

Prudential transition plans: the potential of a new regulatory instrument and a research agenda

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Abstract

Net zero transition plans can be used by prudential supervisors as an additional dynamic instrument to assess, address and bring distant financial risks into the present. To date, transition plans have primarily emerged as non-financial disclosure instrument and as such, their prudential application has been limited. In this article, we discuss the role that transition plans can play in banking supervision. The article outlines steps towards incorporating transition plans into prudential supervision, thereby enabling supervisors to effectively use transition plans as a forward-looking methodology to better manage and overcome some of the challenges associated with climate risks.

Keywords: Banking supervision, climate & environmental risk, risk management, transition planning

1. Introduction

Net zero transition plans have the potential to become an important and innovative prudential supervision instrument that could be used by prudential supervisors as an additional dynamic tool to assess, address and bring distant financial risks into the present. In this article, we discuss the role that transition plans can play in banking supervision as an additional prudential risk assessment instrument. The article outlines steps towards incorporating transition plans into prudential supervision. We outline how this could contribute to enabling supervisors to effectively use transition plans as a forward-looking methodology to better manage and overcome some of the challenges associated with climate risks.

Conceptually, a transition plan is a detailed multi-year account of targets and actions that sets out how a given firm will ensure that its business model and strategy are compatible with a specific environmental objective, such as the goal of limiting global warming to 1.5°C above pre-industrial levels in line with the Paris Agreement. The primary rationale for the financial sector to align operations with commitments made by governments is to anticipate investment opportunities and mitigate transition risks; this is particularly necessary as some governments recently have started to signal lower ambitions in the context of economic challenges and inflation. In the financial sector, transition plans have emerged to make voluntary pledges made by banks more credible. While they continue to have a role in communicating sustainability ambitions to stakeholders, policymakers are increasingly recognizing the importance of setting expectations or binding requirements to integrate transition plans into firms' strategy and non-financial disclosures (e.g. through the Corporate Sustainability Reporting Directive (CSRD) in the European Union).

To date, transition plans have emerged primarily as non-financial disclosure efforts which do not have prudential purpose; they are not geared towards meeting public regulation to curb excessive financial sector risk-taking (See Table 1). Transition plans emerged as voluntary, market-led net zero transition plans through initiatives such as the Glasgow Financial Alliance for Net Zero (GFANZ) that are a voluntary response to rising market and societal expectations with the aim of inviting scrutiny over plans to deliver something that is ultimately to their financial benefit, namely the alignment with transition pathways. Generally, as within the Task Force on Climate-related Financial Disclosures (TCFD) framework, transition plans are considered part of the broad climate-related strategy of the bank, including as part of Corporate Social Responsibility (CSR) initiatives.

More recently, a second class of mandatory legislative requirements for the general corporate sector have emerged to produce transition plans, whereby firms are requested by governments to disclose – as part of their non-financial disclosures – how they intend to ensure that their business model and strategy are compatible with the unfolding global transition to a sustainable economy. The EU has already approved first regulatory requirements on this, in June 2022, through the Corporate Sustainability Reporting Directive (CSRD), and has also reached a related provisional agreement between the Council and the European Parliament. In the UK, the Government launched a Transition Plan Taskforce in 2022 to develop its own 'gold standard'. Similar requirements are being proposed in the United States (SEC, 2022). These disclosures are meant to incentivize market discipline by providing investors with adequate information regarding the climate risk profile of their investments. As such, they mainly fall within the remit of market conduct supervisors, who have limited tools to address the inadequacy of the plans from the point of view of addressing prudential risks.

In this article, we focus on a third type of initiative, namely mandatory prudential transition plans that focus on the risks of misalignment with net zero targets. Prudential transition plans – as risk-based regulatory instruments – would be a regulatory requirement introduced specifically with an eye on micro- and macroprudential concerns related to transition risks and the net zero transition. These prudential transition plans could serve as an additional forward-looking assessment tool to safeguard the stability of the financial system. In the EU, policymakers are already discussing plans to introduce prudential transition plans as part of the ‘Single Rulebook’ for banks. These transition plans are envisioned to fall squarely within the remit of prudential supervisory processes, such as the EU’s Supervisory Review and Evaluation Process (SREP).

In this article, we ask how banking supervisor can make effective use of mandatory transition plans to achieve their prudential objectives. The article is structured as follows. In Section 2, we review the by now well-established limitation of existing risk-management approach and supervisory techniques where it concerns climate and environment related financial risk (C&E risk). In Section 3, we set out the specific contribution that transition plans can make to overcoming the limitation of existing prudential techniques and discusses the potential of well-calibrated prudential plans to address specific micro- and macro-prudential concern, distinguishing different purposes. In Section 4, we set out how prudential transition plans can fulfil this promise, exploring how prudential supervisors would have to develop suitable frameworks to integrate transition plans into their supervisory practice. We set out three steps to guide this integration relating to an expectation-setting, assessment and risk-mitigation function. Given how consequential prudential transition plans are likely to become in the context of the sustainability transition, Section 5 sketches the challenges going forward and a future research agenda. Section 6 concludes.

Table 1.1 Emerging typology of transition plans

	Corporate disclosure-based transition plans		Prudential transition plans
	Type 1: Voluntary disclosure	Type 2: Mandatory disclosure	Type 3: Prudential requirement
Global landscape			
Aim and issue scope	Delivering net zero alignment.	Delivering net zero alignment and potentially other sustainability goals (such as biodiversity, human rights).	Managing risk of misalignment to transition to a sustainable economy and climate neutrality. Decarbonisation a priority.
Examples	Science Based Targets initiative [SBTi], Task Force on Climate-related Financial Disclosures [TCFD], Glasgow Financial Alliance for Net Zero [GFANZ].	EU’s Corporate Sustainability Reporting Directive [CSRD], Corporate Due Diligence Directive [CDDD] and UK Transition Plan Task Force.	EU’s 2021 Banking Package proposal.
Sector coverage	All firms, including	All firms, including	Banks, with potential for

	corporates and financial firms.	corporates and financial firms.	extension to other regulated financial institutions.
Regulatory requirement	No	Yes	Yes
Perspective	Market-led self-regulation	Market conduct-focused regulation	Micro- and macroprudential risk regulation
Supervisory role	Indirect. Main enforcement through market discipline and civil society scrutiny.	Indirect. Enforcement through financial conduct authorities (e.g. European Securities and Markets Authority [ESMA], Financial Conduct Authority [FCA] plus market discipline and civil society.	Direct (banking supervisors, e.g. Bank of England [BoE], European Central Bank [ECB]).
Standard setters	Private initiatives.	Legislators and financial conduct regulators (e.g. European Commission, ESMA).	Legislators and banking regulators (e.g. European Commission, EBA, ECB, BoE).
Transparency	Public.	Public.	Prudential transition plans may be disclosed only partially, if at all.
Implementation	2022	2023–2024 (EU)	2026 (estimated for EU)

Supervisory playbook: banks

Supervisory expectations	Non-binding.	Non-binding (and linked to cooperation with market conduct authority).	Binding.
Supervisory value and assessment	Indirectly relevant for Supervisory Review (such as Supervisory Review and Evaluation Process [SREP] in EU) and informing on bank progress on meeting C&E risk management expectations on transition risk, including reputational risk, litigation risk (fraud, misrepresentation, directors' duties) and internal risk governance. One of many other factors.	Indirectly relevant for Supervisory Review (such as SREP in EU) and providing more rigorous and consistent insights on bank progress on meeting C&E risk management expectations on transition risk, including reputational risk, litigation risk (fraud, misrepresentation, directors' duties) and internal risk governance. Primary assessment done by market conduct	Directly relevant for Supervisory Review (such as EU SREP) as part of dedicated misalignment risk assessment as required by primary legislation; assessed in the context of C&E risk management as well as broader financial stability concerns. Supervisors can set templates and test bank assumptions, trajectories and targets. They can impose corrective measures and capital additions where transition plans inadequate.

		authorities.	
Enforcement	Self-regulation, market discipline, civil society scrutiny.	Market discipline and private enforcement, civil society scrutiny.	Prudential oversight.
Supervisory consequences	Indirect.	Indirect.	Direct.
Time horizon	2050 (with intermediate targets).	2050 (with intermediate targets).	2050 (with intermediate targets). Frontloading misalignment risk assessment to the present.

Strengths and weaknesses (notably from a prudential perspective)

Strengths	Harnessing market innovation, enabling early adoption and learning.	Providing universal reporting with consistent and rigorous disclosures.	Responding directly to prudential dimension of transition planning. Clear legal basis for supervisors to assess what they know – risk. Effective lever for banks and their counterparts to develop credible transition plans and meet targets.
Weaknesses	Lack of universal adoption, insufficient legitimacy and accountability of framework setters, inadequate ambition from firms, greenwashing, insufficient focus on financial risks, few consequences when institutions backtrack on their commitments.	Time taken to agree standards, potential regulatory burden, competitive arbitrage with other jurisdictions, insufficient focus on financial risks.	Time taken to agree standards, potential regulatory burden, competitive arbitrage with other jurisdictions, overlap with Type 2 plans, risks of overly broad discretion for supervisors and of them over-stepping their role with regard to bank business models assessment, legislative changes necessary.

Source: Compiled by authors

2. Literature review: The prudential challenge of climate and environmental risk and the promise of transition plans

Notwithstanding the role of governments, private investment will have to play a crucial role in financing the transition of the real economy. At the same time, financial institutions are exposed to the financial, physical and especially transition risks stemming from a misalignment of economies with a low-carbon transition path to net zero emissions. This creates a dual challenge for policymakers, summarised by the concept of ‘double materiality’: ensuring that banks are not vulnerable to climate and environment-related (C&E) risk, while lending and investing in ways that do not harm the Earth’s climate and ecosystems (Boissinot et al., 2022).

In recent years, financial regulators and supervisors have started to require banks to apply traditional risk management approaches to their climate and environment-related exposures (Section 2.1). However, C&E exposures have turned out to be difficult to manage effectively due to, among other factors, the longer time horizons over which the relevant risks will materialise, the limited effectiveness of the current, conventional, backward-looking risk management approaches, and the lack of comprehensive financial data (Section 2.2). Transition plans that are forward-looking and oriented to longer time horizons offer an additional and supplementary prudential instrument to ensure the financial stability of banks.

2.1 Integrating C&E risk into the existing prudential framework

Banks are exposed to a wide range of risks as a consequence of misalignment of the real economy with climate targets (Battiston, Mandel, Monasterolo, Schütze, & Visentin, 2017; Campiglio et al., 2018; BCBS, 2021b). Accordingly, supervisors around the world have sought to mitigate C&E risks through a variety of high-level approaches ranging from relying on market-led initiatives to mandatory rules by supervisors. So far, supervisors have faced challenges in assessing financial exposures arising from climate-related risks as well as potential losses and impacts from using forward-looking approaches (BCBS, 2021b; BIS, 2021; NGFS, 2021).

Given concerns that banks and the financial sector at large could be misaligned with the transition pathway towards a sustainable and net zero economy, there is a considerable risk of sudden build-ups of financial risks. This calls for a prudential assessment of risks resulting from misalignment and an appropriate calibration of prudential policy to address them.

The alignment of the banking system also has a crucial role to play in the broader climate transition (Boissinot et al., 2022). While the transition requires structural changes in the real economy, the financial sector is a critical lever for helping non-financial corporates assess the alignment of their activities with the transition to a sustainable economy. The banking sector is particularly important given its role as a financial intermediary and provider of payment systems for the ‘real economy’. The transition plans of banks’ customers will feed into banks’ transition plans, highlighting the importance of banks’ scrutinising the information they receive. In this context, and by asking banks to ensure alignment of their lending and investments by engaging with their customers, the financial system can make a positive contribution to the broader sustainable transition.

In the last years, policymakers have started to identify a class of C&E financial risk that banks need to incorporate into their operational and risk management frameworks to ensure the financial stability of the institution.

These efforts have taken a somewhat heterogenous shape across the three pillars of the Basel Framework (Smoleńska and van ‘t Klooster, 2022):

- Under the first pillar, the existing microprudential framework sets minimum capital requirements based on an institution’s investments and its credit, trading and operational risks. There has been very limited concrete regulatory action to incorporate C&E risk into Pillar I to date.
- The second pillar sets the supervisory framework for a bank’s internal risk management and governance, of which the annual Supervisory Evaluation and Review Process (SREP) is the most important component. This exercise has a broad scope, making it suitable to include climate and environmental risk, and some supervisors have issued detailed supervisory guidance based on several regulatory requirements for how banks should deal with C&E risk (ECB, 2020). Within the context of the SREP, the supervisor can impose additional capital requirements on banks that are exposed to particular risks.
- Finally, Pillar III sets out a bank-specific disclosure framework, which is meant to enable investors to scrutinise bank risk-taking. While policymakers and supervisors are providing more guidance on the identification of risk, their actions with regard to how such risks should be evaluated have as yet been limited. The European Banking Authority (EBA) has issued detailed requirements for Pillar III disclosures, providing templates and instructions for the disclosures that need to be made (EBA, 2022).

Table 2.1. C&E risk in the Basel and existing supervisory framework

Basel Pillar	Overview	Actor responsible	Progress
Pillar I – Regulatory capital requirements	Banks and credit rating agencies improve their capacity to assign risk-weights to C&E risk (potentially subject to new regulatory standards). Also includes capital add-ons/buffers, large exposure limits, liquidity/leverage ratios and so on	Basel Committee on Banking Supervision (BCBS), legislatures and regulators	Discussions ongoing at legislative level in the context of microprudential reform
Pillar II – Supervision	Banks set their strategy and risk management for C&E risk subject to supervisory evaluation as well as binding supervisory guidance	BCBS, legislatures, banking regulators and supervisors	Supervisors and regulators making initial steps to incorporate C&E risk into the supervisory processes
Pillar III – Disclosures	Disclosure rules for C&E risk together with metrics developed by banks and supervisors	BCBS, legislatures, banking regulators and supervisors, market conduct authorities	Detailed rules have been introduced across a number of jurisdictions and frameworks (EU Pillar 3 Disclosures; TCFD)

Source: Adapted from Smoleńska and van ‘t Klooster (2022)

So far, policymakers have largely left the task of ensuring that C&E risks are adequately priced to private banks and market participants, in some cases subject to (non-binding) regulatory expectations, and with binding requirements focused on microprudential Pillar III disclosures. This approach follows the logic outlined in the speech by Mark Carney (2015), wherein he expressed the view that by improving

disclosure and building market discipline, banks could set in motion a transition without requiring detailed regulatory guidance.

2.2 Transition plans as an approach to C&E risks

Policymakers and researchers have developed a detailed understanding of the limitations of existing approach to C&E risks (Bolton, Depres, Pereira da Silva, Samama, & Svartzman, 2020; Condon, 2022). Starting with the macroprudential side of supervision, policymakers have become increasingly aware of epistemic obstacles to the measurement of financial risk based on historical data gathered over a limited timeframe (Borio, 2011; Baker, 2015; Lockwood, 2015). Because there are often significantly different ways to assign risk-weights to individual assets, supervisors have been reluctant to challenge assumptions concerning specific risk-weightings assigned to transition risk (Stellinga & Mügge, 2017). At the moment, capital markets and active stakeholders (such as non-governmental organisations and think tanks) have the main role in verifying the viability of a bank's transition strategy. However, they too face the limitations of existing disclosure and risk management techniques with regard to C&E risks.

First, concerning the *time horizon*, the risks from climate change will occur beyond the usual business, financial and policy cycles (Elderson, 2021; Offer, 2022). As noted by EBA (2018), supervisors should introduce new C&E risk analysis into supervisory assessment, evaluating whether institutions sufficiently test the long-term resilience of their business models against the time horizon of relevant public policies or broader transition trends, i.e. exceeding commonly used time-frames of three to five years and covering a time horizon of at least 10 years. Therefore, microprudential supervisory frameworks – currently treating three years as the long term – need to be adapted in order to be able to account for risks that will materialise over a longer time horizon. In the context of transition risks, extending the time horizon for examining risks to cover the entirety of the transition to a net zero economy would be required. Nevertheless, the duration from now to the net zero 2050 horizon should not obscure the immediacy of action necessary to achieve it, in particular the need for front-loaded climate change mitigation action (Fankhauser, 2022; IPCC, 2022).

Second, the *backward-looking nature* of certain elements of the existing prudential approach contrasts with the current understanding of climate risk dynamics and the material impacts that will manifest in the years to come (Bolton et al., 2020; NGFS, 2021). The transition and physical consequences of climate change have no historical precedent. As a consequence, there are several challenges relating to the incorporation of climate risk into prudential frameworks, including its specific characteristics concerning the inherent complexity and interconnectedness of environmental risks, tail-risks and the non-linear impact of tipping points (Lenton et al., 2019; Sharpe & Lenton, 2021). To the extent that risks are estimated based on historical data, the current approach is unable to accurately estimate potential losses that will be the consequence of a rapid transition. The current lack of implementation-ready and well-understood, forward-looking techniques and metrics for financial institutions and supervisors is impeding the ability to assess C&E risk, in particular over a longer time horizon.

Third, C&E risk assessment is plagued by problems relating to *data availability*, for example concerning scope 3 emissions and energy performance certificates (BCBS, 2021a; EBA, 2020; TCFD, 2021). Currently widely-used sectoral benchmarks are often not designed for the purpose of assessing transition efforts and related risks. Even if simple metrics become widely available, they may not be adequate for risk assessment. For example scope 3 emissions and energy performance certificates provide a proxy for

alignment, but the compatibility of individual investments with net zero depends essentially on what other actors do. In this regard, it has been noted that sustainability is not a feature of individual investments or firms, but rather of economic systems as a whole (Krahé, 2021). Most pressingly, the allocation of capital within the energy sector has far-reaching implications for other sectors. For similar reasons, the transportation sector needs to effectively transition before production can be aligned with net zero and remain organized via global value chains. To date, even sophisticated models require hard to evaluate assumptions regarding the pace of transition, policies enacted, consumers lifestyles and the effectiveness of negative emissions technologies (Monasterolo, Nieto, & Schets, 2023).

Given these significant challenges in assessing climate risks through traditional risk frameworks, supervisors are not always able to explicitly and fully incorporating climate risks into prudential oversight (Baer, Campiglio, & Deyris, 2021; Bolton et al., 2020; Chenet, Ryan-Collins, & van Lerven, 2021; Robins, Dikau, & Volz, 2021). For banking supervision, widely discussed proposals focus on stress testing and scenario analysis (Battiston et al., 2017; Baudino & Svoronos, 2021), capital requirements (Dafermos & Nikolaidi, 2021) and supervisory review of bank risk models (ECB, 2022). On the monetary policy side, the design of asset purchase programmes (Matikainen, Campiglio, & Zenghelis, 2017), refinancing operations (Böser & Colesanti Senni, 2021; van 't Klooster & van Tilburg, 2020) and collateral frameworks (Dafermos, Gabor, Nikolaidi, Pawloff, & van Lerven, 2020) have come in for review. This article contributes to that literature by exploring the potential use of transition plans as supervisory instruments.

3. Prudential transition plans: the role for supervisors

Transition plans can serve the function of bringing distant alignment risks into the operational timeframe of supervisors, enabling them to overcome current obstacles to the effective supervision of the climate and environment-related transition exposures of banks. Prudential supervision has the objective of safeguarding the stability of the banking system, but the assessment and management of C&E-related risks raises new challenges. We distinguish three contributions in this section that prudential transition plans can make.

3.1 Integrating C&E risk into the prudential framework through transition plans

As a regulatory instrument, transition plans could play an essential role in overcoming these challenges by assessing the alignment, and the transition risks from misalignment, at different points in time along the transition pathway. Transition plans could thereby contribute to enabling supervisors to improve the mitigation of C&E risks by requiring financial institutions to expand their risk management and assessment capabilities and clearly map, monitor and adjust their transition strategy as needed.

There is a strong case to turn to transition plans as an important additional instrument for supervisors to achieve their prudential objectives:

- First, pertaining to *time horizons*, transition plans can bring distant alignment risks into the operational timeframe of supervisors and at the same time support the economic transition through the requirement for detailed milestone adjustment targets for any point between now and 2050. One important way in which transition plans can help overcome the obstacles described is by identifying the short- and medium-term milestones for delivering 2050 targets, comparing them with banks' transition efforts and related exposure to transition risks, and enabling supervisors to bring climate risk more within their traditional prudential frameworks. They are essentially plans to link the bank's operations today to its practice in the distant future.
- Second, the focus on alignment also offers a *forward-looking alternative* to current ways of estimating risk and associated data requirements. Transition plans can be developed against scenarios and transition pathways that are fundamentally about policy ambition. In light of the clear objective set out in the Paris Agreement, national plans and targets, as well as in the work of the Intergovernmental Panel on Climate Change (IPCC), International Energy Agency (IEA) and other bodies, a fine-grained understanding is emerging of the immense task placed on economies by the 1.5°C goal. Supervisors can use these insights to ask banks to ensure that their business model and strategies are resilient to C&E risks and challenges from the transition, including changes in policies, technologies and consumer preferences.
- Third, transition plans by themselves will not solve the current *data limitations* and parts of bank transition planning could also be confidential. Still, there are various ways in which bank transition planning can help reduce the current lack of information concerning transition risks in the broader economy. For one, they require banks to develop a detailed account of how their strategy fits with available scenarios and transition pathways, where banks would need to incorporate micro-level, bottom-up information concerning bank counterparties. Furthermore, and given that most of financial institutions' carbon emissions are financed emissions, micro-level information concerning bank counterparties, including counterparties' transition plans, would become available. In fact,

financial institutions' client engagement strategy could become not only a key element of the bank risk management aspect, but also serve to provide an important layer of verification for corporate disclosures. Effectively designed bank transition plan requirements promise to produce significant amounts of data on the alignment of individual financial institutions, the financial system and the economic system as a whole, theoretically at every point in time between today and 2050. The publicly available data would have a range of applications beyond supervisory prudential assessments of misalignment risks.

3.2 Three prudential tasks

We distinguish three roles for prudential plans, discussed in turn. **First, prudential transition plans can support the use of existing risk-based instruments**, guiding supervisory attention to weaknesses in the bank's management of C&E risk today. Second, prudential transition plans provide supervisors with a tool to address risks that an individual bank will likely be exposed to if it continues to operate in line with a misaligned transition plan. In this context, alignment can serve as a proxy for the materiality of C&E exposures that result from the bank's business model, sectoral orientation and strategy. Finally, prudential transition plans are a granular and forward-looking tool that provides insights into the alignment of the financial sector as a whole.

Microprudential risks – alignment and short- and medium-term risks

Conventional microprudential supervision focuses on financial risks over the business or financial cycle, and therefore on short- and medium-term risks, with the aim of ensuring the stability of individual financial institutions (ECB, 2014).

Careful scrutiny of transition plans can complement existing microprudential approaches to identifying, on individual balance sheets, C&E risk arising from misaligned transition plans. These risks will typically materialise in the short and medium term, and from exposures that the bank has already originated or will originate within a typical supervisory timeframe of three to five years. A review of bank transition planning also fits the broader focus of the supervisory process on strategy and internal systems for risk management.

While supervisors are already developing and using forward-looking tools, including climate-related stress-tests (some of which cover longer time horizons of up to 30 years and may include dynamic balance sheet assumptions), transition plans offer an important additional forward-looking tool. They allow supervisors to assess a bank's alignment with and potential divergences from the relevant policy objectives, potentially at any given point in time between now and 2050. They move beyond exposures of banks as a function of their current exposures to focus on how the C&E-related risks of their portfolios will evolve over time along specific trajectories. Using transition plans in this way can enable supervisors to identify excessive risk-taking and the resilience of the business model of a bank against competition and market developments.

Microprudential risk – alignment as a proxy for long-term risks

Where C&E risks resist quantification, the efforts that banks make to ensure they anticipate future risk can be a crucial proxy for the material risk that banks are exposed to now and in the future (NGFS, 2021; Boissinot et al., 2022).

As discussed, C&E risks are by nature extremely difficult to estimate with a high

degree of accuracy, leaving room for banks to cherry-pick from different metrics, assumptions and methodologies. The timeline of risk from the transition to net zero is often difficult to assess, as different transition pathways imply very different levels of risk while the transition pathways are changing. Risks can result from the bank's future lending and investment decisions, while no individual transactions exist today for which supervisors would be overseeing risk. For that future period, banks have ample discretion to downplay risk. They could also make ad hoc assumptions, for example concerning increased regulatory capital that is yet to be acquired. Accordingly, it will not always be possible to test the forward-looking plans of banks against a narrow (single) materiality standard.

Transition plans could help supervisors identify ways in which the bank's transition planning itself is deficient, thereby raising questions about the adequacy of its risk management. In that role, transition plans could become an essential tool for enabling supervisors to assess the microprudential implications of the climate transition. Here, successful alignment of the bank's lending with likely transition pathways can serve as a proxy for C&E risks that cannot yet be quantified as a material exposure. A bank that operates on the basis of a misaligned transition plan is riskier than one that does not (all other things being equal), and therefore the act of identifying misalignment in itself provides information about bank safety. For the stability of the bank over longer time horizons, alignment with net zero may often be the best proxy available for the materiality of exposures.

In this context, supervisors would identify banks' transition plans that are insufficient, review their business model and ensure that risks from misalignment are adequately addressed, while respecting the flexibility of the bank's operations to cater for the uncertainty around the transition. Banks are complex institutions, which take years to successfully implement large organisational changes. Waiting until C&E risks are so large that they constitute clearly identifiable material exposures often creates the risk that supervisory intervention comes too late. Nonetheless, it is essential that supervisory interventions retain a clear prudential and risk-based rationale. Misalignment should be first and foremost approached as a source of future financial stability risk, which has implications for how transition plans feature in the supervisory process.

Macroprudential risks – aggregate alignment and systemic risks

Pervasive misalignment of the banking system with net zero transition pathways are a threat to the stability of the financial system as a whole (Mercure et al., 2018; van der Ploeg & Rezai, 2020; Semieniuk, Campiglio, Mercure, Volz, & Edwards, 2021; Semieniuk et al., 2022). Because C&E risks are difficult to quantify and manage using existing backward-looking methodologies, a misaligned financial system is itself a macroprudential risk.

In the short and medium term, transition plans could be aggregated to get a sense of the fragility of the system as a whole, which could in turn provide a rationale to increase systemic risk buffers. Generally, systemic risk buffers can serve as an additional capital requirement for the banking sector, implemented with the aim of preventing and mitigating systemic risks in the financial system and the real economy. As a system-wide buffer, they can be applied either for all banks or for groups of banks, or across subsets of sectoral exposures and could also be applied to address C&E-related risks. Furthermore, a sectoral subset of exposures could be defined in terms of economic activity and/or geographical area. This targeted buffer could increase resilience against the potential materialisation of risks and could also introduce incentives for financial

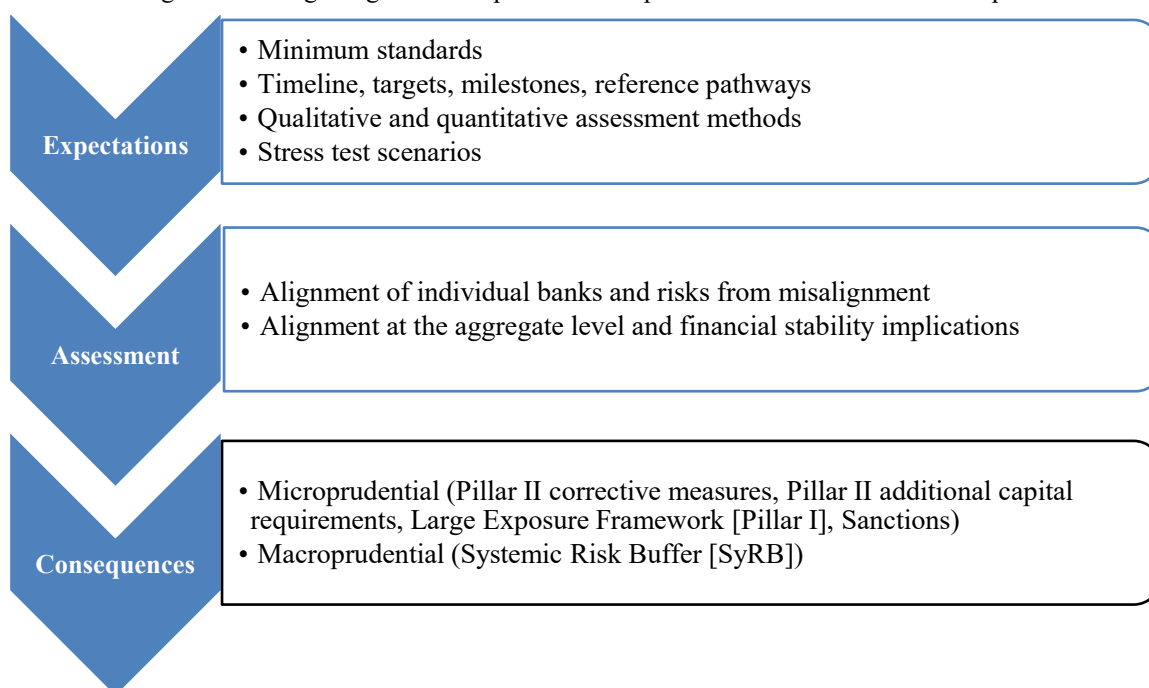
institutions to reduce their exposure to C&E risks. In addition to relying on broad measures for the banking sector as a whole, which can be inadequate for dealing with risk from misalignment by also penalising individual banks that have adequate transition plans, the supervision of transition plans could enable this more targeted use of macroprudential tools tailored to individual institutions.

The current discussion around the use of systemic buffers also highlights the challenges in calibrating these buffers (e.g. related to the trade-offs of a sector approach, the selection of sectors and the precise calibration) and the possible unintended consequences such as fragmentation in the internal market and undesirable interference in the macroprudential policies of other countries (EBA, 2021).

4. Developing the framework for prudential transition plans

We now turn to how supervisors can incorporate prudential transition plans into their conventional supervisory tasks; we outline three steps towards making effective use of prudential transition plans for supervision (See Figure 4.1). First, setting out expectations regarding the content of the transition plans. Second, assessing transition plans as part of a standardised process. Third, consequences based on related supervisory powers. As argue, these policies would need to be implemented on an appropriate legislative level and in accordance with the existing mandates of supervisors, depending on the jurisdiction. Given the complexity of the task and the relevance of non-financial knowledge (in environmental science), new supervisory powers would require a simultaneous increase in the internal capacities of supervisors (e.g. via the creation of ‘climate centres’), new forms of inter-agency cooperation (e.g. with environmental agencies), and engaging relevant stakeholders (including civil society) to identify an appropriate approach.

Figure 4.1. Integrating transition plans into the prudential framework – three steps



Source: Compiled by the authors

4.1 Setting supervisory expectations for prudential transition plans

From an *ex ante* perspective, supervisors and policymakers would set out detailed expectations for the design of transition plans by banks. This would serve to ensure credibility and relevance of the transition plans for supervisory purposes, and would create a level playing field, ensure comparability between banks and reduce heterogeneity in approaches to transition plans.

The purpose and basic elements of a transition plan typically would be specified at a legislative level. However, the legal framework will only offer the starting point for developing adequate supervisory expectations and practices. Consequently, supervisors and regulators would have to develop clear guidelines for how banks are expected to formulate their transition plans. The formulation of a transition plan that is ‘fit for

prudential purpose' entails three stages:

- a. Selecting the scenarios and transition pathways that institutions would take into account in designing their transition plans
- b. Gathering banks' portfolio projections and assessing the risk of misalignment
- c. Identifying measures taken by banks to mitigate the risk.

The selection of scenarios and transition pathways

Science-based transition scenarios and pathways that lead to net zero by 2050 provide a logical starting point for transition planning. To ensure effective transition planning, policymakers would have to set out detailed guidance on the relevant methodology and metrics. The transition scenarios would need to cover climate change, policy and expectations related to technological transition. The latter would also include sectoral pathways against which the bank portfolios could be assessed.

First, concerning net zero targets and transition pathways. Banks would need to define net zero targets and transition pathways they expect their portfolios to develop in the future with reference to the 1.5°C goal of the Paris Agreement or specific climate policy goals in a jurisdiction. In the EU, for example, this would be an intermediate emissions reduction target of 55% on 1990 CO₂ emissions by 2030 and climate neutrality by 2050. Supervisors would provide detailed guidance on the short- and long-term metrics in relation to the 2030 and 2050 climate change mitigation targets.

Formulating effective expectations requires bringing together the expertise of micro- and macroprudential supervisors as well as economic and environmental policymakers. A particular challenge stems from the need to translate a government's expected transition pathway into guidance that financial institutions should plan for. In some jurisdictions, this role may be outside of supervisors' mandates. Although high-level emission reduction objectives may have a solid footing, transition policies often remain unclear. Once these policies are enacted, however, they may have material consequences for bank investments and the real economy. Moreover, asking supervisors to play a guiding and advisory role in helping financial institutions to effectively anticipate transition pathways would create significant additional responsibility and may well be considered to be outside the mandate of many. In this case, supervisors would have a strong interest in the creation of an appropriate forum to develop guidance on the required scenarios and alignment measurement methodologies.

Second, concerning scenarios. There is a need for both baseline and adverse scenarios that set out material C&E-related factors for the bank in the short, medium and long term, across relevant geographical scales and sectors. The scenarios used in transition plans would have to be science-based and fit for prudential purpose and ideally would also refer to national and international targets and capture all jurisdictions that have material exposures. At the moment, banks are using International Energy Agency (IEA) scenarios – including ones that presuppose not meeting the net zero target. Going forward, the NGFS scenario framework can provide a critical point of reference, given also the prudential origin and wide representation of NGFS members. Sectoral pathway scenarios used for prudential purposes would also have to incorporate regional considerations, including the entry into force of dedicated sectoral standards and laws implementing climate neutrality goal (e.g. new energy efficiency standards or fuel standards). Given the prevailing uncertainty around future transition pathways, banks could, for example, be asked to select the scenarios and sectors that have the greatest adverse effect on their portfolio to calculate their potential exposure to transition risk.

While transition plans made by financial institutions to date have mostly adopted

a sectoral perspective, future transition plan design – in light of advances in technological data analytics – would have to be developed at a higher degree of granularity than now. Banks would benefit from increasingly drawing on corporate-level data to identify the C&E risks from the economic activities and counterparties within sectors they are exposed to. Corporate transition plans can play a crucial role in this context. The transition plans of banks would incorporate data from the transition plans of its corporate customers (and potentially also other private customers). These transition plans, disclosed as a general corporate governance requirement, could play an auxiliary role, allowing for a holistic assessment of the bank’s risk strategy. The bank’s reliance on these plans, in turn, could create more market scrutiny of corporate transition plans. To this end, supervisors, in collaboration with other public agencies responsible for guiding the industrial transition, would formulate specific expectations regarding the engagement by the bank with counterparties, depending on the respective C&E risks and exposure to transition risk (for example, on the basis of the level of emissions of an entity).

Assessment of banks’ portfolio projection and risk of misalignment

Building on the scenarios, supervisors would indicate how banks are expected to present how they anticipate their evolving business portfolio allocation to align with the transition pathway. This would be based on forward-looking quantitative metrics and targets (e.g. scenario analysis) provided by the disclosure of the underlying corporates they are exposed to. While assessing the plans for all corporates individually may be too burdensome, it is important to consider the principles of materiality and proportionality. The portfolio projection requires banks to also specify their long-term strategy and client engagement.

In their expectations, supervisors would set out how transition plans would require varying levels of granularity depending on the time horizon, to cover both short- and long-term risks to financial institutions from the transition. For cross-border banks, the assessment could be done at both the individual and consolidated level. Including multi-year milestones for transition-relevant economic sectors, companies and economic activities would add greater granularity and enable supervisors to steer the financial sector towards achieving an orderly transition towards net zero. This graduated approach would also enable supervisors to assess whether banks and non-financial corporates are backloading their climate mitigation action, and therefore increasing their exposure to short-term transition risks.

Finally, portfolio alignment and proper assessment of misalignment risk hinges on banks having appropriate governance practices. Therefore, assessment of alignment would need to entail a forward-looking strategy and business model analysis, specifying *inter alia* management and client processes related to transition. At management level, bank transition plans should be treated as a matter of risk strategy (including involving risk committees where appropriate). The time horizon requires transition plans to be a part of the forward-looking strategy of the bank, shaping its business model to be compatible with a sustainable economy. Supervisory expectations would extend in this regard to management and board membership, to ensure adequate capacity at the strategy level of the bank. Nevertheless, procedure for formulating transition plans would have to engage various parts of the bank (operational, accounting, legal) to ensure adequate mainstreaming and inbuilding of sustainable transition thinking throughout the firm. Given that a successful transition hinges on real-economy transformation, transition plans would also outline the processes of engagement with bank clients (e.g. specifying a requirement for client transition plans for large or environmentally-impactful corporates).

The transition plan approach, as argued above, would also adopt a double materiality perspective. Given the forward-looking perspective of transition plans as a prudential tool, transition plans by definition would not only be concerned with the assessment of risk to the bank from C&E risks, including transition risks, but would also look at the impact that bank lending has on accruing environmental risks. The presence of misalignment provides important insights into the financial stability of individual banks and the banking system as a whole.

Policymakers would set out standards for the identification and assessment of C&E risk exposures by the bank that result from misalignment. This requires a detailed overview across current portfolios and their future development and an explanation of evolving risk management practices around climate risk. To ensure proportionate application, supervisors could differentiate these requirements depending on the institution's size, the scale, nature and complexity of the C&E risks, and the scope of the institution's activities.

Measures to mitigate misalignment risk

The final part of this first step is for transition plans to incorporate the bank's evolving efforts to ensure its strategy and evolving risk management mitigate future risk of misalignment. To this end, supervisors would have to formulate expectations for how banks adapt their operations in light of their annual transition plans. This would likely take the form of an iterative dialogue, where banks discuss measures taken in light of previous transition plans and to be taken to improve future alignment. This process should allow for an assessment of the progress made and drawing lessons regarding the credibility of the bank's net zero transition as a matter of strategy. This entails elaborating how the financial institution expects to mitigate future climate-related transition risks (e.g. Miller and Dikau, 2022). To that end, banks would have to build capacity and develop long-term strategies for exposed sectors, financed activities and product offerings. In addition, an estimate of their future exposure to risks at various time intervals in reference to important milestones and yearly targets for economic sectors would be provided (e.g. 2025, 2030, 2035, 2040), as well as for different scenarios, including baseline and adverse scenarios.

4.2 Conducting a supervisory assessment of transition plans

As a second step, a comprehensive review process by supervisors would enable the identification of pockets of risk from misalignment and disorderly transition. This also builds on the supervisory expectations for banks to outline their minimum standards and reference methodologies, focus areas, level of granularity and time horizon of their transition plans. The discussed components of prudential forward-looking transition plans would provide supervisors with information on the level of financial institutions' risk exposure and help to overcome the current mismatch in time horizons between climate risks and prudential supervision.

Such an assessment could become an integral part of the supervisory review process (and fit under Pillar II of the Basel regime for prudential supervision, as part of which supervisors evaluate how well banks assess their capital needs relative to their risks and take measures, where appropriate). This kind of supervisory assessment remains the appropriate tool given that it enables the supervisor to develop an idiosyncratic assessment of banks' risk exposures and leaves space for extending the time horizon of the supervisory process (EBA, 2020; NGFS, 2021).

The information provided by the transition plans would enable supervisors to assess the risks arising from a possible misalignment with the transition pathway, potentially at any time, and to take appropriate action to mitigate the risk for financial institutions that fail to reach defined milestones. Important caveats include that there may be less clear-cut cases where the supervisor cannot say if there is a misalignment or how much misalignment exists, as well as cases where there is more than one transition pathway, which would create the need for more flexible supervisory responses.

The supervisory assessment of transition plans would have the aim of determining whether financial institutions have done enough to take into account the economy's transition, changing sectoral composition, policy changes, innovation and changing production techniques, and the associated changes in consumer preferences.

First, supervisors would assess the alignment against climate policy targets with the aim of establishing a quantitative basis for examining individual banks' exposure to transition risk. From the transition plan, banks would disclose their portfolio [mis]alignment based on current and expected carbon intensity performance (or another suitable metric) against climate policy targets.

Second, the assessment would focus on the development of risk management and governance processes at financial institutions to identify, monitor and mitigate climate risk through their portfolio exposure. Transition plans would have the aim of enabling supervisors to understand banks' evolving development of capacity to assess climate risk and integrate the longer-term transition plan objectives into operational decision-making. The forward-looking assessment of banks' risk management practices in conjunction with their quantitative exposure would introduce a qualitative aspect to examining banks' climate transition risk, enabling supervisors to assess transition risks without establishing a quantitative measure of risk for banks' individual exposures.

Where banks' portfolio exposures are not aligned to climate and policy pathway targets, banks would be asked to disclose how they assess and mitigate these risks, as well as their future strategy in managing transition risks. Consequently, the supervisory assessment of transition plans is inherently linked to banks' long-term strategy and business model. While such a supervisory assessment should be limited by deference to business judgement and property rights, adequate corrective measures and exercise of appropriate supervisory powers would be necessary to ensure adequate mitigation of transition risks (see Section 2 above).

Supervisory assessment, while remaining part of the supervisory review process, could also entail cooperation between different financial supervisors and other government agencies, depending on the organisation of tasks within a specific jurisdiction.

Banking supervisors could also use information from non-financial disclosures of banks' net zero plans and other climate pledges in their assessments. The non-prudential disclosures also have a bearing on banks' risk profiles, and in particular operational and reputational risk. Bank supervisors would have to work in this regard towards developing joint and coordinated approaches with market conduct supervisors.

While the microprudential supervisor would remain in the driving seat for the purpose of transition plan assessment, there should be an efficient information flow and the input of specific agencies should be decisive in matters regarding science-based assessments. For example, environmental agencies could be consulted with regard to net zero scenarios, facilitated through dedicated Memoranda of Understanding.

As outlined above, prudential transition plans could also feed into macroprudential policy. Transition plans at an aggregate level could enable the assessment of banks' exposure to certain sectors and activities under scenarios that

present the greatest systemic risk. Aggregating transition plans would thereby enable monitoring the aggregate exposure of banks to individual corporates, which may pose material risks to the financial stability of the banking sector.

For banks operating across borders, supervisory colleges, which are structures comprised of an international bank's 'home' and 'host' supervisors, play an important role. Dedicated cooperation between home and host supervisors around the transition plan process would have to be established, bearing in mind local financial stability concerns. Such cooperation would ensure appropriate information exchange and coordination of assessment at the level of the entity and at the consolidated level (BIS, 2021).

4.3 Mitigating risks from misalignment by introducing supervisory consequences

To mitigate the identified risks, and for transition plans to play a meaningful role, enforcement and potential sanction mechanisms are critical. Accordingly, supervisors would need to have appropriate powers to scrutinize bank transition plans and address identified risks where there is misalignment and ensure these are effectively mitigated. Supervisors could address identified risks through various avenues and powers from the applicable micro- and macroprudential toolboxes.

Within the microprudential toolbox a range of measures can be used to sanction misaligned banks. Prudential plans, as outlined above, can be used as a Basel Pillar II (supervisory review process) instrument, to help diagnose the risk that the bank is exposed to as a consequence of misalignment. Where banks are misaligned, supervisors would need to make a careful assessment concerning the appropriateness of corrective measures and, for example, the possible need to hold additional capital to reflect the risk that the bank is exposed to. In the context of Pillars I and II, supervisory requirements and guidance would serve to ensure that misalignment risks are mitigated and managed appropriately. Under Pillar III, banks could be required to disclose their methodology and metrics for calculating their quantitative exposure to transition risk. This would encourage best practice in the way banks submit transition plans and provide supervisors with additional insight.

Although the existing Pillar I frameworks currently do not contain dedicated provisions for C&E risk and transition plans, there is no *a priori* obstacle to this. Going forward, expectations for transition plans and consequences for misalignment could be incorporated into Pillar I. However, incorporating misalignment into Pillar I through dedicated risk-weighted assets (RWA) for transition risk raises important practical obstacles. First, this would require a quantitative way of mapping transition risk to individual exposures, which faces numerous obstacles (see Section 2). Second, it would potentially reduce the flexibility of the prudential framework.

A more promising approach would focus on pillar II corrective measures. Since the assessment of transition plans takes part in supervision, the prudential framework also offers the most immediate levers to address identified misalignment risks. Where scrutiny of transition plans leads to diagnosing inadequate management of transition-related financial risk, supervisors already have a range of corrective measures at their disposal that could be used in the context of transition plans. Supervisors can require the bank to strengthen risk management, apply internal limits, strengthen the level of provisions and reserves (funds set aside as assets to pay for anticipated future losses), and improve internal controls (BCBS, 2019).

Transition plans provide insights not only into a bank's management of risk but also into whether the board as a whole has sufficient knowledge, skills and experience. If there is inadequate planning, management risks being able to fulfil their functions in the

face of a rapidly changing economic transition. In this context, supervisory corrective measures could include requiring senior members of the bank to attend additional training such as a climate awareness course to increase their understanding of climate-related risks (Miller and Dikau, 2022). In cases of serious concerns about the misalignment of bank portfolios and strategies with the net zero transition, supervisors could explore requesting a change in the composition of senior management or the board to ensure representation of adequate climate and sustainability transition expertise.

Specific supervisory sanctions could be extended to the remit of transition plans, such as banning dividend payments¹, or publicly naming banks that have inadequate plans to enable the market to price-in misalignment risks. An assessment linking banks' transition plan performance over time with additional and deferred release of bankers' bonuses could provide an additional incentive for consistent implementation of the transition plans over an extended period.

Complementing these measures we also envisage an important role for additional Pillar II capital requirements and the large exposures framework. Misalignment is a prudential concern since it exposes the bank to financial risk, raising the prospect of using transition plans as the basis for imposing additional capital requirements in various ways. Under Pillar II, which already covers banks' forward-looking risk horizon using stress tests and additional disclosure, the incorporation of transition plans can extend the supervisory risk assessment timeframe to allow for the inclusion of climate transition risks. Moreover, Pillar II focuses on the risk management practices of banks, which aligns with the supervisory assessment outlined under Step 2 of the proposed prudential transition plan framework. Consequently, in cases where transition plans are assessed to be inadequate, supervisors could introduce a capital surcharge within the bank's Pillar II requirements or guidance (either through concentration risk or the risk management and governance scalars). This would require or strongly incentivize banks to increase the regulatory capital to mitigate the risks from their portfolio exposure.

For similar reason, the large exposure limit could be introduced for the aggregate large exposures to relevant climate transition-sensitive sectors, activities and geographical locations, which if exceeded would require firms to submit a transition strategy (Miller and Dikau, 2022). Specific sectoral lending limits could be foreseen on this basis. Credit ceilings, similarly, could be applicable across all bank exposures in accordance with perceived misalignment.

Finally, there are range of measures which could be used within the macroprudential toolbox. Transition plans could also enable supervisors to adjust their macroprudential policy frameworks and specifically Systemic Risk Buffers (SyRB). Given the long-term horizon of transition plans and pending macroprudential assessment, SyRB can help prevent and mitigate long-term, non-cyclical systemic or macroprudential risks arising from C&E risks and transition misalignment risk. SyRB can be applied across certain sets or subsets of exposures, for instance those subject to transition risks related to climate change (European Commission, 2021). Moving beyond this narrow focus on individual exposures, supervisors could potentially also be granted macroprudential powers to intervene more directly when banks are misaligned and are contributing to financial stability risks. However, more work is needed to calibrate these metrics and address the risk of market fragmentation and spill over effects.

¹ E.g. under the CRD IV's concept of Maximum Distributable Amounts, which requires financial supervisors to restrict earnings distribution if a bank's total capital falls below the sum of its Pillar I, Pillar II and CRD buffer requirements.

5. Challenges and a future research agenda

In developing their prudential expectations for transition plans, supervisors would also have to be mindful of several possible challenges and unintended consequences. In particular, there are issues relating to data availability, relevant expertise and capacity constraints, plus unintended market impacts from transition plans.

5.1 Limited data quality and availability

The effective implementation of transition plans for financial institutions depends on the availability, wide coverage and granularity of climate-related data on non-financial corporates, which is subject to significant gaps. Additionally, mandatory non-financial corporate climate disclosure frameworks, such as the UK's announcement of mandatory TCFD disclosure for all large corporates (UK Government, 2021) or the EU's CSRD regime, have not yet been implemented. The substantial gaps in available data for banks to identify, assess and report their climate transition risk exposure hinders banks' ability to conduct scenario analysis or examine current and future climate policy targets. To mitigate this limitation, the necessary data collection should be incorporated into expectations for transition plans, thereby ultimately also leaving it up to banks to gather the data required to properly manage exposures, while taking the uncertainty on the transition pathways at national and international levels into account.

Prudential transition plans will have to be based on comprehensive datasets. This provides a challenge for financial institutions and supervisors. Granular climate-related disclosure from the underlying non-financial corporates that includes scenario analysis (similar to the TCFD's) and information on the alignment with climate policy targets and sectoral pathways are necessary prerequisites. Within corporates' climate disclosure, specific metrics for current and expected carbon intensity by sector are required for the assessment of alignment to climate pathway targets (with intensity measured as CO₂ per revenue ton kilometre or CO₂-equivalent per ton, etc.). Beyond this, additional metrics and disclosure from non-financial corporates could be introduced to assess the credibility of stated future mitigation efforts. Efforts under scrutiny could include a reliance on offsetting measures to achieve near-term emissions reductions, and CAPEX to observe future expected investment in transitional activities; the emissions reductions expected from these mitigation actions would also be studied, as well as a breakdown of mitigation action and expected emission intensity reduction from each type of mitigation action.

5.2 Lack of expertise and capacity limitations

The vastly extended time horizon and the new types of risk that the transition exposes banks to create new challenges for supervisors. Sector- and activity-specific expertise is required to comprehensively understand the origin, size and materiality of transition risks, which will originate within transition-sensitive sectors of the real economy – including within the Climate Policy Relevant Sectors (CPRS) (see Battiston et al., 2017) – from where they may spill over into the financial sector. While financial supervisors have in-depth expertise on financial institutions, markets and instruments, they might lack similarly detailed expertise on the real economy, as well as an explicit mandate to exercise such expertise. A detailed understanding of the changing interconnections and interdependencies between sectors in the real economy is necessary for the effective supervision of transition risks. For example, supervisors cannot assess the complex

transition risks of the agricultural sector without having a strong grasp of the interconnected biodiversity and climate risks it exposes the banks to (NGFS and INSPIRE, 2022). Furthermore, the transition from a dependency on fossil fuels to renewable energy entails a new dependence on critical minerals crucial to the production of green energy generation and storage technologies, which is also subject to complex sectoral and supply chain dependencies, with implications for prices and financial risks that will have to be understood by supervisors (Miller et al., 2022).

Global financial authorities' networks, such as the Basel Committee and NGFS, can play an important role in addressing this challenge. Deepening inter-agency cooperation (cross-border, micro/macprudential and between financial supervisors and environmental agencies) can also help alleviate knowledge gaps. Appropriate resources need to be made available to this end from state budgets. Technical assistance from multilateral institutions can facilitate the development of capacity in less developed markets.

5.3 Unintended consequences and related risks

Incorporating transition planning into the heart of the supervisory process would constitute a significant step in the evolution of current supervisory practice. It could, therefore, also lead to far-reaching changes in how the financial system operates. By supporting the transition to net zero by 2050, the regulatory scrutiny of banks' transition plans would also have pervasive effects on the real economy. Accordingly, there are a range of potential risks and unintended consequences that would need to be monitored closely as new supervisory practices are adopted and existing ones changed.

First, the introduction of mandatory transition plans, and the supervisory consequences that could follow from an assessment that identifies misalignment, could have adverse impacts on specific 'strategic sectors' due to reduced access to funding from banks and a higher cost of capital that may hinder their efforts to transition to low-carbon activities. The relevant sectors include: housing, where raising capital requirements based on mortgage lending to energy-inefficient houses may raise the cost of mortgages; emission-intensive mining and quarrying, given the negative environmental impacts; and other 'hard-to-abate' sectors, including manufacturing sectors that currently lack affordable low-carbon alternatives. In this context, the proposed bottom-up (as opposed to sector-level) approach to assessing transition risk in the banking sector would enhance the effectiveness of risks assessment approaches. Furthermore, the required collection and provision of climate-related data in exchange for access to finance could have negative implications for small and medium-sized enterprises (SMEs). This could undermine efforts to achieve a 'just transition' if the cost of disclosing climate-related data proves to be too costly for SMEs, which may face higher costs of capital and being 'left behind' in the transition.

Third, the increased scrutiny of banks could lead to a migration of risk to other parts of the financial system. For example, it has been shown that, rather than taking C&E risks on board, banks seek to arbitrage around climate policies in cross-border lending (Benincasa et al., 2021). Similarly, activities most exposed to transition risks could be moved to non-bank sectors of the economy, thereby dispersing risk but not necessarily improving macro-level stability. Likewise, a narrow focus on early alignment may lead to rapid sell-offs of certain assets, which may induce instability in the financial sector. To address and mitigate these potential consequences, transition plans could be used to promote client engagement and meaningful C&E risk transition advice, which could also present a new and attractive business opportunity for banks.

The interplay and sequencing of the different transition plans outlined in Section 3 offers an opportunity to mitigate the various challenges outlined above, *inter alia* through iterative learning as well as exchanges and peer learning between the different supervisory authorities. There is an opportunity here for further engagement as well as the involvement of market conduct authorities in the emerging networks for oversight of sustainability issues in the financial sector, such as the Network for Greening the Financial System (NGFS).

6. Conclusions

Net zero transition plans can play an important prudential role in addressing the risks associated with the pathway to implementing the Paris Agreement. The primary rationale for the financial sector to align operations with commitments that are made by governments is to anticipate investment opportunities and mitigate transition risks. In the financial sector, voluntary transition plans have already started to emerge to give credibility to voluntary pledges made by banks. Mandatory transition plans are currently introduced in a number of jurisdictions as a matter of general non-financial disclosure and, as outlined in this chapter, prudential transition plans have the potential to provide supervisors with an additional dynamic and forward-looking prudential instrument.

The emerging practice and discussion signals that the requirements placed on banks by the three types of transition plan could be met by a single document, but it is important to keep the distinct functions of Type 1, 2 and 2 plans in mind. Already, in jurisdictions where Type 2 disclosures are mandatory, these are replacing Type 1 voluntary transition plans. Similarly, a well-designed Type 3 mandatory transition plan that focuses on misalignment could be adequate for meeting the disclosure requirements required by Type 2 plans. Alternatively, some jurisdictions may prefer a separate Type 3 disclosure process that only complements the required Type 2 disclosures.

Even if corporate and supervisory plans cover similar terrain, the discussed prudential Type 3 transition plans serve the distinct purpose of identifying prudential risks related to alignment as well as ways to address risks from misalignment. Accordingly, it may be the case that the same metrics and other information disclosed in Type 2 plans need to be integrated separately into Type 3 plans to ensure that prudential concerns are adequately met.

Furthermore, prudential transition plans can offer a useful risk assessment tool for prudential supervisors to evaluate whether individual banks and the banking system at large are on a transition pathway that is in line with a country's legally binding climate goals. These prudential transition plans could become a supervisory instrument to provide insights into banks' exposure and risk management over long time horizons and could be employed as a forward-looking prudential risk assessment tool by linking banks' operations today to their practice in the distant future. Furthermore, dedicated prudential transition plans promise to offer a valuable additional risk assessment tool for the prudential supervision of individual banks and the banking system at large to help overcome some of the limitations of traditional risk management tools and supervisory practices.

As outlined in this article, prudential transition plans will have to be clearly defined in terms of scope, relevant methodologies and how they complement and integrate climate scenario analysis. As an initial step to introduce and prudentially utilise net zero transition plans for financial institutions, it would be helpful to implement the mandatory climate-related disclosure for financial and non-financial corporates in line with the IFRS Foundation's International Sustainability Standards Board (ISSB) and the EU's Corporate Sustainability Reporting Directive (CSRD). This would improve the availability and granularity of the underlying data that, in turn, enables the assessment of transition risks. In addition, forward-looking methodologies, including climate risk scenario analysis and prudential transition plans, need to be further developed and disseminated through capacity-building efforts that enable financial institutions to assess their future risk exposures, and prudential supervisors to assess and address relevant risks. As discussed, in the EU, where discussion around all three types of transition plan have

advanced or even led to regulatory efforts, supervisors can already rely on important standards and instruments to set supervisory expectations (e.g. the EU Taxonomy, guidance on climate risk scenarios, supervisory expectations for banks, risk management expectations and Pillar III requirements).

Strategically, in this first phase of the elaboration of net zero transition plans, the related applications, expectations and potential prudential as well as alignment aims will have to be explored further. This is the case both for market-led corporate disclosures and on the prudential supervision side. It will be important for the prudential community to be active participants in the discussion around the design of transition plans so that they can play their full part in addressing climate risks. Financial supervisors should also coordinate their activities to develop international standards for prudential transition plans. In this context, international information sharing will be important to develop effective tools for assessing transition plans from all regulated financial sectors, pointing to a role for the Bank for International Settlements (BIS), the Financial Stability Board (FSB), and the Network for Greening the Financial System (NGFS) to work towards developing international guidance on supervisory approaches to prudential transition plans.

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