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Realising Central Banks’ Climate Ambitions Through Financial Stability Mandates

This paper discusses how financial stability governance has evolved and how central banks and financial regulators are coping with the threats posed by climate uncertainty, providing an overview of G20 countries’ green central banking experiences in the past 20 years. The analysis shows that most central banks realise their climate ambitions through financial stability mandates, leaving the monetary stability mandate unaffected. Considering the debate on market neutrality, the concerns on the risk of overstressing the central banks’ mandate, violation of Tinbergen’s principle and threats posed to central banks’ independence, the provided evidence reveals a mismatch between the observed policy practice and its theoretical underpinnings. Drawing on these findings, we argue that effective green central banking governance should be based on a synthesis between monetary and macroprudential policymaking.

Since the Paris Agreement, central banks and regulatory authorities have been urged to keep global warming below 2°C by scaling up green finance and protecting financial stability, i.e. the macroprudential objective (D’Orazio and Popoyan, 2019). The determination of monetary and financial regulatory authorities to scale up the finance to align with climate change mitigation roadmaps was also confirmed in the COP26 Glasgow Declaration by the Network of Central Banks and Supervisors for Greening the Financial System, central banks and financial regulators in order to integrate climate considerations into their decision-making processes.

Due to their financial regulatory oversight on money and credit flows, central banks have, on the one hand, a dominant position in promoting efficient green finance through fair pricing of climate risks by financial intermediaries (Kemfert et al., 2020). On the other hand, their implicit or explicit responsibility for financial and macroeconomic stability urges monetary authorities to address climate-related and other environmental risks on a systemic level

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Open Access funding provided by ZBW – Leibniz Information Centre for Economics.

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(Carney, 2015). However, preserving the central bank’s mandate and independence while leaning against climate-related risks is undoubtedly not an easy task. Supply and demand shocks driven by extreme weather events or a sudden transition to a low-carbon economy because of changes in climate policies can impact output and inflation in different directions (Pfister and Valla, 2021). Moreover, traditional policy instruments may be less effective in smoothing these shocks; thus, central banks need to opt for unconventional measures to support climate agendas on a “pure” monetary policy playground.

The critical question that thus arises is how can monetary authorities and financial regulators get out of this institutional deadlock. Although monetary authorities have recently shown greater engagement in climate-related issues, their institutional nature limits their action. Central banks are unelected delegates, and their actions are closely connected with their operational mandates and objectives. They are endowed with extensive political independence and authority to achieve monetary policy objectives and exert power without distorting the market, thus coping with market neutrality. Hence, directing financial flows to low-carbon activities without an explicit mandate could compromise the credibility and independence of the monetary authority (Cochrane, 2020).

In recent years, the allocation of supervisory powers and responsibility has been at the core of an intense debate among policymakers and academics. The global financial crisis has contributed to reviving this debate, and incorporating financial stability into the central bank framework

has opened new questions on coordination between post-crisis financial regulations (mainly referred to as macroprudential) and monetary policy (Smets et al., 2014; Popoyan et al., 2017).

The need for coordination arises through dependencies and overlaps in transition mechanisms as they operate in the same field affecting monetary aggregates, credit conditions and credit growth (Popoyan et al., 2020). Furthermore, in a broader framework that considers climate-related financial risks and the need to scale up green finance, the question emerges as to how the interaction between the two policies will work. This paper investigates how financial stability governance has evolved in the past decades and how central banks and financial regulators are coping with the threats posed by climate uncertainty. From a political economy perspective, we find it worthwhile to examine which kinds of institutional mandates and financial stability governance architecture are in place when macroprudential authorities decide “to go green”. This analysis is relevant considering the current debate on the ideal of market neutrality for the conduct of monetary policy (van’t Klooster and Fontan, 2020; Schnabel, 2020), the concerns raised regarding the risk of overstressing central banks’ mandates, the violation of Tinbergen’s principle and threats posed to central bank independence (Weidmann, 2020; Cochrane, 2020). Moreover, a better understanding of the increasing complexity of the monetary-financial policy landscape in the face of climate change could help address climate mitigation and contribute to low-carbon structural change.

The proposed analysis consists of three steps. First, this article presents the evolution of monetary policy mandates over the past decades and discusses the channels of transmission of climate change to monetary policy. Second, it analyses the diffusion of climate-related financial policies. Third, it addresses the role of financial stability governance models and examines the possible entanglements when monetary authorities institutionally embrace the climate change challenges.

Climate change and monetary policy

In the past decade, the increasing public recognition of the risks posed by climate change produced an intense debate on the role central banks could play in withstanding the threats posed by climate uncertainty (Batten et al., 2016; Campiglio et al., 2018; D’Orazio and Popoyan, 2019). There is a growing awareness that climate change can directly or indirectly affect a central bank’s ability to meet its price stability objectives because of the materialisation of supply and demand shocks in the economy (Pfister and Valla, 2021). Losses deriving from extreme cli-

mate events can generate demand-side shocks, having a negative wealth effect and causing a reduction in private consumption. Supply-side shocks induced by extreme weather events can lead to a shortage of commodities followed by price volatility, erosion of productive capital stock, and ultimately higher risk, market volatility and slower economic growth. They could also cause adverse financial shocks driven by high uncertainty, stranded assets and financial losses (Semieniuk et al., 2021).

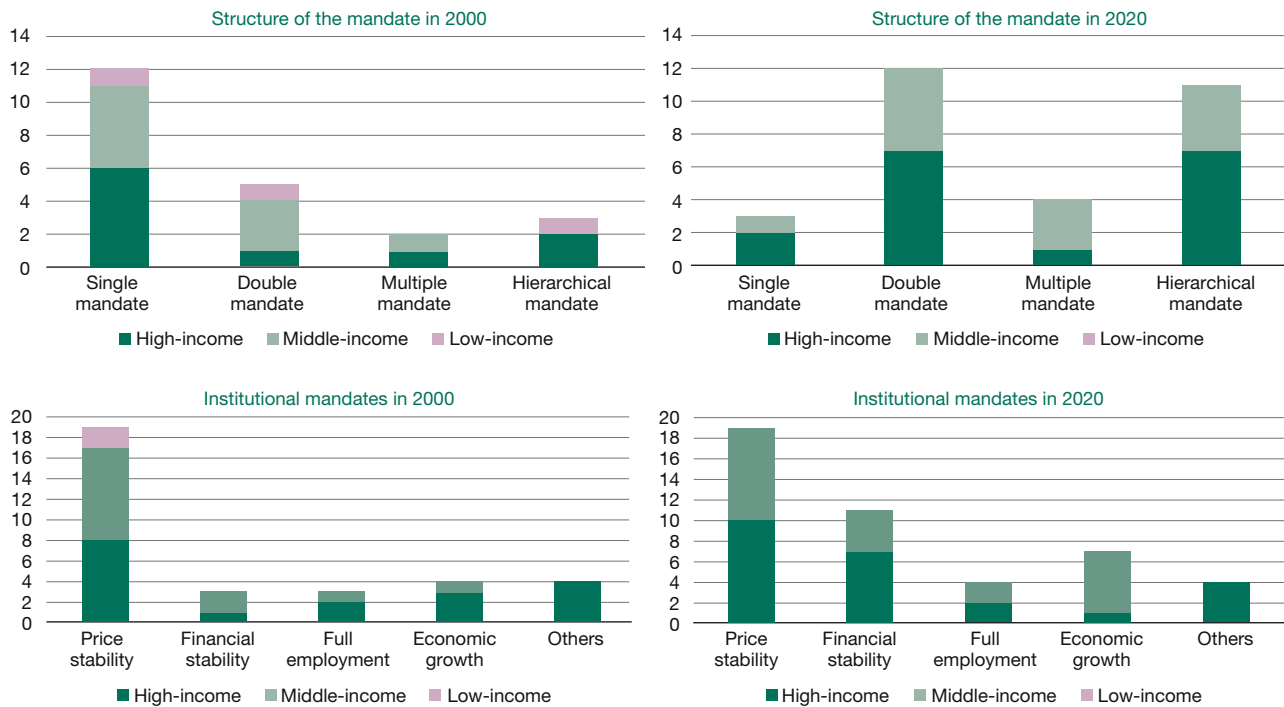
Additionally, supply-side shocks can arise because of a sudden or disorderly transition from a high-carbon economy to a low-carbon economy, implying a choice between the need to limit climate change effects in the long run with a short-term cost of reducing the resources available for economic growth. Furthermore, the above-mentioned factors can directly or indirectly affect precautionary saving, credit spreads, real interest rates and financial instability, hence affecting inflationary pressures, for which monetary policy is responsible. There is therefore a clear transmission channel that relates the conduct of monetary policy and the materialisation of physical and transition risks, thus making central banks susceptible to the risks posed by climate change (see Bolton et al., 2020 and Semieniuk et al., 2021 for reviews of the transmission channels). Accordingly, monetary authorities will need to identify the nature, persistence and magnitude of the climate-induced shocks hitting the economy and prepare an adequate instrumental set-up to address them.

Roles and objectives of modern central banks

Most central banks acknowledge that climate change and the uncertain trajectories of the developments it brings are a significant threat to monetary policy. The debate is often focused on whether central banks should act directly, take auxiliary functions or ignore the climate debate. And in case they act, how they should align their climate ambitions with their operational mandates (Krogstrup and Oman, 2019). This concern derives from the historical differences in central banks’ policy traditions and the evolution of institutions’ mandates (Goodhart et al., 2011), which mostly focus on price stability.

Central banks’ mandates often include contributions to general economic welfare in addition to the main price stability objective, but sustainability is far from being an explicit mission statement when considering G20 countries’ experiences (see Figure 1). While the heterogeneity in operational scopes is indisputable, an explicit similarity emerges as all countries have a price stability objective as a necessary component of the institutional mandate. Compared to emerging economies’ experiences, monetary authorities in advanced economies have narrower

Figure 1
Overview of institutional mandates of central banks in G20 countries



Source: Authors' calculations on central banks official acts and laws, IMF Central Banks Legislation Database and World Bank Analytical Classifications, 1987-2020.

mandates. Having a broader monetary policy (and frequently also developmental objectives) gives, for example, to the Chinese and Brazilian central banks marked flexibility in their mandate interpretations. As a result, climate-related financial instruments directed to canalising credit flows to more environmentally friendly sectors have been employed as part of economy-wide sustainable development objectives in these jurisdictions.

Regarding the financial stability objective, we note that the global financial crisis triggered a massive transformation in monetary policymaking, reshaping central banks' institutional role, governance and mandate structures.

As shown in Figure 1, in 2000, financial stability was an objective rarely present in central banks' mandates; indeed, only three out of 19 central banks targeted financial stability. Induced by the global financial crisis and heavy criticism towards central banks for omitting systemic financial risks from the monetary policy radar, this picture changed between 2007 and 2012, leading to the massive adoption of financial stability as an operational target of central banks (58% in 2020 vs. 16% in 2000). High-income countries included economic stability in the

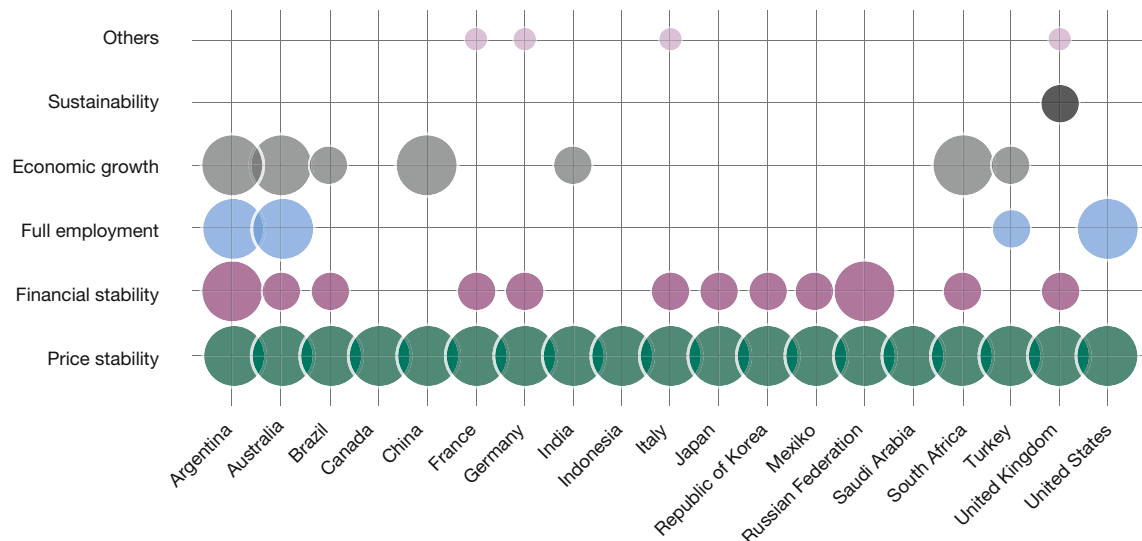
hierarchical context, focusing primarily on price stability (see Figures 1 and 2). In contrast to developed countries, emerging economies either lack financial stability or it is present at the same level as the primary price stability mandate. The absence of implicit financial stability mandates in these jurisdictions is often compensated with sustainable economic growth and development objectives. Monetary authorities in emerging economies are assigned supervisory objectives to safeguard the financial system's stability to achieve the final goal. All in all, central banks in G20 countries are directly (through primary or secondary objectives) or indirectly (through broad mandates supporting economic growth) involved in preserving financial stability.

Towards a green monetary policy

Three main "green" monetary policy approaches could be distinguished (Krogstrup and Oman, 2019). The first is related to implementing the so-called green quantitative easing, based on the recalibration of asset purchase programmes by eliminating high-carbon assets from central banks' portfolios, thus favouring low-carbon assets. The second relates to targeting refinancing operations, con-

Figure 2

Structure of institutional mandates of central banks in G20 countries as of 2021



Note: The bubble size indicates the role of a monetary policy objective in the structure of central banks' mandates. Two bubbles of equal size: dual mandate; two bubbles, one is bigger than the other: hierarchical dual mandate.

Source: Authors' calculations based on central banks official acts and laws, and IMF Central Banks Legislation Database.

tingent on private credit allocation towards low-carbon investments. In this setting, the cost of refinancing could be linked to the amount of household and firm loans to carry out environmental investments, implying that central bank liquidity will be provided at preferential interest rates. In the euro area framework, this approach has been recently proposed by van't Klooster and van Tilburg (2020). Alternatively, differentiated rediscount rates, i.e. the possibility of rediscounting green loans at lower rates at the central bank, are also conceivable. The third approach considers revising the collateral eligibility criteria in monetary refinancing operations (Oustry et al., 2020).

Looking at G20 countries' experiences, a few central banks have decided on considerable climate action on the monetary policy side. To the best of the authors' knowledge, only the People's Bank of China has a dedicated policy to promote green finance via monetary policy so far. Other countries, such as Brazil, India, Indonesia and Japan, adopted credit allocation measures to prioritise environmentally friendly sectors, such as green lending quotas and concessional loans. The ECB has recently shown a greater engagement in this respect, defining climate change as mission-critical and strongly emphasising climate change implications for the primary monetary policy objective (ECB, 2020). In July 2021, the Governing Council of ECB decided on an ambitious roadmap to incorporate climate change considerations into its policy framework to reflect environmental sustainability considerations in its monetary policy. The decision follows the strategy review of 2020-21, in which the reflections

on climate change and environmental sustainability were of central importance (see ECB, 2021). The ECB's action plan seeks an optimal interaction scheme of financial supervision, monetary policymaking and financial markets, replacing the market neutrality principle with market efficiency to thoroughly incorporate the risks and societal costs associated with climate change (Schnabel, 2021). The commitment of the ECB will mainly be directed to (i) developing new models and statistical methods to monitor the implications of climate risks to the financial system and the transmission of the monetary policy; and (ii) including climate risks in monetary policy operations, in particular in the area of disclosure, risk assessment, collateral framework and corporate sector asset purchase.

When approaching the issue of greening monetary policy, three aspects need to be considered. First, since many central banks, especially in developed and high-income countries, possess significant institutional and operational independence, addressing long-term sustainability issues is regarded with a degree of reluctance. Moreover, central banks' action in this realm is often considered a second-best intervention compared to other policy actions such as taxation of carbon emissions and cap-and-trade policies. Incorporating sustainability objectives into the monetary policy's operation may overstretch the mandate (a point that has been previously emphasised), thus creating conflicts between the objectives and endangering institutional independence (see Campiglio et al., 2018 for a review). Furthermore, such actions are frequently viewed as a massive departure from the non-distributional and mar-

ket-neutral principle of monetary policymaking (Cochrane, 2020; Weidmann, 2020). Second, the operational scope of supporting the climate agenda varies widely across central banks, with sustainability far from being a universally explicit mission statement as discussed above (see Figure 2). Some monetary and financial regulatory authorities have relatively narrow interpretations of their mandate to address climate issues, while others, e.g. in China, Brazil or India, possess somewhat broader policy remits to support green finance measures and climate policy. Indeed, while an increasing number of central banks show a notable public engagement in acknowledging the threats posed by climate-related risks (Elderson, 2018), the institutional arrangement in some jurisdictions limits the scope of their actions. Third, “market neutrality” is often introduced for motivating the “prudence” to make monetary policy sensitive to climate risks (Weidmann, 2020). Some argue that to achieve the policy goals of (mainly) price and financial stability, central banks must not distort financial markets. Accordingly, their intervention in promoting low-carbon activities without a dedicated mandate could compromise their independence and credibility, creating institutional deadlock (Cochrane, 2020). Thus, the market neutrality ideal (partially) explains why the debate on central banks’ role in addressing climate change is usually inclined towards the importance and effectiveness of fiscal instruments, such as carbon pricing, considered the best tool to achieve decarbonisation. Indeed, the support of the ideal of market neutrality and the reluctance to engage in green monetary policy operations is motivated by the fact that it would imply politicising monetary policy (van’t Klooster and Fontan, 2020).

Climate change and financial supervision and regulation

The literature classifies the risks posed to financial stability by climate change in two main categories: physical and transition risks (Carney, 2015). The former is associated with the economic cost of actual or expected extreme climate events that can cause the erosion and high volatility of physical and financial assets’ monetary value, thus increasing overall uncertainty in financial markets. The latter derives from a sudden or disorderly transition, triggered by, among others, unanticipated changes in public policy caused by market participants and concerns about their destabilising effects on the financial system, such as lower portfolios value, higher non-performing loans in banks’ balance sheets or a decline in returns for insurance companies (Batten et al., 2016).

Since the signing of the Paris Agreement, many financial regulators have shown greater engagement in addressing climate-related financial risks and coping with climate

uncertainty. Following the seminal contribution of the former Governor of the Bank of England (Carney, 2015), the Financial Stability Board advocated for the Task Force on Climate-related Financial Disclosures creating the High-Level Expert Group.

A review of existing climate-related financial policies highlights that no climate-related macroprudential measure concerning capital requirements, leverage ratios or systemically important banks or liquidity requirements have been adopted in G20 countries (see D’Orazio, 2021b, 2022). However, several risk management and supervisory measures exist: Significant action has been detected concerning climate-related stress testing. Other policies, such as climate-related disclosure requirements of the climate-related financial risks associated with climate change, are also relevant to developing a credible green financial system and avoiding so-called greenwashing (TCFD, 2018). The Chinese macroprudential authority, the Indonesian central bank as well as Turkey and Mexico’s banking associations have promoted banks’ disclosure requirements. Instead, disclosure requirements for non-financial institutions, pension funds, insurance companies and green finance principles and guidelines have been widely adopted over the past 20 years in most G20 countries. At the euro area level, we note that most countries have developed green market-shaping policies and adopted disclosure requirements for non-financial firms, insurance companies or institutional investors. A summary of the adopted policies in the G20 countries over the period 2000-2020 is provided in Table 1.

Governance structure, policy interaction and coordination

The analysis indicates that most central banks address climate-related financial risks and support the transition towards a carbon-neutral economy.

There are two main climate-oriented policy options. The first refers to central banks’ supervisory roles and responsibility to protect the banking sector’s safety and soundness. It involves assessing climate-related financial risks and correct pricing in financial institutions’ balance sheets. The second option refers to central banks’ portfolio management; it calls for a responsible approach that considers climate risks when deciding non-monetary portfolios’ composition and how to align them with the Paris Agreement goals.

The evidence collected in the investigation indicates that few G20 central banks have engaged in unconventional green monetary policies, i.e. the People’s Bank of

Table 1
Diffusion of climate-related financial policies and authorities responsible

Financial policy area	Category	Instrument	Objective	Countries that adopted (Authority responsible for promotion/implementation)	
Green prudential regulations: to promote the development of green macroprudential frameworks	Quality and level of capital	CAR with GSF/BPF	Mitigate and prevent excessive credit growth and leverage		
		CCyB Sectoral leverage ratios Sectoral capital requirements			
	Capital	Governance and risk management		Evaluate effect of economic or financial shocks to the financial system	Australia (PRA), China (CB, PRA, GOVT), France (PRA, GOVT), Indonesia (GOVT), Mexico (CB), UK (PRA)
			Climate-related stress test (macro)		Canada (CB), China (PRA), France (PRA), UK (PRA)
		Risk management and supervision	Green Asset Ratio	Assess exposure of banks' portfolios to carbon-intensive assets	
			Internal Capital Adequacy Assessment Process	Include social and environmental risks when assessing their capital needs	Brazil (CB)
Enhanced risk disclosure and market discipline	Climate-related disclosure requirements	Inform about concentration of carbon-intensive assets in the financial sector	China (PRA), Indonesia (CB), Mexico (BA), Turkey (BA)		
Liquidity	Liquidity	LCR NSFR	Mitigate and prevent market illiquidity and maturity mismatch		
Large exposures	Lending limits	Large exposures limit	Mitigate systemic risk by limiting the concentration of certain exposures		
Green financial principles: to create green financial markets				All G20 countries except Saudi Arabia	
Other disclosure requirements: to promote the public disclosure of climate risks (also for non-financial institutions)				All G20 countries except Argentina, Mexico, Saudi Arabia, Turkey	
Green credit allocation policies: to directly promote green credit measures and investments				Japan (GOVT), South Korea (GOVT)	

Notes: CAR: Capital Adequacy Ratio; GSF: Green Supporting Factor; BPF: Brown Penalising Factor; CCyB: Countercyclical Capital Buffer; LCR: Liquidity Coverage Ratio; NSFR: Net Stable Funding Ratio; BA: Banking Association; PRA: Prudential Regulatory Authority; CB: Central Bank; GOVT: Government.

Source: Authors' elaboration based on D'Orazio (2021b).

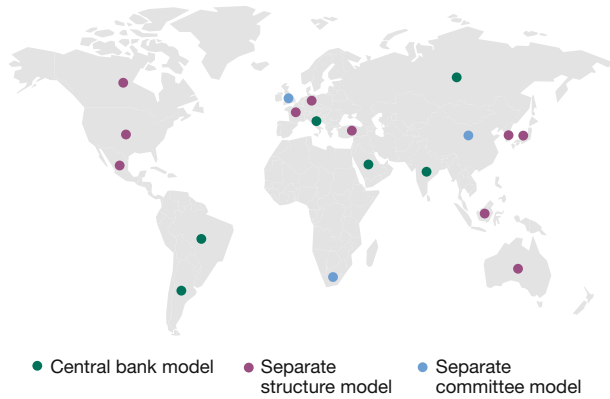
China, the Bank of Japan and the ECB, which shows increasing interest in this direction (ECB, 2020d). Examining climate-related financial policies reveals, instead, a larger commitment of G20 countries. In our view, this evidence calls attention to the financial stability governance structures.

In the past decades, the annexation of the financial stability mandate to monetary policy objectives gave rise to three main financial stability governance models based

on coordination efforts between monetary and macroprudential policies (see Figure 3).

We refer to the central bank model when the monetary and prudential policies are under one roof because the prudential policy is included in the central bank mandate, and the central bank is the prudential authority. In the separate committee model, different authorities work in a committee related to the central bank or an independent committee to conduct monetary and pru-

Figure 3
Financial stability governance models in G20 countries



Source: Authors' calculations based on elaborations of official acts and statutes of central banks.

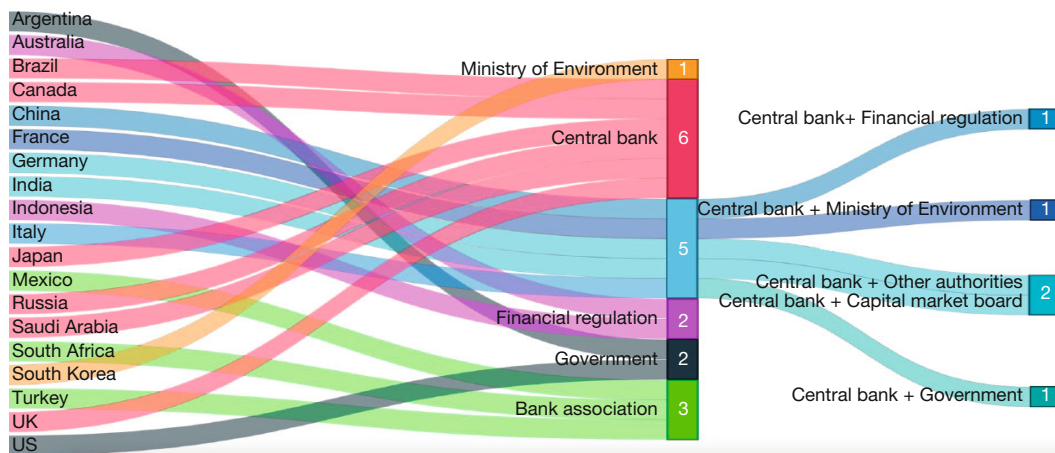
dential policies. In this case, the prudential regulation is still in the central bank mandate, but the central bank is not responsible for implementing financial policies. In the separate structure model, monetary and prudential policies are separate as in the previous model, but the prudential regulation mandate is held by multiple agencies, as shown in Figure 4.

Combining the evidence collected in our analysis, we note that central banks that either do not have financial stability explicitly in their mandate or have it at the bottom of the hierarchy prefer to opt for separate structure mod-

els. Instead, central banks with implicit financial stability mandates, characterised by the monetary authority's determinant role, opt for either central bank or committee models. The most prevalent governance arrangements in G20 countries when a climate-related financial policy has been adopted are thus separate structure models, which can be observed in Australia, Canada, France, Indonesia, Mexico, South Korea and Turkey. In contrast, China and the UK have separate committee models and Brazil has a central bank model.

On the one hand, the importance of having a central bank that has climate-related macroprudential regulation in its mandate is supported by the fact that tools and transmission mechanisms of monetary and macroprudential policy are so profoundly intertwined that it is both ineffective and impossible to delineate a clear separation of the two policy objectives. For example, climate-related macroprudential measures to reduce carbon-intensive lending and direct resources to sustainable sectors impact money creation, directly feeding into price stability. And the close interaction between monetary and macroprudential policy leaves room for the bottleneck approach. Consider, for example, a situation in which carbon-intensive sectors are profoundly affected by a debt overhang because of the low-carbon disorderly transition. If this situation does materialise, these sectors should be primarily supported. The contraction of the carbon-intensive industry could indeed quickly end up in a liquidity spiral, consequent fire sales of assets and cause self-reinforcing deflationary spirals. In this framework, the monetary policy equipped with a price stability mandate is short-handed,

Figure 4
Climate-related financial stability governance structures



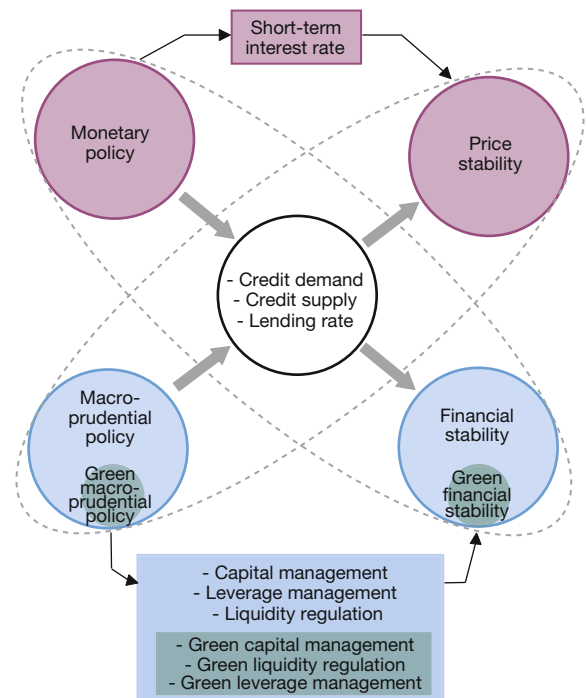
Source: Authors' elaborations based on publicly available information retrieved from national central banks websites.

whereas the climate-related macroprudential policy can target a specific sector (D’Orazio and Popoyan, 2019). On the other hand, separate governance models benefit from balanced coordination without falling into time inconsistency issues and the advantages of the central bank model, namely, the expertise in analysing systemic risk, independence from short-term political pressure, and coordination between the two policy decision-making processes. These features allow policymakers to mitigate the so-called financial dominance, reputational risk and time inconsistency that usually represent more significant risks in the pure central bank model (Smets et al., 2014).

Realising the climate ambitions through the macroprudential mandates can cause trade-offs because climate-related financial and monetary policies differ substantially in terms of objectives. Whereas the former focuses on climate-related financial stability, i.e. reducing systemic risks posed by climate change, the latter relies, in most cases, on monetary stability. In terms of policies, when addressing climate-related threats to price and financial stability, the interaction is more complicated because of possible conflicts due to intertwined transmission mechanisms (Popoyan, 2020). As shown in Figure 5, the field of influence of macroprudential and monetary policy passes indeed through the financial system.

In a broader framework that considers climate-related financial risks and the need to scale up green finance (Kemfert et al., 2020), the question emerges as to how the interaction between the two policies will work. In our view, the challenges posed by climate change call for the development of a synthesis between monetary and macroprudential policymaking. As emphasised in Figure 4, in this setting, monetary policy is concerned with its primary objective, mainly price stability. In contrast, macroprudential policy, enriched with climate-related objectives, is concerned with financial stability, reaching the goal of addressing climate-related financial risks and scaling up green finance. Nevertheless, the implementation of this synthesis poses questions about whether it implies stretching central banks’ mandates and whether this violates the well-known principle of Tinbergen (1939, 1952) according to which “for each policy objective, at least one policy instrument is needed”. We note that by considering Tinbergen’s rule that n objectives require n tools, the inclusion of climate-related objectives in the price stability mandate could, on the one hand, jeopardise the principle itself and, on the other hand, lead to an overstretching of the central bank mandate. The latter becomes less clear and too broad, thus undermining the monetary authority’s independence. However, if the climate-related macroprudential regulation is considered an offspring of the more general macroprudential policy, the leaning against the

Figure 5
Monetary and macroprudential policy interactions and transmission mechanisms in the presence of climate-related financial risks



Source: Authors’ elaboration.

climate-related risk function can be undertaken without violating the Tinbergen principle. This approach is consistent with the EU Task Force’s position on Climate-related Financial Disclosures (FSB, 2019), which places the reporting of climate risk at the same level as reporting financial risks.

Conclusions

The analysis in this paper highlights the fact that some G20 countries realise their climate ambitions through financial stability mandates without affecting the monetary stability mandate. This result is puzzling because of the mismatch between the observed policy practice and its theoretical underpinnings.

We propose engagement in climate-related financial policymaking by studying the types of financial stability governance structures that characterise these countries. The evidence that separates financial stability governance structures is the most common when climate-related financial policies are active; this could be interpreted with respect to the higher expertise and effectiveness of

decision-making that characterises these governance models. The rationale is that when the macroprudential policy mandate is shared among multiple agencies, and each is represented by high-level technical expertise, the decision-making regarding implementing new climate-related instruments is more specialised and eased. Still, the coordination with monetary policy is guaranteed by the important role played by the central bank in the separate committee governance model.

Drawing on these findings, our study emphasises that the potential hurdles emerging from the interaction between monetary and financial policy require a rethink of monetary authorities' and supervisors' roles when dealing with climate change uncertainties and their effects on central banking. In the presence of massive market failures such as climate change, some economists are already calling for overtaking the ideal of market neutrality. As a complement to this view, and based on the evidence collected in our study, this paper argues that effective green central banking governance should be based on a *synthesis* between monetary and macroprudential policymaking that will allow the countries to realise their climate ambitions through climate-related financial policymaking without affecting the monetary policy mandate.

We note that a lack of adequate responses to the climate-related financial risks from central banks and financial regulators could lead to inaction bias and build up additional risks (D'Orazio, 2021a), implying additional threats to the price stability mandate. This calls for a larger engagement at the global level for integrating climate-related financial risks under the macroprudential regulations radar.

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