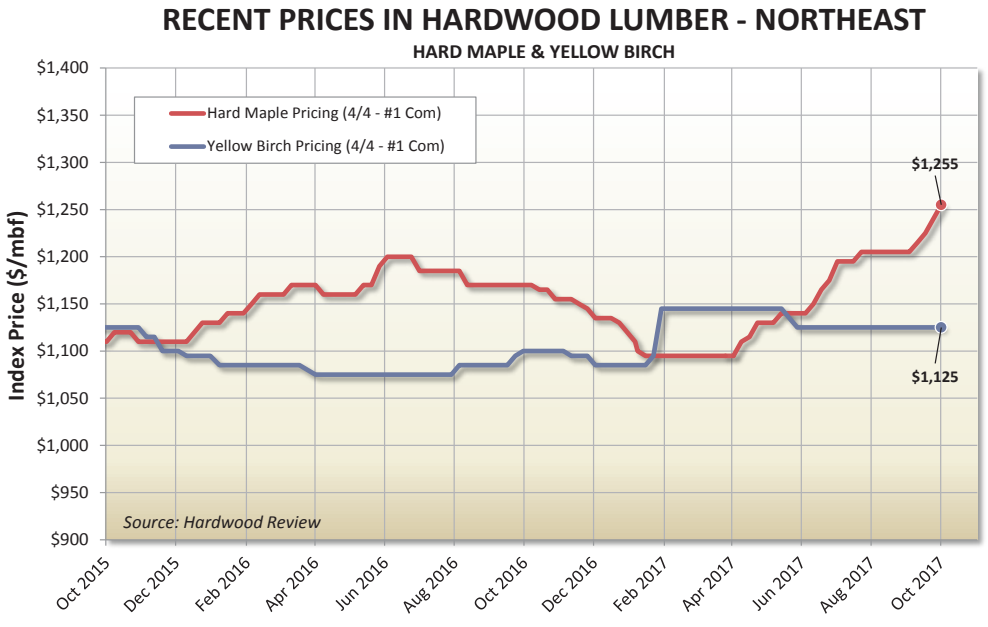
- ***Legislation favoring biomass introduced*** (Aug 17th)
  Senators and Representatives of Maine recently introduced the Biomass Thermal Utilization Act of 2017, legislation that incentivizes the development of biomass as an affordable, clean and home-grown source of energy. The bill would amend the federal tax code to incentivize biomass energy through tax credits for capital costs incurred in residential and commercial installations. By offering tax incentives, the legislation would encourage people and businesses to upgrade away from oil boilers to efficient wood-pellet boilers.
  — Northern Logger

It would be difficult to discuss the softwood lumber market without covering the impact that the two hurricanes – Harvey and Irma – have had on our regional sawmills. Lumber price indexes, which were already enjoying a rally coming into the quarter, have skyrocketed in the last month on speculation that demand for lumber will increase with hurricane recovery & rebuilding efforts. Moreover, supply of western lumber has been constrained due to an abnormally damaging forest fire season and reduced harvests due to insect damage in the pacific states and British Columbia. We expect that the spike will soften, but demand for construction materials should remain elevated as recovery efforts will take some time to occur.

The trade dispute with Canada on softwood lumber, the significance of which we have reported on in the past, has yet to be resolved. We are awaiting the U.S. Dept. of Commerce's final ruling on the import tariffs, which has been delayed until mid-November. Our concern with this tariff is that it will not recognize the unique benefits of the so-called Quebec Border Mills, which are a significant economic engine in the northeastern forest as well as a critical outlet for U.S. timber. These mills have historically been able to demonstrate an absence of subsidy due to their location and lack of supply from public lands. The interdependence with the U.S. and the Quebec Border Mills has been recognized through an exemption to past trade agreements, and we are hopeful that this decades-long arrangement will be recognized in a new agreement. Although we have been disheartened by the lack of progress in negotiations, the run up in lumber prices and the associated increased cost of recovery to U.S. consumers may serve to apply pressure domestically to resolve the issue quickly.

Hardwood

Hardwood log inventories at the regional sawmills are generally high, but demand for lumber has ticked up in recent months. Lumber prices are strengthening and we have seen this translate into slightly improved pricing on logs, particularly for hard maple, ash and red oak grade logs. Yellow birch, another staple of the northern forest, has been stable.



Over the past few years we've had increased talk about export of logs from the U.S. to Asia and Europe from our region, but as of this quarter, we are now regularly selling logs destined for export markets. This is a practice that has been going on for some time in regions closer to the major ports of New York City, but there are now viable local markets for export.

- ***The Softwood Imports to U.S. from Europe flourish thanks to U.S. Duties on Canadian Industry*** (Aug 22nd)
  Canada and the U.S. are trying to negotiate a new softwood trade deal to replace one that expired in 2015, but thus far have been unable to come up with a plan acceptable to the U.S. Lumber Coalition. In the meantime, Canadian companies are paying duties and prices are rising, making imports from places like Germany suddenly more attractive.
  — *Forest Business Analytics*

- ***Interior Secretary Zinke recommends keeping Maine's national monument*** (Aug 24th)
  Zinke's long-awaited report advises Trump to keep the monument's boundaries intact, while making "some changes on allowable uses." Those new uses could include permitting demonstrations of historic logging practices. Zinke is also advising the President that the other 26 monuments he reviewed should also keep their status as national monuments. He is urging Trump to shrink a handful of them, however.
  — *Bangor Daily News*

- ***US housing starts drop unexpectedly in July*** (Aug 28th)
  US housing starts dropped unexpectedly in July as new construction of single and multi-family homes declined. The recent report from the US Census Bureau also showed a decline in building permits, which suggests that residential construction might continue its struggle after tightening in the second quarter. As the peak building season comes to a close, this latest data could temper expectations of a rebound in housing market activity in 3Q and 4Q2017.
  — *Forest2Market*

It is not just centered around the top-quality logs – the veneers and slicers – markets are actively exporting grade logs as well. For the time being, log export doesn't amount to much; but now that it is established, we are optimistic about its potential to grow.

Regional demand for hardwood timber mat logs has been light in recent months. This is not due to any tapering off of timber mat consumption or usage, which is as strong as ever. Lack of demand is solely a result of current raw material inventories at the mat manufacturing facilities, which have blossomed with the good weather and abundant supply.

Biomass

Nothing reminds us of the interdependence of the various forest product & commodity markets like biomass does. While it is generally considered to be the lowest grade forest product, landowners, loggers, and mills are all in some way tied into the production or consumption of this material. While it is a very small component of landowner stumpage returns, it is an important piece of the economic puzzle simply because all timber production techniques in some way generate this byproduct.

Biomass in its primary form acts as an energy source, either for the production of electricity or for the production of heat. With energy & heating costs relatively low, markets for biomass have been poor in the past few years, and only viable when the material is close by a biomass plant. Unfortunately, when biomass cannot be sold profitably, it is a waste product that must be managed. In the woods, we often elect to bring the material back in the forest to help prevent soil & root damage. At a mill yard, however, biomass is a headache unless the mill has a way to burn it. There has been at least a few regional sawmills exploring the option of co-locating a biomass generation facility simply to solve their residual problems, and although it is a huge capital investment we expect this to be a small but hopefully stable relief valve for biomass.

Benjamin D. Carlisle
PRESIDENT

Re-Examining The Case For Timberland

by Sam Radcliffe, Vice President

"Timberland is an attractive alternative investment which provides competitive returns, low risk and volatility, an effective inflation hedge, and effective diversification from financial assets." So says a web site advocating timberland in 1997[1]. In the previous 10 years (1987-1996) the NCREIF Timberland Index[2] had averaged an annual return of 22.50%[3], CPI inflation had averaged 3.65%[4], the return on long-term US treasuries had averaged 8.26% and the return on the stock market[5] had averaged 15.97%[6]. During this period, single family homebuilding (a major driver of timber demand) averaged just over one million starts, and there was a brief economic recession during 1990-91.

In the next 10 years (1997-2006) NCREIF averaged 8.86%, inflation averaged 2.54%, US treasuries averaged 6.36% and the stock market averaged 9.90%. Nominal returns on all assets had moved down from the previous decade, but so had inflation. During this period, single family homebuilding averaged nearly 1.4 million starts. There was a brief recession during 2000-01, and the period encompassed the entire dot.com boom and bust.

Fast forward another ten years to the present. Most of the major TIMO websites describe the rationale for investing in timberland and continue to stress rate of return performance, portfolio diversification and inflation hedging[7]. For the previous ten years (2007-2016), NCREIF averaged 6.01%, inflation averaged 1.77%, US treasuries averaged 5.03% and the stock market averaged 8.64%. This period started with the Great Recession and ended with

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- ***Montreal-based forestry company wants to send lumber to help Texas rebuild*** (Aug 28th) Texans forced from their flooded homes by unprecedented water levels may get help rebuilding from a Canadian forestry company. Resolute Forest Products has committed to sending a rail car full of lumber to Houston once the storm-battered city begins to recover from the devastation wrought by Hurricane Harvey.

  — *CBC News*

- ***Canadian lumber producers get reprieve with end of 20% of preliminary duties*** (Aug 29th) Canadian softwood lumber producers are getting a temporary reprieve as a large portion of preliminary duties in place for four months have ended pending a final decision. Most lumber companies will pay 6.87 per cent in anti-dumping tariffs after a 19.88 rate for countervailing duties formally ended as of Saturday. The Department of Commerce postponed the final determinations until no later than Nov. 14.

  — *Montreal Gazette*

- ***An "America First" policy on trade with Canada is going to hit Harvey victims hardest*** (Sep 9th) Earlier this year, the US government charged Canada with giving its logging industry an unfair leg up and slapped steep tariffs on Canadian timber. This is bad news for Canada since around three-quarters of its softwood lumber goes to the US. However, it's also bad news for America homeowners and prospective homebuyers - particularly in the wake of Harvey. In fact, this trade kerfuffle illustrates how easily protectionism can backfire, hurting an economy more than it helps.

  — *qz.com*

the Trump stock market. Single family homebuilding averaged just 630,000 starts.

So for thirty years we have seen dramatic changes in the economy and asset markets, yet timberland continues to be touted for the same three characteristics – rate of return, inflation hedging, and portfolio diversification. Even though inflation-adjusted returns on timberland have declined in each of those three decades, more money is entering the asset class and recent property prices, especially in the South, are hard for this writer to rationalize. It seems like an appropriate time to re-examine the case for timberland.

Before beginning the analysis, we should note that the NCREIF Timberland Index is not without warts. These have been addressed elsewhere in some detail[8], but to summarize:

- NCREIF represents a basket of timber properties that is not tradeable, and that basket has changed over time, in terms of number of properties, location, and timber characteristics.
- The basket represents only a portion of US timberland owned by institutional investors, and does not contain any of the timberland owned by other private investors, or the timber REIT's.
- Timberland returns are calculated on the basis of appraised values, not actual transactions.
- Returns are reported on an unlevered basis.
- Returns are reported gross of investment fees. Typical TIMO annual fees are 1.0 percent of assets under management, and there may be additional performance fees, acquisition fees, etc.

Despite these problems, NCREIF is still the best available indicator of timberland investment performance.

This analysis applies to the performance of timberland in an investment portfolio – not as a stand-alone investment. That means the relevant measures to consider are timberland's rate of return relative to other asset classes and the comparative returns to portfolios with and without timberland. To facilitate this perspective, we will refer to a standard "60/40" portfolio, i.e. one composed of 60% stocks (S&P 500) and 40% bonds (10-year US Treasuries). The bond component is extremely conservative – Treasuries are thought to be "risk-free" due to the stability of the US government[9]. To the 60/40 portfolio we compare two hypothetical timber portfolios: a "59/39/2" with a 2% allocation to timberland and a "57/37/6" with a 6% allocation to timberland. Most institutions who have an allocation to timberland are typically in the 1% to 2% range; 6% would be considered very aggressive.

Examination of Timberland's Rate of Return

The long term real (net of inflation) rate of return on timberland over the last thirty years is impressive: an average of 9.50% as compared with 8.67% for the S&P 500. From the perspective of an institutional investor with a typical 10-year holding period, timberland has shown a positive return in every holding period in the history of the NCREIF index. Holding period returns have clearly been steadier and (on average) higher than S&P 500 returns over the last 20 years, although they have under-performed the stock market in the two most recent holding periods (Figure 1).

Holding period real returns for timberland have been very stable since 2003, always falling within a range of 4.00% to 5.96%. By contrast, S&P 500 returns have gyrated between -4.06% and 9.27%.

- ***Opinion: Logging is necessary for Katahdin Woods and Waters' future sustainability*** (Sep 11th)
An Aug. 29 BDN editorial about Secretary Zinke's review of the monument contains the line, "Logging, of course, isn't needed in the monument." The reality is that a forest that is not managed with responsible timber harvesting eventually becomes overgrown and ultimately succumbs to insects, disease and quite often fire. Sustainable logging allows us to manage the health of a forest in the same way that a garden is weeded and tended. It allows us to control pests, remove unhealthy trees and promote wildlife habitat.
— Bangor Daily News

- ***Canadian mining company eyes property near national monument*** (Sep 12th)
Wolfden Resources Corp., a mineral exploration company based in Thunder Bay, Ontario, plans to buy and mine property in northern Penobscot County that's near Katahdin Woods and Waters National Monument. The company announced in a Sept. 7 news release that is has entered into a purchase-and-sale agreement for a cash price of $8.5 million.
— MaineBiz

- ***Harvard report: New England losing 24,000 acres of forest a year*** (Sep 25th)
In 2010, a group of scientists from Harvard University and University of Vermont established a regional goal - called Wildlands and Woodlands - to conserve 30 million acres of forest and 2.8 million acres of farmland by 2060. But rather than an increased commitment, public funding for conservation across New England has dropped by 50 percent in recent years to about $62 million a year. The region has achieved about one-third of its long-range conservation goal.
— Treesource

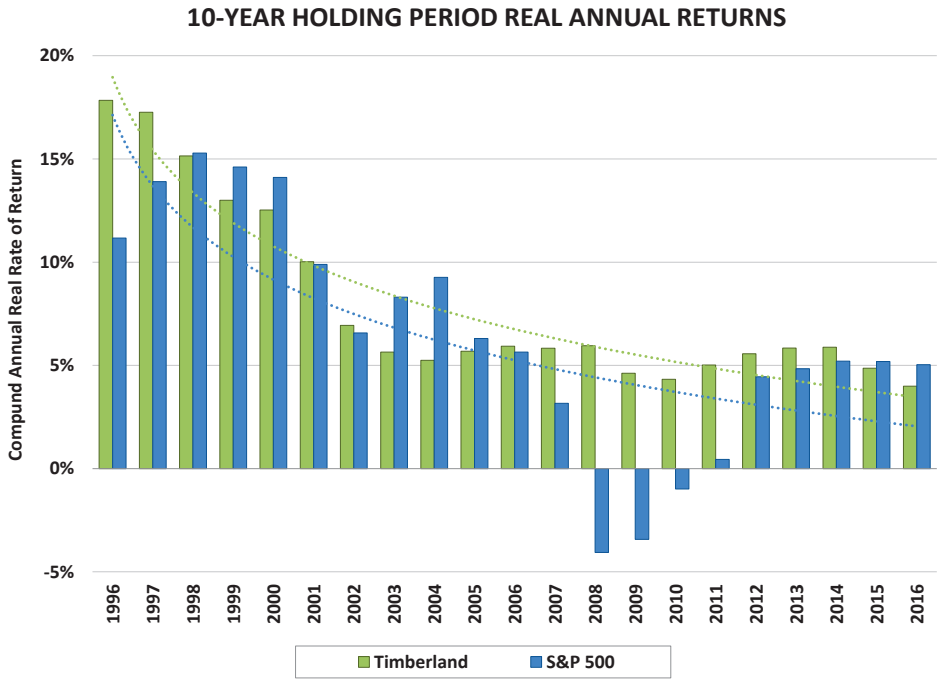

Figure 1. Comparison of 10-year Holding Period Returns for Timberland and the S&P 500.

Examination of Timberland as an Inflation Hedge

The common definition of an inflation hedge is an asset whose nominal rate of return is positively correlated with the rate of inflation. In other words, when inflation rises the rate of return also rises (and correspondingly falls when inflation falls). Figure 2 shows that in the history of NCREIF, timberland returns have been positively correlated with inflation, while the S&P 500 returns can best be described as uncorrelated with inflation.

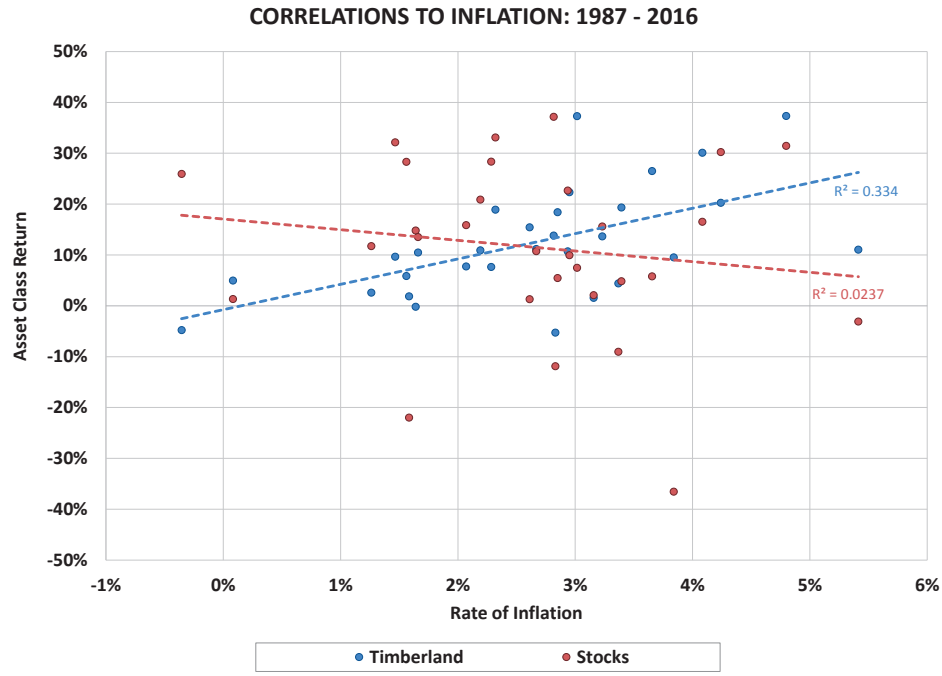

Figure 2. Correlation of Timber and S&P 500 Rates of Return to the CPI Inflation Rate, 1987-2016.

Yet another approach is to look at the response of returns to the annual change in inflation rate. This would get at the asset's response to unexpected inflation – which is what we are truly trying to hedge against. Figure 3 shows that over our thirty-year period, inflation increased in 15 years and decreased in 14 years.

- ***UMaine gets $455K for "mass timber" commercialization center*** (Sep 27th)
  The University of Maine System has landed a $454,532 federal grant to create a center to accelerate the use of Maine-sourced timber and engineered wood composites in place of steel and concrete for larger construction projects. This grant will help strengthen Maine's forest economy, support jobs in the rural communities and further diversify the industry.
  — MaineBiz

- ***Tree eating beetles march north as winters warm*** (Oct 3rd)
  Warmer winters mean the southern pine beetle is here to stay, and is set to march ever northward as temperatures rise. Historically, the tiny beetles, which starve evergreens to death, were largely unheard of north of Delaware. The Northeast's cold winters killed off any intruders. The winters are no longer cold enough.
  — Star Advertiser

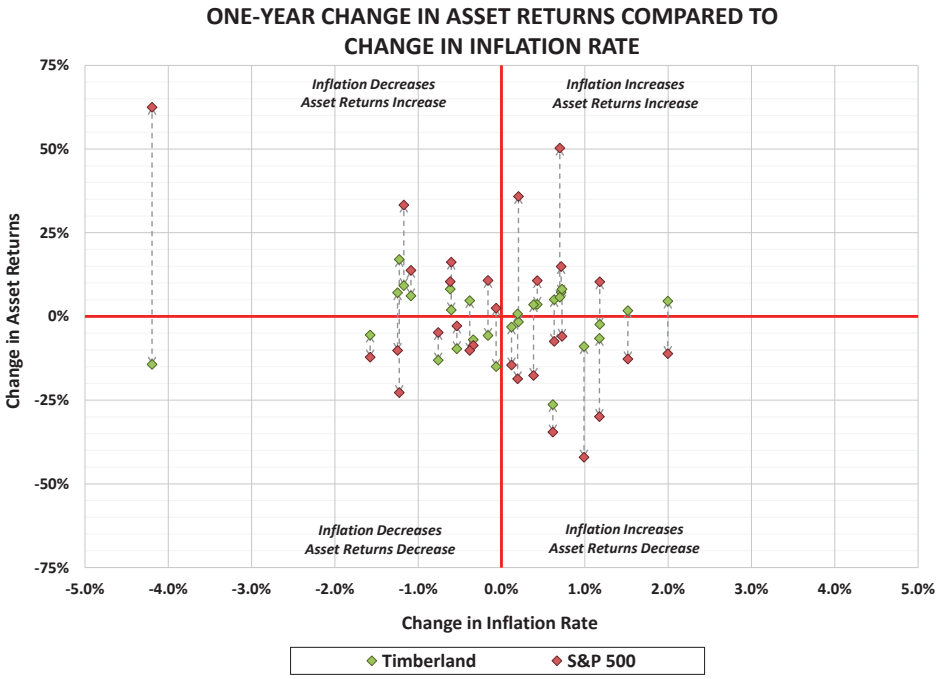

Figure 3. One-Year Change in Asset Returns Compared to Change in CPI Inflation Rate.

When inflation increased, stock returns decreased 67% of the time. This is not unexpected; the market generally feels that inflation is bad for business. However when inflation increased, timberland returns also decreased 40% of the time, although timberland returns decreased less than stock returns in all cases. When inflation declined, the opposite was true – stock returns tended to increase more or decrease less than timberland returns.

Figure 2 is the conventional way to look at inflation hedges, but note in Figure 4 that the trends in stock, bond and timberland returns are all in the same direction as the trend in inflation, which over this period has been negative. Moreover the slope of the trends for stocks and bonds is about the same as the slope of the inflation trend, while timberland returns have declined much faster than the rate of inflation. Throughout this period, inflation has been relatively benign and returns for all three asset classes have moved in the same direction.

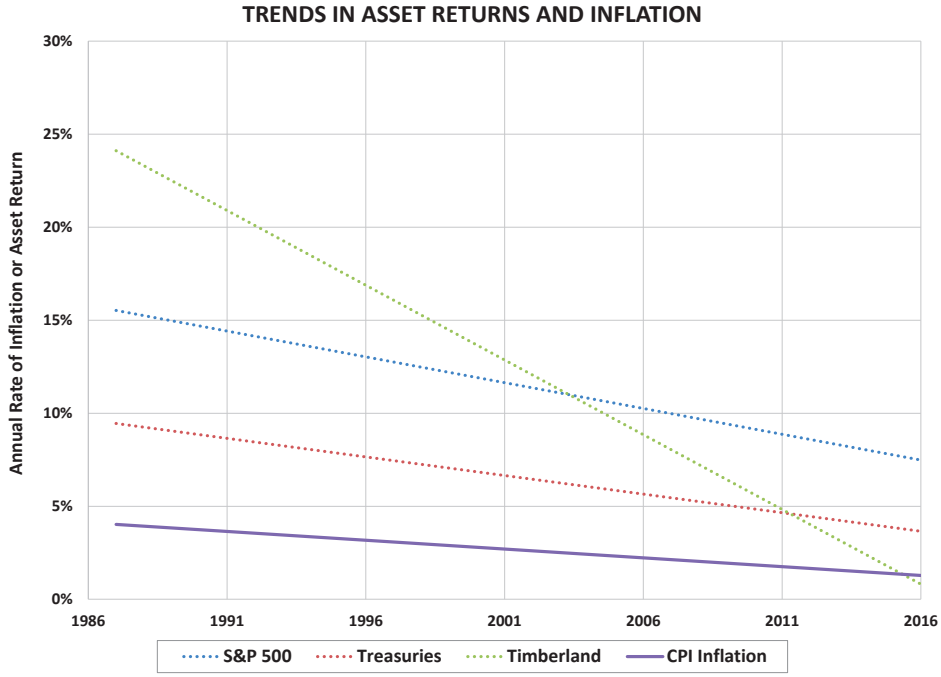

Figure 4. Trends in Asset Returns Compared to the Trend in Inflation, 1987-2016.

Examination of Timberland as a Portfolio Diversifier

Diversifying a portfolio involves adding an asset class that is less risky than or uncorrelated to the portfolio's principal driver – typically stocks. When the returns from different asset classes in a portfolio do not all move in the same direction, the investor is provided with a less bumpy ride.

Risk is conventionally measured by the standard deviation of annual returns. When returns are less variable (lower standard deviation), the asset is said to be less risky. Standard deviation is more precisely a measure of volatility – the frequency and amount by which the asset rate of return varies from its long-term average.

Figure 5 compares the risk/return profiles for stocks, bonds, and timberland for each decade during 1987-2016. During the first decade, timberland provided a significantly higher return than both stocks and bonds, and at equal or lower risk. That return, as previously noted, dropped precipitously over the next two decades, but timberland continued to be the least risky asset.

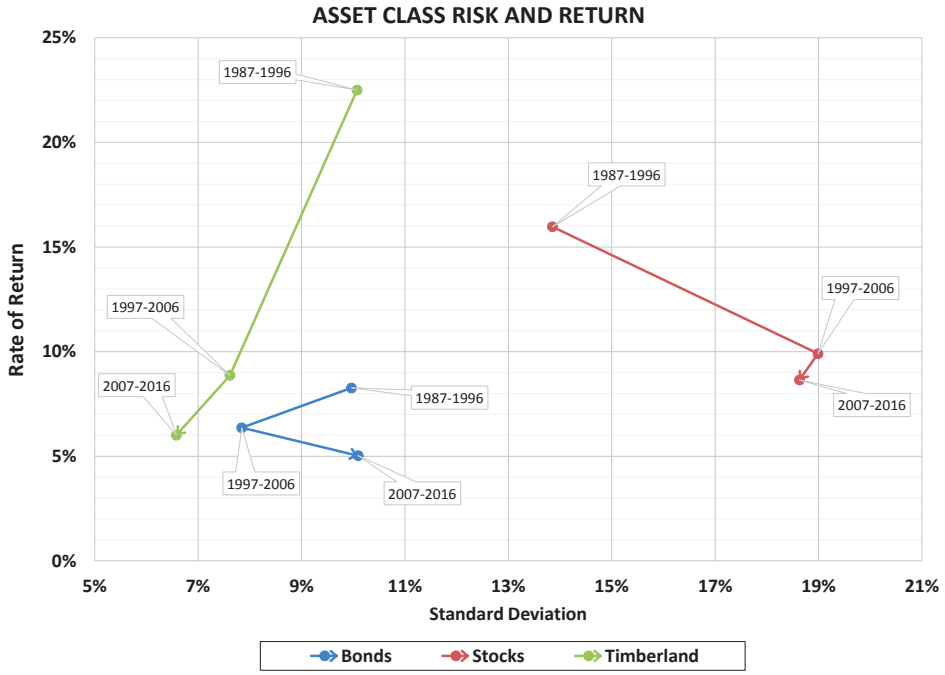

Figure 5. Risk/Return Comparison for Three Asset Classes During Three Decades.

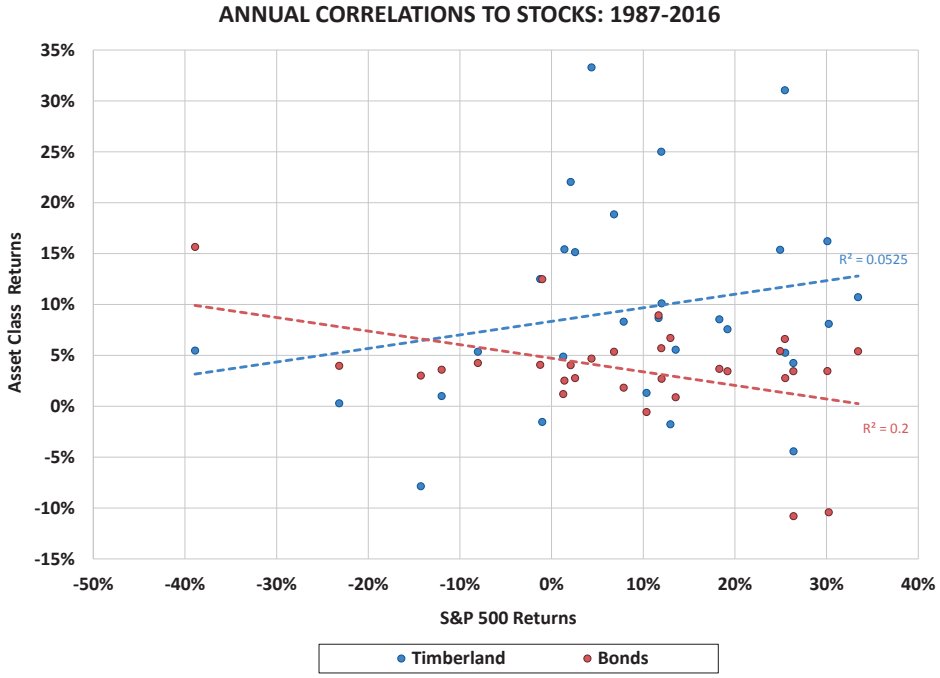

Figure 6. Correlation of Timberland and Treasury Bond Annual Returns to the S&P 500.

Portfolio volatility is minimized when the returns to individual assets are either negatively correlated or at worst uncorrelated. Figure 6 shows that bonds are negatively correlated to stocks, but timberland is positively correlated. However, the timberland relationship is statistically insignificant so we would conclude, as others have[10], that the two asset classes are simply uncorrelated. The inclusion of the uncorrelated timberland asset class is what reduces the volatility of the portfolio returns shown in Figure 7. At each decade as timberland is added to the basic portfolio, risk is driven down while return is maintained or slightly improved.

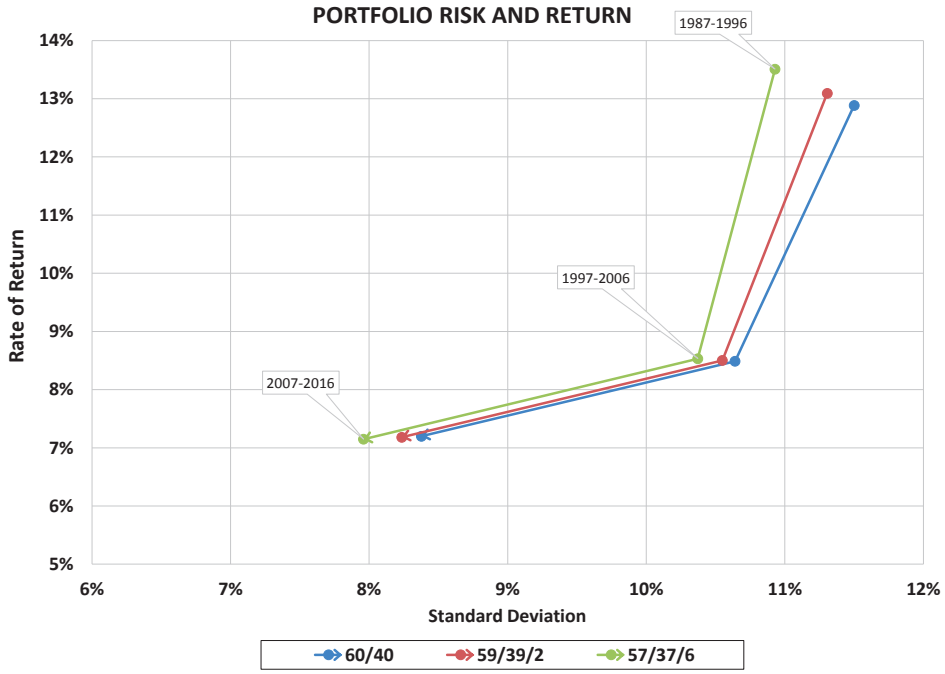

Figure 7. Risk/Return Comparison for Three Portfolios During Three Decades.

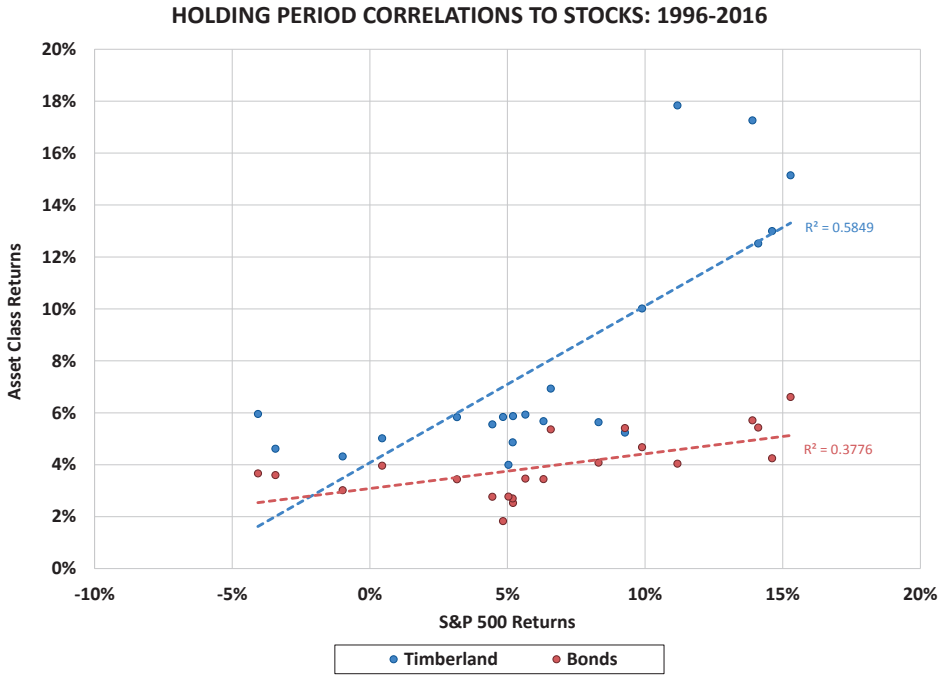

Figure 8. Correlation of Timberland and Treasury Bond 10-Year Holding Period Returns to the S&P 500.

This conclusion is valid only for year-to-year correlations. Most institutional investors, despite having long-term liabilities, care very much about year-to-year portfolio returns – compensation and sometimes even careers are on the line. But true long-term investors would be expected to have an interest in how asset classes are correlated over longer time periods. Figure 8 shows that if we analyze correlations over 10-year holding periods, both bond and timberland returns are positively

correlated to stock returns, with statistical significance. In other words, in a given year, timberland returns could move in the same or opposite direction as stock returns, but over a 30-year period we have seen all three asset classes move in the same direction – unfortunately returns have all moved down.

Conclusions

Any conclusions to be drawn from this brief analysis must be prefaced by reiterating its limitations:

- The NCREIF Timberland Index may not accurately represent the performance of the asset class. Of particular concern are: (1) the influence of appraisals, which likely understate volatility, and; (2) the exclusion of investment fees, which biases returns upwards.

- The 60/40 portfolio and the two other timberland portfolios we have examined by no means represent the spectrum of possible portfolio constructions, and in fact are much more simplistic than typical institutional portfolios, which may include commercial real estate, hedge funds, oil and gas partnerships, etc. Even within the timberland portion of these portfolios, non-US properties may be prominently represented.

- As the mutual funds are so fond of saying, "Past performance is no guarantee of future results." 1987-2016 was a unique period in the history of institutional timberland investment. Actually, it was almost the entire history! The outsized performance of timberland in the early years was due to, among other things, the lack of transparency in markets, public policies limiting timber supply, changes in the tax code, and Wall Street pressure on publicly traded companies to divest their timberlands, coupled with an insufficient albeit growing pool of buyers. The middle period was characterized by a housing boom, and the most recent period by a housing bust. In those latter two periods, timberland went from a relatively unknown to a mature asset class. That development along with persistently low inflation and interest rates combined to drive timberland prices up and returns down.

This last limitation is particularly important because it suggests that recent history is a better guide to the future than the entire thirty-year period. Historic returns have been more than satisfactory, but current returns are quite low when considering investment fees, the illiquidity of timberland, and the complexity of the asset class for most investors.

These low returns may persist for a while:

- For existing investors, returns can increase only if there are very substantial increases in real timber prices, which have been wrongly forecast for several years now. While housing starts have begun to creep up at a faster rate, southern sawmill capacity has increased, and Canadian lumber imports are likely to be curtailed, it is not clear that these timber price stimulants are enough to overcome the sawtimber inventory "overhang" that has been accumulating due to low harvest rates since the recession[11].

- For new investors, higher returns can be realized if the initial acquisition is priced more reasonably than today. But as timberland prices decline, seller returns will be driven down until prices settle at a level that motivates discriminating new entrants. In other words, a lot of investors will have to lose money for the asset class to look attractive to new buyers. How to explain that irony?

The available evidence seems to suggest that timberland can viably hedge against inflation, a conclusion reached by others[12]. But this evidence spans a period in which inflation averaged only 2.65%, and only 1.77% in the last 10 years, a challenging period with which to gauge inflation hedging[13]. Long-term inflation expectations are for 2.15% over the next 10 years[14]. Given that history and projections, it is reasonable to ask whether inflation hedging is very high on the list of portfolio needs. Nevertheless, there are inflation bulls and bears.

The stability of holding period returns to timberland should be of interest to the long-term investor, but it is hard to imagine that returns of 3% to 5% after investment fees are enough to entice institutional investors into an asset class that many do not understand. One thing should be clearly understood: the days of 10% to 20% returns to timberland, as experienced in the 1980's and early 1990's, are long gone. There is simply too much demand for an asset class that is in limited supply. Steady but relatively low returns are the name of the game for the future.

We have noted that timberland's short-term risk-reducing impact might be important to institutional portfolio decisionmakers, but question whether riskiness is lessened for long-term patient investors. Moreover, we wonder whether riskiness as defined by the standard deviation of NCREIF returns is a meaningful measure. NCREIF index volatility is very much influenced by the appraisal process that underpins it[15].

Because timberland is such a thinly traded market, the set of comparable sales used by the appraiser may vary little from year to year. In addition, appraisers often use trend-line or "return to trend" timber pricing approaches, which limit volatility. Finally, there is a cultural abhorrence to volatility among both appraisers and investors alike.

In summary, although a given property may present an attractive investment opportunity, we think that the general case for including timberland as a portfolio asset cannot be made as it has for the past thirty years. Maybe steady low returns are good enough – might timberland be an absolute return asset? There is also a case to be made for timberland as an impact investment. But are either of these rationales appealing to institutions who are already underfunded with respect to long-term liabilities?

Clearly there are timberland properties that would perform well both as stand-alone investments and as portfolio enhancers. But we believe these properties should be sold on their own individual merits, not on the rationale that they are members of a desirable asset class.

Institutions are generally geared toward an asset class focus rather than an individual property focus, so it is not surprising that TIMO's have maintained the general asset class pitch. In our view, successful timberland investing requires a nimbler investor, one free of institutional constraints. However, there is no doubt that successful timberland investing also requires scale. Both of these characteristics suggest that the ultra-high net worth (UHNW) sector might be better equipped than institutions to successfully invest in timberland. A recent report[16] pegs the global wealth of this sector at $27 trillion, while institutional timberland investment was estimated at $57 billion in 2016[17].

In our view, the timberland market is due for a correction to remain competitive with other assets. Might this correction be facilitated by a transfer from institutions to the UHNW sector? There would be significant cultural and structural adjustments required, but we're keeping our eye on this potential long-term transition.

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1. http://www.iforest.com/finance2.htm last accessed on 8/28/2017. The article indicates "Copyright 1997" and cites no data later than 1995.
2. The NCREIF Timberland Index consists of 457 investment-grade timber properties with a market value of $25.4 billion. This includes 319 properties in the South, 91 in the Northwest, 31 in the Northeast, and 15 in the Lake States. https://www.ncreif.org/news/timber2q2017/, last accessed on 8/28/2017.
3. All US regions aggregated, 4-quarter compounded return before investment fees.
4. Consumer Price Index-All Urban Consumers. Bureau of Labor Statistics, Series ID: CUUR0000AA0, annual averages. https://data.bls.gov/timeseries/CUUR0000AA0, last accessed on 8/28/2017.
5. As represented by the S&P 500.
6. Source of historical data on returns for the S&P 500 and 10-year US Treasury bonds is the website of Professor Aswath Damodaran of the Stern School of Business at New York University http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histretSP.html, last accessed on 8/28/2017.
7. For example: Timberland Investment Resources at https://tirllc.com/investing-asset-class/value-proposition/; Hancock Timber Resource Group at http://htrg.com/wp-content/uploads/sites/2/Hancock-Timber-White-Paper-Timberland_-The-Natural-Alternative_2012.pdf; Forest Investment Associates at http://www.forestinvest.com/why-timber/. All last accessed on 8/28/2017.
8. See for example "The Tao of Timberland", Forest Research Notes, Vol. 5 No. 2, 2008. Forest Research Group, http://www.forestresearchgroup.com/Newsletters/V5No2.pdf, last accessed on 9/1/2017.
9. Note that the bond returns shown here do not represent the "risk-free rate". The treasury bond return includes coupon and price appreciation. It will not match the treasury bond rate each period.
10. See for example "Correlation Update: Timberland is still not correlated with stocks –but the pendulum is swinging", Forest Research Notes, Vol 10, No 1, 1st Quarter 2013. http://www.forestresearchgroup.com/Newsletters/Vol10No1.pdf, last accessed on 9/14/2017.
11. "Forisk Forecast: Six Reasons Why Timber Prices in the South Do Not Track U.S. Housing Starts Today" Forisk Blog May 10,2017. http://forisk.com/blog/2017/05/10/forisk-forecast-six-reasons-timber-prices-south-not-track-u-s-housing-starts/ last accessed on 9/21/2017.
12. Yang Wan, Bin Mei, Michael L. Clutter, and Jacek P. Siry, 2013. "Assessing the Inflation Hedging Ability of Timberland Assets in the United States". Forest Science 59(1), https://www.researchgate.net/publication/272271474_Assessing_the_Inflation_Hedging_Ability_of_Timberland_Assets_in_the_United_States last accessed on 9/29/2017.
13. Court Washburn and Clark Binkley, using a different approach and datasets, found timberland (with some regional exceptions) to be inflation hedging during the period 1955-87, when the CPI averaged 4.7%. http://greenwoodresources.com/wp-content/uploads/2014/06/DoForestAssetsHedgeInflation.pdf last accessed on 9/29/2017.
14. Median of estimates from 13 studies by federal reserve banks, investment banks, and consultants.
15. Bert Scholtens and Laura Spierdijk discuss the impact of appraisals on volatility more technically in "Does Money Grow on Trees? The Diversification Properties of U.S. Timberland Investments", Land Economics 86(3), August 2010. http://investmentforestry.com/resources/3%20-%20Does%20Money%20Grow%20on%20Trees.PDF last accessed on 9/29/2017.
16. "The World Ultra Wealth Report 2017", Wealth-X. https://www.wealthx.com/report/exclusive-uhnwi-analysis-the-world-ultra-wealth-report-2017/ last accessed on 9/19/2017.
17. Christopher O'Dea, "Forestry: Slow growth market", IPE Real Estate, January/February 2016. https://realestate.ipe.com/markets-/sectors/alternatives/forestry-slow-growth-market/10011831, article last accessed on 9/19/2017.