Discounting to Incentivize Climate Action Today

Summary →

- In the context of climate change mitigation, immediate action is needed. This time preference for near-term action can be incentivized by using basic economic principles.
- Using the principle of economic discounting to quantify the expected damages caused by carbon emissions allows us to identify the number of tons of carbon that need to be held out of the atmosphere for a year to have the same value as holding a ton out of the atmosphere forever.
- The NCX harvest deferral methodology leverages peer-reviewed research on climate economics and implements a discount rate of 3.0% to calculate the value of delaying a planned timber harvest by one year.

Background

The goal of climate change mitigation today is to avoid costly damages to people and ecosystems tomorrow. Much of the focus of mitigation to date has been on reducing physical quantities of carbon in the atmosphere. However, what society really values is reducing impacts that are caused by carbon emissions, like extreme heat, catastrophic floods and wildfires, food insecurity, and water scarcity. Carbon offset programs should incentivize immediate action to both avoid emissions and remove carbon from the atmosphere at the highest possible levels. Doing more to mitigate climate sooner can help prevent reaching climate thresholds[1], and buys society time to develop additional carbon removal technologies, which will not be ready at scale for decades.

Incentivizing immediate climate action requires thinking about future costs and benefits in terms of their economic value today. Economists call this *discounting*, and it is rooted in the well known concept of 'the time value of money', which states that a sum of money received today is worth more than the same sum received later[2]. There are several reasons for this, including that money received today can be 'put to work' immediately to earn a positive return (i.e., the opportunity cost of investment), and that people tend to have a time preference, valuing their present-day over their future well-being. The 'time value of carbon' applies these same economic principles to climate change mitigation[3]. Under a higher discount rate, the annual value of holding a ton of carbon out of the atmosphere will increase, and vice versa.

1 https://www.theguardian.com/environment/2022/sep/08/world-on-brink-five-climate-tipping-points-study-finds
2 https://www.rff.org/publications/explainers/discounting-101/
3 Zack Parisa, Eric Marland, Brent Sohngen, Gregg Marland, and Jennifer Jenkins. "The Time Value of Carbon Storage." *Forest Policy and Economics* (in press).

The use of discounting to compare the social welfare outcomes and economic costs of different climate change mitigation actions is well established, for example through the widely used Social Cost of Carbon.

Application of Discounting in Our Methodology

The NCX harvest deferral methodology relies on calculating the net climate benefit of delaying timber harvests by one year. To do this, we use discounting in combination with 'tonne-year accounting'. Most forest carbon offset frameworks define a 'permanent ton' as one tonne of CO2 held out of the atmosphere for 100 years, which is obviously less than permanent. Instead of the arbitrary 100-year threshold, NCX uses an economic framework to identify the amount of carbon required to be held out of or removed from the atmosphere today to have the same net benefit as a tonne stored truly permanently. In order to quantify this equivalence, it is necessary to have an accounting system that includes the duration of storage. That is why we use tonne-year accounting, in which a tonne-year is defined as one tonne of CO2 held out of the atmosphere for one year–so that we can compare the impacts of short- and long-term projects in the same units. For more on tonne-year accounting, see our recent blog.

NCX has chosen to use a net discount rate (i.e., the nominal discount rate less the expected growth in the cost of carbon) of 3.0% to define the economically efficient tradeoff between the number of tons stored for one year in forested ecosystems and one ton emitted into the

atmosphere. Earlier versions of NCX's methodology used different discount rates. However, we have worked extensively with our academic collaborators, including the authors of Parisa et al. 2022, to refine our choice of discount rate. After reviewing the extensive literature on tradeoffs in choosing different discount rates[4], we chose a 3% discount rate, which is consistent with current leading economic research and federal guidance relating to the Social Cost of Carbon[5]. We derive our tonne-year ratio by looking at the difference between the discounted impacts of the baseline scenario (timber harvest) and the discounted impacts of the project scenario (harvest delayed by one year). Using a 3% discount rate results in an equivalence ratio of 33.8 tonne-years. In other words, holding 33.8 tons out of the atmosphere for one year can mitigate the economic damages associated with 1 ton of emitted C02 over its lifetime.

Ongoing Work

The use of traditional economic valuation methods, including discounting, is well established in research related to climate change mitigation[6]. Discounting allows us to properly value and incentivize immediate action via shorter-term nature-based solutions. As part of our commitment to learning in public, NCX works with economic advisors and collaborators to ensure our methodology reflects current thinking on economic valuation.

4 Groom, B., Drupp, M.A., Freeman, M.C., Nesje, F., 2022. The Future, Now: A Review of Social Discounting. Annu. Rev. Resour. Econ. 14.
5 https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf
6 Roe S et al 2021 Land-based measures to mitigate climate change: potential and feasibility by country Glob. Change Biol. 27 6025–58.