



The Coalition  
of Finance Ministers  
for Climate Action

# Navigating the trade-offs between investments for growth and climate action: the role of social discount rates

Asian Development Bank (ADB)

Lei Lei Song, Strategy, Policy and Partnerships Department

A contribution to the 'Compendium of Practice from a Global Community of Ministries of Finance and Leading Organizations: Economic analysis and modeling tools to assist Ministries of Finance in driving green and resilient transitions'

**Topic:** Addressing the climate policy questions facing Ministries of Finance: financing the green and resilient transition

June 2025

Access the full Compendium at [www.greenandresilienteconomics.org](http://www.greenandresilienteconomics.org)

---

This contribution was prepared at the request of, and with guidance from, the Ministry of Finance of Denmark as Lead of the Coalition's Helsinki Principle 4 initiative 'Economic Analysis for Green and Resilient Transitions' and its Steering Group, with input from its Technical Advisory Group. The views, findings, interpretations, and conclusions expressed are those of the authors. While many Coalition members and partners may support the general thrust of the arguments, findings, and recommendations made in this contribution, it does not necessarily reflect the views of the Coalition, its members, or the affiliations of the authors, nor does it represent an endorsement of any of the views expressed herein by any individual member of the Coalition.

© The authors, 2025

Licensed under [CC BY-NC 4.0](https://creativecommons.org/licenses/by-nc/4.0/).

**Climate change is one of humanity's most pressing existential threats.** Addressing it is crucial to ensure economic growth and development. Conversely, sustained economic growth is essential for generating necessary savings to invest in climate action, particularly for developing countries. While climate action and economic growth are aligned in the long term, in the short to medium term, a trade-off can exist between investments for growth and climate action due to limited savings and funds. This is especially critical for developing countries, which must carefully prioritize their investments over the next decade to lift millions out of poverty and address climate change at the same time.

**Investment decisions, whether public or private, are primarily driven by expected returns over the life of the investments.** Public investments are typically evaluated based on social or economic returns, valued at shadow prices rather than market prices. Future returns and costs over the investment horizon are discounted to their present values. The chosen social discount rate is crucial in determining the Net Present Value (NPV) of an investment, which is the difference between its payoffs and costs over its economic life. A higher discount rate would result in a lower NPV with the same stream of future net returns. Furthermore, a higher discount rate would allow an investment with more net returns in the near future to yield a higher NPV than that for another investment with higher net returns in more distant periods, even when the two investments have the same NPV under a lower discount rate.

**The social discount rate is pivotal in evaluating the long-term impacts of a potential public project or regulation.** Discounting helps current generations account for the welfare of future generations in their decisions. There are three approaches to social discounting: the social opportunity cost of capital, framed as a rate of return on public funds; the financial market rate of risk investment; and the social time preference approach.<sup>1</sup> Governments across the world use the three approaches to estimate their social discount rates, and the social time preference approach often produces lower estimates of the social discount rate.<sup>2</sup>

Greenhouse gas emissions have enduring effects, necessitating their impact to be assessed across generations. The social time preference discounting approach has become conventional in assessing impact of climate change over the very long term (see, for example, Stern 2007). Social time preference is usually derived from the widely used Ramsey formula, which expresses the social discount rate  $r$  as a function of the pure rate of time preference  $\rho$ , the elasticity of marginal utility of consumption  $\eta$ , and the growth rate of per capita real consumption  $g$ :  $r = \rho + \eta g$ .

**The Ramsey formula accounts for correlation between climate change damages and consumption growth when discounting and provides internal consistency.** Ethically, the pure rate of time preference is often set close to zero, suggesting that future generations have the same rights as current ones. The elasticity of the marginal utility of consumption usually falls between 1 and 1.5. Growth of per capita consumption is proxied by that of per capita GDP. Based on the historical global GDP growth of about 1.9% per year in the past six decades, a social discount rate of 3% or lower is typically used in many climate studies such as Stern (2007), ADB (2023), and EPA (2023), and is usually considered to be a reasonable approach. This rate is usually the average rate for the near term, and lower dynamic rates that are often endogenous to the scale of economic damages are used in the distant periods.

**The climate change literature typically uses the social cost of carbon to assess the impact of greenhouse gas emissions and therefore the benefits of reducing greenhouse gas emissions in the long term.** The social cost of carbon measures the monetary value of the future stream of net damages associated with adding 1 ton of greenhouse gas to the atmosphere in a given year, and therefore, reflects the societal net benefit of reducing emissions by 1 ton at present. A social discount rate is used to calculate the social cost of carbon by discounting future damages to their present value at the time emissions occur. With the same stream of future climate damages, the lower the discount rate, the higher the social cost of carbon.

---

<sup>1</sup> For a recent survey, see Spackman (2024).

<sup>2</sup> See Creedy (2018) and Groom et al. (2022) for the surveys of the practice of social discounting.

**Besides being a key parameter in estimating the social cost of carbon, the social discount rate is also used in evaluating climate policies in climate modeling.**<sup>3</sup> Integrated assessment models, a main group of climate models for policy simulation and evaluation, often assume that representative agents choose climate policies to maximize their social welfare, represented by NPV of intertemporal utilities. The social discount rate is a key parameter to estimate the NPV of social welfare. Different values of the social discount rate will yield different NPVs of intertemporal utilities, and therefore different choices of climate policy.

**The Ramsey formula links the social discount rate to consumption growth. In the past six decades, poor countries have seen faster improvements in their economies, and therefore consumption, than rich countries.** From 1961 to 2023, low- and middle-income economies averaged 3.0% annual growth in real GDP per capita, compared with the world average of 1.9% (World Bank, 2025).<sup>4</sup> Recent decades saw developing economies grow even faster, at 3.6%, compared with OECD countries at 1.4%. This higher growth implies a higher discount rate than the one based on the global average growth. East Asia has grown the fastest, while other regions have also grown quickly. Since the early 1960s, South Asia's average annual growth has been 3.0%, compared with 2.1% for OECD countries. Over the past 30 years, South Asia's growth accelerated to 4.1%, while the OECD's fell to 1.4%. Comparing South Asia and OECD countries, the Ramsey formula results in a social discount rate of 3.0% versus 2.1% (based on six decades), or 4.1% versus 1.4% (based on three decades), if the pure rate of time preference and the elasticity of marginal utility of consumption are assumed conservatively to be 0 and 1, respectively. A significant difference in the social discount rate would result in different policy choices and investment decisions.

**The higher discount rate reduces the NPV of future net returns, making investments with more immediate returns more attractive than those with more benefits in the longer term.** Typically, investments in human capital and physical infrastructure have higher returns in the short to medium term than investments in climate action, which avoid damages and thus yield benefit mostly in the more distant future. Moreover, with the same stream of damages of greenhouse gas emissions in the future, a higher social discount rate would produce a lower social cost of carbon, implying smaller damages from an additional ton of greenhouse gas emissions at present than otherwise. A 1-percentage-point difference in the social discount rate leads to vastly different estimates of the social cost of carbon, often cutting it by half, and therefore reduces the attractiveness of long-term climate mitigation investments, making immediate growth-focused projects more appealing in developing countries. As a result of higher net benefits, fast-growing developing countries might prioritize investments in human capital and physical infrastructure over those reducing greenhouse gas emissions.

**A better growth prospect, and therefore higher social discount rates, would make policymakers in developing countries favor investments for growth over climate action.** Yet, as argued by many, a low social discount rate is justified for human society, as future generations have the same rights as the current generation and climate damage has extreme risk and is deeply uncertain. Addressing climate change is globally optimal, because the net benefits of investments for climate far outweigh other investments for the world. To make the global optimal also locally optimal and to tackle climate change immediately in all countries, it is crucial to incentivize fast-growing developing countries to invest in climate action. Two strategies can be employed.

The first is to lower financing costs for climate investments, which can make climate projects with payoffs in the long term more attractive. Developed countries can expand partnerships with developing countries by providing financial support for climate investments in the form of, e.g., low-cost funds and grants. Multilateral development banks (MDBs) need to expand their support for climate action with lower funding costs than their usual operations. MDBs can also streamline and

---

<sup>3</sup> See EPA (2023) for a discussion of the social cost of greenhouse gases and the latest estimates by EPA.

<sup>4</sup> All statistics in this paragraph are from this source.

simplify their procedures and processes to support climate action, reducing the administrative costs of their financing to developing countries.

**The other strategy is to enhance future returns on climate investments and shift the balance toward climate projects.** One example is that developed countries or MDBs may agree to provide future financial payments to climate investments that reduce greenhouse gas emissions or restore nature's capacity to sequester carbon from the atmosphere. Furthermore, the reduction of future greenhouse gas emissions could be verified and exchanged for payments between countries. This would lead to a more efficient and effective abatement of carbon emissions globally. Eventually, a global carbon credit market could be established to monetize future returns of climate investments and explicitly incentivize climate investments.

**Navigating the trade-offs between investments for growth and climate action is complex yet essential for all countries, and particularly daunting for developing countries, where the growth and development needs are the greatest.** By understanding and adjusting the factors influencing investment decisions, particularly the social discount rate, policymakers can better balance the needs for immediate economic growth and long-term sustainability. Encouraging climate investments through reduced financing costs and enhanced incentives for emission reductions can help bridge the gap between these competing priorities in the short to medium term.

## References

- Asian Development Bank (2023) *Asia in the Global Transition to Net Zero*.
- Creedy, J., and Passi, H. (2018) Public Sector Discount Rates: A Comparison of Alternative Approaches. *Australian Economic Review* 51, 139–157.
- Environmental Protection Agency (2023) *EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances*.
- Groom, B., Drupp, M. A., Freeman, M. C. and Nesje, F. (2022). The Future, Now: A Review of Social Discounting. *Annual Review of Resource Economics* 14(1), 467–491.
- Spackman, M. (2024) The Social Discount Rate and the Cost of Public Funds: A Search for More Consistency and Better Practice. *Journal of Environmental Economics and Policy* 13(2), 228–242.
- Stern, N. (2007) *The Economics of Climate Change: The Stern Review*. Cambridge University Press.
- World Bank (2025) *GDP per capita growth (annual %)*. World Bank Development Indicators. Available at: <https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG>.