

Accounting for finance is key for climate mitigation pathways

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A new study published in the journal *Science* highlights the opportunity to complement current climate mitigation scenarios with scenarios that capture the interdependence among investors' perception of future climate risk, the credibility of climate policies, and the allocation of

investments across low- and high-carbon assets in the economy.

Climate mitigation scenarios are key to understanding the transition to a low-carbon economy and inform [climate](#) policies. These scenarios are also important for financial investors to assess the risk of missing out on the transition or making the transition happen too late and in a disorderly fashion. In this respect, the scenarios developed by the platform of financial authorities known as the Network for Greening the Financial System (NGFS)—a platform of over 80 financial authorities around the globe who take an active interest in advancing the transition toward a sustainable world economy—have been a major step to provide investors with forward-looking views on how economic activities, both low- and high-carbon, could evolve in the next decades. However, currently, these scenarios do not account for the role that the [financial system](#) (i.e., [financial firms](#), markets, and instruments) could play in such a transition.

"The financial system can play an enabling or hampering role in the transition to a low-carbon economy, depending on expectations, in other words, their perception of risks and returns. If investors delay revising their expectations, but then their expectations change suddenly, this can lead to financial instability, making the transition more costly for society," explains lead author Stefano Battiston from the University of Zurich, Switzerland and Ca' Foscari University of Venice, Italy.

"However, if investors adjust expectations in a timely fashion and reallocate capital into low-carbon investments early and gradually, they enable the transition, leading to smoother adjustments of the economy and of prices."

"Current mitigation scenarios implicitly assume that financing is provided by investors without assessment of risk, resulting in high financing costs and possible limits on funding, in particular for low-carbon firms. This is because the Integrated Assessment Models (IAMs) used in studies on the subject do not include actors such as banks that

can decide to grant loans to firms, or actors like insurance firms and pension funds that can decide to invest (or not) in stock market shares of firms. As a result, in the NGFS scenarios, the orderly versus disorderly character of scenarios is assumed exogenously, independently of the role of the financial system," adds coauthor and IIASA Sustainable Service Systems Research Group Leader, Bas van Ruijven, who is also co-developer of the NGFS Climate Scenarios.

Why does this matter? Not modeling the feedback loop between the financial system and mitigation pathways limits our understanding of the dynamics and the feasibility of the low-carbon transition, and the ability to inform policy and investment decisions. This could also lead to an underestimation of risk across mitigation scenarios and trajectories of orderly and disorderly transitions.

"While climate mitigation scenarios describe what the world might look like in the next decades, they also have the power to shift markets' expectations today. This is because they are endorsed by many influential central banks and financial authorities in the world, as well as by large investors. It is therefore critical to understand if these scenarios for potential tomorrows could lead, unintentionally, to insufficient investments today. This presents an opportunity to interface IAMs with models that allow investors to carry out climate-financial risk assessments (CFRs)," says coauthor and IIASA Energy, Climate, and Environment Program Director Keywan Riahi.

To this end, the authors have developed a framework to connect climate mitigation scenarios and financial risk assessment in a circular way, demonstrating the interplay between the role of the financial system and the timing of the climate policy introduction. IAMs generate sets of climate mitigation scenarios, which are then used by the CFR to model how investors assess the financial risk of high- and low-carbon firms along the IAM's trajectories. The resulting trajectories of financing cost

across low- and high-carbon firms are fed back to the IAMs to update the respective mitigation scenarios, closing the loop between the IAM and the CFR.

By conditioning the investment decisions to the credibility of climate policy scenarios, the study considers how the role of the financial system as enabling or hampering can reverse the ordering of costs and benefits of climate mitigation policies, which are currently distorted by not considering the financial system.

With regard to the implementation of fiscal policies such as carbon pricing and the phasing out of fossil fuel subsidies, or the introduction of funding for renewable energy projects, neglecting the role of finance implies that a projected carbon price schedule could miss the emissions target because the mitigation scenario does not necessarily imply a risk perception by the financial system that leads to the investment reallocation assumed by the scenario. Thus, the framework could help the IPCC community to revise their carbon price projections obtained from climate [mitigation](#) models to make them more consistent with the role that the financial system plays.

"Our framework could support financial authorities in encouraging investors' assessment of climate-related financial risk. The new IAM-CFR scenarios would limit the underestimation of financial risk in climate stress-test exercises. Accounting for the role of the financial system also has implications for criteria used by central banks to identify eligible assets in their collateral frameworks and purchasing programs," concludes Irene Monasterolo from the Vienna University of Economics and Business and visiting scholar in the IIASA Energy, Climate, and Environment Program. "Furthermore, our results shed light on the importance for financial authorities to monitor and tame the possible moral hazard of the financial system in the dynamics of the low-carbon transition."

More information: "Accounting for finance is key for climate mitigation pathways" *Science* (2021). [science.sciencemag.org/lookup/ ... 1126/science.abf3877](https://science.sciencemag.org/lookup/doi/10.1126/science.abf3877)

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