$\mathbb{C} \mid \mathbb{A}$

CAMBRIDGE ASSOCIATES LLC

TIMBERLAND INVESTING: CURRENT ENVIRONMENT

February 2005

Mike Walden

Copyright © 2005 by Cambridge Associates LLC. All rights reserved.

This report may not be displayed, reproduced, distributed, transmitted, or used to create derivative works in any form, in whole or in portion, by any means, without written permission from Cambridge Associates LLC ("CA"). Copying of this publication is a violation of federal copyright laws (17 U.S.C. 101 et seq.). Violators of this copyright may be subject to liability for substantial monetary damages. The information and material published in this report are confidential and non-transferable. This means that authorized members may not disclose any information or material derived from this report to third parties, or use information or material from this report, without prior written authorization. An authorized member may disclose information or material from this report to its staff, trustees, or Investment Committee with the understanding that these individuals will treat it confidentially. Additionally, information from this report may be disclosed if disclosure is required by law or court order, but members are required to provide notice to CA reasonably in advance of such disclosure. This report is provided for informational purposes only. It is not intended to constitute an offer of securities of any of the issuers that are described in the report. This report is provided only to persons that CA believes to be "Accredited Investors" as that term is defined in Regulation D under the Securities Act of 1933. When applicable, investors should completely review all Fund offering materials before considering an investment. No part of this report is intended as a recommendation of any firm or any security. Factual information contained herein about investment firms and their returns which has not been independently verified has generally been collected from the firms themselves through the mail. CA can neither assure nor accept responsibility for accuracy, but substantial legal liability may apply to misrepresentations of results delivered through the mail. The CA manager universe statistics, including medians, are derived from CA's proprietary database covering investment managers. These universe statistics and rankings exclude managers that exclude cash from their reported total returns, and for calculations including any years from 1998 to the present, those managers with less than \$50 million in product assets. Returns for inactive (discontinued) managers are included if performance is available for the entire period measured. Performance results are generally gross of investment management fees. CA does not necessarily endorse or recommend the managers in this universe.

Cambridge Associates LLC is a Massachusetts limited liability company headquartered in Boston, MA with branch offices in Washington, DC and Menlo Park, CA. Cambridge Associates Limited is a Massachusetts limited liability company headquartered in Boston, MA and registered in England and Wales (No. FC022523, Branch No. BR005540). Cambridge Associates Limited also is registered to conduct business in Sydney, Australia (ARBD 109 366 654). Cambridge Associates Asia Pte Ltd is a Singapore corporation (Registration No. 200101063G).

CONTENTS

Abstract	Ĺ

Summary	. 4
---------	-----

Exhibits

1	U.S. Timberland Values and Stumpage Prices	15
2	NCREIF Timberland Index	16
3	Sources of Timberland Returns	17
4	Trends in Net Exports: United States and Russia	18
5	Breakdown of the NCREIF Timberland Index	19
6	Industrial Roundwood Production	20
7	Non-U.S. Timberland Investing	21
8	Global Timberland Investing Quantitative Characteristics	22
9	Timberland Ownership: Shifting Toward TIMOS	23
10	Institutionally Investable Timberland	24

ABSTRACT

- 1. Timberland investing remains a value game, driven by skillful active management. Assuming a real return of 0% from price appreciation, timberland managers must have well-developed strategies for purchasing properties at a discount, enhancing yields, boosting tree growth, and opportunistically selling properties, which in sum will deliver real returns of at least 6%. These return assumptions (6% real) are far below the banner performance of the 1980s and 1990s (8% real), but U.S. investors should not expect those returns going forward for many reasons, including fewer inefficiencies throughout the market, less export demand, and the fact that a good portion of the historical performance was from one-time events (e.g., spotted owl crisis).
- 2. There has been a marked increase in both the interest and level of investment in timberland over the past two years. In some cases, relatively inexperienced investors have paid large premiums to the price of standing timber based on *potential* higher and better use (HBU) for the underlying land. While there have certainly been cases where investors earned significant returns from selling their properties for real estate development, the key has been to *not* pay up for what is a very uncertain payoff 15 years down the road. The HBU potential should act as a kicker or very long-duration call option, for which investors pay very little, if anything.
- 3. In recent years, stumpage values have decoupled from timberland prices. Indeed, if the discount rate has fallen to reflect a more mature asset class with lower return expectations today than ten to 15 years ago (e.g., 6% real rather than 8% real), investors would either be willing to pay the same price today for relatively lower stumpage values, or pay more for the same stumpage values. However, part of this may be related to a temporary decline in stumpage values from the 2001-02 global recession. While lumber prices subsequently experienced a sharp rebound in 2003-04, production capacity bottlenecks and a temporary glut of harvested timber hindered a similar rebound in stumpage prices.
- 4. We currently view timberland as fairly valued over ten- to 12-year investment horizon, but believe investors should perform significant due diligence before investing and carefully evaluate each manager or opportunity. Timberland investment managers with a well-documented, value-driven approach (e.g., a comprehensive discounted cash flow approach that results in a fairly low bid to success rate and acquisitions at significant discounts to appraisal values) are likely to deliver better relative results in this environment. Managers with experience turning around neglected tracts of timberland also maintain a significant advantage over those that only purchase well-managed, efficiently yielding properties. In addition, the headlong rush of relatively inexperienced investors willing to pay up for HBU will produce some opportunities to sell off small portions or tracts of timberland.
- 5. While there has been little change in aggregate global consumption of industrial roundwood (IRW) and forest products over the past decade, several underlying shifts have important implications for investors. For example, the plantations of South America and old-growth forests of eastern Russia are playing an increasingly important role. In addition, the growing wealth of emerging nations is likely to result in significant changes in usage patterns, as rising income levels drive demand for many luxuries taken for

C A CAMBRIDGE ASSOCIATES LLC

granted in the developed Western world (e.g., housing, furniture, and newspapers). Finally, plantations are expected to play an increasingly significant role—moving from approximately 25% of aggregate IRW production today to more than 50% in 20 years.

- 6. China's low-cost labor advantage has resulted in its becoming a major producer of wood products such as plywood and furniture, while it is also consuming increasing quantities of wood resources domestically. This coupled with far-reaching environmental programs to curtail logging in natural forests has made China a significant net importer of timber. U.S. hardwood investors, and hardwood exporters in countries like Malaysia, should benefit substantially from growing demand out of China and the economic resurgence of Japan. However, China's appetite for softwoods is predominantly served by Russia (84% of softwood IRW logs imported into China in 2003 were from Russia).
- 7. Canada supplies the United States with 90% of wood product and lumber imports, despite an ongoing, 20-year trade dispute. Brazil and Chile supplied the United States with \$640 million and \$450 million, respectively, of total imported wood and forest products in 2001, a very distant second and third behind Canada (\$23 billion). While the South American markets are often noted for their fast-rotation plantation hardwoods, the mixes of plantation-produced timber are quite different between the two countries. For example, Brazil produces approximately 60% hardwoods (eucalyptus) and 40% pines, while radiata pine and eucalyptus account for approximately 75% and 17% of plantation timber, respectively, in Chile.
- 8. New Zealand, which had exports of \$190 million and \$1.8 billion to the United States and world, respectively, in 2001, is a major supplier of logs and wood products to neighboring Asian countries such as Japan, Hong Kong, and China. In 2003, New Zealand experienced a 17.1% increase in its IRW exports to China, reaching 1.7 million cubic meters. More recently, surging lumber exports to China have taken the place of New Zealand's more traditional role of supplying logs. As in Chile, radiata pine makes up nearly 75% of New Zealand's timberland supply.
- 9. Many of these foreign markets are relatively more inefficient than the United States and there is some evidence that suggests a globally diversified timberland portfolio can increase returns and reduce overall risk. However, the *qualitative* risks are many and are often paramount to investing in foreign markets. Such risks include the skill and depth of the local labor pool, advancement (or lack thereof) in forestry technology, climate variations, environmental regulations, legal restrictions, and mill processing capabilities. Generally speaking, investors should gain significant experience investing in timberland domestically before diversifying internationally, so that they can afford to focus on the numerous qualitative factors likely to impact non-U.S. investments.

SUMMARY

Introduction

"It is remarkable what a value is still put upon wood even in this age and in this new country, a value more permanent and universal than that of gold."

-Henry David Thoreau

Such sentiments continue to ring true a century and a half later, as hosts of investors have come to appreciate timberland for its inflation-hedging characteristics, portfolio diversifying attributes, and price stability relative to other commodities. In fact, there has been a marked increase in both the interest and level of investment in timberland over the past two years. While the influx of new capital has not altered the fundamental case for a relatively small allocation to timberland, there have been some noteworthy changes to the market environment, which this paper discusses in a review of current valuations, return expectations, global timber economics, and international investment opportunities.¹

Valuations

At first glance, several indicators suggest U.S. timberland may be overvalued. For example, new investor flows have increased significantly over the past two years and now exceed most estimates of currently available property supply. In some cases, relatively inexperienced investors have paid large premiums to the price of standing timber based on *potential* higher and better use (HBU) for the underlying land. While there have certainly been cases where investors earned significant returns from selling their properties for real estate development, the key has been to *not* pay up for what is a very uncertain payoff 15 years down the road. Rather, the HBU potential should act as a kicker or very long-duration call option, for which investors pay very little, if anything. Experienced timberland managers will bid for deals with HBU, but will seek deal prices that imply greater than fair market value returns on the standing timber alone, plus a small, very conservative premium for the HBU.

The other factor that makes timberland look a bit frothy today is that stumpage values have, on average, decoupled from timberland values. This trend first occurred in the western United States in the midto late 1990s due to falling exports, but has occurred more recently in the southern United States as stumpage prices have yet to rebound from their 20% decline between 2000 and 2002 (Exhibit 1). Although the snap conclusion would be that this is due to investors overpaying for HBU in recent deals, the HBU deals actually represent a small portion of aggregate timberland transactions and prices are at 2000 levels, not new highs. The more important question is whether the changes are temporary, or something more permanent driven by a change in fundamentals.

¹ For an overview of timberland as an asset class and for implementation considerations, see our reports *Timberland Investing* (2002) and *Implementing Investments in Real Assets* (2004).

Stumpage Prices

A fair purchase price for timberland is the sum of discounted cash flows from the standing timber.² However, if the discount rate has fallen to reflect a more mature asset class with lower return expectation today than ten to 15 years ago (e.g., 6% real rather than 8% real), investors would either be willing to pay the same price today for relatively lower stumpage values, or pay more for the same stumpage values. In either case, there would be a widening in the "fit" between timberland prices and stumpage values.

It is also important to consider the possible adverse affects of the 2001-02 global economic recession, which was particularly tough on the forestry industry. However, what explains the failure of stumpage prices to subsequently rebound? After all, lumber (sawn timber) prices, approximately \$380 per thousand board feet (m/bf), are 40% higher than their fourth quarter 2002 lows and many paper product companies have recently experienced record profit growth. Two factors that provide some explanation: production capacity bottlenecks and an unusually large inventory of harvested timber. There are currently 220 fewer wood and paper mills and 128,000 fewer total jobs in the North American forestry industry than there were in 1997.³ Thus, the industry was left with insufficient production capacity to meet sharply rising (and unanticipated) levels of global demand in 2003. This type of production squeeze results in higher finished product prices, but not necessarily higher prices for raw timber. In addition, if a net reduction in the number of mills forces loggers to travel a materially farther distance to the remaining mills, transportation costs will rise and stumpage values could fall as reflection of less expected net revenue. Coincidentally, increases in the harvested supply of pulpwood also hampered stumpage values. These temporary increases were the result of drier than average weather in the U.S. South and thinning programs in both the South and West. Additionally, many South American plantations recently reached harvest maturity, resulting in greater volumes of competing supply for the U.S. markets.

With much of the excess supply deck cleared and production rates accelerating, there is now some budding evidence of an increase in log and stumpage prices. The one-year income return on the NCREIF Timberland Index was 5.0% in 2004—the highest four-quarter income return since the first quarter of 1999 and only slightly below the rolling annual average of 5.3% since 1994⁴ (Exhibit 2). However, an increase in harvest volumes could produce the same effect.

Leading timber economists expect stumpage and delivered log prices to be flat or slightly down in real terms over the next several years, depending on the species and the region. Such forecasts rely on very accurate predictions of economic growth, interest rates, world demand, and even the weather (wet weather especially hinders the harvesting of low-lying pine plantations in the South; while late or inconsistent freezes can reduce the pivotal winter harvest in the Northeast). Prices could also be affected by changes in exchange

 $^{^2}$ Timberland properties are valued according to an implied capitalization rate (discount rate) much like real estate. Historically, the cap rate band across regions has been 6% to 8% real.

³ Source: "A Leaner North American Paper Industry is benefiting from global economic growth and an upturn in pulp, paper, and paperboard prices," *Paperloop*, May 2004. It is important to note that the drastic mill reduction has not resulted in as drastic a production decline because mill efficiency and size has generally increased.

⁴ The comparison since 1994 is more relevant than starting in 1987 (index inception) because logging bans in the Pacific Northwest (PNW) between 1989 and 1993 drastically reduced production on government lands and artificially inflated prices for private owners (the PNW made up 40% to 50% of the NCREIF 1989-93).

rates, with a sharply lower U.S. dollar likely to result in a significant boost to demand and U.S. timber prices. When one adds the variable impacts of transportation costs, impediments to extraction, and wood quality, it becomes apparent that price forecasts are something of a shot in the dark.

Given that our baseline long-term return assumption of 6% real (5% for the asset class, plus 1% from active enhancements) includes zero real timber price appreciation, we view timberland as fairly valued over a ten- to 12-year investment cycle. However, investors should carefully evaluate the purchasing discipline and strategies of the timberland managers they hire, as there is no remedy for overpaying.

Return Expectations for U.S. Timberland

Long-Term Assumptions

Successful timberland investing remains a value game, driven by skillful active management. Assuming a real return of 0% from price appreciation, timberland managers must have well-developed strategies for purchasing properties at a discount, enhancing yields, boosting tree growth, and opportunistically selling properties, which in sum will deliver real returns of at least 6% (Exhibit 3). Currently, some timberland investment management organizations (TIMOs) note that capitalization rates are approximately 6.5% real in the U.S. South, within the historical band of 6.0% to 7.5% real, and that rates appear to be converging across U.S. regions. Further, the downside risk for southern United States capitalization rates is estimated to be limited to another 50 basis points, with a rough balance between supply and demand expected over the next 15 years.

The 1980s and 1990s Are History

Long-term equilibrium return assumptions for timberland are far below the banner performance of the 1980s and 1990s, but investors should not expect those returns going forward for many reasons. First, timberland was a very immature *asset class* during that period since it lacked many of the basic characteristics of an institutional investment. As with any new, untapped investment space, there were relatively more inefficiencies of greater magnitude being exploited by relatively fewer players. Second, there was a relatively greater supply of medium-sized tracts available from private landowners, who had never before "managed" timberland for the purpose of enhancing yields, nor had they been approached to sell. Third, North America, and the western United States in particular, has less of the export market share today than it did ten to 15 years ago (Exhibit 4). Some of this is driven by resurgence of areas like Russia, which serves the growing demand of China. This is not to say that select species in the United States (e.g., specialty hardwoods like black cherry from the Northeast and high-quality softwoods like Douglas fir in the PNW) will not continue to benefit from overseas demand, but exports are a much smaller factor for the overall U.S. market today than they were in the 1980s and early 1990s. Finally, a good portion of the return in the 1980s and 1990s came from one-time events. For instance, the spotted owl crisis of the late 1980s and early 1990s resulted in logging bans across the PNW, which effectively reduced timberland harvests by 80%

and drove prices to record levels. Some private timberland owners (i.e., non-government) earned extraordinary returns.

NCREIF Timberland Index

The PNW made up approximately half of the NCREIF Timberland Index from 1989 to 1993. As a result, the index returns for those years are highly idiosyncratic and should probably be excluded from any evaluation of the "normal" or expected range of returns for this asset class. In fact, the NCREIF Timberland Index was a fairly narrow benchmark throughout the 1990s, covering the timberland properties of just three managers that in aggregate made up only 25% to 30% of institutionally managed timber properties. In the past few years, NCREIF has sought to broaden the scope and coverage of the index, such that it now includes the holdings of seven TIMOs, which represent approximately 40% of the U.S. market (Exhibit 5). However, the properties that represent the Northeastern region were recently switched from a mix of hardwoods and softwoods in the Northeast (approximately \$300/acre) to a limited subset of hardwoods in Pennsylvania (\$3,000/acre). This is due to sales by CALPERs in the Northeast, which removed the properties from the managers that report to NCREIF.

Looking Ahead

In recent years, the largest, integrated forest product companies have sought to divest their timberland holdings. The trend peaked during the global recession of 2001-02, when tight credit conditions forced their highly leveraged hands and many companies sought to raise cash immediately. This created a brief and favorable buying environment for TIMOs and direct investors. The transfer of timberland ownership to TIMOs has since resumed, as a handful of forest product companies continue to struggle under large debt loads (e.g., Crown Pacific⁵) and industry leaders seek to raise capital for overseas opportunities. However, now that the majority of forest product companies are dealing from the context of loose credit conditions, high profits, and greater investor flows, they are likely to be more selective about selling their properties—likely to be seeking profits rather than desperately raising cash.

This suggests that skilled managers will need to proceed cautiously, but must also know when to pounce. One sign of a manager with an eye toward value would be a relatively low bid to success rate (e.g., succeeding in 20% to 25% or less of total purchase bids). This should be supported by a consistent history of acquisitions at discounts to appraisal values, which is the result of a well-documented and tested valuation process (e.g., comprehensive discounted cash flow analysis). Managers with experience at turning around neglected tracts of timberland maintain a significant advantage over those that only purchase well-managed, efficiently yielding properties. In addition, the headlong rush of relatively inexperienced investors willing to pay up for HBU will produce some opportunities to sell off small portions or tracts of timberland. Finally, as the U.S. market matures and capitalization rates converge across regions, we would recommend that investors focus on bottom-up analysis of individual investment opportunities, while carefully considering the

⁵ Crown Pacific has turned over 525,000 acres in the PNW to its creditors, a step that completes its dissolution and results in the temporary formation of creditor company Cascade Timberlands.

C A

regional and species diversification of the overall portfolio. U.S. timberland remains moderately inefficient, but this is not a time to invest in the asset class willy-nilly, just to be there.

A Word on Species and Regions

While diversifying among the major U.S. timberland regions (i.e., the Northeast, South, and West) is often considered synonymous with species diversification, that is not necessarily the case. In addition, there are many important distinctions within the catchall categories: softwoods and hardwoods. For example, different species of hardwoods are used in low-value lumber products (e.g., plywood) than those used for high-value lumber products (e.g., cabinets and furniture), but together these applications only represent one-third of annual hardwood consumption. The remaining majority of hardwood consumed each year is used for pulpwood and fuel. Within the hardwood lumber segment, higher-value woods (e.g., cherry and maple) represent approximately one-third of consumption. The remaining two-thirds of hardwood *lumber* is of lower quality (e.g., beech, poplar, and some oaks) and is used in a wide range of applications from pallets, containers, and other shipping materials to railroad ties and flooring. While the Northeast and North Central regions contain the majority of *high-quality* hardwoods, the overall hardwood market is widely distributed (46% in the South, 27% in the Northeast, 20% in the North Central region, and 7% in the West).

Softwoods are generally divided between the South and West. The southern United States specializes in fast-rotation plantation softwoods (pine), while the slower-growing western United States produces some higher-quality grades of softwoods (e.g., Ponderosa pine used for "knot-free" applications like moldings, cabinets, and flooring and Douglas fir, which is the lumber of choice in residential construction). Plantation logs are generally of small diameter and are used for pulp, composite wood, and light framing wood products. Large-diameter logs from natural growth forests (e.g., Douglas fir) remain the main source of construction/dimension lumber and generally fetch prices many multiples higher, and disproportionately greater, than smaller-diameter plantation logs.

Global Forest Economics

While there has been little change in aggregate global consumption of industrial roundwood (IRW) and forest products over the past decade, there are several emerging trends that have important implications for investors. For example, the plantations of South America and old-growth forests of eastern Russia are playing an increasingly important role in timber production. In addition, the growing wealth of emerging nations is likely to result in significant changes in usage patterns, as rising income levels drive demand for many luxuries taken for granted in the developed Western world (e.g., housing, furniture, and newspapers). Finally, plantations are expected to play an increasingly significant role in the global forest resource—moving from approximately 25% of aggregate IRW production today to more than 50% in 20 years.

Housing

New residential construction and remodeling account for 40% and 30% of the softwood lumber consumed, respectively, in the United States. As a result, some speculate that the current record U.S. housing boom (and similarly hot housing markets worldwide) is setting timberland investors up for a nasty one-two punch—overpaying today for what will be disappointing demand tomorrow. While this risk should not be disregarded, history and demographics suggest otherwise. The net effect of the U.S. recession of 1990-91, which was characterized by a sharp decline in real estate prices and a massive overhang of new home inventories, was a 20% decline in annual new housing starts over a two-year period (from 1.5 million units in 1989 to 1.2 million units in 1991). Housing construction resumed its 1989 pace by 1993 and has since trended up to near 2.0 million annual starts. More importantly, stumpage prices in the southern and western United States were basically unchanged between 1989 and 1991.⁶

According to the U.S. Census Bureau, the total U.S. population is expected to increase by more than 100 million people (40%) by 2045. Based on how population growth influenced housing construction between 1980 and 2003, Global Forest Partners estimates that housing starts will average 2.2 million units/year over the next 40 years (an increase of 0.5 million units over the average since 1980). This, in turn, will result in a 76% increase in lumber consumption between 2003 and 2045 (from 45 billion to 76 billion board feet [bbf]), compared to an increase of 125% since 1980 (20 bbf to 45 bbf). Their assumptions include a continued increase in average home sizes; if no increase in home size is assumed, the increase in lumber consumption is expected to be 42%. While these are clearly long-term forecasts and just one set of expectations, the main point is that demographics underpin a long-term increase in timber consumption that should support asset class returns.

China and Russia

China's emergence as a leading growth engine for the world economy is likely to have a significant impact on timber supply, demand, and usage. Not only has China's low-cost labor advantage resulted in its becoming a major producer of wood products such as plywood and furniture, but it has also been consuming significantly greater wood resources domestically. In addition, China's government has implemented far-reaching environmental programs to curtail logging in natural forests (e.g., Natural Forest Protection Program [NFPP] among others). The end result is that China is becoming a significant net importer of timber. In 2003, total annual consumption of IRW in China was approximately 110 million cubic meters (m³) compared to domestic IRW production of approximately 85 million m^{3.7} China is starting to see a rebound in supply from accelerated plantation efforts like the Fast-Growing Timber Plantation Program (FGTPP), but it is unlikely that programs like the FGTPP will do more than offset the loss of supply from programs like the NFPP.

⁶ The logging bans in the PNW did not appear to show up in stumpage prices until 1992 and 1993, when they increased 42% and 62%, respectively; however, there could have been more offsetting effects in 1990-91.

⁷ If one counts the wood used for fuel, China's total annual consumption is approximately 300 million m³. As a sign of how far China has to come, consider that approximately 63% of China's total wood consumption is for fuel purposes, compared to just 18% used for fuel in the United States.

CAMBRIDGE ASSOCIATES LLC

U.S. hardwood investors, and hardwood exporters in countries like Malaysia, should benefit substantially from growing demand out of China and the economic resurgence of Japan. Though New Zealand has been increasing its exports of softwoods to these two countries, their appetites for softwoods are predominantly served by Russia (84% of softwood IRW logs imported into China in 2003 were from Russia). In fact, Russia has been chipping away at the U.S. exports of softwoods to China and Japan for more than a decade. The United States was a net exporter of approximately 5.5 million m³ of softwood IRW in 2003, compared with approximately 25 million m³ of softwood IRW in 1990, while Russia's net softwood IRW exports have soared from 3.4 million m³ to 28.4 million m³ over the same period. Russia will continue to dominate the Chinese market for many reasons, including its vast timber resources (albeit a large portion is economically inaccessible); a long history of trade with China; similarities between timber in Russia and Northeastern China that simplifies processing for Chinese mills; and an abundant supply of cheap Chinese workers to the Russian forestry industry. It is also believed that much of the cross-border commerce is going unrecorded—Russian authorities estimate that nearly 20% of logging is being done illegally, while others estimate illegal logging may be closer to 50%. However, should China stumble, the Russian forestry industry may retrench rather than export elsewhere. Many of Russia's competitive advantages are either regionally constrained or wholly dependent on China. For example, since 1999 U.S. softwood lumber imports from Germany have grown at a rate five times faster than imports from Russia.

The Rest of the World

Despite having just 6% of the world forest coverage, the United States is the world's largest producer of IRW, with approximately 21% of total world production. The mirror image of this imbalance can be found in the two largest areas of forest coverage, Russia and Brazil. These two countries combined represent 56% of total world forest coverage, but provide just 7.0% and 6.8% of world IRW production, respectively.

Canada, which supplies over 90% of U.S. imports, has historically been the main threat for the U.S. forestry industry. Canada has the potential to be a much larger supplier, since its forest resource is the world's third largest behind Russia and Brazil, but significant U.S. tariffs and Canadian law that prohibits the exportation of logs from public lands (i.e., only wood *products* made in Canada from these logs can be exported) restrain free trade. The running dispute between the United States and Canada goes back more than 20 years and results from the fact that 90% of industrial timberland in Canada is government owned. The government sets stumpage prices when it solicits bids, which the U.S. forestry industry contends are substantially below market value. They argue that this constitutes an unfair subsidy that effectively allows Canadian mills to dump cheap Canadian exports on U.S. markets. The United States has responded with significant tariffs, at one point exceeding 27%. However, the United States remove or significantly reduce the tariffs—a move that could result in a major hit to U.S. softwood prices. Then again, this soap opera has been playing for 20 years without any resolution or real change. Further depreciation of the U.S. dollar relative to the Canadian dollar could also reduce the threat of cheaper Canadian imports.

Outside of Canada, timber's high costs of extraction and transportation, and wide range of mill and processing efficiencies, make it a fairly regional commodity. It takes more than vast forest resources, lower labor costs, and a favorable exchange rate to sway demand toward any one region or country. As a result, those countries closest to the United States pose the biggest competitive threat to domestic prices.

Brazil and Chile supplied the United States with \$640 million and \$450 million of total imported wood and forest products in 2001, respectively, a very distant second and third behind Canada with total exports of approximately \$23 billion. In comparison, Brazil and Chile generated total global export revenue from wood and wood products of approximately \$4 billion and \$2 billion. While the South American markets are often noted for their supply of hardwoods, the mixes of plantation-produced timber are quite different between the two countries. For example, Brazil produces approximately 60% hardwoods (eucalyptus) and 40% pines, while radiata pine and eucalyptus account for approximately 75% and 17% of plantation timber, respectively, in Chile. Other differences between these two regions relate to their production facilities, with Brazil having a more extensively developed production base that results in export of more wood products than logs or lumber. However, in both nations and the region as a whole, the main competitive advantage is the growing climate, which fosters the production of hardwoods on ten- to 20-year plantation rotations, compared to 40 to 80 years for naturally grown hardwoods in the United States.

New Zealand, which had exports of \$190 million and \$1.8 billion to the United States and world in 2001, is a major supplier of logs and wood products to neighboring Asian countries such as Japan, Hong Kong, and China. In 2003, New Zealand experienced a 17.1% increase in its IRW exports to China, reaching 1.7 million m³. More recently, surging lumber exports to China have taken the place of New Zealand's more traditional role of supplying saw logs. As in Chile, radiata pine makes up nearly 75% of New Zealand's timberland supply.

Investing in Non-U.S. Timberland

Greater investors flows and the proliferation of new technologies have moved the U.S. timberland market up a notch on the maturity scale (to perhaps a three, on a scale of one to ten), but many overseas markets remain highly inefficient. In addition, the rebound in global demand has clearly jump-started the timber harvesting and wood product manufacturing operations in areas like Brazil, Chile, New Zealand, and Australia (Exhibit 6). These factors suggest that investors who have significantly diversified domestically— by region, species, and end demand—may find further opportunities overseas. However, there is a significant difference between turning on the power and running an efficient operation.

Historical pricing data is not only hard to find for these markets, but can be inherently unreliable for many reasons. For example, most of the timberland in Australia was state-owned historically, which resulted in fixed and stable prices that mask its true volatility. New Zealand, which unlike Australia is a significant net exporter (nearly one-third of production), has historically relied on the fickle demand of Japan and Korea for much of its exports. With China entering the mix as a major customer and Japan seemingly emerging from more than a decade-long slump, the last ten to 15 years of data on New Zealand timberland may prove

very misleading. While Russia is clearly benefiting from China's rapid industrialization, Russian timberland is at least a decade behind other countries in its use of technology and silviculture techniques to enhance yields.

Qualitative Considerations

While some of these countries would appear to present outstanding investment opportunities, potential investors must carefully examine both the quantitative and qualitative characteristics of each market. Indeed, the qualitative risks are many and are often paramount to investing in foreign markets. For instance, the fragmented and outdated Russian forestry industry may signal blood in the water for timberland investors with a penchant for distressed assets, but the opportunities must be weighed against the rising level of political risk associated with foreign investments in Russia. Any on-the-ground presence must not only be skilled in forestry, but must also be quite savvy and informed politically. Even in relatively tamer countries like Brazil, highly experienced TIMOs have learned that the only way to invest internationally is to have an on-the-ground presence with local investment and forestry experience. This is also important for making reasonably accurate estimates of forest yields in different regions and countries. Other qualitative risks include the skill and depth of the local labor pool, advancement (or lack thereof) in forestry technology, climate variations, environmental regulations, legal restrictions, and mill processing capabilities (Exhibit 7). Some of these "risks" may actually look like opportunities (e.g., the lack of technology advancement and silviculture techniques may provide an edge for a U.S. team that can successfully import these skills).

Quantitative Considerations

From a quantitative perspective, research suggests that adding non-U.S. timberland investments to a U.S. portfolio can provide diversification—higher returns and lower volatility. Through a multifactor process that considers volume risk, price risk, currency risk, and interest rate risk, Global Forest Partners has developed historical risk, return, and correlation assumptions for timberland investments in Australia, Brazil, Chile, New Zealand, Uruguay, and the U.S. South and West (Exhibit 8). It is important to note that the assumptions, and correlations in particular, are not extrapolated solely from historical data, but have been adjusted to reflect qualitative considerations and greater expected globalization going forward. In addition, the data are in U.S. dollars and do not include assumptions about currency hedging.

The very tight range of Sharpe ratios (0.20 to 0.30) suggests that there is little benefit to adding non-U.S. timberland investments on a stand-alone basis; however, diversification benefits accrue from the relatively low correlations among these markets. For example, outside of a 0.60 correlation with neighboring New Zealand, Australia's correlation with all other markets has ranged from a high of 0.40 with the U.S. West to a low of 0.15 with Brazil and Uruguay. Based on this data, investors that moved from a purely domestic U.S. mix to one that was 73% U.S. and 27% non-U.S. (diversified among all non-U.S. markets above except for Argentina) would have increased their return, lowered their portfolio volatility, and boosted their Sharpe ratio from 0.22 to 0.28.

While the assumptions have been carefully constructed to incorporate how historical results may differ from the future, this is by no means a blueprint for a global investment portfolio. Given the extremely inefficient and illiquid nature of these timberland markets, actual results have a very high probability of diverging from these assumptions. Some investors will do much better, but some will do much worse (like the proverbial brother-in-law who lost his shirt investing in soybeans). Many of the markets are *dependent* on very volatile exports to emerging nations. Similarly, the particularly high levels of political and environmental risks in these regions are hard to quantify. Results will also differ based on the ability (or inability) to import western harvesting talent and to leverage local market advantages (e.g., cheap labor). Finally, investment results will be significantly influenced by the future direction of foreign exchange rates, and decisions to hedge this risk.

Generally speaking, investors should gain significant experience investing in U.S. timberland before diversifying outside of the United States, so that they can afford to focus on the numerous qualitative factors likely to impact non-U.S. investments.

Conclusion

Despite the interest shown in timber by institutional investors in recent years, it remains a relatively immature asset class that we would characterize as fairly valued. As with all inefficient and illiquid asset classes, the likely range of returns to different investors will reflect their knowledge of timber's investment characteristics and their ability to *implement* effectively. However, with a 6% estimated real long-term average annual compound return, low correlations with most other asset classes, and inflation sensitivity, timber has considerable appeal to investors with a long horizon.

Investors already experienced in U.S. timber investing have also been exploring opportunities elsewhere, where the markets are increasingly inefficient as one moves out the risk spectrum, from, say, Chile and New Zealand to the wild and unstable frontiers of Russia. For the most part, however, we would caution that the risks of such investments seem commensurate with their higher potential return and should be pursued only by those well equipped with the necessary knowledge and expertise.

EXHIBITS

U.S. TIMBERLAND VALUES AND STUMPAGE PRICES



Southern Timberland: Values vs Stumpage Prices

Western Timberland: Values vs Stumpage Prices



Sources: Global Forest Partners, National Council of Real Estate Fiduciaries, and Timber Mart-South.

NCREIF TIMBERLAND INDEX



Source: National Council of Real Estate Investment Fiduciaries.

* Index inception is 1987, but analysis starts in 1994 to exclude the spotted owl crisis in the Pacific Northwest during 1989-93.

SOURCES OF TIMBERLAND RETURNS

<u>Source</u>	Expected Real Returns (%)
Biological Growth and In-Growth	3-5
Purchase and Sale Discipline	1-3
Opportunistic Harvesting	1-2
Other Active Enhancements	1-2
Real Price Appreciation	0
Total Annual Real Returns*	6-10

Definitions

Biological Growth and In-Growth: Biological growth represents annual biological growth increment adjusted for the cost of bare land. In-growth relates the value of log diameters to their end uses. For example, a tree with a 30-inch diameter might have a value that is 40 to 80 times greater than one with a 10-inch diameter, because the larger tree can be used to produce lumber, while the smaller tree is limited to pulp. As a result, timber can appreciate significantly "on the stump."

Purchase and Sale Discipline: The skill of management is largely reflected in their ability to find properties at a discount to their discounted cash flow and appraisal values. Similarly, selling properties opportunistically, either in small increments or larger tracts, can have a significant influence on total returns.

Opportunistic Harvesting: This relates to a TIMO's decision to increase/decrease harvests at the margin (e.g., +/ 5% to 10%) when market prices are significantly above/below average.

Other Active Enhancements: This covers a range of activities that may add incremental return, including application of advance silviculture techniques, better marketing of logs, land leases for recreational use, and usage right sales to environmental groups.

Source: National Council of Real Estate Investment Fiduciaries.

* These are meant to be very broad ranges; managers may derive a disproportionately greater amount of returns from some areas than others, depending on the property and/or their skill set.



TRENDS IN NET EXPORTS: UNITED STATES AND RUSSIA





Source: "World Wood Fiber Annual Historical Data, 2004," Resource Information Systems, Inc.

* Net exports is based on the difference between industrial roundwood produced and consumed for all species and all uses in each country. The United States imports over \$20 billion in lumber and other wood products from Canada each year, which is included in gross consumption and therefore offsets U.S. gross exports. Data for 2003 are estimated.

BREAKDOWN OF THE NCREIF TIMBERLAND INDEX



Total Market Cap: \$6,629 (\$ millions)

As of December 31, 2004

NCREIF Constituent Managers:

Campbell Group Forest Investment Associates Forest Systems Global Forest Partners Hancock Timber Resources Group Prudential Timber Investments RMK Timberland Group



Source: National Council of Real Estate Investment Fiduciaries.

Notes: Figures may not equal 100% due to rounding. Standard deviations are based on quarterly returns thus requiring at least 20 data points (five years) to be statistically significant. 540q

INDUSTRIAL ROUNDWOOD PRODUCTION



Cumulative Industrial Roundwood Production Growth: 1990-2003



Source: "World Wood Fiber Annual Historical Data, 2004," Resource Information Systems, Inc.

Notes: The United States is the single largest producer of industrial roundwood, Canada is second, and Russia and Brazil are approximately tied for third. "Other" represents the sum of many relatively small producers. Data for 2003 are estimated.

NON-U.S. TIMBERLAND INVESTING

Sample of Qualitative Risks

Operating/Harvesting

- Current forest status
- Technological advancements (harvesting, silviculture, and general infrastructure)
- Transportation (equipment and roads)
- Mill efficiency and operational stability
- Climate and impact on tree growth
- Skill and experience of local labor pool

Pricing/Returns

- Local demand vs export dependence
- Timber usage/product demand
- Accuracy of yield forecasts in new species/harvesting environment
- Deal negotiating environment
- Principal owners of timberland historically (state or privately owned?)
- Wood processing facilities (state or privately owned?)
- Illiquidity

Legal and Political

- Enforcement and protection of property rights
- Easements on land usage
- Environmental restrictions
- Foreign ownership restrictions
- Taxation

GLOBAL TIMBERLAND INVESTING QUANTITATIVE CHARACTERISTICS

	<u>Australia</u>	<u>Brazil</u>	Chile	<u>New Zealand</u>	U.S. South	U.S. West	<u>Uruguay</u>
Australia	1.0						
Brazil	0.2	1.0					
Chile	0.3	0.4	1.0				
New Zealand	0.6	0.3	0.4	1.0			
U.S. South	0.3	0.3	0.3	0.4	1.0		
U.S. West	0.4	0.3	0.3	0.5	0.6	1.0	
Uruguay	0.2	0.6	0.4	0.3	0.3	0.3	1.0

Sample Portfolios

	-		Standard	Sharpe
	Allocation (%)	Return (%)	Deviation (%)	<u>Ratio</u>
U.S. Only				
U.S. South	67.0	7.6	14.3	0.2
U.S. West	33.0	8.2	17.1	0.2
Total	100.0	7.8	13.6	0.2
Global				
Australia	3.0	7.7	15.8	0.2
Brazil	6.0	11.1	24.6	0.3
Chile	6.0	9.3	19.8	0.2
New Zealand	10.0	9.6	22.0	0.2
U.S. South	48.0	7.6	14.3	0.2
U.S. West	25.0	8.2	17.1	0.2
Uruguay	2.0	11.5	25.6	0.3
Total	100.0	8.3	12.6	0.3

Source: "Regional Investment Allocations in a Global Timber Market," Kurt Akers and Renato Staub, Global Forest Partners.

Note: Data are in U.S. dollar terms and assume no currency hedge.

TIMBERLAND OWNERSHIP: SHIFTING TOWARD TIMOS



Timberland Ownership Trends: Holdings by TIMOs

Sources: The Campbell Group and GMO.

Note: For 2004, Cambridge Associates LLC estimates the current institutional AUM to be closer to \$17 billion.

INSTITUTIONALLY INVESTABLE TIMBERLAND



Estimates of U.S. Investable Timberland Base



Estimate of Non-U.S. Investable Timberland Base

Sources: John Hancock and Global Forest Partners.

Notes: Hancock estimates the investable base to be worth \$123 billion. Global Forest Partners estimates the total non-U.S. investable base to be worth approximately \$19 billion.