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TIR

TREES AND TOLL ROADS:

COMPARING TIMBERLAND AND INFRASTRUCTURE INVESTMENTS IN A REAL ASSETS PORTFOLIO

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Introduction

Infrastructure is a real asset class that has garnered a lot of attention among investors in recent years. Institutional investors, such as pension funds, charitable foundations and university endowments, are particularly attracted to infrastructure's long-dated contractual sources of income, which can be a good match for their long-term liabilities.

The young asset class, which only emerged as an option for institutional investors in the early 2000s, offers compelling risk-adjusted returns that are competitive with more-established real asset sectors, like commercial real estate, timberland and farmland. As a result, privately-funded infrastructure funds have experienced explosive growth during the last decade. According to the real asset research firm, Preqin, the infrastructure asset class has grown from $54 billion back in 2006 (the total value of unlisted infrastructure assets under management) to $418 billion in 2017 (Figure 1). Capital raising has continued unabated, with $65 billion raised by infrastructure funds in 2017, virtually matching the $66 billion such funds raised in 2016. Talk by members of the Trump Administration that suggest it plans to spearhead a trillion-dollar-plus infrastructure spending program undoubtedly helped draw some of this wave of investor capital (see sidebar).

Prospect of $1 Trillion of U.S. Infrastructure Spending

In early 2018, the Trump Administration proposed spending $200 billion of federal funds over the coming decade to kick-start $1.3 trillion of infrastructure projects by state and local governments and the private sector. How this will be achieved had not been finalized when this paper was being prepared. Given that the new two-year budget agreement passed by Congress will likely cause the federal deficit to surpass $1 trillion by 2019, there could be a limited appetite among members of Congress for adopting an infrastructure package of the size and scope proposed by the current administration.

Figure 1. Private infrastructure assets under management, as tracked by Preqin.

In contrast to the strong interest shown in the infrastructure sector by institutional investors, the timberland asset class has largely been out of the spotlight in recent years. Despite having some features and characteristics in common with infrastructure, less than $5 billion in new capital was raised for placement in timberland in 2017.[1] One clear reason for this disparate interest was relative performance. Infrastructure funds of a 2004 vintage, and later, have consistently produced median returns approaching 10 percent.[2] Timberland funds, on the other hand, have generated returns of 4.15 percent over the past 10 years ending in 2017.[3]

Nevertheless, while this relative difference is substantial and worthy of investors' attention, historical performance should not be the sole criteria for making portfolio allocations in the real asset sector. In this paper, TIR provides a comprehensive, comparative analysis of the timberland and infrastructure asset classes – one that may help investors make more informed decisions when choosing to include either, or both, in their alternative assets portfolios.

Comparing Timberland with Infrastructure

No one could confuse the trees of a timberland investment with a gas pipeline or a solar farm held by an infrastructure fund, but these two types of hard assets have many common investment features.

Comparable Long-Term Performance

If we take this greater volatility into account using the Sharpe Ratio metric, the difference between timberland and infrastructure is relatively small.

One of the similarities just referenced is risk-adjusted return. As was noted earlier, across its relatively short history as an asset class, infrastructure has generated higher returns than timberland (Table 1). However, that has come with higher risk, which is reflected in greater return volatility. If we take this greater volatility into account using the Sharpe Ratio metric, the difference between timberland and infrastructure is relatively small. The Sharpe Ratio is a quantitative measure of performance after accounting for the greater risk that is borne by one asset in comparison to another. A higher ratio denotes higher risk-adjusted performance. For example, over the five-year period through 2016, infrastructure investments had a Sharpe Ratio of 2.22, which is not much different than the 2.13 measured for timberland. Over a span of 15 years, infrastructure's Sharpe Ratio of 0.65 was lower than timberland's, which was 0.94. This indicates that over the long-run, infrastructure investments often incur higher levels of risk in order to generate returns that are higher than those for timberland. This greater volatility could be the result of number of factors. For instance, infrastructure projects are frequently

1 James W. Sewall: Timberland Investor Survey 2017 4Q

2 Cambridge Associates, "Digging In; Assessing the Private Infrastructure Opportunity Today" (April 2017)

3 NCREIF Timberland Fund and Separate Account Index, time-weighted, value-weighted, gross returns

delayed by permitting and other regulatory issues. Furthermore, cost overruns and construction delays are not uncommon in the sector. Such factors, however, rarely affect timberland. After weighing the differences in their risk profiles, timberland actually competes favorably against infrastructure.

Table 1. Measures of return, risk and Sharpe Ratio of private infrastructure and timberland investments, as tracked by the Preqin Infrastructure Index (3-year, 5-year), Cambridge Associates Private Equity Infrastructure Index (15-year) and the NCREIF Timberland Property Index. The Sharpe Ratio assumes the risk-free rate to be the annual return of 90-day U.S. Treasury Bills over the period in question. Note: The most current performance values for private infrastructure investments at the time of writing was 2016; returns for 2017 were not available.

Period	Average Annual Return		Risk (Standard Deviation)		Sharpe Ratio (Risk-Adjusted Performance)	
	Infrastructure	Timberland	Infrastructure	Timberland	Infrastructure	Timberland
3-Year (2014-2016)	8.15%	6.02%	5.01%	4.05%	1.61	1.46
5-Year (2012-2016)	9.20%	7.10%	4.10%	3.29%	2.22	2.13
15-Year (2012-2016)	8.58%	7.59%	10.83%	6.74%	0.65	0.94

Return Expectations

The similarities between timberland and infrastructure extend beyond just historic performance. The return expectations of investors and managers of both timberland and infrastructure also overlap. Of course, return targets depend on the perceived risk exposure of the investments. In a recent study by Cambridge Associates of timberland, real estate, and infrastructure funds, the firm found that the target returns of low-risk "core" infrastructure funds are 6-to-8 percent, while more speculative "value-added" and "opportunistic" infrastructure funds aim for returns in the ranges 10-to-12 percent and 14 percent-plus, respectively. Surveys conducted by James W. Sewell among timberland owners and managers also reflect similar return targets for timberland (see Table 2).

Table 2. Commonly accepted nominal target returns of private equity investments in infrastructure and timberland. Sources: Cambridge Associates, James W. Sewall & Co., TIR Research.

Asset Class	Market Segment	Targeted Return)
Infrastructure	**CORE** Stable regulatory environment with secure markets under contractual or predictable revenue streams	6% - 8%
	VALUE-ADDED Greenfield projects that face development risk. Or holding assets with a measure of market uncertainty.	10% - 12%
	OPPORTUNISTIC Operating in private, untested and unregulated markets. Or investing in an emerging market, typically "greenfield," that are exposed to political or regulatory uncertainty.	14%+
Timberland	**CORE** Well-developed wood markets benefiting from an extensive mill presence or shipping facilities. U.S. South, the U.S. Pacific Northwest and New Zealand are common places for core timberland investment.	6% - 8%
	VALUE-ADDED / EMERGING A significant segment of the forest asset offers higher-valued, but higher-risk options such as wetlands mitigation banking, energy leasing (e.g., wind farm), or minerals development. Or timberland is in a developing economy with a proven track record in forestry, such as Brazil, Chile and Uruguay.	9% - 13%
	OPPORTUNISTIC / PIONEERING Investment in unproven or undeveloped wood markets. Forestry services are very limited or there is uncertainty in the exit strategy. Tropical hardwoods in Central America or forest plantations in East Africa are examples.	14%+

Common Investment Features

Here are some of the other investment features shared by the timberland and infrastructure asset classes:

Diversification: Timberland and infrastructure both offer low correlations of returns against other real assets (commercial real estate and farmland, etc.) and against traditional asset classes like stocks and bonds. This allows investors to easily diversify their portfolios.

Inflation Hedge: Timber is a primary natural resource that is integrated into the broader economy, from housing and furniture to packaging and hygiene products. The integration to the rest of the economy makes timberland a useful inflation hedge. In the case of infrastructure, it is not uncommon for contractual income streams of infrastructure projects to have an inflation adjustor.

Impact Investing: There is growing awareness among institutional investors about the environmental, social and governance (ESG) profiles of their portfolios. Timberland and certain types of infrastructure investments offer positive contributions to the environment and to societal wellbeing. Infrastructure projects that are focused on renewable energy or that provide strong community benefits in less-developed localities (for instance, providing clean water to villages in developing countries) could score strongly under many ESG impact metrics. In the same way, timberland is a renewable resource than can sequester carbon, promote biodiversity, and provide clean air and water. Timberland assets can be credited with strong ESG features by being certified under the Sustainable Forestry Initiative (SFI) or the Forest Stewardship Council (FSC).

Long-Dated Life Cycles: Both timberland and infrastructure assets are long-dated assets that can take years to develop. As a result, their income streams have extended life-spans. As such, infrastructure and timberland funds typically have terms of 10 years or longer. This suits certain institutional investors, such as pension funds and endowments, as their long-term liabilities can be matched with the long durations and reliable income streams of forest and infrastructure assets.

Active Management Demands Manager Expertise: As hard asset investments, forests and infrastructure are multifaced and complex. No two forests and no two infrastructure assets are alike. They all require specialized skills and expertise to ensure their proper management and the capacity to unlock their value. For these reasons, manager experience and depth of knowledge can significantly influence return levels.

Considerations when Investing in Infrastructure vs. Timberland

While timberland and infrastructure feature many common attributes, the two asset classes also have some important and exceptional differences. When assessing the merits of infrastructure against timberland there are three factors one should consider.

Energy Concentration of Infrastructure Funds Can Limit Realized Diversification

The assets of many infrastructure funds may overlap considerably with their existing exposures to other alternative asset classes, and specifically those in energy and private equity

Many infrastructure-focused funds have high allocations to utilities, oil and gas pipelines, solar and wind farms, and other such energy-related assets. This can over-expose an investor that is already strongly allocated in that sector. According to Preqin, 51 percent of private infrastructure investments in 2017 were made in renewable energy assets.[4] Another 10 percent were other types of energy projects. Since 2014, energy has accounted for at least 60 percent of all private infrastructure investments. In contrast, timberland is physically and functionally quite different than any other real or alternative asset. The business of growing and harvesting pine trees in Georgia, for instance, bears little relationship to owning office buildings, running a toll road, or leasing farmland in Iowa to wheat farmers. However, owning a liquified natural gas shipping terminal in the Port of Houston in an infrastructure portfolio is no different than owning the same LNG terminal in an energy or private equity portfolio.

In short, investors should be aware that the assets of many infrastructure funds may overlap considerably with their existing exposures to other alternative asset classes, and specifically those in energy and private equity. Consequently, the realized benefit of any intended diversification may be less than had been anticipated.

Capital Influx is Outpacing Deal Space

Another issue for infrastructure investors to consider is the heated market for deals. As was previously mentioned, private infrastructure funds raised a near-record $65 billion in new capital in 2017. Meanwhile, 166 infrastructure funds were in the market during that time striving to raise a record total of $122 billion in institutional capital.[5] In other words, competition for quality infrastructure opportunities has grown significantly, leading to higher prices and rate compression. Even as early as 2015, JP Morgan Chase & Co. estimated that the average yields of core infrastructure investments fell 300 to 350 basis points as compared to 2010. This resulted in prices of infrastructure deals increasing 30 to 40 percent. This suggests a parallel with another, popular real asset class: real estate. Like infrastructure, institutional capital has poured into commercial real estate, resulting in escalating values and lower discount rates. According to the NCREIF Property Index, the cash yields from institutional investments in the real estate sector fell from 7.97 percent in 2003 to 5.61 percent in 2013. In 2017, the cash yield was 4.68 percent. These metrics suggest respective declines of 236 and 93 basis points during these periods.

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[4] Preqin: 2017 Infrastructure Deals. (January 4, 2018)

[5] Preqin: *Real Assets Spotlight – Infrastructure.* (February 2018) p. 2.

Market saturation in the infrastructure space already may be evidencing itself by the degree to which infrastructure funds are struggling to find attractive opportunities. A record of $150 billion of "dry powder" was reported by infrastructure funds in 2017. Furthermore, the rate at which infrastructure investments were being capitalized fell for the first time in a decade in 2017. Total infrastructure transactions, according to Preqin, fell 6 percent in number and 8 percent in the value compared to 2016.

For many national and local governments in the developed world, including the United States, support for private funding of public infrastructure projects has been slow to gain momentum. Looking ahead, this could mean investors will face increasing challenges putting their allocations to infrastructure to work in a timely manner in the future.

By comparison to transactional activity in the infrastructure space, institutional investors purchase an average of US$2 billion to US$4 billion worth of timberland annually. With the global investable universe of forestland valued at between US$300 and US$500 billion, deal flow in the space amounts to about 1 percent of its total value.

Large Deal Sizes Can Limit Diversification and Flexibility

A third important factor to consider when investing in infrastructure is the large deal size that is normally characteristic of the sector. Deal flow often focuses on large-scale, expensive assets, such as pipelines, airports and ports. Any given infrastructure investment can commonly reach several hundred million dollars in size (see Table 3). In 2017, for instance, 2,378 infrastructure deals were completed worth a total value of $916 billion (including those without institutional investor capital), which made the average transaction size US$385 million.[6] Furthermore, infrastructure deals require high levels of due diligence so investment managers often favor investing in fewer assets to reduce deal costs. Because deals tend to be larger in the sector, infrastructure funds can be less diversified than other types of real asset funds, such as commercial real estate, farmland and timberland. Furthermore, for most investors, commingled funds are the only option for gaining exposure to the asset class because separate accounts require larger capital commitments than most are able to make.

6 *2018 Preqin Global Infrastructure Report*, p. 16

Table 3. Notable Infrastructure Deals Completed in 2017. Source: *2018 Preqin Global Infrastructure Report.*

Investor	Location	Industry	Deal Size (US$ billion)	Date
Sempro Energy	US	Power distribution	$18.8	Aug 2017
Rosneft, Trafigura, United Capital Partners	India	Natural resources	$12.9	Feb 2017
CEFC China Energy Company	Russia	Energy	$9.1	Sep 2017
Total SA	Denmark	Natural resources	$7.5	Aug 2017
Pembina Pipeline Corp.	Canada	Pipelines, natural resources	$9.7	May 2017

By comparison, the timberland asset class offers a broader and more flexible range of asset sizes for investment than does infrastructure. The smallest, economically effective, size of a commercial timberland asset destined for inclusion in an institutional investor's portfolio is between $5 million and $10 million. Consequently, it is possible to assemble a timberland portfolio that is well diversified by species composition, age class and geography by investing as little as $75 million, which is a viable option for many investors that are interested in participating in the asset class through a separate account vehicle that affords full control over the composition, level of risk exposure, yield and investment term of a portfolio.

Considerations when Investing in Timberland vs. Infrastructure

When comparing timberland against infrastructure, the features investors should assess and consider about the timberland asset class are equally unique.

Given this exposure to economic cycles, timberland therefore should not be considered a defensive investment.

Exposure to Economic Cycles

To a greater degree than infrastructure returns, timberland returns are exposed to economic cycles. This is because timber prices impact the income and value of a timberland portfolio – and timber prices are, in turn, linked to the health of the overall economy. The chart in Figure 2 below illustrates this relationship. Douglas fir is a bellwether commercial timber species in the U.S. Pacific Northwest. During the periods when the United States economy has experienced economic recession or contraction, such as in 1990 to 1991, 2001, and 2007 to 2009, Douglas fir sawtimber prices declined.

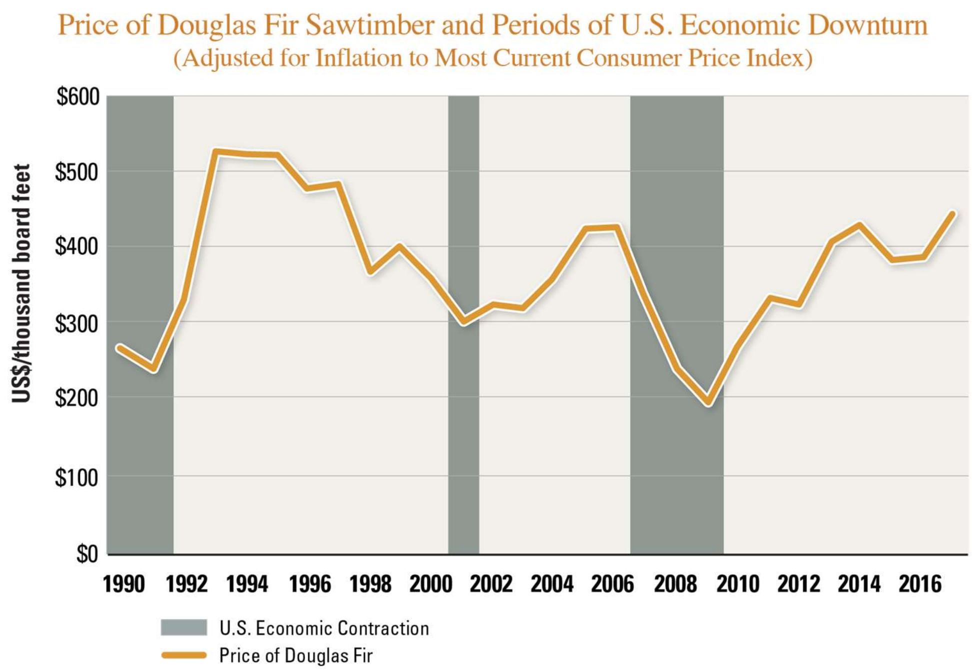

Figure 2. Stumpage price of Douglas fir sawtimber since 1990, adjusted for inflation, with the periods of United States economic contraction marked. Inflation adjustment based on the Consumer Price Index. Sources: RISI, US Commerce Dept., and the National Bureau of Economic Research.

Given this exposure to economic cycles, timberland therefore should not be considered a defensive investment. While timberland does have a strong track record in capital preservation and can serve has a hedge against inflation risk, timberland returns often correlates to the ups and downs of the economy. In contrast, the nature of many of infrastructure projects allows demand and performance to be fairly stable and predictable, - after, of course, the projects surpass the challenging hurdles of approval, permitting, and construction

Smaller Average Deal Size of Timberland Could Slow Capital Placement Pace

As noted earlier, timberland asset sizes are smaller than many infrastructure investments. While the upside of smaller deal sizes is that they enhance one's capacity to diversify a portfolio, the downside is that they make it harder to place significant amounts of capital in short time frames. As with infrastructure, the pace is limited by the fact that timberland acquisitions require significant amounts of due diligence, which commonly extends the purchase process to 4 to 6 months. In the United States, for instance, the average transaction size in the timberland sector has been less than $150 million over 9 of the past 10 years (Figure 3). Over that period, the number of deals never exceeded a total of 50 in a given year.

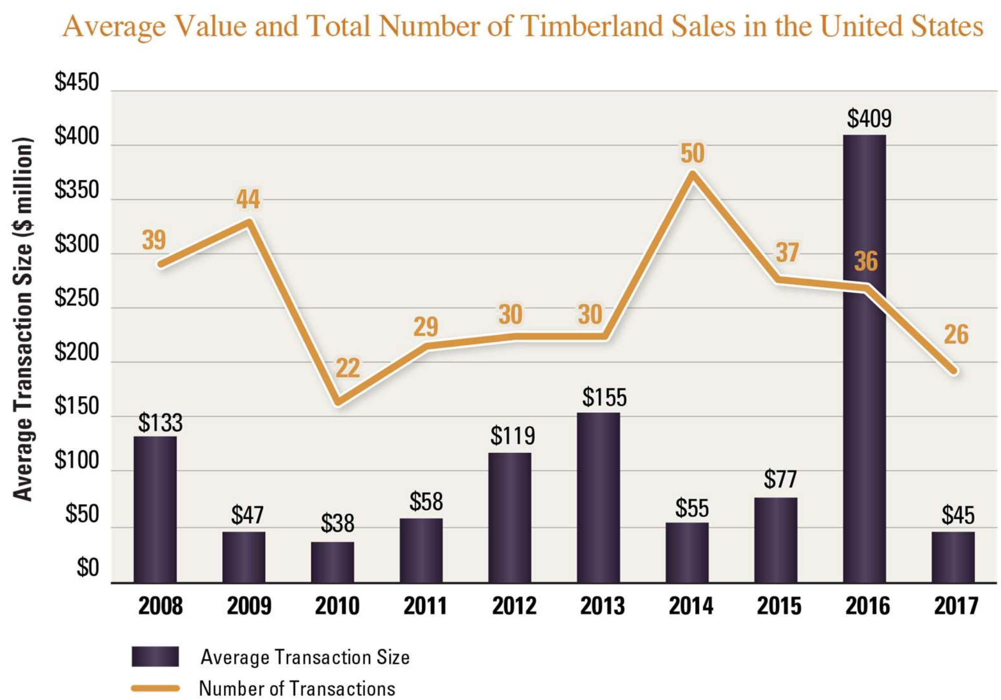

Figure 3. Average transaction value and the total number of sales of investment-grade timberland assets in the United States. Source: Timberland Markets Report.

For this reason, investors or funds that have large amounts of capital to place – US$250 million or more, for instance – may need two years or more to become fully vested. In other words, a measure of patience is required to successfully invest in the asset class.

Smaller Investment Universe Outside of a Few Core Markets

The third and final feature that make timberland different from infrastructure is that most investable assets are concentrated in a few core markets. In a 2017 survey by TimberLink, 71 percent of professionally managed timberland investments were, based on value, located in North America (Figure 4). If one includes Australia and Oceania, the total rises to 87.5 percent. Only 8.7 percent of total invested capital was situated in Latin America. Other potential investment regions, including Asia, Africa and Eastern Europe, accounted for less than one percent. As evidenced in the Timberlink survey, institutional timberland investors have concentrated their activities in a select cluster of countries: United States, Australia, New Zealand and Brazil. This could limit one's capability of building a broadly diversified geographic timberland portfolio, or a portfolio that targets higher returns by investing in higher risk emerging and pioneering markets.

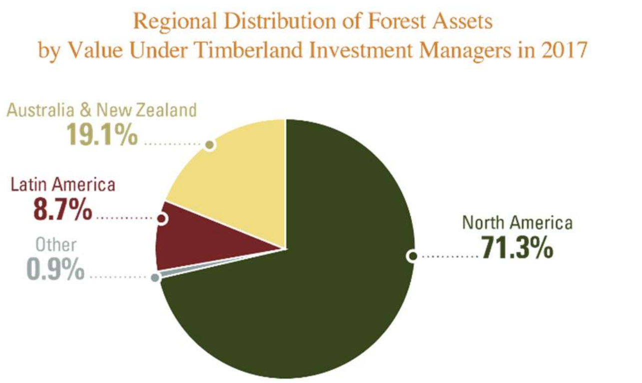

Figure 4. The regional distribution of forest assets managed by timberland investment management organizations (TIMOs), as measured by market value in 2017. Source: TimberLink.

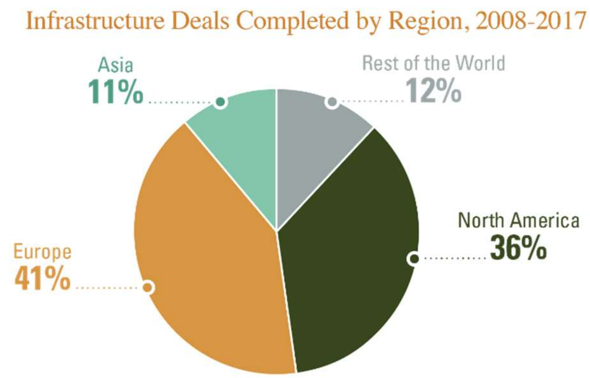

Figure 5. Completed secondary stage infrastructure deals by region from 2008 through 2017. Source: 2018 Preqin Global Infrastructure Report.

Timberland investment activity is more geographically concentrated because, if an investment is to perform, it must be situated in markets where there is active demand for timber, private property rights are strongly and consistently enforced, quality infrastructure for cutting, hauling and shipping timber is available, and networks of competent and professional forest service providers are active. Only a very limited number of forested regions in the world meet all of these requirements.

By comparison, the pool of opportunities for making infrastructure investments is comparatively large (Figure 5). Even for a risk-averse investor, one that demands high-quality, core assets, the investment universe for infrastructure extends into parts of Europe and Asia where institutional timberland investments are sparse.

Recommendations

In the end, the decision before the typical institutional investor ought not be a choice between timberland or infrastructure. It is how both asset classes can play the most constructive and advantageous role within a well-balanced portfolio. While timberland has underperformed infrastructure in the last few years, there is no *a priori* reason that this underperformance will be sustained. In fact, over the long-run, both asset classes have historically behaved and performed comparably. Timberland investments, as measured by the NCREIF Timberland Property Index, performed within 100 basis points to Cambridge Associates Infrastructure Index[7] in the past 10 years ending September 30, 2016 (see Figure 6). This is not a surprise given the degree to which the two asset categories share many key characteristics and attributes. Both are long-dated, intensively-managed assets that carry an illiquidity premium, yet benefit from predictable cash flows.

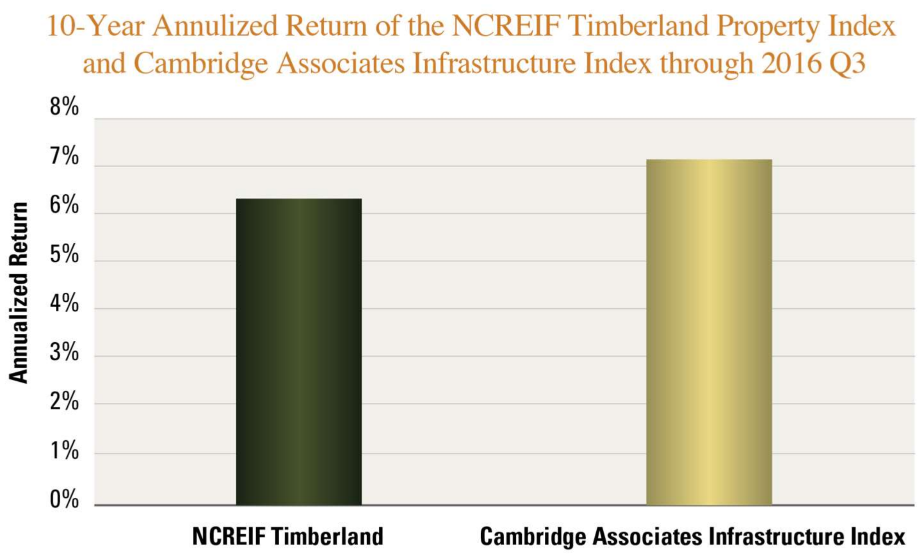

Figure 6. 10-Year annualized total return of the NCREIF Timberland Property Index and Cambridge Associates Infrastructure Index through 2016 Q3.

Timberland has a valuable role to play as counterbalance to infrastructure, or any other alternative asset.

For these reasons, some investors may argue that: *If timberland and infrastructure investments have overlapping characteristics and similar long-term return profiles, why not simply choose to exclusively allocate to infrastructure given its recent performance?* In response, we would argue in counterpoint. Timberland has a valuable role to play as counterbalance to infrastructure, or any other alternative asset. Timberland investments have these compelling features, which infrastructure investments rarely replicate:

- **Biological Growth:** Timberland is a self-perpetuating asset that tends to increase in value regardless of economic or market conditions. Commercial forests grow more volume each year that either can be harvested for income or stored to add value. By comparison, infrastructure assets

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[7] Cambridge Associates Infrastructure Index, 10-year period ending September 30, 2016, the must current data available to the public at the time of the paper is written.

depreciate over time and require continued capital investment to remain viable.

- **Flexibility in Income Deferment:** Trees do not need to be harvested when timber market conditions are weak. Timberland owners can defer harvesting and let their trees continue to grow during down economic cycles without sacrificing value. Effectively, storing timber on the stump is a strategy that allows one to maximize timber value over time without forfeiting much value in the near term. In contrast, infrastructure projects can face delays and suspensions that can result in a permanent loss of income – income that cannot be recouped at a later time.

- **Optionality of Land and Alternative Income Sources:** In many forested regions, timber production is considered the lowest-value land use. This means transitioning land uses tend to benefit timberland owners by changing and improving the underlying economic value propositions of their forest assets. Forestland that is in the path of demographic or economic development can be used for a variety of alternative uses, such as conservation, recreation, mineral extraction and both commercial and residential development. In addition, a typical timberland investment may offer sources of income beyond those associated with commercial timber production. These can include the marketing of recreational leases, the establishment of wetlands mitigation banks, the monetization of conservation easements, and, the generation of carbon offset credits. In other words, timberland assets typically offer a great deal of optionality for generating near-term income and long-term value.

Due to these features, timberland has a lower volatility of returns than many other real assets, including infrastructure. It is also carries a very low correlation to returns from other asset classes. Adding timberland investments alongside one's infrastructure allocations may enable investors to either reduce portfolio risk or improve overall returns.

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