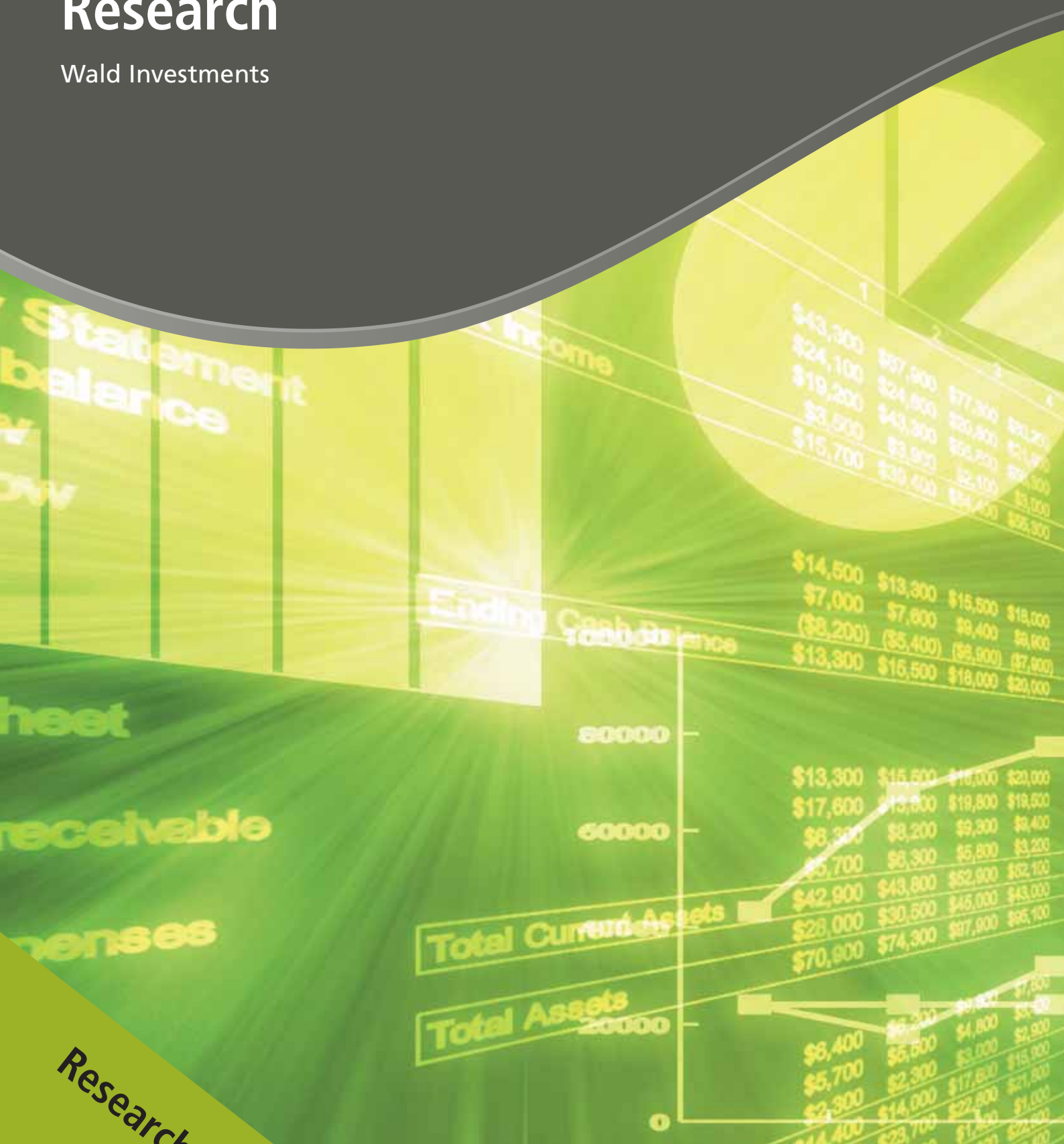


# Research

Wald Investments



Research

**Weltweit gibt es ca. 3,95 Mrd. Hektar Waldfläche. Rund 165 Mio. Hektar – oder 4,17% – davon sind durch Privatbesitz für Investoren zugänglich. Dazu kommen etwa 922 Mio. Hektar öffentliche Waldflächen. Zusammen entsprechen sie einem Wert von fast 500 Mrd. US\$.**

Ob Dauerskeptiker, Berufsoptimisten oder einfach nur verunsicherte Anleger – die jüngsten Turbulenzen am Finanzmarkt haben viele Investoren dazu veranlasst, ihre Asset Allokation grundsätzlich zu überdenken; nur langsam verheilen die Wunden des vergangenen Jahres. In 2008 fiel weltweit der Wert von Aktien um etwa 40%, einzelne Märkte mussten einen mehr als 50%igen Verlust hinnehmen.

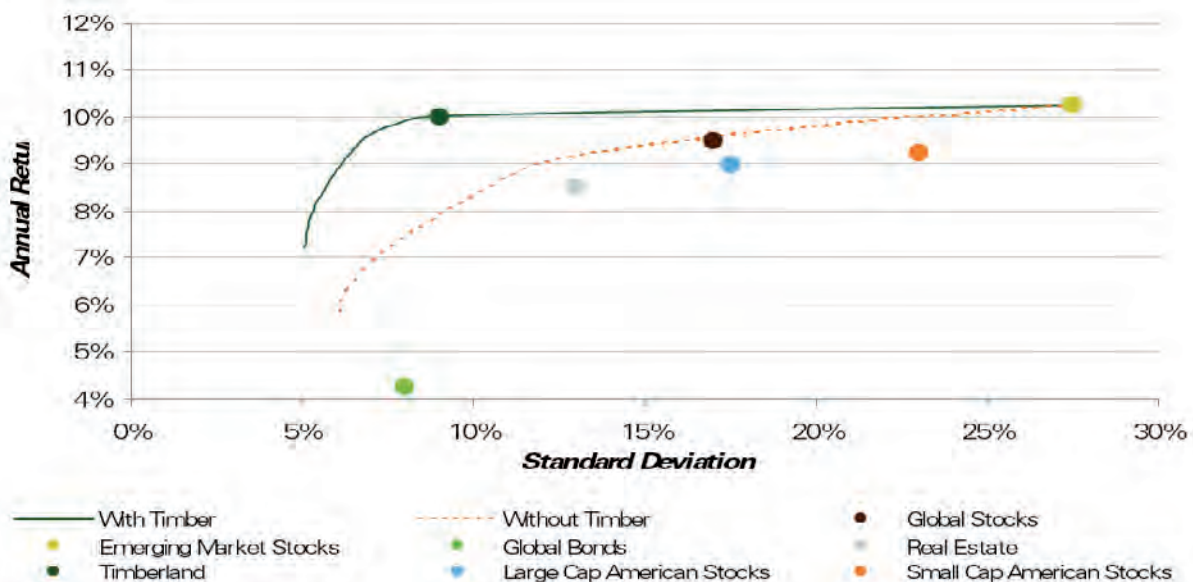
In solch turbulenten Baissephasen zeigen sich Waldinvestments als bekannte Risikostreuer – so erzielten sie im vergangenen Jahr durchschnittlich mehr als 9% Rendite. Seit 1987 zeigen Forstinvestments erstaunlich stabile Performance-Kennzahlen mit nur einem Jahr negativer Ertragsentwicklung. Besitzer von Wäldern sind typischerweise Langzeitinvestoren mit entsprechendem Anlagehorizont. Wenn der Holzpreis in krisenbetroffenen Zeiten sinkt, können Erntepläne und Verkauf optional angepasst werden. Mit positiven Lagerkosten wächst der Rohstoff weiter und steigt aufgrund der längeren Haltezeit entsprechend im Wert.

In den letzten 25 Jahren hat die Assetklasse Wald signifikant an Bedeutung gewonnen. Dabei sind drei Wertetreiber für die erzielten Renditen verantwortlich: der biologische Zinseszineffekt, Preistendenzen am internationalen Holzmarkt sowie die Steigerung der Grundstückswerte. Alle drei Kennzeichen sowie die zusätzliche Flexibilität in Bezug auf Markteinstieg und Erntezeitpunkt bieten Investoren ein attraktives Chancen-Risiko-Profil.



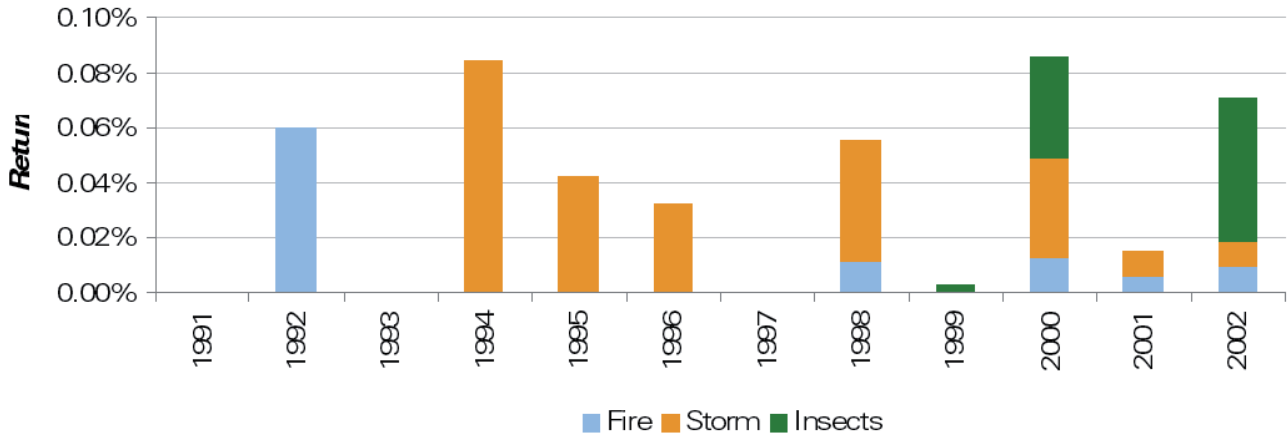
(Figure 1. Sources of Timberland Return. Source: RMK.)

Die Eigenschaften von Forstinvestments wurden auch in die moderne Portfolio-Theorie eingearbeitet. Eine aktuelle Studie der International Woodland Company (IWC) bildet ein Muster-Portfolio mit und ohne Eindung der Assetklasse Wald ab. Die optimale Allokation von Timberinvestments führt dabei zu einer Zielrendite von 8,5% p.a.



(Figure 2. Efficient frontier for an institutional portfolio including and excluding timberland investments.)

Natürliche Risiken wie Sturmschäden, Brand oder Schädlingsbefall sind im Rahmen aktiv gemanagter Waldinvestments weitestgehend zu vernachlässigen. Regelmäßige Wartung und Pflege der Flächen sowie die Diversifizierung über verschiedenen Anbau- und Waldarten bieten hier zuverlässigen Schutz.



(Figure 3. Percentage asset value loss of total in Hancock's<sup>20</sup> investments in North America. Hancock had during that time managed timberland valued at about USD 2 billion. Source: Hancock Timber Resource Group, 2003d)

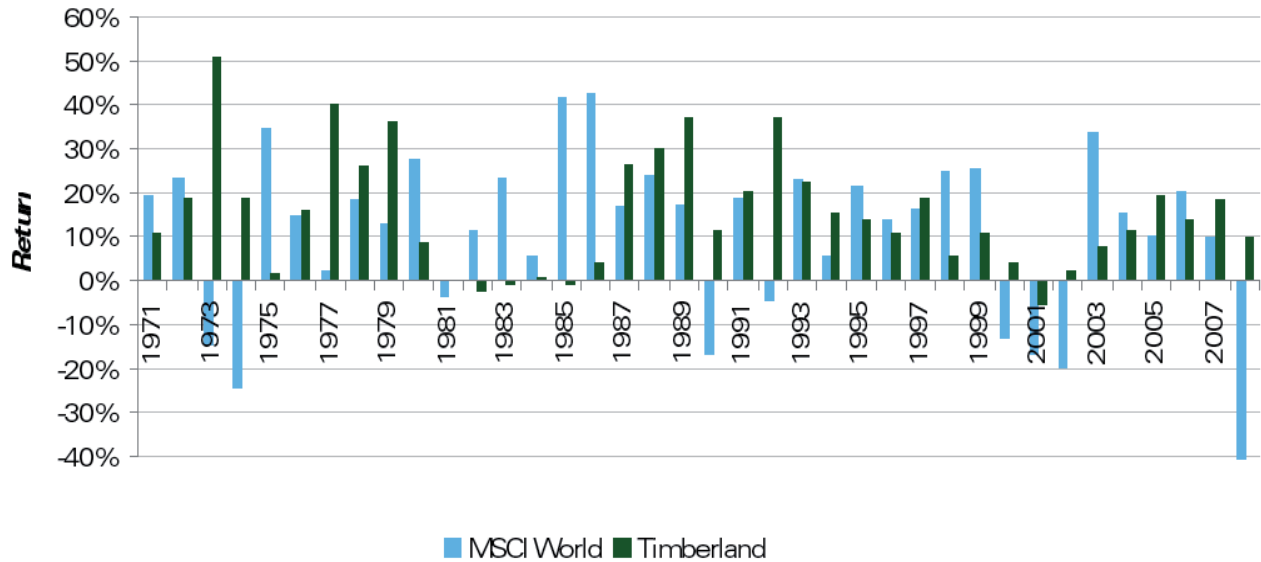
Neben den natürlichen Gefahren spielen auch politische Risiken eine Rolle in der Evaluation passender Zielinvestments und der zu erwartenden Rendite. Zur Orientierung bietet der Worldwide Governance Indicator (WGI) seit 1996 ein Ranking von rund 212 Ländern, die neben der Einschätzung der Regierungssouveränität auch die Kategorien Korruption oder Gesetzgebung abdecken. Insbesondere für die Investmentregionen rund um den Äquatorial-Bereich resultieren aus dieser Studie entsprechende Risikoprämien, die wiederum zur Renditeerwartung des Investments beitragen.

Renditen aus Waldinvestments zeigen historisch betrachtet eine niedrige Korrelation mit Gewinnen aus traditionellen Assetklassen wie Aktien, Anleihen oder Immobilien. Die Frage ist nun, wie die Bedingungen für die Korrelationsverhältnisse der Zukunft definiert werden können. Vier Faktoren nennt die International Woodland Company darauf als Antwort:

### 1. Korrelation der Holzpreise

Empirische Daten haben bestätigt, dass der Holzpreis ca. ein Drittel der Renditeerwartung von Waldinvestments ausmacht. Basierend auf dieser Annahme wurden durch die IWC die Entwicklung des US Holzmarktes im Vergleich zum US Finanzmarkt betrachtet.

Das Ergebnis: Historisch gesehen tendiert die Korrelation des amerikanischen Holzpreises mit den Renditen aus US Aktien, US Anleihen oder US Immobilien im Mittel gegen Null. Die zyklischen Bewegungen des Holzmarktes zeigen dabei nur wenig Berührungspunkte mit den Ausschlägen des Finanzmarktes. Zwar zeigen sich die Holzpreise kurzfristig zum Teil stark volatil, in der Langzeit-Betrachtung ist jedoch eine Steigerung der Preise über dem allgemeinen Preisniveau festzustellen. Erträge aus Waldinvestments können aufgrund der Stabilität der Anlage in dynamischen Wachstumsphasen zeitweise unterperformen. In der Langzeitperspektive dienen sie als Risikostreuer für das Gesamtportfolio (vgl. MSCI World vs. - John Hancock Timber Index, 1987 - 2008).



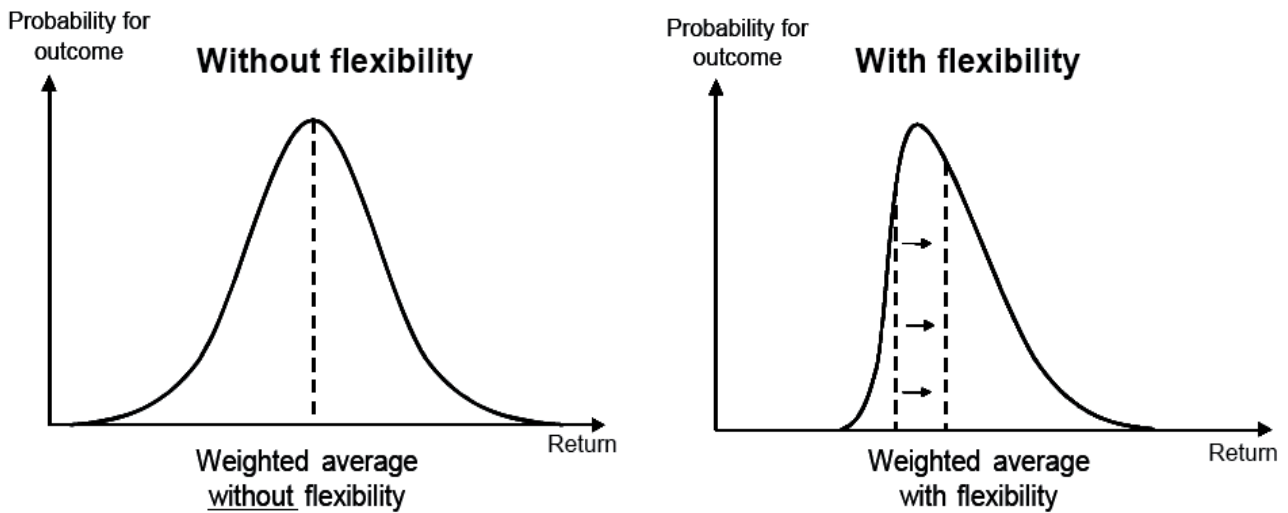
(Figure 4. John Hancock Timber Index<sup>5</sup> versus MSCI World<sup>6</sup>, 1971-1987, and NCREIF Timberland Index<sup>7</sup> versus MSCI World, 1987-2008)

## 2. Prinzipien der Grundstücksbewertung

Der Marktwert von Forstflächen wird ermittelt anhand prognostizierter Werte desselben Jahres für vergleichbare Grundstücke. Die Festlegung dieses Wertes hängt mit der Beschaffenheit der gegebenen Flächen zusammen: Wie viel Ertrag brachten die vorhandenen Baumbestände in der Vergangenheit, in welchem Wachstumszustand befinden sich die Hölzer, was kostet die Wiederaufforstung und wie gestalten sich die Abnahmeverträge vor Ort? Auch die Lage, Flächengröße und Bodenbeschaffenheit des Waldstücks gehen in diese Rechnung ein. Der größte Teil des Wertes hängt jedoch abermals von dem biologischen Wachstum der Pflanzen ab. Unbeeinflusst von schwankenden Bodenpreisen wachsen die Bäume kontinuierlich und gewinnen an Wert – während die Nachfrage nach dem Rohstoff kontinuierlich steigt. Getrennt vom restlichen Kapitalmarkt sollte der Wert von Waldflächen auch in Zukunft nur wenig von den Schwankungen der Finanzmärkte betroffen sein.

## 3. Ernteflexibilität

Der biologische Zinseszins der Baumbestände ermöglicht Investoren besonders eines: Akkurates Ernte-Timing. Über die Preisschwankungen für Holz können Ernte und Verkauf entsprechend terminiert werden. Ein Halten der Baumbestände während fallender Märkte schmälert nicht die zu erwartende Rendite sondern erhöht sie durch positive Lagerkosten. Eine asymmetrische Ertragsstruktur ist die Folge. Niedrige Risikopotenziale treffen hier auf eine erhöhte Renditeerwartung.



(Figure 5. The effect of return structure due to the introduction of harvest flexibility)

#### 4. Exogene Schocks

Auch exogene Schocks – Verwerfungen, die unabhängig von ökonomischen Trends und Bewegungen sind – können Wälder und die zu erwartenden Holzpreise beeinflussen. Ein Beispiel dafür ist die Russische Waldsteuer, die Ende 2000 eingeführt wurde. Obwohl die Steuer bis Mai 2009 nicht abschließend in Kraft trat, sorgte sie dennoch für eine Veränderung der Balance zwischen Angebot und Nachfrage. Der Export aus Russland wurde stark unterbunden und führte zu einem Nachfrageüberschuss der die Holzpreise antrieb.

Alle vier genannten Faktoren werden auch in Zukunft diversifizierend wirken. Die historisch niedrige Korrelationsrate der Assetklasse Holz sollte damit auch in den nächsten Jahren zur Stabilisierung eines Gesamtportfolios beitragen.

*Bei Erwerb und Bewirtschaftung der Waldflächen arbeitet Aquila Capital eng mit dem Investment Advisor International Woodland Company (IWC) zusammen. Als führender europäischer Anbieter für weltweite, professionell gemanagte Waldinvestments führt die IWC zwei Kernkompetenzen zusammen: fundiertes forstwirtschaftliches Fachwissen und langjährige Investorenerfahrung.*

# ANHÄNGE

## GLOBAL TIMBERLAND INVESTABLE UNIVERSE – 2009 UPDATE

Methodology .....	S. 02
Results .....	S. 03
Conclusion .....	S. 04

## REASONS FOR LOW CORRELATIONS BETWEEN RETURNS FROM TIMBERLAND INVESTMENTS AND FINANCIAL MARKETS – 2009 UPDATE

Correlation with timber prices .....	S. 01
Principles for property appraisals .....	S. 02
Harvest flexibility .....	S. 03
Exogenous shocks .....	S. 04
APPENDIX 1 .....	S. 06

## IWC 2008 INFORMATION REPORT

2008 Highlights .....	S. 01
Statements by the managing director .....	S. 04
New Business: IWC's fund-of-funds .....	S. 06
Corporate Social and environmental responsibility .....	S. 10
Financial Highlights .....	S. 12
Management review of the 2008 financial results .....	S. 13
Organisation and human resources .....	S. 14
Company information .....	S. 18

## TIMBERLAND INVESTMENTS IN AN INSTITUTIONAL PORTFOLIO – 2009 UPDATE

### Timberland Investments in an Institutional Portfolio – 2009 Update

EXECUTIVE SUMMARY .....	S. 03
1 INTRODUCTION .....	S. 05
2 TIMBERLAND RETURN CHARACTERISTICS .....	S. 06
3 HISTORICAL TIMBERLAND PERFORMANCE .....	S. 11
4 IWC'S ASSET ALLOCATION MODEL .....	S. 21
REFERENCES .....	S. 24

# GLOBAL TIMBERLAND INVESTABLE UNIVERSE

Copenhagen, June 2009

# GLOBAL TIMBERLAND INVESTABLE UNIVERSE

This note is the executive summary of IWC's research on timberland available worldwide for institutional investments. In total, there are 3.95 billion hectares of forest in the world, of which we estimate 165 million hectares (or 4.17%) to be privately investable, representing a value of USD 467 billion. In addition, investable public forestland is estimated to be 922 million hectares (23.33%), representing a value of USD 249 billion.

## 1 Methodology

Countries have been investigated through three main criteria: political stability, forest cover, and data availability. The countries meeting these criteria were then divided into regions based on continents and sub-regions based on forest types.

Political stability was measured based on the World Bank's governance indicator. Countries were included if they are above the world median. The Food and Agriculture Organization (FAO) forest cover data was used to determine the forestland area of each country; a minimum of a forest cover of 10% being required to be included in the study. Some countries were excluded due to insufficient data whereas other countries were included even though they did not meet all criteria as long as they are considered major timber producer countries or countries that have already welcomed institutional forest investments.

Ownership patterns were surveyed dividing the forestland into private, public and other types of ownership. Private forestland should here be understood as land readily investable via fee simple purchase while investable public forestland is accessible via long-term lease agreements or harvesting rights. Other ownership types like municipalities, churches, etc., have been regarded as non-suitable for institutional investments. Finally, each type of forest was assigned a per hectare value based on known transactions and best estimates.

## 2 Results

### 2.1 Investable private forestland

The USA possesses the largest area of private investable forestland followed by Europe and South America (see Figure 1). Altogether, IWC estimates that 165 million hectares of private forestland are available for institutional investments worldwide. This represents a value of USD 467 billion.

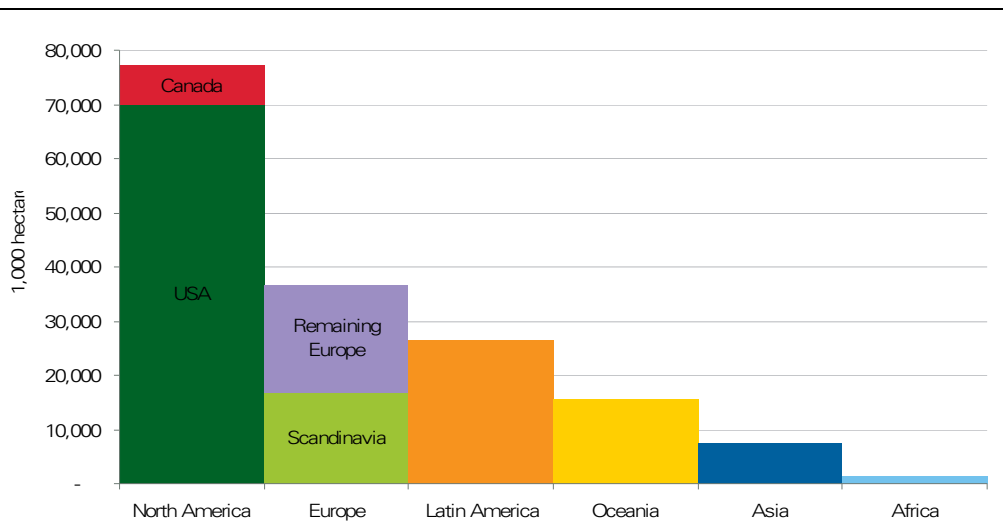


Figure 1. Area of investable private forestland by region.

### 2.2 Investable public forestland

Russia has the largest investable public forestland with two thirds of the global public area. Canada and China also have significant areas. As seen in figure 2 below, Europe outside of Russia and the USA do not have public forestland available for institutional investments. Worldwide, the total public area available for institutional investments is estimated to be 922 million hectares, valued at USD 249 billion.

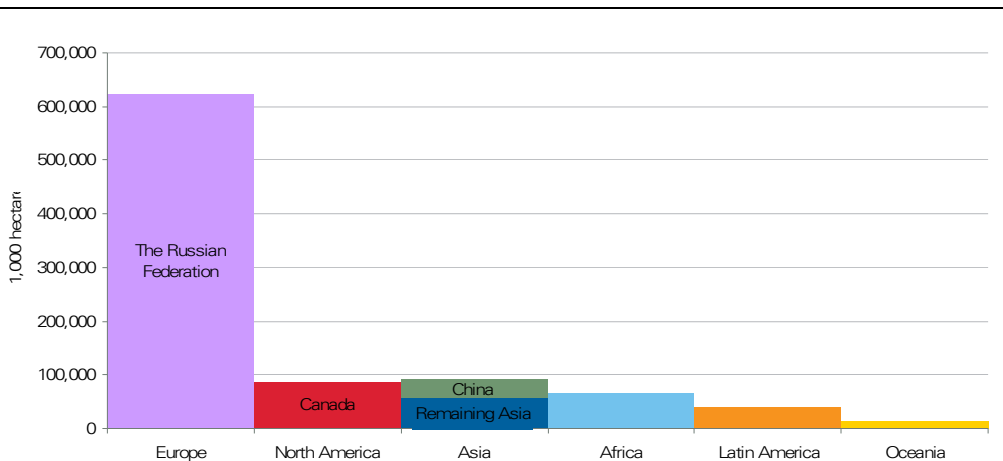


Figure 2. Area of investable public forestland by region.

### 3 Conclusion

IWC estimates the global timberland investable universe to be around 1.1 billion hectares scattered through out the world. This is 25% of the total forest cover and is valued to USD 716 billion. As of the end of 2008, different sources suggested that USD 50 billion of institutional money was invested in forestland. This would mean that about 1/14 of the total available forest area is invested so far, leaving many opportunities for institutional investors.

Furthermore, several conditions could increase the investable universe in the near future. Firstly, China and several African countries have schemes to implement large plantations which would increase the available investable forestland. Also, the general tendency towards improved political stability should open up new markets. Finally, through advance technology, areas currently removed should become available to investments.

# REASONS FOR LOW CORRELATION

Returns from institutional timberland investments have historically shown low correlations with returns from investment in traditional financial asset classes such as stocks, bonds and real estate. This note describes four factors IWC believes contribute to low correlation levels. These are correlation between timber prices and financial markets, principles for property appraisals, harvest flexibility and exogenous shocks. The note concludes that low correlations between timberland returns and returns from financial markets is a fundamental characteristic for timberland investments, and can thus also be expected in the future.

## Introduction

Historically (1987-2008), returns from timberland investments have shown low correlations with returns from investments in traditional financial asset classes.

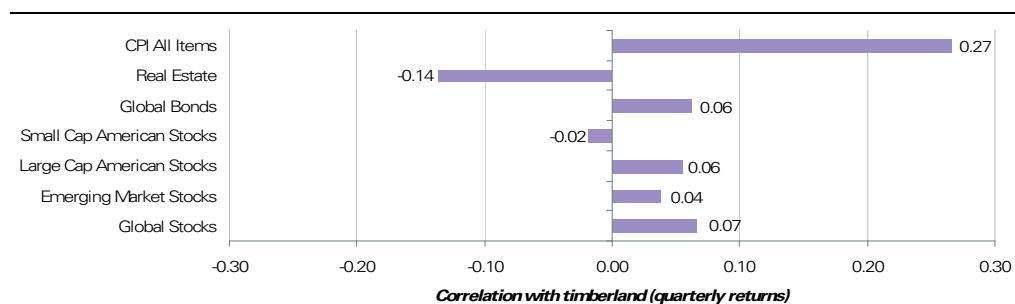


Figure 1. Historical correlations with timberland returns based on quarterly data between Q1 1987 and Q4 2008<sup>1</sup>.

The question is whether such level of correlations will prevail in the future. As a result, IWC has identified four factors explaining the low correlations. These are described below.

## 1 Correlation with timber prices

Statistical analysis of empirical data has confirmed that timber prices constitute approximately 33% of timberland returns (Hancock<sup>2</sup>). Based hereon, IWC has conducted an analysis of US timber prices' correlation with US financial markets. The analysis, available in Appendix 1, shows that changes in US timber prices have historically had correlations close to zero with returns from US stocks, US Bonds and US real estate.

A probable explanation to the low correlation between timber prices and financial markets is that timber prices seems to be cyclical (Lutz 1998<sup>3</sup>), whereas financial markets follow more of a random walk. Another likely reason is a time delay in the development of timber prices compared to the general economic trend.

<sup>1</sup> Timberland Investments in an Institutional Portfolio, 2009, IWC.

<sup>2</sup> FAQ section at [www.htrg.com](http://www.htrg.com) (Hancock Timber Resource Group)

<sup>3</sup> Jack Lutz, Do timber prices follow a random walk or are they mean-reverting?

# REASONS FOR LOW CORRELATION

In conclusion, empirical data suggests that timberland investment returns largely depends on timber prices, which have low correlations with returns from financial markets. These factors, which are unlikely to change in the future, contribute to a low correlation between returns from timberland investments and returns from financial markets.

## 2 Principles for property appraisals

The market value of a forest property is determined so that it is the most probable price a property would be sold for in a competitive and open market within a year. Such market value is most often determined on the basis of three principles: cost approach, sales comparison approach and income approach.

### **Cost approach**

The cost approach consists of the sum of outlays that would be required to reproduce or replace the assets that make up a property.

The two major components in the cost approach are the land and the timber. The timber value consists of the value of merchantable timber based on current volumes and current prices and the reproduction costs for pre-merchantable stocking.

The value change between appraisals according to the cost approach is, especially for mid-rotation and mature forest, dependent on changes in current timber prices. It is most accurate to use on a young property where the reproduction costs are easily measured or for mature properties where exact timber value can be calculated.

### **Sales comparison approach**

This method produces an estimate of a property value by comparing it to recently sold or marketed properties with similar characteristics. The comparison involves judgment as to their similarities and subsequent necessary adjustments for a variety of factors such as location, size, productivity, timber volume, etc. Upon proper utilization of this approach and, assuming adequate data is found, a reasonable value can be estimated.

The value changes under this approach reflect the development in the timberland market including the supply and demand for properties, required discount rates, and expectations regarding the future.

### **Income approach**

The income approach is based upon investors' willingness to pay a specific amount today in order to receive the future income stream reasonably expected to be generated by the property. The price is thus determined by the net present value of expected future cash flows. The analysis includes a) strategic analysis b) determination of expected future cash flows, and c) determination of the fair discount rate to be used.

When applying this method, the expectations for future timber prices and an adjustment for risk are included.

# REASONS FOR LOW CORRELATION

The value change between two appraisals is mainly dependent of changes in applied discount rate, changes in timber price expectations, as well as biological growth (volume and quality).

## Conclusion

Under the well recognized appraisal standards, the market value of a forest is determined by applying any of the three above described methods or a combination of the three approaches. As a result, in addition to long-term expectations for timber prices, which we saw under section 2 have low correlations with returns from financial markets, the return from a timberland investment is to a large extent based on biological growth. Such growth is not dependent on any financial aspect impacting the rest of the economy - "Trees do not read the Financial Times" - which tells us that changes in market values of forest should in the future stay fairly disconnected from financial markets movements.

## 3 Harvest flexibility

The steady biological growth of trees and the consequent increment in value of standing volume provide an option to time harvests according to market conditions.

Under the assumption that an investor is not subject to budget constraints<sup>4</sup>, the investor has the opportunity to withhold part of the harvest in years with low timber prices and increase harvest when prices are favourable. By exercising this flexibility an asymmetric return structure is obtained. This implies a lower down-side risk and increased upside potential, as illustrated in figure 2.

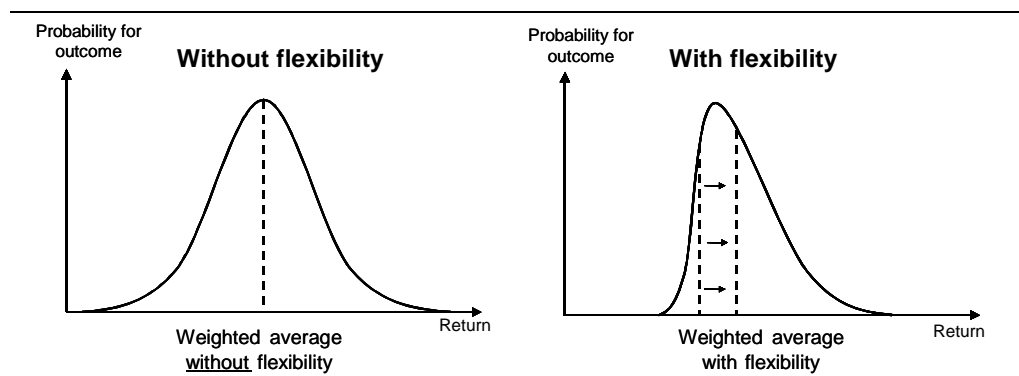


Figure 2. The effect of return structure due to the introduction of harvest flexibility.

<sup>4</sup> E.g. high leverage and therefore debt to service and/or a downstream industry where delivery is required to fulfil the capacity of expensive production machinery.

# REASONS FOR LOW CORRELATION

Figure 3 below graphically shows the annual rate of returns from a US-based timberland portfolio compared to the MSCI World Index from 1971 to 2008. The volatility on the upside (higher returns) is approximately the same for timberland and stocks. However, the volatility on the downside (lower returns) has historically been lower for timberland than stocks.

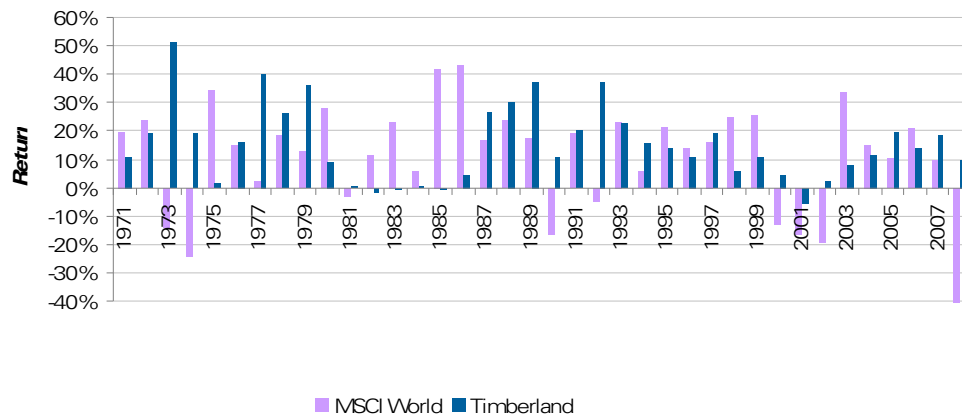


Figure 3. John Hancock Timber Index<sup>5</sup> versus MSCI World<sup>6</sup>, 1971-1987, and NCREIF Timberland Index<sup>7</sup> versus MSCI World, 1987-2008.

The asymmetric return structure contributes to lowering the correlation between timberland and financial markets. Here, it is important to remember that difference in volatility for two data series does not necessarily make the correlation lower than 1. However, when the data series fluctuate with different patterns, as in this case, the correlation between the two data series becomes less than 1, thus contributing to a lower correlation along with other factors.

## 4 Exogenous shocks

Exogenous shocks, which are unrelated to the general economic trend and financial markets, can affect timber and timberland prices due to a shift in either supply or demand and consequently contribute to the low correlation.

<sup>5</sup> Historic timberland performance figures calculated from the John Hancock Timber Index are based on a model constructed by Hancock Timber Resource Group, one of the largest timberland investment management organizations (TIMO) for institutional investors.

<sup>6</sup> The MSCI World Equity Index is designed to measure the performance of the global equity markets.

<sup>7</sup> The NCREIF Timberland Index is considered as the forest investment industry benchmark. The index has been published since 1994 and includes returns dating back to 1987. It is a property-based index reporting returns for three regions in the USA. As of the end of 2008, the index accounted for 305 properties valued at about USD 23.9 billion.

## REASONS FOR LOW CORRELATION

An example of this is the Russian timber tax increase that was implemented in the late 2000's. Even though the tax increase has not been fully implemented by May 2009, it has so far created some changes in the supply versus demand balance as it has stopped the export of crude timber from Russia leading to an enormous vacuum in the demand.

Another example of exogenous shocks is the spotted owl campaign in the US Pacific Northwest in the early 1990's, which led to a complete halt in the felling of public forests, followed by significant increases of timber prices in the region.

Other examples could be found in relation to building/construction regulations, energy, policy, public trends etc.

### Conclusion

Nothing indicates that the four factors identified above should change in the future and thus historic low level of correlations between timberland investments and investments in traditional asset classes should prevail in the future.

# REASONS FOR LOW CORRELATION

## APPENDIX 1

### CORRELATION BETWEEN US TIMBER PRICES AND OTHER US ASSET CLASSES

The present analysis of correlations between timber prices and traditional asset classes investigates the following:

- Timber prices
  - US South represented by prices for mixed pine
  - US Pacific Northwest represented by prices for Douglas fir
- Index for other assets classes
  - American stocks represented by the SP 500 Index
  - American bonds represented by US 3mth Treasury Bonds
  - American real estate represented by the NCREIF Property Index

The correlations for the entire periods are shown in the table below.

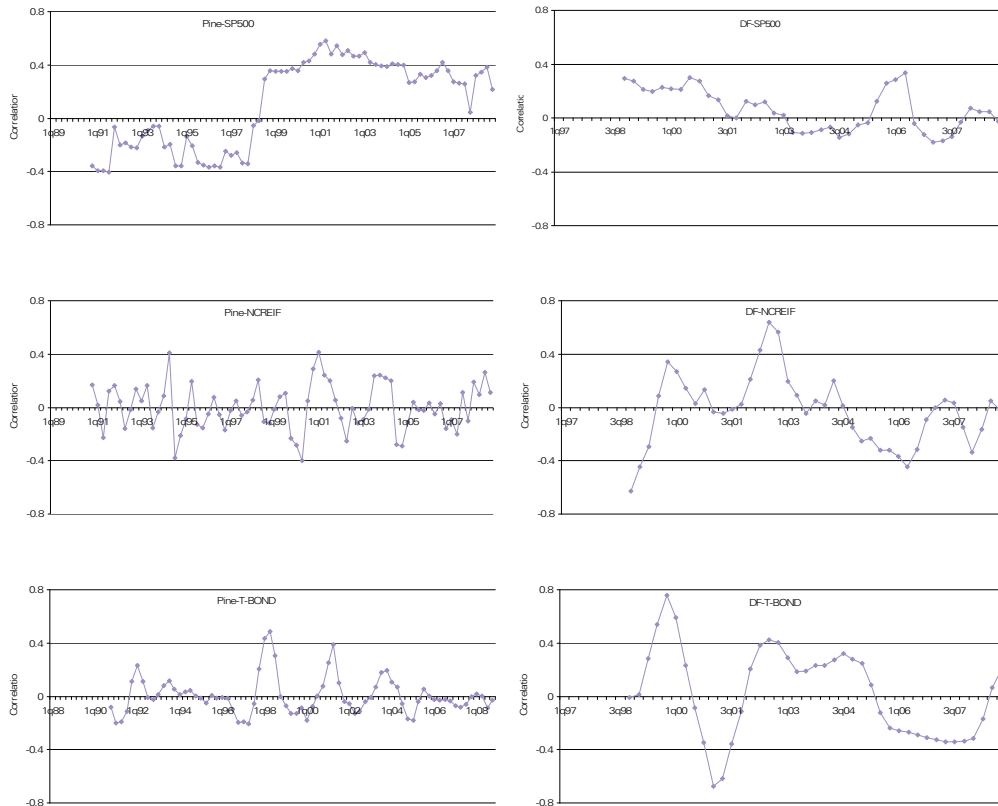
Correlations between timber prices and traditional asset classes indexes based on quarterly observations.

	Stocks	Bonds	Real estate
Southern pine (1987 - 2008)	0.17	-0.01	-0.04
Douglas fir (1995 - 2008)	0.03	-0.22	-0.08

According to the table above, correlations between changes in timber prices and changes in indexes from traditional asset classes have historically been low (-0.22 to +0.17). It has not been determined, if there is a statistically significant difference between the correlations.

To illustrate whether there has been changes in the correlation levels over time, running correlations based on 12 quarterly observations have been calculated and graphically illustrated below.

## REASONS FOR LOW CORRELATION



Correlations between timber prices and traditional asset classes, running periods of 12 observations.

It appears from the figure above that correlations based on 12 quarterly observations generally fluctuate around zero. It is not possible to identify a trend or paradigm shift over time. As a consequence, the correlations for the entire period are the best proxy for the historic correlations between changes in timber prices and returns from traditional asset classes.

2008  
INFORMATION  
REPORT

# CONTENTS

- 1 2008 HIGHLIGHTS
- 4 STATEMENT BY THE MANAGING DIRECTOR
- 6 NEW BUSINESS: IWC'S FUND-OF-FUNDS
- 10 CORPORATE SOCIAL AND ENVIRONMENTAL RESPONSIBILITY
- 12 FINANCIAL HIGHLIGHTS
- 13 MANAGEMENT REVIEW OF THE 2008 FINANCIAL RESULTS
- 14 ORGANIZATION AND HUMAN RESOURCES
- 18 COMPANY INFORMATION

The financial statements of this English Information Report have been translated from IWC's Danish 2008 Annual Report. The Danish text shall govern for all purposes and prevail in case of discrepancy with the English version.

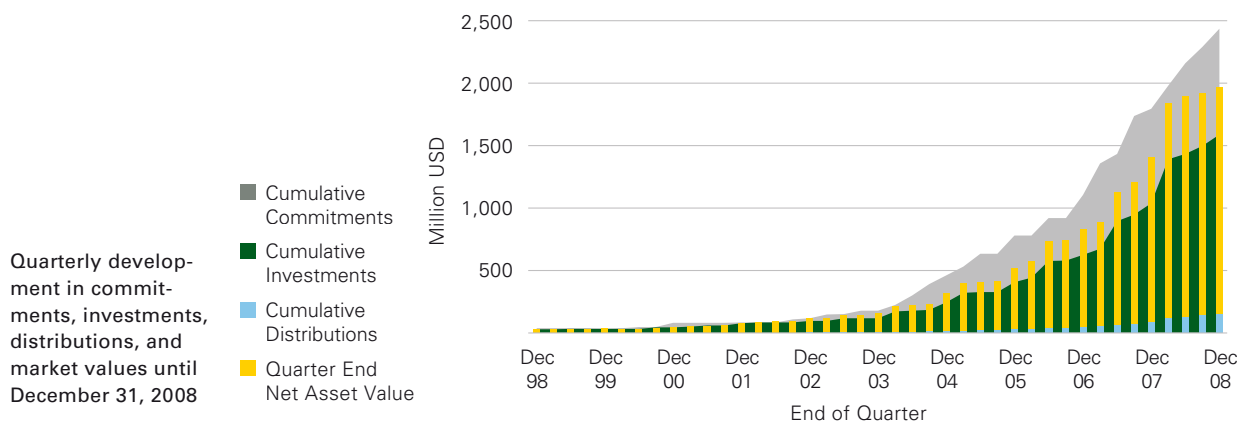


2008  
HIGHLIGHTS



### Overview of asset under advice or management

Commitments from IWC's clients to forest investments continued to grow in 2008, ending at over USD 2.4 billion, which is an increase of USD 640 million since 2007 year-end or +36%. This development clearly confirms the desirability of forest investment by institutional investors and a strong recognition of IWC's services.



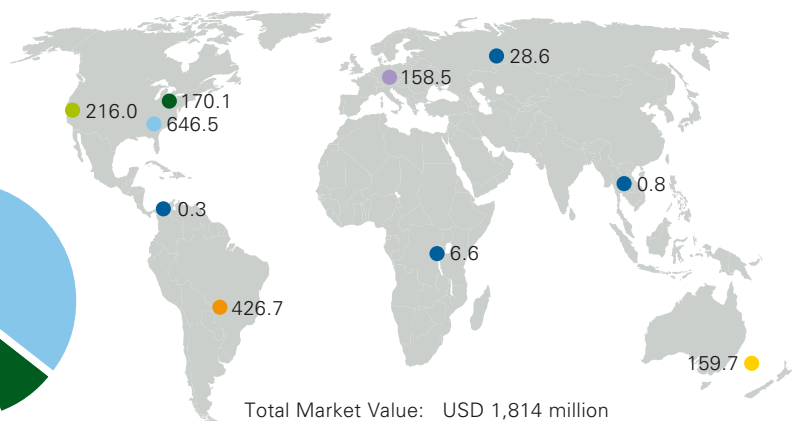
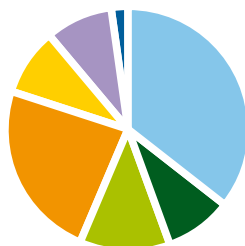
Of the committed amount, USD 1.6 billion were invested at the end of 2008, representing a market value of over USD 1.8 billion.

### Investments' geographic allocation

#### Geographic allocation as of December 31, 2008

Figures on the map represent market values in million USD

- US South 36 %
- US Northeast 9 %
- US PNW 12 %
- South America 24 %
- Oceania 9 %
- Europe 9 %
- New markets 2 %



## FACTS

*Total strategic allocation to forest investments by IWC's clients is around 4 billion USD.*

*As of December 31, 2008, IWC's investors owned or leased over 1.4 million hectares worldwide valued at 1.8 billion USD.*

### **IWC direct presence in new markets**

In 2007, IWC closed the Capricorn Forest Fund with a strategy to invest in commercial timber production in investment locations that are currently not developed for institutional investors. In 2008, investors in IWC's Capricorn Forest Fund increased their commitment so that today, aggregate commitment to the fund equals USD 240 million; of which 50% have been committed to specific investments in Russia, Tropical Latin America, Africa and Asia at the end of 2008.

### **Performance**

Despite capricious financial markets, IWC's external composite has yielded a nominal return of 1.8% (in USD, before fees) in 2008.

Since inception (March 1998), IWC's external composite yielded a return of 13.2% per annum.

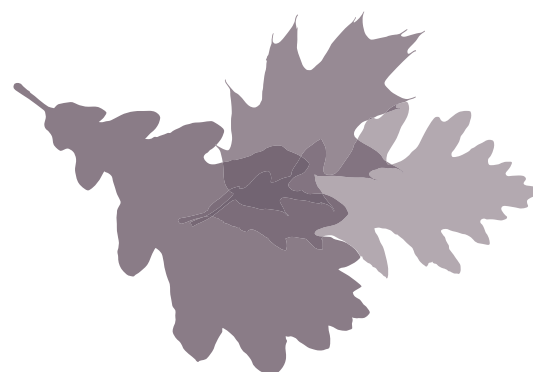
	Yearly Time Weighted Returns (nominal, before fees, calculated in USD) <sup>1)</sup>										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	ITD
External Composite <sup>2)</sup>	12.7%	6.8%	5.3%	11.1%	18.8%	16.3%	12.2%	15.9%	15.4%	1.8%	13.2%

1) Returns are computed by chain-linking quarterly rate of returns.

Returns are before asset management fee and performance fee to external managers and IWC.

2) All IWC clients' timberland investments managed by external timberland managers. Inception date of the composite is March 1998.

At the end of 2008, the composite represented 89% of IWC's assets under advice or management.



# STATEMENT BY THE MANAGING DIRECTOR

**2008:  
A challenging  
but positive year**

As a result of the financial crisis and the emergent global economic downturn, 2008 was undeniably a challenging year. However, IWC succeeded in securing a stable business platform by continuing to widen its human resources within forestry and forest management, fund management, due diligence, financial controlling and SRI (socially responsible investment). This has enabled us to fully service our existing clients and to prepare to expand our client base. In 2008, we also focused on developing policies and procedures to ensure transparency and good corporate governance within our businesses, thereby facilitating due diligence of the company.

#### **A change in ownership**

A change in the firm's ownership was successfully conducted in 2008 so that today employees and Board members hold a majority share of 51 % of the company with Managing Director Otto Reventlow as the largest shareholder with 30 %. The Danish insurance company Lærerstandens Brandforsikring G/S holds the remaining 49 %.

#### **An investment activity slowdown**

In 2008, IWC clients committed USD 640 million to forest investments (compared to USD 780 million in 2007). By the end of the year, aggregate commitments through IWC totaled USD 2.4 billion of which 1.6 billion was invested.

#### **A positive investment performance for our clients**

Despite capricious financial markets, IWC's external composite has yielded a nominal return of 1.8 % (in USD, before fees) in 2008. Since inception (March 1998), IWC's external composite yielded a return of 13.2 % per annum.

#### **A strong financial result for the company**

In 2008, IWC realized a turnover of DKK 35 million (estimated EUR 4.7 million) and a net result of DKK 12 million (estimated EUR 1.6 million). This is the company's best financial result ever.

## **FACTS**

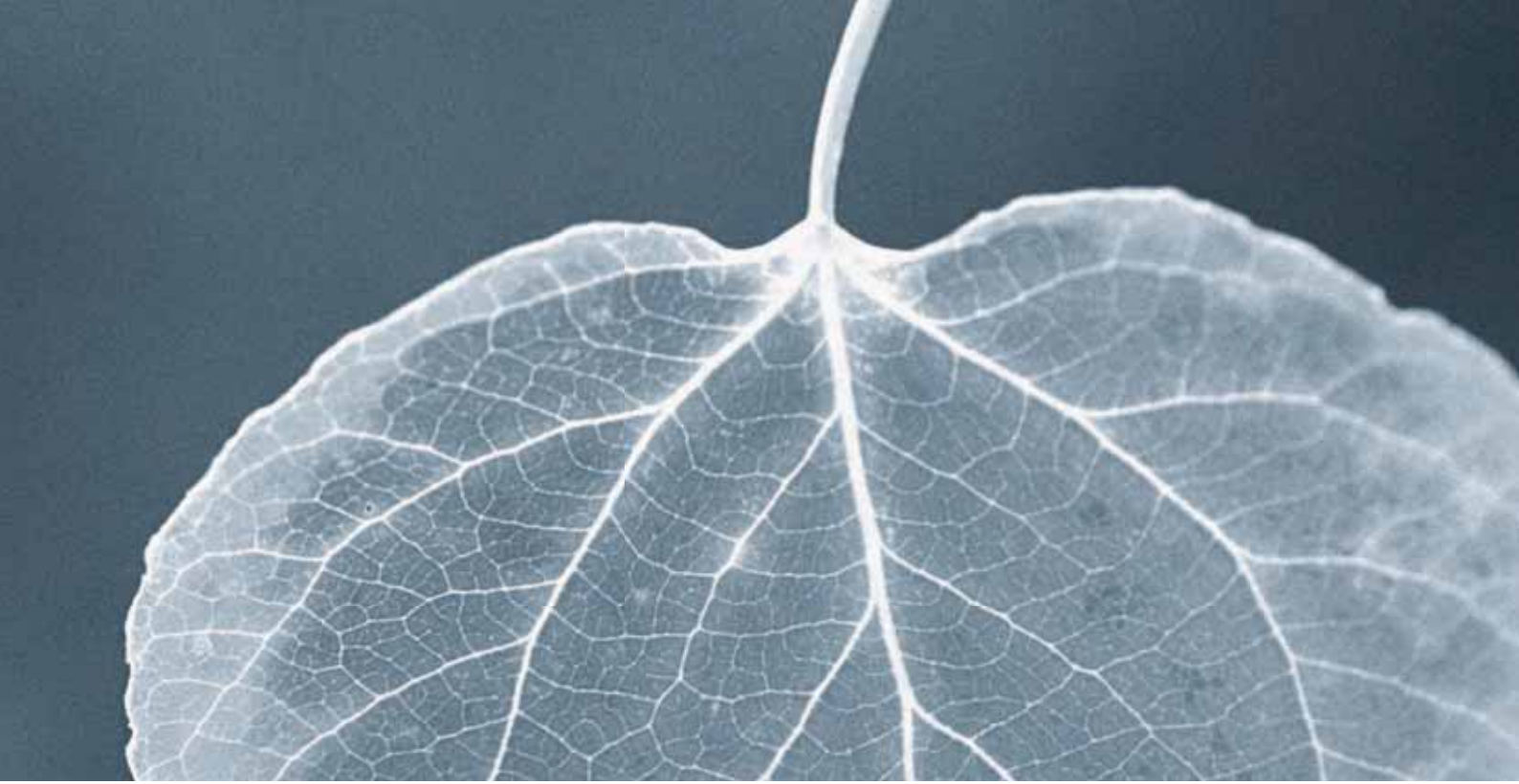
#### ***IWC's Mission***

*Creating and capitalizing on the optimal conditions for forest investment to the benefit of our clients.*

#### ***IWC's Strategy***

*The International Woodland Company aims to foster innovative thinking and to promote development and advancement in the field of global forest investment.*

*As new markets are created and more investors enter the asset class, we believe that forest investments will continue to develop. Through the application of our vast experience and knowledge, as well as our unique international approach, IWC is leading the way to the next generation of forest investments.*



As a consequence of the financial crisis, we expect low activity from our current clients during all of 2009. On the other hand, we believe that the recent negative performance of traditional asset classes will, in the near future, bring an increased focus on timberland investments from the institutional world. As a result, in the summer of 2009, IWC will launch a fund-of-funds offering investors a diversified exposure to the asset class. In addition, a series of good deals might emerge in 2009 from distressed sellers which could translate into a superior performance.

Investments in timberlands, which are advised or managed by IWC, have now been conducted in 15 countries, 4 continents and 3 climate zones. Thus, one of our focuses in 2009 will be to further develop our ability to handle the variety of issues arising from the different biological conditions, cultures and markets that influence our investors' portfolios. IWC also has a multinational work force comprised of seven nationalities, which we believe to be an important reason for our past success and the foundation for our future performance. Therefore, we will continue to work towards ensuring intercultural understanding and communication both within IWC and in our international business endeavours.

A persistent slowdown in 2009 may create new opportunities



Otto Reventlow



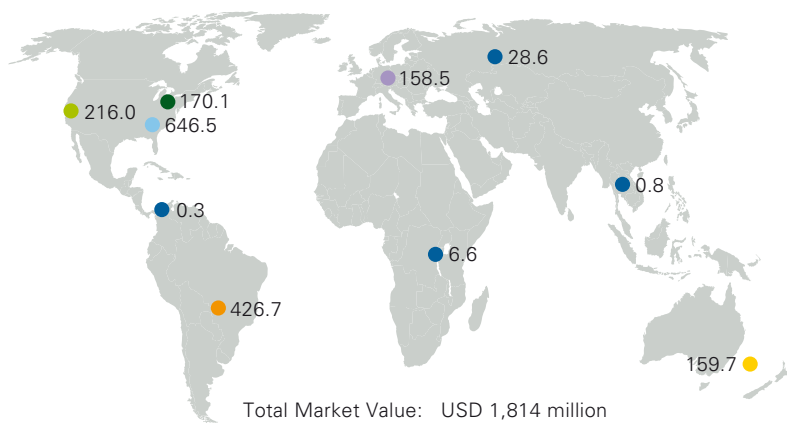


NEW  
BUSINESS:  
IWC'S  
FUND-OF-FUNDS

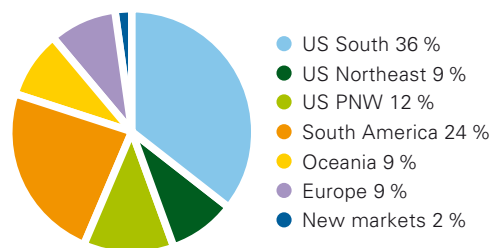
**IWC has built timberland portfolios since 1991**

As of December 31, 2008, IWC’s clients’ aggregate portfolio was as follows:

- Market value of investments above USD 1.8 billion
- Value of assets plus uninvested binding commitments was over USD 2.6 billion
- 25 external timber funds and 2 external separate accounts
- 7 direct investments
- 1 IWC fund focusing on emerging markets (“Capricorn”)



Investments’ geographic allocation as of December 31, 2008  
 Figures on the map represent market values in million USD



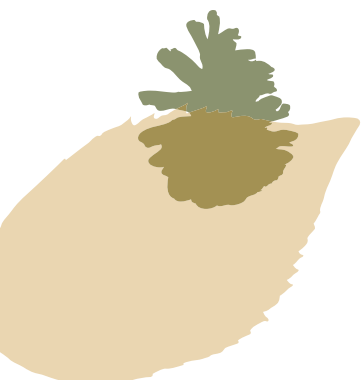
**Creation of fund-of-funds structures**

With over 10-years experience in advising highly sophisticated institutional investors on timberland funds managed by external timberland investment management organizations (TIMOs), and a proven track-record in this regard (read more on page 2), IWC has decided to set up collective investment vehicles to invest in timberland funds (i.e. fund-of-funds structures).

Two fund-of-funds with different geographical focuses and different risk/return characteristics will be offered to investors. Each investor will then be able to decide on their overall target portfolio on which IWC will prepare a recommendation in line with IWC’s regional asset allocation model, the investor’s investment preferences, risk and return objectives.

One fund-of-funds is designed to provide a well-diversified portfolio through commitments to timberland funds to invest in any of the three timber regions of the USA: US South characterized by pine plantations; US Northeast characterized by hardwood forests; and US Pacific Northwest characterized by semi-natural mixed forests.





The second fund-of-funds will commit to funds investing outside the USA, mainly in South America (pine, eucalyptus, and teak plantations including possibly sustainable management of tropical natural forests), Oceania (pine, eucalyptus and possibly exotic species plantations like teak or sandalwood), and Europe (semi-natural forests).

A significant advantage of a fund-of-funds structure for the investors is access to small investment opportunities (which is not the case today due to minimum commitment amount by fund), thus achieving better diversification.

The main benefit for IWC is a more efficient commitment procedure as we will not have to coordinate and await the decision process of several investors. Also, the fund-of-funds structure may result in increased negotiation power for IWC when discussing investment terms with TIMOs as well as a greater access to specific TIMO funds.

As a consequence of the financial crisis, we expect low activity from our current clients during 2009. On the other hand, we believe that the recent negative performance of traditional asset classes will in the near future bring an increasing focus on timberland investments from the institutional world. As a result, IWC will launch the funds-of-funds described above in the summer of 2009.

#### **IWC adds value**

##### **During the decision and commitment phase:**

- Access to economies of scale
- Optimal regional allocations based on IWC's knowledge and network
- Due diligence of timberland fund managers
- Professional due diligence of both forestry and financial assumptions used in investment funds
- Experience with secondary deal analysis and negotiations

##### **During the management and disposition phase:**

- Professional investment control, including assessment of the annual valuation reports
- Forest tours and professional dialogue with investment managers
- Attendance at investor conferences
- Access to IWC's knowledge of global forestry, markets for forest products and forest investments
- Special cases:
  - Assessment of consequences of internal restructuring at TIMOs
  - Dialogue regarding forest management plans for investments
  - Assessment of arguments and consequences for fund extensions

## **FACTS**

**Target size of US fund-of-funds:** USD 250 million

**Target size of Ex-US fund-of-funds:** USD 750 million

**Term:** 20 years

**Commitment period:** 2 years from final closing

**Structure:** Danish Limited Partnership (in Danish: "Kommanditselskab")

Example of a diversified portfolio

- 1 Pine plantation in US South
- 2 Eucalyptus plantation in Brazil
- 3 Hardwood forest in US Northeast
- 4 Pine plantation in New Zealand
- 5 Semi-natural forest in US Pacific Northwest
- 6 Teak plantation in Brazil
- 7 Semi-natural forest in Eastern Europe





CORPORATE SOCIAL  
& ENVIRONMENTAL  
RESPONSIBILITY

## FACTS

*IWC certification policy reads: IWC will work towards attaining the most appropriate, recognized third-party forest certification for all forest investments and forestry activities under advice or management by IWC.*

*IWC recognizes two existing forest certification schemes that have emerged as the most well-developed, commonly-used and well-accepted among stakeholder groups. These schemes are:*

- *Program for the Endorsement of Forest Certification Schemes (PEFC),*
- *Forest Stewardship Council (FSC).*

In recent years, increasing social and environmental awareness among institutional investors and investment managers has led to extensive efforts to implement corporate social responsibility (CSR) and socially responsible investment (SRI) strategies. IWC embraces this development as sustainability is a cornerstone of the company's investment policy.

### **A continuous effort towards socially responsible investment**

In 2008, IWC's work with regards to SRI continued through the development and implementation of procedures which should secure that future and existing investments are aligned with the company's SRI and certification policies previously defined. Recognizing that CSR and SRI are dynamic concepts which constantly evolve, IWC's current SRI guidelines and procedures will continuously be evaluated to secure IWC's overall goal of securing economically, environmentally and socially sound timberland investments.

Today, SRI has been fully integrated into the due diligence process of new investment projects as well as in the ongoing oversight of existing investments. Investments in emerging markets have especially proven to be a continuous challenge for SRI policies, their implementation and enforcement.

### **IWC: Member of the Forest Stewardship Council (FSC)**

During 2008, IWC applied for and was accepted as a member of the Forest Stewardship Council (FSC). The decision to become further involved in FSC is a result of an increasing number of investments being FSC certified or where FSC certification is considered. One of the first benefits from

the FSC membership was the opportunity to participate in the General Assembly which takes place every three years. The last Assembly was held in Cape Town, South Africa, and gathered some 400 people representing stakeholders with a special interest in the social, environmental and economic elements of forest certification.

From IWC's perspective, two very positive statements were presented by the Chairman of the Board in his opening statement of the General Assembly:

- FSC should, in the future, be even better prepared to facilitate the inclusion of institutional investors in the further development of forest management certification.
- The Councils would work more on the development of FSC in Africa.

### **In search of offsetting IWC's CO<sub>2</sub> emissions**

In 2008, IWC carried out a study to calculate the company's contribution to the release of carbon dioxide into the atmosphere. The study suggested ways to reduce our emissions and included measures to offset any contribution beyond potential reduction. Offset through tree planting was calculated based on a variety of plantation sites and tree species to help create an actual business case from carbon credits based on carbon stored in trees.



*Workers at a plantation in Ghana*

## READ MORE

*You can read more about IWC's SRI guidelines on IWC's website, [www.iwc.dk](http://www.iwc.dk).*

# FINANCIAL HIGHLIGHTS

Income Statement (1,000 DKK)	2008	2007	2006	2005	2004
Revenue	35,274	25,088	12,267	9,628	5,954
Other external expenses	7,338	6,853	2,418	1,642	1,326
<b>Gross profit</b>	<b>27,936</b>	<b>18,235</b>	<b>9,848</b>	<b>7,986</b>	<b>4,628</b>
Staff costs	12,734	8,624	4,714	3,844	2,928
Depreciation and amortization	275	192	86	82	83
<b>Operating profit</b>	<b>14,926</b>	<b>9,419</b>	<b>5,049</b>	<b>4,060</b>	<b>1,616</b>
Result from daughter company	-19	0	0	0	0
Financial income	1,212	589	271	95	44
Financial expenses	132	190	32	30	26
<b>Profit before taxes</b>	<b>15,987</b>	<b>9,817</b>	<b>5,288</b>	<b>4,124</b>	<b>1,634</b>
Taxes	4,009	2,506	1,489	1,167	501
<b>Net profit</b>	<b>11,978</b>	<b>7,311</b>	<b>3,799</b>	<b>2,957</b>	<b>1,134</b>
<b>Balance Sheet (1,000 DKK)</b>					
<b>Fixed assets</b>	<b>893</b>	<b>1,081</b>	<b>205</b>	<b>69</b>	<b>134</b>
Receivables	5,153	6,249	1,739	1,495	1,215
Securities	7,348	7,440	7,477	0	0
Cash	24,381	11,062	5,318	8,296	4,377
<b>Current assets</b>	<b>36,882</b>	<b>24,751</b>	<b>14,534</b>	<b>9,791</b>	<b>5,593</b>
<b>Total assets</b>	<b>38,195</b>	<b>25,923</b>	<b>14,739</b>	<b>9,860</b>	<b>5,727</b>
Share capital	1,000	1,000	1,000	1,000	1,000
Share premium	0	1,980	1,980	1,980	1,980
Retained earnings	4,419	15,561	8,250	4,451	1,494
Proposed dividend	9,100	0	0	0	0
<b>Equity</b>	<b>14,519</b>	<b>18,541</b>	<b>11,230</b>	<b>7,431</b>	<b>4,474</b>
<b>Accruals</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>230</b>	<b>0</b>
Income tax	770	0	2,318	1,162	492
Extraordinary dividend	16,000	0	0	0	0
Other payables	6,906	7,375	1,190	1,037	761
<b>Total liabilities</b>	<b>23,676</b>	<b>7,375</b>	<b>3,509</b>	<b>2,429</b>	<b>1,253</b>
<b>Total liabilities and equity</b>	<b>38,195</b>	<b>25,923</b>	<b>14,739</b>	<b>9,860</b>	<b>5,727</b>
<b>Ratios and key figures</b>					
Cost/income ratio (in %)	57.7	62.5	58.8	57.8	72.8
Full-time equivalent staff on average	17.5	10.3	7.5	6.8	4.9

# MANAGEMENT REVIEW

IWC realized a net profit of DKK 12 million in 2008 against DKK 7.3 million in 2007, i.e. an increase of more than 60 %, while revenue rose with 40 %. All business areas contributed to the positive trend in making this the best result in the history of the company.

## Comments on the 2008 financial results

### Income

In 2008, as a result of the continued growth of IWC's Portfolio Management services and a strong increase of the Investment Development & Analysis team activity through the Capricorn Forest Fund, revenue rose by 40.6 % and gross profit rose by 53.2 % to DKK 27.9 million.

### Expenses

Due to a growing team of professionals (average number of full-time employees grew from 10.3 in 2007 to 17.5 in 2008), staff costs increased by 47.7 % during the year. Nevertheless, the cost/income ratio improved from 62.5 % in 2007 to 57.7 % in 2008, in line with 2006 and 2005 levels.

### Balance Sheet

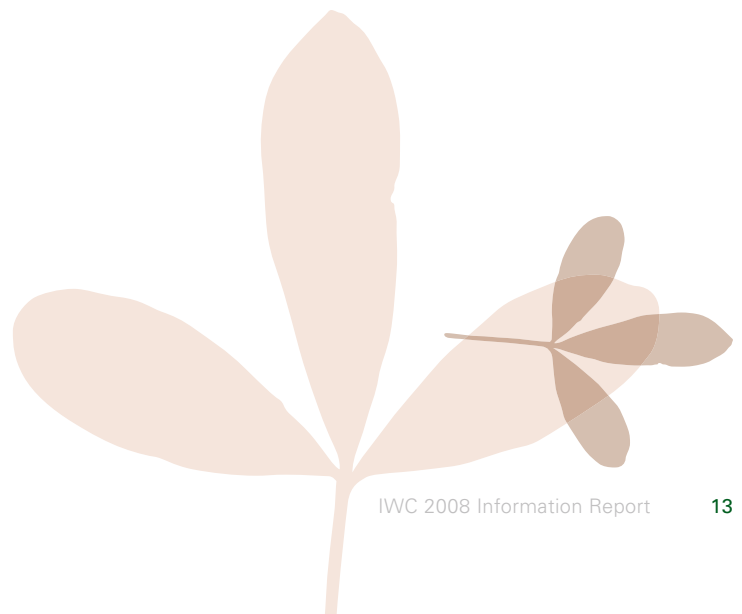
The assets of the company totalled DKK 38.2 million at the end of 2008 against DKK 25.9 million at the end of 2007 – an increase of 47.3 %. While the amount of receivables decreased by 17.5 % to DKK 5.2 million, the amount of cash increased by 120.4 % from DKK 11.1 million to DKK 24.4 million due to the decision of the Board of Directors to pay an extraordinary dividend during the year. Securities were steady at just under DKK 7.4 million.

On the equity and liabilities side, the 2008 net profit has been distributed between the retained earnings account and the proposed dividend account, while an extraordinary dividend of DKK 16 million has been paid out during the year.

## Outlook for 2009

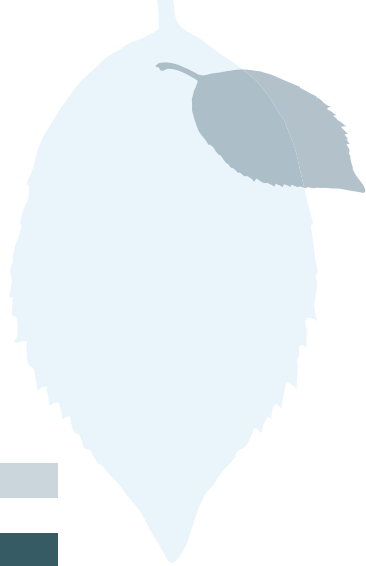
As soon as the financial crisis and consequent freezing of investments by many institutional investors come to an end, IWC expects to see a growth in the commitments to forest investments. IWC should benefit from this through targeted marketing of the asset class. We are fully prepared to respond to the consequent needs linked to such development. With an increased staff, Capricorn and portfolio management services, IWC is in an ideal position to continue delivering a high level of performance to its clients.

From a financial point of view, we expect IWC's turnover to exceed DKK 40 million in 2009. The net profit of the company might be a little lower than in 2008 due to higher costs, especially in relation to securing and growing IWC's most important asset: our human resources.



# ORGANIZATION & HUMAN RESOURCES





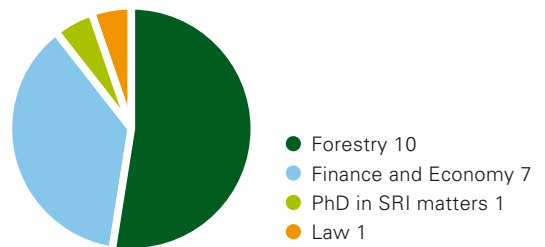
**IWC's organization (as of May 2009)**



By the end of 2009, IWC expects to recruit two additional staff members to help support the company's growth. This will bring the total head count to an expected level of 22 full-time employees by the end of the year.

**A diversified team**

IWC is a knowledge-based company. Our success is highly correlated to our employees' broad spectrum of skills and expertise. At the end of 2008, 19 full-time professionals with diverse backgrounds (see pie-chart below) were employed. The age of the employees ranges from 27 to 62 and the nationalities include American, British, Danish, German, French, Italian and Malaysian.



Number of full-time employees by educational background

# THE TEAM



*First picture: Cross organizational functions*

*From left to right: Otto Reventlow, Managing Director;*

*John Bergen, Business Controller;*

*Mary Ann Thorn-Jakobsen, Executive Assistant.*

*Second picture:*

*The Investment Development and Analysis team in Copenhagen*

*From left to right: Joseph Greco, Financial Analyst; Jim Stevens, Forest*

*Economist; Kelly Droege, Forest Acquisition Manager; Peter Vind*

*Larsen, Head of Investment Development and Analysis; Mogens*

*Pedersen, SRI Coordinator; Esben Brandi, Forest Acquisition Manager;*

*Missing on the picture are Carolina Maia De Biagio, Financial*

*Analyst, and Eva Ortvold Erichsen, Student Assistant.*

---

## FACTS

*IWC works in two complementary teams, Portfolio Management and Investment Development and Analysis (IDA):*

- *IWC's Portfolio Management team develops, monitors, and manages tailor-made international forest investment portfolios.*
- *IWC's Investment Development and Analysis team (IDA) maintains and expands IWC's capacity to facilitate further global forest investments, particularly through the deal sourcing and management of the Capricorn Forest Fund which focuses on emerging markets.*



*First picture: The Portfolio Management team*

*From left to right: Nils von Schmidt, Investment Forester; Martin Munkesø, Due Diligence Manager; Andreas Radich Scheffel, Student Assistant; Elisya Foo, Economist; Karsten Rømer Petersen, Legal Counsel and Economist; Henrik Lundqvist, Head of Portfolio Management; Johnny Vibe, Senior Portfolio Manager; Céline Claudon, Business Development Manager; Lars Holm Simonsen, Investment Forester; Roger Naylor, Investment Forester.*

*Second picture: IWC Regional Office Asia*

*Mikkel Brings Nielsen, Forest Acquisition Manager.*



## **FACTS**

*In August 2008, Mikkel Brings Nielsen relocated with his family to Singapore to open IWC's first overseas Representative Office. Mikkel is focusing on deal sourcing and timberland acquisitions in Asia.*

*Within one to two years, IWC expects to open a Regional Office in Latin America.*

### **The Board of Directors**

The Board of Directors is formed by Steen Villemoes (Chairman), M.Sc. Economic; Jørn Anker-Svendsen, CEO, Lærerstandens Brandforsikring G/S; Jørgen Bo Larsen, Forestry Professor, Department of Forest & Landscape, Faculty of Life Sciences, University of Copenhagen; Nis Jul Clausen, Professor of Law, Ph.D., LL.M., Department of Law, University of Southern Denmark; Lars Wilhjelm, CEO, Wilhjelm A/S.



# COMPANY INFO

**The Company** The International Woodland Company A/S  
Amalievej 20  
DK - 1875 Frederiksberg C

Phone: +45 3378 5254  
Fax: +45 3324 0242  
Homepage: [www.iwc.dk](http://www.iwc.dk)  
E-mail: [iwc@iwc.dk](mailto:iwc@iwc.dk)

CVR no.: 15 01 31 76  
Established: January 1, 1991  
Offices: Frederiksberg, Denmark and Singapore  
Financial year: January 1 – December 31

**Board of Directors** Steen Villemoes, Chairman  
Jørn Anker-Svendsen  
Jørgen Bo Larsen  
Nis Jul Clausen  
Lars Wilhjelm

**Managing Director** Otto Reventlow

**Auditor** Grant Thornton  
Statsautoriseret Revisionsaktieselskab  
Stockholmsgade 45  
2100 Copenhagen Ø

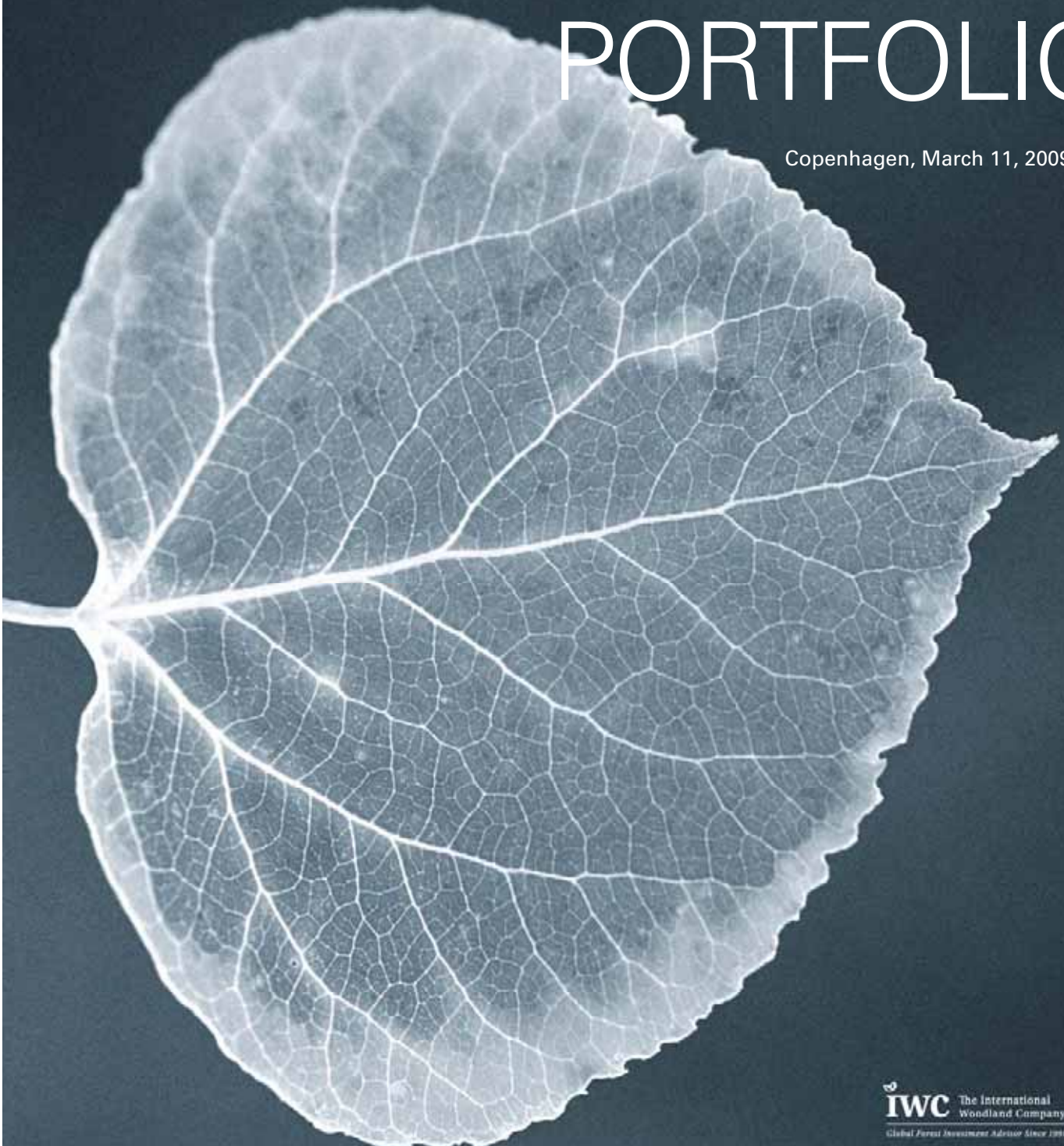
**Design** Hausfrau.name  
Mette Falk





# TIMBERLAND INVESTMENTS IN AN INSTITUTIONAL PORTFOLIO

Copenhagen, March 11, 2009



**EXECUTIVE SUMMARY.....3**

**1 INTRODUCTION .....5**

**2 TIMBERLAND RETURN CHARACTERISTICS.....6**

**2.1 RETURN DRIVERS.....6**

**2.2 RETURN STRUCTURE .....8**

**2.3 DISTRIBUTION OF TIMBERLAND RETURNS .....10**

**3 HISTORICAL TIMBERLAND PERFORMANCE.....11**

**3.1 THE NCREIF TIMBERLAND INDEX .....12**

**3.2 RETURN CHARACTERISTICS FOR TIMBERLAND AND OTHER ASSETS.....15**

**3.3 CORRELATIONS OF TIMBERLAND RETURNS TO OTHER ASSETS.....17**

**3.4 PERFORMANCE MEASUREMENTS .....18**

**4 IWC’S ASSET ALLOCATION MODEL .....21**

**4.1 RISK, RETURN AND CORRELATION .....21**

**4.2 EFFICIENT FRONTIER ANALYSIS .....22**

**4.3 THRESHOLD ANALYSIS .....23**

**REFERENCES.....24**

## Executive Summary

Due to a range of attractive performance characteristics and diversification opportunities from including timberland in a diversified portfolio, institutional timberland investments, especially in the USA, have grown significantly in the last 25 years.

Timberland investment returns can be described as a function of three drivers:

- Biological tree growth – main driver of attractive and stable returns
- Timber product price change
- Changes in land value.

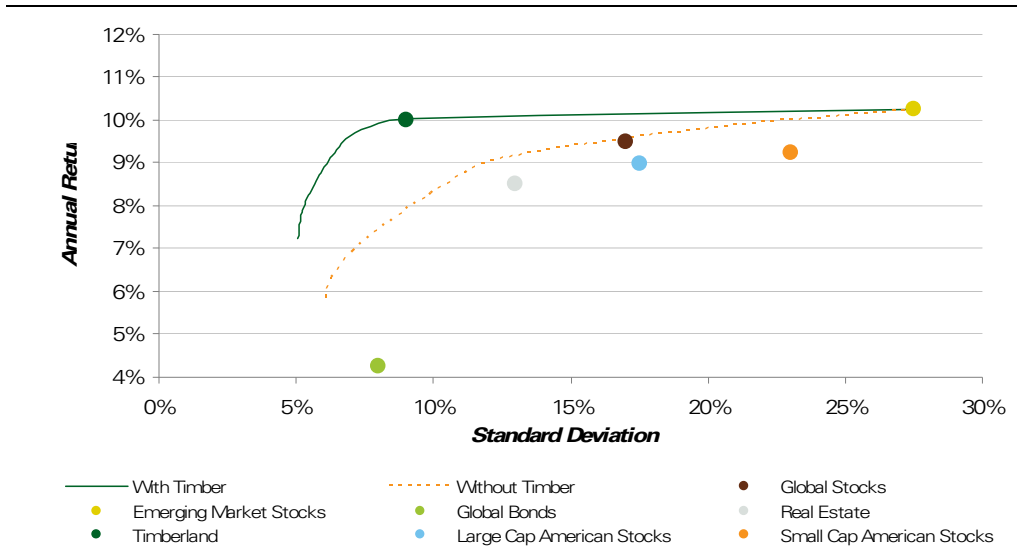
Ownership of timberland and the attendant biological growth and flexibility in connection with timing of entry/exit and timing of harvests provides investors with an attractive return structure. Biological growth and utilization of the timing options reduces the risk of negative returns and results in a higher upside potential and a reduced downside risk compared to investments without these characteristics.

Returns between professionally managed timberland investment funds are almost normal distributed. This indicates that when investing in timberland funds, the number of investments which needs to be made is limited in order to achieve a mean return.

For asset allocation purposes, timberland investment return characteristics are attractive:

- According to an industry index, timberland in the USA has for the period 1987 – 2008 yielded a return of 15.1% p.a. nominal before asset management fee. For an internationally diversified timberland portfolio, The International Woodland Company A/S (IWC) assumes an average future annual rate of return of 10% - 12% before asset management fees.
- Historical standard deviation of returns for the US index used above has been 8.4% p.a. IWC assumes an annual standard deviation of returns of 8% - 10% for an international timberland portfolio.
- Timberland returns have historically shown low or negative correlations with returns from traditional asset classes in an institutional portfolio. IWC expects this to continue in the future, leading to high diversification benefits when including timberland investments in an institutional portfolio.

The benefits of including timberland in an investment portfolio have been analyzed through modern portfolio theory. Based on IWC's asset allocation model, two efficient frontiers have been produced: one that allows allocations to timberland investments, and another where timberland is not included in the portfolio. The result is shown in the figure below.



From the figure it is evident that including timberland in a portfolio is beneficial as, for any given standard deviation, the return for a portfolio including timberland is always superior.

Examples of the risk reduction by including timberland for different annual target returns are shown in the table below.

	Return Target	Risk Level	Change from Base
Incl. Timberland		5.29%	
Excl. Timberland	8.0%	9.22%	3.93%
Incl. Timberland		5.64%	
Excl. Timberland	8.5%	10.44%	4.80%
Incl. Timberland		6.12%	
Excl. Timberland	9.0%	11.92%	5.80%

The table shows that if an optimal allocation to timberland is included in a portfolio with a target rate of return of 8.5% p.a., the expected standard deviation can be reduced from 10.44% to 5.64% p.a.

## 1 Introduction

Institutional investments in timberland emerged in the USA in the early 1980s. Previously, institutional ownership of timberland was limited to investments in timber product companies, which in turn owned timberland to ensure the supply of primary resources.

As opposed to investing in timber product companies, ownership of timberland provides investors with attractive performance characteristics.

Following the establishment of the first US-based timberland investment management organization (TIMO) in 1981, institutional timberland investments have grown significantly. According to AMEC Forest Industry Consulting the investments have grown from less than USD 1 billion in 1990 to more than USD 30 billion in 2006<sup>1</sup>, whereas DANA Limited has estimated that institutional investors have invested a total of approximately USD 50 billion as of early 2008.<sup>2</sup> In July 2006, Mercer estimated that the global investable commercial timberland exceeded USD 300 billion, of which timberland in the US accounted for more than USD 200 billion<sup>3</sup>. IWC's own study shows that the investable and leasable forestland worldwide is valued at nearly USD 480 billion<sup>4</sup>.

Much literature has been published since the 1980s on the subject of the benefits derived from including timberland in an institutional investment portfolio. Most of this literature is based on US institutional investment conditions.<sup>5</sup>

In Europe, IWC has pioneered institutional timberland investments since its establishment in 1991. Particularly since the late 1990s, IWC has seen growing interest among European institutional investors in international timberland investments.

This paper describes the general timberland return characteristics and the diversification opportunities offered by including timberland in a European institutional investment portfolio.

---

<sup>1</sup> Merrill Lynch, 2007

<sup>2</sup> Neilson, 2008

<sup>3</sup> Mercer, 2006

<sup>4</sup> IWC. Global Forestland Investment Study, 2005

<sup>5</sup> Among others: Akers, 2000; Binkley *et al.*, 1996; Caulfield, 1998a; Caulfield and Newman, 1999; Conroy and Miles, 1989; Hancock Timber Resource Group, 2003a; Redmond and Cabbage, 1988; Reinhart, 1985; Zinkhan, 1990; and Zinkhan *et al.*, 1992.

## 2 Timberland Return Characteristics

### 2.1 Return Drivers

Timberland investment returns can be described as a function of three drivers<sup>6</sup> (biological growth, change in timber prices and change in land value) as depicted in Figure 1.

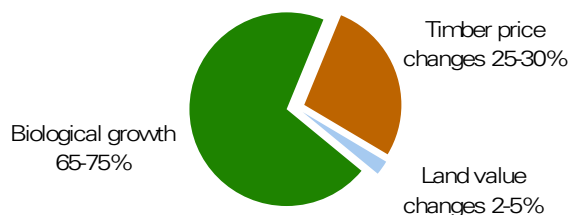


Figure 1. Sources of Timberland Return. Source: RMK.

The split between the return components can vary considerably between individual investments. Other income sources (i.e. higher and better use, HBU) such as hunting, mining royalties, conservation easements etc. are applicable to some investments.

#### *Biological tree growth*

Biological growth is what separates timberland investments from other types of real estate investments, and it is estimated to be the most important return driver. The resulting volume and consequent value change over time are, to a large extent, independent of macroeconomic or financial market conditions (“trees do not read the Financial Times”). The effect from biological growth on return is two-dimensional. Not only do trees grow in volume, but as they grow, they also turn into higher value products (called “ingrowth”).

---

<sup>6</sup> Caulfield, 1998b

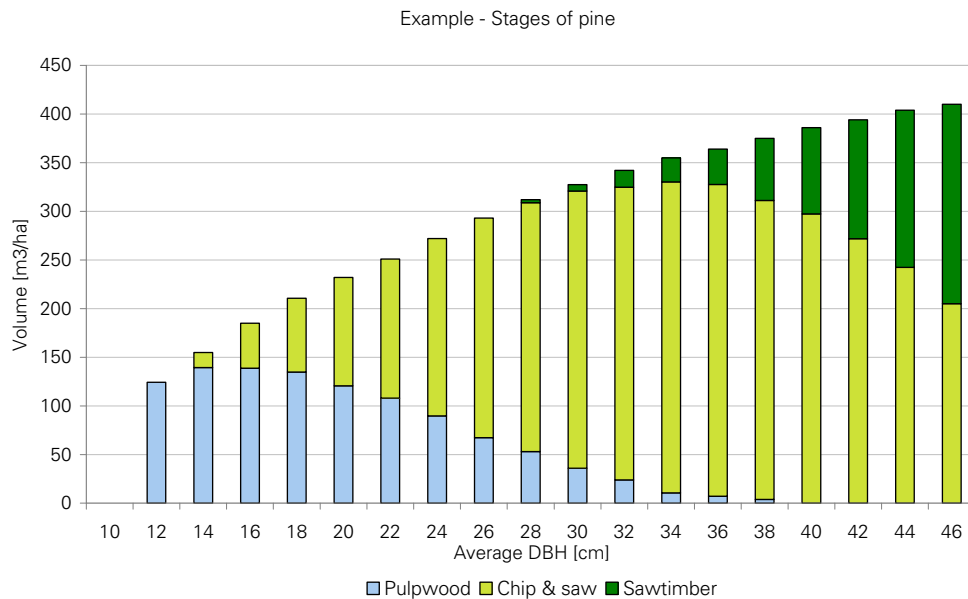


Figure 2. Sources of timberland investment returns – Significance of biological growth.  
Source: IWC internal analysis.

### *Timber price change*

Numerous macroeconomic factors influence the price of timber, including population growth, GDP per capita, activity in the construction sector, interest rates, and the overall level of economic activity. Moreover, microeconomic factors affect the stumpage price within regions.<sup>7</sup> However, it is important to note that during periods of declining timber prices, biological growth counters the impact of reduced timber prices. Therefore, timberland investments have a natural built-in hedge against timber price fluctuations. Furthermore, management has significant flexibility when it comes to timing the harvest of trees. By utilizing positive market conditions, management can maximize the return from the investment. Timber prices have generally appreciated by 2 percent annually during the past century.<sup>8</sup>

### *Changes in land value*

Usually, land value only represents a very small percentage of the total timberland investment value. Land values are related to local supply and demand conditions and therefore vary spatially. In addition, price is also partly a function of quality. A study by Washburn<sup>9</sup> demonstrates that the strongest indicators of real value of land over time are the CPI and the nominal risk-free rate of interest. During periods of low inflation and relative timber product price stability, timberland prices tend to change slowly, and vice versa.

<sup>7</sup> Caulfield, 1998b

<sup>8</sup> Mercer, 2006

<sup>9</sup> Washburn, 1992

## 2.2 Return Structure

The introduction of managerial flexibility by ownership of timberland, as opposed to traditional securitized investments (e.g. timber product companies), can be perceived as acquiring two important timing options:

*Entry/exit option:* Changes in the value of a timberland property are related to a number of factors, of which changes in timber prices and presence of timber industry are particularly important. Investors can utilize timberland market conditions when entering and exiting the investment and thus affect the return on the investment.

*Harvest option:* By utilizing market conditions and harvesting the trees when timber prices are attractive, management can positively affect the rate of return on the investment.

If management is assumed to maximize value and utilize varying market conditions, which means to exercise the options optimally, the return structure of the investment will consequently be changed.<sup>10</sup>

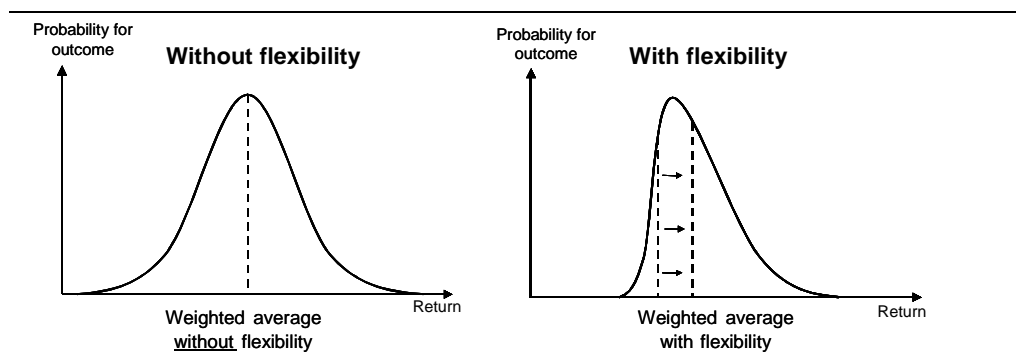


Figure 3. The effect on return structure by introducing options or flexibility in timberland investments.

As Figure 3 illustrates, the flexibility increases the weighted average return and thus the total return on investments. The explanation is that the flexibility makes it possible for management to reduce unfavorable outcomes.

In that respect, a timberland investment has an asymmetric return structure, with a high upside potential and a low downside risk. Historical data, illustrated in Figure 4 below, seem to support this. The figure compares the annual total rate of return of the NCREIF<sup>11</sup> Timberland Index<sup>12</sup> with the MSCI World<sup>13</sup> from 1970 to 2008.

<sup>10</sup> Cordt and Degn, 2003

<sup>11</sup> National Council of Real Estate Investment Fiduciaries

<sup>12</sup> For the period before 1987 the John Hancock Timber Index is used.

<sup>13</sup> IWC's benchmark for global stocks

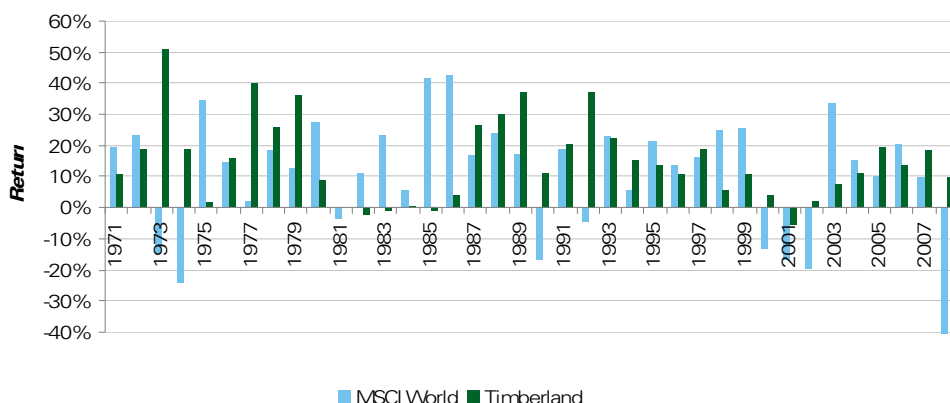


Figure 4. John Hancock Timber Index<sup>14</sup> versus MSCI World<sup>15</sup>, 1970-1987, and NCREIF Timberland Index<sup>16</sup> versus MSCI World, 1987-2008.

The chart demonstrates the difference between volatility on the upside (positive returns) and the downside (negative returns).

The magnitude of the positive green bars (timberland) in Figure 4 is roughly the same as the magnitude of the positive blue bars (global stocks). In other words, the volatility on the upside is almost similar. However, there is a significant difference on the downside: the total magnitude of the blue bars is of completely different dimensions from the magnitude of the green bars.

The conclusion is that returns are highly elastic on the upside, but close to inelastic on the downside for timberland investments, which is the ideal situation.<sup>17</sup>

When considering the risks of timberland investments, biotic and climatic factors are often addressed by investors.

Figure 5 below indicates that professionally managed timberland has hardly experienced adverse events. Less than 0.1% of the total value of the forest asset has been lost due to insects, storm, or fire in any given year.<sup>18</sup> A reason is that after a fire has hit, it is estimated that up to 90 percent of the timber is still merchantable.<sup>19</sup> However, according to IWC ‘s experience, there is a higher risk of losses from hazards in less well managed timberland forests, like public lands.

<sup>14</sup> Historic timberland performance figures calculated from the John Hancock Timber Index are based on a model constructed by Hancock Timber Resource Group, the largest timberland investment management organization (TIMO) for institutional investors

<sup>15</sup> The MSCI World Equity Indices are designed to measure the performance of the global equity markets

<sup>16</sup> Refer to page 10

<sup>17</sup> Ineichen, 2003

<sup>18</sup> According to IWC’s knowledge, neither a more recent study has been conducted nor one focusing on the average loss outside of United States.

<sup>19</sup> Goar , 2001

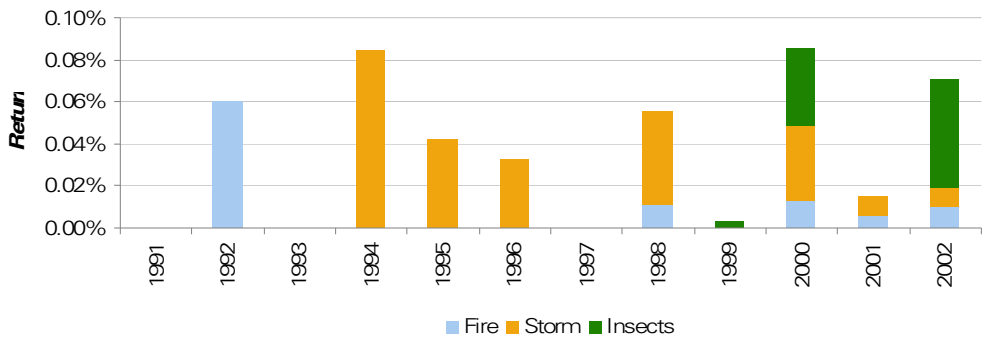


Figure 5. Percentage asset value loss of total in Hancock's<sup>20</sup> investments in North America. Hancock had during that time managed timberland valued at about USD 2 billion. Source: Hancock Timber Resource Group, 2003d.

### 2.3 Distribution of Timberland Returns

The asymmetric return structure of the individual timberland investments, as described above, should not be confused with the distribution of returns between different timberland investments (such as institutional timberland investment funds). If the return distribution between investments is even, the mean and median rates of return will be identical. This implies that the number of underlying investments to be included in a portfolio is limited in order to achieve a mean rate of return.

This is not the case when the returns of different investments are unevenly (e.g. lognormal) distributed, where the median is lower than the mean rate of return. Under those circumstances, the number of investments to be included in the portfolio is substantially larger. This is illustrated in Figure 6 below.

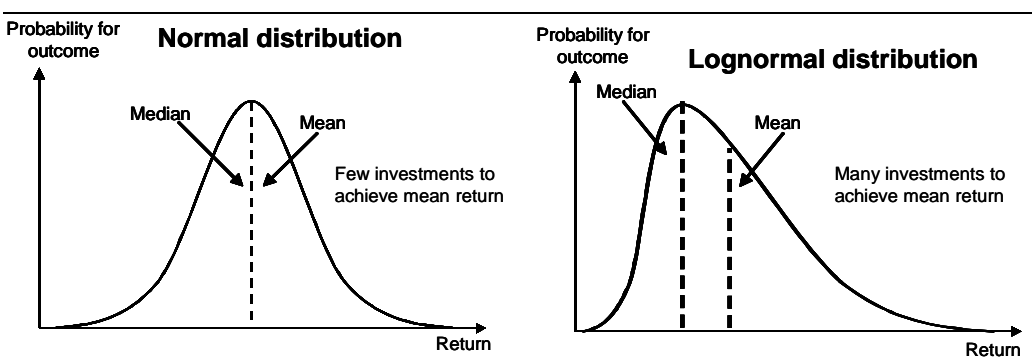


Figure 6. Illustration of two different distributions of returns between investments.

Table 1. Distribution of annual returns in Timberland and US Private Equity/Buyout Funds<sup>21</sup>.

1999-2008Q3	Mean	Median	Max	Min	Upper	Lower
Timberland (NCREIF)	8.9%	10.2%	19.4%	-5.2%	18.5%	1.2%
US Private Equity	5.4%	4.2%	112.1%	-93.5%	15.1%	-3.2%

<sup>20</sup> Hancock Timber Resource Group is the largest timberland investment management organization (TIMO) for institutional investors  
<sup>21</sup> Data is obtained from VentureXpert. Please note that data is as of Q3 2008.

Table 1 shows that compared to US private equity, the annual returns of timberland have not only a higher mean, but also have far smaller “tails”, i.e. is platykurtic. This indicates that extreme returns are much less likely for timberland than for investments in private equity, which shows a distribution with larger tails, i.e. is leptokurtic. Therefore fewer investments in timberland will lead to a mean rate of returns.

IWC has gathered return data from 77 institutional timberland investment funds and accounts with mainly US-based investments. The returns are reported as annual returns since inception. The distribution of the return data is displayed in Figure 7 below.

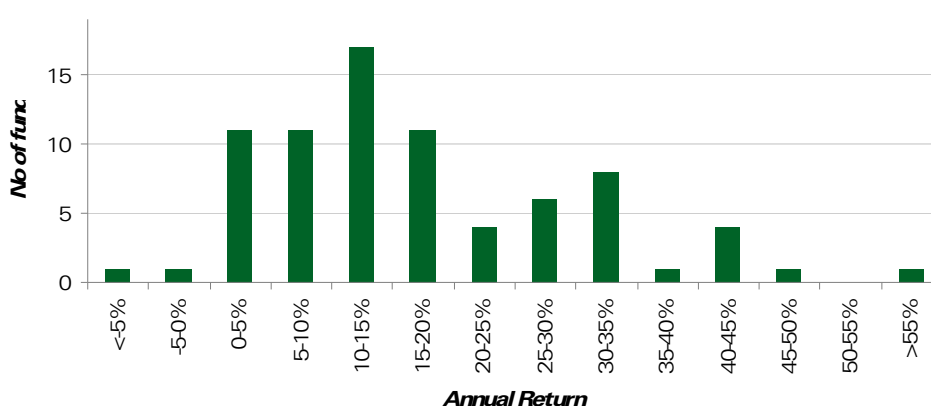


Figure 7. Return distribution from 77 institutional timberland investment funds reported as annual gross IRR returns since inception. Source: IWC internal analysis 2007, based on data provided by TIMOs.

The chart shows that the distribution of the annual returns is not purely normal, nor lognormal. This indicates that a timberland portfolio should include more than a few funds, but not as many as when investing in private equity in order to achieve a mean rate of return.

### 3 Historical Timberland Performance

The remainder of this paper focuses on the historical and expected benefits of including timberland investments in an institutional portfolio.

The historical data are based on quarterly reported returns between first quarter 1987 and fourth quarter 2008, and the asset classes employed in the present study are the ones identified in Table 2 below.

Table 2. Asset classes and respective benchmarks used in the asset allocation study.

Asset class	Benchmark
Timberland	NCREIF Timberland Index
Global stocks	MSCI World Total return*
Large Cap American Stocks	SP 500*
Small Cap American Stock	Russell 2000*
Emerging Markets Stocks	MSCI EM Total Return*. **
Global Bonds	JPM GBI Broad**
Real estate	NCREIF Property Index
CPI	US CPI
Risk-free rate	LIBOR USD 3 Month

\* Including reinvested dividends  
\*\* Data only dates back to 1988

Measuring timberland performance is complicated due to the fact that there is no centralized auction market which continuously prices timberland assets, not to say monitors the returns. Consequently, several analysts have designed models of what the past performance of timberland might have been, had it been possible to observe and record the data.<sup>22</sup>

Based on actual returns, two indices have historically reported quarterly and annual returns: the Timberland Performance Index (TPI) and the NCREIF Timberland Index. The former was discontinued in 1999; hence, the present study will apply the NCREIF Timberland Index which is denominated in US dollars.

### 3.1 The NCREIF Timberland Index

The NCREIF Timberland Index has been published since 1994 and includes returns dating back to 1987. It is a property-based index reporting returns for three regions in the USA. The index is based on generally accepted measures of asset valuation. Additionally, the reported income and appreciation return series conforms to theoretically appropriate concepts of asset returns.<sup>23</sup>

The index accounts for 12.8 million acres of forestland, and the total value of the 305 properties is about USD 23.9 billion, a substantial share of institutional timberland investments in the United States.<sup>24</sup>

However, there are four limitations to the NCREIF Timberland Index<sup>25</sup>:

1. The number of contributing TIMOs has historically been limited and currently the index has eight contributing members.
2. The index series only dates back to 1987, which is a relatively short period. This will be of less concern over time as more years are added.

<sup>22</sup> Binkley *et al.*, 1996

<sup>23</sup> Hancock Timber Resource Group, 2003b

<sup>24</sup> NCREIF, 2008; and Washburn, 2003

<sup>25</sup> Lutz, 1999

3. The index covers only timberland investments in the United States, which as it will be shown later, is not the only market for timberland investments.
4. Only quarterly appreciation returns are reported by the NCREIF. In quarters when properties are not appraised, the appreciation is reported as zero. As a result, the return series shows a higher volatility than there actually is.

In spite of these limitations, the index is the best available measure of historical performance and it provides some indication of expected return characteristics for timberland investments. The annual returns for the NCREIF Timberland Index since 1987 are displayed in Figure 8 below.

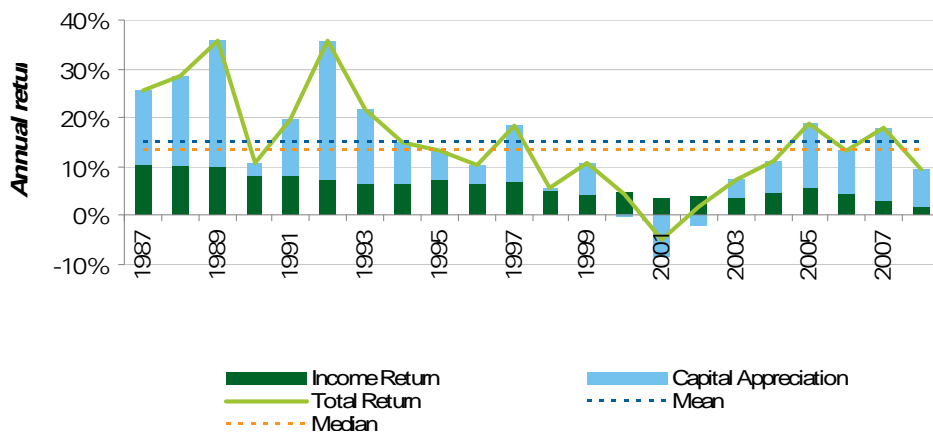


Figure 8. Annual reported return (%/year) since 1987 for the NCREIF Timberland Index.

As it can be seen from Figure 8, timberland investments have had good historical performance. The decomposition show a steady income return, while capital appreciation is more volatile and even experienced depreciation in 2001 and 2002 predominantly due to falling stumpage prices in the USA. Timberland investments have historically yielded an annual nominal return of 15.1% since 1987. The median of the returns is 13.8%, indicating a positive skewness in the annual returns.



Figure 9. Histogram of reported return (%/year) since 1971 for John Hancock Timberland Index (1971-1986) and the NCREIF Timberland Index (1987-2008).

Figure 9 shows that there is a positive skewness in the annual returns, making a large negative return less likely than a large positive return, and a high average return, which is in line with the overall characteristics of timberland; high risk adjusted return.

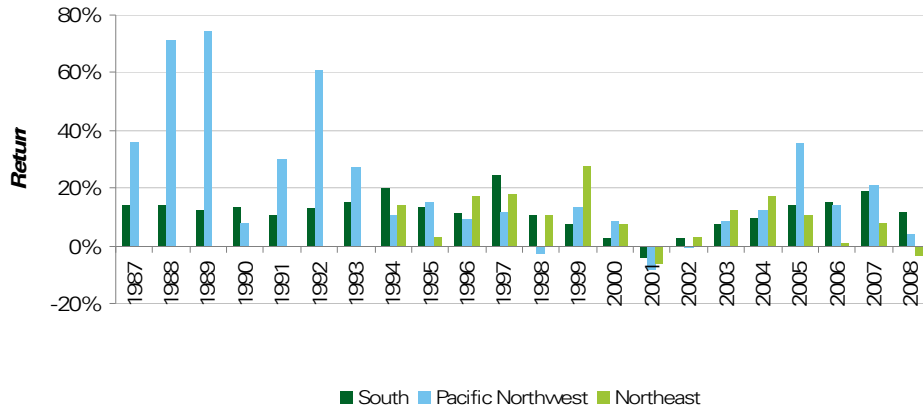


Figure 10. Annual reported return (%/year) since 1987 for the regions covered by NCREIF Timberland Index.

Figure 10 shows that the annual returns vary quite a lot in the different US regions, ranging from an arithmetic average of 9.5% in US Northeast, 11.6% in US South, peaking at 20.9% in US Pacific Northwest. The return in Pacific Northwest is highly impacted by positive outliers, correcting for that by looking at the median instead, the median of the annual returns are at the same level ranging from 10.7% to 13.7%. This indicates that timberland investment is not a unified asset, as e.g. climate, soil, maturity, species etc. impact the return characteristics.

As previously mentioned, a major drawback of the NCREIF Timberland Index is that it only consists of data from the US market. For the institutional investor, there are alternatives to the US timberland market, as timberland investments outside the US are getting more and more feasible to invest in, which means that it is possible for investors to invest in a combination of regions that matches the investor’s preferences. Hancock has estimated annual returns since 1960 on timberland investments in the main investable regions, based on timber prices during the prior 8 quarters. This gives an indicator of the characteristics of return in the different regions.

Table 3. Annual returns since 1987 according to Hancock in different regions<sup>26</sup>

Annual Returns since 1987	U.S. South	U.S. Pacific Northwest	U.S. Northeast	U.S. Domestic	Coastal B.C.	New Zealand	Australia	Brazil
Mean of returns	11.7%	20.9%	9.8%	15.2%	11.7%	9.6%	11.9%	18.4%
Stdev of returns	6.2%	22.6%	7.9%	10.7%	17.8%	14.4%	11.1%	18.9%
Median of returns	12.8%	13.1%	9.3%	13.3%	12.1%	10.5%	12.0%	15.2%
Correlation to US Domestic	0.59	0.95	0.30	1.00	0.50	0.30	0.40	0.45

<sup>26</sup> In order to compare with the NCREIF Timberland Index and as no figures are present from the outside the US prior to 1975, only returns since 1987 are used. No returns from Brazil prior to 1992 are present. Note that IWC carries out regional studies, where expected future performance and correlation within geographical regions are estimated

By combining the output from Figure 10 and Table 3, it becomes clear that there is a minor discrepancy between the average annual returns in the US regions. However, as the discrepancy is relatively small, Figure 10 is a good proxy of how the returns/risk in the different regions have been relative to each other and of how much the returns in the markets outside of the US correlate to the returns in the US market. It is obvious that the correlation between the returns in the US and other markets are low, making it possible to diversify a portfolio of US market timberland with timberland investment in other markets. Moreover, Brazil has shown high returns above the average of the US timberland markets for the past 20 years, especially when adjusting for outliers by looking at the median instead of the mean. As more and more timberland investment opportunities arise in emerging markets, like Russia, Asia, Africa, etc., it is possible to achieve returns that are above the NCREIF Timberland Index.

Even though there are geographical diversification opportunities within the timberland investment universe, by far the most money (91%) is invested in the North American timber assets. Oceania accounts for 5%, South American for 2% and “other” for 2%.<sup>27</sup>

### 3.2 Return Characteristics for Timberland and Other Assets

Figure 11 below displays cumulative total returns of timberland investments since 1987, measured by the NCREIF Timberland Index, relative to other assets in the investable universe.

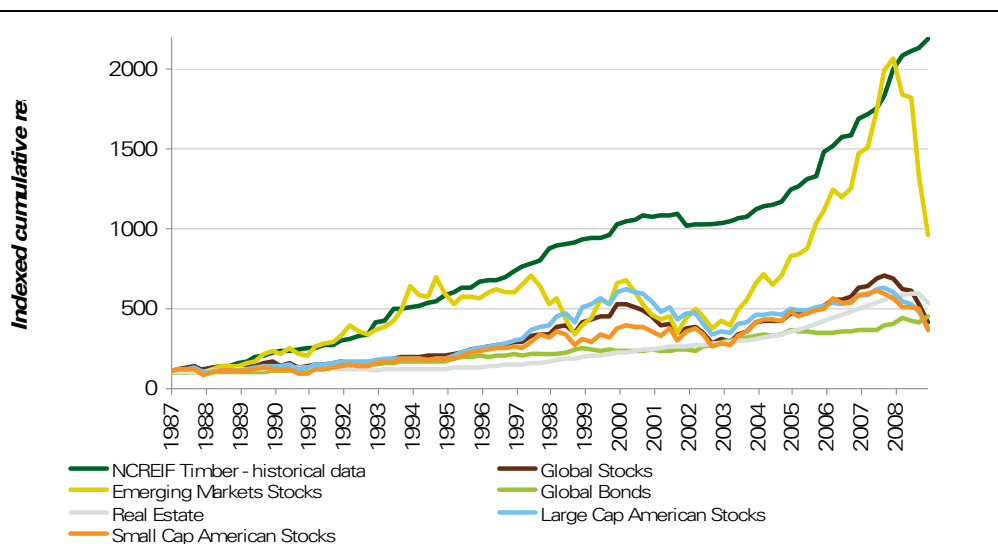


Figure 11. Cumulative nominal returns for timberland investment, measured by the NCREIF, relative to other assets in the investable universe between 1987 and 2008.

<sup>27</sup> Merrill Lynch. Timber Survey, 2007

It is evident that from 2003 to 2007, the stock markets appreciated significantly and especially the emerging markets showed extraordinary performance. Bonds and real estate showed a steadier, but limited appreciation up to 2007, which is in line with the characteristics of those assets. The 2008 turmoil severely hit the financial capital markets and many stock markets were down more than 40%. The real estate markets were also hit but not as brutally as the stock markets. Timberland on the other hand has shown a steady, but overall high appreciation, making it the asset with the highest return since 1987.

Table 4 shows the annualized compounded return for different time horizons since 1987 for the assets analyzed in this paper.

Table 4. Annualized Compounded Returns for the asset classes.

Annualized compounded return	NCREIF Timber	Global Stocks	Emerging Markets Stocks	Large Cap American	Global Bonds	Real Estate
1 year	9.5%	-40.3%	-53.2%	-38.5%	10.4%	-6.5%
5 years	14.4%	0.0%	8.0%	-4.1%	6.2%	11.7%
10 years	8.9%	-0.2%	9.3%	-3.0%	6.0%	10.5%
15 years	10.2%	5.0%	2.7%	4.5%	6.7%	10.6%
20 years	13.8%	5.4%	10.1%	6.1%	7.5%	7.9%
Inception	15.1%	6.6%	10.9%	6.2%	7.1%	8.0%
Highest	37.4%	33.8%	74.8%	34.1%	20.1%	20.1%
Lowest	-5.2%	-40.3%	-53.2%	-38.5%	-6.4%	-6.5%

To illustrate timberland investments' historical attractive returns in terms of variability characteristics, a chart of the rates of returns and standard deviations for the assets included in the investable universe has been prepared. The rates of return and standard deviations are based on the historical return series mentioned in Table 2. The resulting chart is displayed in Figure 12 below.

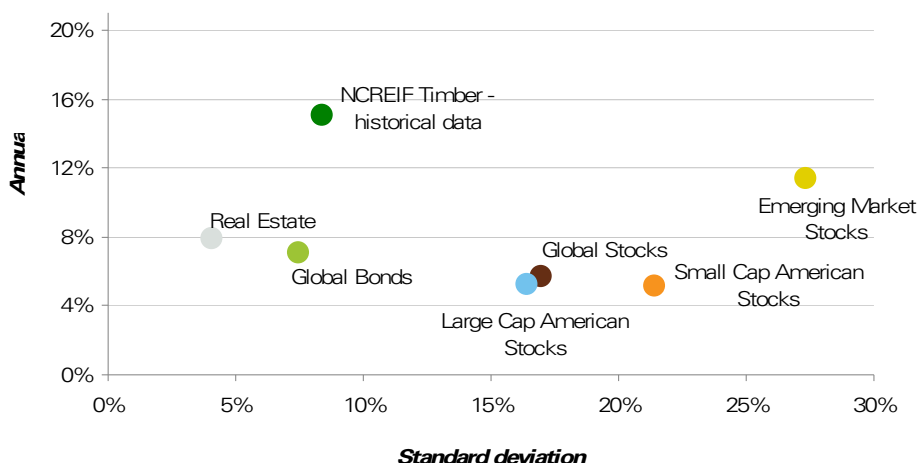


Figure 12. Geometric annual rates of return and standard deviations for the present studies in investable assets based on quarterly historical data from the Q1 1987 to Q4 2008.

The chart clearly shows that on a historical basis, timberland investments have attractive return and risk characteristics.

As historical data is not necessarily a good indicator of future performance, the forecasted performance of the asset classes will be shown in IWC's Asset Allocation Model section of this report.

### 3.3 Correlations of Timberland Returns to Other Assets

Besides attractive risk and return characteristics, timberland investments have low correlations with the other assets in the investable universe, which is beneficial when a portfolio of assets is created from different asset classes.

Figure 13 below shows the correlations between yearly returns on timberland investments, measured by the NCREIF, and the remaining investable universe.

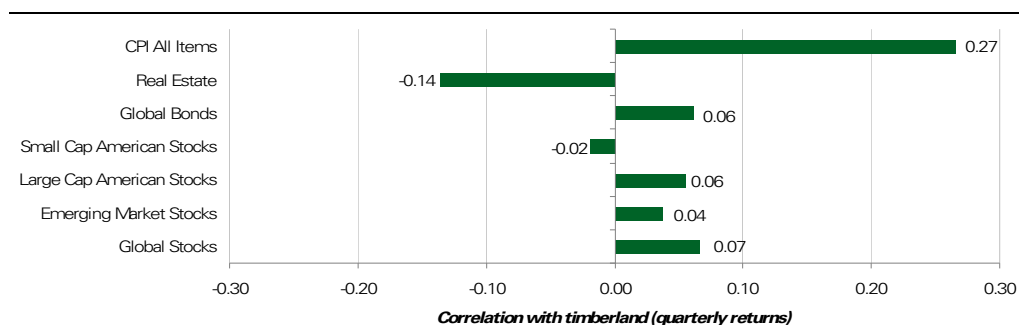


Figure 13. Historical yearly correlations with timberland returns based on quarterly data between Q1 1987 and Q4 2008.

As shown in Figure 13, timberland returns have historically correlated fairly well with inflation, indicating that timberland investments, to some extent, provide a hedge against inflation. This is also supported by a study made by Lutz in 2007, which concluded that a geographically diversified timberland portfolio acts as an inflation hedge.<sup>28</sup>

Quarterly timberland returns have correlated only slightly positively with most asset classes, indicating that there are sizeable benefits to be achieved by including timberland in a diversified portfolio.

Furthermore, timberland investment returns correlate negatively with real estate returns. This is quite interesting since timberland is often categorized as an alternative real estate investment. According to the data presented in this study, there are substantial benefits to be achieved by including timberland in a real estate portfolio.<sup>29</sup>

<sup>28</sup> Lutz, 2007

<sup>29</sup> For more descriptions about the benefits of timberland in a real estate portfolio, see for example Hancock Timber Resource Group, 2003c; and Washburn et al., 2003.

### 3.4 Performance Measurements

This section encompasses a range of well-known financial key figures which are measuring the historical performance of investable assets in different ways.

Based on the risk and return characteristics identified, the Sharpe ratio has been calculated for each asset in the investable universe using the calculated rate of return from Libor 3M as the risk-free rate of return.<sup>30</sup>

Figure 14 below illustrates the result of the analysis. As shown in the figure, the excess return to variability from timberland is attractive, even when lowering the expected return and increasing the standard deviation of returns.

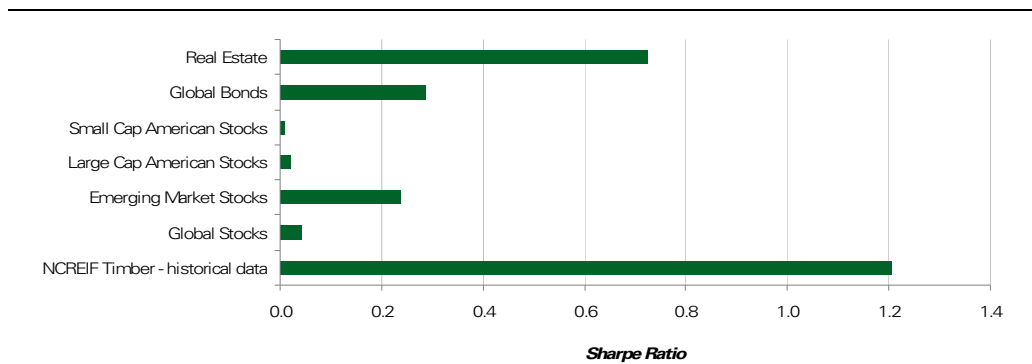


Figure 14. Sharpe Ratio for each asset in the investable universe (risk-free rate of return is estimated from Libor 3M). Returns are based on historical data Q1 1987 to Q4 2008.

In order to examine the fluctuations in the Sharpe ratios over time, an analysis of each asset’s Sharpe ratio over a 10 year horizon has been conducted, e.g. 1987-1996, 1988-1997, etc. The outcome is shown below in Figure 15, where it is clear that the NCREIF Timberland Index historically has not only had a higher average Sharpe ratio, but also the lowest Sharpe ratio is significantly above those of the other assets.

<sup>30</sup> The Sharpe ratio is often referred to as an excess return to variability measure, and is calculated by subtracting the risk-free rate from the expected rate of return for a portfolio and dividing the result by the standard deviation of the portfolio returns.

$$\frac{\overline{R_P} - R_F}{\sigma_P}$$

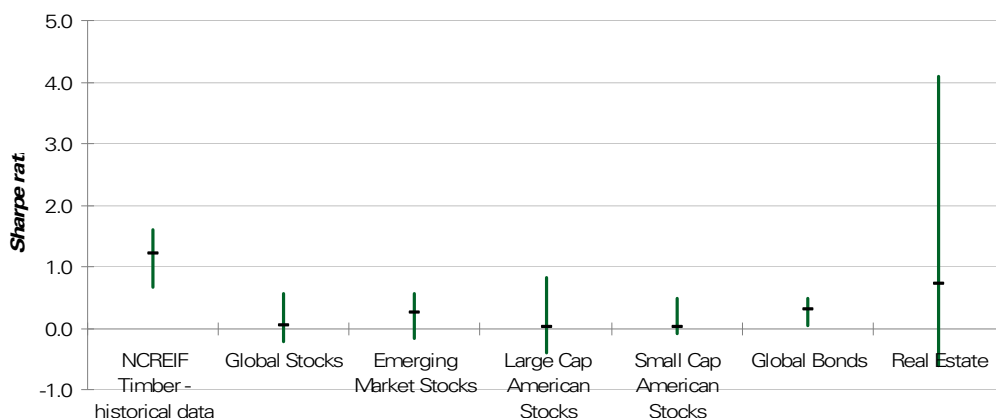


Figure 15. Max, Min and Average Sharpe Ratio for each asset over a 10-year horizon during 1987-2008.

Another measure of an asset’s performance is by its alpha, which shows if an asset has yielded a higher or lower return than the CAPM theory forecasts<sup>31</sup>. According to the CAPM-theory, the return of an asset must be directly correlated to the systematic risk (the risk that cannot be lowered by diversification). By definition, the market risk,  $\beta$ <sup>32</sup> of the market (in this paper the global market<sup>33</sup>) is 1.00. A straight ( $\beta$ /return) line, the Security Market Line (SML), can be drawn from the risk free rate to the market. In a perfect theoretical world all assets should be on this line.

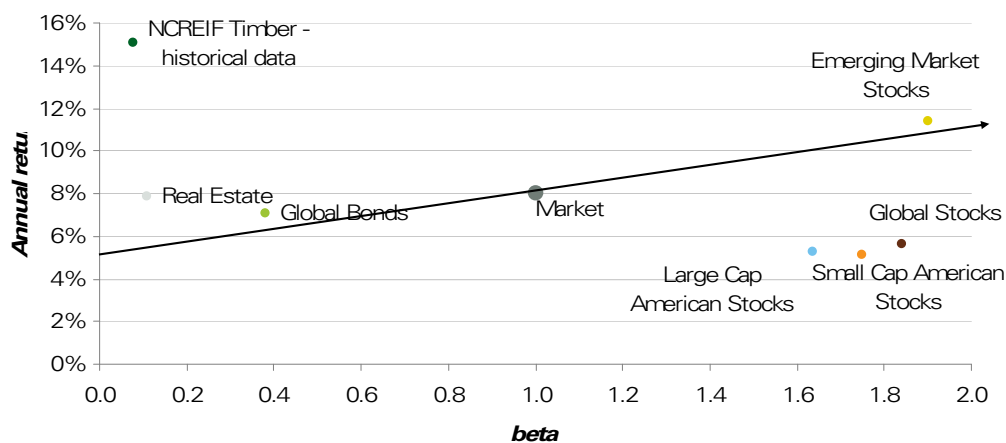


Figure 16. Security Market Line and beta/return of assets.

<sup>31</sup> Capital Asset Pricing Model

<sup>32</sup>  $\beta_{asset} = \text{Cov}(r_{asset}; r_{market}) / \sigma_{market}^2$

<sup>33</sup> The market is derived based on the asset classes included in this paper, weighted with their approximate relative weight in a global portfolio.

Alpha is defined as the superior/inferior return relative to the systematic risk, in other words the vertical distance from the asset to the SML.<sup>34</sup>

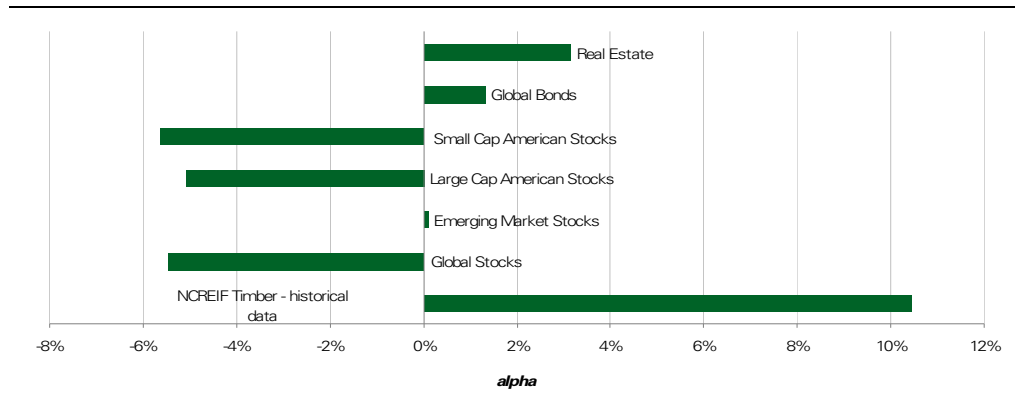


Figure 17. alpha of the investable assets.

As shown in Figure 15 and 16 the performance of the historical NCREIF Timberland is by far outperforming the other asset classes. Even with the reduced expected attractiveness of timberland in the future, the characteristics of timberland is superior to most other asset classes indicating that a superior return has been achievable and is expected to be so in the future as well.

<sup>34</sup>  $\alpha_{asset} = r_{asset} - \beta_{asset} * r_{market}$

#### 4 IWC’s Asset Allocation Model

The previous sections of this study have been focusing on historical performance, which should not be in alignment with future performance expectations. The intention with this section is to show the expected future benefits of timberland investments in an institutional portfolio. Therefore an efficient frontier analysis is carried out using expected performance for timberland and other asset classes.

##### 4.1 Risk, Return and Correlation

The data needed for any asset allocation study are estimates of risk defined by the standard deviation, rate of return, and correlation of any asset combination represented in the investable universe.

According to IWC analysis, an international diversified timberland portfolio is expected to yield an annual nominal rate of return of 10.60-11.25% before tax and asset management fees and an annual standard deviation of 8.75% and 10.60%.<sup>35</sup> The remainder of the present study will employ an expected nominal rate of return of 10% p.a. after asset management fees of 1% and an annual standard deviation of 9.0%.

For this asset allocation study, the investable universe has been defined as: Timberland, Global stocks, Emerging Market Stocks, Small Cap American Stocks, Large Cap American Stocks, Global Bonds, and Real Estate. As IWC does not have the expertise to forecast expected return of other asset classes, a study of 10-15 year expected returns, standard deviations and correlations prepared by JPMorgan is along with IWC assumptions utilized<sup>36</sup>.

The risk, return, and correlations are displayed in Table 5 below.

Table 5. Risk, return, and correlations for the asset classes included in the model.

	Timberland	Global Stocks	Emerging Market Stocks	Large Cap American Stocks	Small Cap American Stocks	Global Bonds	Real Estate
Annual return	10.0%	9.5%	10.3%	9.0%	9.3%	4.3%	8.5%
Standard deviation	9.0%	17.0%	27.5%	17.5%	23.0%	8.0%	13.0%

Correlation on quarterly returns	Timberland	Global Stocks	Emerging Market Stocks	Large Cap American Stocks	Small Cap American Stocks	Global Bonds	Real Estate
Timberland	1.00	0.05	0.07	0.07	0.06	0.05	0.06
Global Stocks		1.00	0.68	0.92	0.80	-0.01	0.24
Emerging Market Stocks			1.00	0.55	0.54	0.01	0.23
Large Cap American Stocks				1.00	0.88	-0.15	0.20
Small Cap American Stocks					1.00	-0.08	0.27
Global Bonds						1.00	-0.04
Real Estate							1.00

<sup>35</sup> IWC internal analysis, 2007

<sup>36</sup> JP Morgan Asset Management Long-term Capital Markets Return Assumptions. 2008.

### 4.2 Efficient Frontier Analysis

On the basis of IWC’s asset allocation model, two efficient frontiers have been produced: one that allows allocations to timberland investments, and another one where timberland is excluded from the portfolio.

The results are shown in Figure 18 below.

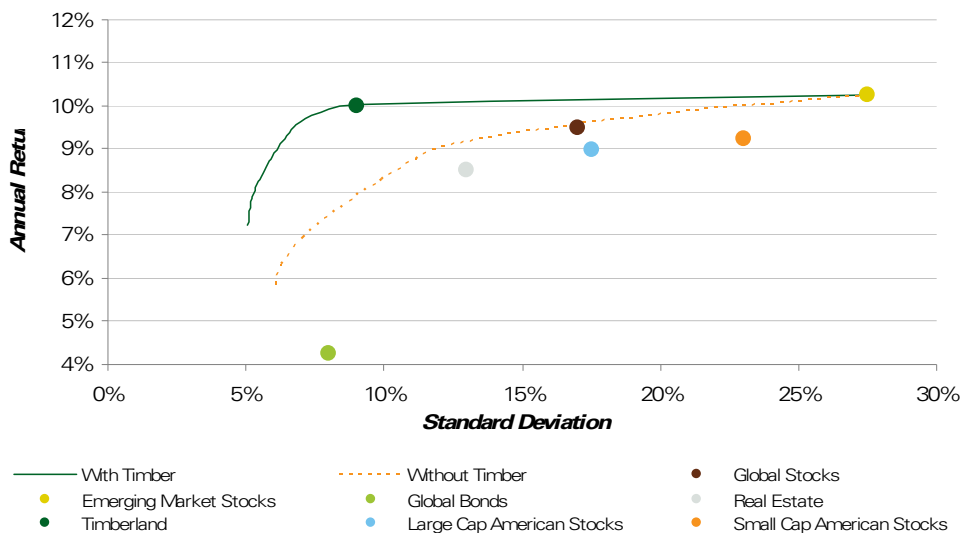


Figure 18. Efficient frontier for an institutional portfolio including and excluding timberland investments.

In Figure 18, the full-lined green-colored curve is the efficient frontier when timberland is allowed in the portfolio and the dashed orange-colored curve is the efficient frontier when timberland is not allowed in the portfolio. Note that the efficient frontier is reaching a larger return and a lower risk, when including timberland in the portfolio.

It is evident from Figure 18 that allowing an allocation to timberland in a portfolio is beneficial as a portfolio with timberland will be superior to a portfolio without timberland. This is further substantiated by the high optimal allocation to timberland.

The incremental benefits of including timberland in the portfolio are summarized in Table 6 below.

Table 6. Incremental benefits of allowing allocation to timberland.

	Return Target	Risk Level	Change from Base
Incl. Timberland		5.29%	
Excl. Timberland	8.0%	9.22%	3.93%
Incl. Timberland		5.64%	
Excl. Timberland	8.5%	10.44%	4.80%
Incl. Timberland		6.12%	
Excl. Timberland	9.0%	11.92%	5.80%

The table above shows the subsequent reduction of risk when including an allocation to timberland in a diversified portfolio. As an example, the table shows that if we include an optimal allocation to timberland in a portfolio with a target annual rate of return of 8.5%, the expected standard deviation can be reduced from 10.44% to 5.64%.

#### 4.3 Threshold Analysis

A threshold analysis has been performed to establish at which rate of return timberland investments are not included in the optimal allocation.

Table 7. Threshold analysis showing at which return timberland should not be included in the optimal allocation.

Portfolio	Return		
	Timber Normal	Timber Indifference Point	Decline to reach
8.0%	10.0%	3.9%	6.1%
8.5%	10.0%	4.2%	5.9%
9.0%	10.0%	6.6%	3.4%

Table 7 shows that timberland should still be included in an institutional portfolio with a return of 8.5%, even if the nominal return of timberland declines by 5.9% from the expected 10% to 4.2% annually.

From Table 6 and 7 it can be derived that timberland investments have a positive impact on the risk level of the total portfolio and that the return expectations of timberland investments could be lowered significantly before they should be omitted from the portfolio.

It is IWC's belief that timberland investments will continue to have a positive impact on the asset portfolio of an institutional investor as there are no indicators that a global portfolio of timberland will yield a nominal return significantly lower than 10% annually in the future.

## References

Akers, K. (2000): Global timber investments: An important role in institutional portfolios – Paper from UBS Asset Management, UBS Timber Investors Research, September 2000.

Binkley, C.S., C.F. Raper, and C.L. Washburn (1996): Institutional ownership of US timberland. History, rationale and implications for forest management – *Journal of Forestry* 9 (Sep 1996), 21 – 28.

Caulfield, J.P. (1998a): Timberland in institutional portfolios and the question of persistence – *Forest Products Journal*, Apr. 1998, 48(4), 23 – 28.

Caulfield, J.P. (1998b): Timberland return drivers and investing styles for an asset that has come of age – *Real Estate Finance*, winter 1998, 14(4), 65 – 78.

Caulfield, J.P. and D.H. Newman (1999): Dealing with timberland investment risk: Theory versus practice for institutional owners – *Journal of Forest Economics* 5:2 1999, 253 – 268.

Conroy, R. and M. Miles (1989): Commercial forestland in the pension portfolio: the biological beta – *Financial Analysts Journal*, Vol. 45, September - October 1989, 46-54.

Cordt, L. and T. Degn (2003): Værdiansættelse af fleksibilitet – DTA eller ROV? – Kandidatafhandling – Copenhagen Business School (Denmark, unpublished).

Elton, E., and M. Gruber (1995): *Modern Portfolio Theory and Investment Analysis* – John Wiley & Sons, Inc. 1995.

Goar, J. S. (2001). *Into the Woods* – Bloomberg Wealth Manager.

Hancock Timber Resource Group (2003a): Timberland as a portfolio diversifier – Research Notes 2003.

Hancock Timber Resource Group (2003b): The NCREIF Timberland Property Index – Research Notes 2003.

Hancock Timber Resource Group (2003c): The benefits of timberland in a real estate portfolio, revisited – Hancock Timber Research Note, Jun. 2003, N-03-7.

Hancock Timber Resource Group (2003d): Risk from natural hazards for timberland investments – Hancock Timberland Investor Second Quarter 2003.

Ineichen, A.M. (2003): Fireflies before the storm – UBS Warburg – AIS Report.

JPMorgan Asset Management Long-term Capital Market Return Assumptions. As of November 30 2008

Lutz, J. (ed.) (1999): *Measuring timberland performance* – Timberland Report 1(2) James W. Sewal Company.

Lutz, J. (2007): Inflation and Timberland Returns - Part 2. - Forest Research Notes. Volume 4, Number 4, 4<sup>th</sup> Quarter, 2007.

Merril Lynch (2007): Timber Survey: What will institutional investors do next?

Mercer (2006): Timberland as an investment for institutional portfolios

NCREIF (2008): Timberland Index Detailed Quarterly Performance Reports

Neilson, D. DANA Limited. Timberland ownership is still only a minute proportion of the total financial market asset base, but ownership is rapidly moving from regional to global; and transaction prices continue to defy gravity -- or do they?

Redmond, C. H. and F. W. Cabbage (1988): Portfolio risk and returns from timber asset investments - Land economics, Vol. 64(4), Nov. 1988, 325-337.

Reinhart, J. (1985): Institutional investment in U.S. timberlands - Forest Products Journal, 35(5), 13-18.

The International Woodland Company A/S (2005) Global Forestland Investment Study. 2005

The International Woodland Company A/S (2007). Regional Allocation Model - Internal research paper. Not published.

VentureXpert. Thomson Financial.

Washburn, C., C. Binkley, and M.E. Arenow (2003): Timberland can be a useful addition to a portfolio of commercial properties - PREA Quarterly, Summer 2003, 28 - 31.

Washburn, C.L. (1992): The Determinants of Forest Value in the U.S. South - In Proceedings of the 1992 Southern Forest Economics Workshop, May 29, 1992.

Washburn, C.L. (2003): Personal comment. Director of Economic Research & Investment Strategy, Hancock Timber Resource Group, 99 High Street, 26th Floor.

Zinkhan, F. C. (1990): Timberland as an Asset for Institutional Portfolios - Real Estate Review, 19, 69-74.

Zinkhan, F. C., W. R. Sizemore, G. G. Mason, and T. J. Ebner (1992): Timberland investments: a portfolio perspective - Portland, OR, Timber Press.