



TIMBERLAND INVESTMENT RESOURCES LLC

growing value for our clients every day

TIR

RELEVANCE OF TIMBER AGE AND GROWTH RATES ON TIMBERLAND INVESTMENT PERFORMANCE

Chung-Hong Fu, Ph.D., *Managing Director*

Economic Research and Analysis

November 2009



Introduction

Over its relatively short history, timberland has moved from being considered an exotic or esoteric investment for pioneering investors to an established asset class with a proven track record of performance.

During this transition, several common misperceptions about the asset class have emerged, and in some cases, have been accepted as fact by some in the institutional investment community. Among others, these include the notion that timberland investment performance is associated with the investment term and the biological characteristics of the timber. These concepts are often expressed as three, specific “rules of thumb”:

- The exit strategy should correspond to the harvest of timber.
- Mature timber or faster growing timber offers higher returns.
- Mature timber or faster growing timber entails less risk.

The purpose of this paper is to address whether these working guidelines are valid and useful or whether they are potentially misleading.

Basis of Fundamental Market Value of Timberland

Before we conduct our assessment, a quick refresher on the basic determinants of timberland value is necessary to provide an analytical foundation.

First, it is important to recognize that timberland is a productive asset. Like an oil well, an office building or a U.S. Treasury bond, a timberland property’s value is derived from its ability to produce cash flows over time. Hence, the fundamental market price of timberland is typically based on the net present value (NPV) of expected future cash flows. Logically, then, a young stand of timber would be worth less than a mature stand because one has to discount further out into the future the anticipated income from the final harvest.

Figure 1 demonstrates how a typical timber investment increases in value over time as its standing inventory of trees age and mature. Note that the value curve based on the age of the forest is generally unbroken and uniformly appreciating – despite the fact that over its lifetime it can alternatively exhibit strong “spikes” of



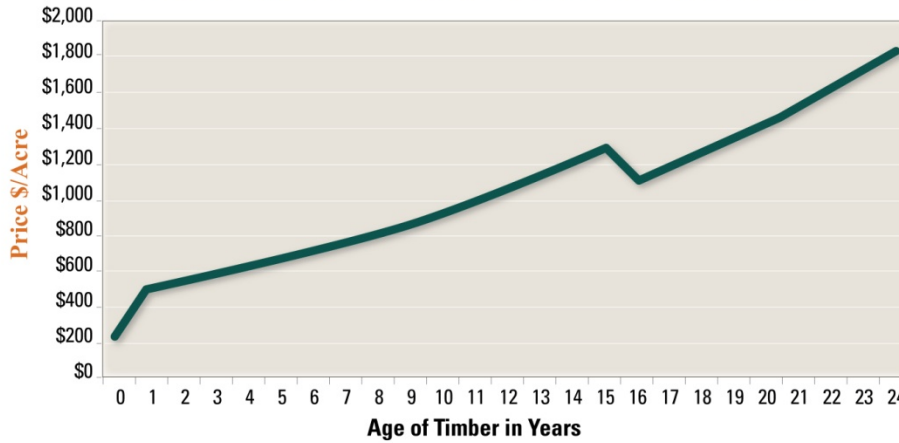
In short, forest investments are timing blind as long as discount rates and price expectations do not change.

positive and negative cash flows. The minor exceptions are the dips (as shown as a single decline at age 15), which are the result of interim cash generated from a thinning harvest (see Figure 2). Overall, the upward progression in value shown in the graph is based on the recognition and discounting of future cash flows derived from the harvest and sale of timber.

Because timberland is usually valued on the basis of discounted cash flows (DCF), investors can purchase or sell at any point in a forest's life cycle – and with all other things being equal, expect to receive the same investment return. In short, forest investments are timing blind as long as discount rates and price expectations do not change.



**Net Present Value of a Hypothetical Stand of Loblolly Pine
in the Lower Coast Plain of the U.S. South Based on Age**



Annual Cash Flow by Age of Timber

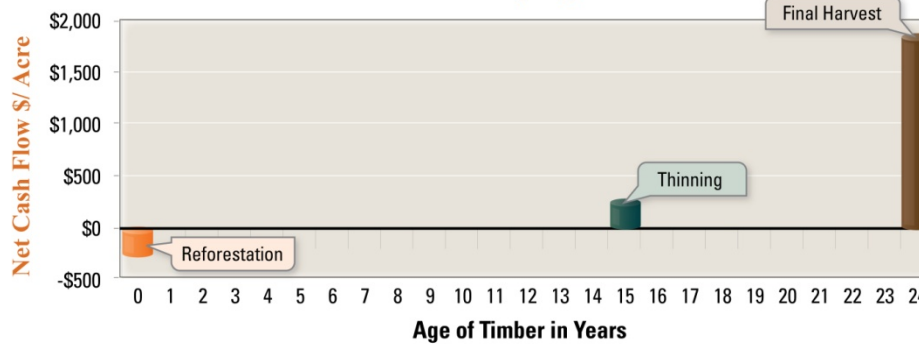


Figure 1 (On Top). Net present value (NPV) of a hypothetical stand of Loblolly pine (*Pinus taeda*) that is growing on the lower coastal plain, that possesses a site index of 65 and that is being grown to a harvest age of 24. The figure illustrates how the market would value a stand of timber based on its age and anticipated cash flows. A discount rate of 6.0 percent real (i.e., no inflation) is used in the illustration. There is a thinning at age 15 and a final harvest at age 24. The prices of the wood products are assumed to be \$8.00 per ton for pulpwood, \$17.00 per ton for chip-n-saw and \$26.00 per ton for sawtimber with flat pricing in real terms. The illustration includes a \$220 per acre outlay for reforestation activities (preparation, tree planting, herbicide treatments and fertilization), annual income of \$5 per acre for recreational leasing, payment of \$4 per acre for annual property taxes, and forest management costs of \$7 per acre. For simplicity, the performance of one rotation is considered, but the general shape of the curve would be the same if an infinite number of rotations were considered. The underlying bare land is not factored into the valuation. *Source: TIR Research.*

Figure 2 (On Bottom). Annual cash flow corresponding to the NPV chart above.



Hence, assuming an efficient and functioning market exists, a timberland investor would not be penalized in return for choosing between (a) harvesting and selling the timberland asset at maturity or (b) selling the timberland asset at an earlier or later time.

PERCEPTION #1

The exit strategy or investment term should correspond with the harvest of timber.

This statement is false. As a rule, the market recognizes future growth and harvests from a timberland property and prices it accordingly. Hence, assuming an efficient and functioning market exists, a timberland investor would not be penalized in return for choosing between (a) harvesting and selling the timberland asset at maturity or (b) selling the timberland asset at an earlier or later time. While the timing of a final harvest should not impact one's ultimate disposition decision, other factors can compel an investor to hold a timberland asset longer, or to sell it sooner. They include:

- **A Discount Rate Differential**
Divergence between the discount rates employed by the broader market and by the timberland owner could push the owner into either selling early or holding his or her timber longer. A market discount rate that is lower than the forestland owner's hurdle rate will favor disposition, while one that is higher will encourage the investor to retain the property for timber income.
- **Transaction Costs**
High transactions costs will encourage a timberland owner to hold a property for harvest income rather than to execute an early disposition. This issue is typically a consideration in thinly-traded timberland markets, such as those in a number of developing countries.
- **Cash Repatriation Losses**
Taxation, fees and cash repatriation issues can cause a timberland owner to favor capital appreciation over timber income, or vice versa. In turn, these factors can impact the holding period of a timberland investment. Such considerations are more prevalent among foreign investors and domestic taxable investors.
- **Different Expectations of Productivity or Price**
A forestland owner who has higher expectations for timber growth or price appreciation than other participants in the market will favor holding timber longer rather than selling it. For instance, an owner who has employed advanced forest science and management to stimulate superior growth on his or her properties may favor holding a particular



Timberlands – mature or immature, high-yield or low-yield – are priced using the same discount rate, so their expected returns should be equivalent.

Younger or slower growing forests do face added risks.

timberland asset in the expectation that these silvicultural investments will produce more robust returns than what many other timberland owners could achieve. Conversely, a landowner who has a very conservative view of the biological potential of his or her timber relative to the market is likely to favor early disposition.

PERCEPTION #2

Mature timber or faster growing timber offers higher returns.

In general, this statement is false. Timberlands – mature or immature, high-yield or low-yield – are priced using the same discount rate, so their expected returns should be equivalent. In fact, contrary to popular perception, if a variance in return were to occur, it would likely advantage the owner of younger or slower growing plantations. Mature or fast growing forests are harvested sooner than younger or slower growing forests, and some timberland buyers are willing to pay a premium (i.e., accept a lower discount rate) for this greater surety and frequency of cash flows. The added price premium that could be paid to acquire a mature timberland asset would make it difficult for an investor to generate a higher return than might have been achieved had a younger or less productive asset been acquired.

Naturally, in light of this assessment, one might ask why return expectations for some fast growing plantations in Latin America are higher than those for slower growing timberlands in North America. The source of those higher return expectations is not the faster biological growth rates in the Southern Hemisphere, but the additional return investors must command to be compensated for the increased risk associated with investing in emerging markets. Among others, these include country and currency exchange risks. In other words, the higher return expectations are not a consequence of how much timber can be harvested and how quickly.

PERCEPTION #3

Mature timber or faster growing timber entails less risk.

On an individual property level, this statement is generally true. Younger or slower growing forests do face added risks. Three in particular come to mind. One is the higher potential for error in projecting long-term



Diversification of timberland assets in a portfolio is important to reduce exposure to risk.

timber growth and yield. Another is the difficulty associated with predicting future prices of harvested timber. The third and final risk relates to the fact that younger or less productive forests have a greater likelihood of experiencing timber loss due to storms, fire, disease, and pest outbreaks because of the longer holding period prior to final harvest.

Conversely, this statement is not valid on a portfolio level. There are inherent risks associated with concentrating one's timberland investments within a specific type or category of timberland (i.e., the same age classes, same species, same end-use markets or same geography). Diversification of timberland assets in a portfolio is important to reduce exposure to risk. To illustrate this point, consider an investor who has acquired only mature timber properties. Given the age-class structure of the portfolio, he or she will only be exposed to a narrow portion of the timber market cycle. That means if wood markets are down when the investor's timber is ready for harvest, the portfolio's income generation and total return potential is likely to be significantly harmed. Conversely, had the investor diversified across age-classes by also acquiring younger timber properties, his or her portfolio would have been in a better position to capitalize when market conditions improve.

Conclusions and Recommendations

There are valid reasons to select timberland investments based on their age profile or rate of growth. For instance, if an investor favors high income over capital appreciation, older or faster growing plantations should be strongly featured in the portfolio. Alternatively, if an investor seeks to enhance returns through improved forest science and management, then acquiring younger, emerging forests is the better choice. In most cases, however, investors should not rely on timber age, productivity or other biological characteristics to shape their timberland acquisition and disposition strategies beyond the purposes of portfolio diversification.

In summary, with regard to the three common perceptions that are often held about timberland investments within the investment community:

- The maturity of the timber one owns should not affect the choice of investment term or the timing of disposition. Disposition decisions should be based on (1) the investment horizon of the investor and (2)



the current pricing environment of the regional market where a particular investment is located.

- The amount of ready-to-harvest mature timber a forest asset holds, or the rate of growth it exhibits, will not inherently produce better returns over the life of a timberland investment. In a competitive market, the amount of merchantable timber or the rate of forest growth will be priced into its value at the point of acquisition.
- Owning a large amount of standing harvestable timber or possessing plantations with high productivity can help reduce risk at the property level. However, what matters most is managing the overall risk of the portfolio. Managing risk requires diversifying one's investments by geography, age class, species and log products. Concentrating timberland investments by employing a narrow focus actually can have the opposite effect – raising return volatility for the portfolio.