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First Conference on Biodiversity and Environmental Challenges for the Financial System

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Opening Remarks
Environmental degradation and the financial system

Motivation and acknowledgements

- Good morning. It is a pleasure to welcome you to the second day of this Conference on Biodiversity and Environmental Challenges for the Financial System, co-organized by the Center for Latin American Monetary Studies (CEMLA), which is funded by the region's central banks, and Banco de México. This is the third event of this type that CEMLA organizes in consecutive years.
- This conference represents an effort to improve our understanding of environmental challenges for the financial system and integrate these into the agenda of central banks, regulatory authorities, universities, and the private sector. What is at stake in the context of environmental risks is none other than the sustainable future of humanity in general, and economic and social systems in particular. Thus, we see this event as a contribution to try to exceed our own expectations on what can be done to limit the consequences of environmental degradation to our societies.
- The discussions around the recent COP26 meeting in Glasgow have highlighted once again the difficulties in reaching global agreements to pledge cuts to carbon dioxide emissions to put a halt on temperature rises. This conference aims to contribute to making the consequences of environmental degradation and biodiversity losses more visible. It does so by providing a platform in which state of the art knowledge about the effect of environmental changes on the financial system can be disseminated and discussed.
- Our objective is to create awareness and incentivize a much stronger agenda to incorporate environmental hazards in global discussions on financial sector reforms. A better understanding of the impacts of climate change and biodiversity loss, which are highly interrelated, on the financial sector can pave the way for more ambitious but also urgent agreements to take action to combat both.

- I wanted to begin by thanking Alejandro Díaz de León Carrillo, Governor of Banco de México, for his support to this joint initiative. In addition, I would like to thank today's keynote speakers, who will generously share their views and expertise on how to assess the impact of environmental challenges for the financial system, as well as on how to incorporate these assessments in financial decision processes.
- We are proud to have Sir Partha Dasgupta with us today, who is Frank Ramsey Professor Emeritus of Economics at the University of Cambridge. Sir Partha Dasgupta's long-standing contributions to environmental and development economics have led him to make some of the world's most key contributions on how to incorporate environmental-related challenges into economics.
- We are also honored with the participation of Prof. Gretchen Daily in today's agenda. Prof. Daily is the Director of the Center for Conservation Biology as well as Co-Founder and Faculty Director at the Natural Capital Project at Stanford University. Prof. Daily has made significant contributions to improve our understanding of the interdependence between the natural environment and societal and economic systems.
- Finally, I would like to thank the program committee of the conference: Serafín Martínez Jaramillo, Rafael del Villar, and Patricia Moles, all from the Environmental and Social Risk Analysis and Policies Directorate at Banco de México for putting together this agenda. Serafín, who is one of the organizers, just finished a three-year stint at CEMLA, and is now back at Banco de México. This initiative has also been supported by Eréndira Fuentes and Matías Ossandon from CEMLA's Directorate of Financial Stability, as well as by CEMLA's IT team.

Climate change, biodiversity, and the economy

- I want to call your attention to the fact that this is a conference about biodiversity and environmental challenges for the financial system, and not about climate change per se. The title of the conference seeks to purposely broaden your attention to other forms of environmental risks that matter for the stability of financial systems. Certainly, biodiversity losses have been scientifically related to climate change, as well as to other forms of human intervention in natural environments (see Chapin and Diaz, 2020). According to Johan Rockström and others, there are four biosphere systems, which together with the climate, interacted to achieve stability in our planet for 10,000 years, during the period called the holocene, so as to sustain life as we know it: land configuration, biodiversity, the hydrological cycle, and the injection of nutrients.
- According to current research, biodiversity is declining faster than in any known period in history. The Living Planet Index¹, a global measure of biological diversity developed by

¹ See 2020 Living Planet Report.

researchers at the Zoological Society of London and the World Wildlife Fund, shows that biodiversity has declined by around 70 percent since 1970 on average around the globe. A recent publication in Nature using the Biodiversity Intactness Index, another measure developed by the Natural History Museum in London, shows that biodiversity losses can be linked to factors such as land conversion, pollution, and human-induced climate change (Leclère et al., 2020, Nature).²

- Climate change and its related rise in temperatures can affect biodiversity through multiple channels. There is evidence that species can be for instance physiologically vulnerable to temperature spikes, increasing the probability of extinction and massive migrations. Weather disturbances triggered by rising temperatures can also affect the diversity of vegetation, favoring alien species that can adapt to stressful environmental contexts (see Burrows et al., 2014, Nature).
- The main channel connecting biodiversity with economic systems are the so-called ecosystem services provided by natural environments that help to sustain economic production. Examples of these services include agricultural productivity gains via soils' fertility, the cleaning of water streams and rivers, or the pollination of plants and crops. The increasing use of biomass for energy production highlights how these ecosystem services can have far-reaching implications for economic sustainability.
- It is easy to see how several ecosystem services fall into the category of common goods, with their use being non-excludable and non-rivalrous, a characteristic that induces well-known market failures in their supply and sustainability (see Kroeger and Casey, 2007). As with the case of clean air or water, the incentives to regrow and protect natural suppliers of ecosystem services remain low. Adding to this, and equally or even more important, is the lack of low-cost measurability and valuation of such services, which has precluded efficient regulatory or market-based approaches to prevent their depletion (Stallman, 2011). These key market failures and the difficulties to apply ordinary regulatory approaches to prevent them, are central to understanding the spillovers of biodiversity losses to the financial system.

Biodiversity losses and contagion channels to the financial system

- Financial systems are affected by biodiversity losses mainly through channels that originate in the real-sector. These channels have been related to so-called **physical and transition risks**.

² See the [website of the Biodiversity Intactness Index](#).

- **Physical risks** capture the potential that reductions in the quantity and quality of ecosystem services may affect borrowing firms' capacity to access credit and service their debt. While we often think of agriculture as the main affected sector, ecosystem services are in fact important also for the clothing industry, energy production, and tourism, just to mention a few examples. As a reference, a recent report by Swiss Re, a Swiss reinsurance company, estimates the dependence on ecosystem services at approximately 55 percent of global GDP (Swiss RE, 2020). The evidence suggests that this dependence is material for financial institutions. For example, the Dutch Central Bank has estimated that on average 36 percent of the portfolios of financial institutions in the Netherlands are either highly or very highly dependent on ecosystem services (Toor et al., 2020).
- **Transition risks** reflect the risk of changes in policy, preferences, or technologies due to adaptations to sustainable practices to prevent biodiversity losses. The ever-increasing public scrutiny towards firms' investments is a good example of this type of risk. The transition towards a greener economy means that certain economic sectors can face higher costs and sudden shifts in asset values, affecting financial firms through channels such as collateral values, credit risk, or the concentration of sectoral exposures in their credit portfolios. Transition risks have received relatively less attention, but their importance is likely to increase as action against environmental degradation takes place.
- While these risks affect financial firms through their exposures to the real sector, we should not forget that also feedback loops exist. For example, financial firms can impact biodiversity through their lending, risk-taking, and investment decisions. Difficulties to measure, price, and mitigate these impacts have so far precluded incorporating these feedback loops into financial decisions (WWF, 2021).
- As these ideas suggest, biodiversity-related risks can affect multiple economic sectors via network effects with far-reaching consequences for financial stability. As Prof. Partha Dasgupta has suggested in his enlightening recent review on the economics of biodiversity, the materialization of high-impact environmental events, sometimes referred to as 'green swans', are more likely to happen, compared to other critical financial events, calling for urgent action.
- In their role of anticipating and mitigating financial risks, central banks have ample scope to incorporate these emerging challenges into their policy actions. I wanted to stress two important areas in which new approaches can be introduced. First, macroprudential policy frameworks can be adjusted to assess environmental-related risks, for instance, through concentration limits on exposed sectors or green capital surcharges, which are already being evaluated by the European Central Bank (Baranović et al., 2021).
- Second, monetary policy tools can be adjusted to prevent that monetary transmission channels end up amplifying the effects of environmental damages. For instance, environmental risks could be considered alongside traditional measures of credit risk in central banks' collateral frameworks. Also, central banks' own portfolio management

could incorporate these new objectives by undertaking analyses of the impact of their portfolio on biodiversity, following the example of Banque de France (Svartzman et al., 2021).

Emerging challenges for economic science

- A considerable number of people in the audience, including me, are economists. The important question for us here is what can we do in order to contribute to avoiding the climate and environmental disasters. Borrowing from Daron Acemoglu's recent opinions on climate change, if we aim to provide adequate policy pathways to stop biodiversity loss and build a path into the restoration of the environment, there is the need to revise some important assumptions on mainstream economics ([Acemoglu, 2021](#)).
- First, we require addressing which is a central question when thinking about a climate/environmental-policy utility function: How much current consumption and wealth do we need to sacrifice to avoid the damage that environmental degradation will cause? Given the long-term horizon in which the risks associated with climate change and biodiversity loss materialize, the way in which discounting is approached is key for the conclusions drawn from the economic models.
- A second challenge relates to the design of ad-hoc policy approaches. A common recommendation in policymaking is that market failures or negative externalities should be dealt with policies which are specific to the purpose of moderating such failures. In the case of climate change, however, a single policy instrument (like carbon tax) might not be sufficient and should most likely be complemented with other policies and market-based incentives (Acemoglu, 2021). As biodiversity loss is much more complex and many factors and their interaction affect it, policy making to address it becomes even more difficult.
- All in all, climate science, as well as the understanding of the workings and interaction of the different biosphere systems (including biodiversity) has made huge strides in the last few decades. This is very fortunate, as it has made abundantly clear how dire are the straits that we already find ourselves in, and how urgent is the need that we take action, that is, implementing policies to try to avoid disaster.
- This, in turn, has made other disciplines come into play. One of the crucial ones is economics. There are many aspects to this. Let me comment very briefly on two.
- The first one comes from Professor Dasgupta's work and has to do with the need to modify traditional market economics by explicitly including natural capital as an input in production processes, akin to physical or human capital, as well as changing the way economic performance and derived welfare are evaluated and measured. By doing this, the appropriate problem to solve becomes one of asset allocation. Now, since we also have to account for risk, the latter framework would probably provide the appropriate pricing of risk, which is, simply put, perhaps the most important challenge that finance

faces and what this conference is about to a large extent. Again, Professor Dasgupta's work has done enormous strides on this and other related topics. For example, his framework could go a long way in answering Acemoglu's key question on the need of appropriately measuring the necessary foregone consumption to reach sustainable economic equilibria. From implementing Professor Dasgupta's work, in turn, many policy prescriptions could be derived.

- The second one has to do with the design of policies that have the right incentives for societies in general, and governments in particular, to implement them. This is a herculean task, as the policies needed to address climate warming and environmental degradation need an unprecedented level of international collaboration, in a setup that is inherently highly non-cooperative. In game theory parlance, we need to have a cooperative equilibrium in a highly non-cooperative game. We also know that this type of equilibria can only be achieved if there is a kind of supra-national authority that makes players comply with the needed policy actions. Needless to say, currently this is extremely difficult or even impossible to do.
- The various reasons the game can be characterized as non-cooperative are abundantly clear, perhaps most importantly among them that different societies and/or countries bear very different responsibility for climate warming and environmental degradation, and would also bear very differently the costs of policies designed to stop or reverse them. As mentioned, there is no supra-national authority that would be able to make all players comply with the needed policies. So far, rich countries subsidizing poor ones, which would go some way in dispensing with the need to have a supra national authority that enforces compliance, has advanced very little.
- So, what to do? Firstly, widespread public dissemination of the information where we stand today is very helpful. Second, world leader conferences such as the COP are crucial. Conferences like this one also help. However, all in all, at present all of these do not seem to be sufficient to avert very adverse scenarios. Perhaps it is time to think deeply about which would be the best feasible global governance to lead us to a scenario that maximizes the probability of avoiding a disaster.

Final remarks

- As a note from our region, I wanted to emphasize that the Americas host some of the most biodiverse countries in the world; as a consequence, the topics of natural capital and biodiversity loss are crucial to us. In addition to the negative impact that climate change will bring, some of the negative effects associated with biodiversity loss are already materializing. I am confident that this conference will allow countries in our region to gain awareness and knowledge about how both business activities and policy actions should be adjusted to deal with this threat.

- Before concluding, I would like to welcome you again to today's sessions and emphasize that this initiative is part of CEMLA's ongoing effort to broaden our understanding of the interplay between environmental risks and financial stability.
- As part of this commitment, CEMLA will host during 2022 a new course on Environmental Risk Analysis for the Financial System, jointly organized with the Toronto Center and with the collaboration of Banco de México. This course aims at providing our associated central banks and other institutions means to enhance their analytical capacities to incorporate and assess environmental risks for the financial system.
- I am hoping that you have fruitful discussions in today's sessions. Thank you for your attention.

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