CHAPTER 9

The role of central banks and supervisors in scaling up sustainable finance and investment in the Global South

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1 INTRODUCTION

A growing number of central banks and financial supervisors (CBFSs) in emerging market and developing economies (EMDEs) have begun to address the financial and macroeconomic stability challenges of climate change and environmental degradation. Many have also started to explore and encourage the scaling up of sustainable finance and investment with the aim of supporting financing of national mitigation and adaptation efforts. In general, there are at least five reasons why CBFSs should be concerned with environmental degradation, climate change and the loss of nature.

First, CBFSs are required to respond to environmental externalities affecting their traditional core responsibility of safeguarding macroeconomic stability (especially low and stable inflation) as well as financial stability. It is now widely recognised that the physical and transition impacts of climate change and nature loss create financial risks that need to be mitigated. Moreover, it is increasingly well-documented that climate impacts can threaten macroeconomic and price stability. It is therefore critical that CBFSs understand, assess and address climate- and nature-related risks and impacts in their prudential and monetary policy frameworks to adequately respond to these new challenges.

Second, central banks need to consider the impact of climate- and nature-related risks on their own balance sheet. Importantly, central banks' collateral frameworks need to account for material climate- and nature-related risks to protect their balance sheet from financial losses arising from counterparty default. Moreover, central banks need to mitigate climate- and nature-related risks in their investment and policy portfolios. By integrating sustainability risks in their collateral frameworks and investment policies, central banks are able to both mitigate their own risk and have a positive impact on the real economy.

Third, CBFSs need to consider the potential impact of their own policy choices on climate- and nature-related outcomes. As highlighted by the concept of double materiality, organisations need to not only consider material climate/nature-related impacts on themselves, but also how their own operations and policies affect the climate, nature or other dimensions of sustainability (Täger 2021). This is particularly relevant for CBFSs in jurisdictions where the government has formally adopted climate targets such as net zero, which CBFSs should not contravene through their actions.

Fourth, given their role at the heart of the financial system, the policies and actions of CBFSs can have a market-shaping impact. Through their convening power but also their monetary, prudential and other policies, they can play a crucial role in aligning financial markets with sustainability goals. While CBFSs cannot substitute for government policies on climate change and nature, they can play an important role in ensuring that the financial system supports the much-needed transition to a low-carbon, more environmentally sustainable and resilient economy. At the same time, supporting the transition to a low-carbon and sustainable economy is the best way of minimising the risks of climate change and nature loss to the stability of the financial system and the macroeconomy. The extent to which CBFSs may contribute to 'greening' the financial system and the economy depends on the specific country context as well as their institutional mandate, remits and interpretation thereof (Dikau and Volz 2021a).

Fifth, CBFSs should lead by example. When requesting that supervised entities disclose climate- and nature-related risks and impacts and account for these risks in their lending/investment decisions, CBFSs should apply the same standard to themselves and their own operations.

In principle, these five reasons apply to CBFSs in both advanced economies and EMDEs. A consensus has started to emerge in the global central banking community that taking climate- and nature-related risk into account in the design of monetary policy and financial supervision in the pursuit of the traditional goals of price and financial stability falls squarely within their mandates and remits. This has been affirmed by the 116 CBFSs that are members of the Network of Central Banks and Supervisors for Greening the Financial System (NGFS). The NGFS has also forged a consensus that CBFSs should support the scaling up of sustainable finance.

While the challenge is universal, climate- and nature-related risks and investment needs tend to be larger in EMDEs than in advanced economies, while financial systems are less developed. Although most EMDEs have contributed little to nothing to climate change, they tend to be disproportionally affected by its physical impacts, which means they face enormous investment needs in adaptation and resilience. Moreover, most EMDEs face the need for significant upfront investments in low-carbon energy and transport infrastructure, all of which should be climate-resilient. It is hence of vital importance for CBFSs in EMDEs to explore and consider how they can support ramping up sustainable investment to reduce risks and vulnerabilities.

Against this background, this chapter discusses the role that CBFSs in the Global South can play in scaling up sustainable finance and investment. Section 2 discusses the rationale for CBFSs to be actively involved in aligning finance with sustainability and in designing and implementing policies that encourage sustainable finance and investment. Section 3 discusses the specific tools and instruments that CBFSs can use to this effect, and Section 4 reviews the emerging practice in EMDEs. Section 5 concludes.

2 THE RATIONALE FOR CENTRAL BANKS AND SUPERVISORS IN THE GLOBAL SOUTH TO SUPPORT THE SCALING UP OF SUSTAINABLE FINANCE AND INVESTMENT

To achieve the twin goals of the Paris Agreement and the 2030 Sustainable Development Goals, and to avert the looming climate and environmental catastrophe that would come with significant economic and financial disruptions, investment will have to be directed away from fossil fuel-dependent and resource-intensive activities and towards sustainable economic activities. At the same time, vulnerable countries need to massively ramp up investment in adaptation and resilience.

The need to transition to a low carbon economy was formalised in the Paris Agreement on Climate Change in December 2016. Although the Paris Agreement recognises that peaking of greenhouse gas emissions will take longer for developing country parties, the amounts of finance that EMDEs will have to mobilise to undertake critical investment in renewable energy and low-carbon infrastructure are significant. It is important to highlight that investments in a low-carbon transition are also critical in EMDEs in order to maintain international trade competitiveness. As highlighted by Patel (2022), the threat from decarbonisation policies of advanced economies to EMDEs' mining, manufacturing and agricultural sectors "is both real and imminent". Plans by the European Union to introduce a Carbon Border Adjustment Mechanism (CBAM) highlight this challenge.

EMDEs are not only disproportionately affected by the physical impacts of climate change, but many are also acutely threatened by nature and biodiversity loss. Nature loss is becoming an increasingly pressing issue for EMDEs, forcing policymakers to extend their definitions of 'sustainable' and develop a comprehensive understanding of the impact and dependency of the economy and financial system on key ecosystem services (NGFS and ISNPIRE 2022). A large portion of the most biodiverse regions in the world are located in EMDEs, whose national economies are often highly dependent on key ecosystem services. Over the last decades, losses of intact ecosystems have occurred primarily in the tropics, home to the highest levels of biodiversity on the planet (IPBES 2019). The loss of nature and ecosystems, which is largely driven by land use change,

including deforestation, can have lasting impacts on the economy and financial system.[1] Unlike climate change, where impacts are spread globally regardless of the origins of emissions, impacts of nature loss are more localised. Economic sectors that EMDEs rely on, such as fisheries, agriculture and tourism, are highly dependent on healthy ecosystems. But manufacturing processes which require clean water and other ecosystem services to operate are also vulnerable. In a recent study, Johnson et al. (2021) estimate that low- and lower-middle-income countries could be the most severely impacted by the disruption of ecosystem services provided by nature. Low-income countries are estimated to lose up to 10% of GDP by 2030, while lower-middle-income countries could lose up to 7.3% of GDP. This compares to 2.4% for high-income economies.[2] Agarwala et al. (2022) show that such nature loss scenarios would result in substantial sovereign credit downgrades in EMDEs.

In this context, CBFSs face the interrelated dual challenge of, first, mitigating the macroeconomic and financial stability risks stemming from the physical and transition risks of climate change and nature loss; and second, supporting the alignment of financial markets with sustainability goals and the scaling up of sustainable finance and investment. The two rationales are interconnected as mitigating climate- and nature-related financial risks will in many cases also have implications for the allocation of credit away from environmentally harmful and polluting activities that are also most exposed to transition risks, towards more sustainable economic activities and sectors, the scaling up of which also helps to reduce long-term physical risks. Indeed, by supporting an alignment of the financial sector with climate, nature and other sustainability goals, CBFSs can contribute to a climate-proofing of the economy and make the economy less vulnerable to future shocks.

When discussing the potential role of CBFSs in aligning financial flows with sustainability goals and the scaling up of sustainable finance and investment, an important question is how addressing environmental degradation relates to the mandated objectives of CBFSs (Dikau and Volz 2021a). Following a long historical process of changing remits and priorities (often abruptly in response to an economic or financial shock), today, central banks typically have two core mandates.

First, virtually all central banks are tasked with maintaining price stability, i.e. low and stable inflation. In this context, it is important to recognise that while there is increasing empirical evidence that shows that the physical impacts of climate change are also affecting inflation in advanced economies (Beirne et al. 2021, Faccia et al. 2021), the effects have been generally more pronounced in the Global South (Parker 2018, Heinen et al. 2019, Mukherjee and Ouatarra 2021). Going forward, more frequent and severe weather events

1 For example, deforestation across the Amazon has contributed to prolonged droughts that have impacted agricultural yields and Brazil's hydropower production (Harris 2021). These impacts reduce the revenues of agricultural firms and power producers and affect the macroeconomy through rising food and electricity prices, contributing to inflation and rising global commodity prices (Harris and Pulice 2021).

2 Note that spillover effects such as trade were not accounted for.

could have a significant impact on agricultural and industrial production, potentially leading to supply shocks that manifest as cost-push inflation (Dikau and Volz 2019). In a similar vein, nature- and ecosystem-loss could lead to disruptions in provisioning services (i.e. pollination, fisheries, and soils) that negatively affect agricultural and other commodity production, thereby also causing prices to rise. Moreover, transition impacts can also affect inflation in different ways (Schnabel 2022). Through their impacts on multiple macroeconomic variables and the monetary transmission process, climate change and nature loss could significantly complicate monetary policy with varying implications under different monetary policy regimes (McKibbin et al. 2020). Central banks therefore need to augment their macroeconomic models to correctly analyse and predict the drivers of inflation and respond adequately (Boneva and Gianluigi 2022, NGFS 2020a, Schoenmaker 2021). Moreover, as will be discussed below, they can use different monetary policy tools to account for environmental impacts.

A second core responsibility of central banks – even if it is not explicitly stated in the legal mandate – is safeguarding financial stability.[3] If climate change and environmental degradation affect the stability of banks, insurers and other actors within the financial system, prudential intervention by CBFSs would be warranted (NGFS 2021). CBFS are thereby concerned with the financial stability of individual financial institutions as well as with the stability of the system as a whole. Whether climate- or nature-related financial risks caused by physical and transition impacts are systemic or only affect individual institutions depends on various factors.

Physical risks arise through exposures of the economy to the physical impacts of climate change and nature loss. For example, more severe droughts or floods resulting from climate change and nature loss can disrupt business as usual, negatively impact business operations and lead to credit and market risk. In many EMDEs, these risks are of special concern because of the frequency and severity of the physical impacts of environmental changes coupled with an often-high dependence of the economy on sectors such as agriculture, forestry, fishing or tourism that are particularly exposed.

Transition risks, on the other hand, arise as a result of changing policies, consumer preferences and innovations in line with a low-carbon and nature-positive future. For example, a carbon tax or restrictions on habitat modification could increase business costs, operations and profitability, particularly for companies whose activities have a negative impact on climate or nature, ultimately transmitting to financial risk. Again, these risks can threaten individual financial institutions, and potentially aggregate into systemic financial exposures, warranting the attention of CBFSs. Closely related to physical and transition risks, litigation risks could also arise, particularly in the context of nature loss, as immediate impacts tend to be local and more easily linked to firms that are harming local environments (e.g. logging companies, factories polluting freshwater).

3 Even if this function is formally separated from the central bank and tasked to a dedicated supervisory authority, the central bank cannot ignore (macro)financial stability considerations.

Concerning the timeframe of these risks, climate change has been described as a 'tragedy of the horizon' (Carney 2015). The worst effects of climate change will be felt beyond the traditional horizons of most actors and will impose a cost on future generations that the current generation has no direct incentive to fix (Stern 2007). Likewise, the main risks materialise beyond the business and financial cycle, the political cycle and the traditional horizon of technocratic authorities, including CBFSs. To overcome the tragedy of the horizon, policymakers need to address the lack of incentives by market participants to limit risks that will affect future market participants and society. Because the financial system, which is overseen by CBFSs, plays a key role in allocating capital in the economy, it is critical that financial institutions incorporate sustainability factors into their risk management and governance frameworks to mitigate the adverse, longer-term impacts of climate- and nature-related risks.

Operationally, the primary function of prudential risk-mitigation frameworks is the identification and mitigation of financial risks. Requiring financial institutions to assess, price and disclose climate- and nature-related financial risks would lead to disinvestment and a scaling-down of financial flows to unsustainable, and therefore high-risk sectors, which in turn would reduce the longer-term risks to the economy and the financial system. The risk-based deployment of prudential instruments, such as large exposure restrictions and capital requirements, can therefore, in addition to mitigating risks, contribute to the scaling-down of unsustainable finance in favour of investment in more sustainable activities. It should be mentioned, however, that some CBFSs in EMDEs are also employing prudential instruments outside of a risk-based approach to penalise lending to unsustainable activities or support sustainable investments.

Furthermore, some central banks, especially but not only in EMDEs, have broader mandates to support wider economic policies such as sustainable development, maximum employment or financial inclusion (Dikau and Volz 2019, 2021a). While there are differing views on whether CBFSs should play a role in actively aligning financial flows with sustainability objectives, some CBFSs in the Global South are already playing a much more active, sustainability-oriented 'developmental' role. For example, the legal mandate of Bangladesh Bank, the central bank of Bangladesh, includes supporting economic growth and development as a secondary objective, while the central bank of Brazil has a mandate to promote balanced development and to serve the collective interest, implying a sustainability objective (Dikau and Ryan-Collins 2017). Insofar as central banks are mandated to support their governments' overall economic, social and environmental policies, they may have a more proactive role to play in aligning financial flows with sustainability objectives (Dikau and Volz 2021a). Additionally, as highlighted above, EMDEs are likely to be more affected by the physical impacts of climate change, and thus their central banks could be compelled to take action to promote green growth.

Conceptually, interventions to affect the allocation of credit could be justified by the existence of far-reaching market failures. To achieve global climate and biodiversity targets, it is necessary for the financial sector to fund sustainable economic activities

and curtail funding of economic activities that harm the environment. Meanwhile, in the absence of public intervention through fiscal or environmental policy, the financial sector will likely prioritise maximising short-term returns, which could mean allocating capital to environmentally and socially harmful activities. The argument in favour of intervention into the allocation of capital to scale up sustainable finance relates to the failure of the financial system to account for the negative externalities of activities causing environmental degradation and harmful emissions (Dikau and Volz 2021a). Climate change has been described as a result of the biggest market failure of our times (Stern 2007). Those who pollute the environment (e.g. through carbon emissions, toxins, plastic) do so without having to pay for their actions, while impacts are spread across society – mostly affecting the poorest and most disadvantaged within and across countries. Environmental degradation, biodiversity loss and climate change are the result of an environmentally unsustainable and socially sub-optimal allocation of resources, and of a lack of internalisation of negative externalities. This discrepancy between environmental or social returns and private returns represents a market failure or imperfection that justifies efficiency-enhancing public intervention. While strong market correcting government policies such as carbon pricing would be the first-best option to address such externalities, these types of policies are often politically difficult and infeasible, and thus may compel CBFSs to step in, as a second-best option to address market failures and support the allocation of credit towards sustainable activities (Volz 2017, Dikau and Volz 2021a).

The externalities that cause an environmentally suboptimal allocation of capital by financial institutions provide a sufficient rationale for a more active, market-correcting role of CBFSs. Their oversight over money, credit and the financial system enables them to nudge (or in some cases push) financial institutions to redirect credit and investment toward green sectors of the economy. Especially when coupled with a mandate to support the government's economic policy, EMDE central banks are in a unique position to support the scaling up of green finance. Importantly, EMDE central banks tend to have a strong institutional standing, enabling them to influence policy outcomes where other public institutions, such as environmental ministries, may not be able to.

However, it is important to mention that such interventions into the allocation of credit stand in strong contrast to the notion of the 'market neutrality' of monetary policy (Colesanti Senni and Monnin 2020). Moreover, and perhaps more importantly, policymakers need to be aware that interventions, even if made with the best of intentions, can cause negative and distortive side-effects. Historically, credit allocation policies and various other instruments of 'financial repression' were widely used and led in many cases to substantial distortions of financial systems with often unwanted repercussions for savings and prices (Dikau and Volz 2019). Any intervention hence needs to be well designed and its efficacy needs to be carefully monitored, measured and verified.

3 HOW CAN CBFSS HELP THE SCALING UP OF SUSTAINABLE FINANCE AND INVESTMENT?

The instruments and policy frameworks of CBFSs can be calibrated in ways that, on the one hand, account for climate- and nature-related financial risks and, on the other hand, contribute to achieving climate and nature goals. Table 1 provides an overview of different types of policy instruments, grouped in three broad policy areas: monetary policy, prudential policy, and other policies. The full 'toolbox' of instruments is set out in Annex 1.

TABLE 1 A TOOLBOX OF SUSTAINABLE CRISIS RESPONSE MEASURES FOR CENTRAL BANKS AND SUPERVISORS

Monetary policy
(1) Collateral frameworks
(2) Indirect monetary policy instruments
(3) Non-standard instruments
(4) Direct monetary policy instruments
Prudential policy
(5) Microprudential instruments
(6) Macroprudential instruments
Other policies
(7) Further financing schemes and other initiatives
(8) Management of central bank portfolios
(9) Supporting sustainable finance

Source: Dikau et al. (2020).

As a general starting point, CBFSs can play an important role in building the critical financial architecture for sustainable finance (including standards, taxonomies and metrics, frameworks for disclosure and compliance) to help the identification, assessment and mitigation of relevant climate and environmental risks and impacts, and to enable the mobilisation of sustainable finance and investment. In addition to establishing an effective data and information infrastructure, CBFSs may also have a role to play in aiding the development of missing markets, for example, primary and secondary securities markets as well as money and exchange markets (Gray and Talbot 2007). This is particularly relevant in EMDEs where there are missing or incomplete financial

markets preventing the trading of different forms of credit, assets or risks. Furthermore, CBFSs can play a role in supporting the development of new green market segments, for example by ensuring that the regulatory environment is supportive of green, social and sustainability bond issuance and trading (Dikau and Volz 2019).

Operationally, CBFSs have various tools to influence investment decisions and the allocation of resources and credit. First, central banks' monetary policy tools can be utilised to encourage, incentivise or force the financial sector to scale up sustainable finance. Starting with the collateral framework, which defines the set of eligible collateral that financial institutions can use in operations with the central bank to obtain central bank credit, central banks can apply haircuts to account for climate and nature risks or entirely exclude asset classes that are not aligned with sustainability objectives (Oustry et al. 2020). Adjusting the collateral framework, which has been shown to be subject to a carbon bias in the EU context (Dafermos et al. 2021), has a powerful impact, as financial institutions have an incentive to hold assets that are eligible as collateral and receive only a small haircut. Furthermore, differential or preferential refinancing lines offer refinancing for commercial banks at preferential terms for specified asset classes, thereby compensating or overcompensating financial institutions for lending at lower-than-market interest rates to low-carbon or otherwise sustainable projects. Some central banks in EMDEs also rely on so-called 'window guidance' to induce financial institutions to extend credit and allocate lending in line with official (government) targets. While window guidance originated in Japan, the instrument has been used in China to promote green lending while discouraging investment in environmentally harmful activities (Dikau and Volz 2021b). Furthermore, central banks can use mandatory minimum/maximum credit quotas/floors – fixed lending requirements that are set by the central bank to require commercial banks to allocate a certain share of their loan portfolio to specified asset classes, sectors, industries, or geographical areas – to require banks to fund sustainable investments. In contrast to most policy instruments in use by central banks, the operating channel of credit quotas is not the creation of incentives for financial institutions to allocate their resources to preferred causes, but a mandatory and binding quota, which may potentially create severe market distortions. The administrative setting of commercial banks' lending rates with the aim of promoting green investment and curbing unsustainable lending is another heavy interventionist tool that is not aimed at creating incentives, but instead targets the setting of lower rates for preferred sectors (to increase funding) or higher rates for less preferred ones (to reduce funding).

Second, as mentioned above, while prudential frameworks should be primarily used to mitigate financial risks, prudential instruments can in principle also be used outside of a risk-based approach to penalise unsustainable or support sustainable investments. Microprudential policy instruments can be employed to address the identified relevant risks for individual financial institutions by, for example, requiring banks and other financial institutions to adopt environmental risk management standards, to assess and disclose climate- or nature-related risks, or to hold additional capital. Macroprudential

frameworks that are concerned with systemic risk implications can be used to, for example, require banks, especially systemically important financial institutions, to build up additional buffers against systemic risks (e.g. countercyclical and higher capital buffers), making it less attractive for them to finance high-risk activities.

Finally, under 'other policies', CBFSs are at times relying on corporate financing facilities or loan guarantees subject to a reduction of carbon emissions or sustainability enhancing activities. Furthermore, the management of central bank portfolios can play an important signalling role through the disclosure of climate-related financial risks in own portfolios or the adoption of sustainable and responsible investment principles for portfolio management. In addition, CBFSs can support the broader sustainability agenda through sustainable finance roadmaps, by providing advice to their government, and by engaging in capacity building programmes in sustainable finance for the financial sector.

4 EMERGING PRACTICE OF EMDE CENTRAL BANKS AND SUPERVISORS

CBFSs in EMDEs are already employing a wide range of tools to assess and mitigate environmental risks and to align financial flows with sustainability objectives. In fact, given the pressing environmental and climate-related challenges facing their countries, CBFSs in EMDEs were among the first seeking to address climate change and environmental degradation – long before CBFSs in advanced economies started to consider such factors (Dikau and Volz 2019). Table 2 provides selected examples of sustainability-related policies implemented by CBFSs in the Global South. Policy measures range from indirect and direct monetary policy instruments over micro- and macroprudential tools to other policies such as the development of sustainable finance classifications, standards and taxonomies.

While many EMDE CBFSs have been creative in introducing green/sustainable policy frameworks and instruments that many advanced economy CBFSs would consider unorthodox, they are in part just repurposing existing 'developmental' frameworks through an added sustainability component.

Although a plethora sustainable finance measures has been rolled out by CBFSs in EMDEs, there is so far little robust empirical evidence regarding the efficacy of these measures. This may not be surprising given that most measures were introduced only recently, although in some jurisdictions (including Bangladesh, Brazil, China and Lebanon) measures have been in place for many years. Going forward, CBFSs will have to more systematically assess the effectiveness, efficiency, and equity of adopted measures to ensure that clearly defined policy goals are met while unwanted distortions are avoided (Augoyard et al. 2022).

TABLE 2 EXAMPLES OF SUSTAINABILITY POLICIES IMPLEMENTED BY CBFSS IN THE GLOBAL SOUTH

	Monetary policy
(1) Collateral frameworks	In 2018, the People's Bank of China (PBoC) included green bonds in the pool of assets eligible as collateral for its Medium-Term Lending Facility and gave green bonds a 'first-among-equals' status.
(2) Indirect monetary policy instruments	In 2001, Banque du Liban introduced differentiated reserve requirements, favouring loans tied to energy saving plans. In 2009, Bangladesh Bank introduced a Refinancing Scheme for Renewable Energy and Green Financing which refinances green loans at a preferential rate, thereby incentivising commercial banks to extend loans for sustainable investment projects. In 2010, the Banque du Liban issued a circular to facilitate financing and investments in green sectors by exempting commercial banks from part of the required reserves, enabling the finance of these projects at lower costs. In 2011, the Brazilian Monetary Council issued rules on financing climate mitigation and adaptation projects and established credit (refinancing) lines for climate-friendly lending, backed by resources from the National Plan for Climate Change. In 2014, Banque du Liban established a Subsidised Loan Scheme (refinancing lines) to incentivise investments into green sectors of the economy. In 2016, the PBoC offered green refinancing, allowing commercial banks to use green loans or bonds as collateral for borrowing at discounted rates. In 2017, Banque du Liban issued a circular to decrease the total liabilities subjected legal to reserve requirements from foreign currency loans balance to finance investments and incentivise eco-friendly investment. In 2021, the PBoC launched a Carbon Emission Reduction Facility to offer low interest loans to financial institutions that help firms cut carbon emissions. In 2021, Bank Negara Malaysia committed to assessing how climate change would feed into monetary policy as part of its periodic review of the monetary policy framework. In 2021, Hungary's central bank published a green monetary policy toolkit outlining a strategy for introducing climate objectives into its monetary policy. In 2022, Bank Negara Malaysia introduced the RM1.0 billion Low Carbon Transition Facility to encourage and support SMEs in adopting sustainable practices for business resilience in line with the Government's target for Malaysia to be a net-zero emission economy by 2050.
(3) Non-standard instruments	No current initiatives

(4) Direct monetary policy instruments	Since 2006/2007, the China Banking Regulatory Commission and the PBoC included 'green' targets in their window guidance policy to discourage lending to carbon-intensive and polluting industries and/or to increase support to sustainable activities. In 2012, the Reserve Bank of Fiji introduced an Agriculture and Renewable Energy Loans Ratio, requiring commercial banks to allocate 4% of their deposits, and similar liabilities in loans, to the agriculture (including forestry and fisheries) sector, and 2% to the renewable energy sector. In 2015, the Reserve Bank of India (RBI) extended its Priority Sector Lending guidelines, under which it requires banks to allocate 40% of their lending according to government priorities, to include lending for social infrastructure and renewable energy projects (Reserve Bank of India, 2015). In August 2019, the RBI added a provision that allows banks to increase their exposure to non-banking financial companies by permitting on-lending for the priority sectors. In 2016, Bangladesh Bank mandated banks and financial institutions to set at least 5% annual targets (increased to 15% in 2021) for eco-friendly financing and sustainable financing respectively. In 2021, the Royal Monetary Authority of Bhutan introduced priority sector lending (PSL) guidelines towards the promotion of sustainable micro, small and medium enterprises (MSMEs).
	Prudential policy: Regulation and supervision
(5) Microprudential instruments	In 1998, Bank Indonesia required banks to conduct environmental impact assessments for large or high-risk loans. In 2011, the Banco Central do Brazil (BCB) published a circular on the Internal Capital Adequacy Assessment Process in Pillar 2 of Basel III, requiring banks to demonstrate how they evaluate the risk arising from exposure to social and environmental damage caused by their activities when assessing how much capital is needed to cover a range of operational and financial risks. In 2014, the BCB issued Guidelines on Social and Environmental Responsibility for Financial Institutions. In 2012, Bank Bangladesh issued Environmental Risk Management Guidelines for Banks and Financial Institutions. In 2017, Bangladesh Bank issued updated Environmental and Social Risk Management Guidelines for Banks and Financial Institutions. In 2014, the Brazilian Securities Commission required listed companies to include environmental information in their annual reports. In 2015, the State Securities Commission of Vietnam issued Guidelines for Information Disclosure on Securities Market, requiring listed companies to report on their impacts on the environment and society. In 2015, the State Bank of Vietnam issued a Directive on Promoting Green Credit Growth and Environmental and Social Risks Management in Credit Granting Activities, as well as Guidelines for Information Disclosure on Securities Market to require listed companies to report on their impacts on the environment and society. In 2015, Peru's Superintendency of Banking Insurance and Private Pension Fund Administrators issued Regulation on Socio-environmental Risk Management of Financial Firms in Peru.

In 2017, the State Bank of Pakistan issued Green Banking Guidelines providing guidance regarding Environmental and Social Risk in lending, financing green projects and reducing the banks' carbon footprint.

In 2017, the Indonesian Financial Services Authority (OJK) issued Regulation on the Application of Sustainable Finance, requiring financial services agencies, issuers, and public companies to prepare sustainable finance action plans and ensure that they have sufficient environmental and social management policies and processes in place.

In 2018, Nepal Rastra Bank issued Guideline on Environmental & Social Risk Management (ESRM) for Banks and Financial Institutions. In 2020, Nepal Rastra Bank issued a directive requiring all banks and financial institutions to integrate ESRM into their overall credit risk management process and formulate ESRM policies in compliance of 2018 Guideline.

In 2018, Paraguay's Central Bank issued a Guide for the Management of Environmental Social Risks for Entities Regulated and Supervised by the Central Bank of Paraguay, to be integrated within the credit risk analysis of financial institutions.

In 2018, the Central Bank of Iraq issued a Corporate Governance Guide, promoting best practices in governance and sustainability within the banking sector.

In 2019, the Bank of Ghana launched the Ghana Sustainable Banking Principles to provide guiding principles for effective environmental and social risk management for banks.

In 2019, the National Bank of Rwanda issued a Regulation on Publication of Financial Statements and Other Disclosures, requiring banks to prepare an annual integrated report that demonstrates the links between financial performance and the wider social, environmental and economic context.

In 2019, the Philippines Securities and Exchange Commission released Sustainability Reporting Guidelines for Publicly Listed Companies.

In 2019, the Magyar Nemzeti Bank (Hungary) introduced preferential capital requirement programme for credit institutions to support the growth of green financial products and to improve the energy efficiency of the Hungarian building stock.

In 2020, the National Bank of Georgia issued ESG Reporting and Disclosure Principles.

In 2020, the Bangko Sentral ng Pilipinas issued a Sustainable Financial Framework, expecting all banks to embed sustainability principles, including those covering environmental and social risk areas, in their corporate governance framework, risk management systems, and strategic objectives consistent with their size, risk profile and complexity of operations. The framework outlines specific duties and responsibilities of the board of directors and of senior management.

In 2020, the National Banking and Insurance Commission of Honduras issued a Standard for the Management of Environmental and Social Risk applicable to the Institutions of the Financial System.

In 2021, the Bank of Thailand included ESG risks as part of the revised Guideline on Application of the Supervisory Review Process under Pillar 2 of the Basel capital framework, coming into effect in 2022.

	In 2021, the Securities and Exchange Board of India issued a circular implementing new sustainability-related reporting requirements for the top 1,000 listed companies by market capitalisation, replacing the existing Business Responsibility Report. In 2021, the Brazilian Securities Commission introduced ESG information disclosure criteria, requiring listed companies to disclose ESG information or provide an explanation why they did not disclose them. In 2021, Bank Al-Maghrib published a directive for credit institutions to improve their management of climate-related and environmental risks. In 2021, Banco Central do Brasil launched a public consultation on the improvement of rules on risk management and social, environmental and climate responsibility applicable to financial sector. In 2021, the Central Bank of Kenya published Guidance on Climate-related Risk Management under the Banking Act.
(6) Macroprudential instruments	In 2015, the PBoC introduced a green component of its Macro Prudential Assessment (MPA) system, which includes indicators for capital and leverage, asset and debt, liquidity, pricing, asset quality, risk of cross-border financing and the implementation of credit policy. Is also ranks banks on their performance and attributes higher MPA scores to banks that have a higher proportion of green loans and that have issued green bonds. In 2021, Banco de la República (Colombia) conducted a macroeconomic and sectoral climate risk stress test. In 2021, the Superintendencia Financiera de Colombia conducted a sectoral climate risk stress test. In 2021, Banco de México conducted a counterparty, macroeconomic and sectoral climate risk stress test. In 2021, the South African Reserve Bank conducted a sectoral climate risk stress test (future exercises planned for 2022-2023). In 2022, Bank Al-Maghrib (Morocco) started working on a macroeconomic and sectoral climate risk stress test. In 2022, Banco Central de Chile is conducting a macroeconomic and sectoral climate risk stress test. In 2022, Bangko Sentral ng Pilipinas (Philippines) is conducting a climate risk stress test. In 2022, the People's Bank of China is expected to complete a counterparty and sectoral climate risk stress test.
	Other policies
(7) Further financing schemes and other initiatives	In 2009, the Brazilian Monetary Council issued a resolution requiring all Brazilian pension funds to state in their investment policy whether they consider environmental and social (E&S) issues in their investment decisions. In 2016, Bangladesh Bank introduced the Green Transformation Fund (GTF) to provide finance for environment-friendly infrastructures in export-oriented industries. The GTF expanded its scope in 2019 from just three sectors (textiles, leather, jute) to include all manufacturing and export-oriented entities, irrespective of sector.

	In 2018, the Brazilian Monetary Council issued a resolution with Investment Rules of Occupational Pension Funds, requiring pension funds' asset managers to consider environmental, social, and governance (ESG) risks as part of their investment decision making process. In 2018, Argentina's Superintendencia de Seguros de La Nación implemented a Green Insurance Project, which allocates 1% of the premiums of automotive policies to support afforestation efforts.
(8) Management of central bank portfolios	In 2021, Bank Negara Malaysia committed to further strengthening internal frameworks for integrating sustainability factors in its investment operations and reserves management.
(9) Supporting sustainable finance	In 2012, the Central Bank of Nigeria together with the Nigerian Banking Association approved the adoption of the Nigerian Sustainable Banking Principles. In 2012, the China Banking Regulatory Commission (CBRC) issued Green Credit Guidelines, introducing a first definition of green loans that included 12 sectors and activities. In 2013, the CBRC introduced the Green Credit Statistics System for banking institutions when categorising their green credit portfolio. In 2014, the CBRC issued a Notice on Green Credit Key Performance Indicators, requiring all banking institutions to conduct a self-assessment of their implementation of the Green Credit Guidelines. In 2014, the Mongolian Central Bank together with the Mongolian Banker's Association issue Mongolia's Sustainable Finance Principles and related Sector Guidelines as a voluntary framework to help local banks integrate environmental and social considerations into their lending decisions and product design. In 2015, the People's Bank of China established a green bond standard through the Green Bond Endorsed Project Catalogue in 2015. In 2016, the PBoC, Ministry of Finance, National Development and Reform Commission, Ministry of Environmental Protection, China Banking Regulatory Commission (CBRC), China Securities Regulatory Commission, and China Insurance Regulatory Commission issued Guidelines for Establishing the Green Financial System, which aim to mobilise and incentivise more capital to invest in green sectors, while restricting investment in polluting sectors. In 2017, the Indonesian Financial Services Authority (OJK) issued a Regulation on the Issuance and the Terms of Green Bond to set standards for green bonds. In 2017, the China Securities Regulatory Commission issued Green Bond Assessment Guidelines, setting out official requirements for what projects qualify as green, the management of proceeds, and reporting.

In 2018, Egypt's Financial Regulatory Authority approved the legal framework for issuing green bonds, with the aim of providing financial tools to fund eco-friendly projects in the fields of new and renewable energy, construction, and transport. In 2021, it approved a draft amendment in the Capital Market Law in regard to regulating bonds, securitisation bonds and sukuk.
In 2018, the Moroccan Capital Market Authority issued Green, Social and Sustainability Bond Guidelines.
In 2018, the China Insurance Regulatory Commission, together with the Chinese Ministry of Environmental Protection, passed the Compulsory Environmental Pollution Liability Insurance Regulation.
In 2019, the National Bank of Georgia launched the Roadmap for Sustainable Finance, aiming to provide a credible, predictable and stable regulatory framework and prepare the market for transitioning to sustainable finance.
In 2020, the Superintendencia Financiera de Colombia published a Good Practice Guide for Issuing Green Bonds on how to comply with the highest standards of transparency.
In 2020, the Central Bank of Mongolia announced its national Green Loan Statistics, calculating the amount and ratio of green loans in the portfolio based on the Mongolia Green Taxonomy.
In 2020, the Central Bank of Sri Lanka published a Roadmap for Sustainable Finance in Sri Lanka.
In 2021, Bank Negara Malaysia published a Climate Change and Principle-based Taxonomy guidance document with specific focus on how business operations affect pollution, biodiversity and resource efficiency.
In 2021, the Superintendencia Financiera de Colombia published the first phase of the construction of the Colombia Green Taxonomy, which seeks to facilitate the identification of projects with environmental objectives, develop green capital markets, and promote the effective mobilisation of private and public resources towards sustainable investments.
In 2022, Qatar Central Bank announced plans to implement strategic actions on green finance as part of the Second Strategic Plan for Financial Sector Regulation 2017-2022.
In 2022, the Capital Markets Board of Turkey released Guidelines on Green Debt Instruments and Green Lease Certificates.

Source: Compiled by authors, building on Dikau and Volz (2019, 2021), Dikau (2022) and information from CBFSs' reports and websites.

5 CONCLUSION

A growing number of CBFSs in the Global South have become active not only in acknowledging and addressing climate- and nature-related financial risk, but also in scaling up sustainable finance, utilising a plethora of policy instruments. Against the background of a strong rationale to mitigate long-term risks, correct market failures and reduce vulnerabilities, EMDE CBFSs are resorting to conventional as well as unconventional policy instruments to green their economies and financial flows. While various instruments employed by EMDE CBFSs would be considered by many CBFSs in advanced economies to be outside of their scope and remit, there is an increasing openness to learn lessons from some of the unconventional approaches tested in EMDEs.

The more active engagement by many EMDE CBFSs in scaling up sustainable finance to enhance mitigation and adaptation efforts is reflective of a growing awareness in the Global South of the need for urgent policy adjustments in the face of significant vulnerabilities and the necessity to mitigate the worst impacts. CBFSs in EMDEs have typically played a significantly broader, at time 'developmental' or even 'quasi-fiscal', role in supporting their governments' economic policies and development priorities. This is in many ways now reflected in quite pragmatic, hands-on approaches regarding sustainable finance and investment. Many EMDE CBFSs are in a strong position to implement far-reaching policies to scale up sustainable financial flows in their economies, illustrating how existing mandates and policy instruments often provide ample room to address and mitigate environmental implications and scale up sustainable investment.

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ANNEX 1: POLICY TOOLS AVAILABLE TO CENTRAL BANKS AND FINANCIAL SUPERVISORS

	Conventional (sustainability-blind) calibration	Sustainability-enhanced calibration
Monetary policy		
(1) Collateral frameworks	Collateral credit quality is assessed based on conventional methods, perpetuating exposure to and market mispricing of climate risks and carbon bias and maintaining financing conditions for industries not aligned with the Paris Agreement.	Collateral frameworks become carbon-neutral, take climate- and other sustainability-related financial risks into account and apply haircuts to account for these risks. Collateral frameworks exclude asset classes that are not aligned with sustainability goals such as the Paris Agreement.
(2) Indirect monetary policy instruments	Standard instruments such as open market operations, standing facilities, reserve requirements and refinancing operations are calibrated without sustainability considerations, leading to a potential carbon bias.	Align refinancing operations with sustainability goals such as the Paris Agreement. Differentiated reserve requirements, risk weights, accounting for carbon footprint, climate-related financial risk (particularly transition risks), or other sustainability factors. Interest rates based on sustainability criteria.
(3) Non-standard instruments	Asset purchase programmes (APPs) ignore climate- and other sustainability-related financial risks, perpetuating financial markets' exposure to climate risks and carbon bias. Direct (short-term) credit to the government to support standard fiscal spending. Helicopter money without conditionality.	APPs exclude carbon-intensive assets. Direct (short-term) credit to the government to support sustainable/ Paris-aligned fiscal policies. Purchase of green sovereign bonds Helicopter money conditioned on sustainable/Paris-aligned spending.

(4) Direct monetary policy instruments	Direct controls on interest rates (e.g. minimum and maximum interest rates, preferential rates for certain loan categories). Credit ceilings (at aggregate level or on individual banks). Directed lending policies (e.g. preferential central bank refinance facilities to direct credit to priority sectors). Window guidance/moral suasion to promote priority sectors.	Credit interest rate ceilings for sustainable priority sectors, asset classes, and firms. Minimum/maximum allocation of credit through credit ceilings or quotas to restrict/promote lending to carbon-intensive/ sustainable sectors. Targeted refinancing lines to promote credit for sustainable sectors. Window guidance/moral suasion to promote lending to sustainable sectors.
Prudential policy: Regulation and supervision		
(5) Microprudential instruments	Conventional stress testing / excessive delay of climate-stress testing. No disclosure requirements for climate-related financial risks. Standard supervisory review process (SRP). Conventional calibration of other Basel III instruments.	Stress testing frameworks that acknowledge climate and other sustainability risks and help firms take into account longer-term risks. Mandatory disclosure requirements for climate-related financial risks or other sustainability risks. Supervisory review process (SRP) that highlights management of climate-related financial risks or other sustainability risks. Climate risk-sensitive calibration of other Basel III instruments, distinguishing between low-carbon and carbon-intensive/high-exposure assets to create buffers against climate-related losses (e.g. differential risk-based capital requirements, lower required stable funding factor for green loans).

(6) Macroprudential instruments	Conventional system-wide stress testing. Calibration of instruments along the cyclical dimension without explicit acknowledgement of climate-related financial risks. Calibration of instruments along the cross-sectional dimension without explicit acknowledgement of climate-related financial risks.	System-wide stress testing that acknowledges and assesses systemic climate-related financial risks. Cyclical instruments calibrated to account for and mitigate systemic risk implications of climate change and restrain the build-up of risk-taking during the recovery/expansion phase (e.g. countercyclical and higher capital buffer in order to protect the financial sector from periods of excessive carbon-intensive credit growth, LVRs and loan-to-income ratios to limit the extension of credit by banks to carbon-intensive industries and investment in non-sustainable asset classes). Cross-sectional instruments calibrated to account for and mitigate systemic risk implications of climate change and to mitigate individual institutions' contribution to systemic risk (e.g. large exposure restrictions to limit financial institutions' exposure to highly carbon-intensive assets, capital surcharges for systemically important financial institutions and institutions with high exposure to carbon-intensive assets).
Other policies		
(7) Further financing schemes and other initiatives	Corporate financing facilities or loan guarantees without climate or sustainability conditionality. Financial sector bailouts without climate or sustainability conditionality.	Corporate financing facilities or loan guarantees subject to reduction of CO2 emissions or sustainability enhancing activities. Incorporation of sustainability considerations into bailout packages in case of partial or full nationalisation of financial institutions. Funding sustainable lending/investment schemes by public banks and development finance institutions (e.g. for renewable energy or retrofitting of buildings) through refinancing credit lines or purchase of bonds under APPs in secondary market or direct refinancing operations. Tailoring of supervisory frameworks for development banks to enhance their public policy capacity to bear risk, promote economic transformation.

(8) Management of central bank portfolios	Management of central bank portfolios without consideration of climate change and other sustainability risks.	Disclosure of climate-related financial risks in own portfolios (e.g. following the TCFD recommendations). Adopting sustainable and responsible investment principles for portfolio management.
(9) Supporting sustainable finance	No new sustainable finance initiatives launched, ongoing efforts are postponed or halted.	Sustainable finance roadmaps/ guidance for financial institutions. Advice and dialogue with other parts of the government. Research and publication of handbooks and resources (e.g. reference scenarios, risk assessment methodologies). Capacity building programmes in sustainable finance for the financial sector, convening role of central banks.

Source: Dikau et al. (2020).