

Key Economic Concepts of Forest Management

This article, from the US Forest Service, Northern Research Station, contains the foundational economic principles that all landowners need to understand. We asked NWOA's tax expert, Tammy Cushing, to make minor edits here and there and add her final thoughts at the end of the article. A forestry consultant can go into detail on how these principles figure into your specific forestland investment. And, if you are considering a first time forestland purchase, even if you do not have income as your primary reason for owning forestland, these principles are still very important to your ability to sustainably own and manage a forestland.

Time value of money

The long period of time it takes to grow a forest means many investments in forest management that are made today often aren't going to be fully realized for many years (possibly decades) into the future. Even though the projected revenue from selling your timber in the future might look substantial, keep in mind what your investment could have earned if it had been invested elsewhere during the time your forest is growing. To correctly compare future returns from forest management to the cost of forest management investments, one has to consider how much your initial investment would have grown in value had it been invested elsewhere.

Financial analyses compare investment costs to expected returns. When these costs and returns are realized at different points in time, adjustments need to be made so the two can be correctly compared. Consider a simple project that consists of an investment cost of \$100 and produces a revenue also equaling \$100. If the project's cost and return occurred at the same time you would be indifferent about the whether to undertake the project. The \$100 cost completely offsets the \$100 revenue, leaving you with a net gain of \$0. However, if the \$100 revenue wasn't realized for five years, you probably wouldn't want to undertake the project. Why? If you invested that \$100 in a savings account earning 3 percent annual interest, your account would be worth almost \$116 after five years - considerably more than the \$100 revenue expected from the project. When you take the earning power of your investment costs into account, it quickly becomes apparent that time does matter when it comes to analyzing investment opportunities.

Opportunity cost

Opportunity cost is the value of a foregone opportunity. For example, if you had \$100 that you did not plan to spend for the foreseeable future and had the option of: a) keeping the \$100 in your wallet; b) investing the \$100 in a bank account and earn 2 percent interest, or c) purchasing a savings bond that earned 4 percent interest annually, you'd likely buy the savings bond. The opportunity cost of buying that savings bond is the value of the next best opportunity that was not taken. In this case, it's earning 2 percent in a bank account.

Opportunity cost is an important consideration in analyzing any potential investments in forest management. By investing your time and financial resources (i.e., money) in forest management, you are not able to use these resources elsewhere. Financial and economic analyses use terms like "discount rate" or "interest rate" to represent the opportunity cost of undertaking a project. For example, a landowner's opportunity cost of investing in forest management may be the revenue that could be realized if these resources were invested in the stock market...the next best investment opportunity. For another landowner, the alternative to forest management investment may be quite different such as a savings account. Depending on the value placed on an individual's time and financial resources and tolerance for risk, the opportunity costs for a given project can vary considerably among individuals. Consequently, an analysis of the same project can produce very different results if different discount rates are used. It is important that when analyzing forest management investments, you take into account the true cost of your time and resources.

Don't assume these costs will necessarily be the same for you as they are for your neighbor - they depend on your individual circumstances.

Economic decision rules

Many economic decision rules are used to analyze the financial feasibility of investment opportunities. The more common ones that are used in financial analyses include: benefit-cost ratio (B/C), a ratio of discounted project benefits to discounted project costs; internal rate of return (IRR), the rate of return on a project's investment; and net present value (NPV), the difference between a project's discounted benefits and discounted costs. Projects are considered financially sound if the B/C is greater than one, the IRR is greater than the rate of return that would be generated if the investment was made in the next best investment alternative to the project (i.e., the project's opportunity cost), and the NPV is positive.

While no single economic decision rule is perfect, the one that is the most reliable and widely accepted is NPV. NPV is a straightforward measure of a project's financial attractiveness. It's also easy to understand. A positive NPV indicates that a project is a better use of your resources when compared to the rate of return you could get, over the same period of time, from your next best investment opportunity.

For example, if a landowner needs to earn an 8 percent return on an investment in forest management, all future returns and costs associated with this investment would be discounted back to present day terms (e.g., a \$108 revenue or cost next year is only worth \$100 today using an 8 percent discount rate). The sum of all discounted revenues, minus discounted costs, is the project's NPV. If the project's NPV is positive (the discounted benefits exceed the discounted costs), then the project is worth undertaking based solely on its financial performance.

It's also important to keep in mind what NPV doesn't indicate. NPV doesn't say anything about the size of the investment that is needed for a project, the timing of costs and benefits over the life of a project, or how long a project will last. It also doesn't take into account any project costs or benefits that can't be quantified in monetary terms.

Assumptions

The results of any economic analysis are heavily influenced by the assumptions that are made about the project being considered. In analyzing the financial attractiveness of an investment in forest management, a number of important assumptions need to be considered. These include assumptions about future timber prices, forest management costs, rates of tree growth, property taxes, insurance costs, inflation, and interest rates. Decisions made regarding forest management must take into account the long time period. Using time value of money concepts will allow you to consider not only whether to do a particular operation but will also allow you to consider alternative investments.

Final thoughts from NWOA's tax expert, Dr. Tamara Cushing

While no one can predict with complete certainty these factors, steps can be taken to increase the likelihood your assumptions are "in the ballpark". This includes using only sources that are known for providing objective and reliable information, consulting more than one source to determine how greatly the factors you are considering can vary from one source to another, and reviewing existing financial analyses of forest management investments. Government and university publications, professional consulting services, and economic and market reviews are good starting points. Additionally, the Internet provides access to many sources of useful information that, until recently, were not widely distributed or known.



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