Green swans: climate change risks, central banking and financial stability

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On April 23, 2020, the OECD hosted Luiz Awazu Pereira da Silva, Deputy General Manager, Bank of International Settlements, to discuss his work on the challenges posed by climate change to financial stability, drawing on his co-authored book, "The green swan: Central banking and financial stability in the age of climate change". This blog presents key takeaways from his talk.

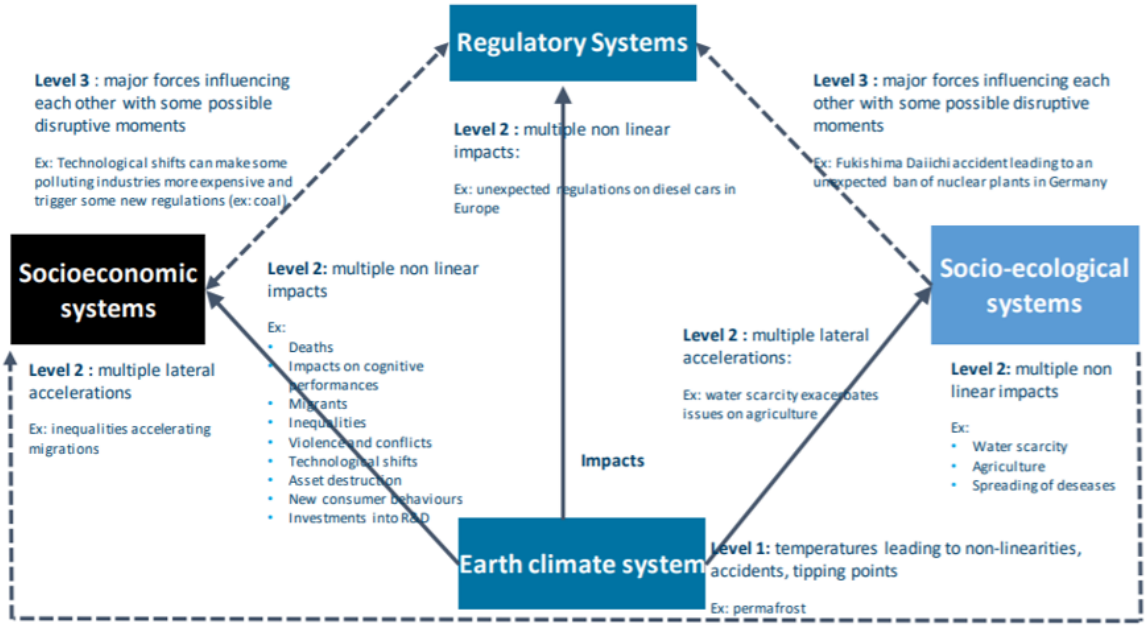
The unprecedented challenge posed by climate change is well documented. The rising concentration of greenhouse gases in the atmosphere has profound environmental impacts (e.g. rising sea levels, extreme temperature events, etc.) that threaten the delicate balance of the planet's natural systems. The human and societal consequences of the climate emergency are also massive, as environmental damages can exacerbate inequalities, food and water insecurity, and conflicts. **Accounting for climate-related risks is, thus, indispensable for building resilient socio-economic-ecological systems**.

There is an emerging recognition among central banks and financial regulators that climate-related risks are also a source of price and financial instability, and that there is a need to safeguard the financial system against these risks. This is complicated by a paradoxical tension between physical climate risks and transition risks. For example, on one hand, inaction towards the climate crisis means that climate-related accidents become more frequent and severe, threatening socio-economic systems and financial stability (i.e. physical risks). On the other hand, a rapid and aggressive decarbonisation effort can lead to sudden asset repricing (i.e. transition risks). This tension epitomises the fact that climate-related risks are transmitted through complex and inter-connected channels and have cascade effects. Treating these risks requires a departure from status quo thinking, as outlined by the following four key ideas.

First, while similar in some respects to "black swans"– highly unexpected events with severe far-reaching consequences (e.g. 2008 U.S. housing market crash) that can be best explained ex post – climate-related risks are distinct. They are not tail-risk events; scientific evidence suggests that climate-related shocks are virtually certain to occur, though the exact timing of these events is uncertain. Since the climate crisis poses

an existential threat to humanity, climate-related risks are also more catastrophic than traditional systemic financial risks. Finally, as alluded to earlier, climate-related risks are much more complex. They are propagated non-linearly with destructive feedback loops and can cascade across sectors, countries and systems (see Figure 1 for a representation of chain reactions stemming from climate-related risks). Taking inspiration from the "black swan" moniker, **climate-related events are termed "green swans"**.

Figure 1. Chain reactions stemming from climate risks



Source: (Bolton, Despres, Pereira da Silva, Samana, & Svartzman, 2020), *The green swan: Central banking and financial stability in the age of climate change*, https://www.bis.org/publ/othp31.pdf

Second, a methodological shift in macroeconomic-climate modelling is required to better understand green swan events, and how they emerge, accumulate and cascade. Backward-looking and deterministic approaches (e.g. vector autoregressive models) that extrapolate historical trends do not suffice in capturing the complexity and radical uncertainty of climate-risks. Even current scenario-based forward-looking risks assessment mechanisms are unable to completely incorporate the broad range of chain-reactions associated with climate change.

This, in tandem with the fact that these approaches lack granularity and there is uncertainty regarding approaches to climate-change mitigation, means that **the current paradigm of models cannot fully elucidate the potential macroeconomic, sectoral and firm-level repercussions of climate change.** Thus, an exploration of alternative approaches is needed, such as non-equilibrium models (instead of more sophisticated dynamic stochastic general equilibrium models), sensitivity analysis with more complex scenarios, and studies specific to countries, sectors and firms.

Third, given the intrinsic complexity of climate change, international co-ordination and co-operation is vital. While central banks play a critical role in mitigating climate-related risks, they do not possess a silver bullet to do so by themselves. Central banks and financial regulators have a role to play in identifying and managing climate-risks (e.g. integrating risks into prudential regulation), internalising externalities (e.g. incorporating environmental, social and governance considerations into their own portfolios), and enabling structural low-carbon transitions (e.g. reforming the international monetary and financial system). Nevertheless, many tools, such as green fiscal policy and carbon pricing, fall outside their purview, and uncoordinated actions from central banks would be insufficient and could potentially have unintended consequences. A systems-wide green transition necessitates buy-in and action from all stakeholders (i.e. governments, private sector, and civil society), and central banks need to contribute to coordinate on climate change by being more proactive on this front while continuing to fulfil their financial stability mandate.

Fourth, it is important to acknowledge that green swans have a tremendous negative redistributive impact, within and between countries. Not only do the physical risks stemming from

climate change predominately affect lower-income countries, but also the costs of adaptation to climate-change (e.g. shift away from carbon-intensive industries) are higher for poorer households. **This means that addressing climate change requires scaled-up mechanisms for redistribution** and a redesign of societal safety nets and efforts to finance the green transition of low-income countries. Otherwise, a society-wide acceptance of actions on climate change will prove elusive.

The ecological and environmental stability of the planet is a prerequisite for price and financial stability. So, for central banks to fulfil their central mandate, they have an important role in contributing to a systems-wide climate-change effort. In a nutshell, this involves identifying and communicating the risks ahead, calling for bold actions from all stakeholders to ensure the resilience of the earth's socio-ecological systems, and helping manage the risks within the bounds of their mandate.

Bibliography

Bolton, P., Despres, M., Pereira da Silva, L. A., Samana, F., & Svartzman, R. (2020). *The green swan: Central banking and financial stability in the age of climate change*. Bank for International Settlements.