

Introduction

As investors contemplate real assets and investments that provide a hedge against inflation, Silver Creek has been asked by its clients to contemplate issues surrounding the timberland asset class which include the differences in return between the public and private markets, the drivers of those returns, how timber behaves in recessionary periods, and our view of current timberland valuations and market timing. The following is our view of these topics

The Behavior of Timberland Returns during Public Equity Market Downturns

It is obviously impossible to discuss the behavior of timberland returns during any period of time without first getting clear on how those returns can be measured. To that end, there are two ways in principle to go about doing it. The first is with some type of an index of public market returns based on the performance of Timber REITs. And, the second is with some suitably constructed index of the returns attributable to private timber investments.

In the case of Timber REIT returns, we use the Forisk Timber REIT (FTR) Index which is a market capitalization weighted index of all publicly traded, timberland owning REITs. The FTR Index was developed by Forisk, who is an investment consulting company specializing in the forest products industry.

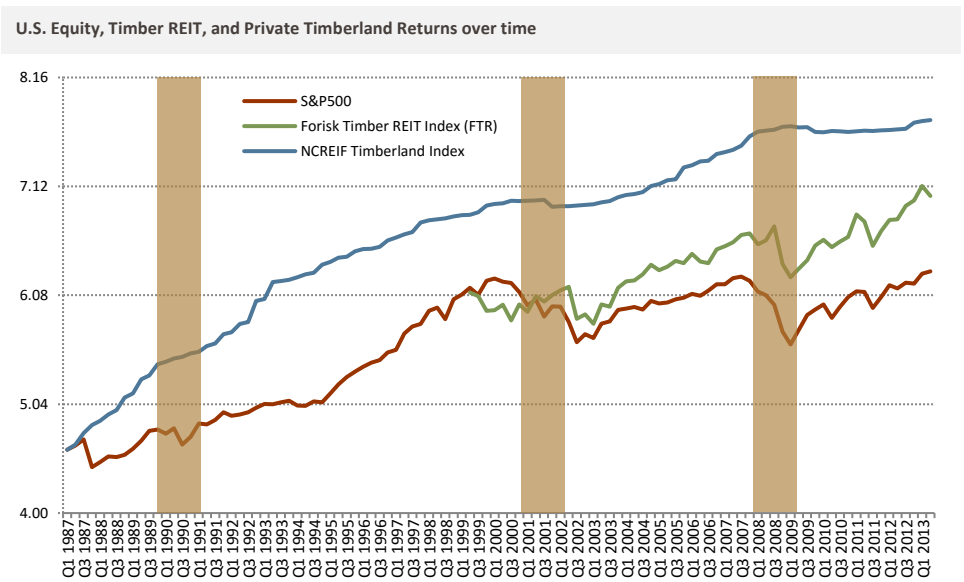
In the case of private timber returns, things are a bit more complicated. The most well-known and high-quality data in provider in the space is the National Council of Real Estate Investment Fiduciaries (NCREIF). The NCREIF Timberland index is a property level index representing data collected

from members. Calculations are based on quarterly returns of individual properties before the deduction of management fees. While each property return is weighted by appraisal-based market values and the index is not completely representative of all timberland in the institutional property universe, we believe the index provides a robust proxy of timberland returns in the U.S. The index is currently comprised of 442 properties with a total market value of \$24.7B.

NCREIF data represent a fairly representative (and comprehensive) sample of the type of private timber returns that investors historically earned. Private timber returns themselves can be decomposed into two components. One component represents the actual income that is generated by harvesting and selling timber each year. The other is based on changes in the value of the underlying timberland. Not surprisingly, NCREIF provides data on both, and combines them into an overall "Total Return" index.

Relationship between Timber and Broader Market Returns – Full Sample

With that as a backdrop – and in keeping with the classic “picture is worth a 1000 words” adage – the best way to start to understand the relationship between timber returns and the broader markets is to plot the various indices noted against the S&P 500. For ease of interpretation, we’ve used a log scale (so you can ignore the units) and shaded the recessionary periods in brown.



Source: NCREIF

Zeroing in more closely on what we find, let’s take the easiest to interpret first. As the log scale makes clear, the Timber REIT index (the green line) is extremely highly correlated with the S&P 500 (the red line), though it is not immediately clear whether or not this correlation increases, decreases, or remains more or less the same in recessionary and non-recessionary periods. Over the full sample period for which Timber REIT data are available, in

fact, the estimated correlation is a fairly high 63.4%. With regard to private timber returns, the NCREIF data (the blue line) appear much less correlated – a result that also shows up readily in the data. For the full sample period, the estimated correlation between private timber returns and the S&P 500 is a much lower 23.4%.

Relationship between Timber and Broader Market Returns – Tails/Recessionary Periods

While these full sample results are instructive, investors are often rightfully suspicious of “diversifying” investments that appear to have very low correlations most of the time, only to have very high correlations at the most inconvenient times. There are many ways to measure these state-dependent correlations. One way to measure them, is to measure the correlation that occurs during recessionary and non-recessionary periods. Given the vagaries of recession dating, a slightly more robust

approach that we tend to prefer is simply to split the sample between “normal” periods and “stressed” periods based on the returns observed for some broad market index. In the table below, we have split the sample up into those periods of time in which the S&P 500 return was within the lowest quintile of observations (i.e. the bottom 20%) and the rest of the sample (the top 80%). We’ve then calculated separate correlation coefficients for each sub-sample. We’ve also done the same thing for the recessionary and non-recessionary periods.

Correlation of Timberland Returns to the S&P500

	REITs	NCREIF Data		
		Total Return	Capital Appreciation	EBITDDA Return
Full Sample	63.40%	23.40%	19.70%	25.40%
80%	48.10%	-5.30%	-33.40%	-2.40%
20%	81.20%	23.20%	-10.00%	55.30%
Non-recession	58.30%	20.30%	23.40%	21.30%
Recession	74.30%	11.10%	-15.10%	29.30%

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Correlations for timberland returns and the broader markets do appear to increase significantly in stressed or recessionary market environments. However, there’s a profound difference in the order of magnitude of the phenomenon between public and private investment alternatives. While the full sample correlation for REITS is fairly high to begin with, it is even

higher (81.2% versus 63.4%) during stressed market periods. So, investors banking on a correlation in the 60's to achieve at least some level of diversification are likely to find their Timber REITS acting no better than many of their other equity holdings when they need diversification most.

On the other hand, private timberland holdings are likely to fare much better. While we continue to observe the same general pattern of correlations increasing during stressed market periods (at least with the 80/20 portfolio split), this pattern does not result from correlations increasing to levels much higher than they appear during times of stress. Instead, it simply results from the fact that correlations in non-stressed periods are zero (or weakly negative) while those in the tail periods are essentially responsible for all the full sample correlation that we see.

Private valuations also appear to provide some buffer to downside volatility. If we break the NCREIF total return data into its two constituent parts, we can examine the behavior of both the operating return component and the capital appreciation return separately. The former (the EBITDDA Return) represents the

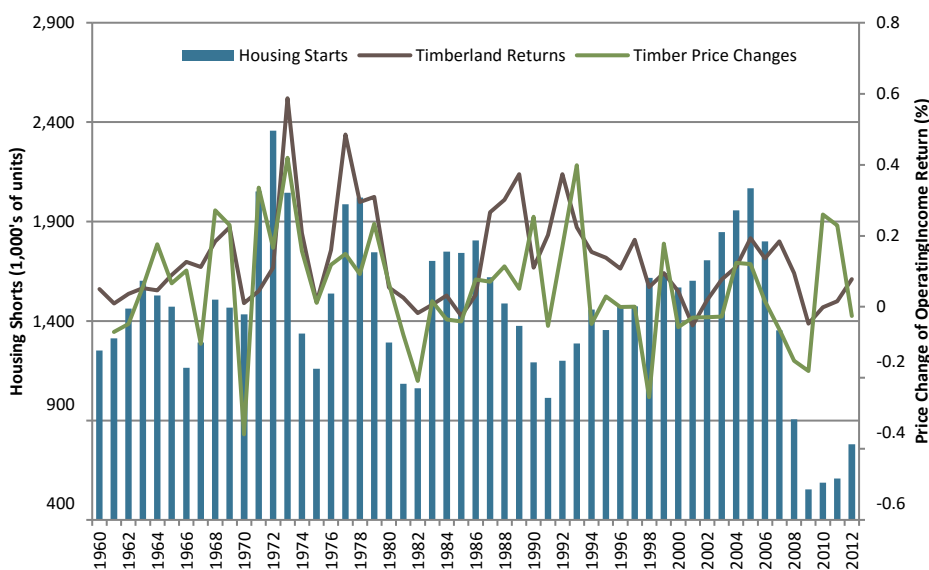
contribution to returns from annual operating income and is obviously driven by harvesting and selling activities. As we would expect, the EBITDDA component is more correlated with broader markets, particularly in downturns. The capital appreciation component, on the other hand, provides a bit of an “internal hedge.” In fact, when we split the sample into recessionary and non-recessionary periods, we see some evidence that valuations actually increase in the worst periods (relative to their sub-sample mean), consistent with the potential for timber investors to build inventories (or just allow trees to grow) rather than bringing product to market when demand is depressed. But, given the extremely limited data, we certainly wouldn't want to overemphasize this result.

The conclusion to draw from all these analyses seems clear. Investors hoping for strong diversification benefits from an investment in timber are likely to be sorely disappointed if they rely on public market Timber REITs to implement their investment strategy. But, they can be fairly confident that the low correlations they hope for out of a timber investment will exist not only in historical data series, but also in actuality during those periods of time when the rest of their portfolio is under stress and they need the diversification most.

Basic Drivers of Timber Market Returns and Correlations

Reassuringly, this correlation behavior is backed up by fairly intuitive economic relationships as we've discussed. Business cycles and construction cycles are obviously integrally linked. At the same time, there are certainly some examples of recessions in which a construction boom and subsequent bust were arguably a key driver (like 1990-91 recession) and there are others in which the housing market remained robust and played a key role in lifting the economy out of recession (2001).

Housing Starts, Timber Prices, and Timberland Returns Over Time



Source: NCREIF

Likewise, construction demand is obviously a significant driver of timber returns. It's crucial to stress, however, that timber prices themselves are only one component of timberland returns, as we'll discuss in more detail below. And even with regard to the construction-sensitive portion of returns, the simple assumption that new building construction determines lumber prices, lumber prices determine timber prices, and timber prices determine timber returns is fraught with imperfections. While it is common to assume that new housing construction is the key driver of lumber demand, for example, only around a third of lumber has been used for new housing, one third has been used for repair and remodel, and one third has been used for industrial use historically.ⁱ

In addition, at each level of the value chain there are built-in buffers that dampen the connection between new construction demand and timber returns. Lumber retailers draw down or increase inventories (and similar increase or decrease variable costs) to limit the impact of demand shocks on prices. Saw mills do the same, stocking up on timber to build inventory when demand and prices are low, and drawing down inventories when demand and prices are high. Finally, timber owners themselves optimally time their decision to harvest. If prices aren't right, the timber is simply left to continue growing for longer ensuring they'll have even more available to sell when prices recover.

The impact of these buffers is apparent in the figure below. While there are innumerable ways to demonstrate the point, in the figure we plot housing starts (the solid green bars – with units on the left axis), timber price changes (the blue line plotted on the right), and the operating component of timber returns (the red line plotted on the right). While there is a clear (and strong) correlation between housing starts and both lumber price changes and timber returns early in the sample period, the relationship breaks down in the mid-1990's as export markets became a bigger driver of demand and the supply of timber was greatly reduced from public land.

The figure also shows a strong correlation between lumber price changes and timber returns throughout the sample period. As we would expect, however, the lumber price series is much more volatile (particularly on the downside). The buffers discussed above clearly enable timber owners to insulate themselves against timber price changes. Interestingly, over the entire sample period, operating returns for timber owners are also very rarely negative (and even then, by only a small amount), as it seems clear that timber owners prefer to exercise their "growth option" rather than to hit the market with timber at depressed prices.

Current Timberland Valuations, Market Timing, and Waiting for Timberland Prices to Come Down

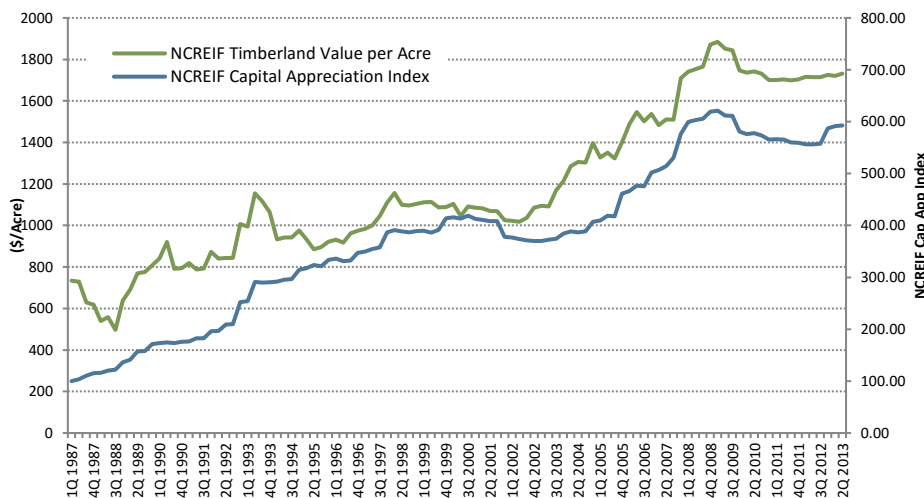
Timberland prices have obviously gone up significantly in recent years as investors have continued to enter the space. Drawing again upon data from the NCREIF, there are at least two different ways we can estimate the impact of this increase over time. The first is simply to add up the total value of all the properties owned by the entities reporting data to the NCREIF and then divide by their total acreage. While this provides a direct Value per Acre measure, it also suffers from changes in the composition of the underlying sample with regard to timberland quality, geographic region, etc. as properties come into and out of the sample over time. To rule out these types of sample composition effects, we also construct an implicit index of timberland values from the data the NCREIF collects on the overall capital appreciation or depreciation of timberland holdings over time (the Capital Appreciation Index). The Value per Acre is plotted in green below (with units plotted on the left axis) and the Capital Appreciation Index is plotted in blue (with units on the right).

As we would expect, the green Value per Acre line also shows a great deal more volatility, consistent with the type of sample composition effects that we discussed. On the other hand, the Capital Appreciation Index that we construct from

valuation changes is much smoother. Fortunately, however, they are both highly correlated and tell essentially the same story: timberland values have increased markedly over the past 25 years.

Courtesy of this strong increase in prices, early entrants to the private timberland market (like Harvard and Yale) have been handsomely rewarded. This is actually a fairly familiar pattern that we see in many alternative investment markets. Early entrants often earn significant “pioneer premiums” as sectors gradually open up to institutional capital. Beforehand, investable assets (or risks) are typically held on the balance sheets of closely related businesses. As such, rates of return required for holding them are driven by the respective companies’ (often very high) cost of capital. As pure financial investors enter the sector and begin pricing investments within a broader portfolio context, prices can get bid up as the return profile degenerates to something more in line with the investment’s own underlying risk characteristics.

Evolution of U.S. Timberland Values (\$ / Acre)



Source: NCREIF

The question of valuation and timing, cuts right to the heart of this underlying dynamic. Does the increase in timberland values shown above suggest that the sector has over-heated and the “smart money” should stay on the sidelines waiting for prices to come down? Or have prices increased so that returns are just more in line with what they should be from a broader portfolio context? We believe it is the latter for at least two reasons. First, and most straightforwardly, taking the NCREIF data as a guide, there is very little evidence to suggest that capital appreciation for private timberland owners is at all closely related to broader market or economic developments. As we discussed as well, even the operating return component of investor returns tends to be fairly well insulated. So, there’s really not much opportunity to wait for (say) a downturn in the broader economy or construction industry and “buy on the dips.”

On the other hand, we think there are very good reasons to believe that the increased prices (and valuations) we have seen represent a structural shift toward levels more consistent with required rates of return. As a result, we believe there are very good reasons to expect that investors will continue to be well compensated for holding private timberland investments going forward. To understand why, it’s essential to break down timberland returns into their distinct components and then to examine each of them individually.

Timberland returns have three basic drivers: biological growth, timber prices, and timberland prices. While timberland price increases have certainly been accretive to early investors’ returns, they have in no way been the primary driver. In fact, studiesⁱⁱ show that timberland price increases accounted for only 5% of the 12% overall returns earned on a broad sample of properties from 1981 to 2009. Further increases in prices are not at all necessary to make a strong case for investing in the sector. In fact, a much more significant driver of timberland returns has been timber price increases. While these have been a more meaningful contributor to returns historically (representing 30%), there’s no reason to suspect they won’t continue to increase going forward. In fact, we expect them to at least keep pace with inflation as we’ll discuss further

below. Finally, the last – and by far the most significant driver of timberland returns – accounting for 65% of the returns observed in the study – has actually been biological growth.

In our opinion, the fact that biological growth represents the key driver of timberland returns is the key reason the sector is so unique among “real asset” investments. Biological growth is highly predictable given industry and academic research, and well developed modeling techniques. Adding to matters, biological growth can be stored on the stump with little to no holding costs providing optionality. Biological growth can also be characterized as being independent from all other factors. Thus the biological growth-driven component of returns should be truly uncorrelated with all other investable factors. After all, water and sunlight are the only major inputs required, and neither one tends to wake up and read the Wall Street Journal every morning!

According to the data presented in the study noted above, in fact, biological growth contributed 65% of the cumulative 12% return for the respective timberland owners. In other words, the simple growth of the underlying trees contributed 7.8% annually to the timberland investors’ return. It is tempting to want to extrapolate that result and conclude that we can expect 7-8% returns driven solely by biological growth going forward. After all, trees are continuing to grow at least as fast as they did in 1981, and even faster when you take into account the impact of improvements in Timberland management techniques. Unfortunately, that’s too much of an oversimplification. While the actual growth rate (and life cycle) of the respective trees is the biggest driver of the biological yield, it is also impacted by the relative prices of the timber sold and the various inputs required to grow and ultimately harvest it (the most significant of which is land). Different species of trees also have different rates of growth and optimal life cycles. And in practice, prices for land tend to increase or decrease so that (for example) investors’ ultimate returns for owning faster growing and slower growing trees are roughly equal.

What we can say, however, is that the biological growth rate (or “yield”) of the underlying trees provides a robust source of real (rather than nominal) returns for timberland investors. Real yields of 7.8% are no longer likely in most cases, as investors have bid up prices for timberland (the key input) to some extent relative to the prices of the timber sold. Even so, however, we expect to earn a 4% real yield going forward, driven primarily by the underlying biological yields of the properties we anticipate acquiring.

At 4% rather than 7.8%, does this real yield still represent an attractive opportunity for investors? Answering this question requires first digging a bit more deeply into what this type of biological growth-driven real yield really represents. Quite simply, it represents the return that investors can expect to earn even if timber and timberland prices remain exactly the same (in nominal terms) throughout the period of time that they own the asset. If one (or both) of these prices increase over time, investors will also profit from any increases in the value of the timber they sell and/or the timberland they own.

Even if we assume that timberland prices have run their course and will remain flat going forward, there’s no reason to believe that timber output prices won’t continue to serve as an excellent inflation hedge in the future. Over the past century, timber prices have consistently trended above inflation. While no product is entirely immune to the threat of substitution (and alternative building materials could ultimately be developed), there are also numerous near term tailwinds that ought to bolster prices going forward. Growing demand pressures stemming from the U.S. housing recovery, pacific rim export markets, and bioenergy policy in Europe represent only a few. In addition, supply will continue to be constrained by reductions in Canadian timber production due to both large-scale pine beetle infestation in British Columbia and other harvest reductions in Eastern Canada.

So, with all this in mind, is now the right time for investors to consider investing in private timberland if they have not already? With the real yield on long-term TIPs at only a little more than zero, the opportunity for investors to earn a real rate of return of more than 4% certainly seems attractive to us. As noted above, even if timberland prices remain flat – and timber proves to be a less than ideal inflation hedge and timber output prices increase more slowly than the overall price level going forward – it still seems well worth considering. And, if we take into account the tailwinds provided by a number of secular trends (including those noted above) an investment in the space seems all the more attractive.

ⁱ RISI (2000 to 2012)

ⁱⁱ Caulfield, 1998 (updated 2009)

About the Author

Bill Turner, PhD is the Director of Timberland. He is responsible for asset class research, investment strategy, and reviewing prospective acquisitions. As the Director of Timberland, he oversees the timberland valuation process and works as a liaison with our strategic partners. Dr. Turner has over fifteen years of timberland investment experience; including portfolio management, forest management operations and planning, and timberland transactions. Prior to joining Silver Creek in 2013, Bill was a director at Forest Legacy Investments. Earlier in his career, he worked with Olympic Resource Management, a Pope Resources Company, which managed over 650,000 acres of timberland and served as the western timberland manager for the Hancock Timber Resource Group. On behalf of institutional and private investors, Dr. Turner has led the valuation analysis of over \$3 billion of timberland assets. Dr. Turner holds a PhD in Forest Resource Economics from the University of Washington, a Masters in Applied Economics, and a B.A. in Business Administration with a concentration in Finance.

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