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TIMBERLAND INVESTMENTS

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Economic Research and Analysis

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Introduction

Timberland is a relatively new asset class, having emerged as an attractive investment option for institutional investors in the early 1980s.

Given its short history and its unique investment characteristics, there are few basic research materials on the asset class available to investors. The academic community produces some work on the subject, but it is usually narrow in scope and designed to meet the rigorous requirements of peer reviewed publications rather than the needs of investors. The timberland investment sector is another source of useful information, but it too tends to produce materials that are focused on specific and tightly defined subjects, rather than on providing investors with the overarching perspective they need to make informed investment decisions.

This paper was produced to help fill this information gap by providing a high-level overview of the asset class' history, scope and value drivers. It looks at the subject of timberland investment from both a U.S. domestic and an international perspective. Its intent is to provide investors with a consolidated information resource that can serve as either an introduction to the asset class or as a general reference tool.

We begin by defining timberland investment:

Timberland Investment is the acquisition and management of a forest asset for the purpose of producing a financial return.

This is a broad definition and therefore it is important to recognize that not all tree-based investments are timberland investments. For instance, one may invest in fruit orchards, but such assets are considered agricultural investments rather than timberland investments. Likewise, ownership of, or participation in, forest-based projects that generate values that cannot be monetized – like clean air, clean water, biodiversity, aesthetics and legacy values – are not considered timberland investments.

On the following pages, we offer a brief history of the asset class that includes an overview of its investment benefits and limitations. This is followed by an assessment of the different methods available for investing in the sector. We then look at the unique attributes and characteristics of the world's timberland investment markets, an effort that includes examining the sectors of the global economy that buy and consume timber – and thus provide a foundation for investment in the asset class. We conclude with an overview of how to evaluate timberland investments and how to build, manage and exit from a timberland portfolio.

Timberland as an Asset Class

A Short History

The Employee Retirement Income Security Act (ERISA) was the catalyst that spawned interest in the timberland asset class. Passed by the United States Congress and signed into law in 1974, ERISA, among its many measures, pushed private pension funds to diversify their portfolios beyond ownership of equity and fixed income instruments. This prompted many institutional investors, both private and public, to consider a range of alternative investments such as real estate and private equity. From that point, it did not take long for innovative thought leaders in the

investment community to develop more specialized, non-traditional asset classes like timberland.

The first recorded institutional investment in timberland occurred in the United States in 1982. From that point, several factors fueled the growth of the U.S. timberland investment universe. On the sell side, U.S. forest products companies, which held most of the privately-managed investment grade commercial timberland in the country, lost the right in 1986 to apply favorable capital gains tax rates to income generated from timber harvesting. Without this tax advantage, many forest products companies soon realized

that it was more advantageous from a financial standpoint to sell their forest holdings to tax-exempt investors like pension funds, foundations and endowments. Furthermore, over time, these companies also began to recognize that owning timberland did not convey any significant strategic or competitive advantage as long as they could purchase the wood they needed from the investment-oriented timberland owners to whom they were selling their corporate lands. As a result, over the next two decades, companies like Kimberly-Clark, James River and Georgia-Pacific demonstrated that it was possible to operate successful paper and building products businesses without devoting precious capital to timberland ownership. This not only prompted industrial landowners to accelerate the pace at which they were divesting their timber holdings, it also led others to begin exploring ways of moving their timberland assets out of their C-Corp structures and into more tax-efficient vehicles. Initially, this trend led to the establishment of some large, master limited partnerships by companies like Plum Creek, International Paper and Rayonier, but by the early 2000s, the timberland ownership and investment sector had come to recognize that the real estate investment trust (REIT) vehicle was a more advantageous holding structure from both a tax benefit and public market acceptance standpoint.

On the buy side, the divestiture of timberland assets by forest products companies was further facilitated by the actions of the U.S. Internal Revenue Service (IRS). In the early 1980s, the agency confirmed that revenue from timber harvests did not generate Unrelated Business Taxable Income (UBTI) for tax-exempt organizations. In many instances, this gave institutional investors like pension funds, foundations and endowments further confidence to invest in timberland.

From 1989 to 2013, the total amount of institutional capital invested in timberland grew from less than US\$1 billion to somewhere between US\$65 billion and US\$75 billion.¹ In

¹ J.P. Morgan Investment Analytics & Consulting; DANA Ltd.

addition, while the asset class was initially anchored in North America, it has since expanded to other forested regions around the world. The first institutional timberland investment outside of North America was made in New Zealand in 1992. A decade later, the asset class' global footprint has expanded to Australia and the Latin American countries of Brazil, Chile and Uruguay. In recent years, timberland investors have further broadened their geographic scope to consider opportunities in China, East Africa and Central and Eastern Europe, as well as some emerging Latin America countries.

Key Features of Timberland that Attract Investors

Investors are attracted to timberland for a variety of reasons. At a conceptual level, their motivations fall into four categories: (1) portfolio fit; (2) intrinsic attributes; (3) positive market fundamentals; and, (4) soft values.

Portfolio Fit

From an investment attributes standpoint, timberland offers three attractive features:

- 1. Competitive Risk-Adjusted Returns.** Timberland has historically offered attractive average returns relative to its volatility, and its performance compares favorably with that of equities, fixed income and several other leading asset classes. Table 1 illustrates this point by presenting the risk and return profile of the NCREIF Timberland Index against other major indices.
- 2. Inflation Hedging.** Timberland, like agricultural commodities, precious metals and oil and gas investments is considered a real asset. A *real* asset is one that derives its intrinsic value from its utility. To varying degrees, real assets are recognized as potential inflation hedges. In the case of timberland, wood-based products permeate and are used in a multitude of sectors within the global economy. The chart in Figure 1 demonstrates timberland's inflation-

hedging attributes. It shows how five-year returns of the NCREIF Timberland Index are closely correlated with U.S. inflation over corresponding periods, offering a high linear regression R^2 value of 63.4 percent.

3. Diversification Through Low Return Correlations. Finally, timberland investment returns have moved in a

manner quite different from those of many other asset classes. Consequently, timberland can help provide portfolio-level diversification. This potentially lowers a diversified portfolio's total risk profile and expands its efficient frontier of risk and return. Figure 2 shows correlations between the NCREIF Timberland Index and other major benchmarks.

Table 1. Comparison of 20-year average return and standard deviation (1994 to 2013) of timberland, as represented by the NCREIF Timberland Index, against select asset classes. Sources: Ibbotson, Morningstar.

Asset Class	Benchmark Index	Time Weighted Average Quarterly Return (Annualized)	Quarterly Standard Deviation (Annualized)	Sharpe Ratio
U.S. Timberland	NCREIF Timberland Index	8.5%	5.5%	1.02
U.S. Large Cap Equities	Standard & Poor's 500	8.7%	16.9%	0.34
Global Developed Market Equities	MSCI World	6.8%	17.4%	0.23
Gold		6.7%	13.1%	0.29
U.S. Real Estate	NCREIF Property Index	9.5%	4.6%	1.43
Commodities	S&P GSCI	7.4%	23.6%	0.19

Note: Sharpe ratio assumes a risk free rate of 2.85%, which is the average return of U.S. Treasury bills from 1994 through 2013.

5-Year Timberland Return vs. Inflation

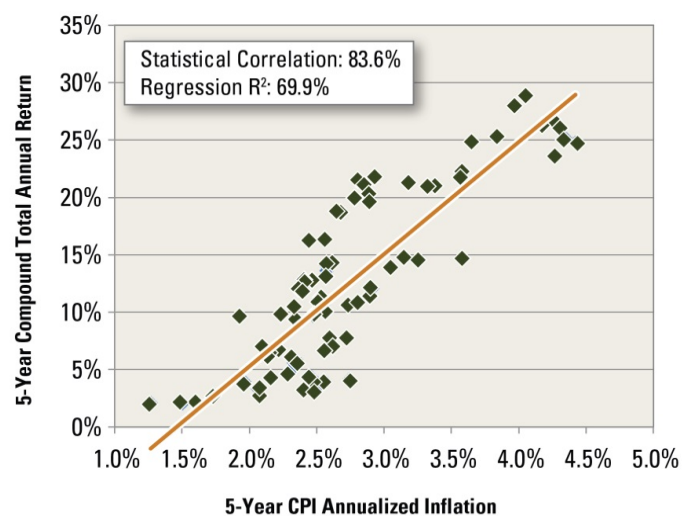


Figure 1. Plotting the five-year compound total annual return of the NCREIF Timberland Index against the realized annual U.S. inflation rate (as measured by the Consumer Price Index or CPI) over the corresponding period from 1987 through 2011. Sources: U.S. Census Bureau, NCREIF.

Correlation of Annual Returns Between Timberland and other Asset Classes

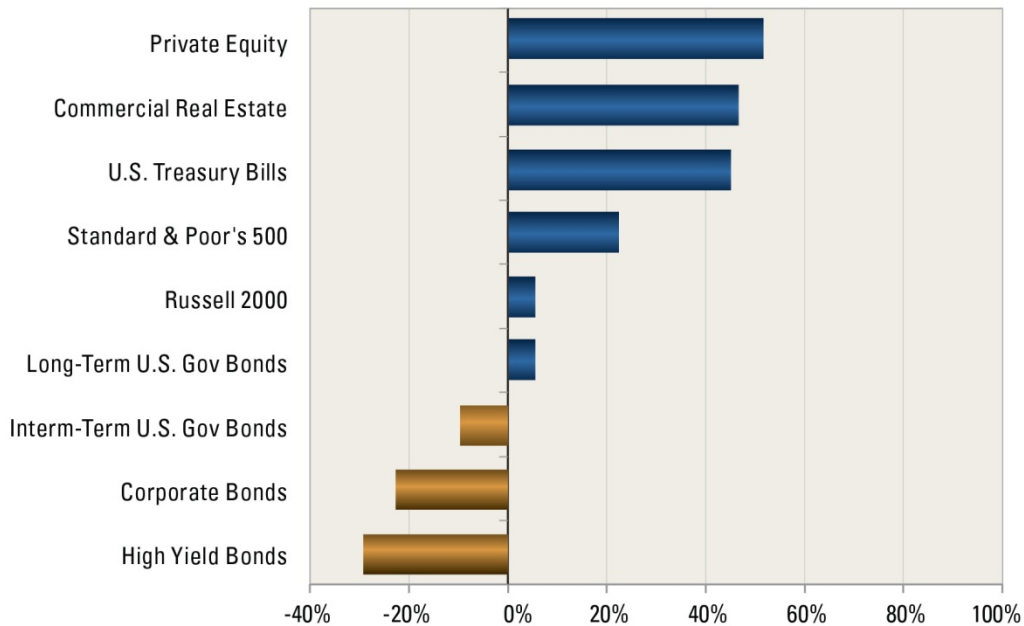


Figure 2. The statistical correlation of quarterly returns between timberland, as represented by the NCREIF Timberland Index, and a selection of other U.S. asset classes, reflecting 20-year returns of 1994-2013. Source: Bloomberg.

Intrinsic Attributes

Beyond basic financial performance, there are also some biological features of timberland that compellingly differentiate it from other asset classes. One of these is the ability of a commercial forest to add value through biological growth regardless of what is happening in financial markets and the economy.

Another biological attribute of timberland that investors find attractive is the flexibility the asset class affords to raise or lower harvests in response to timber price movements. When prices are low, an investor or timberland owner can withhold harvests and “store timber on the stump” with low opportunity cost. This is because un-harvested trees continue to grow and add value through time. This cash flow optionality, when used effectively, can lower return volatility

and raise the long-term, total investment performance of a timberland holding.

Positive Market Fundamentals

Investors who view commodities in a positive light also tend to view timberland favorably. The resumption of global economic growth is expected by some economists to place upward price pressure on many commodities and real assets, and timber is likely to be part of this wave. The world population of 6.7 billion people is projected to reach 9 billion by 2040. This will increase global consumption of paper and wood products as needs for tissue, packaging and housing grows. Furthermore, rising incomes in fast growing emerging economies such as Asia, Central Europe and Latin America, will augment this demand, which will increase per capita consumption rates. See Figure 3 for projections of global wood consumption by the United

Nations' Food and Agriculture Organization (FAO).

While long-term demand is expected to grow, the supply of timber is expected to be constrained. Government restrictions and public conservation efforts are limiting harvests from natural forests. Furthermore, illegal logging is being curbed due to international pressure. Meanwhile, consumer preference for sustainably-grown timber continues to grow. This means more and more of the

world's wood demand will have to be met from timber grown within managed forest plantations. However, the total land base available for the establishment of such plantations is limited due to competing land uses, such as agriculture, conservation and development.

Because of these global trends, investors increasingly view this as an opportune time to make new and expanded commitments to the asset class.

FAO Estimate and Projections of Global Demand for Industrial Timber

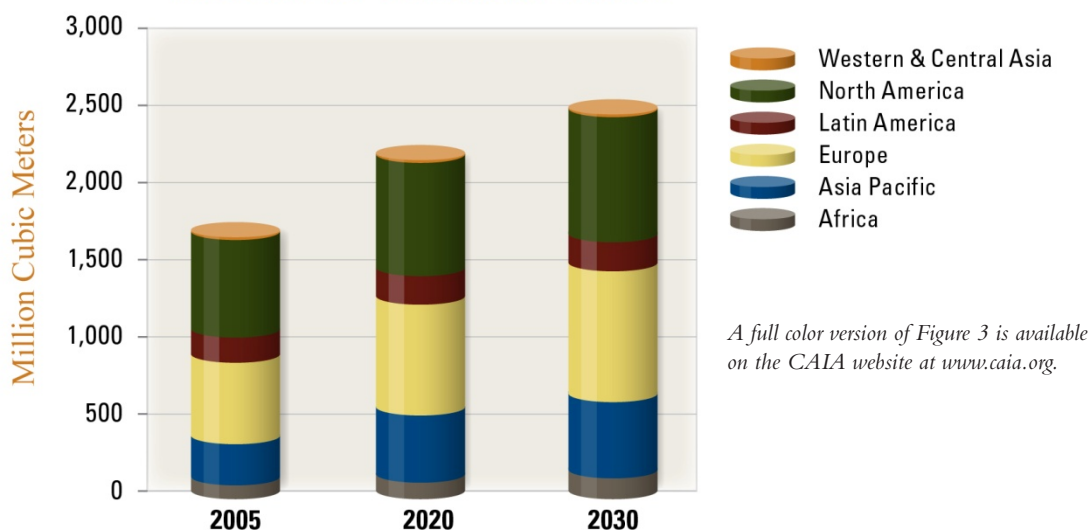


Figure 3. Estimate and projections of global demand for industrial timber to produce paper, lumber and other products. Excludes household uses, such as firewood. Source: UN FAO State of the World's Forests 2009. Source: United Nations Food and Agriculture Organization.

Soft Values

The fourth argument that has been made in support of timberland investment is that it is "green." Timberland investments, when managed responsibly, are an environmentally-friendly investment option. Sustainable forestry and timberland investment share many complementary objectives. However, the degree to which investors consider these soft values important varies greatly. Those who place a high

priority on participating in socially responsible investments (SRI) are more likely to see this as an advantage of the asset class, while those who are not motivated by SRI considerations usually discount these soft values entirely. They tend to place a greater emphasis on benefiting from timberland's other attributes, including its history of strong investment performance as well as its capacity to provide portfolio diversification.

Limitations of the Asset Class

Like any asset class, timberland has its limitations and disadvantages. Perhaps most prominently among these is the fact that it is a relatively illiquid asset. Timberland markets are inefficient and therefore it takes time to place and withdraw capital from timberland investments. This is particularly true in many emerging markets, which tend to be shallow and which often are characterized by light transaction volumes.

The “lumpy” and sporadic nature of timberland market sales means precise capital allocations to specific regions, species or timber age classes can be difficult to execute. Consequently, investors are generally advised to embrace timberland investment strategies that are broad and adaptable to emerging opportunities, challenges and market conditions.

Another consideration investors must weigh is the fact that timberland is a long-term investment. Trees are not like annual crops such as corn or

soybeans. A forest owned for investment purposes often needs to be managed and cultivated over a number of years before the economic potential of its standing timber and other values can be fully realized. As a result, most timberland funds offered by investment managers have an investment life of 8 to 15 years.

Lastly, like all private equity investments, there is a measure of uncertainty about timberland market values. In short, it is difficult to definitively establish the value of a timberland asset unless it has been the object of a market-based transaction. Appraisals can provide estimates of value, but they are based on subjective analyses of comparable sales data and prevailing market conditions. In addition, independent third-party appraisals are typically commissioned by timberland investment managers at annual intervals or longer. This means investors who participate in the timberland asset class need to be comfortable with some degree of ambiguity.

Pros	Cons
Historic risk-adjusted returns have been competitive against many asset classes	Private equity timberland investments are relatively illiquid . Transactions can take 2 to 12 months
As a real asset, it may offer inflation hedging potential	Markets for timberland can be thin , especially in a number of emerging markets
Low correlation against other asset classes can add diversification to a portfolio	Not well suited for short-term or medium-term investment horizons. It is a long-term investment
Biological growth provides asset appreciation independent of financial markets and the economy	Asset values are based on appraisals, which are infrequent (often annually). That can create some ambiguity to the exact market value
Timber harvest can be adapted to timber price movements to reduce market exposure	
Long-term market fundamentals indicate limited supply facing rising demand in support of prices	
Can be considered an environmentally friendly, socially responsible investment	

Table 2. Some of the leading arguments for and against timberland investments.

The Timberland Investment Universe: Players and Structures

There are number of publicly-traded and private equity investment options available to investors interested in participating in the timberland asset class and the most prominent among them are profiled below.

Publicly-Traded Securities in Timber and Timberland

While the universe is relatively small, publicly-traded timberland investment vehicles exist. For investors for whom liquidity is a priority, the most common of these are the exchange-traded timberland focused real estate investment trusts (REITs). In the United States, Plum Creek Timber Company (PCL), Potlatch Corporation (PCH), Rayonier Inc., (RYN) and Weyerhaeuser Company (WY) are the most prominent public REITs. In recent years, timberland-oriented REITs also have begun to develop in Europe.

REITs are favored in the United States because of their tax efficiency and their broad market acceptance as a mechanism for investing in real estate assets. In other parts of the world there are still other ways to invest in publicly-traded timber oriented companies. One such example is Sino Forest Corporation (TRE). Based in Hong Kong and Toronto, its shares are traded on the Toronto Stock Exchange. The company has a market capitalization of more than US\$5 billion and overseas forest holdings of 750,000 hectares (or 1.6 million acres), primarily in China. Nevertheless, pure public timberland operating companies are more the exception than the rule. In most cases, public companies that own commercial timberland are vertically integrated. In other words, their manufacturing capabilities and their forest resources are managed within the same entity and are closely linked operationally. While now rare in the United States, vertical integration remains common among timber owning companies in Western Europe and Latin America. However, investors who seek to fully benefit from the fundamental investment attributes of the timberland asset class often find that owning equity in vertically integrated forest products companies offers limited appeal because

their investment performance is heavily influenced by the commingling of their forest and manufacturing assets.

Outside of these publicly-traded options, the third way to invest in timberland through a liquid mechanism is to own shares in a timber-focused unit investment trust or exchange-traded fund (ETF). Cambium Global Timberland Ltd., which is managed by Cogent Partners, and the Phaunos Timber Fund, which is managed by Four Winds Capital Management, are examples of exchange-traded funds. While ETFs are often described as vehicles that give investors access to all of the advantages of the timberland asset class along with the added benefit of liquidity, these vehicles do have their drawbacks. If an exchange-traded fund has a small market capitalization, for instance, or if its shares are thinly traded or subject to exchange restrictions, its capacity to provide its investors with liquidity can be considerably compromised.

In addition to liquidity, the other primary appeal of publicly-traded securities is their capacity to provide continuous market valuations. However, compared to private market alternatives, publicly-traded vehicles offer the investor far less control over how they participate in the timberland asset class. Investors in REITs and ETFs have little ability to influence management's investment activities or forestry practices. In addition, there are many key global timberland markets that simply are not accessible by investing in timber-focused REITs and ETFs. This is because the available vehicles may not hold, or even target for acquisition, forest assets located in those regions. For an investor who has a specific objective in mind, perhaps participating in a balanced, U.S.-focused investment program that also provides some exposure to a broader spectrum of international markets, like Australia, Central Europe or Latin America, achieving their overarching goals may be difficult or impossible if their strategy emphasizes investing in timber-focused, exchange-traded vehicles.

The second drawback of publicly-traded, timber-focused securities is the exposure they provide to systematic market risk. Unlike private equity timberland investments, which have low correlations with other types of financial assets, shares of timber REITs, timber-related companies and even ETFs tend to closely track the movements of global equity markets. This means those who seek exposure to timberland through exchange-traded securities may not receive the full benefit of the portfolio diversification attributes for which the asset class is recognized.

Self Investment Versus Timberland Managers

An alternative to owning publicly-traded shares of REITs, ETFs and vertically-integrated forest products companies, is buying timberland outright. Investors who have access to strong in-house forest investment expertise may choose to purchase, hold title and directly manage forest properties. Although unusual, this approach is most commonly employed by private individuals and family offices. By and large, institutional investors tend to rely upon timberland investment management organizations (TIMOs) to build and operate their timberland portfolios. Even institutions that have established, in-house timberland investment proficiencies, Harvard Management Company among them, still work with TIMOs to execute aspects of their investment strategies. As a general rule, institutional investors who invest in timberland through or with TIMOs typically utilize one of three private equity structures: limited partnerships (LP), limited liability corporations (LLC), and private REITs.

TIMOs provide investors with a full array of services. Among other things, they source and acquire timberland assets; manage the holdings for growth and income; and, sell the assets at appropriate times in accordance with the objectives of the client. In return, TIMOs typically receive an asset management fee, which may be based on the placed capital or the net asset value (NAV) of the client's portfolio. Their fee structures also may include incentive payments for meeting or exceeding certain pre-determined performance targets.

If an investor's timber allocation is large enough, one may choose to utilize the services of more than one TIMO. In such cases, managers are often selected based on their relative strengths and areas of expertise. There is a significant degree of differentiation among TIMOs and savvy investors can use this to their advantage. A manager, for instance, may be chosen for its track record of identifying and developing conservation and other ecosystem service values within forestland investments – while another may have specialized expertise investing in Latin American high-yield plantations. Depending on the investor's risk and return objectives, one or both of these TIMOs may have a role to play in executing one's overarching timberland investment strategy.

Commingled Funds Versus Separate Accounts

TIMOs typically offer two types of products: individual (or separate) accounts and commingled funds. The separate account product offers the most control, as the investor can dictate the strategy, risk profile and investment term. The investor also has the power to move the portfolio to another TIMO if either the client-manager relationship or their program's investment performance is unsatisfactory. The one drawback to utilizing a separate account vehicle is that it typically requires a significantly higher level of capital commitment. This is necessary to ensure that a separate account portfolio can be properly diversified. Separate account minimum commitments vary greatly depending upon the investment strategy that is being implemented, but one should assume that most TIMOs require an allocation of at least US\$30 million to US\$50 million to provide the latitude necessary to produce meaningful portfolio diversification.

The other option for investing in timberland is participation in a commingled fund, which is a more passive and lower maintenance investment approach. TIMO-sponsored commingled funds, which are typically appealing to investors who lack the funding capacity to invest through a separate account vehicle, have the potential to offer greater diversification than otherwise would be possible.

because the capital of several investors is pooled to create critical mass. The life of a commingled fund is commonly fixed at between 8 and 15 years, with many offering extensions to help ensure final exit occurs under favorable conditions.

The characteristic investors should consider before committing capital to a commingled fund is that the structure offers limited control. Investors in commingled funds generally have little capacity to influence management decisions or the investment strategies being implemented on their behalf. They also must accept the legal and organizing terms of the funds in which they participate, which can make it difficult to relieve management, even if investment performance is unsatisfactory. Commingled funds do have significant disclosure requirements, however. This allows prospective investors to fully analyze the experience and capabilities of management, as well as their investment theses and implementation plans, in advance of making capital commitments. Investment execution parameters for commingled funds are typically outlined in their organizing materials, which include a private placement memorandum (PPM) and associated legal documents.

Despite the limitations on direct control, investing in a commingled fund is an excellent way to participate in a well diversified timberland portfolio – particularly for investors who are unable to make large capital commitments to the asset class. Involvement in a variety of commingled funds also can facilitate an investor’s ability to make tailored allocations to niche timberland market segments – opportunities that otherwise might be difficult to access or justify if one relied on a separate account strategy. For instance, investing through a commingled fund might be the best way for an investor to make a targeted investment in Sub-Saharan Africa or Central America, emerging markets that otherwise might be too risky to enter on a separate account basis.

Finally, since the mid-2000s, timberland fund-of-funds have grown in popularity and may be a viable option for some investors to manage risk and obtain broad diversification across the timberland investment universe. A fund-of-funds raises capital in a standalone commingled fund from a number of investors and then allocates it among a universe of commingled funds managed by several TIMOs.

Table 3. The five established means to invest in the timberland asset class.

Investment Vehicle	Control & Flexibility	Liquidity	Suited Investor	Comments
Direct Investment Self purchase and management of timberland	Highest	Low	Investor with strong in-house forestry expertise	Takes a large commitment to manage a diverse timberland portfolio
TIMO Account Dedicated account with a timberland investment manager	High	Low	Investor with significant capital	Offers a well tailored portfolio, but care must be taken to pick the right manager
TIMO Managed Fund Commingled timber fund of a chosen strategy and investment term	Low	Limited	Investor with moderate capital or desires broad diversification	Limited control of the investment. However, pooled funds offer critical mass to buy properties of scale
Fund of Funds A fund that broadly invests in a variety of timberland funds	Very Limited	Limited	Investor with modest capital or desires minimal risk exposure	Low maintenance with high diversification, but net fees are higher
Public Equity/ETF Shares of a exchange traded timber REIT, timber company, or timber ETF	Very Limited	High	Investor is comfortable with high systemic risk but values liquidity	Only a limited set of timber regions, sectors and strategies are represented

Overview of Investment Options for Timberland

To summarize, there are essentially five ways to invest in timberland. These are outlined in Table 3 above. Each offers different tradeoffs between liquidity and control. It is important to recognize that investors are not limited to one approach, but rather may wish to obtain broad exposure to the asset class through a variety of mechanisms

Who are the Investors?

The principal participants in the timberland investor sector have been U.S. tax-exempt organizations, including pension funds, university endowments and charitable foundations. Because they are typically making investments to match financial obligations and liabilities that are long-term in nature (sometimes encompassing decades), these types of investors have what is often described as “patient capital” – capital that is being invested with a long-term perspective that is well matched with the long-duration, biological investment characteristics of timberland assets. The first wave of investors entered the timberland sector in the 1980s and 1990s and most were based in North America. Among others, these included the State Teachers Retirement System of Ohio, the California Public Employees’ Retirement System, the University of Chicago Endowment and the GE Pension Fund. As the asset class established a track record of performance, more U.S.-based and off-shore institutional investors began to develop serious interest in timberland. The 2000s saw the entrance of several European investors as well as the emergence of some European-based timberland managers. This market development was followed by the establishment of timber funds in Latin America and Oceania. Estimates are difficult to obtain, but according to a recent survey by the investment consulting firm, TimberLink, nearly one-fourth of the capital placed in timberland to date has come from non-U.S. investors (Figure 4). Regardless of the country of origin, the same TimberLink survey indicated that based on market value, three-quarters of all timberland investments have been made by

Net Asset Value of Timberland by Investor Domicile

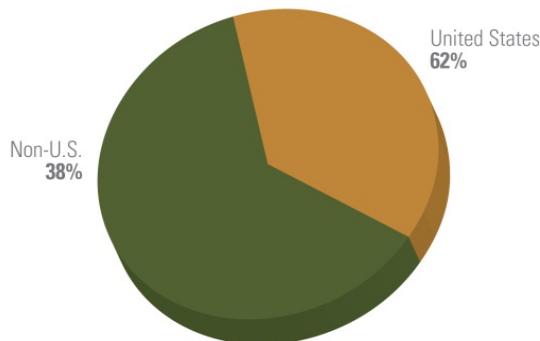


Figure 4. Share of net asset value of TIMO managed timberland investments based on the geographic domicile of the investor, according to a 2013 TimberLink survey of 21 timberland investment managers.

Net Asset Value of Timberland by Investor Type

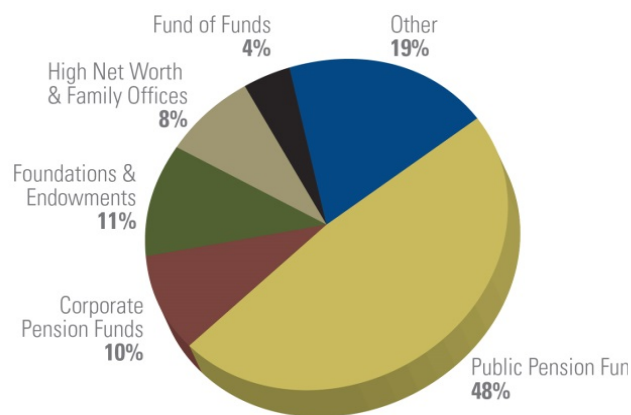


Figure 5. Share of the total value of TIMO managed timberland investments based on the type of investor, according to a 2013 TimberLink survey of 21 timberland investment managers.

institutional investors of one type or another (Figure 5).

In a span of three decades, what was once a North American-centered asset class now

features global participation by investors and investment managers who are seeking to capitalize on increasingly global investment opportunities.

Timberland as a Biological Asset

Investable Regions for Timberland

Roughly 30 percent of the world's land area is covered by forests. This amounts to 15 million square miles (40 million square kilometers). Only a fraction of this area, however, has the attributes necessary to accommodate timberland investments. Excluding forests that are protected by law and reserved in the public domain as parks and preserves, a forest must meet two biological conditions before it can be considered a viable investment opportunity:

1. **Productivity:** Its growth rates must be high enough to produce wood in a cost competitive manner.
2. **Marketability:** It can be managed to grow tree species that have commercial value.

Based on these two fundamental requirements, the universe of attractive timberland investment markets shrinks to only a handful of regions. These areas are highlighted in the map shown in Figure 6.

With regard to the core investment-grade forest regions that are accessible to investors, brief snapshots of each follow.

North America

Western Canada and the U.S. Pacific Northwest produce softwood species such as Douglas fir and hemlock fir. Eastern Canada and the U.S. North produce both softwoods and hardwoods. These softwoods include spruces, red pine and jack pine. The hardwoods, including maple, cherry, oak and beech, are valued for the production of high quality furniture and flooring. The U.S. South also produces hardwood and softwood, but its

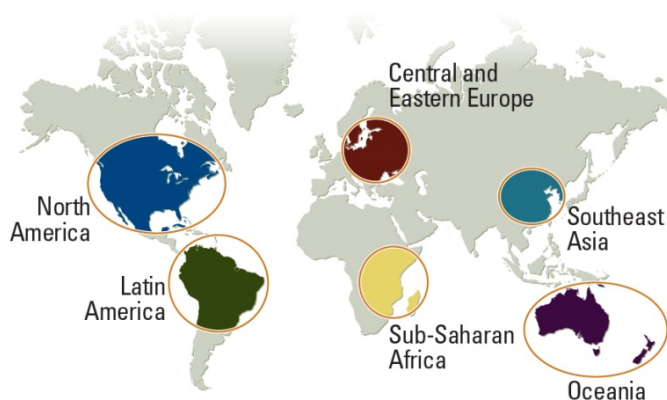


Figure 6. Share of net asset value of TIMO managed timberland investments based on the geographic domicile of the investor, according to a 2010 TimberLink survey of 23 timberland investment managers.

hardwoods are commonly of lower quality as compared to those grown in the North. The dominant commercial species in the South are southern yellow pines like loblolly pine, longleaf pine and slash pine.

Latin America

The leading investment regions in this part of the world are Brazil and Uruguay. The dominant commercial timber species vary and include hybrids of eucalyptus. These species are grown primarily as feedstock for the pulp and paper sector and to produce charcoal, which is used by the agricultural and steel industries. While less common, eucalyptus also can be managed to produce sawlogs for the manufacture of lumber and veneers. Softwoods, typically loblolly pine, also are produced commercially, but on a smaller scale as compared to eucalyptus. In the tropical and sub-tropical areas of Latin America, highly-

valued exotic hardwood species are cultivated for furniture and paneling. The tropical hardwood of choice for such uses is teak, but other species like gmelina, balsa, and paricá are grown for such products as well.

Sub-Saharan Africa

The African countries that are best suited for timberland investments are South Africa and the East African nations of Uganda, Tanzania and Mozambique. Many of the private forest plantations in East Africa are stocked with eucalyptus and teak, but native species also are cultivated. In South Africa, various species of pine are grown for commercial purposes. These include radiata pine and loblolly pine. In terms of hardwoods, eucalyptus and black wattle are grown in South Africa.

Central and Eastern Europe

Many countries in this region are considered to have the attributes and characteristics necessary to facilitate timberland investment. Among others, these include Romania and the Baltic States of Estonia, Latvia and Lithuania. European forestry practices emphasize the cultivation of sawtimber, which usually requires growing trees on cycles of 50 to 120 years. The Baltic region offers native, naturally grown species of Scots pine, Norway spruce and birch. Other hardwoods grow in the area as well. These include aspen, oak, alder and ash. In Romania, spruce, fir, beech and oak species are predominant.

Southeast Asia

In Asia, China is the focal point for timberland investment. The Southeast Asian countries of Vietnam and Laos also are considered interesting and potentially lucrative markets. In the case of China, the southeast quadrant of the country is the most attractive region for the cultivation of commercial plantations, which are primarily stocked with eucalyptus. Other species include various pines and hardwoods like acacia and alder. A variety of hardwoods are grown commercially in Southeast Asia, including eucalyptus, acacia and teak.

Oceania

Australia and New Zealand offer sizeable areas dedicated to commercial timber plantations. The former features radiata pine and a variety of eucalyptus species (eucalyptus is native to the continent). Other pines are grown in Australia as well. In comparison, the most important commercial species in New Zealand, by far, is radiata pine. Plantations of Douglas fir exist as well, but are far less prevalent. Eucalyptus is no longer grown in New Zealand because of pest and disease tolerance issues.

Natural Versus Plantation Investing

Timberland investments can be made in both natural forests and plantations. Exceptions exist, but as a general rule, timberland in the higher latitudes is more commonly managed in a natural state because such regions are typically characterized by colder temperatures. This results in slower rates of overall growth, which tends to undermine the applicability of employing plantation management techniques. The U.S. Northeast, much of Canada and Northern Europe are examples of regions where natural forests occur. In comparison, plantations are more characteristic of the lower latitudes, where warmer climates and higher amounts of rainfall make it economical to practice intensive forestry that involves planting, fertilizing, thinning and other types of silvicultural activities.

Despite the obvious differences between natural and plantation forest investments, there is no direct relationship between investment performance and the type of forestry practiced. In other words, the higher growth rates that are typical of a forest plantation investment do not inherently result in higher rates of return as compared to those generated by a natural forest investment. Performance is based on market values and risks, not biological characteristics. Under a common discount rate, prices for timberland assets adjust to account for higher or lower levels of biological productivity.

Perspective of Investment Grade Timber Species

Table 4 below provides a representative sample of the commercial timber species that are available for investment on a global basis in the six major regions previously described. This is

not an all inclusive list because timberland investments also can include niche species like sandalwood in Australia and aspen in the Lake States of the United States. It does, nevertheless, offer an introductory guide to the spectrum of opportunities that are available to timberland investors.

Table 4. Sample of representative growth rates and harvest age (rotation) of commercial forests across the world. Sources: RISI Global Tree Farm Study and Fred Cabbage et al, “Global Timber Investments, Wood Costs, Regulation, and Risk” in *Biomass & Energy*, 2010.

Country	Species	Rotation (years)	Average Growth Rate (m ³ /ha/yr)
Argentina	Eucalyptus Grandis (Rose Gum)	18	35
Australia	Eucalyptus Globulus (Blue Gum)	11	20
Brazil	Pinus Taeda (Loblolly Pine)	15	30
	Pinus Elliottii (Slash Pine)	20	22
	Eucalyptus Grandis (Rose Gum)	15	40
Chile	Pinus Radiata (Radiata Pine)	22	30
China	Pinus Massoniana (Chinese Red Pine)	15	9.5
Indonesia	Tectona Grandis (Teak)	60	6
Latvia	Picea Abies (Norway Spruce)	80	8
New Zealand	Pinus Radiata (Radiata Pine)	28	17
Paraguay	Eucalyptus Grandis (Rose Gum)	12	38
Romania	Spruce	90	7.5
	Poplar	30	13
South Africa	Pinus Patula (Mexican Weeping Pine)	30	14
	Eucalyptus Grandis (Rose Gum)	20	32
Uruguay	Eucalyptus Globulus (Blue Gum)	9	22
	Eucalyptus Grandis (Rose Gum)	16	30
United States	Pinus Taeda (Loblolly Pine)	30	15
	Pseudotsuga Menziesii (Douglas Fir)	45	14
	Pinus Resinosa (Red Pine)	80	8.5
Vietnam	Acacia Hybrid	7	16

Markets for Forest Products and Services

Function and Structure of Timber Markets

Due to their size and bulk, logs are normally processed close to where they are harvested. Timber that is cut and sold is commonly transported within 100 miles (160 kilometers) to a mill or manufacturing facility, but there are exceptions to this rule. There is, for instance, an active export market for logs, which are transported by ocean freight from New Zealand, British Columbia and the U.S. Pacific Northwest to mills in China, Japan and South Korea. In addition, valuable high quality hardwood timber is sometimes transported long distances to conversion facilities that specialize in such products. In most cases, timberland owners sell their timber within local or regional markets, known as “wood baskets.” These local wood baskets can offer very unique market dynamics based on the makeup of the mills and processing facilities that are located nearby.

The highly localized nature of timber markets means there is no universal method for selling timber. The market in one region may work differently than the market in another. TIMOs managing properties for investors recognize these differences and adapt their wood marketing strategies accordingly. In the U.S. Pacific Northwest, for example, timberland owners are generally responsible for delivering their logs to the mills and processing facilities that purchase them. Timberland owners in the region are expected to hire logging contractors to harvest and transport their wood to nearby mills. In the U.S. South, however, the opposite tends to be true. Forestland owners sell the standing timber on their property “on the stump.” The timber buyer in this case, sometimes the mill or processing facility and sometimes a wood dealer or broker, is then responsible for harvesting the logs and ensuring their delivery. Wood dealers serve as market intermediaries between timberland owners and mills. They typically acquire stumpage – or the right to harvest standing timber from a timberland owner – and

then sell it to a mill. They are paid when the logs go through the mill’s scale house. When mills buy stumpage directly from landowners, they hire independent logging contractors to cut and haul the timber to their woodyards.

Beyond the procedural differences that are common to specific regions, there also are variations in how timber is sold. When a regional wood market is tight and the number of buyers is limited, negotiated sales are often employed. In such cases, the timberland owner negotiates the sale with the prospective timber buyer on a one-on-one basis. In more competitive markets, where many mills may be vying for the same timber, a bidding or auction system is commonly employed by landowners to ensure that they sell their wood at the highest possible price. In the United States, the primary auction process employed is the sealed bid. Prospective timber buyers are allowed to inspect the stumpage that has been placed on the market to assess its value. Their bids are then due to the stumpage seller by a pre-established deadline and the winning bidder is then given a certain amount of time (usually 3 to 12 months) to harvest the purchased timber.

A third timber sales method is the long-term contract, which is known as a *wood supply agreement* (a.k.a. *fiber supply agreement* or *forward contract*). Wood supply agreements are best suited for large forestland owners that are willing to commit to providing substantial volumes of timber over long periods of time to one or more major wood consumers in a particular region. Such contracts may be among the terms of a timberland sale agreement. For instance, a forest products company may decide to sell its forest holdings, but it may wish to have continuing access to the wood on an exclusive basis for some period of time. In such cases, the sale of the company’s timberland assets may be subject to a wood supply agreement. If properly structured, wood supply contracts can be a win-win for timberland buyers and sellers, providing sellers with continuing access to raw material while ensuring that the new owners of the land

have a ready-made market in which to sell their wood under relatively predictable conditions. The downside of such contracts is that they can limit forestland owners' ability to take advantage of open market opportunities to capitalize on strong timber demand and premium prices.

Like timber markets, not all logs are the same. Each species and each regional market has different categories of timber products. Table 5 illustrates this point by showing the different log grades of radiata pine that are established for export and domestic use in New Zealand. In this case, New Zealand offers at least five different export grades and seven different domestic grades. Despite these variations and the range of timber product classifications, there are effectively two main types of commercially-saleable timber: sawtimber (sawlogs) and pulpwood (or pulp logs). The sawtimber grade consists of logs large enough to be processed into dimensional lumber. Pulpwood logs are logs too small for the manufacture of lumber or plywood but that are large enough to be processed into chips or flakes. Beyond these two primary log grades there are several sub-categories of products. These include, among others, pole logs (used for utility poles), peeler logs (or ply logs used to make plywood and veneers), and top wood (used to make chips and biofuels).

Table 5. Major log grades for Radiata pine in New Zealand, as recognized by the Ministry of Agriculture and Forestry, New Zealand.

Export	Domestic
Pruned	P1
Unpruned A Grade	P2
Unpruned J Grade	S1
Unpruned K Grade	S2
Pulp	L1 & L2
	S3 & L3
	Pulp

Consumers of Timber

The global forest products sector is diverse and includes a wide range of industries. Structural lumber and plywood manufacturers are the major consumers of softwood sawtimber. Hardwoods, on the other hand, are not commonly used to produce construction materials. They are a primary raw material for the manufacture of furniture, moldings, flooring, cabinetry, railroad ties and pallets. In the case of both hardwood and softwood products, wood residuals are a valuable by-product of the timber conversion process. In fact, a sawmill's processing waste, which normally includes chips, shavings and sawdust, can be used to manufacture panels, paper and packaging products. They also can be used as feedstock for wood-based biofuels.

Like sawtimber, pulpwood is a versatile product that has many industrial uses. It is mainly used to manufacture tissue, paper and packaging. It also is employed in the production of wood panels, including oriented strand board (OSB), particleboard, fiberboard and hardboard. Builders use OSB as sheathing and underlayment in new homes. Fiberboard and particleboard are used in cabinets, furniture and moldings. The inexpensive self-assembly furniture sold at retailers like Wal-Mart and IKEA, for instance, is often made with particleboard that has been covered with wood veneer.

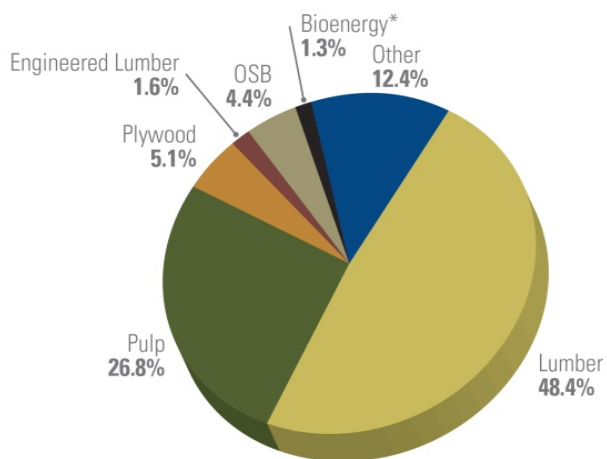
Pulpwood also is used to produce transparent film and the absorbent fluff used in infant diapers. Other products made from pulpwood include food additives, a variety of industrial chemicals and even rayon, a synthetic textile used in the production of clothing and floor coverings, among other things. Finally, pulpwood also can be used in bioenergy applications. When it has been chipped, it can be burned alone, or mixed with coal, for heating and power generation applications. Alternatively, like sawtimber residuals, pulpwood can be processed into biofuels like cellulosic ethanol and biodiesel. Pulpwood also can be processed into wood fuel pellets, which are in growing demand in North America and Europe for power generation and commercial and residential heating uses. In certain markets, like Brazil, the steel industry

converts pulpwood into charcoal to produce pig iron. Soya processors in Brazil, including ADM, Cargill and Bunge, use eucalyptus pulpwood to dry soybeans for processing.

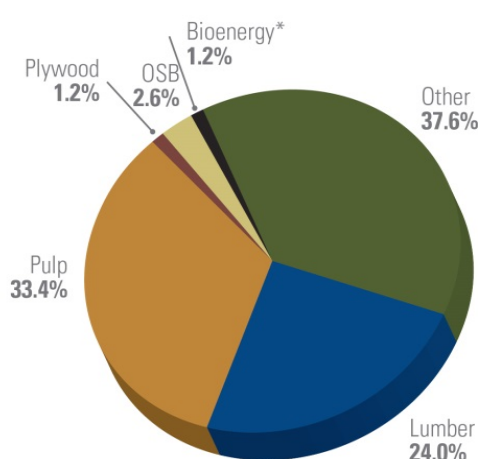
Each country has a different profile for its use of wood products. In the case of the world's largest timber market, the pie charts in Figure 7 illustrate how softwood and hardwood timber are used in the United States.

Figure 7. The different industrial end-use market shares of softwood (top right), hardwood (top left) and all types of wood (bottom) harvested in the United States during 2013. Source: RISI.

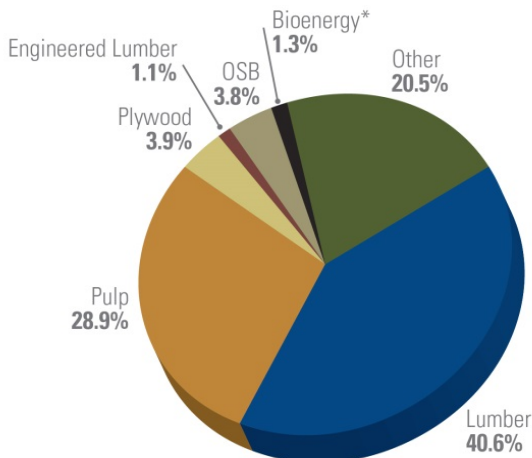
U.S. Softwood End Use out of 8.9 Billion ft³ Harvested in 2013



U.S. Hardwood End Use out of 4.3 Billion ft³ Harvested in 2013



U.S. Wood End Use out of 13.2 Billion ft³ Harvested in 2013



Non-Timber Markets

Timber harvests and land sales are not the only sources of income timberland investments generate. Forests also can produce revenue from a variety of other products and services, including those described below.

- **Recreational Licenses/Leases:** Some forestland owners charge land-use fees to groups or individuals in exchange for providing them with the exclusive right to engage in recreational activities, such as hunting, fishing or birding, on their lands.
- **Mineral Rights:** In some cases forests contain surface minerals – such as rock or gravel – or sub-surface minerals – such as natural gas deposits. Some landowners lease or sell these rights to others, granting them the option to develop or extract the resources.
- **Right-of-Way and Access Rights:** Landowners can sell or lease access (or “right-of-way”) rights on their lands using a variety of approaches, including time-based fees and royalties. They also can sell these rights outright. The sale or leasing of right-of-way rights is often associated with power transmission lines, cellular phone towers, communication towers, natural gas pipelines and wind farms.
- **Wetlands and Stream Mitigation Banking:** Under the right conditions, a forest can be managed to generate wetlands or stream mitigation credits. These credits, which are acquired by others to offset activities in other locations that are producing adverse environmental impacts, are typically acquired by land developers and public agencies. In the United States, the mitigation banking market was created under the Federal Clean Water Act (1972) and sales of

mitigation banking credits exceed \$1 billion annually.²

- **Species and Conservation Banking:** As with wetlands mitigation banking, a forest can be a source of credits for endangered species or biodiversity. These credits can be sold to developers or other public or private entities to offset the loss of habitat or wildlife populations associated with development projects. The Endangered Species Act (1973) is the basis for the U.S. market for species and conservation banking and it is estimated to have reached \$200 million in size in 2009.²
- **Carbon Offset Credit Markets:** By way of background, a growing forest sequesters carbon. Assuming the necessary systems and procedures can be put in place, this sequestered carbon can be monitored and registered. A landowner’s capacity to certify that a certain amount of carbon has been “locked up” in a particular forest ecosystem can be monetized in the form of registered carbon offset credits. These credits are, in turn, typically acquired, voluntarily or under some government-mandated protocol, by entities that are emitting greenhouse gases (GHGs) into the atmosphere. The purchase of such credits is intended to cost effectively mitigate the entity’s release of GHGs. A variation of this strategy is selling carbon credits based on one’s active preservation of a natural forest, such as a native tropical rainforest. Again, in this case, the emphasis also is on preventing carbon that is stored in the trees, soil and other vegetation from being released into the atmosphere as a result of harvesting or disturbance. This is known as Reducing Emissions from Deforestation and Forest Degradation (REDD). The REDD market

² David Brand. “Ecosystem-Based Markets in the USA.” Who Will Own the Forest? Conference, Portland, OR. September 21-22, 2010.

is concentrated in developing economies like those in sub-Saharan Africa, Latin America and the Pacific Rim, where deforestation is a problem. With all of this as background, however, it is important to recognize that investment opportunities in forestry that are based on the production and sale of carbon credits are currently very limited due to the lack of an effective global compliance market for forest-based carbon emissions offsets. This may change if a new global carbon accord is adopted to replace the Kyoto Protocol.

Many of these forest-based markets are known as *ecosystem services* because they usually derive value based on the natural function and qualities of forests, rather than on their specific capacity to produce merchantable timber. However, the ability of any given timberland investment to generate income from ecosystem services varies

greatly from property to property. It usually depends on the characteristics of the forest as well as the viability and proximity of non-timber markets. For example, the U.S. Northeast has a tradition of free public access across both public and private forests, which makes it difficult for forestland owners in the region to charge for hunting leases. In contrast, restricting public access on private lands is commonplace in the U.S. South and therefore the hunting license market is very strong.

Some TIMOs offer investors strategies that focus on specific non-timber markets. For instance, there have been timber funds dedicated to wetlands mitigation banking. More often, however, non-timber revenue associated with ecosystem services is viewed as supplemental to traditional timber income. In general, non-timber revenue sources can be expected to contribute between 0 and 150 basis points to a typical timberland investment's total return.

Evaluating Timberland Investments

Timberland investors should have a basic understanding of the principles of timberland asset valuation and that begins with recognizing the asset class' return fundamentals.

Contribution of Tree Growth to Value Generation

As is shown in Figure 8, trees generally grow in an S-shaped curve. The addition of merchantable timber is slow at the beginning of a forest's life cycle, but it increases over time as the trees mature. At some point, tree growth peaks and begins to slow.

From an investment standpoint, the economic value of a forest also grows in an S-shaped curve. However, the year-to-year changes in value can differ measurably from biological growth. This is because as a tree grows, it not only adds volume, it may transition from a lower-valued log product into one that is more highly valued. For instance, in the case of southern yellow pine in the U.S. Southeast, a 14-year old tree that is seven inches in diameter usually would be classified as a

Amount of Standing Timber of Natural Loblolly Pine by Age

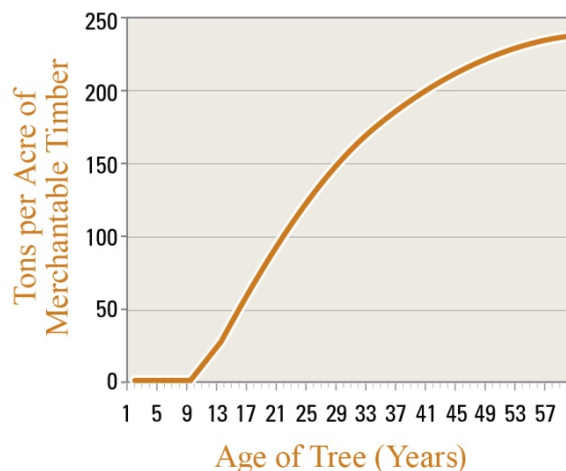


Figure 8. A growth projection of non-genetically improved loblolly pine on a productive site in the state of Georgia, but without any forest management or silvicultural treatments such as fertilization and thinning. Source: Georgia Forestry Commission

pulpwood log and command a price of roughly \$8 per ton (see Figure 9). Five years later, due to biological growth, this same tree is likely to be classified as a small sawlog (often called a chip-n-saw log). At that stage in its maturity, the chip-n-saw log would be at least 10 inches in diameter and would be worth \$16 per ton. This would represent a doubling in value for each ton of wood that has been added through biological growth. When one considers that the tree also has added 50 percent more wood volume over that five-year period, the total value of the tree would have tripled (300 percent). If that tree was allowed to grow for another five years, it probably would be classified as a large sawlog, or sawtimber. It would measure 14 inches in diameter, or more, and could be sold for \$28 per ton. This would result in a 75 percent increase in value over its previous estimated value as a chip-n-saw product. In that transition from chip-n-saw to sawtimber, volume would likely have increased by 50 percent. The combination of price and volume gains would generate a 250 percent increase in value due to biological growth. For some, this may raise the question: Should all forest investments be managed with a goal of producing nothing but older, larger diameter sawtimber? The answer is, “No.”

As was mentioned previously, every regional timber market is unique. One market may be strong for pulpwood but another may be strong for sawtimber. Moreover, commercial tree species grow differently based on climate, soil, genetics and the types of forest management techniques employed. As a result, the best economic option in a given situation may be growing pulpwood. For instance, a timberland owner may choose to manage a eucalyptus plantation in Brazil on a 7-year harvest rotation to produce pulpwood, rather than manage it on longer rotations to cultivate sawtimber, because a large pulp and paper mill operates nearby, providing a ready market for quality pulpwood. In different places and under different market circumstances, it may make more sense financially to grow higher-valued sawtimber on longer rotations. Teak in Costa Rica, for example, may be grown on 30-year rotations because the region has a large number of sawmills that need that product to manufacture

Breakout of Loblolly Pine by Major Log Product as it Grows

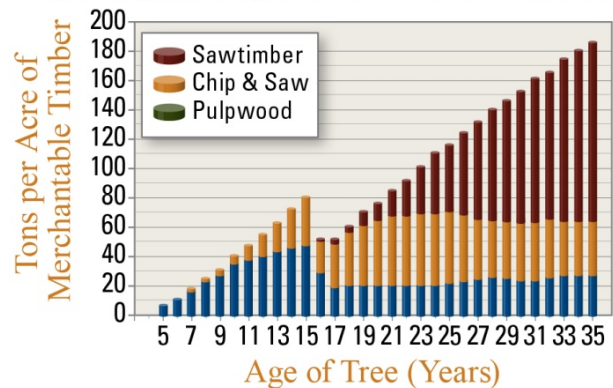


Figure 9. Projected volume growth for a stand of southern yellow pine consisting of the three major log grades. The illustration assumes the stand is planted with second generation, genetically-enhanced seedlings that have been planted in the lower coastal plain physiographic region of the Southern United States. The stand’s site index is 65 (on a 25 year basis) and it is modeled with the assumption that it underwent a thinning harvest at age 16 and received both fertilization and herbaceous weed control applications at planting. Source: TIR Biometric Research.

fine furniture and hardwood boards for high quality flooring.

The ideal time at which to conduct harvests depends, of course, on the discount rate and the best approach for maximizing the net present value of one’s investment. That leads to the next challenge associated with investing in timberland: How to value a forest asset.

Timberland Valuation Methodology

As in the commercial real estate sector, there are three established methods for valuing a timberland property:

1. Comparable sales
2. Cost approach (a.k.a. component valuation or replacement cost)

3. Net present value of income

Each of these methods is described briefly below.

Comparable Sales

Comparable sales analysis is arguably the most pragmatic approach for determining the value of a forest property. It simply entails surveying recent transactions in a given area that are similar in profile. The problem with the comparable sales approach is that timberland markets are relatively thin. For instance, in the United States, which is the world's largest timberland market, only \$1.2 billion in large timberland sales were recorded in 2010. These sales involved only 1.1 million acres in 40 transactions.³ Even at its peak in 2007, the U.S. timberland market only saw 5.2 million acres valued at \$8.4 billion change hands. This was accomplished with fewer than 50 large scale transactions, which was a fraction of the number of transactions completed in the commercial real estate sector during the same time period.⁴

In short, the number of transactions executed in a given timberland market may lack sufficient frequency to provide comparable sales data that is robust enough to draw informed conclusions about regional pricing dynamics. This becomes particularly problematic during weak market cycles. It also is a major challenge in emerging markets such as East Africa, Southeast Asia and Central Europe, where timberland investment activity has been modest. Nevertheless, when comparable data is available, it is an important point of reference for any value assessment of a prospective timberland investment. Investors also must be aware, however, that comparable sales are backward looking, which means they do not reflect emerging trends within a market. As a result, they can be biased in a rapidly shifting investment environment.

³ Tom Harris, Sara Baldwin and Jacek Siry. United States Timberland Markets: Transactions, Values & Market Research – 2000 to mid-2010 Update. Timber Mart-South, Athens, GA.

⁴ Timberland Markets Report, August 2010, Vol. 8, No. 4, p.2

Cost Approach to Valuation

While rarely used on its own, the cost (or component) approach to valuation can serve as a backstop, or reality check, during the timberland valuation process. The cost approach entails breaking out all of the individual assets of a forest property and applying a market value to each. This includes the standing merchantable timber, the land and associated special assets, if any, including mineral rights, land with conservation values and wetlands from which mitigation credits might be generated. The sum of these values then can be used to establish a floor for the value of the timberland asset. In short, the cost approach attempts to quantify the cash that would be derived, in total, if all of the property's individual assets were sold at prevailing market prices.

In certain timber markets, a discount factor is applied to the component value. This can be a reflection of the difficulty one might face in selling the timber in a short period of time because of logistical complications or government regulations. In other cases, local wood and land markets may not be able to absorb large influxes of timber or raw land, creating a depressed pricing climate. Where such market inefficiencies exist, a discount factor may be applied. In the hardwood dominant regions of the U.S. Northeast, for instance, it is not uncommon for TIMOs and REITs to apply a 10 to 20 percent discount to the component value of a forest property.

Net Present Value of Future Expected Income

The third and most theoretically robust method available for valuing timberland is calculating the net present value (NPV) of future expected income from the timberland asset (assuming it will be managed to its optimal economic value). Also known as discounted cash flow (DCF), the net present value approach is the most demanding of the three leading timberland valuation methods. To be executed correctly, a large number of projections must be made and subjected to careful analysis. Calculating an NPV, or its ancillary, the internal rate of return (IRR), for a

timberland investment requires producing and utilizing the following:

- **A Harvest Schedule:** A projection of how much timber will be grown, cut and sold over the property's holding period, assuming a particular forest management regime.
- **A Projection of Timber Prices:** A forecast of prices for the different types of timber that will be harvested and sold from the property.
- **Discount Rate:** An interest rate (i.e., capitalization rate or hurdle rate) that is applied to future cash flows and that includes an adjustment for the perceived risk and duration of the investment.
- **Management Fees and Operating Costs:** The management and operation of a timberland property requires that management fees and operating expenses be incurred by the investor and these costs must be projected for purpose of valuation. Applicable costs include plantings, fertilization, competition control, forest inventory and general day-to-day property oversight.
- **Land Sales Schedule:** For investments that are held in fee simple or freehold title (where the land underneath the forest also is owned by the investor) a schedule is developed outlining when the land is projected to be sold. Certain portions of a property may increase in value significantly over the course of an investment. Therefore care must be taken to properly estimate when and how the property will be sold (in its entirety or on a piecemeal basis).
- **Forecast of Land Prices:** Rates of appreciation for timberland values are not uniform. Certain parts of a property may have higher or lower values based on local levels of demand for land that can be used for agriculture, conservation,

public recreation or development. Regional demographics also play a strong role in how land values are derived. As population centers expand into rural and semi-rural areas, there can be increased pressure to convert raw timberland to other uses. These competing land uses, which generally are characterized as "higher and better uses" or HBU, typically drive up land values. The expression of these other land values in certain cases can have a significant impact on the NPV and IRR estimate of a timberland property.

- **Acquisition Costs:** Timberland properties are not fungible assets like stocks or bonds. Consequently, the unique characteristics of each timberland asset are accompanied by a variety of costs at the point of acquisition. Many of these costs are related to the extensive due diligence that is required before a timberland asset can be purchased with confidence. Among other things, this process can include conducting environmental site assessments (ESAs), inventorying standing timber volumes and obtaining independent third-party appraisals. There also are legal costs and professional fees. As one would anticipate, making a timberland

Harvest Age is Not Linked to Investment Term

A misconception sometimes held by investors new to timberland is that final harvest should coincide with the sale of the land. That is not required, as a competitive market usually attributes the right economic value of the standing timber on the land when it is sold. Since timberland can be sold regardless of the age of the trees, slow growing forests do not necessarily require a longer investment term than fast growing forests.

investment in an emerging or pioneering market generally entails assuming higher acquisition costs because of the extent of the due diligence required.

- **Alternative Income:** Non-timber income, such as recreational leases, mineral rights and ecosystem services can potentially serve as additional or even primary sources of income and these values must be quantified and assessed.
- **Other Modeling Variables:** Depending on the timberland property, other factors that can impact future income should be

considered during the valuation process, such as taxation and foreign currency exchange rates for non-domestic timberland holdings.

Despite the heavy reliance on quantifying variables, timberland investments are typically valued primarily based on an assessment of their future income generation potential. One additional benefit to this approach is that NPV or IRR models can be used to conduct sensitivity testing and risk analysis, which are important given the number of factors that can influence total return.

Execution of a Timberland Portfolio

When an investor decides to make an allocation to timberland there are many decisions that must be made and the first entails establishing a strategy.

Defining an Investment Strategy

A timberland portfolio can be tailored to meet an investor's needs. It is possible, for instance, to adjust a timberland portfolio's duration, expected risk, expected return, cash yield and inflation hedging potential based on the type of forest properties one acquires. Buying younger forests, for example, tends to extend the duration of an investment by shifting the income towards the end of the investment holding period. In contrast, acquiring older forests shortens the duration by pushing cash flows to the front of the investment term. If inflation hedging is important to an investor, it often is better to acquire domestic timberland assets rather than offshore assets as shifts in currency exchange rates can reduce the inflation-hedging properties of a forest asset.

A portfolio strategy also can accommodate an investor's SRI goals. Timberland investments can be certified as *sustainable* by internationally recognized bodies like the Forest Stewardship Council (FSC) and the Sustainable Forestry Initiative (SFI). Investors must understand, however, that forest certification can lower net returns, primarily because of the higher

management and record keeping costs involved. Beyond certification, timberland assets that have readily identifiable forest-based ecosystem values are considered highly attractive from an SRI standpoint. One should recognize, however, that markets for ecosystem services are relatively modest in size, so it may be difficult for investors to concentrate capital in those sectors.

The best approach for developing an effective timberland investment strategy is to seek advice from a respected consultant or an investment manager who is knowledgeable about the asset class. However, before a strategy is developed, timberland investors should first establish their risk and return expectations.

Discount Rate for Timberland

The foundation of a timberland portfolio is its expected return – i.e., its discount rate or hurdle rate. Back in the 1980s and the early 1990s, when the asset class was relatively young, the discount rate for timberland in the United States hovered around 8 to 9 percent in real terms (inflation adjusted). In some cases, it was as high as 11 percent. By the early 2000s, however, the discount rate in developed timber markets like the United States, Canada, New Zealand and Australia was closer to 7 or 8 percent. During the period between 2007 and 2008, when the asset class was experiencing peak transaction volumes,

the rate fell further to as low as 5 or 6 percent real (and for some investors it was even lower). At present, timberland's hurdle rate has moved back to a sustainable level of 6 to 7 percent real, which many experts believe will remain consistent in established timberland markets for the foreseeable near future.

As would be expected, as timberland investors move to less developed markets, there is a requisite increase in the hurdle rate to compensate for the higher risks involved. From an exposure standpoint, a timberland investment opportunity ideally must meet the following criteria: (1) It must have deep, competitive markets for timber and land; (2) It must have developed infrastructure like roads, transportation systems and forestry services; (3) It must offer legal transparency and exist in a regulatory climate that provides strong enforcement of private property rights and that offers regulatory latitude to landowners so they can operate their forests to their highest economic use; and, (4) It must exist in an environment that is stable with regard to taxation and repatriation of investment proceeds. The more a timberland market falls short of these criteria, the higher the return premium that is required for investment. For this reason, emerging markets that are acknowledged by investors for having more favorable timberland investment environments – such as Chile and Uruguay – may only command a 200 or 300 basis point premium to the most favored markets (Table 6). However, regions that are deficient on the criteria, such as Southeast Asia and Russia,

typically would require a much higher return premium, possibly as much as 800 basis points or more.

Prudent investors should carefully weigh their risk tolerance when selecting the countries in which they intend to acquire and hold timberland assets. Strong, low cost wood markets and high rates of growth are not enough to qualify a timberland opportunity. One should also weigh the political, regulatory and business environment. Some markets may very well be too risky, such as certain emerging economies in Southeast Asia, Latin America and Eastern Europe. Table 7 below shows the World Bank's ranking of countries that have significant forest resources and each country is ranked based on the ease with which business can be conducted within its borders.

Diversification

Asset diversification is another core consideration investors must weigh when establishing an investment strategy. Choices for diversification depend, in part, on how much capital is being committed. For a small commitment, one that falls under \$30 million, commingled timber funds or fund-of-funds may provide the best mechanism for achieving broad diversification. For larger commitments, investors may wish to participate in the asset class through a separate account vehicle.

Regardless of the investment mechanism chosen, timberland investment diversification is achieved

Table 6. Sample of representative countries or regions in perceived risk level for timberland investment.

Established 6-7% Real	Near Established +200 to 400 bp	Pioneer +500 to 700 bp	Frontier 800 bp or Higher
United States	Brazil	Central America	Russia
Canada	Uruguay	Central/Eastern Europe	Southeast Asia
New Zealand	Chile	Argentina	East Africa
Australia			

NOTE: Actual risk may be different by investment regardless of country, and a prudent investor should exercise proper due diligence to determine whether performance will suit the investor's risk and return expectations.

by building portfolios that have (1) species variation; (2) different log products; (3) a range of forest maturities; and, (4) a broad range of trees of differing maturities, or age classes. In many cases, it is not necessary to hold timberland investments in numerous countries to create a well balanced risk-managed timberland portfolio.

Table 7. A selection of countries with large timberland resources and their corresponding World Bank ranking by their ease of doing business, with 1 being the best and 181 being the worst (2009).

Country	Ease of Doing Business Country Rank (lower is better)
New Zealand	2
United States	3
Finland	14
Chile	40
China	83
Uruguay	109
Russia	120
Venezuela	174

Breadth of Timberland Universe will Limit Geographic Diversification

Another important consideration when making diversification choices is the relative availability of timberland across markets. It may be impractical, for instance, to place the bulk of one's timberland portfolio in a region that has a small investable market, like Africa. Estimates vary, but according to one recent assessment by International Woodland Company (IWC), the total investable universe of private forestland globally is worth around US\$467 billion.⁵ Out of the half trillion dollars worth of timberland potentially available for investment, 46 percent of the total area is based

⁵ International Woodland Company, "Global Timberland Investable Universe." Copenhagen, 2009.

in North America (Figure 10). All other regions are measurably smaller. Latin America has 16 percent and Oceania, which includes Australia and New Zealand, only holds 10 percent. It is important for investors to therefore calibrate their investment strategies with such geographic placement limitations in mind.

Placement of Capital and Form of Investment

After a timberland investment strategy has been defined, investment prospects need to be sourced. Normally, in countries with well-established timberland markets, it can take 8 to 24 months to find the right mix of forest assets. This process is even longer in emerging and pioneering markets because deal flow can be light and access to attractive deals can be challenging. Obstacles to participation vary by country. Some countries, like many in Europe, have entrenched or fragmented land ownerships. Other timberland markets, like Brazil and Chile, are characterized by strong competition from vertically-integrated domestic forest products companies, which have a strategic focus on expanding their captive base of forest resources.

Property rights are another key consideration when placing capital in certain timberland markets. In some countries, it is either challenging or impossible to take fee simple title (or freehold title) of land. This may be the result of the fact that the land is publicly owned – as is the case in China, Vietnam and Russia. Alternatively, the land may be owned and managed under the stewardship of a particular community, which is commonplace in certain parts of Africa. In such cases, timberland investments often are made through leaseholds. Under a leasehold arrangement, forestland is leased for a span of time (often measured in decades) and during this period the lessee can manage the forest and harvest the timber that is grown. At the end of the lease arrangement, the land and all of the remaining trees return to the lessor.

Another type of timber-only investment arrangement is the timber-cutting right. In this scenario, a forestland owner sells cutting rights to

Area Distribution of Investable Private Forestland

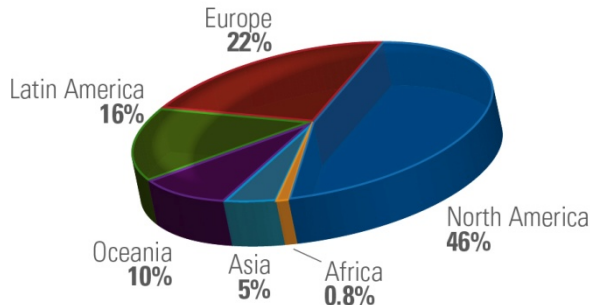


Figure 10. Regional distribution of 165 million hectares, or 408 million acres (representing of US\$467 billion in value) of private timberland considered suitable and available for institutional investment. Source: IWC.

a buyer who then has the right to harvest a certain volume of timber over a certain period of time from the landowner's property. Timber cutting rights are common in Canada where 93 percent of the forestland is held as "Crown Tenures" by the federal and provisional governments.

Summary and Conclusions

The type of investor for whom timberland is a good fit tends to (1) have a long-term outlook characterized by patient capital that can be matched against long-term liabilities and obligations; (2) does not have irregularly high liquidity demands; (3) is comfortable with some degree of ambiguity with respect to asset valuations; (4) wishes to hold assets that provide a hedge against inflation risks; and, or (5) may see value in participating in "green" or socially responsible investments. For such investors, timberland has the potential to provide competitive risk-adjusted returns. It also can help diversify a portfolio because of its low correlations with other asset classes.

Timberland, however, is not a uniform investment. There is great variation in species, products,

Investment opportunities with timber leases and timber-cutting rights can occur even in timber markets where fee simple or free hold ownership is permitted, including the United States. The availability of such opportunities, however, is often limited. Nevertheless, some investors like these arrangements because they consider them "pure" timber investments – investments that do not also blend land values with the underlying performance of the asset. On the other hand, the downside is that such approaches to timberland ownership provide less diversification potential and fewer opportunities to capture land-based option values.

Closing an Investment

Just as the acquisition process associated with constructing a timberland portfolio can take one or two years, the disposition or liquidation of a timberland fund or account can take an equivalent amount of time. In some cases, TIMOs may recommend extending the disposition window of a timberland investment program to better realize higher asset values based on evolving market conditions.

forest management, techniques and markets. This poses challenges and presents opportunities. Successful timberland investors take a holistic approach to creating well-diversified portfolios across a broad spectrum of potential forest investment opportunities. Nevertheless, balancing risk and return requires a sound strategy and the application of rigorous analysis because timberland investment opportunities that have higher risk profiles may not provide higher returns. Some countries, for instance, lack sufficient enforcement of land title or offer the minimum level of infrastructure and forestry services necessary to make forest investment compelling for any but the most intrepid of investors.

In addition, compared to some other asset classes, the timberland investment universe is relatively small. The total amount of capital invested in timberland globally is estimated to be in the range of US\$50 billion. This pales in comparison to many other asset classes. Global hedge fund assets, for example, are estimated to total US\$2.5 trillion.⁶ Given the smaller scale of the timberland asset class, investors should be flexible in establishing their timberland investment strategies. Portfolios with precise allocations or rigid selection criteria can be more challenging to execute.

Beyond strategy, it also is important to select the right managers. Since the introduction of the asset class in the early 1980s, the universe of TIMOs has expanded dramatically and many firms have differentiated themselves from their competitors. Investors should carefully select managers based on how their relative strengths and specialties relate to the investors' own philosophies and objectives. In certain instances, it is better to choose a small number of managers with well defined areas of specialization than it is to engage a firm that positions itself as a generalist.

⁶ As of January 31, 2011 according to HedgeFund.net

For more information

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