INSPIRE

THE INSPIRE
SUSTAINABLE CENTRAL BANKING TOOLBOX
Policy Briefing Paper 10

Supporting the just transition: a roadmap for central banks and financial supervisors

December 2022

Pierre Monnin (Council on Economic Policies)

Nick Robins (LSE)

Summary

Shifting to a sustainable economy will reshape the outlook for countries and sectors across the world. Managed well, the net zero transition could lead to more and better jobs as well as reduced risks from climate shocks. Managed poorly, however, it could result not only in stranded assets but also stranded workers and communities – and even stranded countries. In response, government policymakers have stressed the necessity for a 'just transition' that leaves no one behind in this process of change.

This objective requires action across all policy fields, including financial and monetary policies. A growing number of commercial banks and institutional investors are starting to incorporate just transition considerations into their climate strategies. Until recently, central banks and financial supervisors have focused their attention on the first order climate risks that confront financial systems and institutions. They have tended not to set out how they can respond to the social risks of decarbonisation and what they could do to support a just transition. However, there are emerging signs that central banks are starting to recognise the just transition agenda.

This paper sets out why it is important for central banks and supervisors to take an active role in supporting the just transition. It suggests a roadmap containing three steps – assessing, advising, and acting – for them to achieve this goal and explores some concrete policy options for aligning monetary policy operations and financial regulation with the imperative of a just transition.

This paper is part of a toolbox designed to support central bankers and financial supervisors in calibrating monetary, prudential and other instruments in accordance with sustainability goals, as they address the ramifications of climate change and other environmental challenges. The papers have been written and peer-reviewed by leading experts from academia, think tanks and central banks and are based on cutting-edge research, drawing from best practice in central banking and supervision.

Centre for Sustainable Finance
SOAS University of London

LSE

Grantham Research Institute on Climate Change and the Environment

1. Introduction

Moving the economy to a sustainable model will have profound impacts, both positive and negative, on sectors and regions the world over. In particular, the transition to a net zero economy will cause some activities with a large carbon footprint to disappear, together with the incomes and livelihoods they provide. But in their place, other activities and sectors will emerge and flourish, presenting new opportunities for wealth creation and employment. These shifts will affect some regions and some families more than others. To make this process of economic transformation both orderly and inclusive, public and private institutions need to design and deliver a just transition. (Box 1 below explains what is meant by a 'just transition'.)

Over the past decade, these challenges have come to the fore most prominently in response to climate change. The just transition is embedded in the 2015 Paris Agreement which commits governments to deliver climate action in ways that incorporate "the imperatives of a just transition of the workforce and the creation of decent work and quality jobs in accordance with nationally defined development priorities." In the same year, the International Labour Organization (ILO) issued a set of Just Transition Guidelines stressing the importance of ensuring that the move to sustainable economies results in "decent work,

"The just transition is a strategy to ensure that the greening of economies generates positive social impacts for workers and communities."

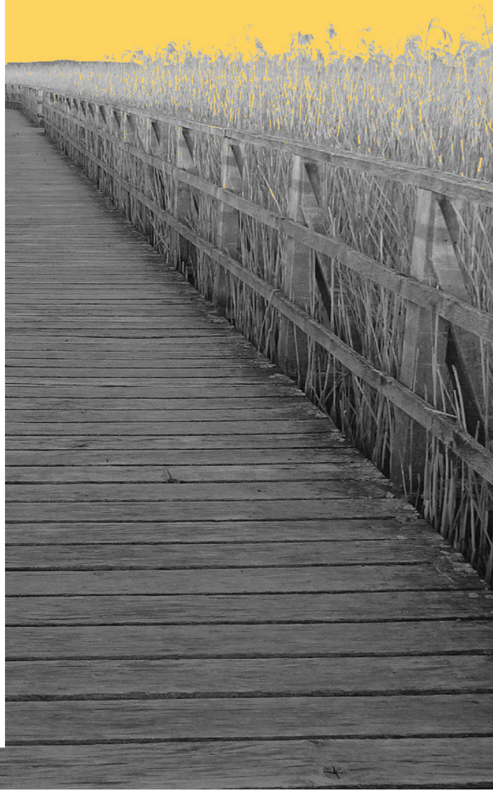
Box 1: What is the just transition?

Originating in the trade union movement, the just transition is a strategy to ensure that the greening of economies generates positive social impacts for workers and communities, and that no one is left behind in these processes. Alongside its incorporation in the Paris Agreement in 2015, a comprehensive set of just transition guidelines were agreed at the International Labour Organization (ILO) by governments, businesses and trade unions, covering key policy areas (such as macroeconomic policy, skills and regional policies) and critical mechanisms (such as social dialogue between workers and company management) (ILO, 2015).

Examples of just transition definitions

"A just transition towards an environmentally sustainable economy needs to be well managed and contribute to the goals of decent work for all, social inclusion and the eradication of poverty." (ILO, 2015).

"The imperative of a just transition is that governments design policies in a way that ensures the benefits of climate change action are shared widely, while the costs do not unfairly burden those least able to pay, or whose livelihoods are directly or indirectly at risk as the economy shifts and changes." (Scottish Government, 2021).



social inclusion and the eradication of poverty" (ILO, 2015). A growing number of governments and businesses are now translating these high-level goals into real-world efforts. In Scotland, for example, the Government has appointed a Just Transition Minister, established a Just Transition Commission, and developed its approach, focusing on a strategy that "ensures the benefits of climate change action are shared widely while the costs do not unfairly burden those least able to pay, or whose livelihoods are directly or indirectly at risk as the economy shifts and changes" (Scottish Government, 2021).

Governments, businesses and financial institutions, as well as trade unions and civil society, recognise that the just transition is not only the right thing to do, but it is necessary to win public support for climate action. The just transition is also the smart thing to do as it focuses on building the 'human capital' and 'social capital' required for a successful sustainable economy. Managed well, the net zero transition can deliver a range of socioeconomic benefits, as well as mitigate the damage caused by climate change. Forecasts invariably conclude that the net zero economy will bring higher levels of employment and wider social benefits. For example, the International Energy Agency's *Net Zero by 2050* roadmap estimates that the transition could create 30 million jobs across the energy sector (against around five million job losses) and provide clean energy to 785 million people currently without electricity and 2.6 billion people without clean cooking solutions (IEA, 2021). Managed poorly, however, the transition could result not only in stranded assets in the financial system but also stranded workers and communities – and even stranded countries, particularly those that are currently dependent on fossil fuels for growth, trade and employment.

> "At the COP27 climate summit, governments agreed to establish a new work programme on the just transition to mitigate the potential adverse impacts of climate action."

Since 2015, the just transition has risen to the top of the global climate policy and sustainable finance agendas. At the 2022 COP27 climate summit, governments agreed to establish a new work programme on the just transition to mitigate the potential adverse impacts of climate action, stressing that "sustainable and just transitions to the climate crisis must be founded on meaningful and effective social dialogue and participation" (UNFCCC, 2022).

Finance is a key lever for making the just transition a reality. The Glasgow Climate Pact agreed by world governments at COP26 in 2021 included a recognition of "the need to ensure just transitions that promote sustainable development and eradication of poverty, and the creation of decent work and quality jobs, including through making financial flows consistent with a pathway toward low greenhouse gas emission and climate-resilient development" (ibid.). In parallel, leading multilateral development banks (MDBs), as well as commercial banks and institutional investors, have stepped up their actions on the just transition (Curran et al., 2021).

As a cross-cutting imperative, the just transition requires coordinated action across all fields of financial policy and practice. This includes the monetary policies and financial regulations implemented by central banks and financial supervisors. Some central banks and financial supervisors are starting to recognise the importance of the just transition for their activities. In its 2022 report, the G20's Sustainable Finance Working Group (SFWG), which brings together representatives of finance ministries and central banks, stressed the importance of an "orderly, just and affordable transition" (G20 SFWG, 2022). At COP27, Ravi Menon, Managing Director of the Monetary Authority of Singapore and Chair of the Network for Greening for the Financial System (NGFS), identified that "effective partnerships across the public, private, and people sectors will be key to mobilise the financing necessary for an effective and just transition" (Menon, 2022).

This paper suggests available policy options for central banks and financial supervisors to turn the recognition of the need for a just transition into relevant actions consistent with their mandates. Our recommended roadmap for central banks and financial supervisors is organised around three steps that should be taken in parallel:

1. **Assess:** Central banks and financial supervisors must understand the social implications of the shift to net zero, particularly where these might prevent an orderly transition. This includes identifying the economic activities, regions and households most affected by the transition, assessing the magnitude of the just transition's economic and social impacts on them, and highlighting measures that support an effective and equitable response. They must also understand and assess the repercussions of these social implications, as well as those of an unjust transition, on their ability to carry out their mandates.
2. **Advise:** Central banks and financial supervisors can play a key role in the coordination of financial system responses required by the just transition. They can use their convening power to bring stakeholders together to develop coherent just transition plans, at both the national and international levels. They can also share their expertise and knowledge of economic systems with other policymakers to help them assess and recommend different policy options. At an international level, central banks and supervisors are ideally placed to advise, support, and feed into collective initiatives.
3. **Act:** Central banks and financial supervisors have several options available to them when it comes to supporting a just transition. Some of these options for monetary policy operations and financial regulation are explored in this paper and illustrated with examples of policies already implemented in some jurisdictions. Where appropriate, policies should be implemented sooner rather than later to anticipate and avert shocks and risks.

"The just transition is increasingly seen as a key enabling factor for the delivery of climate goals: notably net zero and, increasingly, resilience to physical shocks."

2. Just transition: a critical enabling factor for climate change

2.1. Themes underpinning the delivery of the just transition

The just transition is increasingly seen as a key enabling factor for the delivery of climate goals: notably net zero and, increasingly, resilience to physical shocks. Three common themes underpin emerging practice:

- **Integrating the social and environmental dimensions of the transition:** The just transition is a way of connecting the environmental and social dimensions of the Sustainable Development Goals (SDGs), for example: SDG 13 on climate with SDG 1 on poverty eradication; and SDG 8 on decent work with SDG 10 on reduced inequalities. The just transition focuses on making sure that the 'Social' pillar of Environmental, Social, and Governance (ESG) is incorporated into the climate activities of businesses and financial institutions. This means applying well-established social, labour and human rights standards to the net zero transition and respecting these standards. These include the UN *Guiding Principles on Business and Human Rights*, the ILO labour standards, and the OECD *Guidelines for Multinational Enterprises*. Net zero needs to be science-based, and the just transition needs to be rights-based.
- **Addressing the social risks and opportunities of net zero:** The just transition means anticipating, analysing and addressing the potential negative social risks as well as the positive opportunities of decarbonisation for workers, suppliers, communities and consumers. This focus on distributive and restorative justice places particular emphasis on the needs of vulnerable and marginalised groups so that they do not bear the burden of change. The just transition can have both

a reactive lens, focused on foreseeing and managing the consequences of climate action to minimise social risks, and a more proactive, transformational lens, identifying how net zero can be shaped to address long-standing priorities such as eradicating poverty and reducing inequality.

- **Ensuring participation and dialogue in design and delivery:** The just transition is both an outcome and a process, whereby those affected by the change are included in decision-making that affects them. Such a focus on procedural justice means making sure that workers have meaningful social dialogue and wider engagement with other affected stakeholders. This can often require proactive efforts to empower excluded groups that have traditionally been under-represented in decision-making, due to income, gender or race, for example. A place-based approach to participation is often needed as the impacts of the transition can be highly specific to local contexts. Participation can provide the basis for the partnerships that will be critical to delivering the just transition to net zero at the local, sectoral, national and global levels.

2.2. What progress has been made on implementing a just transition?

Government policies as well as business and financial institution strategies to deliver a just transition are starting to be developed and implemented.

Government policy

Overall, nearly 50 governments (around a quarter of the total Parties to the UN Framework Convention on Climate Change) have explicitly referred to the just transition in their Nationally Determined Contributions (NDCs), or climate strategies for 2030. Progress on implementing a just transition has been greatest in post-industrial economies. In Europe, the just transition is central to the European Union's Green Deal programme which has a dedicated Just Transition Mechanism and Just Transition Fund focusing on the regions, industries and workers who will face the greatest challenges. In the United States, President Biden has made jobs the centrepiece of US climate policy, stressing the importance of "good-paying union jobs", an "equitable clean energy future" and delivering "environmental justice". Individual states such as Colorado are also introducing just transition plans.

The just transition is also rising in importance in some leading developing economies. South Africa, for example, is far advanced in developing a just transition framework. At COP26, South Africa agreed to the world's first Just Energy Transition Partnership (JET-P) and returned in 2022 with a detailed Just Transition Investment Plan worth $98bn over five years, of which an initial $8.5bn will be provided by international partners (Presidency of South Africa, 2022). At the 2022 G20 Summit, the Government of Indonesia also released its own JET-P framework, which will mobilise $20bn of external finance split 50:50 between public and private (Indonesia Joint Statement, 2022).

Business and financial institution strategy

When it comes to financing the just transition, both public and private institutions have recently stepped up action. For example, on the public side, a coalition of leading multilateral development banks (MDBs) including the African Development Bank (AfDB), the Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), the Inter-American Development Bank (IDB) and the World Bank adopted a shared set of just transition principles (AfDB et al., 2021). These principles include: delivering climate objectives while enabling positive socioeconomic outcomes; supporting a just transition away from greenhouse gas-intensive activities; taking a long-term approach to support a structural economic transformation; mitigating negative socioeconomic impacts and supporting affected workers and communities; and encouraging transparent and inclusive planning.

"Nearly 50 governments have explicitly referred to the just transition in their climate strategies for 2030."

On the private side, the just transition is being integrated into routine investor practice and assessment and shareholder engagement exercises such as the Climate Action 100+ initiative (CA100+, 2022). More broadly 550-plus commercial banks, insurers and investors are part of the Glasgow Finance Alliance for Net-Zero (GFANZ) and have committed to producing credible plans for achieving net zero portfolios by 2050. As part of its guidance for the development of these plans, GFANZ has underscored the importance of the just transition (GFANZ, 2022). The London School of Economics has also produced a detailed set of recommendations based on experience for how banks and investors can embed just transition principles throughout their net zero plans (Curran et al., 2022).

3. Financial authorities and just transition: exploring the links

To date, work to address climate change has focused on the first order financial risks it poses for micro- and macro-prudential supervision, and monetary policy and operations (see, for example, NGFS, 2020a; NGFS 2020b; NGFS, 2021a; and other papers in this INSPIRE Sustainable Central Banking series).

In summary, central banks and supervisors have taken action on climate change for three key reasons:

- **Strengthening financial stability**: Climate change and environmental threats pose serious financial risks. These risks not only threaten the soundness of individual financial institutions, but they also represent a systemic risk for the financial sector. In terms of financial stability, central banks and supervisors have clearly shown that an early and smooth transition is the safest scenario for the financial system. Supporting policies that drive the low-carbon transition thus falls squarely within their financial stability mandate.
- **Supporting price and economic stability**: The environmental crisis has profound economic consequences that challenge economic stability and growth. Central banks agree that an early and smooth transition is the best way to provide price and economic stability. Supporting low-carbon transition policies is therefore in line with their price stability mandate and the economic stability (or sustained growth) mandate that most of them have.
- **Contributing to sustainability goals**: Some central banks have the mandate to support broader governmental policies in general, including those with environmental goals (Dikau and Volz, 2021). In this context, where the environmental transition is part of a country's policy agenda, central banks and supervisors should support public policies that move towards sustainability goals to the extent that it does not jeopardise other monetary and financial policy objectives.

"Central banks and supervisors have a legitimate interest in closely monitoring and possibly containing the social consequences of climate change."

So far, addressing the social dimensions of climate change has not been a part of these motivations. In developing countries, however, central banks have started to make links between climate action and the critical agenda of financial inclusion (Volz et al., 2020).[1] Furthermore, there are other reasons which are set to make the just transition increasingly relevant for central banks, not least because of its linkages to wider questions around inequality and employment.

3.1. Inequality matters for central banks

Central banks and supervisors have a legitimate interest in closely monitoring and possibly containing the social consequences of climate change. The income and regional inequalities generated by climate change, as well as potential side effects of the transition to a sustainable economy, are of key strategic relevance. In general, central banks and supervisors have tended to show limited concerns about inequality

[1] The linkages between the just transition and financial inclusion will be addressed in a forthcoming INSPIRE Sustainable Central Banking policy briefing paper.

to downplay their impact on it, and to question the ability and the desirability to use monetary policy to address it (Fontan et al., 2016). Central banks do emphasise the role that they play in supporting employment – which is sometimes part of their mandate – and argue that reducing unemployment is their best contribution to mitigating inequalities. However, it is increasingly clear that central banks should be particularly concerned about growing economic inequalities for four reasons:

- **Inequalities challenge the effectiveness of their monetary policy**: The distribution of income and wealth is central to the transmission of monetary policy (Auclert, 2019). High inequality jeopardises the effectiveness of a monetary policy stimulus (Pereira da Silva et al., 2022), especially when the implementation does not reach all parts of a given region or all segments of the population. Knowing the income and wealth structures of the economy and using adequate monetary policy tools for them can greatly improve policy decisions (Voinea and Monnin, 2017).
- **Inequalities challenge financial stability:** Inequality can lead to financial crises when it combines two elements: (i) an increasing demand for debt by poor households in response to stagnating income; and (ii) a higher supply of savings by wealthy households resulting from rising income. This situation can generate bubbles in debt markets, which eventually burst to trigger financial instability.[2] Inequality across regions can also generate local instability when the transition affects local financial institutions in some regions more than in others.
- **Inequalities challenge their mandate**: Several possible mandates usually attributed to central banks are challenged by rising inequality. First, inequality hampers economic growth (Cingano, 2014; Berg and Ostry, 2017), which is a key mandate for many central banks. Second, higher inequality increases the severity and length of recessions, which goes against central banks' objectives of economic stability (Pereira da Silva et al., 2022). Third, employment and wage conditions are key to the evolution of inequality (Kaplan et al., 2018), and supporting employment is an explicit mandate for some central banks and an implicit one for many others. Finally, many central banks are also accountable for financial inclusion and must thus ensure that all parts of the population have access to basic financial products.
- **Inequalities challenge their independence**: Independence is essential for central banks to succeed in delivering their primary objectives, so ensuring continued public support for their independence is key. By emphasising to the public their commitment to societal preferences, including moderate levels of inequality, central banks can reinforce society's support for their independence (Honohan, 2019).

When bringing together the twin priorities of the net zero transition and addressing inequalities, the case for central banks and supervisors to support a just transition is a compelling one. From a climate risk perspective, the absence of a just transition could result in vital decarbonisation efforts being delayed or even halted by a lack of popular support. This would result in the crystallisation of climate risks across the financial system and in the economy (Robins et al., 2021; Green and Healy, 2022). As the Intergovernmental Panel on Climate Change (IPCC) concluded in its *Sixth Assessment Report*, "climate finance in support of a Just Transition is likely to be key to a successful low-carbon transition globally" (IPCC, 2022). From a social risk perspective, supporting the just transition is also critical to make sure that addressing one systemic risk (climate change) does not exacerbate another (inequality). Ideally, central bank and supervisor policies on climate change and inequality should be designed and implemented in a joined-up way so that they are mutually supporting.

"From a climate risk perspective, the absence of a just transition could result in vital decarbonisation efforts being delayed or even halted by a lack of popular support."

[2] See Monnin (2018) and references herein.

3.2. Employment is central to both just transition and monetary policy

A just transition requires, among other things, the creation of quality jobs in environmentally sustainable economic activities to replace the positions lost in stranded sectors. Employment creation is also at the heart of central bank policies. For some central banks, like the US Federal Reserve, full employment is explicitly part of the mandate. For others, this dimension is implicitly taken into account in monetary policy decisions. Whether part of a central bank's mandate or not, employment plays a key role in the conduct of monetary policy: central banks control price and output stability largely through their impact on the labour market and employment, since aggregate demand is predominantly driven by income and wealth effects resulting from changes in wages and unemployment.

The impact of monetary policy on employment and job creation is also central to inequality. Although monetary policy affects income and wealth distribution through many different channels – some equalising, others not (Koedijk et al., 2018; Colciago et al., 2019) – its most equalising impact is when it effectively stimulates labour markets (Pereira da Silva et al., 2022). Wage increases and reductions in unemployment essentially benefit low-income households, which rely on constant earnings for their livelihoods. It is important to note that monetary policy transmission is also most effective when it reaches these same households. Indeed, low-income households typically have a higher marginal propensity to consume and hence are more reactive to income effects induced by monetary policy.

The aggregate effect of monetary policy on inequality thus largely depends on central banks' ability to stimulate labour markets, but it also varies with society's income and wealth structure, as well as with the instruments used to implement it. Conventional monetary policy – e.g. a short-term interest rate policy, tends to reduce inequality in recessions (Furceri et al., 2018). Empirical evidence is less conclusive for unconventional monetary policy – e.g. large-scale asset purchases, for which disequalising financial effects can possibly exceed the equalising impact of labour market stimulation (Monnin, 2019).

> "A just transition requires the creation of quality jobs in environmentally sustainable economic activities."

Since the instruments used by central banks to implement monetary policy have different impacts on inequality, their choice matters to achieve a just transition. In the case of the environmental transition, adequate monetary policy instruments should be able to mitigate the negative impact of the transition for affected households and regions. One way to achieve that is to stimulate labour markets in these regions and in the sectors in which these households are active. However, traditional monetary policy instruments work rather at the aggregate level and might be too blunt to specifically target these markets. This might warrant implementing new or targeted monetary policy instruments to effectively reach them (see Section 4.3).

3.3. Macroprudential policy: a key climate risk tool, but with social side effects

Climate change and the net zero transition have clear systemic dimensions. Their impacts affect all actors in the economy, across all sectors and geographical regions, and the financial risks associated with them can potentially destabilise the financial system. International supervisory bodies such as the Financial Stability Board (FSB), the Bank for International Settlements (BIS), the International Monetary Fund (IMF), and the Central Banks and Supervisors Network for Greening the Financial System (NGFS) have all recognised that climate risks are a potential systemic risk for the financial system.

The current macroprudential framework can be adapted to address systemic risks from climate change (Hiebert and Monnin, 2022). However, the macroprudential tools suggested for that, such as systemic risk buffers (Monnin, 2021) or large exposure limits (Miller and Dikau, 2022), also have social side effects. A study by Frost and van Stralen (2018) on the link between several types of macroprudential measures and income inequality (across 69 countries over the period 2000 to 2013) found that countries with countercyclical capital buffers, concentration limits or limits on credit growth tend to experience higher income inequality. By contrast, countries with specific requirements for systemically important financial institutions have lower levels of income inequality. In addition, Carpantier et al. (2018) showed that the impact of macroprudential measures like caps on loan-to-value (LTV) ratios on inequality is not straightforward and can be positive or negative.

4. Policy options: assessing, advising, acting

As set out in the previous section, central banks and supervisors have several reasons to support a just transition that mitigates the unequal social consequences of climate change and the transition to a sustainable economy. We propose and describe below a roadmap to enable this support composed of three priorities: assess, advise and act – which should be implemented as an integrated package.

4.1. Assess

The just transition connects with central banks' core roles in understanding the economic and social implications of economic transitions, notably in terms of employment, incomes and regional development, as part of existing monetary policy and macroeconomic analysis. With their extensive access to data and research expertise, central banks and financial supervisors are exceptionally well placed to improve the understanding of the systemic dynamics of distribution and climate change as they interact with financial systems (Honohan, 2019). They have already developed a solid knowledge of the economic and financial consequences of climate change and the transition, including through the work of the NGFS. However, the social and regional consequences of climate change and the transition remain a relative blind spot for them. These dimensions are, for example, absent from NGFS scenarios (NGFS, 2021b). Central banks and supervisors need to fill this gap and build up capacities to better understand and assess the distributional consequences of climate change and the low-carbon transition. This requires integrating socioeconomic implications in their modelling toolkits, forecasts, regular economic surveillance and research.

"Central banks and supervisors need to build capacities to better understand the distributional consequences of the low-carbon transition."

In this context, scenarios and stress testing tools can enable both financial authorities and financial institutions to better understand the implications of key trends and shocks on employment and wider social and regional indicators. The incorporation of social and regional dimensions in transition scenarios is key to this, to highlight concentration risks for specific regions and social groups, and also to monitor the progress of the financial system and the economy on a just transition pathway.

4.2. Advise

Governments have the primary responsibility to put in place the policy and financial frameworks to accelerate the just transition across macro-economic and fiscal strategy, industrial, sectoral and regional policies, employment and skills development, labour rights and social dialogue (ILO, 2015). But this does not mean that central banks and supervisors should be passive actors in the process. The just transition will need to be incorporated into real economy policies across sectors and regions, and into financial policies and regulations. Monetary and financial authorities can support the development of these frameworks through their dialogue, expertise, and advocacy with governments and other agencies.

At the national level, central banks and supervisors can play several roles. First, an essential part of the just transition is that affected workers and communities have a say in the decisions that impact them ('nothing about us, without us'). Social dialogue with workers and engagement with local communities must be integral to financial policy decision-making. Central banks and supervisors can reach out directly to trade unions and community organisations to ensure their voices are reflected in just transition efforts (Robins and Muller, 2021). Second, central banks and supervisors can support and feed into broad-based national initiatives, such as Just Transition Commissions, which can ensure that climate action is people-centred and inclusive. If such initiatives are not yet in place, central banks and supervisors can initiate them and take a central role in setting the agenda and pace of just transition policies.

Central banks and supervisors play a crucial role in setting the policy agenda in this context. Importantly, the greatest investment needs for net zero and climate resilience lie in low- and middle-income countries, but real constraints exist there in terms of access to and cost of capital, as well as in terms of limited institutional capacity to realise a just transition. It is therefore important for central banks and supervisors to understand how financial regulation and monetary policy enable capital to flow across borders where it is needed for the just transition, and how to implement coordinated policies that enable the international financial framework to fulfil this function.

"The greatest investment needs for net zero and climate resilience lie in low- and middle-income countries."

At an international level, central banks and supervisors are ideally placed to advise, support and feed into collective initiatives. Central banks, for example, are key members of the G20 Sustainable Finance Working Group (SFWG). The G20 recognises the important role of governments in supporting an orderly, just and affordable transition, as well as the critical role of a resilient financial sector in mobilising private sector finance to facilitate such a transition. In its 2022 report, the SFWG outlined a common set of principles for transition finance to enable this process to take place. Principle 6 stated that decision-makers should "consider and include measures to facilitate an orderly, just and affordable transition, while avoiding or mitigating possible negative impacts on employment and affected households, communities and other SDGs (including environment protection and biodiversity), or risks to energy security and price stability". Alongside this, Principle 22 focused on the need to "strengthen the dialogue and cooperation between governmental agencies, employers and workers' representatives, markets regulators, academia, civil society and private sector stakeholders to define a comprehensive strategy to mitigate negative economic and social implications" (G20 SFWG, 2022).

4.3. Act

Central banks and supervisors have several options to directly support the just transition with monetary policy operations and financial policies. This section highlights some of them, inspired by instruments already implemented by a few central banks and supervisors worldwide.

Monetary policy

Employment and labour market dynamics play a key role in both the just transition and the transmission of monetary policy. To stabilise inflation and output, central banks closely monitor the impact of their policies on aggregate employment. Their impact on wages and unemployment is also central to ensuring that they do not increase economic inequality (see Section 2.2). Central banks regularly face a trade-off between mitigating inflation and supporting labour market activity. A just transition might shed new light on this trade-off as supporting job creation is key to it.

In this context, central banks might want to prioritise certain employment objectives during the transition phase to ensure that workers with stranded jobs are well placed to find alternative working opportunities. Although not related to the transition, in the United States the Federal Reserve may have taken a step in this direction with a change in its definition of the employment objective in its monetary policy framework – from "deviations from its maximum level" to "shortfalls of employment from its maximum level" (FOMC, 2022). This indicates that the Fed would no longer pre-emptively tighten monetary policy when unemployment is approaching levels estimated as consistent with stable inflation but wait until full employment is observed. Another option for central banks to better account for the financial circumstances of middle- and low-income households could be to shift focus from aggregate inflation to inflation experienced by these households.

Macro measures aimed at supporting labour markets at the aggregate level might fall short when it comes to addressing the sectoral and regional dimensions of climate change and the transition. If this is the case, central banks could turn to monetary policy schemes that focus on the affected workers or regions and that align with just transition objectives. The asset purchases and refinancing operations that central banks commonly use to implement monetary policy can be designed to serve such purposes.

The Bank of Japan's 'Purchases of ETFs to Support Firms Proactively Investing in Physical and Human Capital' programme provides an example of such a scheme. Within this programme, the Bank of Japan regularly purchases exchange-traded funds (ETFs), of which underlying stocks are issued by firms that meet criteria such as growth in the number of employees and wage expenses, and the implementation of policies that improve working environments, provide childcare support, or expand employee training programme (Bank of Japan, 2021). However, although in place since 2016, there is a lack of empirical studies assessing the effectiveness of this programme.

"Central banks could turn to monetary policy schemes that focus on the affected workers or regions."

Refinancing operations targeting just transition objectives are another option for central banks. Among several targeted refinancing operations programmes already in place around the world (Colesanti Senni and Monnin, 2021), the Bank of Korea offers an interesting scheme that is likely to support a just transition. Its 'Bank Intermediated Lending Support Facility' provides refinancing at lower rates to banks that lend to small and medium-sized enterprises (SMEs), in particular start-ups with innovative technology, and also to banks in regions in which economic conditions warrant such support. Similar targeted refinancing schemes have also been suggested to the US Federal Reserve (see: Petrou, 2021 for a proposition supporting banks with an equality charter; and Nelson, 2020 for a proposal targeted at low- and moderate-income areas and households).

Finally, central banks can contribute to a just transition by supporting public authorities' borrowing conditions through sovereign debt purchases. However, the effectiveness of this funding is conditional on the government aligning its use with just transition objectives and is constrained by several concerns including central bank credibility. Coordination between fiscal and monetary policies is therefore key to ensuring that the limited degree of freedom available to central banks for sovereign debt purchases has the maximum impact on supporting a just transition.

Financial supervision

Developing and setting supervisory expectations on how financial institutions should manage climate risks is a key mechanism with which central banks and supervisors can address climate financial risks (NGFS, 2020). Such supervisory expectations should involve requiring all regulated financial institutions to submit net zero transition plans and addressing climate risks in regulatory ratios (Robins et al., 2021). To ensure these plans effectively address the social risks and opportunities of decarbonisation, they need to incorporate just transition principles. Voluntary frameworks for how financial institutions should design and implement net zero plans are now starting to emerge. For example, GFANZ has recommended that financial institutions integrate the just transition in the underpinning foundations of their plans, applying this not only to the delivery of climate solutions but also to the managed phase-out of fossil fuels (GFANZ, 2022). This incorporation of just transition factors in net zero plans should also be reflected in supervisory expectations and regulatory responses. Additionally, supervisors should scrutinise the integrity of just transition commitments of regulated financial firms (banks, insurers, asset owners, fund managers, etc.) by ensuring that they are effectively embedded in overall systems for governance and risk management.

"Voluntary frameworks for how financial institutions should design and implement net zero plans are now starting to emerge."

The macroprudential policies that central banks and regulators implement can also have distributional impacts that go against the objective of a just transition. Financial authorities must therefore carefully consider the potential feedback loops between macroprudential policy, climate strategies, economic inequality and financial stability. For example, some measures aimed at addressing financial instability might increase inequality, which can in turn weaken financial stability. In such a case, central banks and supervisors, perhaps in collaboration with fiscal authorities, could consider accompanying measures to mitigate the impact of macroprudential measures on inequality (Monnin, 2018).

In some jurisdictions, the mandates and legislative frameworks for central banks and supervisors can enable a more direct way of supporting community-focused approaches to financing the transition. In the United States, for example, the Community Reinvestment Act (CRA) provides a financial supervisory framework that can be adapted to address the social implications of decarbonisation, particularly for underserved communities. The CRA requires the Federal Reserve and other federal banking regulators to encourage financial institutions to help meet their communities' needs and to expand access to credit, investment and basic banking services to low- and middle-income communities. Each financial institution under the CRA must periodically provide supervisors with a record of their efforts to meet the credit needs of its entire community for evaluation. This record is taken into account by US supervisors when considering an institution's application for expanded deposit facilities, including mergers and acquisitions. The CRA could also serve as a basis for the implementation of other potential policy instruments such as a new, permanent discount window credit programme by the Fed to fund and subsidise lending to low- and middle-income areas and households (Nelson, 2020), or banks with an equality charter (Petrou, 2021). The Federal Reserve of New York has made mitigating climate-related risk in low- and middle-income communities one of the three focal areas of its community development strategy (New York Federal Reserve, 2020).

5. Challenges

Implementing the roadmap proposed above would come with its challenges and below we discuss those that central banks and supervisors face in their efforts to ensure that the net zero transition is consistent with reducing inequalities. Several of these are similar to the challenges discussed in the case of supporting the transition to net zero.

Monetary policy is too blunt an instrument to address growing inequalities

Central banks often argue that the monetary policy tools at their disposal are too blunt for addressing inequality issues because they are designed with aggregate outcomes and not subgroups of households or regions in mind. It is true that changes in interest rates, for example, affect the economy as a whole and cannot target specific parts of the economy. However, more targeted instruments exist, and central banks have started using them in other contexts. Several central banks have, for example, implemented refinancing operations targeted at specific segments of the economy (Colesanti Senni and Monnin, 2021). In the context of climate change, the NGFS has laid out the options that central banks have to hand for supporting the transition through their monetary policy operations (NGFS, 2021a). Such tools can be adapted to pursue social objectives as well.

Central banks could also consider developing and implementing new tools that can both transmit monetary policy and address inequality issues. Direct monetary transfers from central banks to households is an option that has been extensively discussed by academic and policy circles since Milton Friedman first suggested it in 1969. Other options developed in the context of climate change, such as differentiated interest rates (Böser and Colesanti Senni, 2021; van 't Klooster, 2022) could be adapted to target households and regions affected by the transition.

Monetary policy instruments may have a marginal impact on inequality
Central bankers also argue that monetary policy is likely to have only a marginal impact on reducing inequality. The argument that fiscal policy is a far better option to address inequality issues is not contested. However, tackling inequality issues cannot be done through fiscal measures alone: it requires a comprehensive policy package using all available policy levers. Monetary policy and financial regulation should be fully part of this package and used to leverage and support other policies where possible. Coordination among authorities is key in this context.

Addressing inequalities can conflict with other objectives
Monetary policy and financial regulation measures required to mitigate inequalities can sometimes be at odds with those that are necessary to pursue other objectives. Raising interest rates to dampen inflation, for example, might induce an increase in unemployment, which is likely to increase inequality in the economy. Macroprudential policies can also have negative social impacts. Such cases are inevitable, but arbitrage can be made through a clear hierarchy of objectives in the mandates of central banks and supervisors. In the context of climate change, the mandate of the European Central Bank, for example, is clear: the objective of price stability prevails over environmental objectives. When facing a trade-off, central banks and supervisors should also examine alternative policy options and choose the one that has fewer adverse effects on inequality (Fontan et al., 2016).

Beyond these challenges, which relate specifically to central banks and supervisors, there are others related to the just transition itself, not least in understanding the scale of the social risks and opportunities involved, the levels of financing that could be required to address these, and the lack so far of common metrics to measure progress in terms of the social dimension of net zero. These are all areas where central banks could play a useful role in contributing to shared baselines, methodologies and assessments.

"The just transition connects two systemic risks facing the financial system: worsening climate change and increasing inequality."

6. Conclusion

As a strategy, the just transition connects two systemic risks facing the financial system: worsening climate change and increasing inequality. The just transition was first recognised as a critical factor for enabling climate action in the 2015 Paris Agreement, but it was only in 2021 that governments, businesses and the financial sector recognised that it was an essential ingredient in an orderly transition to net zero. In 2022, this acknowledgement has broadened to include the importance of a just transition in the response to the biodiversity crisis and the road to a nature-positive economy (NGFS and INSPIRE, 2022; Muller and Robins, 2022). 2022 is also the year that central banks started to use the language of just transition in their statements about climate action.

Central banks and supervisors have several reasons to support a just transition and implement policies that work towards its goals. The net zero transition is key for price, economic and financial stability, as well as other possible objectives within their mandates, such as employment and financial inclusion. Making the net zero transition a just one, and thus restraining the inequality that could be associated with it, is in line with efficient monetary policy transmission. In tackling growth and inequality, just transition policies can reinforce public support for financial institutions. In addition, the just transition needs to be part of the climate expectation of financial authorities in their supervisory roles, to ensure that the social risks of the transition are effectively identified and acted upon by banks, investors and insurers. Central banks and financial supervisors now need to identify the roles they can play as part of a system-wide response.

> "Given the urgency of environmental deterioration, central banks and supervisors must start now to work for a just transition."

Given the urgency of environmental deterioration, central banks and supervisors must start now to work for a just transition. The three pillars that we have proposed in our roadmap must not be understood as sequential: they must be developed and implemented in parallel, and quickly. Neither is the just transition something to be added as an afterthought: the social implications of decarbonisation need to be anticipated at an early stage to facilitate the necessary scaling up of capital investment in this decade and beyond. This requires central banks and supervisors to quickly build up their capacities on these issues and put the just transition at the top of their agenda.

References

African Development Bank [AfDB], Asian Development Bank [ADB], Asian Infrastructure Investment Bank [AIIB] et al. (2021) *MDB Just Transition High Level Principles*. https://www.adb.org/sites/default/files/related/241521/Statement-MDBs-Just-Transition-High-Level-Principles.pdf

Auclert A (2019) Monetary policy and the redistribution channel. *American Economic Review* 109(6): 2333-2367.

Bank of Japan (2021) *Special Rules for Purchases of ETFs to Support Firms Proactively Investing in Physical and Human Capital*. https://www.boj.or.jp/en/mopo/measures/term_cond/yoryo91.htm/

Berg A and Ostry J (2017) Inequality and Unsustainable Growth: Two Sides of the Same Coin? *IMF Economic Review* 65: 792–815.

Böser F and Colesanti Senni C (2021) CAROs: *Climate Risk-Adjusted Refinancing Operations*. Working Paper 21/354. Zurich: Center of Economic Research.

Carpantier J, Olivera J and Van Kerm P (2018) Macroprudential policy and household wealth inequality. *Journal of International Money and Finance* 85: 262-277 https://www.sciencedirect.com/science/article/pii/S0261560617302322

Cingano F (2014) *Trends in Income Inequality and its Impact on Economic Growth*. OECD Social, Employment and Migration Working Paper No. 163. Paris: OECD Publishing. https://www.oecd-ilibrary.org/social-issues-migration-health/trends-in-income-inequality-and-its-impact-on-economic-growth_5jxrjncwxv6j-en

Climate Action 100+ (2022) A need for robust just transition planning. News article, 16 June. https://www.climateaction100.org/news/a-need-for-robust-just-transition-planning/

Colciago A, Samarin, A and de Haan J (2019) Central bank policies and income and wealth inequality: A survey. *Journal of Economic Surveys* 33(4): 1199-1231.

Colesanti Senni C and Monnin P (2021) *Aligning central bank refinancing operations with the G20 agenda*. CEP Policy Brief. Zurich: Council on Economic Policies [CEP]. https://www.cepweb.org/aligning-central-bank-refinancing-operations-with-the-g20-agenda/

Curran B, Robins N, Muller S et al. (2022) *Making Transition Plans Just*. London: Grantham Research Institute on Climate Change and the Environment, London School of Economics. https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2022/10/Making-Transition-Plans-Just-2.pdf

Dikau S, Robins N, Smoleńska A et al. (2022) *Net zero transition plans: a supervisory playbook for prudential authorities*. London: Grantham Research Institute on Climate Change and the Environment, London School of Economics. https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2022/11/Net-zero-transition-plans-a-supervisory-playbook-for-prudential-authorities.pdf

Fontan C, Claveau F and Dietsch P (2016) Central banks and inequalities: taking off the blinders. *Politics, Philosophy and Economics*, 15(4)

The Federal Open Market Committee [FOMC] (2022) *Statement on Longer-Run Goals and Monetary Policy Strategy*, 25 January. https://www.federalreserve.gov/monetarypolicy/files/fomc_longerrungoals.pdf

Frost J and van Stralen R (2018) Macroprudential policy and income inequality. *Journal of International Money and Finance* 85: 278-290.

Furceri D, Loungani P and Zdzienicka A (2018) The Effects of Monetary Policy Shocks on Inequality *Journal of International Money and Finance* 85: 168–186.

G20 Sustainable Finance Working Group (SFWG) (2022) *Sustainable Finance Report*. https://g20sfwg.org/wp-content/uploads/2022/10/2022-G20-Sustainable-Finance-Report-2.pdf

Glasgow Finance Alliance for Net Zero [GFANZ] (2022) *Financial Institution Net-Zero Transition Plans: Guidance and Recommendations*. London: GFANZ. https://assets.bbhub.io/company/sites/63/2022/09/Recommendations-and-Guidance-on-Financial-Institution-Net-zero-Transition-Plans-November-2022.pdf

Green F and Healy N (2022) How inequality fuels climate change: The climate case for a Green New Deal. *One Earth*. https://doi.org/10.1016/j.oneear.2022.05.005

Hiebert P and Monnin P (2022) *Climate-related systemic risks and macroprudential policy*. INSPIRE Sustainable Central Banking Toolbox Policy Briefing Paper. Forthcoming.

Honohan P (2019) *Should monetary policy take inequality and climate change into account?* Peterson Institute for International Economics Working Paper 19-18. Washington, DC: PIIE. https://www.piie.com/sites/default/files/documents/wp19-18.pdf

Indonesia Just Energy Transition Partnership (2022) *Joint Statement by the Government of the Republic of Indonesia (GOI) and the Governments of Japan, the United States of America, Canada, Denmark, the European Union, the Federal Republic of Germany, the French Republic, Norway, the Republic of Italy, and the United Kingdom of Great Britain and Northern Ireland (together the "International Partners Group" or IPG)*, 15 November.

Intergovernmental Panel on Climate Change [IPCC] (2022) *Climate Change 2022: Mitigation of Climate Change*. Working Group III Contribution to the IPCC Sixth Assessment Report. https://report.ipcc.ch/ar6/wg3/IPCC_AR6_WGIII_Full_Report.pdf

International Energy Agency [IEA] (2021) *Net Zero by 2050*. Paris: IEA. https://www.iea.org/reports/net-zero-by-2050

International Labour Organisation [ILO] (2015). *Guidelines for a just transition towards environmentally sustainable economies and societies for all*. Geneva: ILO. https://www.ilo.org/wcmsp5/groups/public/@ed_emp/@emp_ent/documents/publication/wcms_432859.pdf

Kaplan G, Moll B and Violante G (2018) Monetary policy according to HANK *American Economic Review*, 108(3): 697-743.

Koedijk K, Loungani P and Monnin P (2018) Monetary policy, macroprudential regulation and inequality: An introduction to the special section. *Journal of International Money and Finance* 85: 163-167.

Menon R (2022) Net zero - act now, act fast, act together. Speech at the COP27 Singapore Pavilion Finance Day. Sharm El-Sheikh, 9 November 2022.

Miller H and Dikau S (2022) *Preventing a 'climate Minsky moment': environmental financial risks and prudential exposure limits - Exploring the case study of the Bank of England's prudential regime*. London: Grantham Research Institute on Climate Change and the Environment, London School of Economics. https://www.lse.ac.uk/granthaminstitute/publication/preventing-a-climate-minsky-moment/

Monnin P (2018) Financial stability and inequality: a challenge for macroprudential regulation. CEP Blog, June 5. https://www.cepweb.org/financial-stability-and-inequality-a-challenge-for-macroprudential-regulation/

Monnin P (2019) “Distributional impact of UMP” in *The Risks and Side Effects of UMP: An Assessment of IMF Views and Analysis*. Chapter 3: 33-43. Washington, D.C: Independent Evaluation Office of the IMF.

Monnin P (2021) *Systemic risk buffers – The missing piece in the prudential response to climate risks.* CEP Policy Brief. Zurich: Council on Economic Policies. https://www.cepweb.org/systemic-risk-buffers-the-missing-piece-in-the-prudential-response-to-climate-risks/

Muller S and Robins N (2022) *Just Nature: How finance can support a just transition at the interface of action on climate and biodiversity.* London: Grantham Research Institute on Climate Change and the Environment, London School of Economics. https://www.lse.ac.uk/granthaminstitute/publication/just-nature-finance-just-transition-climate-and-biodiversity-2022/

Nelson B (2020) How to Design a Fed Credit Facility to Help Support LMI Communities. Blog post, 5 August. Washington, DC: Bank Policy Institute. https://bpi.com/how-to-design-a-fed-credit-facility-to-help-support-lmi-communities/

New York Federal Reserve (2020) *Community Development Unit – Strategic Plan.* New York. https://www.newyorkfed.org/medialibrary/media/outreach-and-education/community-development/community-development-strategic-plan.pdf

Network for Greening the Financial System [NGFS] (2021a) *Adapting central bank operations to a hotter world Reviewing some options.* Network for Greening the Financial System Technical document, March. https://www.ngfs.net/en/adapting-central-bank-operations-hotter-world-reviewing-some-options

NGFS (2021b) *NGFS Climate Scenarios for central banks and supervisors*. https://www.ngfs.net/en/ngfs-climate-scenarios-central-banks-and-supervisors-june-2021

NGFS (2020a) *Guide for supervisors - Integrating climate-related and environmental risks into prudential supervision.* https://www.ngfs.net/en/guide-supervisors-integrating-climate-related-and-environmental-risks-prudential-supervision

NGFS (2020b) *Climate change and monetary policy: initial takeaways*. https://www.ngfs.net/en/climate-change-and-monetary-policy-initial-takeaways

NGFS and INSPIRE (2022) *Central Banking and Supervision in the Biosphere: an agenda for action on biodiversity loss, financial risk and system stability*. https://www.ngfs.net/en/central-banking-and-supervision-biosphere-agenda-action-biodiversity-loss-financial-risk-and-system

Pereira da Silva L, Kharroubi E, Kohlscheen E et al. (2022) *Inequality hysteresis and the effectiveness of macroeconomic stabilisation policies.* Basel: Bank for International Settlements [BIS]. https://www.bis.org/publ/othp50.pdf

Petrou K (2021) *Engine of inequality: the Fed and the future of wealth in America*. John Wiley & Sons. Print.

Presidency of South Africa (2022) *Just Energy Transition Investment Plan*. Statement, 4 November 2022.

Robins N, Dikau S and Volz U (2021) *Net Zero Central Banking*. London: Grantham Research Institute on Climate Change and the Environment and Centre for Climate Change Economics and Policy, London School of Economics and Political Science, and Centre for Sustainable Finance, SOAS, University of London. https://www.lse.ac.uk/granthaminstitute/publication/net-zero-central-banking-a-new-phase-in-greening-the-financial-system/

Robins N, Muller S, Tickell S et al. (2021) *Just Zero: 2021 report of the UK Financing a Just Transition Alliance*. London: Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science. https://www.lse.ac.uk/granthaminstitute/publication/just-zero-2021-report-of-the-uk-financing-a-just-transition-alliance/

Robins N and Muller S (2021) *Lessons from COP26 for Financing the Just Transition*. London: Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science. https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2021/12/Lessons-from-COP26-for-financing-the-just-transition.pdf

Scottish Government (2021) *Just Transition Commission – A national mission for a fairer, greener Scotland*. https://www.gov.scot/publications/transition-fairer-greener-scotland/

Seccareccia M and Matamoros Romero G (2022) Is there an appropriate monetary policy framework to achieve a more equitable income distribution or do central bank mandates really matter? Interest-rate rules versus a full employment policy. *Journal of Economic Issues* 56(2): 498-507.

van 't Klooster J (2022) *The European Central Bank's strategy, environmental policy and the new inflation: a case for interest rate differentiation*. London: Grantham Research Institute on Climate Change and the Environment and Centre for Climate Change Economics and Policy, London School of Economics and Political Science. https://www.lse.ac.uk/granthaminstitute/publication/the-european-central-banks-strategy-environmental-policy-and-the-new-inflation/

Voinea L and Monnin P (2017) Inequality should matter for central banks. Blog post, February 16. Zurich: Council on Economic Policies [CEP]. https://www.cepweb.org/inequality-should-matter-for-central-banks/

Volz U, Knaack P, Nyman J et al. (2020) *Inclusive green finance: From concept to practice.* Kuala Lumpur and London: Alliance for Financial Inclusion and SOAS, University of London. https://eprints.soas.ac.uk/34540/1/AFI_IGF_SOAS_digital.pdf

UNFCCC (2022) *Glasgow Climate Pact – Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its third session, held in Glasgow from 31 October to 13 November 2021*. https://unfccc.int/sites/default/files/resource/cma2021_10_add1_adv.pdf

About the authors

Pierre Monnin is a Senior Fellow at the Council on Economic Policies.

Nick Robins is a Professor in Practice at the Grantham Research Institute on Climate Change and the Environment, London School of Economics.

Acknowledgements

The authors would like to thank two anonymous referees for their useful comments. The authors are responsible for any remaining errors.

Disclaimer

The views expressed in this briefing paper are those of the authors and do not necessarily reflect those of the series editors or the editors' host institutions.

Briefing paper series editors

Dr Simon Dikau: S.Dikau@lse.ac.uk
Professor Nick Robins: N.V.Robins@lse.ac.uk
Professor Ulrich Volz: uv1@soas.ac.uk

Find out more about their work at www.lse.ac.uk/granthaminstitute/research-areas/sustainable-public-and-private-finance/ and www.soas.ac.uk/centre-for-sustainable-finance/.

Editing and production

Georgina Kyriacou (Managing Editor), Natalie Pearson and Zoe Kay, with support from Sophie Scharlin-Pettee.

About INSPIRE

The International Network for Sustainable Financial Policy Insights, Research, and Exchange (INSPIRE) is a global research network and designated research stakeholder of the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) in its work to manage climate risk and mobilise finance to support the transition to a sustainable economy. The INSPIRE secretariat is co-hosted by the Grantham Research Institute on Climate Change and the Environment and the ClimateWorks Foundation, and is guided by an Advisory Committee who provide domain expertise independently but in close interface with the work priorities of the NGFS. Philanthropic support for INSPIRE is provided by ClimateWorks Foundation. **www.inspiregreenfinance.org/**

For other papers in the INSPIRE Sustainable Central Banking Toolbox, please visit www.lse.ac.uk/granthaminstitute/sustainablecentralbanking