

■ Sustainability risks in banking supervision

Climate change and the transition to a low-emission economy are posing major challenges for banks. Whilst extreme weather events such as the 2021 floods in the Ahrtal region of Germany can have a direct impact on the real estate affected and thus on banks' loan collateral, the consequences of a gradual increase in average temperatures are transmitted to banks and their risks over a significantly longer time horizon. The transmission channels are multi-layered and complex. Added to this are policy measures to mitigate climate change, which may affect banks' corporate customers, in particular, via factors such as higher costs for greenhouse gas emissions. That said, climate action measures are just a subset of the European Union's (EU) measures to achieve the United Nations' sustainable development goals. In addition to climate objectives, they also include other environmental objectives, social objectives and the promotion of good governance. The acronym "ESG" (environmental, social, governance) is used to summarise these sustainability categories.

The risks to banks stemming from ESG measures, or even from delays in their implementation, are relevant for risk-oriented banking supervision. ESG risks are not entirely new types of risk for banking supervisors. Rather, they can be understood as drivers of known risk categories such as credit or market risk. However, when it comes to capturing and – in the case of climate-related risks in particular – quantifying them, conventional methods quickly reach their limits. Regulatory requirements and established risk analysis methods are largely based on historical data. These are only of very limited use in predicting how ESG risks could manifest in the future and translate into financial risks.

This means that banks need to develop new approaches in order to adequately manage ESG risks and become more resilient to them. Supervisory authorities and standard setters have published guidance on this at the national, European and global level. Various studies show that most banks have so far fallen short of the supervisory expectations of the ECB and the Federal Financial Supervisory Authority (BaFin). Supervisors will therefore focus on the progress made by banks in implementing the existing requirements over the next few years. Findings from ESG reporting and the Bundesbank's climate risk stress test will support the ongoing work.

■ Introduction

Climate change and the transition to a sustainable and, in particular, climate-neutral economy are both posing major challenges to the German banking system. This article considers sustainability risks – often referred to as ESG risks – from a supervisory and regulatory perspective. ESG stands for environmental, social and governance, with climate-related risks forming a separate sub-category of environmental risks. ESG risks as understood in this article subsume both risks arising from “too little” sustainability – such as risks stemming from environmental degradation and climate change – and risks arising from a transition to greater sustainability, although this also entails economic opportunities. Given their urgency, climate-related risks are the focus of current supervisory and regulatory work and debate, particularly at the global level, and are also the focal point of this article.

The article begins by outlining the possible transmission channels through which climate-related risks can affect banks. Next, it sets out the regulatory treatment of ESG risks, before turning to current supervisory practice at the national and European level and the challenges facing banks. The Bundesbank’s climate risk stress test is used to shed more light on possible approaches and challenges in analysing financial risks stemming from climate change.

■ Possible transmission channels: how ESG risks give rise to bank risks as illustrated by climate-related risks

For the supervisory treatment of climate-related risks, it helps to distinguish between “transition risks” and “physical risks”.

“Transition risks” are risks arising from the transition to a low-emission economy. These risks can be triggered, for example, by policy measures such as an increase in carbon taxation, by

technological developments such as the expansion of electric mobility or by changes in consumer preferences. Because transition risks can alter the behaviour and planning of banks’ customers and counterparties, they have an impact on bank risks. For example, stricter climate-related rules, such as a scarcer supply of emissions trading allowances, could lead to an increase in a firm’s operating costs and render certain production methods and products unprofitable in the medium or long term. If firms do not adapt, this could, among other things, impair their creditworthiness or reduce the recoverability of the loan collateral that these firms can provide to a bank; this would lead to an increase in the bank’s credit risk.¹

Physical risks, on the other hand, comprise damage resulting from extreme weather events or the gradual change in climate. Extreme precipitation followed by flooding can damage infrastructure, disrupt supply chains and lead to financial losses for the enterprises affected. This, in turn, could have a negative impact on the solvency of those enterprises and thus increase the credit risk of the bank concerned. Increasing drought can make agriculture more expensive or unprofitable in certain regions, have a detrimental impact on forestry, or constrain inland shipping and the industries that depend on it.² The chart on p. 77 gives an overview of the possible transmission channels via which climate change can give rise to bank risks.

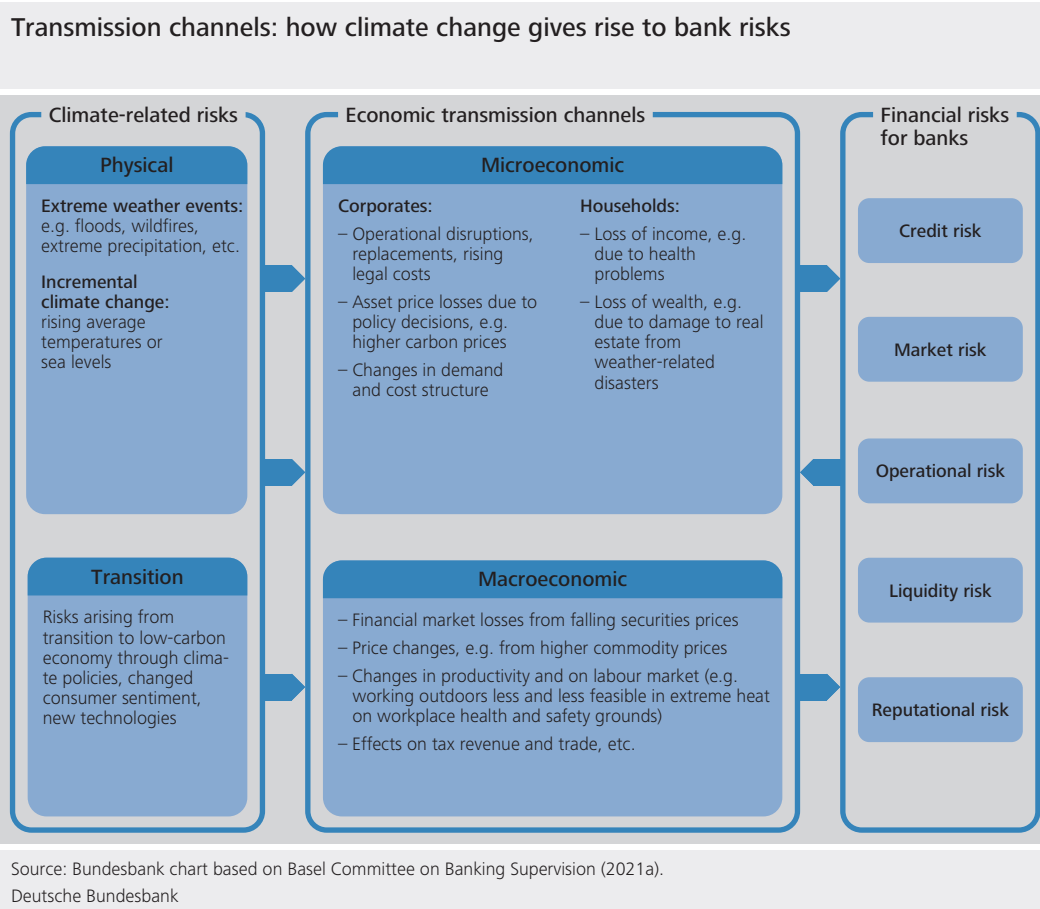
Given Germany’s moderate climate, the banks themselves state that transition risks tend to be more significant for the German banking sector than physical risks in the short term. The relevant physical risks for German banks in the foreseeable future, according to the banks themselves, are primarily floods, as they can cause great damage – potentially even posing

Transition risks influence the behaviour of economic agents and thus bank risks

Physical risks stem from extreme weather events or gradual climate change

¹ See Network for Greening the Financial System (2019) and Basel Committee on Banking Supervision (2021a).

² For more information on analytical needs and options from a central bank perspective, see also Deutsche Bundesbank (2022).



an existential threat – to debtor firms’ physical assets. To make matters worse, such events generally affect larger, contiguous areas, rendering smaller banks with a highly regional business model especially vulnerable. Moreover, the German banking system may also be exposed to indirect physical risks in the wake of global and regional changes in climate. For example, rising average temperatures may cause labour productivity to decrease or lead to worsening living and working conditions in some parts of the world or declining agricultural yields. That might affect German firms’ suppliers and (sub)products and put existing value chains and processes at risk, while at the same time restricting German firms’ sales markets. The changed growth outlook may then increase credit risk for German banks.

Refining banking supervision to cover ESG risks

ESG risks are multi-layered and complex, meaning that they can affect the economy and the financial system through many different channels. However, ESG risks are not an entirely new type of risk to banking supervisors. As shown in the above chart, which uses climate-related risks as an example, ESG risks can in fact be understood as drivers of known risk categories such as credit or market risk. As a result, banks need to take them into account in their business organisation, when implementing their business strategy and in their frameworks for risk management and good governance.³

ESG risks are drivers of risk categories such as credit or market risk

³ See Federal Financial Supervisory Authority (2019) in conjunction with Federal Financial Supervisory Authority (2021) and European Central Bank (2020).

At the same time, though, it is very difficult to capture and quantify ESG risks using conventional methods. The specific causal chains stemming from an increase in average temperatures are manifold. If tipping points are reached in the near future, the consequences are likely to be far more substantial. While some effects are already discernible, others may not materialise for several years or even decades, significantly exceeding the usual horizon of two to five years used in macroeconomic scenarios for bank stress tests. What is more, regulatory requirements and established risk analysis methods are largely based on historical data. However, these are only of very limited use in predicting how climate-related and environmental risks could manifest in the future and translate into financial risks.

New approaches needed to manage ESG risks

Banks therefore need to develop new, forward-looking approaches in order to adequately manage climate-related risks and become more resilient to them. Supervisory authorities and standard setters have published guidance on this, and in some cases on ESG risks as a whole, at the national, European and global level in the form of guides on supervisory practice and banks' risk management. These are intended to raise banks' awareness of climate-related and ESG risks and help them implement supervisory expectations. The guides describe the possible transmission channels through which ESG risks could affect banks and present various measurement methods and good practices for assessing ESG risks. They are also designed to help banks integrate ESG risks into their risk management, business processes and business strategy.

Climate-related risks are currently the primary focus at the global level. The Network for Greening the Financial System (NGFS), which was established within the framework of the Paris Agreement, has done pioneering work on this issue.⁴ In addition, the Basel Committee on Banking Supervision (BCBS) has declared climate-related risks a strategic priority for its work in the coming years.⁵

For EU regulation, on the other hand, the entire ESG spectrum is relevant.⁶ Thus, as part of the EU action plan on financing sustainable growth,⁷ the European Banking Authority (EBA) was given multiple mandates for the future inclusion of ESG risks in the European banking sector. In December 2019, the EBA published its action plan including the relevant milestones.⁸ The EBA initially focused on the areas of strategy and risk management as well as disclosure of ESG risks. In compliance with its mandate under Article 98(8) of the Capital Requirements Directive (CRD),⁹ it published a report in June 2021 describing how banks should manage their ESG risks internally and how supervisors will review and evaluate this.¹⁰ The report defines relevant terms and presents criteria and methods for identifying and measuring ESG risks. The EBA also proposes three

EBA has multiple mandates for inclusion of ESG risks in European banking sector

⁴ The NGFS is a global network of 121 central banks and supervisory authorities, including the Bundesbank and BaFin. Sabine Mauderer, Member of the Executive Board of the Deutsche Bundesbank, is currently serving as Vice-Chair of the NGFS. The network's goal is to analyse the implications of climate change for the financial system and to steer global financial flows in a way that enables low-carbon economic growth. In April 2019, the NGFS presented a first comprehensive report, "A call for action – Climate change as a source of financial risk". At its core are six recommendations for action chiefly aimed at central banks, supervisors and legislators. See <https://www.bundesbank.de/en/bundesbank/green-finance/-/network-for-greening-the-financial-system-808978>

⁵ The BCBS, whose task is to set uniform standards for internationally active banks, has published papers on transmission channels and possible methods of measuring climate-related risks to the banking sector based on analytical work and a stock-taking exercise in its members' jurisdictions. In June 2022, the BCBS also formulated principles for the effective management and supervision of climate-related financial risks, in an effort to help harmonise supervisory expectations about how large banks deal with these risks across different jurisdictions. See Basel Committee on Banking Supervision (2021b).

⁶ The EU has a holistic approach to sustainability that translates the UN's sustainable development goals (SDGs) into concrete actions. The 17 SDGs can be roughly aligned with the "E", "S" and "G" of the acronym, although there are many interactions. For example, climate change (E) has implications for living and working conditions (S) in countries with an already high annual average temperature.

⁷ See European Commission (2018).

⁸ See European Banking Authority (2019).

⁹ Directive 2013/36/EU of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC (OJ L 176, 27 June 2013, p. 338) as last amended by Directive (EU) 2021/338 of 16 February 2021 (OJ L 68, 26 February 2021, p. 14).

¹⁰ See European Banking Authority (2021).

methods which banks can use to assess ESG risks depending on their business and risk strategy and their risk profile.¹¹ In its report, the EBA expresses the expectation that banks will also address their strategic objectives from an ESG risk perspective. It also recommends that banks incorporate ESG risks, inter alia, when defining their risk appetite, risk policies and risk metrics and indicators, and that they develop internal climate stress tests.

At the time of publication, many of the recommendations and expectations set out in the EBA report were already included in BaFin's 2019 Guidance Notice on Dealing with Sustainability Risks and in the ECB Guide on climate-related and environmental risks, published in 2020.¹² Their content and implementation by banks will be discussed in more detail later on.

Discussion of possible adjustment of capital requirements

Question of adjusting capital requirements still in exploratory stage

A great deal of progress has already been made in integrating ESG risks into the qualitative regulatory requirements regarding business strategy, risk management and business organisation (Pillar 2 risks of the Basel regulatory framework).¹³ By contrast, work on integrating ESG risks into the calculation of quantitative regulatory requirements (Pillar 1) is still at an exploratory stage.¹⁴

In the EU, Article 501c of the Capital Requirements Regulation (CRR)¹⁵ mandates the EBA with assessing "whether a dedicated prudential treatment of exposures related to assets or activities associated substantially with environmental and/or social objectives would be justified".¹⁶ To this end, the EBA presented a discussion paper in May 2022, which explores whether environmental risks are already sufficiently taken into account in the Pillar 1 framework or where changes might be possible.¹⁷ The EBA found that the Pillar 1 framework already includes certain mechanisms that allow the inclusion of new types of risk drivers, such

as climate-related risks. These include the use of internal models, external credit ratings and the valuation of collateral and financial instruments. However, the EBA paper also discusses targeted enhancements or additional clarifications within the framework which could help to explicitly address environmental risks. Since historical data are of little use in deriving climate-related risks, the EBA has put up the use of forward-looking methodologies for public discussion.

As an alternative to recognising environmental risks within the existing framework, the EBA paper considers the advantages and disadvantages of introducing specific risk-weighted adjustment factors. The part on credit risk contains a section on the highly politically charged issue of the possible introduction of capital relief for financing environmental projects. While such a "green supporting factor" may be polit-

From a supervisory perspective, green supporting factor not a suitable instrument for transformation, as not risk-sensitive

¹¹ The three methods are (i) the portfolio alignment method (i.e. aligning portfolios with policy objectives such as the emissions reduction target), (ii) the risk framework method (quantifying ESG risks at the portfolio level using stress tests and scenario analyses in particular) and (iii) the exposure method (analysing the ESG risks of individual exposures, e.g. for lending).

¹² See Federal Financial Supervisory Authority (2019) and European Central Bank (2020).

¹³ See <https://www.bundesbank.de/en/tasks/banking-supervision/legal-basis/basel-framework/basel-framework-622964> for more on the three pillars of the Basel framework.

¹⁴ In December 2022, the BCBS published a preliminary catalogue of frequently asked questions with answers clarifying how climate-related financial risks could be incorporated into the calculation of risk-weighted assets for credit, market and operational risk and the liquidity ratio in the existing Pillar 1 framework. In itself, this does not yet constitute an adjustment of the Basel framework, but the adjustment could be made at a later date, subject to the outcomes of further work. See Basel Committee on Banking Supervision (2021).

¹⁵ Regulation (EU) No 575/2013 of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 646/2012 Text with EEA relevance (OJ L 176, 27 June 2013, p. 1) as last amended by Regulation (EU) 2022/2036 of 19 October 2022 (OJ L 275, 25 October 2022, p. 1).

¹⁶ The EBA plans to publish its final report on the possible integration of ESG risks into Pillar 1 by the end of 2023.

¹⁷ For methodological reasons, the EBA discussion paper focuses on the analysis of environmental aspects, which also include climate aspects. In the discussion paper, the EBA solicits input from stakeholders on the potential inclusion of financial risks, which are also linked to social changes, amongst other things. See European Banking Authority (2022).

ically desirable, it is problematic from a risk-oriented supervisory perspective for several reasons. An initial study conducted by the NGFS in 2020 on the risk profiles of “green” and “brown” assets at banks failed to come to a clear conclusion as to whether there is a clear difference between them.¹⁸ A more recent NGFS study also found no statistically verifiable differences between “green” and “brown” assets.¹⁹ A green supporting factor would therefore reduce the capital requirements for “green” assets, while credit risk would continue to exist unchanged and would not differ systematically from that of “brown” loans. However, lower capital requirements for otherwise equal risks could reduce banks’ ability to absorb losses. This could jeopardise the stability of the financial system and thus undermine the precondition to reliably financing the transformation of the economy.

Overall, banking regulation is not a viable substitute for policy measures. Other financial and non-financial instruments are better suited to financing the decarbonisation of the economy and mitigating climate-related risks. For example, an effective price for greenhouse gas emissions would internalise external climate costs and thus negatively affect the profitability of enterprises with environmentally harmful business models. This, in turn, would be taken into account in the regulatory framework via poorer credit ratings, but this time in a risk-oriented way.²⁰

Introduction of supervisory disclosure requirements to strengthen market discipline

EU taxonomy defines “green” economic activities and creates transparency for market participants

In view of the lack of data or information on sustainability risks, regulation at the European level has given transparency a high priority from the outset. The 2020 Taxonomy Regulation formulated common definitions of “green” economic activities at the EU level. The taxonomy thus initially serves as a reference point for EU labels on sustainable financial products

and sustainability benchmarks.²¹ These definitions and the transparency requirements based on them are, however, also relevant for banks for another reason: large, publicly listed corporates and banks with more than 500 employees must disclose the extent to which their business activities are aligned with the climate objectives of the Taxonomy Regulation. The basis for this is the Non-financial Reporting Directive (NFRD).²² When the NFRD was replaced by the Corporate Sustainability Reporting Directive (CSRD) in January 2023, the sustainability reporting requirement was expanded to cover a larger number of enterprises and the level of detail of the requested information was increased.²³ This means that suppliers and customers of small and medium-sized enterprises (SMEs) in the extended user group will in future also have to provide additional information in a standardised form to ensure a consistent flow

¹⁸ See Network for Greening the Financial System (2020a).

¹⁹ See Network for Greening the Financial System (2020b).

²⁰ For more information on the possible advantages and disadvantages of using a green supporting factor or a brown penalising factor, see European Banking Authority (2022).

²¹ The EU taxonomy is an EU-wide classification system for sustainable economic activities and is at the heart of the European Commission’s Action plan on financing sustainable growth, a ten-point action plan to promote sustainable growth in the EU published in March 2018. A regulation and associated delegated acts set out what is meant by “green” economic activities. The creation of uniform definitions is crucial, particularly for mobilising and channelling private investment into environmentally sustainable sectors, without which it will not be possible to achieve the Paris climate goals or climate neutrality by 2050 as enshrined in the European Green Deal. See European Commission (2018).

²² Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups (OJ L 330, 15 November 2014, p. 1).

²³ Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU, as regards corporate sustainability reporting (OJ L 322, 16 December 2022, p. 15). The CSRD extends the NFRD user group from large listed enterprises to all large enterprises and all listed enterprises, including listed SMEs, with proportional rules. It captures around 49,000 enterprises in total, instead of the previous figure of 11,000. The information to be provided covers the full ESG spectrum, taking double materiality into account, i.e. the impact of external influences on the enterprise, on the one hand, and the impact of the enterprise on the environment and society, on the other. The reported information is to be checked by auditors and digitally tagged for feeding into the planned European single access point.

of sustainability information along the financial value chain. This, in turn, will allow banks to collect additional ESG-related data and borrower information. Nevertheless, most SMEs will remain exempt from the obligation to provide information. As they also make up a significant part of German banks' credit exposure, there will continue to be a data gap in this area for the foreseeable future.

Large banks must report on the extent to which their business activities are aligned with the taxonomy's climate objectives

Pursuant to Article 449a of the CRR, large banks which have issued securities that are admitted to trading on a regulated market of any Member State have since mid-2022 additionally been required to disclose ESG risks as part of regulatory disclosure requirements (Pillar 3) at year-end on an annual basis. The EBA has developed Implementing Technical Standards (ITS) for this purpose. The quantitative data collection initially encompasses climate-related and environmental risks, as they are already aligned with the aforementioned taxonomy. Furthermore, the methods and instruments for capturing these risks are more advanced than is the case for risks related to social or governance aspects. By contrast, the qualitative questions on business strategy, governance and risk management cover the entire ESG spectrum.

Various key performance indicators, in particular the green asset ratio (GAR), are requested for climate-related and environmental risks. The GAR is intended to help third parties understand the extent to which banks' business activities are aligned with the climate objectives of the Taxonomy Regulation. The formula for calculating GAR excludes exposures to companies which are not subject to NFRD reporting obligations. As mentioned above, this typically concerns SMEs. Since this distorts the informative value of the GAR, the EBA proposed the additional introduction of a banking book taxonomy alignment ratio (BTAR) for its ITS. The BTAR is a voluntary ratio that allows banks to demonstrate sustainable exposures within the meaning of the Taxonomy Regulation, even if the enterprises concerned are not themselves subject to reporting obligations. Although such

information can only be obtained bilaterally and on a best effort basis and therefore entails additional costs, it gives banks the opportunity to disclose additional credit exposures to sustainably operating SMEs. In comparison with the GAR, the additional reporting of the BTAR thus provides a better picture of a bank's taxonomy-eligible credit exposures, as such exposures for which no data are otherwise disclosed can also feed into the calculation.

Supervisory requirements in the Single Supervisory Mechanism

In November 2020 the ECB outlined its supervisory expectations relating to risk management and disclosures in its Guide on climate-related and environmental risks.²⁴ Amongst other things, it expects the impact of climate-related and environmental risks to be considered in the framework of their business environment, business strategy, governance and risk appetite, risk management and credit risk. The guide was developed jointly by the ECB and the national supervisory authorities and is aimed at the significant institutions (SIs) directly supervised by the ECB under the Single Supervisory Mechanism (SSM).²⁵

In 2021, on the basis of its guide, the ECB conducted a detailed assessment of how SIs were managing and integrating climate-related and environmental risks. To this end, the SIs first had to provide a self-assessment of the extent to which they already met the expectations of the guide. They also had to outline their plans for further measures, including relevant milestones. On this basis, the ECB examined not only the ability of SIs to identify climate-related and environmental risks in a timely manner and to assess and adequately manage these, but

To what extent are climate-related and environmental risks integrated into the relevant practices and processes?

²⁴ See European Central Bank (2020).

²⁵ For more information on cooperation in the SSM, see: <https://www.bundesbank.de/en/tasks/banking-supervision/bundesbank/ssm/cooperation-in-the-single-supervisory-mechanism-622966>

also whether SIs have properly integrated these risks into their practices and processes. On balance, the ECB found that banks were lagging behind its expectations considerably. For example, around one-fifth of SIs had not yet integrated climate-related and environmental risks into their business practices at all or had done so only to a very limited extent. At the same time, however, many banks had formulated adequate implementation plans to address the identified gaps, which meant that positive developments were evident.²⁶

Supervisory assessments of SIs by the ECB with clear implementation deadlines

Supervisors expect banks to integrate climate-related and environmental risks into their business practices and risk management procedures incrementally over the next few years. To this end, banks were set deadlines, amongst other things, for the binding implementation of the expectations set out in the ECB's Guide on climate-related and environmental risks. The deadline for banks to implement the assessment of materiality of climate-related and environmental risks in the risk inventory already elapsed in March 2023. The deadline for integrating climate-related and environmental risks into risk management is end-2023. By the end of 2024 banks are expected to have met all the remaining supervisory expectations in the ECB's Guide.

Supervisory requirements at the national level

For German banks that are supervised at the national level (less significant institutions – LSIs), BaFin already provided non-binding guidance in 2019 in the form of its “Guidance notice on dealing with sustainability risks”.²⁷ BaFin expects supervised entities to ensure that sustainability risks are considered and that this process is documented. In order to support the supervised entities in this regard, the guidance notice lists numerous examples of ESG risks to the financial sector and presents good practice approaches for their consideration, particularly

in the areas of risk management and business organisation.

The seventh amendment to the Minimum Requirements for Risk Management (MaRisk), which is expected to be published in the first half of 2023, will transpose the non-binding guidelines from the BaFin guidance notice into mandatory rules. In doing so, supervisors are clarifying the requirements for integrating ESG risks into banks' risk management and governance, and in some cases are adding even more extensive requirements, taking the principles of proportionality, materiality and methodological freedom into account in the process. Banks will be required to assess the impact of ESG risks – starting with climate-related risks – not only at present but also in a forward-looking manner. To this end, they are to use scenarios based on scientific findings with an appropriately long time horizon. The inherent uncertainty about the future effects of climate change, also known as the “green swan” problem,²⁸ can be addressed using various scenarios. Based on the risk inventory, the MaRisk amendment explicitly stipulates that, with regard to their internal capital adequacy, business and risk strategies, organisational guidelines, internal stress tests and reporting, banks must incorporate ESG risks explicitly, adequately and, where meaningful and possible, also quantitatively. This is intended to enable banks, consistent with their risk profile, to perform their management functions such that ESG-specific targets and risk limits are also taken into account. For credit processes, institutions will be required to include the impact of ESG risks in the assessment of credit quality and the valuation of collateral.

MaRisk amendment clarifies and extends the requirements for integrating ESG risks

²⁶ See European Central Bank (2021).

²⁷ See Federal Financial Supervisory Authority (2019).

²⁸ In economic theory, the black swan is an extremely rare and unexpected event that can only be explained ex post due to the lack of empirical data. The green swan differs from the black swan in that, according to climate research findings, extreme climate-related risks (physical and/or transition) are almost certain to materialise in the future. These risks can be far more systemic and complex than past financial crises. See Basel Committee on Banking Supervision (2020).

Thematic review

On the basis of the first assessment of significant institutions (SIs) supervised by the ECB performed in 2021, the ECB and the national supervisory authorities conducted a thematic review in 2022 that covered a total of 107 SIs and 79 less significant institutions (LSIs), which are under the direct supervision of the national authorities. As part of the review, they conducted deep dives into SIs' relevant risk management practices and analysed the progress made by the SIs since the first assessment.

BaFin and the Bundesbank, together with national supervisory authorities from seven other countries in the Single Supervisory Mechanism (SSM), participated in the thematic review with selected large LSIs. A total of 17 German LSIs were subject to the review.

In early November 2022, the ECB published a comprehensive report¹ on the results of the thematic review as well as a compendium of good practices observed at the SIs.²

Compared with other institutions, German SIs were within the average in both the 2021 assessment and the 2022 thematic review. The first assessment in 2021 revealed that the practices of German SIs, like most other banks in the SSM, were still far from being aligned with supervisory expectations. The thematic review in 2022 showed that almost all SIs had developed at least basic practices for the majority of supervisory expectations. However, even though most SIs anticipate that climate-related and environmental risks could have a considerable impact on their business activities in the short to medium term, the majority of banks still fall short – significantly so in some cases – of adequately managing

climate-related and environmental risks in certain areas. The methodologies behind banks' practices are not mature, and there is also a lack of granular data. Overall, only around half of the SIs are fully and effectively implementing the practices that they have developed. As for the LSIs, German banks are, on average, performing better than LSIs from other countries in some areas, but they, too, are still in the early stages of adequately dealing with climate-related and environmental risks. The majority of German LSIs have implemented only "basic practices" that will not meet future supervisory expectations. It is particularly notable that most German LSIs exhibit shortcomings with respect to the quantitative analysis of climate-related and environmental risks. There are no specific key performance indicators for effective risk management and mitigation. Only a few German LSIs had advanced practices, particularly in the area of credit risk management.

¹ For detailed results on the individual components of the assessment and the underlying methodology, see European Central Bank (2022b).

² See European Central Bank (2022c).

All in all, it is very challenging to identify, assess and manage ESG risks. Not only is there a lack of data, but also often a lack of knowledge or experience with regard to integrating ESG risks into existing methods or developing new ones. It is also difficult to take potential longer-term ESG risks into account in the risk inventory and stress tests. The attendant necessity of using approximative and qualitative approaches at first may suffice for now. However, it is crucial that banks develop realistic plans to gradually close data and methodology gaps.

Analyses of financial risks stemming from climate change

Modelling the effects of climate change is challenging

New and improved analytical methods are needed to assess the impact on the financial sector of risks stemming from climate change. Although major progress has been made in this area over the past few years, the quantification of climate-related financial risks remains a major challenge for both supervisors and the financial industry. Climate-related data, such as enterprises' direct and indirect greenhouse gas emissions, are only available to a limited extent, as they are difficult to collect, especially from smaller enterprises. A survey of small and medium-sized German banks as part of the 2022 LSI stress test showed that data gaps are the key reason why the majority of banks currently only consider climate-related risks indirectly in their risk management.

Heterogeneous transmission of climate-related risks places new demands on stress tests

The challenges outlined above apply in particular to the modelling of risks in the context of scenario analyses and stress tests,²⁹ which are already being used by various supervisory authorities to quantify climate-related risks in the financial system.³⁰ The effects of climate-related risks on the real economy and the financial system vary considerably. For example, some sectors cause high emissions of climate-damaging greenhouse gases and are therefore exposed to higher transition risks than other sectors of the economy.³¹ The heterogeneous

transmission of climate-related risks places new demands on the design of stress tests. Climate risk stress tests therefore differ from conventional stress tests not only in that they have a much more specific – but also more granular – reference dataset, but also in their modelling approach, which maps the effects of climate-related risk to individual borrowers as precisely as possible.

Most climate risk stress tests are based on the scenarios developed by the NGFS.³² These scenarios use integrated assessment models (IAMs) to model the global macroeconomic impact of various climate pathways up to 2100. They are developed by an international consortium of climate research institutions and central banks that also ensures they are consistent with the forecasts of the Intergovernmental Panel on Climate Change. In an “orderly” transition³³ to global net zero greenhouse gas emissions by 2050, prompt policy measures limit global warming to below 1.4°C by 2100. A “disorderly” transition³⁴ achieves the same objective, albeit at a higher cost owing to diverging or delayed measures. In the “hot house

²⁹ Scenario analyses and stress tests are established supervisory analytical tools to identify potential vulnerabilities in the financial sector. The aim of the regular supervisory stress tests is to analyse the resilience of banks in a very adverse yet realistic economic environment. At the consolidated level, the results are used to identify potential systematic risks. At the single entity level, they serve as an early warning indicator and – in the case of solvency stress tests – as a basis for setting the supervisory guidance on additional own funds.

³⁰ Owing to these uncertainties, the main objective of climate risk stress tests and scenario analyses is not to provide a precise point estimate for the current risk at a bank, but rather to estimate its magnitude and importance for various sets of circumstances and development paths.

³¹ For more information on analytical requirements and options from a central bank perspective, see also Deutsche Bundesbank (2022).

³² See Network for Greening the Financial System (2022).

³³ The NGFS models two orderly transitions with varying degrees of ambition. The statements refer to the “Net Zero 2050” scenario. Besides this, the “Below 2°C” scenario is also seen as an orderly, albeit less ambitious transition.

³⁴ Two disorderly transition scenarios are also modelled: “Divergent Net Zero” and “Delayed Transition”. The climate risk stress test presented here uses a scenario based on a “Delayed Transition”.

Structured survey of sustainability risks in supervisory meetings

In the first quarter of 2022, the Bundesbank, in consultation with BaFin, began collecting data on the way in which banks supervised at the national level deal with sustainability risks during the institutions' annual supervisory meetings. The aim of this structured survey was to gain an idea of the state of play with respect to banks' implementation of previously non-binding supervisory standards in the areas of strategy, responsible governance, business organisation and the management of environmental, social and governance (ESG) risks. At the same time, it made banks aware of supervisory expectations contained in the seventh amendment to the Minimum Requirements for Risk Management (MaRisk). A total of 810 banks participated in the structured survey, including 443 cooperative banks, 229 savings banks, 86 commercial banks, 10 building and loan associations and 11 promotional banks.

Just over half of the banks surveyed reported that they were in the planning phase or the early stages of the implementation phase with regard to integrating ESG risks into their business practices. They perceive ESG risks as primarily affecting credit and reputational risk. However, perceptions vary depending on the category of banks (see the adjacent chart). For example, savings banks cited ESG factors as primarily having an impact on legal risk and other operational risks, whereas cooperative banks see ESG risks as translating first and foremost into credit risk/counterparty default risk. Nevertheless, their impact on the overall risk profile and the overall risk situation across all banks is limited. All in all, only 215 banks (27%) identified ESG factors as contributing to the materiality of one or more types of risk.

In its guidance notice, BaFin recommends that the entities and banks it supervises anchor ESG risks in their business strategy and critically review their business lines for interdependencies with ESG risks. According to the survey, 70% of the participating banks have already done this, with 173 banks (21%) having developed their own sustainability strat-

egy. The primary methods for managing and/or mitigating ESG risks within the scope of business strategy are formulating sustainability objectives and other commitments, such as engaging in dialogue with counterparties that present a significant sustainability risk. Far-reaching measures, such as discontinuing lines of business or managing risks through the exercise of voting rights, have so far rarely been undertaken in practice (see the left-hand chart on p. 86). Risk strategy methods are implemented less frequently on average than business strategy methods. The majority of the banks surveyed have set ESG-specific limits or made sector-specific exclusions. In addition, around one-fifth of the commercial banks surveyed report devising other methods, such as investment strategies (see the right-hand chart on p. 86).

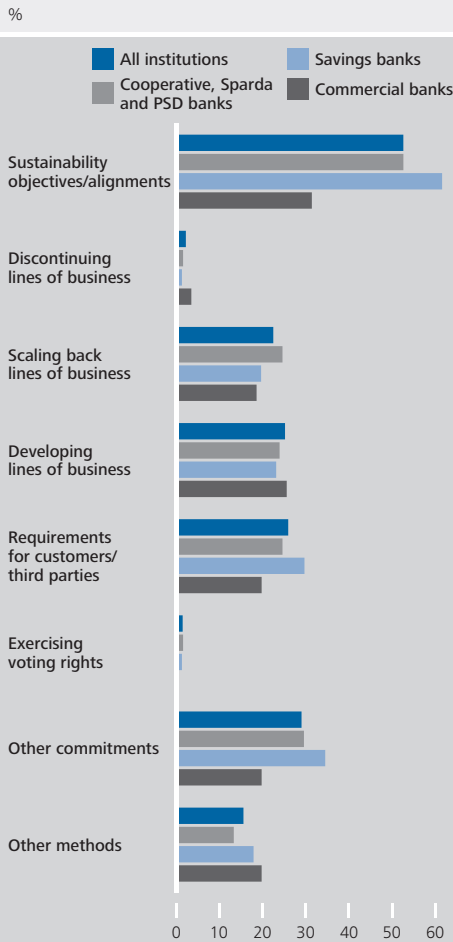
The majority of the banks surveyed (59%) already include ESG risks in their regular risk in-

Risk types affected by sustainability risks at institutions* (by category of banks)



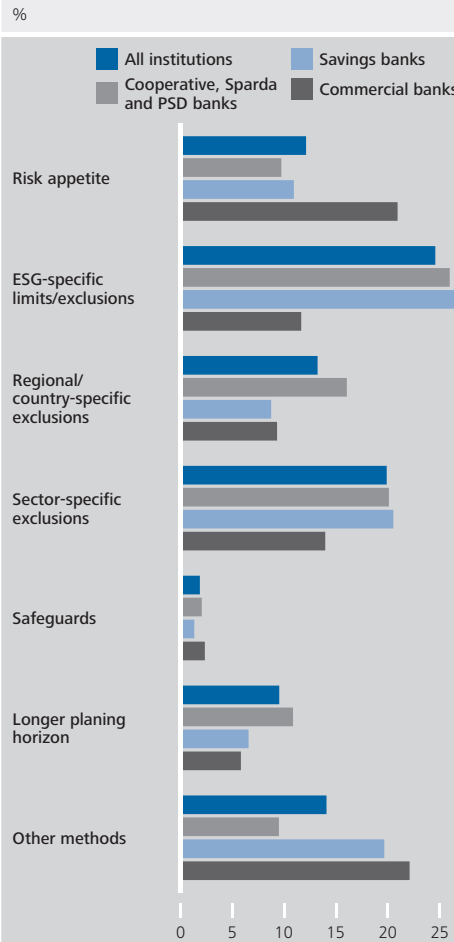
* Structured survey of LSIs, respondents selected all answers that applied. Question: Which risk types are affected by sustainability risks at your institution?
 Deutsche Bundesbank

Integration of ESG risks into the business strategy* (by category of banks)



* Structured survey of LSIs, respondents selected all answers that applied. Question: How have sustainability risks been integrated into your institution's business strategy?
 Deutsche Bundesbank

Integration of ESG risks into the risk strategy* (by category of banks)



* Structured survey of LSIs, respondents selected all answers that applied. Question: How have sustainability risks been integrated into your institution's risk strategy?
 Deutsche Bundesbank

ventory, and one-third of the banks (36%) have incorporated ESG risks into their written risk management guidelines.¹ With regard to conducting ESG-related stress tests and scenario analyses, 26% of respondents stated that they had conducted these tests or planned to do so in 2022. A large percentage of commercial banks (35%) reported that they did not intend to conduct scenario analyses or stress tests in the future.

Overall, the survey shows that there is still a lot of work to be done by the banks if they are to fully satisfy the future supervisory requirements set out in the seventh amendment to MaRisk. First and foremost, it needs to be ensured that there are fundamental methods and processes in place to determine the ma-

teriality of ESG risks. This, together with the parallel establishment by banks of a quantitative database, will be the focus of supervision over the next few years. In this context, the way in which institutional associations set the pace in the German banking sector should not be underestimated. This is because 77% of all banks in Germany belong to the German Savings Banks and Giro Association (*Deutscher Sparkassen- und Giroverband*) or the Association of Cooperatives (*Genossenschaftsverband*).

¹ Multiple responses were possible to some questions.

world" scenario,³⁵ by contrast, global warming rises to 3°C as the current level of policy ambition is not exceeded.³⁶

The NGFS scenarios are not generally designed to be stress scenarios. Unlike conventional stress tests, climate risk stress tests do not have a clear baseline scenario. Instead, the different scenarios are intended to model the most realistic pathways possible for the environment and the economy, depending on current and future climate policy measures. The individual scenarios therefore differ greatly in their degree of transition and physical risks, and thus also their potential stress effect.³⁷ The very long horizon over which the NGFS scenarios take place presents another challenge, as established frameworks for bank stress testing usually work with fairly short forecast horizons.³⁸

Results of previous climate-related scenario analyses and stress tests

Irrespective of the challenges outlined above, supervisors and central banks have already conducted a number of climate risk stress tests and scenario analyses. For example, in its 2021 Financial Stability Review, the Bundesbank presented a climate-related scenario analysis that examined how transition risks could affect portfolios in the German financial sector.³⁹ The impact on the financial sector was fairly moderate owing to the relatively low losses in macroeconomic value added in the NGFS scenarios used. Compared to insurers and funds, the banking sector showed the lowest level of vulnerability here.

Losses projected in the short-term ECB scenarios were moderate overall

In 2022, the ECB conducted a climate risk stress test for around 100 SIs.⁴⁰ This exercise analysed one short-term and three long-term transition risk scenarios and two acute physical risk scenarios (flood risk and drought and heat risk).⁴¹ The losses projected in the short-term scenario were fairly moderate overall.⁴² The long-term projections show that so far, banks are having

trouble adapting their strategies effectively to the various scenarios.

These results are largely consistent with those of climate risk stress tests conducted by other supervisory authorities (including De Nederlandsche Bank and Banque de France; see the table on p. 91), which show that the estimated losses tend to be lower for banks than for insurers and funds, that their extent depends on how carbon-intensive the borrowing economic sector is, and that they are lower in the long term in an orderly transition than on other climate policy pathways.

³⁵ Alongside the "Current Policies" scenario, the NGFS has established the "Nationally Determined Contributions" scenario, which also belongs to the "Hot House World" category. The latter scenario takes into account heterogeneity and different levels of ambition in policy measures to prevent climate change.

³⁶ Amongst other things, the plan under the European Commission's European Green Deal is to ensure there are no net emissions of greenhouse gases within the EU from 2050 onwards. However, this policy objective cannot be directly assigned to one of the NGFS scenarios.

³⁷ An orderly transition towards a climate-neutral economy is the most desirable option from a long-term macroeconomic and climate policy perspective. Compared to other scenarios, an orderly transition minimises economic downturns and long-term physical damage resulting from rising global temperatures. However, more transition risks materialise in an orderly transition than in a "hot house world" scenario in which no or hardly any measures are taken to contain global warming and its consequences. In turn, the "hot house world" scenario is dominated by the physical damage caused by climate change and its negative long-run impact on the economy.

³⁸ On the one hand, the forecast horizon for stress tests is usually three to five years and balance sheets are assumed to be static. However, this is becoming increasingly unrealistic due to the lack of adjustment responses over a longer period of time. On the other hand, forecasts over such a long period of time are naturally subject to a high degree of uncertainty. Banks' planning horizon does not generally exceed three to five years, for instance. Therefore, the climate risk stress tests carried out so far have either focused (exclusively) on the shorter term, in which transition risks generally predominate, or have tried to make the most realistic assumptions possible as to how business will develop over the next few decades for longer-term analyses.

³⁹ See Deutsche Bundesbank (2021).

⁴⁰ See European Central Bank (2022a).

⁴¹ The baseline scenario was provided by the Eurosystem staff macroeconomic projections for the euro area published in December 2021.

⁴² Taken together, under both the short-term, disorderly transition risk scenario and the two physical risk scenarios, the combined credit and market risk losses for the 41 banks that provided projections would amount to around €70 billion. See European Central Bank (2022a).

The Bundesbank's climate risk stress test

The climate risk analyses conducted by the Bundesbank so far have taken a predominantly macroprudential view. But what matters in particular for banking supervisors is the microprudential perspective – that is, the view at the level of individual institutions. That is why the Bundesbank has also developed a climate risk stress test specially for banks. This stress test is conducted as a top-down exercise – i.e. without any involvement on the part of the banks – and the plan is to give supervisors scope to flexibly analyse banks' robustness to various climate scenarios going forward. Two adverse scenarios and one baseline scenario are analysed as part of this stress test. The latter is based on the NGFS's Current Policies scenario, while one adverse scenario expands upon the NGFS's Net Zero 2050 scenario and the other is an explicit short-term stress scenario based on a DSGE approach that simulates an abrupt increase in the price of carbon to €200 per tonne.

The methodology is being developed primarily to estimate the impact of transition risks in the near term, which offers two benefits. First, it improves comparability with existing stress tests and second, it mitigates the problem that model uncertainty increases disproportionately for longer time horizons. One notable reason why uncertainty increases disproportionately over long time horizons is that dynamic balance sheets – that is, adjustments not just by the bank but also by non-financial corporations (the borrowers) to the environment under observation – have to be simulated.¹ To address this issue, the Bundesbank uses climate scenarios that differ from one another mainly in terms of the size of the carbon price² increases they simulate. These scenarios are then converted into stressed financial metrics, such as banks' profitability.³

This is done using granular annual financial statement information and data on greenhouse gas emissions at the firm level, on the basis of which stressed probabilities of default (PDs) and loss given default ratios (LGDs) are computed for borrowers. In parallel, a macroeconomic model is deployed to quantify how the scenarios impact on average PDs and LGDs in individual economic sectors. Owing to the complete lack of historical comparative data that could be used for validation purposes, credit risk parameters are estimated using various modelling approaches to allow an assessment of the quality and robustness of the results. As a final step, the stressed firm and sector metrics are used to calculate provisions at the individual bank level.

The first results from the climate risk stress test are consistent with findings from analyses conducted by other supervisory authorities. The potential risks that the transition to a climate-neutral economy presents for the German banking sector appear to be fairly moderate overall, based on the current NGFS scenarios, with the modelled aggregate loss for all German banks amounting to around €16 billion. Express-

¹ A static balance sheet would mean that banks and firms, too, do not adjust their business models and carry out every single transaction just as they would have done prior to the simulated shock, i.e. without taking the incoming data from the scenario into account. This is a very hard assumption that is reasonable only for fairly short time horizons.

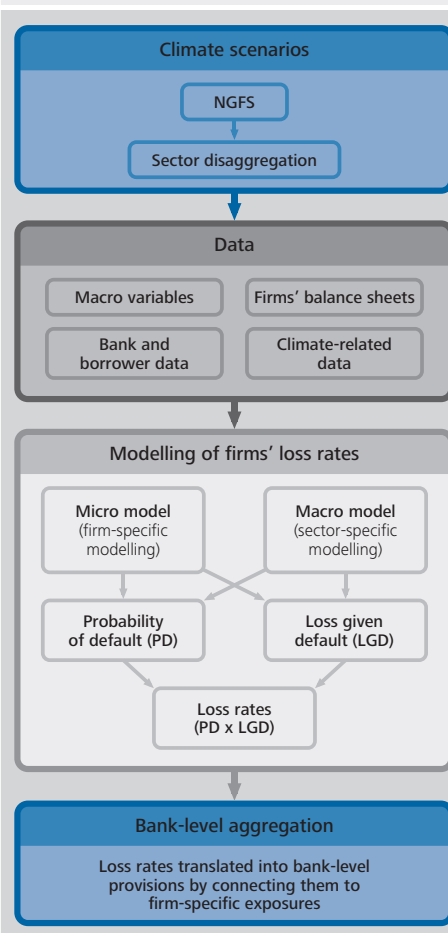
² Though the term "carbon price" might suggest otherwise at first glance, this variable encompasses more than just the market price for carbon. Rather, it serves as a collective variable that comprises all the policy measures that are designed to have an impact on emissions activity.

³ The first iteration of the climate risk stress test used the NGFS's Net Zero 2050 and Current Policies scenarios. The Net Zero 2050 scenario represents an orderly transition with an increase in the price of carbon, while the Current Policies scenario assumes that currently implemented policies are preserved and thus serves as a reference scenario.

ing that figure as a percentage of the stressed corporate loan portfolio of roughly €2,100 billion produces a relative loss of around 0.76%. The loss rate is unlikely to be any higher than this because other model specifications lead to lower losses. Needless to say, certain banks may be impacted more heavily if a large share of their borrowers are particularly exposed to transition risks. Another insight produced by the Bundesbank's climate risk stress test is that transition risks can be spread very heterogeneously across regions. Especially for banks with a strong regional focus, this could mean taking a more active approach to managing the loan portfolio as a way of evading such risks. That said, a comparison with conventional stress tests reveals that the results they produce say very little indeed about how a bank will fare in a climate risk stress test. That is why climate-related risks need to be explicitly modelled and analysed. Climate risk stress testing and scenario analyses complement prudential risk analyses and are a useful tool for analysing how climate-specific risk scenarios impact on banks. By enhancing and refining the scenarios and models used and improving the underlying dataset, the quantification of climate-related risks can be made more robust going forward. With this aim in mind, the Bundesbank will regularly update and review its risk assessment.

A schematic diagram presenting the methodology behind the Bundesbank's climate risk stress test can be found in the adjacent chart. As with a variety of other exercises, the NGFS's climate scenarios provide the groundwork for this stress test. In the economic model underpinning these scenarios, it is not possible to disaggregate the effects by country and economic sector at the same time. However, a sectoral disaggregation of the German economy is crucially important if the climate risk stress test is to work properly, which is why disaggregated

Climate risk stress testing methodology – schematic diagram*



* Stress test analyses how transition risks impact on German banks' corporate exposures.
 Deutsche Bundesbank

scenario variables calculated by means of a production network model are used.⁴ The macroeconomic scenario variables form part of the underlying dataset alongside credit relationships and other loan, balance sheet and profit and loss data from firms as well as data on firms' direct and indirect greenhouse gas emissions.

The methodology is built around the modelling of firm-level PDs and LGDs, based on a micro and a macro approach. Drawing on established methods for modelling PDs as part of stress tests, the micro approach con-

⁴ See Frankovic (2021).

sists of three steps. First, an empirical model is used to derive historical dynamics between firm PDs and a series of explanatory corporate metrics (including profitability and leverage ratio). Second, the relevant key financial metrics are projected across the entire scenario horizon based on the scenarios and using balance sheet assumptions. Third, the extrapolated values of these metrics are fed into the model and then converted into stressed PDs.⁵ LGDs are modelled based on how borrowers' capital ratios evolve in conjunction with the loan collateral provided. This approach allows the transmission of climate scenarios into stressed firm-level parameters to be modelled in a granular fashion. In parallel to the micro approach, a macro approach is also employed to allow users to assess the quality and robustness of results with the aid of independent modelling approaches. This macro approach centres around an established credit risk model that identifies historical dynamics between credit risk parameters (PDs and LGDs) and macroeconomic scenario variables and converts them into stressed credit risk parameters in a consistent manner. This model has been enhanced and refined to also allow sector-specific paths to be estimated for credit risk parameters. Furthermore, various specifications and restrictions have been adapted to allow for the novel nature of climate risk modelling. The firm and sector-specific output from both approaches are then blended with a view to mapping the credit risk parameters of borrowers of German banks as comprehensively as possible. Firm-specific loss rates are calculated as a product of PDs and LGDs. As a final step, the modelled firm-level loss rates are connected to bank data based on existing credit relationships. By multiplying firm-specific lending volumes and loss rates, it is possible to compute provisions for each bank that reflect the stress effect produced in each scenario. For now, only loan exposures to firms are being ana-

lysed; going forward, the model will be gradually expanded to incorporate other exposure classes (e.g. real estate-secured exposures and retail exposures) and also physical risks.

The methodology behind the Bundesbank's climate risk stress test is comparable to the exercises conducted by other European supervisory authorities (summarised in the table on p. 91). The risk assessment in other climate risk stress tests was carried out at least at the sector level; wherever possible, it was modelled at the firm level as well. Both the supervisory authorities that conducted calculations of their own using a top-down approach and the banks that had to provide data in the bottom-up approach reported facing a similar set of challenges. The limited availability of granular (climate-related) data was an issue, and new stress test models had to be developed, or existing ones expanded, to be able to map climate risks as adequately as is possible at the present time. Because separate data sources and methodologies need to be used when quantifying transition risks and physical risks, and since transition risks predominate in the short term (which is common for stress tests), some exercises focused on this aspect only. Compared with traditional stress tests, the climate risk stress tests looked only at the credit risk and market risk channels for the most part.⁶ Thanks to these exercises, both supervisory authorities and banks have already made significant progress in quantifying climate-related risks, but there is still room for development.

⁵ This approach is based on the assumption that the relationship between PDs and financial metrics will not change significantly in future.

⁶ Other channels, such as interest rate risk and operational risk, were usually omitted because they were (presumed to be) less material for analysing climate-related risks.

Climate risk stress tests run by European supervisory authorities

Supervisory authority	Methodology	Scenarios	Key results
De Nederlandsche Bank ^{1,2} (2019)	<ul style="list-style-type: none"> – Transition risks – Top-down – Banks, insurers and pension funds – Five years – Credit risk and market risk – Sector level 	Four scenarios: policy shock, technology shock, double shock and expectation shock	<ul style="list-style-type: none"> – A disruptive energy transition scenario could cause sizeable but manageable losses for financial institutions
Bank of England ^{3,4} (2020)	<ul style="list-style-type: none"> – Transition and physical risks – Bottom-up – Insurers – Instantaneous shock – Market risk – Sector level 	Four natural catastrophe scenarios and a separate claims inflation scenario	<ul style="list-style-type: none"> – Significant losses but none of the participating insurers was expected to become insolvent – Considerable gaps in the ability to measure climate-related scenarios within the financial industry
ECB ⁵ (2021, macroprudential)	<ul style="list-style-type: none"> – Transition and physical risks – Top-down – Banks – 30 years – Credit risk and market risk – Firm level 	One baseline scenario: orderly transition; two adverse scenarios: delayed transition and hot house world	<ul style="list-style-type: none"> – Only a brief increase in loss rates in the orderly transition scenario over 30 years; some stronger increases over the medium and long term in the delayed transition and hot house world scenarios – Costs lowest over the long term for firms in the orderly transition scenario; costs highest in the hot house world scenario mainly due to huge physical costs
Banque de France/ACPR ^{6,7} (2021)	<ul style="list-style-type: none"> – Transition and physical risks – Bottom-up – Banks and insurers – 30 years – Credit risk and market risk – Sector and firm level 	One baseline scenario: orderly transition; two adverse scenarios: delayed and sudden transition	<ul style="list-style-type: none"> – Firms impacted to different degrees within sectors, some very heavily – French banks moderately exposed to heavily impacted sectors – Financial stability risks possible owing to heterogeneity across and within sectors; magnitude possibly stronger than expected from aggregate perspective
Oesterreichische Nationalbank ⁸ (2021)	<ul style="list-style-type: none"> – Transition risks – Top-down – Banks – Five years – Credit risk and market risk – Sector and firm level 	One baseline scenario based on EBA stress test; orderly and disruptive transition scenario	<ul style="list-style-type: none"> – Banking system well equipped for potential increases in carbon prices – Agriculture and transport sector impacted most in disruptive scenario
Deutsche Bundesbank ⁹ (2021, macroprudential)	<ul style="list-style-type: none"> – Transition risks – Top-down – Banks, insurers and funds – Ten years – Credit risk and market risk – Sector level 	Two orderly transition scenarios and one hot house world scenario, each used interchangeably as increase and reference scenarios	<ul style="list-style-type: none"> – Impact appears moderate overall; some financial intermediaries could be affected more, though – Of the financial intermediaries tested, banks were least vulnerable
Bank of England ¹⁰ (2021)	<ul style="list-style-type: none"> – Transition and physical risks – Bottom-up – Banks and insurers – 30 years – Credit risk and market risk – Sector level 	Three scenarios: “Early Action”, “Late Action” and “No Additional Action”	<ul style="list-style-type: none"> – Signs of progress in considering climate-related risks in the banking sector; availability of debtors’ climate-related data still an issue – While costs potentially resulting from climate-related risks are substantial for UK banks and insurers, solvency is ultimately not at risk – Possible to reduce follow-on costs if timely policy action is taken
ECB ¹¹ (2022, microprudential)	<ul style="list-style-type: none"> – Transition and physical risks – Bottom-up – Banks – Instantaneous shock and three/30 years – Credit risk and market risk – Sector and firm level 	Transition risks: two short-term and three long-term scenarios; physical risks: two short-term scenarios (flood and heatwave/drought)	<ul style="list-style-type: none"> – Climate-related risks not yet incorporated into internal stress tests or risk management at 60% of banks – Availability of climate-related data e.g. emissions data and energy performance certificate (EPC) ratings still patchy; reliance on approximation techniques – Financial losses low for the most part, though adverse scenarios are not too severe
Deutsche Bundesbank (2023, microprudential)	<ul style="list-style-type: none"> – Transition risks – Top-down – Banks – Three/ten years – Credit risk – Sector and firm level 	One orderly transition scenario and one current policies scenario	<ul style="list-style-type: none"> – Losses resulting from provisions in German banks’ corporate loan portfolio moderate, for the most part

1 See Vermeulen et al. (2018). 2 See Vermeulen et al. (2019). 3 See Bank of England (2019a). 4 See Bank of England (2019b). 5 See Alogoskoufis et al. (2021). 6 See Allen et al. (2020). 7 See Clerc et al. (2021). 8 See Oesterreichische Nationalbank (2021). 9 See Deutsche Bundesbank (2021). 10 See <https://www.bankofengland.co.uk/stress-testing/2022/results-of-the-2021-climate-biennial-exploratory-scenario> 11 See European Central Bank (2022a).

■ Outlook

Climate change presents a major challenge to banks and the financial system as a whole. Banking supervision and banking regulation must ensure that the risks in the banking sector are taken into account adequately, i.e. in a risk-oriented manner. Risk-oriented regulation and supervisory practice are not suitable as primary management tools for climate objectives. Instead, these objectives should be tackled through the economic and fiscal policy measures taken since the Paris Agreement in order to pursue the 1.5°C target. They include instruments such as carbon taxation and caps on emissions.

Over the past few years, significant progress has been made in advancing supervisory practices and raising the standards for banks to meet in integrating climate-related risks into their risk assessment. However, the work is far from complete. From a regulatory perspective, the Basel framework is currently being reviewed with regard to climate-related risks. The ongoing revision to the CRR and the CRD, referred to as the “European banking package”, currently envisages several ESG-related mandates for the EBA. For instance, it will be responsible for developing guidelines for climate-related scenario analyses and stress tests. As the capturing of climate-related factors becomes increasingly common, the data needed to assess risks are gradually becoming available through reporting.

In addition, the topic of biodiversity, another sub-category of environmental risk, is gaining more attention within Europe and globally. The coronavirus pandemic has further heightened awareness of the link between infectious diseases and unsustainable developments in agriculture or, for example, the loss of forest areas. Numerous initiatives to prevent and reverse biodiversity loss have been launched at the G7 and G20 level, as well as by the United Nations, amongst others.

At the European level, work on the European Union’s social taxonomy is also being continued. This is intended to create a classification system for economic activities with regard to social and human rights criteria and will supplement the existing “green” taxonomy.⁴³ Overall, the success of ESG regulation will rely heavily on a clear and consistent definition of social and governance factors. These developments will also require banking supervisors to build up additional knowledge in order to better analyse and assess the risks associated with biodiversity and social aspects in and for the banking sector.

Supervisors will focus on the progress made by banks in implementing the existing requirements over the next few years. The ECB has made climate-related risks a strategic priority for its supervisory activities in the period 2022-2024.⁴⁴ In the years thereafter, the ECB is planning to monitor remedial actions, review banks’ implementation plans, conduct targeted deep-dive reviews in relation to selected aspects and focus on climate-related and environmental risks when carrying out on-site inspections. Furthermore, climate-related and environmental risk management is to be gradually integrated into the methodology of the Supervisory Review and Evaluation Process (SREP) via qualitative and quantitative requirements.

BaFin and the Bundesbank have also defined ESG risks as a medium-term issue to focus on in the period up to 2025. In supervisory practice, the intention is to regularly address ESG risks in supervisory discussions and to intensify dialogue with the banking associations. Going forward, on-site inspections will focus on ESG aspects and assessments regarding the management of ESG risks will be integrated into the SREP process. The findings from ESG reporting

⁴³ On 28 February 2022, the Platform on Sustainable Finance presented its final report, including proposals for the design of a social taxonomy. See Platform on Sustainable Finance.

⁴⁴ See https://www.bankingsupervision.europa.eu/banking/priorities/html/ssm.supervisory_priorities2022--0f890c6b70.en.html

and the Bundesbank's climate risk stress test will support the ongoing work.

The development of transition plans will be key to the successful continuation of work, particularly in the area of climate-related risks. A transition plan is a detailed, multi-year presentation of the objectives and measures established by an enterprise to align its business model and strategy with specific environmental objectives.

The NGFS and the BCBS are currently working intensively on how banks' transition plans – or, more precisely, transition planning processes – can be used effectively. Assessing banks' transition planning processes will require very close cooperation with the real economy. Ultimately, it is the transition plans of banks' corporate customers that will play a key role in banks' transition planning processes.

■ List of references

Allen, T., S. Dees, J. Boissinot, C. M.C. Graciano, V. Chouard, L. Clerc, A. de Gaye, A. Devulder, S. Diot, N. Lisack, F. Pegoraro, M. Rabate, R. Svartzman and L. Vernet (2020), Climate-Related Scenarios for Financial Stability Assessment: an Application to France, Banque de France Working Paper, No 774, July 2020.

Alogoskoufis, S., N. Dunz, T. Emambakhsh, T. Hennig, M. Kajser, C. Kouratzoglu, M. A. Munoz, L. Parisi and C. Salleo (2021), ECB economy-wide climate stress test, ECB Occasional Paper Series, No 281, September 2021.

Bank of England (2019a), Life Insurance Stress Test 2019: Scenario Specification, Guidelines and Instructions, June 2019.

Bank of England (2019b), General Insurance Stress Test 2019: Scenario Specification, Guidelines and Instructions, June 2019.

Basel Committee on Banking Supervision (2022), Frequently asked questions on climate-related financial risk, December 2022.

Basel Committee on Banking Supervision (2021a), Climate-related risk drivers and their transmission channels, report, April 2021, pp. 10 ff.

Basel Committee on Banking Supervision (2021b), Principles for the effective management and supervision of climate-related financial risks, June 2021.

Basel Committee on Banking Supervision and Banque de France (2020), The green swan – Central banking and financial stability in the age of climate change, report, January 2020.

Clerc, L., A.-L. Bontemps-Chanel, S. Diot, G. Overton, S. Soares de Albergaria, L. Vernet and M. Louardi (2021), A first assessment of financial risks stemming from climate change: The main results of the 2020 climate pilot exercise, ACPR Analyses et synthèses, No 122-2021, May 2021.

Deutsche Bundesbank (2022), Climate change and climate policy: analytical requirements and options from a central bank perspective, Monthly Report, January 2022.

Deutsche Bundesbank (2021), Financial Stability Review, November 2021.

European Banking Authority (2022), The Role of Environmental Risks in the Prudential Framework, Discussion Paper, 02/2022, May 2022, pp. 15 ff.

European Banking Authority (2021), Report on Management and Supervision of ESG Risks for Credit Institutions and Investment Firms, June 2021.

European Banking Authority (2019), Action Plan on Sustainable Finance, communication, December 2019.

European Central Bank (2022a), 2022 climate risk stress test, July 2022.

European Central Bank (2022b), Walking the talk. Banks gearing up to manage risks from climate change and environmental degradation: Results of the 2022 thematic review on climate-related and environmental risks, November 2022.

European Central Bank (2022c), Good practices for climate-related and environmental risk management. Observations from the 2022 thematic review, November 2022.

European Central Bank (2021), Banks must accelerate efforts to tackle climate risks, ECB supervisory assessment shows, press release, 22 November 2021.

European Central Bank (2020), Guide on climate-related and environmental risks. Supervisory expectations relating to risk management and disclosure, November 2019.

European Commission (2018), Action Plan: Financing Sustainable Growth, communication, March 2018.

European Commission (2014), Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups, October 2014.

Federal Financial Supervisory Authority (2021), Minimum Requirements for Risk Management, Circular 10/21, August 2021.

Federal Financial Supervisory Authority (2019), Guidance Notice on Dealing with Sustainability Risks, December 2019, pp. 12 ff.

Frankovic, I. (2022), The impact of carbon pricing in a multi-region production network model and an application to climate scenarios, Deutsche Bundesbank Discussion Paper No 07/2022.

Network for Greening the Financial System (2022), NGFS Climate Scenarios for central banks and supervisors, June 2022.

Network for Greening the Financial System (2020a), A status report on financial institutions' experiences from working with green, non-green and brown financial assets and a potential risk differential, technical document, May 2020.

Network for Greening the Financial System (2020b), Capturing risk differentials from climate-related risks. A Progress Report: Lessons learned from the existing analyses and practices of financial institutions, credit rating agencies and supervisors, technical document, May 2020.

Network for Greening the Financial System (2019), A call for action. Climate change as a source of financial risk, report, April 2019, pp. 13 ff.

Oesterreichische Nationalbank (2021), Financial Stability Report 42, November 2021.

Platform on Sustainable Finance, Final Report on Social Taxonomy, February 2022.

Vermeulen, R., E. Schets, M. Lohuis, B. Kölbl, D.-J. Jansen and W. Heeringa (2019), The heat is on: A framework measuring financial stress under disruptive energy transition scenarios, De Nederlandsche Bank Working Paper No 625, February 2019.

Vermeulen, R., E. Schets, M. Lohuis, B. Kölbl, D.-J. Jansen and W. Heeringa (2018), An energy transition risk stress test for the financial system of the Netherlands, De Nederlandsche Bank Occasional Studies, Vol. 16-7.