



SOUTH AFRICAN RESERVE BANK

Climate change and policy coordination: What can central banks do?

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Introduction

Last year's floods in KwaZulu-Natal (KZN) reminded us yet again that climate change is real and can devastate households, businesses and property. Close to 500 people lost their lives and over 4 000 houses were destroyed.¹ At the same time, we saw dams running dry in the Nelson Mandela Bay area, limiting water supply to firms and households. The frequency and severity of extreme events is increasing across the world. Just last month, powerful winds and severe rainfall damaged houses and roads in the Western Cape. Most recently elsewhere, Storm Daniel caused extreme flooding across countries in the Balkans and Mediterranean with over 10 000 people reported missing in Libya, and the city of Derna completely destroyed when the walls of its dams burst.² We are rapidly approaching what is being referred to as global climate tipping points, which, once crossed, lead to greater disruptive effects of climate change on our livelihoods.³

¹ See Institute for Security Studies (2022) "Is climate change to blame for KwaZulu-Natal's flood damage?" available at <https://issafrica.org/iss-today/is-climate-change-to-blame-for-kwazulu-natals-flood-damage>

² World Meteorological Organisation (2023), *Storm Daniel leads to extreme rain and floods in Mediterranean, heavy loss of life in Libya*, published 12 September 2023, available at <https://public.wmo.int/en/media/news/storm-daniel-leads-extreme-rain-and-floods-mediterranean-heavy-loss-of-life-libya>

³ See Lenton T M et al. (2019). Climate tipping points – too risky to bet against, Nature Publishing Group.

The bottom line is that we need decisive action to slow rising temperatures. The United Nations Intergovernmental Panel on Climate Change says that achieving the goal of limiting temperature increases to 1.5 degree celsius (°C) requires global greenhouse gas emissions to peak before 2025 and then decline by 43% by 2030.⁴ A goal that appears increasingly difficult to achieve.

While the combination of urgency and complexity is daunting, it is important that we think carefully about policy coordination. We should think about the roles and responsibilities of the public regulatory system and how their actions impact the behaviour of economic agents, firms and households.

Central banks globally have been drawn into these policy debates and while we certainly have a role to play, when it comes to broader society and economy-wide systems, it is best to think of central banks as just one important node in a neural network.

In neural networks, the power of a network comes from how the different nodes are interconnected.⁵ A central bank's effectiveness in addressing policy challenges will depend on how our actions impact on and are integrated with other policy areas.

Today, I am going to talk to you about what central banks can do to strengthen climate policy coordination. I will also focus on how climate change affects our core mandate; how to reduce the risks of policy design and coordination failures; and how to avoid over-reach driven by these policy challenges. Let me discuss each one of these in turn.

How climate change affects our core mandate

Climate change refers to long-term shifts in temperatures and weather patterns. These will have profound economic effects. Think about experiencing the 2022 KZN floods every year, just twice as severe. Or having no rainfall in the citrus-producing regions of South Africa, destroying part of our agricultural sector.

⁴ United Nations Framework Convention on Climate Change, (2022), *Five Key Takeaways from COP27*, available at <https://unfccc.int/process-and-meetings/conferences/sharm-el-sheikh-climate-change-conference-november-2022/five-key-takeaways-from-cop27>

⁵ See Anderson, J A (1995). *An introduction to neural networks*, MIT press.

Climate change affects economies through multiple supply and demand channels. And, unlike other supply-side shocks, those from climate change are expected to be persistent, with frequently irreversible effects.⁶

For example, climate change will impact labour supply, capital accumulation and productivity. Extreme heat is expected to increase mortality and morbidity, reducing the skills base. Human capital more generally is likely to be affected by mass migration, crime and social unrest.⁷ Some estimates suggest a 7% decline in GDP per capita by 2100 for every 0.04°C increase in temperatures globally.⁸

It is because of these impacts that countries are moving to reduce greenhouse gas emissions while also trying to increase the resilience of their economies to the effects of climate change. However, our efforts to reduce emissions may also generate unintended negative consequences on firms and households. The economy will also be affected by the climate policy decisions of other countries and the changing preferences of investors and consumers. South Africa's high carbon intensity of production has already exposed us to the European Union's (EU) Carbon Border Adjustment Mechanism, which will see an increase in the cost of our exports.

The combination of rising temperatures, more frequent and extreme events and policy actions to mitigate and adapt may increase macroeconomic volatility and put pressure on the balance sheets of some households and firms. Prices of products and services from weather-dependent sectors such as agriculture and carbon-intensive sectors will increase more rapidly. Banks may be faced with stranded assets as global demand for carbon-intensive goods declines. Price and financial stability will be affected simultaneously with impacts characterised by these so-called 'tipping points'.^{9,10}

⁶ See Bolton, P et al. (2020). [The green swan](#). Bank for International Settlements, Basel

⁷ See Dell, M et al. (2014). "What do we learn from the weather? The new climate-economy literature." [Journal of Economic Literature](#) **52**(3): 740–798.

⁸ Kahn, M E et al. (2021) "Long-term macroeconomic effects of climate change: A cross-country analysis" [Energy Economics](#) **104**: 1–13

⁹ In climate science, tipping points are thresholds that, when crossed, lead to irreversible changes in the climate system. In the context of the financial system, these are thresholds when the financial and price impacts are suddenly much bigger than seen in the past.

¹⁰ Bolton, P et al. (2020). [The green swan](#). Bank for International Settlements, Basel

In the face of these challenges, central banks have started to consider the impact of climate change on the economy and the financial sector. Many are conducting financial sector climate stress tests, greening their portfolios, assessing the impact of extreme weather events and mitigation policies on inflation, and incorporating climate-related considerations in financial sector supervision.

How to reduce the risks of policy design and coordination failures

If our metaphor of neural networks is correct, then policy failure in areas that are outside our remit will impact on our performance, in particular where it impacts price and financial stability. For example, fiscal decisions are often a source of risk in emerging and developing economies. Climate change risks will amplify them. Major economic disruptions due to floods and droughts can increase spending pressures as governments need to rebuild destroyed infrastructure or compensate farmers for lost income. At the same time, tax revenue will decline as economic activity slows.

The impact of fiscal decisions on monetary policy and financial stability are well illustrated in our case. Fiscal balances deteriorated significantly post the 2008 Global Financial Crisis. Strong real growth in government wages was funded by higher taxes, contraction in public investment and rapid debt accumulation. The outcome was high inflation and weaker growth. At the same time, financial stability risks increased as banks increased their holdings of government debt that has a higher probability of credit default.¹¹

Monetary policy in South Africa faced strong fiscal dominance effects, in particular in the post-GFC period as well as through the COVID-19 pandemic.¹² We were reminded recently of this relationship by Francesco Bianchi and Leonardo Melosi during their presentation at Jackson Hole last year.

“When fiscal imbalances are large and fiscal credibility wanes, it may become increasingly harder for the monetary authority to stabilise inflation around its desired target. If the monetary authority increases rates in response to high inflation, the

¹¹ South African Reserve Bank (2022) *First Edition Financial Stability Review*, Pretoria

¹² Soobyah, L et al. (2023) “Is South Africa falling into a fiscal-dominant regime?” *SARB Working Paper Series, No WP/23/02*

economy enters a recession, which increases the debt-to-GDP ratio. If the monetary tightening is not supported by the expectation of appropriate fiscal adjustments, the deterioration of fiscal imbalances leads to even higher inflationary pressure. As a result, a vicious circle of rising nominal interest rates, rising inflation, economic stagnation, and increasing debt would arise.”¹³

By contrast, monetary and fiscal responses to the green transition of South Africa’s economy would be more effective if large fiscal buffers are built, spending is prioritised for investment in infrastructure and to develop new skills to drive economic growth. Equally important, the tax system needs to tackle the historically low costs of generating greenhouse gas emissions, for example through carbon taxation and providing tax incentives for firms and consumers to invest in cleaner technologies. These actions provide clear relative price signals to decarbonise the economy. This type of fiscal policy allows central banks to support the transition by maintaining price and financial stability.

Let me emphasise, if government actions do not create the appropriate relative price signals, then our investment and consumption decisions will continue to support brown sectors; our exports will face carbon-border tax adjustments; and foreign funding will decline as investors become more considerate of climate-related issues. Under these conditions, there is limited potential for expansionary monetary policy to support economic activity.

How to avoid over-reach driven by policy failures

To understand the role of central banks in the green transition, we need to discuss its main drivers. These are relative price changes that provide a strong signal for households and firms to consume and invest in greener goods and services; new technologies that reduce the cost of adaptation and mitigation; and infrastructure that is more resilient to extreme weather events and supports the economic transition. The tools that we have as central bankers cannot impact these elements directly.

¹³ Francesco Bianchi and Leonardo Melosi. “Inflation as a fiscal limit” 19 August 2022. Available at: https://www.kansascityfed.org/Jackson%20Hole/documents/9037/JH_Paper_Bianchi.pdf

Relative price changes

There are many ways to change relative prices and returns in the economy. These drive structural changes and are always the mandate of government. Carbon pricing is considered the most effective and efficient instrument in changing the relative price of carbon-intensive good and services.¹⁴ Yet, carbon prices remain low, and governments try to achieve these relative price shifts using second-best options.

One of these options is asking central banks to step outside their mandates and do 'more'. For example, while it may seem like a good idea to provide credit lines to commercial banks to extend green loans or to engage in green quantitative easing (QE), what is the market failure that we try to address?

Credit lines will not address the funding problems associated with the development and adoption of new technologies. Commercial banks are not in the business of supporting technology development due to high monitoring costs and failure rates.¹⁵ The activities that will receive funding are the ones that will have received funding anyway. Borrowing rates may be slightly lower but these will ultimately be determined by the credit profile of the borrower rather than its green status.

The experience with QE programmes provides useful insights as to why green QE is not an effective relative price or funding instrument. QE programmes in the developed world have been effective in normalising financial conditions but not so effective at reducing funding rates.¹⁶ More importantly, they can generate significant unintended consequences, which can distort markets and undermine central bank independence.¹⁷ Claudio Borio and Anna Zabai remind us of these risks:

"... there are broader questions about the long-term effectiveness and desirability of these (QE) measures. Some have to do with the measures' overall impact on the central bank goals; others with political economy considerations, which may ultimately

¹⁴ IMF and OECD. (2022). *Delivering Climate-Change Mitigation under Diverse National Policy Approaches: An independent IMF/OECD report to support the German 2022 G7 Presidency*

¹⁵ Philippe Aghion, L B Johannes Breckenfelder, Luc Laeven, Conny Olovsson, Alexander Popov, Elena Rancoita (2022). "Financial Markets and Green Innovation." [ECB Working Paper Series No 2686](#).

¹⁶ See Borio, C and Zabai, A (2018). Unconventional monetary policies: a re-appraisal. [Research Handbook on Central Banking](#), Edward Elgar Publishing

¹⁷ See CGFS (2019). Unconventional monetary policy tools: a cross-country analysis. C. o. t. G. F. System, Bank for International Settlements.

*undermine the central bank's perceived legitimacy and autonomy (or 'independence'). Exit issues loom large."*¹⁸

Another possible tool to change relative prices is changing microprudential requirements. For example, by penalising banks that have high exposure to carbon-intensive sectors through higher capital requirements.

The main challenge is that physical and transition risks impact both carbon- and non-carbon-intensive sectors. Weather-dependent sectors such as agriculture and food processing are more exposed to physical risks. Other sectors such as mining are exposed to both. Prudential policy needs to consider climate-related risks but using prudential tools to artificially change relative prices to favour green sectors will undermine financial stability.

The bottom line is that when central banks change relative prices, we violate the so-called central bank neutrality principle and take on the mandate of government, thus undermining our independence. Allocative decisions involving difficult choices are for elected officials to make and for technocrats that are the central bankers.

Central bank actions must be consistent with achieving policy objectives that are forward-looking. The failed efforts of the 1970s to support growth at the cost of high inflation illustrate how political interference leads to time-inconsistent actions. Policymakers believed that by tolerating high inflation, central banks can generate permanently higher levels of employment. The outcome was both higher inflation and lower employment as economic agents simply factored in higher inflation expectations in their decisions. Giving central banks multiple objectives undermines the time consistency of their actions, reducing both accountability and credibility.

Technology

The second core element of the transition is the development of new technologies and their adoption. Renewable energy provides a good example of how new technologies

¹⁸ See Borio, C and Zabai, A (2018). Unconventional monetary policies: a re-appraisal. [Research Handbook on Central Banking](#), Edward Elgar Publishing.

and their evolution support the transition. Between 2010 and 2020, the cost of solar and wind generation has fallen by 85% and 56% respectively.¹⁹ At the same time adoption rates have grown exponentially.

What role have central banks played in the development of renewable energy technology?

The answer is not much. We have neither the skills nor the tools to assist. The major driving forces of green innovation are factors such as carbon taxation, research and development (R&D) investment and equity funding, often in the form of venture capital.²⁰ These fall entirely within the mandate of governments, which are responsible for taxation and a variety of incentives to encourage R&D spending and equity funding. The best way for a central bank to support technology development and adoption is not by funding it but by being better at reducing the costs associated with inflation, hedging and financial instability. Lower and stable inflation reduces risk premiums and also translates into less-volatile exchange rates.

Infrastructure

The last element is infrastructure spending. Climate change will require significant investment in adaptation and mitigation infrastructure. We must make our roads and buildings climate resilient. We need to cope with increased flooding, droughts and fires. And we need charging stations for our new electric vehicles. The Blended Finance Taskforce, which was set up to mobilise private capital for the Sustainable Development Goals, estimates that we need to invest US\$250 billion over the next three decades.²¹

¹⁹IEA(2022), *World Energy Outlook*, International Energy Agency, Paris, available at <https://iea.blob.core.windows.net/assets/830fe099-5530-48f2-a7c1-11f35d510983/WorldEnergyOutlook2022.pdf>

²⁰ See Philippe Aghion, L B, Johannes Breckenfelder, Luc Laeven, Conny Olovsson, Alexander Popov, Elena Rancoita (2022). "Financial Markets and Green Innovation." *ECB Working Paper Series No 2686*.

²¹ Blended Finance Taskforce (20 23). *Making Climate Capital work: Unlocking \$8.5bn for South Africa's Just Energy Transition*, available at <https://static1.squarespace.com/static/5acdc066c258b4bd2d15050b/t/628e373f28dafa216b114042/1653487452874/Making+Climate+Capital+Work+-+FINAL+REPORT.pdf>

We are not infrastructure financiers and we have seen that infrastructure budgets are often not spent. There is little we can do to improve the different phases of developing and executing a project, which are often listed as the main obstacles to infrastructure development in South Africa.

What can central banks do?

If funding is important, then our focus should be on ensuring macroeconomic stability. This has been identified as a major driver of green funding in emerging and developing economies by global pension funds.²² In a survey conducted by the Organisation for Economic Co-operation and Development (OECD), close to 90% of global pension funds state that corruption, political risk and macroeconomic stability are important considerations in their investment decisions. This compares to 59% that identify regulation related to environmental, social and corporate governance (ESG) issues as an important driver.

Maintaining price stability

When it comes to maintaining price stability, some economists have made the case for more inflationary approaches to monetary policy to help prevent large relative price shocks from reducing growth.

It is argued that nominal GDP- and income-targeting would better protect economic activity, given expected price volatility associated with mitigation interventions and output gap uncertainty.²³

For many emerging and developing economies, however, low and stable inflation creates wide-ranging benefits that go far beyond any gains that might occur from tolerating higher inflation. These include having clear nominal anchors, lower inflation premiums and interest rates, better access to foreign savings and better protection from global shocks, among other benefits. In turn, these support green investment.

²² See OECD (2021), *Mobilising institutional investors for financing sustainable development in developing countries: Emerging evidence of opportunities and challenges*, OECD Publishing, Paris.

²³ See McKibbin, W. J., et al. (2017). "Climate change and monetary policy: Dealing with disruption."

Financial stability

When it comes to financial stability, we need to identify the short- to medium-term climate-related risks; think about how we can measure their effects; be clear about the limitations of our frameworks; and design effective interventions to increase the resilience of the financial system.

The most immediate risks are not linked to rising temperatures. They are linked to more frequent floods and droughts; how technology evolves; the development of new financial instruments and funding models to support the transition; the introduction of carbon taxation and border tax adjustments; policy coordination failures; and the implications of an uneven global transition, among other factors.

Our role is also to help financial markets have the right information to assess accurately the merits of transition projects. Here, the introduction of globally consistent taxonomy and disclosure rules are critical in improving market efficiency and ensuring financial stability.

Our experience with the COVID-19 crisis shows that we can face new risks, adapt quickly and ensure that financial stability is maintained.

Provide analytical work

In addition to maintaining price and financial stability, we can support the transition by continuing to produce high-quality economic research. The work of the Network for Greening the Financial System (NGFS) and many central banks around climate change has grown exponentially over the last couple of years.

One critical area for research is, of course, macro- and micro-policy coordination and design. This will inform our role in the transition and our understanding of the risks of mission creep. The multi-disciplinary nature of climate change requires that we develop new skills and partnerships to analyse the different impacts, develop new models and understand how technologies will evolve.

Developing good models and producing quality research requires data. We have an important role to play in developing new data sources and providing quality information to households and firms.

Conclusion

In conclusion, the contribution of central banks to climate change-related objectives and their contribution to the transition is conditional on government policy actions. The biggest levers of the transition sit with microeconomic policies. Well-designed and coordinated actions generate an orderly green transition while minimising any unintended consequences. For example, policy actions to help workers reskill and relocate to greener firms will maximise employment gains. Reducing the cost of new technologies through an appropriate mix of incentives and the removal of trade tariffs will lower transitions costs. This will also support the development of new industries. Transitioning the electricity sector more rapidly to green generation can be a major catalyst for investment in sectors across the economy.

Central banks have an important role to play in the climate transition. It is to maintain financial and price stability, produce analytical work to support policy making and address financial market data gaps. These will enable an environment for financial institutions to provide green funding; for companies to invest in new technologies and productive capacity as well as for households to shift their consumption patterns. Our actions will be effective only if they fall within our mandate and as part of a bigger government response.