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SYSTEMIC RISK BUFFERS - THE MISSING PIECE IN THE PRUDENTIAL RESPONSE TO CLIMATE RISKS

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"The ECB subscribes to the view that climate-related risks can be a source of financial risk and to that extent it also falls within the mandates of central banks and supervisors to ensure the financial system is resilient to these risks."

Christine Lagarde[1]

President of the European Central Bank
Chair of the European Systemic Risk Board

INTRODUCTION

Climate-related financial risks can potentially destabilize the financial sector. This fact is acknowledged by the major international financial bodies – the Financial Stability Board (FSB), the Bank for International Settlements (BIS), the International Monetary Fund (IMF) – as well as by the Central Banks and Supervisors Network for Greening the Financial System (NGFS). In Europe, climate change poses systemic risks, as emphasized by the European Systemic Risk Board (ESRB) and the European Central Bank (ECB). Financial supervisors must thus urgently take steps to address this situation and ensure that financial systems are resilient to systemic risks from climate change.

The international prudential framework provides financial supervisors with a variety of instruments to address systemic risks. Among them, they can rely on systemic risk buffers, a macroprudential tool particularly adapted to address systemic risks to financial markets. This policy brief calls for deploying such systemic risk buffers to address climate systemic risks.

Focusing on Europe, this note argues that national supervisors in the European Union (EU) are perfectly equipped to address systemic risks from climate change: the EU macroprudential framework provides them with so-called Systemic Risk Buffers (SyRBs), an instrument that they are routinely using to mitigate different sources of systemic risks. EU supervisors can and should use SyRBs to tackle systemic risks from climate change.

In terms of implementation, this note recommends 1) varying such buffers across financial institutions to reflect individual exposures to climate risks, 2) focusing on high exposure to climate risks, and 3) relying on transparent rules and metrics to implement SyRBs for climate risks. It also highlights the critical role the ESRB can and should play in coordinating the implementation of such buffers across EU jurisdictions.

The policy brief first explains why climate risks are systemic risks and describes their significance in Europe. It then shows that the EU macroprudential framework is perfectly fitted to address climate systemic risks. It finally gives recommendations to national supervisors on how to implement climate systemic risk buffers in Europe.

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[1] Letter to Members of the European Parliament, 25 March 2021.

CLIMATE RISKS ARE SYSTEMIC RISKS

Climate risks present all the characteristics of systemic risks. Systemic risks are risks of disruption in the financial system with the potential to have serious negative consequences for the financial system and the real economy.[2] Economic shocks, including physical and transition shocks related to climate change[3] – and especially their combination – can become systemic, if they are widespread in financial markets, and when they trigger sharp asset price falls affecting simultaneously several important financial institutions. Even limited economic shocks can turn systemic when contagion across financial institutions amplify an initially contained shock.[4]

Climate risks are widespread in the economy and in financial markets. As highlighted by the NGFS, climate risks have far-reaching impacts, both in breadth and magnitude, and they can potentially trigger large losses for the financial sector.[5] Estimations of climate risks are subject to considerable tail risk. Furthermore, they rely on numerous modelling assumptions, are highly sensitive to underlying parameters and greatly depend on the transition path that is considered.[6] With such uncertainties, it is very possible for climate shocks to be much greater than currently anticipated by financial markets.[7] In addition, insurance possibilities provided by markets through diversification are limited since climate risks are likely to affect several assets and markets simultaneously.[8]

Climate shocks can trigger sharp and hasty falls in asset prices. Unanticipated climate events – e.g., an acceleration of climate hazards or a rapid change in technology, consumer preferences or environmental policies – can lead to significant forecast revisions by financial market participants. A change in expectations, even about the long-term, can translate into significant short-term asset price movements. Two considerations make such an abrupt change in expectations a likely scenario: first, future climate costs are highly uncertain, implying that new information about them can trigger significant updates in investors' forecasts. Second, there is broad agreement among supervisors that climate risks are currently not fully priced by financial markets, which make them prone to corrections.[9]

Climate shocks can be amplified by financial markets. A widespread fall in asset prices – following for example a change in market expectations about climate change costs – can trigger substantial shifts in investors' portfolios, leading to simultaneous large-scale or even

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[2] This is the definition used in Directive 2019/878/EU of the European Parliament and of the Council, which lays the legal ground for prudential regulation in Europe. This definition follows the work of the IMF, the FSB, and the BIS for the G20 (see Caruana 2010).

[3] For a definition of physical and transition risks related to climate change, see BCBS (2021b, Section 2).

[4] See ECB (2009) for a description of these dynamics and a short review of their empirical evidence.

[5] See NGFS (2019).

[6] See FSB (2020) and BCBS (2021a).

[7] The Basel Committee on Banking Supervision (BCBS) reckons that "the expected scale and the synchronous nature of transition-related changes have the potential to make the impact much greater than previously anticipated" (BCBS 2021b).

[8] See FSB (2020) and BCBS (2021b).

[9] See ESRB (2020), IMF (2020) and BIS (2021).

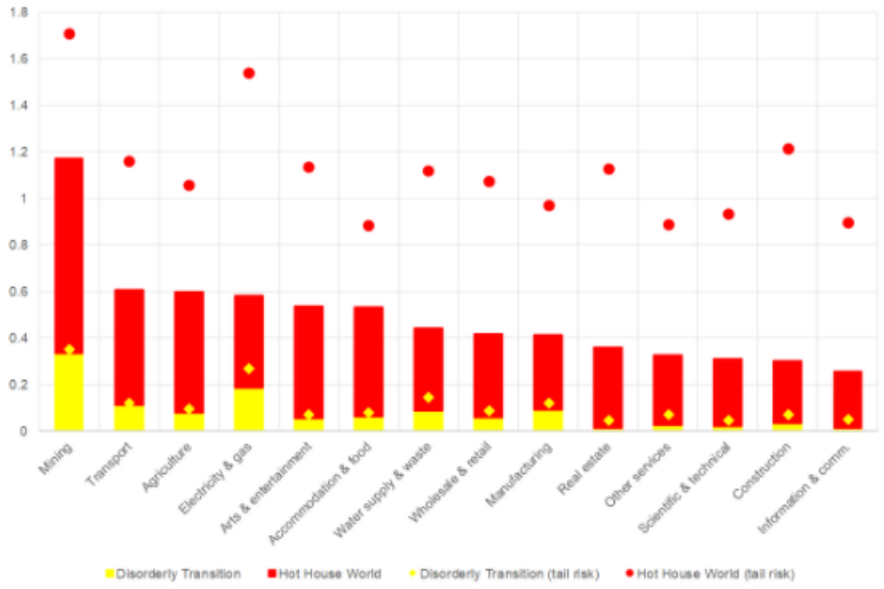
fire sales of assets with high climate risk exposures.[10] Such events, initially triggered by a climate shock, can degenerate in a financial crisis, especially when changes in asset prices start altering perceptions in counterparty creditworthiness and liquidity.[11] Furthermore, self-reinforcing feedback loops can emerge when initial climate shocks weaken financial institutions and cause a reduction in their financing of the real economy.[12]

CLIMATE SYSTEMIC RISKS IN EUROPE

Climate risks represent a major source of systemic risk in Europe. The ECB estimates that a "hot house world" (i.e., a scenario without transition) is by far the riskiest condition for the financial system. In such a scenario, firms could see a significant share of their physical capital destroyed and face a deterioration of their profitability. This would significantly increase their default probability, a key determinant of the banking sector's soundness (see Figure 1). Similarly, an abrupt and disruptive transition would also increase default

Figure 1. Default probabilities and climate risks

Differences in firms' default probabilities (%) in the two adverse scenarios with respect to the orderly transition scenario, by sector and group of firms (mean firms, and firms mostly exposed to physical risk)



Source: ECB calculations
Note: the bars represent the median changes in default probabilities over the next 30 years; the dots instead report the changes in default probabilities when considering the firms that are most exposed to physical risk (95th percentile based on firms' physical risk score).

Source: de Guindos (2021)

[10] See Jondeau, Mojon and Monnet (2021).

[11] See FSB (2020).

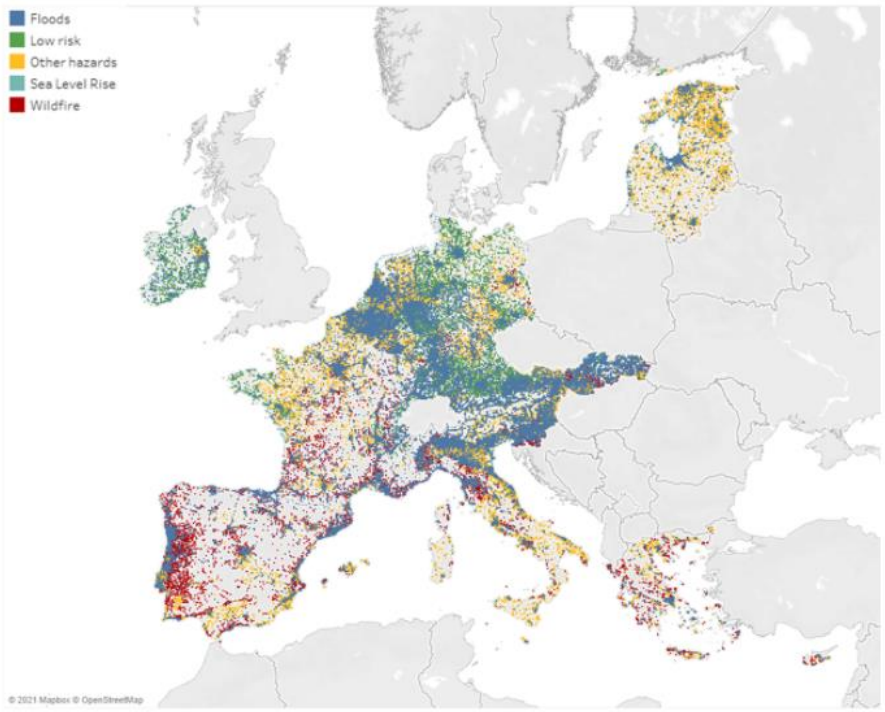
[12] See BCBS (2021b).

probability in the economy. In an orderly transition, defaults might rise temporarily but this initial impact should be more than offset in the medium to long term by much lower costs from physical shocks. The ECB also highlights that, if climate risks trigger sizeable rating downgrades, then losses within the euro area banking system could trigger financial instability.[13] The ECB concludes that "climate change thus represents a major source of systemic risk, particularly for banks with portfolios concentrated in certain economic sectors and geographical areas".[14]

Climate risks are concentrated in certain economic sectors and geographical areas. The structure of a country's economy and financial markets greatly influence its exposure to climate risks.[15] This is confirmed by ECB's firm-level analysis. For physical risks, the ECB observes divergence across countries and regions: Southern European countries are on average more susceptible to heat stress and wildfires, while middle and northern European

Figure 2. Physical risks in Europe

Panel A. Physical risk: forward-looking physical risk score of euro area firms



Source: ECB calculations based on the Four Twenty Seven dataset. Each dot corresponds to a firm in the sample. Gaps in the mapping are due to (a) economic activities being concentrated in specific industrial areas in some countries, and (b) Four Twenty Seven data not being available for latitudes above 60 degrees for flood risk. Other hazards include water stress, heat stress and hurricanes and typhoons. For simplicity only euro area firms are displayed in the chart, although data are available for a much broader sample.

Source: de Guindos (2021)

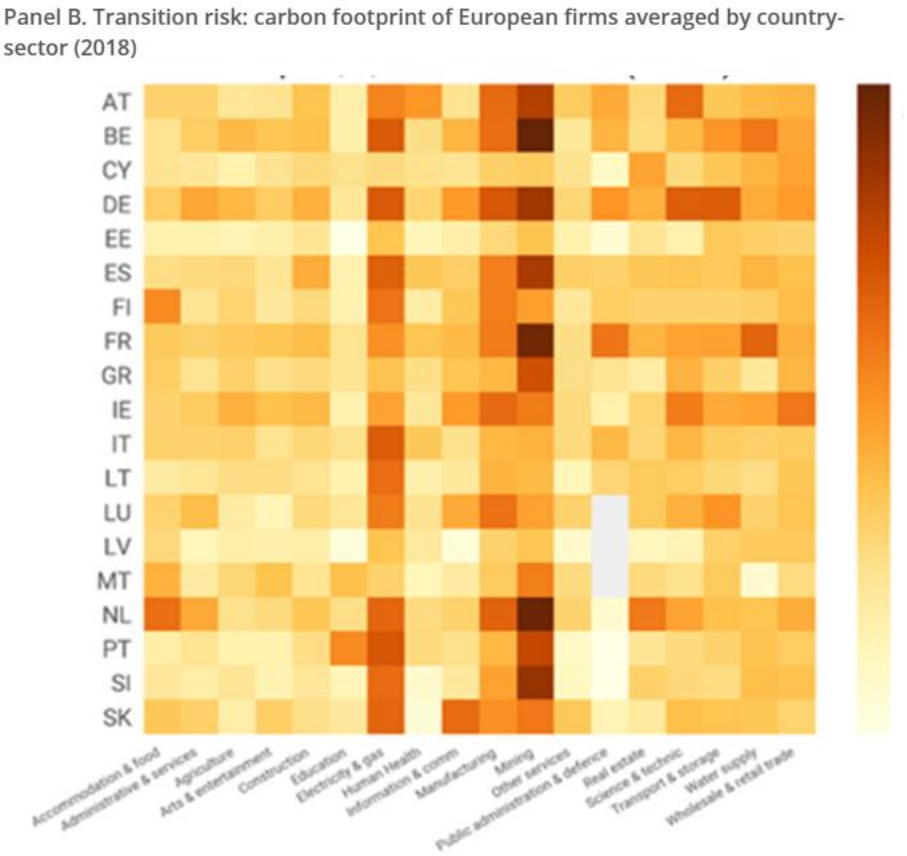
[13] See ECB (2020).

[14] See de Guindos (2021).

[15] See BCBS (2021b).

countries are more vulnerable to flooding risk.[16] For transition risk, firms active in mining, energy, and manufacturing activities – i.e. the most carbon-intensive sectors – would be adversely affected by the transition to a green economy, especially in the case of a sudden and abrupt transition. The ECB's analysis shows that the exposure to manufacturing firms represents a major source of transition-related credit risk to banks.[17] The ECB's results also highlight that the impact of climate risks on corporates is extremely heterogeneous across sectors and geographical areas (see Figure 2 and Figure 3). The biggest polluting firms and those in regions that are the most vulnerable to physical risk could be exposed to up to four times as much to climate risk as the average firm.[18]

Figure 3. Transition risks in Europe



Source: ECB calculations based on the Urgentem dataset. For simplicity only euro area firms are displayed in the chart, although data are available for a much broader sample.

Source: de Guindos (2021)

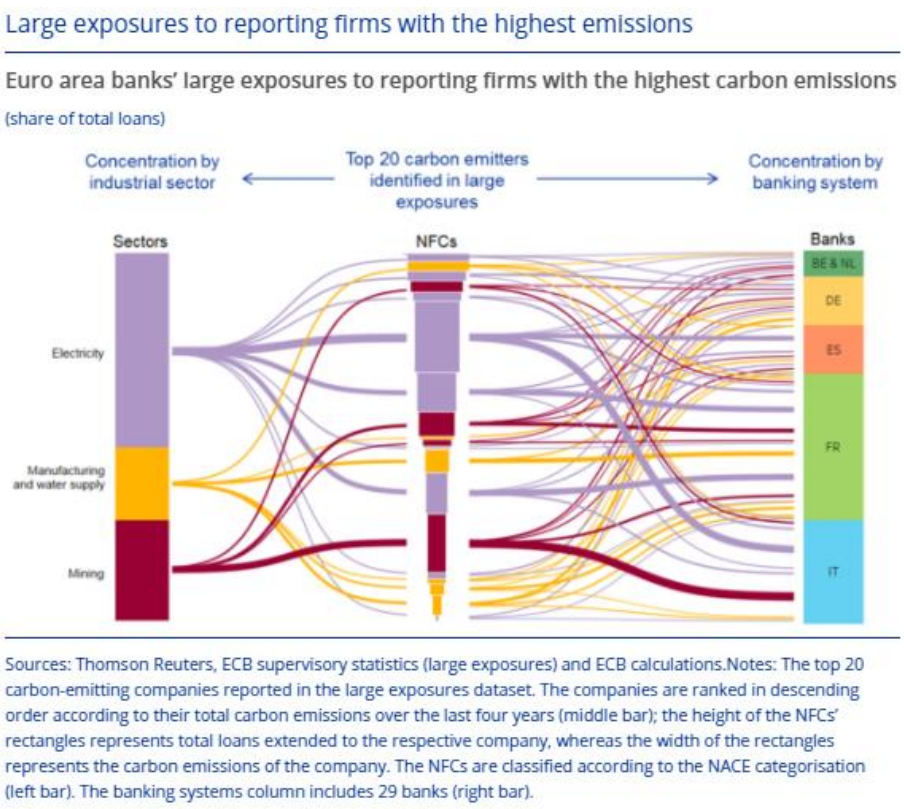
[16] The ECB estimates that 30% of euro area banking system credit exposures to non-financial corporations is subject to high or increasing risk due to at least one physical risk driver (see ECB 2021, p. 103). Furthermore, two-thirds of these exposures are secured by collateral, which may itself be subject to physical risks.

[17] See ECB (2021, p. 101).

[18] See de Guindos (2021).

Climate risks are concentrated in some European financial institutions. The ECB estimates that the exposure to firms subject to high or increasing physical risk is six times larger among the 25% least well capitalized banks – relative to the 25% most well capitalized ones. More than 70% of the banking system credit exposures to the identified high-risk firms are held by only 25 banks, while their total assets represent 64% of the banking system.[19] For transition risks, the exposures of euro area banks to high-emitting firms – those with the highest transition risks according to the ECB – appear limited on average, but the risk is concentrated in a few large exposures of some banks. A few borrowers account for most of banks' aggregate exposure to emitting firms and a few banks hold the bulk of exposure to these borrowers (see Figure 4). The ESRB estimates that a credit rating downgrade of one notch for the highest polluting firms would imply credit losses that could reach up to 10% of total assets for some banks.[20] Furthermore, these losses are likely to be amplified by second-round effects and expand to banks not directly exposed to climate risks through the financial system, posing a threat to financial stability.[21]

Figure 4. Transition risks in banking systems



Source: ECB (2019)

[19] See ECB (2021, p. 105).

[20] See ESRB (2020, p. 3 and p. 31).

[21] See Battiston *et al*. (2017) and Roncoroni *et al.* (2021).

SYSTEMIC RISK BUFFERS IN EUROPE

The EU macroprudential framework provides supervisors with a toolkit to address systemic risks. Based on Basel III international regulatory framework[22], the EU has developed its own macroprudential policy framework.[23] The EU framework aims at mitigating several sources of systemic risk and provides several policy tools for that: countercyclical capital buffers (CCyBs), systemic risk buffers (SyRBs) and buffers for globally and other systemically important institutions (G-SIIs and O-SIIs buffers). All these tools require financial institutions to hold adequate capital to mitigate specific systemic risks. They come on top of other regulatory capital requirements – i.e., requirements stemming from microprudential regulation.

Climate systemic risks fall within scope of systemic risk buffers. The Capital Requirement Directive (CRD V) of the EU states that "in addition to a capital conservation buffer and a countercyclical capital buffer, Member States should be able to require certain institutions to hold a systemic risk buffer in order to prevent and mitigate macroprudential or systemic risks".[24] EU national supervisors are called upon to activate such SyRBs to address long-term non-cyclical risks for the financial sector stemming from the real economy – which is exactly the type of risk posed by climate change.[25]

Systemic risk buffers can and should be used to address climate systemic risks. The EU legislation on SyRBs enables national authorities to target specific sectors – by requiring banks to hold a capital buffer in proportion of their exposure to these sectors – and/or specific institutions – those the most exposed to the source of systemic risk.[26] Both options can be used to address climate systemic risks – i.e., supervisors can apply a buffer on assets from sectors most exposed to climate risks and/or on financial institutions particularly exposed to them. Crucially, the guidelines of the European Banking Authority (EBA)[27] specifies that sectoral exposure can be defined in terms of economic activity and geographical areas, two dimensions particularly relevant for transition and physical risks, respectively. Furthermore, in the EU framework, systemic risk buffers are implemented at the national level.[28] EU supervisors can thus adapt systemic risk buffers to best address local specificities in terms of climate risk exposure. Finally, the EU legislation grants the possibility to implement several systemic risk buffers simultaneously. Climate systemic risk buffers can thus be added to current national macroprudential frameworks.

EU supervisors have a strong expertise in using systemic risk buffers. Since the introduction of SyRBs in 2014[29], seventeen EU supervisors have used them. They are

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[22] See BCBS (2010).

[23] See ESRB (2014).

[24] See Directive 2019/878/EU (§24) of the European Parliament and of the Council, 20 May 2019.

[25] See ESRB (2017).

[26] See Directive 2019/878/EU (Art. 133) of the European Parliament and of the Council, 20 May 2019.

[27] See EBA (2020).

[28] See the List of national macroprudential authorities and national designated authorities in EEA Member States.

[29] Capital Requirements Directive 2013/36/EU and Capital Requirements Regulation (EU) No 575/2013.

currently in place in fifteen countries.[30] Supervisors are using them to address several sources of risks – banking sector concentration, external shocks, and sectoral shocks – as well as to adjust for inappropriate incentives for systemically important institutions. Norway and Estonia, for example, implemented SyRBs for the whole banking sector to mitigate common exposures to specific economic sectors (the petroleum sector in the case of Norway).[31] Austria and Denmark implemented a buffer reflecting individual bank's exposure to specific geographical risks (Eastern European countries and Faeroe Islands, respectively).[32] Sweden requires a buffer for large institutions because of their similar business models.[33] Addressing climate risks requires similar measures as those implemented by these supervisors – i.e. targeting specific economic activities or regions exposed to climate risks, in proportion of banks' specific exposure to them. Finally, note that, in Finland, a SyRB is used when systemic risk is judged more elevated than in other EU countries. This could be applied to the case in countries more exposed to climate risks than the rest of Europe.[34]

IMPLEMENTATION OF SYSTEMIC RISK BUFFERS FOR CLIMATE RISKS

Buffers should reflect individual institutions' exposure to climate risks. Supervisors should require each financial institution to hold capital in proportion of their individual exposure to climate risks – i.e., an institution-specific buffer. The alternative – a system-wide buffer similar for each bank – would dilute the buffer's mitigating potential across the financial system. This is likely to reduce its effectiveness by not addressing risks directly where they are and potentially increase the costs associated with higher capital for the whole banking sector. Furthermore, an institution-specific buffer introduces strong incentives for each financial institution to reduce its individual exposure to climate risks to limit capital costs. A system-wide buffer would not provide such an individual incentive. Supervisors can implement institution-specific buffers either by requiring all banks to hold capital in proportion of their specific exposure to assets facing high climate risks[35] or by applying an identical buffer only to financial institutions most exposed to climate risks.[36]

Financial supervisors should target high exposures to climate risks. The empirical assessment of climate risks at the asset level is a recent but fast-growing field. The risk

[30] See dedicated page on ESRB website.

[31] See Notification by the Norwegian Ministry of Finance on the systemic risk buffer (SyRB) and Notification of the intention to implement a systemic risk buffer by Eesti Pank of Estonia, respectively.

[32] See Notification by Austrian Financial Market Authority on the systemic risk buffer (SyRB) rate for twelve institutions and Notification by the Danish Ministry of Industry, Business and Financial Affairs on change of the level of an existing systemic risk buffer in the Faroe Islands, respectively.

[33] See Notification by Finansinspektionen (Sweden) on the systemic risk buffer (SyRB).

[34] See Notification by FIN-FSA (the Finnish Financial Supervisory Authority) on maintaining the existing systemic risk buffer.

[35] This option is similar to the non-uniform buffer that Austria and Denmark currently require from banks to reflect their individual exposure to specific geographical risks (see previous section).

[36] This option is similar to the buffer Sweden has implemented for large institutions with similar business models (see previous section).

metrics currently available to assess the climate exposure of a specific asset display significant heterogeneity; they do not always agree on the climate risk level of an asset and thus do not provide a robust picture of climate risks across all assets. However, available metrics tend to concur on identifying assets most exposed to climate risks.[37] Supervisors should thus focus on identifying the most climate-risky assets and apply a buffer to them, rather than attempting to reflect the specific climate risk exposure of each asset.

Supervisors should rely on transparent rules and metrics. The experience accumulated in Europe on the use of SyRBs shows that clear implementation of rules and their explanation by supervisors are key for the effectiveness of systemic risk buffers.[38] Such rules should rely on a well-defined set of risk indicators, as well as thresholds for them, to define how and when buffer levels are adapted.[39] Expert judgment can complete such indicators when necessary.[40] Knowing these thresholds – especially those defining when buffers are lowered – is key to incentivise financial institutions to reduce their exposure to climate risks. A straightforward approach to set these thresholds is to compile risk scores combining different climate risk metrics, to define buckets for these scores and to set buffer levels according to these buckets.[41] Examples of climate risk metrics are the share of climate-risky loans in total assets, the banks' holdings of high climate risk securities as a percentage of capital and climate risk exposure metrics provided by external rating agencies.[42]

Climate systemic risk buffers should be implemented by national supervisors in coordination with the ESRB. In the current EU framework, national authorities oversee the implementation of systemic risk buffers. The ESRB is tasked with ensuring that systemic risk buffers are applied consistently across jurisdictions by providing guidance, opinions, and recommendations, as well as guiding principles on how to set the level of buffers. This national set-up is perfectly suited to the case of climate systemic risks buffers: since climate risks vary significantly across jurisdictions, depending on their geography and economic structure[43], national authorities are best placed to assess climate risks in their banking system.[44] The ESRB can and should contribute to level the playing field across jurisdictions by setting common principles and metrics to assess climate systemic risks. It can and should also ensure that national authorities introduce or adapt their buffer when the exposure of their national banking sector to climate risks is markedly higher than for European peers.

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[37] See Bingler *et al.* (2021).

[38] See ESRB (2017).

[39] See ESRB (2014).

[40] See ESRB (2017).

[41] The Basel III international regulatory framework implements a similar methodology – based on risk scores and buckets – to classify global systemically important banks (G-SIBs) according to their risk for the financial system and to then define capital buffers adequate to each bucket of banks (see BCBS 2013).

[42] The first two examples are suggested in EBA guidelines (EBA 2020) for assessing exposure to specific economic sector and adapted from the case of climate risks. Bingler and Colesanti Senni (2020) provide an analyses of climate risk metrics provided by external agencies currently available to financial supervisors.

[43] See Section "Climate systemic risks in Europe".

[44] Assessing systemic risk at the national level allows to combine several methodologies, adapted to local specificities, as recommended by the ESRB (ESRB 2017).

CONCLUSION

Financial supervisors around the world are stressing that climate change poses a potential risk for the stability of financial systems. European supervisors are among them: they emphasize that climate risks represent a major source of systemic risk for the European financial system. They also highlight that climate risks are concentrated in certain economic sectors and geographical areas, and that some financial institutions are more exposed to them than others.

Systemic risks can be addressed by implementing macroprudential buffers. The EU macroprudential framework provides national supervisors with one powerful tool to mitigate climate systemic risks: systemic risk buffers (SyRBs). Such buffers have been used by EU supervisors for almost a decade to address systemic risks like concentration risks and exposure to specific shocks to the economy. They are thus particularly well suited to mitigate climate systemic risks.

Against this background, this policy brief calls for implementing systemic risk buffers that address climate risks. This buffer should vary across financial institutions to reflect their specific exposure to climate risks. An institution-specific buffer is likely to minimize the additional capital costs for the financial system, by addressing risks directly where they are, as well as providing incentives for banks to reduce their exposure to climate risks. Supervisors are advised to focus on identifying assets most exposed to climate risks rather than precisely assessing the climate risk exposure of each asset. The implementation of climate systemic risk buffers must rely on transparent rules and metrics to maximize their effectiveness. Finally, climate systemic risk buffers should be implemented by national supervisors to better reflect national specificities regarding climate risk exposures. In Europe, the ESRB can play an important role by providing common guidelines for climate systemic risk buffers and thus by levelling the playing field across jurisdictions.

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