

Investing in Timberlands Versus the S&P 500: Which Investment Outperforms?

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Investing money has been a popular way to build wealth for generations. It benefits not only the investor, but society as a whole. Companies are able to use these funds to invest in capital equipment, labor, and new production techniques. This paper shows an analysis involving the investment in timberland as a way to increase one's fortune. The lead author is employed in the timberland industry on a daily basis, and their insights are presented from a ground-level view. Risks and benefits are discussed, and a comparative analysis of investing in timberland versus the S&P 500 Index is outlined.

Keywords: investments, forestry, S&P 500, timberland, investing, risk

INTRODUCTION

If you had a million dollars, would you invest it in the stock market or buy timberland? That was the question the lead author posed to his coworkers. A retirement discussion morphed into an observation that some landowners accumulated significant wealth via their timberland investments. The question posed resulted in a unanimous response that all the discussion participants would rather own timberland than stocks. “They aren’t making any more land” was an argument and “I think the stock market is gambling” was another argument for investing in timberlands.

The purpose of this paper is to investigate the validity of these assertions. Is Timberland a better investment than the stock market? To answer this question, we will compare a potential million-dollar investment in timberlands in central Arkansas vs. a market index like the S&P 500. Timberlands are a popular alternative investment and hedge against inflation that is often used by state pension funds, individual investors, and others (Murphy, 2022). The S&P 500, in contrast, is a broad-based equity index that has historically had competitive returns for investors. This paper compares the two investments and will explore the risks and returns associated with each investment. Along with other considerations, investors must consider timing when investing with both options.

TIMBERLAND INVESTMENTS

Timberland investments have become popular with institutional investors over the past four decades (Waggle & Johnson, 2009). Institutional investors with timberland holdings consist of pension funds, endowments and foundations that want diversification in their investment portfolio makeup (Zhang et al., 2012). There are several ways to invest in timberlands.

Investors can invest directly into Timber Investment Management Organizations (TIMOs). Popular TIMOs are Weyerhaeuser, Rayonier, and PotlatchDeltic. These companies hold large tracts of land and employ professional foresters to manage and grow timber. These companies realize their profits when they sell timber or land. Investors can also purchase timber exchange traded funds (ETFs). These ETFs consist of forest product companies. iShares Global Timber & Forestry ETF is an example comprised of thirty-eight forestry and timber companies across the world (iShares, 2023). This paper will focus on the individual investor who buys physical land and plants *Pinus Taeda* also known as Loblolly Pine. In this section we will look at the costs, revenues, risks, and challenges of timberland investment.

Costs

One of the most significant costs to timberland investment is time. Timberlands are an illiquid investment. The pine trees require around 15 years post-planting before an investor can harvest and see any financial return from the timber portion of their investment. The largest payoff on timber is not till year 30! When investing in timberlands an investor must be aware of the long-term nature of this investment. Investors also need to remember that this type of investment is capital-intensive, especially in the first 30-year rotation. Most of the capital that will be used from our example is tied up in purchasing the land itself.

Timberland acquisition is the first step when investing in timberlands. Arkansas has an abundance of land suitable for timber production. This land is cheaper than farmland and land near urban areas, costing around \$10,000 or more. In the U.S. one should be able to find land for \$2,500 per acre that will be suitable for pine timber production (Zhang & Mei, 2019). Central Arkansas is like the rest of the U.S. in terms of land prices. Land used for timber production is typically rural, and unlikely to be developed. Thus, land values suitable for timber land are low by comparison to land near cities.

The next step is replanting; in this example, we are purchasing recently clearcut land. Replanting cost is site-specific. Arkansas is geographically a diverse state, so planting trees in the delta will be different from planting trees in the Boston Mountains. But in general, landowners will need to first spray chemically, with a helicopter, the area to kill off all the plants competing with the pine seedlings they will be planting.

Burning is the next treatment and is necessary to remove all dead standing brush. In our area of Arkansas, ripping is recommended to break up the hardpan layer and retain water for the roots of the seedlings. Then you purchase the pine seedlings and pay the labor to plant the seedlings. Seedling planting density and seedling genetics are factored in at this stage. Higher density does not always translate to higher profits.

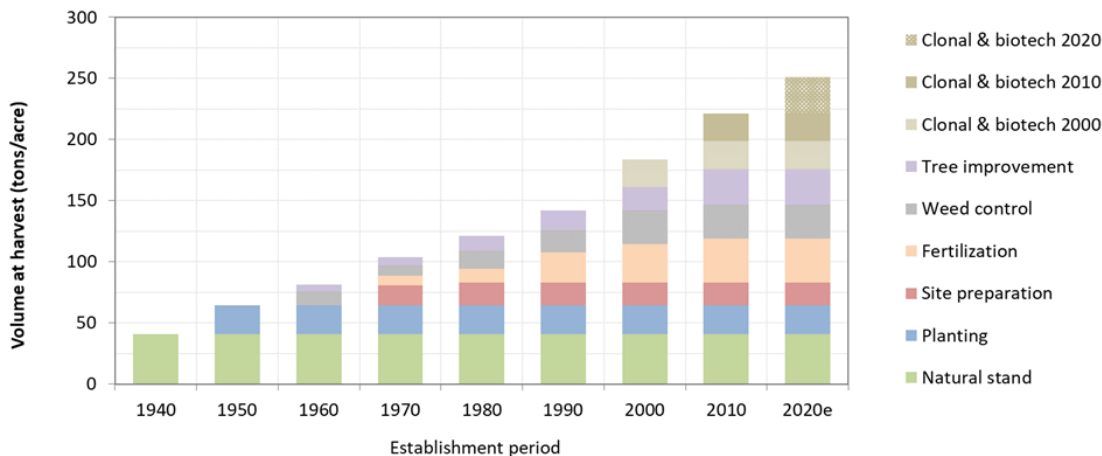
A landowner needs to consider the carrying capacity of their property. For our purposes, the carrying capacity is defined as the amount of timber that can be grown in an area before reaching max production. If a landowner plants too many trees initially, the land will reach its carrying capacity before the trees are economically merchantable. If a landowner plants too few trees they will miss the opportunity to maximize the value of their land.

Because timber is a long-term investment, getting this stocking number right in the beginning is important. Most timber companies in Arkansas plant anywhere from 450 trees per acre (TPA) to 1,000 TPA. A standard number that we will use in this example is 605 TPA. The adage “you get what you pay” for applies in forestry as well. As an industry, pine seedlings' genetics have improved significantly over the past 30 years.

A stand, or a group of trees, of natural timber will typically yield 40-50 tons per acre of timber over a typical 30-year rotation. By planting, controlling competition, and using good genetics a landowner can expect a yield of 120-150 tons of timber per acre over a 30-year rotation (Figure 1). The price to replant a typical acre, at 605 TPA with good genetics, is \$325 per acre in Arkansas. It is worth noting that the Natural

Resource Conservation Service or NRCS does have funds that can reimburse the landowner a portion of the cost to replant (Agriculture, 2023). But the NRCS funding varies yearly, meaning funding for replanting pine trees varies. For our example, we will assume that we do not receive this reimbursement.

FIGURE 1
ADAPTED FROM FOX, T.R., E.J. JOKELA, AND H.L. ALLEN 2004. THE EVOLUTION OF PINE PLANTATION SILVICULTURE IN THE SOUTHERN UNITED STATES



Assumptions

In our example, timberland acquisition at \$2,500.00 per acre will purchase 355 acres which amounts to \$887,500. Then we will assume they replant which includes spraying, ripping, seedling cost and labor at a rate of \$325 per acre which amounts to \$115,375. All in, an investor can buy 355 acres of newly planted pine seedlings for \$1,002,875.00. Not a perfect million but close for our example.

Revenue

There are three primary revenue streams landowners in Arkansas can earn income from owning timberlands. First is revenue from timber harvests. In 2019, timber was the seventh largest commodity in Arkansas, paying \$445,000,000 in stumpage, or the value of the timber, to the landowner. While this is the main income, it only comes in three stumpage payments after the first thinning (at year 15), the second thinning (at year 22) then in the final harvest (at year 30). The next revenue stream is leasing the land from recreational activities like hunting. This is an annual revenue stream. Finally, a landowner can expect land to appreciate over time. There are other non-financial benefits to owning land, such as living on it, holding a tangible asset, or the possibility of real estate development in the future.

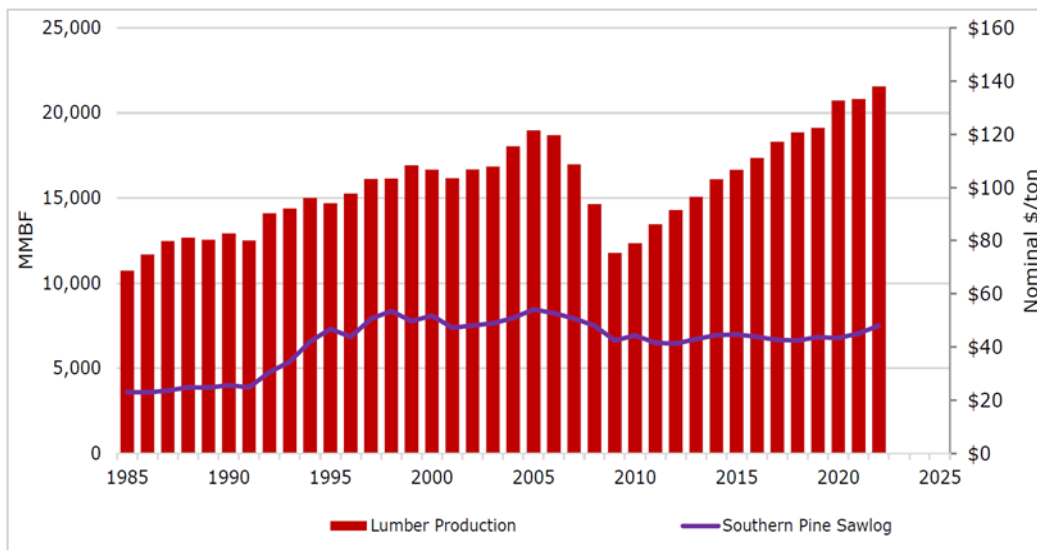
As stated earlier, timber harvest is the main source of timberland income. Two factors can influence a landowner's return on timber, the timing of the timber harvests and the price at the time of the harvest. Pine trees grow quickly from the time they are planted until the land reaches carrying capacity. Growth tapers off once carrying capacity is reached, around 15 years old. This is when the first thinning needs to be done. During a first thinning, 100% of the timber is pulpwood.

Pulpwood is a low quality, low value timber product that is eventually chipped and made into pulp or paper. Pine pulpwood prices in Arkansas are around \$5.00 per ton. A landowner can expect about thirty-five tons of pine pulpwood per acre. The equation for the revenue we can expect is; Revenue = Acres x Tons x Price. In our example we would expect 355 acres x 35 tons x \$5 = \$62,125.00 of revenue from our first thinning. For the next 7 years the remaining trees grow until carrying capacity is reached again and then it is time to do the second thinning.

During a seconding thinning, 80% of the wood harvested, is pine pulpwood and 20% is pine sawtimber. Sawtimber is a high-value product used to make dimensional lumber, timbers, and other wood products

such as OSB. Sawtimber prices have been and will continue to be stable. Though sawmill production has increased recently, it has not led to corresponding increases in stumpage prices (Figure 2). Prices will likely remain flat due to plentiful standing inventory, increases in plantation productivity and only modest gains in housing starts.

FIGURE 2
A GRAPH SHOWING RELATIONSHIP BETWEEN LUMBER PRODUCTION AND SOUTHERN PINE SAWLOG PRICES



Sawtimber prices in Arkansas are about \$24 per ton. A second thinning should produce about thirty-five tons totals per acres, twenty-four tons of pulpwood and eleven tons of sawtimber. The revenue we would expect is $(355 \times 24 \times 5) + (355 \times 11 \times 24) = \$136,320.00$ from the 2nd thinning. Then we let the timber grow 8 more years to age 30 before we do the final harvest. During the final harvest we can expect around seventy tons of timber per acre where 20% is pine pulpwood and 80% is pine sawtimber. The revenue we expect from a final harvest is $(355 \times 14 \times 5) + (355 \times 56 \times 24) = \$501,970.00$. The sum of all timber revenue is \$700,415.00 during the 30-year period.

Leasing land for hunting or other recreational activities is a popular way to generate income from timberlands. In a conversation with Jeff Berry, the head of the Landowner Resource Program at Green Bay Packaging, said that “Landowners in Arkansas can expect to lease their timberland for around \$6-\$8 per acre for hunting. Proceeds from recreational leases can more than offsets property taxes and you can keep a little extra money in your pocket.” In our example we will assume \$7 per acre on 355 acres. That is an annual payment of \$2,478.00. We increase this fee by 2% per year to account for inflation, so over the 30-year timeline, that works out to a total of \$105,016.25 in recreational leases.

Finally, way a landowner can expect a return on their timberland investment is land appreciation. Timberland in Arkansas have been appreciating at a rate of 4% annually. It is important to note that land appreciation is irregular. Land values can be flat for years at a time then land values can have jumps. In this analysis we will be assuming an appreciation rate of 4%. The initial investment in the land was \$887,500 after 30 years at 4% annual growth the land should be worth \$2,878,515.29.

RISKS TO TIMBERLAND INVESTMENT

Investing in timberlands is viewed as a safe and conservative investment but it is not without risks. The most impactful risks to timberlands are natural disasters, insects, and disease. In Arkansas, the most

common natural disasters which affect timber are high winds, ice damage and wildfire. High winds in the form of tornadoes or straight-line winds, especially after a recent thinning, can blow over timber (Tanger & Henderson, 2022). A stand of densely stocked timber, naturally withstands high winds due to crown-to-crown contact and below ground root grafting. This danger only last 2-3 years because trees resistance to high winds increases as trunk diameter increases (Tanger & Henderson, 2022).

While not common ice damage can severely damage a stand of timber. Arkansas is known for some bad ice storms. The most recent ice storms that caused widespread damage in Arkansas were in 2008 and year 2000. If the trees are not completely destroyed, then defects will permanently decrease the future value of the timber. Wildfires are a threat in Arkansas but not a severe threat. Loblolly pine is a fire adapted species and can resist high frequency low intensity fires. The danger is when woody fuels build up and the low-intensity fire becomes a high-intensity fire. These types of fires are difficult for any native plant species to survive.

To reduce risk of wildfire, then woody fuels need to be removed from the stand. Prescribed burns are one way to remove the woody fuels that could lead a catastrophic wildfire. Prescribed burns are controlled burns completed under the supervision of trained wildland firefighters. The fire burns up the available fuel, reducing the fuel load on the stand. The other way to reduce fuels is to perform the first and second thinnings on time. Thinning the timber is a win-win scenario for a landowner. Not only are they reducing the fuel load on the stand, they are also realizing a profit by selling the timber. A prescribed burn or thinning needs to occur every 5-7 years after the first thinning at age 15.

Climate Change – Natural or Otherwise

Whether natural or otherwise, climate change presents a significant challenge to the forestry supply chain. According to the National Climate Assessment, “The ability of U.S. forests to continue to provide goods and services is threatened by climate and environmental change and associated increases in extreme weather events and disturbances (for example, drought, wildfire, and insect outbreaks), which can pose risks to forest health (that is, the extent to which ecosystem processes are functioning within their natural range of historic variation) and conditions across large landscapes for years to centuries (Reidmiller & et al).”

Insect outbreaks and disease are other risks inherent in timberlands that can be exacerbated by climate change. Southern Pine Beetle, SPB or *Dendroctonus frontalis*, and Ips beetle, *Ips spp*, are the most dangerous insect threats to Loblolly pine. SPB and Ips are endemic to southern forests, they kill anywhere from individual trees to small groups of trees in normal years. SPB and Ips have cyclical life cycles that last 26-54 days from egg to adult (Hain, Duehl, Gardener, & Payne, 2011). As many as 5-7 generations of SPB and Ips can occur in a single year. During dry summers, densely stocked pine plantations that are water stressed are susceptible to large scale outbreaks of SPB and Ips.

Once detected, the recommended course of action is to clear cut the area and haul all wood away to paper mills if possible. This is a potentially serious risk to a timber stand investment by cutting short the potential return on the investment. While beetle outbreaks cannot always be prevented some actions can reduce their impact. It is important to perform the 1st and 2nd thins in a timely manner. The thins improve the overall health of the trees by increasing available light, water, and space. The increased space between trees can slow beetle outbreaks. Also, regular visual inspections help alert foresters to act if needed.

THE S&P 500 INDEX

The S&P 500 is an index that represents the five hundred largest publicly traded companies in the United States. The S&P 500, also called SPX, is not directly tradeable. However, SPDR S&P 500 ETF Trust or SPY is an ETF that tracks the performance of the S&P 500. SPY was established in 1993 and has over \$375 billion in assets. For our purposes, we will use SPY or SPX interchangeably. SPX is widely regarded as a benchmark for the overall performance of the US market and the single best gauge of large cap U.S. equities (Thune, 2023).SPX is diversified across 11 sectors, giving investors exposure to a broad

range of the market (S&P Global, 2023). In this section we will discuss the historical performance of the S&P 500, returns an investor can expect then the risks associated with investing in SPY.

Historical Performance

In 1926, the Standard and Poor's Corporation established the Composite Index. In 1957, the Composite Index was expanded to five hundred stocks and was renamed the S&P 500 Index (Siegel & Schwartz, 2004). Since its creation, the index has added and correspondingly dropped about twenty stocks per year to achieve a goal of a diversified and representative index of the entire U.S. stock market. The index has varied significantly since its inception but has exhibited an upward trend that has returned 9.92% annually (Nickolas, 2023).

Returns

In our example, we assume to have one million dollars to invest in SPY. Over the past 30 years the SPY has an annualized 7.91% rate of return and in addition to growth SPY pays a 1.45% dividend. Assuming the next 30 years looks like the past 30 years, we can expect \$1,758,038 in dividends and our investment in SPY to grow to \$9,814,107 which combines for \$11,572,145.

Risks to Investing in the S&P 500

The risk to the S&P500 or SPY is that it is subject to the highs and lows of the stock market. This ETF like any stock will go down if the economy is down due to monetary policy, wars, economic bubbles popping like the tech bubble in the late 1990s, or the housing bubble in the mid-2000s. SPY is an ETF diversified across eleven sectors, so it is diversified and therefore less risky. But there is a real possibility that at the end of the 30-year timeline we could be experiencing a bear market or a recession.

COMPARISON

In this section we will look at the total return of an investment in timberland and the S&P 500. We will compare the final dollar amount and the internal rate of return as a tool to measure the difference between these two investments. The proceeds from the recreational leases, timber stumpage payments, and dividends will not be reinvested in this example but will be held as cash.

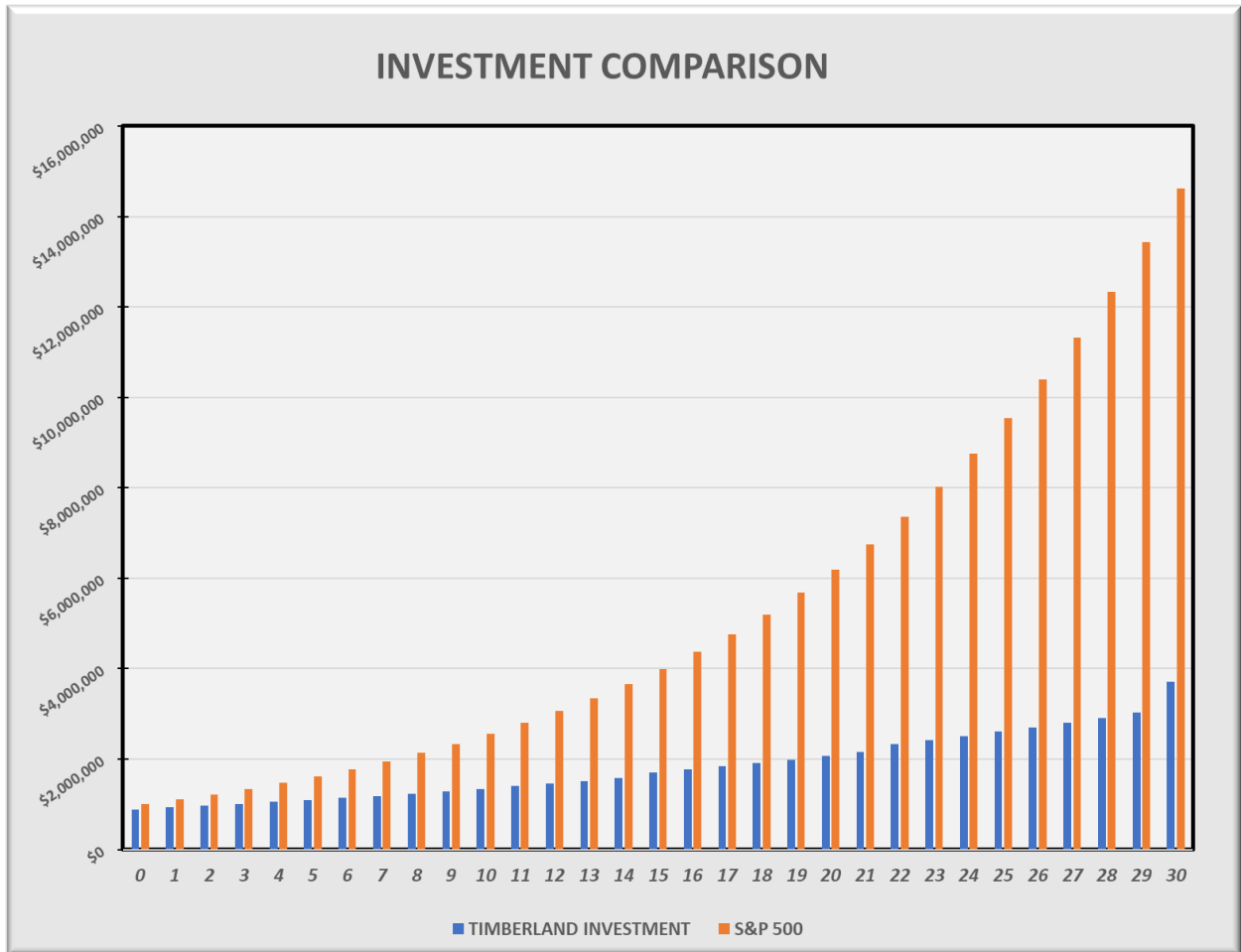
There are several options to reinvest that could complicate this analysis which is why those revenues will be considered cash in hand. Also, taxes are a factor not considered, dividends, and hunting leases will be taxed as income. While timber stumpage, land sales and stock sales will be considered long term capital gains and taxed at a different rate. Taxes will not affect the comparison between timberland and the S&P 500, so they will not be considered for simplicity's sake.

The methodology for this analysis was to map out the future revenues for timberlands and the S&P 500 ETF over the next 30 years. We treated recreational lease revenues and dividends as yearly payments held in cash. We increased recreational leases by 2% annually. Dividends stayed a constant 1.45% of the annual price for SPY. Timber sale revenues at years 15, 22 and 30 were also held as cash. We increased the land value starting at \$887,500 at a rate of 4%. The SPY ETF I was missing the annualized rate of return. So, I found the stock price of SPY on 12/5/1993 30 years ago, \$46.50, and the current SPY price as of 12/5/2023 at \$456.21. I calculated the return to be 881% and the annualized rate of return I calculated to be 7.91% over the past 30 years.

An investment in timberlands over a 30-year timeline returns \$3,683,946.54. This number includes the total revenue from hunting leasing, timber sales and the appreciation of the land. This in scenario the IRR is 4.49%

An investment in the S&P 500 or SPY over a 30-year timeline returns a total of \$11,572,145. This number includes all the dividends and the appreciation of the stock. The IRR is 9.14%. In this scenario we see that investing in SPY nets a higher financial return than timberlands and an IRR of 9.14% vs a 4.49% (Figure 3).

FIGURE 3
SHOWS THE RETURNS IN TIMBERLAND VS THE S&P 500 OVER A 30-YEAR PERIOD



CONCLUSION

This paper compares an investment in timberlands to an investment in the S&P 500. It is difficult to compare these to asset classes side by side. Investing in timberlands is in investment in real estate and a timber commodity. Some distinct advantages to timberlands are that it is a physical asset you can live on, recreate, and still make a respectable return. The big disadvantage is that it is not a liquid investment. Timberlands are a capital-intensive investment. Much of the initial investment is locked up in the value of the land. If the landowner decided not to sell the land in 30 years and replanted the IRR for the second rotation of timber would be higher, close to 8%.

It is difficult for landowners to reinvest funds from recreational leases early on. Timberland needs to be as consolidated as possible. So, a landowner could not feasibly reinvest by purchasing one acre at a time. Landowners would need to hold the cash until they could buy 20+ acres at a time. Investing in SPY is an investment in stocks. It is very liquid and has produced very good returns since its creation.

Reinvesting in SPY is easy. Dividend reinvestment plans or DRIPs are easy to setup within your brokerage account. The big risk to SPY is market volatility. A recession or depression could potentially dramatically reduce returns in the short term. Investing in timberlands or SPY is up to the individual’s unique preferences and investment strategy.

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