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Conference on Climate Change and its Impact on the Financial System

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Welcome

- Good morning! Welcome to the Conference on Climate Change and its Impact on the Financial System that CEMLA co-organizes with Banco de México and with the support from the University of Zürich.
- Allow me to thank the organizers, especially Dr. Serafin Martínez-Jaramillo, Dr. Rafael del Villar and the Program Committee, who have worked very hard to organize a comprehensive agenda that includes both academic, as well as policy-oriented sessions. Let me also thank our keynote speakers, the academic and policy presenters, the discussants, our membership, and the rest of the participants who are attending this timely conference.
- During this conference, we will benefit from the views of academics as well as from policy makers, climate change related organizations and the financial industry. Taking into account all possible views from the relevant players will be necessary to, first, reach a consensus and, consequently, to act in order to manage climate related risks.
- After these two days, we will be convinced more than ever of the importance of the risks that Climate Change poses not only to the Financial System, but to most all other aspects of our everyday lives.
- Let me share with you that CEMLA sees Climate Change as an extremely important topic which deserves full attention, and in which we will continue to push initiatives in the coming years ranging from conferences like this one, to focused seminars and joint research projects.
- In my remarks I will briefly explore how I think Climate Change will impact not only the financial system as a whole, but also some of central banks' most relevant activities, like monetary policy and the procurement of financial stability.

Introduction

- Climate is changing and the increase in Greenhouse Gases (GHG) derived from human activity are, with high probability, the main cause of this change, as stated in many of the reports of the Intergovernmental Panel on Climate Change (IPCC).¹

¹ See IPCC (2014) and IPCC (2018) for example.

- For instance, on its IPCC (2018) Summary for Policy Makers, it states that “...*Human activities are estimated to have caused approximately 1.0° C of global warming above pre-industrial levels, with a likely range of 0.8° C to 1.2° C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate [...]*”
- We have witnessed in recent years the occurrence of extreme weather events associated with Climate Change such as soaring temperatures, cold snaps, stronger and more intense hurricanes, droughts and floods, to name just a few. Although the link between Climate Change and the more frequent and intense occurrence of these extreme events has not been conclusively proved, the IPCC still warns us that “...*A changing climate leads to changes in the frequency, intensity, spatial extent, duration and timing of extreme weather and climate events, and can result in unprecedented extreme weather and climate events [...]*”
- The consensus on the 2° C increase limit from the Paris Agreement brought some hope to bring down Greenhouse Gases (GHG). Unfortunately, the withdrawal from the agreement of relevant global players like the US, as well as some ambiguity on the implementation strategy, have prevented important progress towards the 2° C increase limit goal.²
- Although the impact of Climate Change will bring consequences for the whole planet, Emerging Market Economies and, in particular, the Latin American and the Caribbean region, are perceived to be some of the most exposed to the negative effects from Climate Change.
- Now, the important question for all of us in this meeting is why should central banks in particular, and financial authorities in general, be concerned about climate change?
- The answer is that climate related risks represent a formidable threat to most of the human race activities and, certainly, the economic ones are not the exception. In particular, Climate Change challenges two of the core activities performed by central banks: monetary policy and the procurement of financial stability. I will elaborate further on why this is the case.

Monetary policy

- According to McKibbin et al. (2017), the challenge that closely links Climate Change and monetary policy is the potential for economic shocks to take place and, evidently, the policy response to these. The authors underscore several points, from which I highlight the following ones.
 - ✓ One can think of the impacts of climate disruption and of policies to address Climate Change as supply shocks, some aspects of which would be transitory, and some of which would be permanent. These would all be considered negative supply shocks.³
 - ✓ Of course, climate events can affect prices and output, which can affect central banks’

² To be precise, on November 4, 2019, the US gave a formal notice of intention to withdraw, which takes 12 months to take effect. So, the earliest possible effective withdrawal date by cannot be before November 4, 2020.

³ For example, price spikes in crops might be temporary, but sea level rise may permanently destroy productive coastal land.

ability to forecast inflation.

- ✓ Different approaches to set a carbon tax will impact energy and related prices differently. Some could provide predictable price dynamics. Ambitious climate policy can affect output disproportionately in emissions-intensive sectors.
- ✓ Monetary policy could affect macroeconomic outcomes. If continuously rising prices from carbon constraints induce a central bank to raise interest rates to slow inflation, this could exacerbate the fall in overall economic activity. Now, while doing so could lower welfare in the short run, in the long run not doing so would lead to an exponential all-encompassing deterioration in the quality of human life.⁴
- McKibbin et al contend that Climate Change and monetary policy should be brought together more explicitly. More generally, policy coordination is challenging and, in addition, poses the dilemma of why an economy should implement a policy response, when others do not.
- Relatedly, we have two interesting papers that will be presented in this conference which evaluate the impact of the extreme weather phenomenon known as “El Niño” on food prices and on overall general inflation.⁵
- Until now, climate related economic shocks have been mostly short-lived. Nevertheless, climate change might modify the intensity and persistence of these shocks. Therefore, central banks must take into consideration this source of shocks and design appropriate monetary policy responses.
- The interplay between climate and monetary policy is very rich and, obviously, depends on the particular Climate Change disruptions and the appropriate monetary policy design. Again, McKibbin et al. (2017) illustrate the interactions between the two for different policy designs.

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Financial stability

- On the financial stability side, Climate Change related risks pose potential direct and indirect negative effects to the financial system through various channels. According to the Bank of England (2015) and Carney (2015), there are three types of risks that could have an impact on the insurance sector, which I think could affect the financial system as well: physical risks, transition risks, and liability risks.

⁴ In other words, once we have established that climate change related events do have implications on monetary policy, it is also important to recognize that policies designed to tackle climate change could impact monetary policy. For example, specific implementations of carbon pricing mechanisms could affect not only carbon prices, but other energy related prices. If such policies cause additional price increases and/or volatility, central banks would face greater challenges to implement monetary policy.

⁵ The papers from Colombia explores its impact on food prices and the paper from Costa Rica on general inflation.

⁶ The study’s monetary policy designs range from strict inflation targeting, flexible inflation targeting, price level targeting, Henderson-McKibbin-Taylor rules and nominal income targeting.

⁷ The paper’s Climate policies comprise carbon taxes, a permit trading system and other regulatory responses.

- For example, in the case of physical risks, a natural disaster can impose direct losses to the insurance sector. At the same time, it will affect uninsured households and firms and, thus, the banking sector. On its part, the banking sector might also reduce lending, affecting the recovery of the affected areas and sectors. Additional losses might emerge from asset fire sales arising from portfolio adjustments from insurers and banks. We will see some interesting papers along these lines during the conference.
- Conversely, the financial system can also have an impact on physical risks, as has been pointed out in Batten et al. (2016). This impact is related to the decision by financial intermediaries to allocate resources to sectors that are carbon intensive. This decision can, in turn, increase physical risks related to Climate Change, contrary to the situation that would arise if their funding decisions had opted for greener alternatives.
- There is still an intense debate on how to treat these externalities imposed on the general public by financial institutions. Taxes, subsidies and regulation are common practices in the case of externalities. Prudential regulation is also an option, but serious research is still missing to determine its feasibility and to prevent possible unintended consequences.
- Another important transmission channel is through sovereign debt prices. Countries and regions which are perceived at risk of suffering from extreme events could face re-pricing of their sovereign bonds. The effect is exacerbated by the fact that current capital and liquidity regulation encourages financial institutions to hold sovereign bonds, potentially imposing losses to the intermediaries. Additional rounds of losses might arise depending on the degree of portfolio overlap in the financial system, as has been pointed out in Poledna et al. (2019).
- On the transition risks, the interplay between financial stability and climate related risks has gained prominence in policy discussions.
- More specifically, there is evidence that in some countries, risk is building in some sectors given the misalignment of their current trajectories with respect to those trajectories compatible with the 2° C objective.⁸ This has brought about an increase in the financial institutions transition risks due to their exposure to such sectors. This has been forcefully underscored by Roncoroni et al. (2019).
- From the financial stability point of view, it is relevant that the transition to greener investments takes place in an orderly manner in the financial sector. As a necessary step to achieve this, there is the urgent need for better measurement models and frameworks. I am sure that, in this respect, we will benefit from the papers presented during these two days.
- I have just mentioned key repercussions from Climate Change on monetary policy and financial stability. It is important, though, to consider it from a broader economic perspective. Indeed, the broadest one possible. In this regard, Climate Change has several of the elements, if not all, to bring about a perfect economic storm.

⁸ 2° C compatible scenarios refer to emission scenarios developed from assessment models within more general climate modeling frameworks.

- Let me clarify. Climate Change is, at the end of the day, an externality. Addressing it requires policy coordination under the absence of a meta or supra-national authority (not that I think we should have one!). In effect, as has been painfully evident, there is no penalty for an economy which ceases its cooperation towards mitigating Climate Change.
- Cooperation in this regard would amount to attaining a collusive equilibrium in an unequivocally non-cooperative setup. It is well known that such equilibria are particularly fragile i) if the benefits from cooperation materialize far into the future, ii) if there is uncertainty concerning these benefits, and iii) if there is a low level of economic activity, all features which would seem to be currently present or relevant.
 - For example, recall all the debate and discussions that have taken place since the Global Financial Crisis on whether Advanced Economies find themselves in a situation of Secular Stagnation. In addition, monitoring costs of whether countries are complying with their commitments are nontrivial and, even if we could hypothetically immediately stop all Green House Gas emissions, its benefits would take some time to materialize.

This conference

- Let me guide you briefly through the structure of this conference and I apologize in advance if I omit some relevant talks but, in my defense, I must say that time is a hard constraint, and we should make our best effort to comply with the ambitious agenda which we have set forth for us in this Conference.
- First, the Conference starts with a dialogue with representatives from the Network for Greening the Financial System (the NGFS), which was founded in 2017 at the Paris “One Planet Summit”, and with members across the five continents.
- The purpose of the NGFS is to enhance the role of the financial system to manage risks and to allocate capital for low-carbon and green investments that meet an environmentally sustainable development. For this end, and taking as an example this conference, the NGFS promotes and develops practices to be implemented within and outside its Membership, having as an overall objective, the strengthening of a global response required to meet the Paris Agreement goals.
- Our first academic session is devoted mainly to introducing some evidence on the impact produced by risks related to Climate Change on the Financial System, having in one part physical risks as changes in rainfall and floods, for the Philippines’ and Italy’s cases, and in another, the risk posed by the transition to low carbon technologies and climate policy shocks for the Mexican case. More specifically:
 - ✓ The paper *“Impact of Extreme Weather Episodes on the Philippine Banking Sector – [...]”*, using data from the Branch Regional Information System (BRIS) from 2014 to 2018, confirms the negative effects of extreme weather conditions, in this case rain, on the financial system. However, the overall negative effect tends to taper off eventually, showing the resilience of the banking system.

- ✓ Next, “*Climate risk and financial stability in the network of banks and investment funds*” employs an innovative method to analyze the effect on financial stability of the interplay between shocks in climate policy and different market conditions. The authors observe that under mild shock scenarios, systemic losses are contained. Also, they identify climate policy scenarios and market conditions under which systemic losses can pose a threat to financial stability.
- ✓ Then, “*Climate change and bank lending: the case of flood risk in Italy*” is a study of bank lending to firms under risk of flooding. Following a municipal level approach, the authors find that banks are aware of climate-related catastrophe risk and ration credit to risky firms, independently of credit demand factors and disaster insurance coverage.
- The first policy panel’s purpose is to gain insight on the ongoing work that credit institutions are carrying out greening the banking system, more precisely, i) the measures currently being taken in order to achieve it, ii) the main reasons why credit institutions should get involved in the task of moving toward a lower carbon economy, and iii) the principal barriers they currently face.
- The second academic session aims to shed some light on the impact produced by different weather phenomena as the oceans warming and tropical cyclones affect different economic activities like food production, manufacturing and services. More specifically:
 - ✓ “*Efectos Macroeconómicos de El Niño en Costa Rica*” explores the effect of the climate phenomenon “El Niño” on production and price fluctuations. Results provide evidence that the imbalance of rainfall across Costa Rica generates losses of products due to the drought in some parts of the country and flooding in others. This has, as a consequence, an increment in prices.
 - ✓ Our next paper studies the effects of tropical cyclones on the economic activity at the firm level of the manufacturing and services sectors in Mexico.⁹ The authors observe, on the one side, an increasing negative and persistent effect on firms from the manufacturing sector; and, on the other, firms in the services sector show higher short-run negative sensitivity, but low persistence.
 - ✓ In the paper “*Nonlinear relationship between the weather phenomenon El Niño and Colombian food prices,*” the authors estimate the impact of El Niño Southern Oscillation (ENSO) on food inflation growth with a nonlinear smooth transition regression model.
 - Their results suggest that weather shocks are transitory and asymmetric on food inflation.
 - A strong “El Niño” shock has a significant effect on food inflation growth for about eight months after the shock. Moreover, they find no evidence of changes in the

⁹ The paper is entitled “*The Effect of Tropical Cyclones in Economic Activities: Micro Level Evidence from Mexico for Secondary and Tertiary Activities.*”

size of Colombian food inflation growth responses over time.¹⁰

- Thus, an uptick in inflation arising from “El Niño” shocks could be accompanied by a tightening of the monetary stance if second-round effects emerge. This would be in line with the apparent transitory nature of this phenomenon.
- The second policy panel: *Research and policy papers*, aims to shed light upon the research currently being developed on climate change, green finance and the economy. Its main challenges are the role of regulators to promote research on these topics and the data gaps that need to be closed in order to boost the study of these issues.
- The third policy panel: *The role of Institutional Investors and Asset Managers*, has the purpose of exploring the role that institutional investors and asset managers can take to mobilize resources for green investments. In more detail, the reasons why institutional investors and asset managers should support solid environmental investments, current actions being taken by the latter for greening and decarbonizing their portfolios, and the measures that regulators could take to accelerate resource mobilization towards greener activities.
- The last academic session aims to give a more general view of the impact of Climate Change on the Financial System. Different topics are included, such as sustainable investment and the exposure of investors, Environmental, Social and Governance (ESG) metrics and the impact of climate risks on market indexes. In more detail:
 - ✓ The paper “*The Exposure of Institutional Investors to Environmental Risks: A Study Focused on the Management of International Reserves (IRs) by Central Banks*”, addresses how to implement an Environmental Risk Analysis (ERA) by the development of a multicriteria analytical framework for the strategic asset allocation of the International Reserves. In the study, the authors find that this framework is relevant for the construction of the investment portfolio of the IRs because of the different angles that must be considered in the selection of countries and instruments.
 - ✓ “*Mind the gap, Machine learning ESG metrics and sustainable investing*”, proposes a novel approach to overcome the current inconsistencies in the ESG scores by using Machine Learning techniques to identify those indicators that could better contribute to the construction of efficient portfolios (i.e., taking into consideration social and environmental aspects). They find that some relevant environmental indicators refer to companies’ exposure and ability to manage climate change risk.
 - ✓ Finally, “*Measure of the Impact of Climate Risk on Market Indexes Through the Implementation of a Model CoVaR*”, focuses on the development of climate risk indicators that can be used by financial institutions and regulators as a monitoring tool. Using a CoVar approach, results show that, along with other systemic risk indicators, climate variables can contribute quantifying the transmission channels and understanding the risks that threaten the stability of the Moroccan financial system.

¹⁰ To that end, they build GIRFs for eight different episodes associated with a strong El Niño, in the period corresponding from March 1962 to December 2018

- The fourth policy panel: *Taxonomies and Recommendations*, aims to investigate the role of taxonomies in the transition to an environmentally sustainable financial system. It will debate the types of taxonomies that have already been developed globally and their application to the identification of green products. Also, it will discuss the specific needs of the Mexican financial markets and the necessary convergence to the most widely accepted global taxonomies.
- The last policy session: *International Cooperation and Capacity Building*, has the purpose of explaining how the international cooperation and capacity development could be fundamental to enhance the greening of the financial system, discussing examples of international cooperation with high impact, describing the type of capacities needed to build and the role that multilateral organizations can play in order to mobilize resources towards green projects.

Conclusions

- I have tried to illustrate how climate change is intrinsically related to two of the most important central banks' duties: monetary policy and financial stability. However, there are other areas in which central banks can have a direct impact on greening the financial system, as will be made clear during the conference. For instance, the strategic asset allocation of their international reserves and requiring financial institutions to develop awareness of climate related risks by modifying their loans, collateral and financial assets classifications, by taking into account these risks.
- Before concluding, I would like to invite you to participate actively in the initiatives that CEMLA will be launching related to climate change in the coming months. For example, we are organizing a Seminar on Climate Change in Sao Paulo next year and we hope that the southern part of the continent will be participating actively on this initiative and it will be a good opportunity to evaluate policy and methodological progress at that time.
- To conclude, let me quote David Wallace-Wells (2019).
If you had to invent a threat grand enough, and global enough, to plausibly conjure into being a system of true international cooperation, climate change would be it—the threat everywhere, and overwhelming, and total. And yet now, just as the need for that kind of cooperation is paramount, indeed necessary for anything like the world we know to survive, we are only unbuilding those alliances — [...] retreating from collective responsibility and from each other.
- It goes without saying that if you need anything from CEMLA please approach us as we will be willing to accompany you on any climate change related projects.
- Thank you very much.

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