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Macroprudential policies for  
addressing climate-related financial  
risks: challenges and trade-offs

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# Macroprudential policies for addressing climate-related financial risks: challenges and trade-offs<sup>1</sup>

## Highlights

- *Macroprudential policies aim to maintain financial stability by increasing the resilience of the financial system (together with the microprudential framework) and containing the accumulation of systemic risks.*
- *Standard macroprudential instruments (such as capital add-ons on specific exposures) may not always contribute to these objectives when deployed to address the systemic implications of climate-related financial risks, as they could exacerbate transition risks.*
- *In order to mitigate these potential side effects, authorities need to carefully define the scope of application of such macroprudential policies.*
- *While overcoming these challenges is an operationally complex task, failure to do so may render such macroprudential policies ineffective and potentially counterproductive for financial stability.*

## 1. Introduction

Climate-related financial risks (CRFRs) may affect the safety and soundness of individual financial institutions through two different sets of risk drivers. First, banks are exposed to physical risks. In particular, they may suffer from the economic costs and financial losses resulting from increasingly erratic climate conditions, including more severe and frequent extreme climate change-related events. Second, efforts to mitigate climate change by reducing greenhouse gas emissions may generate transition risks. This is because the cumulative effects of changes in government policies, technology and consumer and investor behaviour and preferences could deteriorate the business prospects of affected firms and entire sectors. This, in turn, may erode the value of some of the banks' assets.<sup>2</sup>

In addition, CRFRs may have broader financial stability implications. In principle, the materialisation of physical and transition risks could result in system-wide shocks, distressing financial markets and triggering sharp asset price corrections simultaneously affecting multiple financial institutions holding such assets. Moreover, transition risk may alter the correlation structure of credit risk across exposures and reduce diversification opportunities. More broadly, economic interdependencies and the feedback loop between the financial system and the real economy mean that the endogeneity of CRFRs and its implications are unlikely to be fully accounted for by individual firms when they assess their exposures and manage their risks.<sup>3</sup>

In the light of the potentially material and increasing risks posed by climate change to the safety and soundness of individual firms, there is a strong case for financial authorities to adjust their microprudential frameworks. Policies would aim to increase banks' resilience by promoting the effective

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<sup>2</sup> BCBS (2021) and Carney (2015).

<sup>3</sup> See ECB/ESRB (2022) for more information on the rationale for macroprudential tools aimed at addressing CRFR.

management of CRFRs and by ensuring that firms have sufficient loss-absorbing capacity against them. In principle, such policy objectives could be achieved with adjustments to all the three pillars of the Basel Framework.<sup>4</sup> These policies, which could take the form of both capital- and non-capital-based measures, would fall squarely within microprudential authorities' remit.

In addition, the potential system-wide risks to financial stability posed by climate change suggest that authorities may also need to have at their disposal macroprudential instruments for addressing CRFRs' systemic implications. In particular, the cumulative effect of lending to carbon-intensive activities will lead to negative externalities in the form of more emissions, and hence higher aggregate risks to the economy and the financial system as a whole.<sup>5</sup> Moreover, in a disorderly transition scenario in which funding to carbon-intensive sectors suddenly becomes scarce and less affordable, firms would find it difficult to clean up their activities to make their business models sustainable. This, in turn, would undermine their ability to repay and service their debt and reduce the value of pledged collateral. Such developments would probably give rise to significant credit losses and spillovers with the potential to become systemic in nature, undermining financial stability.<sup>6</sup>

Importantly, such measures should not be designed with a view to pursuing broader climate change-related objectives. In fact, through a combination of policy instruments, such as carbon taxes, subsidies, guarantees and public infrastructure, governments are in a better position create a framework of incentives (and disincentives) that could foster innovation and steer consumers and corporates towards their sustainability goals. The design and implementation of the macroprudential framework should be informed by financial stability considerations alone. While this framework would certainly interact with supervisory measures imposed on each financial institution and general climate-related government policies, its deployment should always be predicated on the assessment that CRFRs pose risks to financial stability which cannot be addressed by microprudential requirements alone.

However, applying standard instruments to address CRFRs' macroprudential implications may be subject to complex trade-offs. For example, attempts to mitigate the systemic impact of physical and transition risks by containing banks' outright as well as indirect<sup>7</sup> exposures to carbon-intensive counterparties could well affect the availability and affordability of funding and, therefore, the feasibility of an orderly transition path.

This paper discusses the challenges associated with designing and implementing macroprudential policies to address the system-wide effects of CRFRs, with a particular focus on measures that target banks' underwriting practices with a view to containing the accumulation of systemic risks over time. Section 2 reviews the core features of macroprudential policies, including definitions, objectives and potential tools. Section 3 discusses the challenges and trade-offs which stem from the unique features of CRFRs that have a bearing on the design, implementation and effectiveness of the macroprudential

<sup>4</sup> Coelho and Restoy (2022) argue that given the longer time horizons and the high degree of uncertainty as to how and when CRFRs will materialise, standard Pillar 1 instruments such as capital requirements might be sub-optimal for addressing such risks. In contrast, the intrinsic flexibility of the Pillar 2 framework makes it the natural candidate for ensuring that banks effectively manage CRFRs and have sufficient loss-absorbing capacity against them. Pillar 3 would also play a key role to the extent that enhanced disclosures will contribute to attaining the transparency required for market incentives to operate effectively.

<sup>5</sup> ECB/ESRB (2022).

<sup>6</sup> While outside the scope of this paper, the possibility of a so-called green bubble would be another motivation for a macroprudential framework for addressing financial risks deriving from climate change. This is based on the assumption that policy measures and society's increased concerns about climate change could eventually lead to an abrupt shift towards green exposures, with that behaviour boosting the value of these assets and ultimately fuelling a green bubble (Aramonte and Zabai (2021)).

<sup>7</sup> This would include, for example, exposures to firms that may not engage in carbon-intensive activities themselves but are part of the value chain of carbon-intensive industries.

policies for addressing such risks. Section 4 discusses policy options and the complexity associated with their implementation. Section 5 summarises and concludes.

## 2. Macprudential policy: definitions, objectives and tools

A key element of the post-financial crisis reforms, macroprudential frameworks have become an essential part of the operational arrangements aimed at safeguarding financial stability in most jurisdictions. Such frameworks focus on the stability of the financial system as a whole and its interactions with the real economy, rather than just on the safety and soundness of individual financial institutions.<sup>8</sup> In particular, through the use of prudential tools, macroprudential frameworks aim to increase the resilience of the financial system and limit systemic risk – ie the risk of widespread disruption to the provision of financial services that is caused by an impairment of all or parts of the financial system, which can cause serious negative consequences for the real economy. Notice that the first objective of macroprudential policies (increasing banks' resilience) is shared with the microprudential actions. Ultimately, macroprudential and microprudential policies cooperate to reduce the frequency and severity of systemic financial crises.<sup>9</sup>

Macroprudential authorities seek to achieve their goals by deploying policies which operate through the cross-sectional and time dimensions of systemic risk<sup>10</sup> and contribute to three intermediate policy objectives. Within the cross-sectional dimension, authorities primarily aim to reduce the probability that a shock will propagate across financial entities. Policies intended to achieve this objective often target structural vulnerabilities in the financial system that arise from common exposures and interlinkages as well as externalities that individual firms impose on the financial system as a result of their systemic importance.<sup>11</sup> Commonly used instruments to achieve this intermediate policy objective include capital surcharges for systemically important financial institutions and requirements for central counterparties to maintain sufficient financial resources to withstand a default by the participant(s) to which they have the largest exposure(s).

Within the time dimension of systemic risk, authorities deploy macroprudential instruments with two primary objectives. First is increasing the financial system's resilience to aggregate shocks by strengthening bank's loss absorption capacity. Second is containing the accumulation of systemic risks (ie reducing the likelihood and intensity of potential shocks). The latter objective often calls for deploying instruments that affect risk-taking incentives and banks' collective behaviour as a way to dampen the build-up of financial imbalances. Fundamental to this definition is the notion of coordination failure and, in particular, the fact that decisions by firms which may seem optimal from their individual perspective may generate a sub-optimal outcome for the financial system as a whole.<sup>12</sup>

<sup>8</sup> Crockett (2000) and BIS (2018).

<sup>9</sup> Crockett (2000) and FSB-IMF-BIS (2011a,b, 2016).

<sup>10</sup> The cross-sectional dimension of systemic risk refers to the distribution of risk within the financial system at a point in time, while the time dimension refers to the evolution of systemic risk over time. As such, the former is primarily concerned with the relative magnitude of systemic risk, while the latter is interested in the absolute level of systemic risk (Borio (2003) and Borio et al (2022)).

<sup>11</sup> See FSB (2010) for further information on the motivation for introducing higher loss absorbency requirements with a view to reducing moral hazard risks associated with systemically important banks.

<sup>12</sup> This would be the case, for example, if several banks made a decision to quickly expand real estate lending, with that giving rise to imbalances in the housing market, culminating in the burst of a bubble.

## Macroprudential tools and objectives

Table 1

Instrument	Objectives	
	Increasing resilience	Reducing systemic risk
Borrower-based measures (eg limits to debt service-to-income ratios)	=	+
Countercyclical capital buffer, sectoral buffer for real estate exposures	+	+

Source: FSI analysis.

Macroprudential tools operating through the time dimension may help to achieve one or both policy objectives of increasing the resilience of financial system and dampening the accumulation of systemic risks. Borrower-based measures (eg limits to debt service-to-income ratios), for example, target the latter objective. Other macroprudential policies primarily aim to increase the resilience of the financial system but may also contribute to containing the accumulation of systemic risk. This is the case, for example, when authorities raise the rate of the countercyclical capital buffer in response to a situation of increasing systemic risks resulting from excessive aggregate credit growth, or when higher capital requirements are temporarily imposed on riskier real estate exposures (eg loans with higher loan-to-value ratios) to curb the accumulation of imbalances in the housing market.

### 3. Challenges and trade-offs when addressing CRFRs

Designing and implementing macroprudential instruments comes with various challenges. These include: (i) difficulty in defining the ultimate policy objective; (ii) conflicts with other policy objectives, such as between macroprudential and microprudential policy objectives or between macroprudential and monetary policy goals; (iii) challenges associated with identifying financial vulnerabilities early enough and with sufficient certainty to take actions as to mitigate them; (iv) bias towards inaction deriving from the political economy costs of adopting preventive and unpopular measures; (v) difficulty assessing the impact and effectiveness of macroprudential measures; and (vi) potential leakages resulting from a migration of the targeted activity outside the regulatory perimeter.<sup>13</sup>

In addition to these issues, which are relevant to macroprudential policies in general, the design and implementation of macroprudential measures for addressing systemic CRFRs come with a specific challenge. While such policies (in particular those that impose additional capital requirements on banks) would most likely contribute to increasing the resilience of the financial system, unlike other traditional macroprudential tools, they may not necessarily contain the accumulation of such risks.<sup>14</sup> In fact, depending on their design and implementation, such policies could unintentionally lead to higher systemic risks across both the time and cross-sectional dimensions and, more generally, generate a counterproductive outcome for the financial system as a whole.<sup>15</sup>

<sup>13</sup> See BIS (2018) for more details

<sup>14</sup> Dafermos and Nikolaidi (2022) make a distinction between weak and strong macroprudential tools to address CRFRs and increase the resilience of the financial system based on the extent to which such tools take into account the feedback effects of the financial system on the economy.

<sup>15</sup> See Dafermos and Nikolaidi (2021) for a discussion about the transmission channels through which macroprudential tools and other policies affect CRFRs.

In particular, macroprudential measures consisting of higher capital requirements for exposures to carbon-intensive firms and sectors (sectoral buffers and measures that generate similar regulatory outcomes such as concentration risk measures) will arguably reduce the availability and affordability of resources to such firms, thereby hindering their ability to adjust their business models and making them less viable in the medium and long term.<sup>16,17</sup> Therefore, as a result of a coordination failure problem, such a policy could exacerbate transition risks to which the financial system is exposed.<sup>18</sup> Similarly, through banks' common exposures to targeted sectors, the deployment of such policies may give rise to shocks that would propagate across the financial system. This would happen, for example, if banks would rush to reduce their exposures to affected firms, with this dynamic generating further losses to all financial institutions exposed to those firms.

## 4. Policy options

The climate-specific challenges described above seem to suggest that macroprudential policies targeting carbon-intensive activities should be carefully designed so as to mitigate their potential side effects and avoid creating obstacles to an orderly transition towards a sustainable economy.<sup>19</sup> In theory, such side effects could be moderated if the scope of application of the macroprudential instrument aimed at addressing CRFRs' systemic effects could be defined in such a way as to not hinder the provision of transition finance (ie funding to support firms in adjusting their business models to make them more sustainable). In other words, sectoral buffers (or other measures targeting carbon-intensive counterparties such as concentration limits or surcharges) would not target all exposures to carbon-intensive industries and counterparties.

The first important consideration in relation to the definition of the scope of application of such an instrument is about the extent to which such measures would affect the existing stock of exposures in addition to new loans to carbon-intensive entities or projects. In line with the motivation for some borrower-based macroprudential measures, the focus on new loans would create incentives for firms to adjust their underwriting practices, in particular in relation to their pricing and the types and levels of risk they may be ready to accept. Moreover, by focusing on new loans, authorities would have more flexibility to calibrate such measures as the impact in overall capital requirements would be proportional to the stock of new loans granted after the new policy was enacted.<sup>20</sup> In contrast, the application of such a

<sup>16</sup> Bank of England (2021) argues that if dirty penalising factors are not appropriately calibrated, they might deprive consumers and business from essential financial services and hinder the ability of firms to make their businesses more sustainable. Dafermos and Nikolaidi (2022) argue that such measures may also exacerbate physical risks. This would happen if the dirty penalising factor were to focus on lending targeting climate-vulnerable areas as this would hinder the ability of borrowers in these areas to adapt and reduce their vulnerability.

<sup>17</sup> According to Oehmke (2022), an additional side effect is that, depending on their design, such measures may also reduce the availability and affordability of loans to low-emitting firms as consequence of the decline in the profitability of affected banks.

<sup>18</sup> According to Bank of England (2021), as financial institutions respond to the growing risks posed by climate change, there is a risk that they might take similar management actions around the same time and the collective behaviour may lead to volatility in financial markets and create risks to financial stability.

<sup>19</sup> Several authorities have been exploring potential macroprudential tools for addressing CRFR. ECB/ESRB (2022), for example, has conducted an assessment of the benefits and drawbacks of deploying different tools to address such risks. This includes implementing or adjusting the following tools: sectoral systemic risk buffer, concentration threshold, concentration surcharge, sectoral requirements, sectoral leverage ratio, capital conservation buffer, countercyclical capital buffer, borrower-based measures, Liquidity Coverage Ratio, Net Stable Funding Ratio and systemic bank buffers.

<sup>20</sup> Chamberlin and Evain (2021), for example, show that changes in capital requirements have little impact on banks' investment policies unless they are calibrated at a very high level. By focusing on new loans, authorities could in principle calibrate additional capital requirements to achieve such a level, with a limited impact on banks' overall capital requirements.

requirement to the existing stock of exposures could accelerate the unwinding of such exposures, leading to an abrupt transition and hence generating more transition risks.

Nevertheless, the focus on new loans alone could mean that authorities would not have sufficient firepower to moderate the negative externalities derived from their lending activities. This would be the case in particular if the scope of the measure would not encompass credit renewals and refinancing operations. In such a scenario, the stock of such exposures would only slowly decline over time. In addition, by excluding such transactions, there would be a higher risk of regulatory arbitrage to the extent that the renegotiation of existing contracts could be used as the basis to grant new loans.

As a result, in order to increase the firepower of financial sector authorities and mitigate some of the drawbacks described above, authorities could consider targeting stocks in addition to new loans. In this case, however, the more stringent requirements targeting such exposures would ideally be calibrated so as to avoid a rapid unwinding of existing positions. In principle, this could be achieved if the more stringent requirements were to be phased in over a sufficiently long transition period, with the calibration of this instrument being informed by the assessment of the potential transition risks the introduction of the new measure would generate. Nevertheless, in doing so authorities would need to take into account the possibility that banks might front-load the implementation of the measure, with such behaviour potentially giving rise to more transition risks.

The second relevant consideration when designing this measure has to do with the level it will target. There are at least two design options, each with benefits and drawbacks. The first would be to define the scope of application at the firm level, using an assessment of the current and future emission profile of the firm as the basis for identifying entities for which exposures would be subject to more stringent requirements. In principle, this forward-looking assessment could be based on credible transition plans demonstrating how individual firms plan to adjust their emission profile going forward. The second option would be even more granular, as the scope of application would be defined at the level of specific projects rather than counterparties. Under this approach, banks and supervisors would aim to distinguish transition finance from other types of lending to carbon-intensive counterparties in order to mitigate transition risks.

From a practical perspective, however, to implement either the firm- or project-level approach, authorities would need to overcome non-negligible challenges. In particular, they would need to clearly define the scope of application of such policies to identify counterparties or projects in relation to which the more stringent requirements would apply. As a result, such a framework would be predicated on the existence of sufficiently clear and granular data and taxonomies to allow banks and supervisors to assess whether a specific exposure falls within the scope of application of this instrument.<sup>21</sup> In the case of the firm-level approach, an additional challenge relates to banks' and supervisors' ability to make a forward-looking assessment about entities' future emission profile and ability to adjust their business models. As for the project-level approach, authorities and banks will have to distinguish between transition finance and other forms of lending to carbon-intensive counterparties.

<sup>21</sup> While work remains to be done, significant progress has been made in both areas in the last few years. This includes the 2022 publication of the exposure drafts IFRS S1 General Sustainability-related Disclosures and IFRS S2 Climate-related Disclosures by the ISSB (2022a,b) as well the publication of the European Union taxonomy for sustainable finance in 2020 by the European Parliament (European Parliament (2020)), supplemented by regulations issued by the European Commission in 2021 and 2022 (European Commission (2021, 2022)).



## Macroprudential tools and objectives

Table 2

Instrument	Objectives	
	Increasing resilience	Reducing systemic risk
Cap dirty, <sup>⊖</sup> concentration limits and concentration surcharge (scope of application broadly defined)	+	-
Cap dirty, concentration limits and concentration surcharge (scope of application narrowly defined)	+	+

<sup>⊖</sup> Cap dirty = additional capital requirements for dirty exposures (eg dirty penalising factor).

Source: FSI analysis.

Should authorities successfully overcome these challenges, such a measure designed on the basis of a narrowly defined scope of application would presumably outperform similar tools with a broader scope of application. This is because, while both types of measures would increase the resilience of the financial system, the instrument characterised by a narrow scope of application would contribute to mitigating transition risks rather than amplifying them.

In any event, macroprudential policies aimed at containing systemic risks should be a complement rather than a substitute of the required adjustment of the microprudential framework to cope with the CRFRs financial institutions face. In that regard, that microprudential regulation and supervision – whether in the form of quantitative or qualitative measures – aimed at strengthening the safety and soundness of individual banks would normally need to target all their existing exposures to dirty counterparties and they could not focus on just new loans or specific projects.

## 5. Concluding remarks

Authorities should assess whether they need to develop macroprudential policies specifically designed to address physical and transition risks that could result in systemic shocks with broader implications for financial stability. Such macroprudential policies may be needed to increase the resilience of the financial system to the extent microprudential requirements may be insufficient to address system-wide risks. In addition, and, arguably more importantly, such macroprudential policies would be designed to help contain the accumulation of CRFRs of a systemic nature.

However, the design and implementation of macroprudential policies for addressing CRFRs come with challenges. As a result of the unique features of CRFRs and the potential for coordination failure problems, designing policies that help to increase the resilience of the financial system while at the same helping to contain the build-up of systemic risks is likely to be a challenging task. In fact, depending on their design, macroprudential policies may actually exacerbate transition risks and generate a sub-optimal outcome for the financial system as a whole.

In order to mitigate these challenges and their potential side effects, authorities need to carefully define the scope of application of such macroprudential policies. In doing so, however, they will be faced with important trade-offs. First, they will need to assess the extent to which such a macroprudential measure would target the existing stock of exposures in addition to new loans to carbon-intensive activities. Second, as a way to mitigate the risk that the measure could hinder the provision of transition finance for firms to adapt their business model, authorities will need to consider whether to apply such an instrument at the firm or project level.

Regardless of the specific design choices, implementing such a macroprudential policy for CRFRs, which could helpfully complement an adequately adjusted microprudential framework, will not be an easy task. This is because such a framework would be based on the existence of sufficiently clear and granular data and taxonomies which would allow banks and supervisors to determine the scope of application of this instrument. While meeting such complex requirements is likely to be challenging, at least at this stage, failure to adjust the scope of application of macroprudential policies for addressing CRFRs might render such macroprudential policies ineffective and potentially counterproductive for financial stability.

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