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The regulatory response to climate risks:  
some challenges

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# The regulatory response to climate risks: some challenges<sup>1</sup>

## Highlights

- *There is a need for authorities to review their prudential frameworks with a view to taking full account of the implications of climate-related financial risks for financial stability.*
- *Given the longer time horizons and the higher degree of uncertainty associated with the materialisation of climate-related financial risks, standard Pillar 1 instruments might be suboptimal in addressing such risks.*
- *In contrast, the intrinsic flexibility of the Pillar 2 framework makes it the natural candidate for ensuring that banks effectively manage such risks and have sufficient loss-absorbing capacity against them.*
- *Applying the current macroprudential framework to contain systemic climate-related financial risks is likely to be ineffective and potentially counterproductive for financial stability. The same could be said of the introduction of a green supporting factor.*

## 1. Introduction

Driven by human behaviour, climate change is unequivocal and unprecedented. According to the sixth Intergovernmental Panel on Climate Change (IPCC) report, the average global surface temperature has risen by around 1°C since the late 19th century and the pace of increase since 1970 is faster than in any other 50-year period over at least the past 2,000 years. Even in the best-case scenario of immediate, rapid and significant cuts in greenhouse gas (GHG) emissions, the average surface temperature will increase 1.5°C in the next 20 years over pre-industrial levels.<sup>2</sup> Under a very high emissions scenario, average warming could reach almost 2°C by 2040 and over 4°C by 2100.<sup>3</sup> Translating this into financial terms, a 1.5°C temperature increase would shave 8% off global GDP by 2100.<sup>4</sup>

Thus, there is a clear case for a determined and comprehensive policy response to foster a swift and orderly transition towards a low-carbon economy. Through a combination of policy instruments, such as carbon taxes, subsidies, guarantees and public infrastructure, governments can create a framework of incentives (and disincentives) that could foster innovation and steer consumers and corporates towards

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<sup>2</sup> In the context of COP26 negotiations, 153 countries, representing 90% of world GDP and over 85% of global emissions, made commitments on new 2030 emissions targets. The implementation of these commitments, known as Nationally Determined Contributions (NDCs), is expected to deliver a reduction of around 5 billion tonnes in annual GHG emissions by 2030 as compared with what would have been achieved without such pledges. These NDCs, however, will not be sufficient to ensure that the 1.5°C target is met by 2050. In fact, current projections based on the recently made commitments point to a 2°C average increase in temperature by 2050. See COP26 (2021) for further details.

<sup>3</sup> IPCC (2021).

<sup>4</sup> CarbonBrief (2018).

their sustainability goals. If sufficiently ambitious, such policies could ensure that emissions reductions targets are met while at the same time mitigating unnecessary disruptions to the economy.

The financial sector has a role to play in facilitating the massive reallocation of resources required by the economic transformation. In particular, as banks determine resource allocation across the economy through their intermediation function, their strategic decisions could decide whether the transition to a sustainable economy succeeds or fails. For example, banks could contribute to a swift transition by providing funding to green activities, such as renewable infrastructure and technologies. They might also promote an orderly transition by supporting the transformation of carbon-intensive industries into more sustainable businesses.

By ensuring that the financial system adequately manages climate-related financial risks, prudential regulation will also contribute to an orderly transition. The main aim of prudential regulation is to ensure the safety and soundness of financial institutions and to safeguard the stability of the financial system. Adjustments in the prudential framework should be driven by financial stability considerations. In other words, adjustments in the microprudential and the macroprudential rules should aim at correcting possible flaws in the current framework to fully address the risks that climate developments pose for financial institutions. Central banks and supervisory authorities can and should assist in this challenging and critical priority of tackling climate change, but their response should be limited to actions that fall squarely within their mandates.<sup>5</sup>

This paper reviews, from a technical point of view, the challenges that authorities would face in seeking to adjust the prudential framework to cope with climate-related financial risks, and discusses different policy options. Section 2 describes the key climate-related financial risks and how they may affect and be affected by financial institutions. Sections 3 and 4 discuss, respectively, the trade-offs associated with the use of different micro and macroprudential instruments and policies to deal with climate-related financial risks in the light of specific challenges posed by such risks. Section 5 concludes.

## 2. The key risks

Climate change poses formidable challenges to individual banks and the financial system. Financial institutions are exposed to climate change through two different climate risk drivers.

- First, banks are exposed to physical risks. In particular, they may suffer from the economic costs and financial losses resulting from the increasing severity and frequency of extreme climate change-related events (eg heatwaves, landslides, floods, and wildfires), longer-term gradual shifts in the climate (eg changes in precipitation, extreme weather variability, ocean acidification and rising sea levels) and the indirect effects of climate change (eg desertification, water shortage and soil degradation).
- Second, and arguably more importantly, as jurisdictions seek to mitigate climate change by reducing GHG emissions, their efforts generate transition risk drivers. This is because economic disruptions could result from the cumulative effects of changes in government policies, in technology and in consumer and investor behaviour. These, in turn, may erode the value of some bank exposures and the underlying collateral.<sup>6</sup>

By and large, the climate-related financial risks faced by financial institutions fall under the risk taxonomy used in prudential regulation. In particular, physical and transition risks manifest themselves through traditional bank risks (eg credit risk, market risk, liquidity risk and operational risks). For example,

<sup>5</sup> See Bailey (2021) and Powell (2021).

<sup>6</sup> Basel Committee on Banking Supervision (BCBS) (2021a) and Carney (2015).

physical and transition risks may impact borrowers' income and wealth, impairing their repayment capacity. Similarly, climate-related financial risks may affect the prices of real and financial assets and therefore inflict capital losses on banks' portfolios of assets measured at fair value. In addition, climate-related developments can increase operational risk by disrupting business continuity and by giving rise to litigation and reputational losses.<sup>7</sup>

Banks' collective behaviour may have a bearing on the aggregate climate-related financial risks faced by the industry as a whole. For example, if most banks were to adjust their strategy to reduce their brown (ie carbon-intensive) exposures, this could speed the transition to a lower-carbon economy and hence mitigate physical risks. However, collectively, the same actions could increase transition risks as insufficient and less affordable funding might hinder carbon-intensive industries from cleaning up their activities, which in turn could render their business models less profitable or even unsustainable in the longer term.<sup>8</sup> This means that climate-related financial risks should not be treated as fully exogenous from a prudential policy perspective. In other words, in designing the prudential approach for climate-related financial risks, regulators need to bear in mind potential coordination failures, and more generally, that the response of banks to new policies may affect the balance between aggregate physical and transition risks.<sup>9</sup>

### 3. The microprudential framework

The microprudential framework seeks to safeguard the safety and soundness of individual financial institutions against climate-related financial risks. As these risks manifest themselves through traditional bank risks, it would seem logical to address climate-related financial risks within the existing regulatory framework. The natural first step is to assess whether current rules can already adequately capture climate-related financial risks. If not, regulators would need to consider supplementary action by modifying Pillar 1 instruments (eg adjustments in risk weights, concentration limits), Pillar 2 requirements (eg supervisory review processes and capital add-ons) or Pillar 3 disclosure obligations. Indeed, the BCBS, as the international standard-setting body for banks, has announced a workplan to identify potential gaps in the three pillars of the Basel framework and develop appropriate measures to address them, if warranted.<sup>10</sup>

The unique features of climate-related financial risks suggest that such risks are not fully captured by the current microprudential framework.<sup>11</sup> These include:

- First, climate-related financial risks will materialise over short, medium and long (ie decades-long) time horizons. In contrast, the existing microprudential regime, in particular for setting capital requirements, focuses on risks that will materialise over a relatively short time horizon (typically one year).
- Second, as climate-related events are uncertain and likely to grow over time, their evolution will arguably involve non-linearities and tipping points. As a consequence, the largely backward-looking traditional approach based on historical loss experience will probably fail to capture the forward-looking elements of these risks.

<sup>7</sup> BCBS (2021a).

<sup>8</sup> Dunz et al (2021) and Dafermos and Nikolaidi (2021).

<sup>9</sup> For example, in extreme scenarios, an abrupt shift towards green exposures and collateral is likely to boost the value of these assets and may even fuel a green bubble (Dunz et al (2021)).

<sup>10</sup> BCBS (2021b).

<sup>11</sup> Bank of England (2021).

This seems to indicate that adjustments to the existing microprudential framework may be necessary, but determining the adequate prudential approach is challenging. These adjustments, which in principle could involve changes to all the three pillars of the Basel Framework, would seek to ensure that banks can effectively manage climate-related financial risks and to absorb future losses arising from such risks should they materialise. In designing such adjustments, however, regulators may be faced with difficult challenges arising from the unique features of climate-related financial risks. In particular, data and methodological limitations and, especially, the longer time horizon and the high degree of uncertainty as to how and when climate-related risks will materialise, seem to suggest that more flexible prudential instruments might be more suitable for addressing such risks.

Adjusting standard Pillar 1 instruments such as capital requirements to address climate-related financial risks may be particularly challenging at this stage. Capital requirements are designed to ensure that banks have sufficient loss-absorption capacity to cover losses should unexpected developments occur, over a specified time horizon. In particular, Pillar 1 capital requirements are calibrated for a one-year time horizon on the basis of the historical loss experience. For climate-related financial risks, however, the historical loss experience is not available, and a more forward-looking approach is required. In addition, to capture climate-related financial risks, longer time horizons would have to be applied when calibrating capital requirements. While such an extension could be warranted from a conceptual point of view,<sup>12</sup> making this adjustment would entail some non-negligible operational challenges:

- First, capital requirements are usually calibrated on the basis of an implicit value at risk (or similar) methodology, with a view to measuring losses for specific exposures in contingent scenarios occurring with a pre-determined probability. This means that calibrating capital requirements to account for climate-related financial risks would require the probability distribution of climate-related events to be estimated, together with the potential policy reactions – a task that becomes increasingly complex and uncertain as the reference period lengthens.
- Second, the longer the time horizon of the key risk scenarios, the more important it becomes to consider how banks will respond to emerging risks over those scenarios. Requiring banks to set aside capital today to cover losses for risks that may only materialise long after the maturity of most of their current exposures and only if their investment strategy remains unchanged over long time horizons is inconsistent with the construction of the prudential framework.

In contrast, given its flexibility, Pillar 2 offers more scope for dealing with climate-related financial risks.<sup>13</sup> Within the supervisory review processes, authorities have a wider variety of capital and non-capital-based tools that might be deployed to ensure the effective management of climate-related financial risks.<sup>14,15</sup> For example, supervisors could use their assessments of firms' exposures to climate-related financial risks to seek – within a reasonable period of time – enhancements to ensure that firms properly identify, monitor, measure and control such risks. In this context, if a supervisor concludes that the bank's risk profile is not compatible with its risk management capabilities, banks could be required to submit a regularisation plan establishing a timeline for the firm to reduce or mitigate its exposures and improve its risk management framework. Furthermore, if the supervisor identifies persistent and unjustified deviations

<sup>12</sup> In fact, in stress-tests, capital is assessed against estimated losses in different scenarios typically spanning two or three years.

<sup>13</sup> According to the Basel Framework (SRP 10.5), there are "three main areas that might be particularly suited to treatment under Pillar 2: risks considered under Pillar 1 that are not fully captured by the Pillar 1 process (eg credit concentration risk); those factors not taken into account by the Pillar 1 process (eg interest rate risk in the banking book, business and strategic risk); and factors external to the bank (eg business cycle effects)."

<sup>14</sup> Indeed, supervisors use a range of approaches, methodologies and strategies to execute their supervisory review process to meet the overall objectives of a sound supervisory approach to Pillar 2. See BCBS (2019) for an overview of Pillar 2 supervisory review practices and approaches. See also on the same topic Duckwitz et al (2019).

<sup>15</sup> See BCBS (2021c).

from the agreed plans, those findings could be factored into regular Pillar 2 assessments and eventually lead to a capital add-on on the grounds of deficient risk management.

Supervisory actions under Pillar 2 could be based on suitable scenario analysis and stress testing. Climate stress tests allow supervisors, at least theoretically, to consider the potential impact on banks from different scenarios that could combine specific climate developments and actions taken by policymakers and the banks themselves.<sup>16</sup> Those exercises can therefore facilitate the derivation of scenario-contingent impact estimates of both physical and transition risks on banks' balance sheets within an internally consistent framework. Supervisors can use these exercises to increase banks' awareness of potential deficiencies in their risk management framework as well as to require management action and additional loss-absorption capacity, if needed.

While the principles-based nature of the Pillar 2 framework<sup>17</sup> provides authorities with sufficient flexibility to more effectively address climate-related financial risks than is the case with Pillar 1 instruments, this flexibility should not lead to unwarranted differences in the requirements derived from the supervisory review process across jurisdictions, as this could generate competitive distortions. There could therefore be merit in developing some form of common guidance for regulators that could contribute to a consistent implementation of requirements across entities and jurisdictions. In particular, such guidance might describe how climate-related financial risks could be integrated into the supervisory review process, outlining the situations when additional loss-absorbing capacity would be required.

Improved Pillar 3 disclosures are key for attaining the transparency required for market incentives to operate effectively. Publicly available information on the financial impact of climate-related and environmental risks and opportunities promotes market discipline and creates incentives for companies to manage their individual risks. As such, supervisors have a role to play in the regular monitoring of banks' disclosures as regards climate risk, especially when these happen to be inconsistent with the bank's risk appetite and risk management capabilities.

## 4. The macroprudential framework

The macroprudential framework would seek to address the systemic implications of climate-related risks. In line with the logic behind the current macroprudential framework, the first objective of the application of macroprudential policies to address climate-related financial risks would be to increase the resilience of the financial system, particularly if the macroprudential authority considered that climate-related financial risks could give rise to systemic risks that are not sufficiently captured by the microprudential framework. A second – and arguably more ambitious – objective would aim at directly containing these systemic risks by influencing banks' credit policies. Note that, in the case of traditional macroprudential policies, both objectives could, in principle, be achieved by deploying a single instrument such as the countercyclical capital buffer. For instance, in a situation of systemic risks posed by excessive aggregate credit growth, higher capital requirements would help both to increase resilience and to contain the systemic risks by moderating credit expansion.

The importance of the first objective (ie increasing resilience) depends on whether climate-related developments could give rise to systemic risks that are not sufficiently captured by the microprudential

<sup>16</sup> Baudino and Svoronos (2021).

<sup>17</sup> The Pillar 2 component of the Basel framework is based on four key principles. Principle 1 requires banks to have a process that assesses their overall capital adequacy in relation to their risk characteristics, as well as a strategy for maintaining their capital levels. The other three principles apply to supervisors and comprise the supervisory review process of a bank's internal capital adequacy assessments (Principle 2); the expectation that banks operate above the minimum requirements (Principle 3); and the recommendation that supervisors intervene at an early stage to prevent capital from falling below the minimum levels required to support the risk characteristics of a particular bank (Principle 4).

framework. This would be the case if, for example, coordination failures were to give rise to transition risks on a systemic scale. Note, however, that supervisors may increase the resilience of financial institutions by using the Pillar 2 framework. Indeed, through stress tests, supervisors take into account adverse macroeconomic developments, which could in theory embed climate-related developments, such as the failure of carbon-intensive industries. Hence, while potentially helpful, it is not obvious that a climate macroprudential framework is essential to ensure that the financial system is able to absorb systemic shocks generated by climate-related events.

To achieve its second objective (ie containing systemic risks), the macroprudential authority could aim at providing banks with the necessary incentives to reduce their exposures to climate-related financial risks. In the pursuit of this objective, the macroprudential authority would deploy tools with a view to steering banks' underwriting practices away from firms and sectors that are most vulnerable to physical and transition risks.

Yet, the actual effectiveness of prudential tools to steer banks' credit policies is, at best, uncertain. Some empirical evidence shows that changes in capital requirements have little impact on banks' investment policies unless they are calibrated at a very high level.<sup>18</sup> More importantly, macroprudential measures aimed at reducing exposures to carbon-intensive firms and sectors may not always be conducive to reducing aggregate climate-related financial risks. In particular, a significant increase in capital requirements for brown exposures, by curtailing the availability and affordability of credit to carbon-intensive industries, would increase the vulnerability of those sectors and hinder affected firms from adjusting their business models.<sup>19</sup> Consequently, prudential measures directly aiming at containing brown exposures may not necessarily contribute to a financial stability goal, as they might exacerbate transition risks – unlike the case of macroprudential actions aiming at discouraging excessive credit growth or excessive credit contractions.

Similarly, a green-supporting factor, one that alleviates prudential requirements for green exposures, is unlikely to contribute to financial stability policy objectives. A reduction in capital requirements for green assets would cause a break in the fundamental relationship between risks and capital requirements as there is no conclusive evidence that green investments are less risky than other exposures.<sup>20</sup> More importantly, the unexpected losses that could arise from those exposures would, by definition, be insufficiently covered by own resources. Moreover, such an approach could also encourage the overvaluation of green assets in respect to their fundamentals. Although this may look like a remote scenario at this stage, it cannot be completely ruled out that policy measures and society's increased concerns about climate change could eventually lead to a green bubble.<sup>21</sup>

Hence, there is no clear case for macroprudential regulation aimed at containing systemic climate-related financial risks. As illustrated in Table 1, the deployment of macroprudential instruments for that purpose is at best ineffective but could also generate perverse side effects for the financial system. In contrast, government policies could go a long way towards reducing systemic climate-related financial risks. Although a complex endeavour, a comprehensive, transparent and well defined policy programme involving the required mixture of taxes, subsidies and public guarantees for different activities would not only facilitate the achievement of the climate targets more broadly but also, very importantly, alleviate the transition risks.

<sup>18</sup> Chamberlin and Evain (2021).

<sup>19</sup> Dafernos and Nikolaidi (2021).

<sup>20</sup> Network for Greening the Financial System (NGFS) (2020).

<sup>21</sup> Aramonte and Zabai (2021).

Risk	Instrument	Objectives	
		Resilience	Systemic risk reduction
Excessive credit growth	Cap ↑	++	+
Physical CRR <sup>⊙</sup>	Cap (brown) ↑	++	=
Physical CRR	Cap (green) ↓	-	=
Transition CRR	Cap (brown) ↑	++	-
Transition CRR	Cap (green) ↓	-	-

⊙ CRR: climate related risks. Cap: capital requirements (eg countercyclical capital buffer). Cap (brown): capital requirements for brown exposures (eg brown penalising factor). Cap (green) capital requirements for green exposure (eg green supporting factor).

Source: FSI analysis.

## 5. Concluding remarks

There is a need for authorities to review their prudential frameworks so as to fully incorporate the implications of climate-related financial risks for financial stability. Physical and transition risks threaten the safety and soundness of individual banks and the stability of the financial system. Accordingly, there is merit in expanding existing prudential regulatory frameworks to ensure that banks have adequate climate-related risk management processes in place that are consistent with their risk appetite, risk profile and operating environment. In addition, changes to the prudential framework should involve an assessment of whether capital requirements already adequately capture such risks or if adjustments are needed to address any significant gaps as to ensure sufficient loss-absorbing capacity.

Yet, the operationalisation of such a prudential approach for climate-related financial risks entails substantial operational challenges. First, given the longer time horizons and the high degree of uncertainty as to how and when climate-related financial risks will materialise, standard Pillar 1 instruments such as capital requirements might be suboptimal to address such risks, at least at this stage. In contrast, the intrinsic flexibility of the Pillar 2 framework makes it the natural candidate for ensuring that banks effectively manage climate-related financial risks and have sufficient loss-absorbing capacity against such risks. That said, the same flexibility that makes the Pillar 2 framework such a powerful and effective approach may give rise to varying requirements across jurisdictions. Therefore, some form of common guidance would be welcome on how climate-related financial risks could be integrated in the supervisory review process.

At this stage, there seems to be no obvious scope for a macroprudential framework aimed at containing systemic climate-related financial risks. First, because the microprudential regime, and in particular, the Pillar 2 framework, through stress tests and scenario analyses, seems to be a more suitable approach to ensuring that banks have sufficient loss-absorbing capacity against systemic climate-related financial risks. Second, the application of tools such as increasing capital requirements for brown exposures or alleviating these requirements for green exposures are likely to be ineffective and might not necessarily contribute to financial stability.

Swift action by governments to steer the transition towards a greener economy could fruitfully interact with financial stability-focused prudential regulation to ensure that the financial sector contributes effectively to the economic transformation. Through a combination of carbon taxes and subsidies as well as guarantees, public authorities should seek to meet emissions reductions targets and, also, to facilitate an orderly transition to a more sustainable economy. At the same time, this policy mix would help to reduce the overall exposure of the financial system to both physical and transition risks. Combined with a well designed climate-related microprudential framework, this could help the banking system to manage these risks and, thus, to contribute effectively to the economic transformation.

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