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Policy Paper

Financial and regulatory policies in the face of climate challenges

The case of emerging markets and developing economies

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Contents

Executive summary

In 2015, ahead of COP21 in Paris, Mark Carney—then governor of the Bank of England and chairman of the G20's Financial Stability Board—delivered a landmark speech in which he emphasized the importance of climate-related financial risks for the stability of financial institutions and the financial system as a whole. While the task of managing the political burden of the energy transition—assuming it was orderly—would fall to governments, the responsibility for maintaining financial stability would fall to financial regulators and central banks (FRCBs). The financial sector, guided by non-financial disclosure frameworks, would drive demand by allocating capital. These disclosure frameworks would first be developed by private actors, with regulators entering later to support them.

Carney, however, expressed concern that these frameworks lacked consistency, comparability, and clarity. Since then, disclosure frameworks have proliferated, covering both financial risks and the alignment of financial flows with the Paris Agreement. Yet, the underlying "theory of change" and the distribution of responsibilities among actors remain unclear and ambiguous. This Policy Paper examines the role and mandate of FRCBs in managing climate-related financial risks and in ensuring that financial flows align with Article 2.1(c) of the Paris Agreement, which endorses the commitment to "making financial flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development."

The intervention frameworks used by FRCBs to address climate risks, often adapted from traditional credit risk management frameworks, have both conceptual and practical limitations. They struggle to adequately account for four barriers specific to climate issues: the **endogeneity** of financial systems (as highlighted in the IPCC's Sixth Assessment Report), the **uncertainty** surrounding transitions and climate change, the **systemic** nature of climate issues, and the need for a **forward-looking** approach to climate risks. A fifth barrier—**fiduciary duty** and the challenge of balancing climate risks, long-term opportunities, and short-term returns—also warrants analysis, but it falls outside the scope of this paper.

For both alignment and climate risk management, this *Policy Paper* recommends prioritizing the development of an enabling framework. This would include national plans and strategies—such as nationally determined contributions (NDCs), long-term strategies (LTSs), and national adaptation plans (NAPs)—as well as sectoral ones accompanied by appropriate modeling, in order to

define financing plans and determine the expected contributions of domestic resources *via* the national financial system. Additionally, this framework must account for external financing that could potentially be mobilized through the same system. Furthermore, financial and regulatory policies, like other economic policies, must be integrated into this broader framework. Achieving this requires a deep understanding and thorough analysis of external factors beyond the control of individual countries, including global transition dynamics and the impacts of climate change.

To even partially overcome the aforementioned barriers, this *Policy Paper* recommends that FRCBs mobilize both micro- and macroprudential policies, with particular attention to transition financial risks at the macroprudential level, which are often mistakenly reduced to a single metric: "financed emissions." "Double materiality" approaches can help overcome these barriers and provide a more comprehensive understanding of risks. Both prudential and alignment policies would also benefit from adopting a more forward-looking perspective.

Beyond methodological considerations, this *Policy Paper* also highlights the need to tailor FRCBs' policies to national contexts and specificities, particularly the economic and financial structure, the level of exposure to climate risks, and pre-existing vulnerabilities. In emerging markets and developing economies (EMDEs), for example, climate challenges exacerbate pre-existing vulnerabilities. For some, the "tragedy of the horizon" is giving way to a "tragedy of geography," with many countries already facing extreme physical risks.[1] These nations are also particularly vulnerable because of their limited fiscal space and underdeveloped risk management mechanisms. In terms of mitigation needs, it is estimated that two-thirds of the investments required for the energy transition should be directed toward EMDEs (IEA 2023), with a focus mainly on emissions avoidance rather than reduction, in a context of strong growth in energy demand. FRCBs intervention frameworks must therefore be context-sensitive and proportionate.

This *Policy Paper* also identifies financial inclusion as a blind spot in many publications and ongoing financial and regulatory policy initiatives related to climate change. Existing tools, such as refinancing operations, must be adapted to better promote financial inclusion. Moreover, the adaptation and resilience agenda, which is central to Article 2.1(c) of the Paris Agreement, is woefully underrepresented in current approaches, which tend to prioritize mitigation.

[1] According to the World Meteorological Organization's 2023 report on the state of the climate in Africa, climate change is costing African countries between 2% and 5% of their GDP annually, with some nations allocating up to 9% of their budgets to address its impacts.

The final challenge highlighted in this paper—a critical one, in our view—is the fragmentation of climate finance frameworks, standards, and methodologies. There is an urgent need to develop harmonized and interoperable frameworks across different jurisdictions. Existing standard-setting spaces have their shortcomings, in particular an inability to grasp the specificities of each country. It is therefore essential to establish more inclusive spaces that better represent the FRCBs of EMDEs, while also improving the governance processes for these spaces through regulatory or voluntary frameworks.

This *Policy Paper* limits the analysis to the banking sector, even though capital markets are playing an increasingly important role in some EMDEs.

Introduction

For more than thirty years, financial regulations and policies, supported by voluntary initiatives from financial actors, have sought to address sustainability challenges, including climate change. However, the results have been mixed. Diverging interpretations of fiduciary duty, corporate social responsibility, stakeholder engagement, and co-benefits reflect a fragmentation of policies and paradigms.

Since the Paris Agreement and its Article 2.1(c), debates over the role of financial regulation and financial systems in achieving climate objectives and sustainable development goals have intensified. However, principles of sustainability in finance had already begun to emerge with the Brundtland Report (1987) and the Rio Summit (1992), representing gradual yet insufficient progress. The corporate social responsibility (CSR) movement emerged even earlier. Current debates largely focus on how sustainability should be interpreted, the materiality of impacts and financial risks, the fiduciary duty of investors, and the scope of accountability. Today, a key distinction in these discussions is between single and double materiality: Should sustainable finance be limited to a risk–return perspective that considers only the financial risks to investors, or should it also incorporate the broader socio-environmental impacts of financial decisions? Some regions, such as Europe and China, have embraced double materiality, whereas international standards like the International Sustainability Standards Board (ISSB) and the United States tend to favor single materiality, which focuses solely on financial risks related to climate change.[2] On the regulatory front, financial regulators and central banks (FRCBs) in advanced economies (AEs) have primarily addressed climate change through the lens of financial stability, while climate alignment has often been pursued through voluntary initiatives.

The dominant economic and financial theory on the integration of sustainability issues is based on the neoclassical principle of market failure. This theory argues that the failure to fully account for climate change in investment decisions results in a gap between financial returns and social returns. As a result, government intervention is needed to correct price signals, either by improving price discovery by disclosing information to market actors, or by directly influencing the allocation of “green”/“brown” credit through targeted economic policies, such as subsidies, guarantees, tax credits, and carbon pricing (Volz 2017). The case of carbon pricing,

[2] Other sustainability factors, such as biodiversity, are to be gradually introduced.

however, illustrates the complexity of this approach. Setting a carbon price that sends an adequate price signal is fraught with political, distributive, technical, and economic obstacles,[3] even though it may be effective for certain activities. Likewise, the argument that non-financial disclosure can sharpen price signals relies on the efficient market hypothesis[4] and the assumption that economic actors are rational.[5] Moreover, the renewed prominence of industrial policy[6] underscores the complexity of coordinating market mechanisms with state intervention, as well as the interplay between geopolitical and sovereignty issues and climate and environmental challenges.

The "theory of change" in climate finance since the Paris Agreement

Analyzing the full text of Mark Carney's 2015 speech is highly instructive because the speech still reflects the current state of debates on finance and climate. First, the concept of the "tragedy of the horizon" describes the disconnect between the short-term focus of financial markets, political decision-makers, and regulators (five to ten years) and the long-term effects of climate change. Carney identifies the main drivers of the transition: public policy, technological advancements, consumer preferences, and physical climate risks. He also underscores the need to clarify the mandates of FRCBs, arguing that we should reject their political role and refocus them on their core mandate of stability, while entrusting governments with the responsibility for making climate policy. He argues that governments must ensure the careful management of public policies to guarantee an orderly transition and warns that a disorderly transition could trigger a systemic financial crisis—the infamous "Minsky moment." To achieve an orderly transition, Carney argues that transition risks should be at the center of the political agenda. The role of financial systems is reflected in their ability to shape demand by supplying capital, provided that there is adequate access to information. Carney therefore supports delegating the disclosure of non-financial information to private actors initially, with regulators stepping in at a later stage to strengthen disclosure frameworks. However, he cautions against the proliferation of uncoordinated initiatives and advocates for disclosure regimes that are consistent, comparable, clear, and reliable.

[3] We might also consider (i) the elasticity of supply and the substitution effect, as well as (ii) political acceptability and the distribution of "efforts" within and between countries.

[4] A market is considered efficient if the price of an asset reflects its true value, determined on the basis of all available information about the asset.

[5] "Another consequence of the deep uncertainty surrounding the low-carbon transition is the importance of collective mechanisms, as suggested from a Keynesian perspective on financial market actors' rationality. In particular, there could be a collective market 'convention' or market 'sentiment,' for example, on the likelihood of the transition. This collective sentiment could get stuck on the idea that transition risks are not credible, even if, objectively, the evolution of economic signals tends to demonstrate the opposite. In this case, as stated above, it would provide no incentive to align financial activity with transition pathways and to provide transition finance" (I4CE).

[6] The advent of aggressive industrial policies, such as the *Inflation Reduction Act* (IRA) and the *CHIPS and Science Act* (in the United States) and the *Net-Zero Industry Act* and the *Critical Raw Materials Act* (in Europe).

What has happened since then? Between 2015 and 2017, the Task Force on Climate-Related Financial Disclosures (TCFD), a voluntary initiative, made voluntary disclosure of climate-related financial risks a central focus. Over time, this practice has been gradually integrated into regulatory frameworks. Starting in 2017, the first systemic approaches began to be deployed, along with the first stress tests incorporating climate-related financial risks across the entire financial sector, driven in particular by the Network for Greening the Financial System (NGFS). Subsequently, both regulators and voluntary initiatives mobilized to develop taxonomies, a system for classifying "sustainable" or "green" activities. From the 2020s, coalitions of actors began making stronger commitments to alignment, particularly following COP26 in Glasgow and the rise of "net-zero" targets. This movement has been accompanied by the development of financial instruments such as GSSSBs (green, social, sustainable, and sustainability-linked bonds) and the labeling of financial products. Finally, the recent development of transition plans and decarbonization targets aims to provide more forward-looking, action-oriented visions to complement taxonomies. Here again, regulators are gradually integrating these tools into their practices.

The past decade has thus been both prolific and ambitious. However, the frameworks, standards, and methods deployed still lack clearly defined objectives and intentions, making it difficult to gauge their true ambitions. The goal of establishing "consistent, comparable, reliable and clear disclosure" remains distant. Moreover, the "theory of change" that defines finance's role in addressing climate issues runs up against complex realities. Transition risks and alignment, which are often shaped by political decisions and technological developments, are closely intertwined with broader issues such as energy sovereignty, trade and competitiveness, social justice issues, and political acceptability, making them difficult to isolate. In short, the future remains uncertain. These complex realities create confusion and ambiguity around the intended goals, of which there appear to be many: informing investors and shareholders, financing the transition in alignment with the Paris Agreement, accelerating the transition and measuring progress, adopting a risk-based approach at the individual and systemic levels, generating strong price signals to encourage green investments, and influencing expectations in ways that make the transition a self-fulfilling prophecy.

The central role of national trajectories and plans in guiding a policy mix

Figure 1 highlights the central role of national trajectories, which are a fundamental prerequisite for FRCB actions, particularly when considering climate issues from a forward-looking perspective. FRCBs must coordinate with public authorities to develop policies that align with climate objectives, just as they do with other economic policies. These trajectories require a deep understanding of local issues, contexts, and narratives, as well as the external dynamics of transition, in order to anticipate risks, their socioeconomic impacts, tipping points, and redistribution effects. In this regard, AFD has developed numerous "trajectory support" tools through the 2050 Facility (AFD n.d.a), set up in 2018 as part of France's commitments at the One Planet Summit[7] in Paris.

Effective coordination across different policies depends on a strong governance system. To this end, AFD has developed a climate governance framework to ensure consistency between its sectoral policies and FRCB support. Climate governance refers to "all the mechanisms, frameworks, and institutional arrangements used to design, coordinate, and steer the ecological transition, at all levels of the territory and for the benefit of all citizens" (AFD definition). "Human and financial resources" are considered a secondary lever, shaped by political, strategic, and legal frameworks. AFD's approach seeks to "guide states toward polycentric climate governance, in which responsibilities are shared fairly, democratically, and sustainably among public, market, and community actors."[8] Furthermore, in several cases, including Rwanda, Uzbekistan, and Morocco, AFD has incorporated its support for FRCBs into broader programs to help integrate climate considerations into national public policies such as economic policy and public finance management.

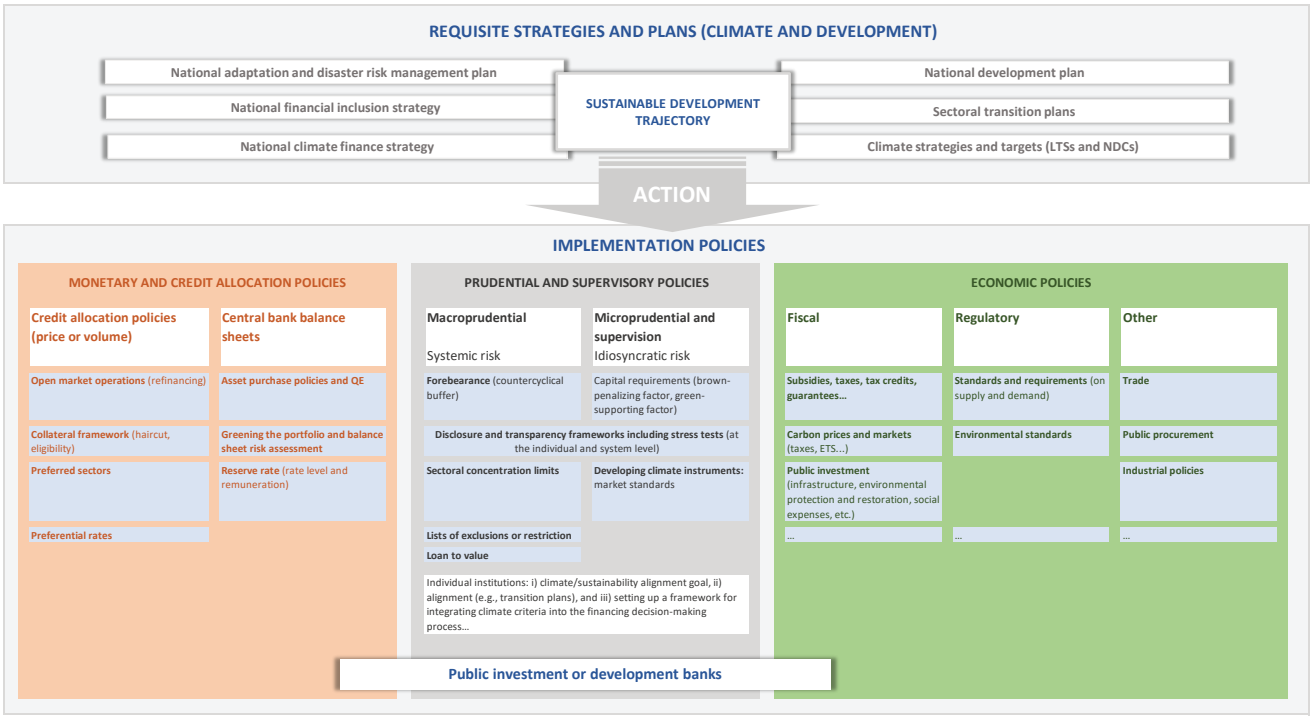
Deploying multiple financial and regulatory policies simultaneously can be challenging: ensuring consistency while aligning them with economic policies requires careful coordination (Krogstrup and Oman 2019). Ideally, the mix of financial and economic policies should be strategically designed and coordinated to achieve national or sectoral objectives and roadmaps (see Figure 1), which requires significant planning and coordination capacities (AEFR 2023; Iacobuţă *et al*. 2022; Dikau and Volz 2021a). Furthermore, ensuring horizontal consistency between the three policy areas outlined in Figure 1 (monetary policy, economic policy, and prudential regulation) means that they must work together toward common objectives while also helping to overcome existing barriers. Even if full alignment is not

[7] See: https://www.afd.fr/en/actualites/one-planet-summit-our-concrete-commitments

[8] Some countries have set up *ad hoc* centralizing bodies to ensure consistency and coordination of these functions, such as South Africa's Presidential Climate Commission and the United Kingdom's Climate Change Committee.

possible, these policies should at least be designed to **avoid generating conflicting incentives**.[9] They should provide clear and consistent signals to economic and financial actors through mechanisms such as sectoral standards,[10] licensing rules, public procurement policies (Siribié *et al.* 2024), and innovation policies.

Figure 1 - A mix of financial and economic policies, guided by national trajectories



Source: authors.

[9] These contradictions can arise in various ways, such as subsidies for activities that do not align with a green taxonomy, public procurement policies that favor high-emission sectors, environmental standards that fall short of green taxonomy requirements, or land-use policies that promote real estate expansion in areas vulnerable to climate risks.

[10] For example, energy efficiency standards for buildings or resilience requirements for construction.

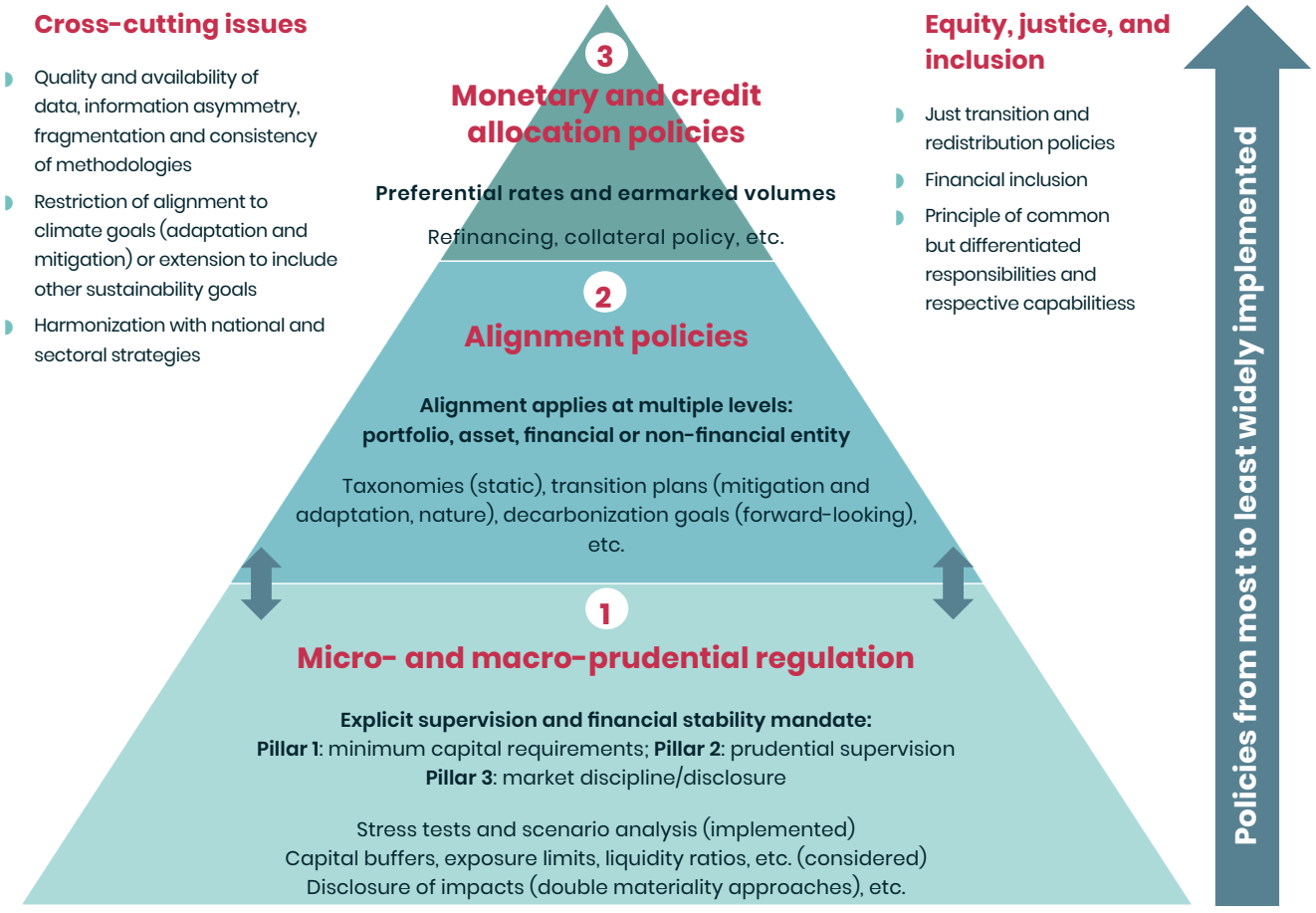
1.
General recommendations

Among the financial and regulatory policy options available to FRCBs, Figure 2 identifies three main categories:

- **Prudential policies**, which reflect regulators' financial stability mandates linked to climate-related financial risks;
- **Alignment policies**, which explicitly pursue the objective set out in Article 2.1(c) of the Paris Agreement and also offer a valuable perspective for prudential exercises;
- **Monetary and credit allocation policies**, which are more prescriptive and interventionist. These policies remain sidelined, particularly in advanced economies, and continue to be the subject of debate regarding their legitimacy and implementation (see Appendix 2).

There is ongoing confusion regarding the difference between prudential policies, which focus on risk management, and alignment policies, which serve a different purpose. These two policy approaches are distinct and do not have a direct reciprocal relationship (Hubert and Hilke 2024). It is essential to clarify their respective objectives and ensure that they go beyond mere compliance exercises. Regulators seeking to advance alignment policies must work to establish harmonized frameworks for the various methods used by market actors while also ensuring access to the necessary data and information. Monetary and credit allocation policies have the potential to serve both risk management and alignment objectives simultaneously, provided that they are implemented in a manner that is consistent with broader economic policies and within FRCB mandates (see previous section).

Figure 2 - Pyramid of financial and regulatory policy options



Source: authors.

Several cross-cutting challenges related to the implementation of these policies have been identified by institutions such as the European Banking Authority (EBA), the European Central Bank (ECB), and the NGFS. In response, we offer a few recommendations to help address these issues. Some obstacles, such as limitations in data availability and access, as well as the predominant focus on mitigation at the expense of adaptation and resilience, warrant a more in-depth analysis but will not be explicitly covered here.

1.1 – Prudential policies

The implementation of prudential policies,[11] at both the micro- and macroprudential levels, plays a crucial role in ensuring the stability of financial systems. However, it is essential to recognize the methodological and conceptual limitations of existing tools while working to improve current practices. Furthermore, climate-related financial risks cannot be evaluated using the same conventional methods applied to credit risk. Moreover, these efforts should not be conducted merely as a regulatory compliance exercise but should be part of a genuinely proactive approach to climate issues that fosters dialogue and understanding of these issues.

Recommendation 1: Introduce double materiality approaches to improve the understanding and management of climate risks

From an operational perspective, there are inherent limitations to a risk-based approach (or a financial single materiality approach) that aims to prevent the accumulation of risks at both the individual and systemic levels. These have been widely documented. Climate-related financial risks involve **radical uncertainty** (Chenet *et al*. 2021), making their assessment particularly challenging due to **non-linearities**, the complexity of their transmission mechanisms, and **feedback effects. Endogeneity**[12] is also a fundamental characteristic of these risks (IPCC AR6, Chapter 15 – Investment and Finance, WG3). Furthermore, traditional credit risk analysis relies on mean value assessments and deviations from the most likely scenario, whereas climate scenarios are largely uncertain.

Box 1 - Improving the understanding of climate-related financial risks (and sustainability) through double materiality

Applying the double materiality principle to financial regulation can help address some of the shortcomings mentioned above. Boissinot et al. (2022) identify three key reasons why a double materiality approach would enhance risk analysis:

- At the individual level, impact analysis can complement the risk-based approach (a concept known as dynamic materiality) by improving the understanding of feedback effects and non-linearities, thereby helping to anticipate and mitigate certain risks.
- At the systemic level, given the endogeneity of climate-related financial risks, a double materiality perspective can provide a more comprehensive understanding of sustainability issues by considering the interconnections between all actors within the system.
- Finally, double materiality offers a framework for assessing the roles and responsibilities of financial system actors in managing and preventing the climate crisis and socio-environmental issues.

Recommendation 2: Devote greater attention to transition risks in macroprudential analyses.[13] Physical risks should be taken into account at both the micro and macro levels.

The Basel Committee's principles, published in June 2022, call for the measurement and monitoring of climate risks at the level of regulated institutions.

[11] Macroprudential (systemic) policies are designed to manage systemic risks and maintain financial stability. These policies include sectoral policies, concentration limits, capital buffers, and financial system stress tests, all of which are intended to mitigate credit bubbles, excessive financial system leverage, and risk concentration from both direct and indirect exposures. They also address issues related to moral hazard, systemically important financial institutions, and implicit government guarantees. Microprudential (idiosyncratic) policies focus on individual actors, requiring measures such as capital requirements, the implementation of transition plans, and robust climate risk management and sustainability practices, both across operations and in governance frameworks.

[12] "... the materialisation of losses is affected by the action of financial players themselves. However, the standard treatment of risk both in financial valuation models and in asset pricing assumes that risk is exogenous. In contrast, endogeneity is a key feature of climate risk because today's perception of climate risk affects climate investment, which in turn affects directly the future risk."

[13] For example, concentration limits or systemic risk buffers.

However, these principles do not account for systemic risk (Chenet *et al.* 2021). In this regard, macroprudential policies[14] can complement microprudential policies, which are limited in their ability to prevent or contain the effects of crises that result from systemic and endogenous risks, such as the global financial crisis (Altunbas *et al.* 2018). Furthermore, transition financial risks differ significantly from physical financial risks: Banks are generally more exposed to physical risks, particularly when their portfolios are concentrated in sectors that are highly sensitive to extreme climate events, such as agriculture and real estate. By contrast, if the transition is orderly, they can gradually adjust their portfolios to manage transition risks (Kaur and Prakash 2024). Finally, the key drivers of transition risks and their timing are largely beyond the control of EMDEs, as they are shaped by decarbonization pathways (technology, policy) that are pursued mainly in AEs and China. The financial system and individual institutions may actually be more exposed, albeit indirectly, through their exposure to sovereign risk, which could be significantly affected by the transition as a result of declining tax revenues and other macrofinancial pressures.

For these reasons, we recommend a system-wide assessment of transition risks, with particular attention given to external risk factors. Pillar 2 and its supervisory exercises are particularly well suited for improving the understanding and management of physical risks. However, limited access to data and information remains a major obstacle, as demonstrated by the recent US Federal Reserve Board exercise.[15]

On the other hand, managing and mitigating these risks through Pillar 1 measures, such as concentration limits or systemic buffers, remains challenging, as it requires navigating complex trade-offs and tensions between different economic authorities and policies. This can obscure the role of macroprudential policies in the broader policy mix (ECB and ESRB 2022; Bartsch *et al.* 2024; Berret *et al.* 2023). As a result, caution should be exercised when implementing such measures.

[14] When applied to climate-related risks, targeted measures can be imposed on all high-emission ("brown") sectors if the risks they generate are deemed systemic and pose a threat to financial stability.

[15] See Board of Governors of the Federal Reserve System, 2024.

Recommendation 3: Introduce a forward-looking approach to risk assessment

According to the EBA, although stress tests[16] are a key tool for both micro- and macroprudential exercises, they remain inadequate, exploratory, and overly simplistic, particularly when it comes to capturing the structural changes required for the transition (EBA and BSG 2022). For instance, these exercises should not be conducted on portfolios that remain static over the duration of the assessment; instead, they should adopt a dynamic approach. Incorporating transition plans into prudential exercises presents an alternative that offers a more forward-looking perspective on risk (Evain 2024; Dikau *et al.* 2024).

1.2 – Alignment policies

A growing number of regulators are implementing, or seeking to implement, mandatory disclosure requirements related to actors' alignment and transition strategies. However, many of these frameworks are still undergirded by a fragmentary network of voluntary initiatives. Alignment itself is subject to multiple interpretations and methodologies: A recent study identified more than fifty (Institut Louis Bachelier 2024). In some cases, alignment focuses solely on mitigation and target temperature objectives, while in others it encompasses broader goals, such as those outlined in Article 2.1(c) of the Paris Agreement. Although they are complementary, institutional alignment strategies such as transition plans and target-setting approaches (which are often voluntary) are generally viewed as more dynamic and transformative than taxonomies (see Box 2). While taxonomies primarily serve to guide and provide visibility to economic actors, transition plans and target-setting methods offer a forward-looking perspective and attempt to clarify the "how" of the transition. However, concerns about the credibility of their implementation are frequently raised, even though in some jurisdictions they are considered indicators for assessing transition risks under Pillar 3. Over time, integrating certain alignment

[16] These exercises are also based on scenarios (NGFS, IEA, IPCC) and stress tests.

methods into prudential frameworks could help improve them and make them more consistent.

Recommendation 1: Reduce the fragmentation of methods

Carney's 2015 speech called for "consistent, comparable, reliable and clear disclosure." However, the proliferation of alignment methods and the fragmentation of data are major challenges for actors. In addition, the lack of accountability frameworks and systematic monitoring of what has been achieved raises concerns and results in a mixed assessment of the effectiveness of voluntary alignment approaches (Sastry *et al.* 2024).

FRCBs must work to develop common alignment methodologies that are supported by reliable access to data and information, including reference scenarios that are consistent with national plans and sectoral trajectories (see Figure 1). In addition, these efforts must actively involve EMDE actors to ensure that climate scenarios and trajectories reflect their particular circumstances, especially in cases where avoiding future emissions is the number-one priority rather than reducing current emissions.

Recommendation 2. Transition plans for adaptation and mitigation should first serve as a basis for dialogue between actors

We recommend that the disclosure of transition plans for adaptation and/or mitigation, as well as of decarbonization targets, be used to foster dialogue both within and across sectors, as well as between private sector actors and political decision-makers. These discussions can help identify synergies and complementarities. For instance, an actor's ability to decarbonize may be heavily dependent on its upstream value chains in other sectors, as well as on the energy sector. The viability of these plans depends on both climate policies (designed to meet national or sectoral targets) and technological advancements. To ensure that these plans are credible, feasible, and successfully implemented, it is crucial to identify these dependencies. Recent research has introduced new analytical frameworks that examine how transitions are dependent on exogenous factors—such as technology, economic policies, regulations, and human resources—which are the key sources of uncertainty in transitions (Rose *et al.* 2024).

Box 2. The challenges of an alignment approach using a green/sustainable taxonomy

The development of a taxonomy must begin with a clear definition of its objectives and a well-defined implementation strategy.

It must take into account various strategic, operational, and technical considerations, as well as the structure of both current and future economic activities (as part of an evolving framework) and the country's sectoral priorities. It should also articulate how its implementation contributes to national objectives. (Phasing out coal is a central focus of the Association of Southeast Asian Nations [ASEAN] taxonomy, for instance. Meanwhile, the Brazilian taxonomy prioritizes agriculture, and the Mexican taxonomy is notable for its integration of social issues.) In this regard, sectoral classification nomenclatures can be both a strategic and an operational consideration. Another critical element is the choice of sustainability thresholds for economic activities: These must reflect not only local conditions and limits to sustainability, but also national regulatory frameworks. The "do no harm" principle and safeguard measures are fundamental to ensuring a taxonomy's robustness and its ability to address multiple sustainability issues simultaneously and, ultimately, to have a strong sustainability approach. Lastly, the scope of actors required to comply with taxonomy-based reporting, including extraterritorial actors, must be determined based on their respective capacities.

A major strategic consideration is interoperability—or even equivalence—with taxonomies from partner jurisdictions or those providing substantial external financing. This is a thorny issue, as it requires balancing the priorities and sustainability issues of different jurisdictions. This challenge is particularly pronounced in capital market finance, which is generally less flexible and customizable than banking finance.

Currently, taxonomies primarily serve to guide economic actors and provide them with visibility, and they are used either on a voluntary basis or for reporting purposes on the alignment of business activities and financing. In the future, however, the use of taxonomies could be expanded to support monetary, prudential, or even fiscal policies, as well as to support frameworks for green/sustainable market instruments and savings mechanisms.

1.3 – Monetary and credit allocation policies

These policies fall within the scope of national planning strategies and central bank mandates. In EMDEs, central bank mandates often differ from those in AEs (Dikau and Volz 2021a), as they frequently include public policy support and development objectives in addition to traditional stability mandates. As a result, several central banks, including in China, India, Bangladesh, and the Philippines, have explicitly implemented such policies (Dikau and Volz 2021b). By contrast, central banks in AEs have taken a more cautious approach, a choice that is the subject of ongoing debate (see Appendix 2). These policies can come into conflict with other central bank objectives, such as financial and price stability.[17]

1.4 – The intersection between financial regulation for the climate and financial inclusion

To what extent can financial and regulatory policies for the climate lead to the exclusion of vulnerable people and entities? This question is underexplored in the literature, despite the fact that financial inclusion is a critical issue for EMDEs, where it is recognized as a key resilience factor (Jungo *et al*. 2021, 2022; Ozili 2021) against various climate and sustainability risks. Consequently, the aforementioned regulatory and voluntary frameworks should be designed to avoid inadvertently undermining inclusion. Several mechanisms are likely to have an impact on climate-related financial inclusion. These mechanisms should be identified beforehand so that they can be circumvented. They include:

- Exposure to physical risks: Banks may limit their exposure to vulnerable entities such as households and small and medium-sized enterprises (SMEs) because of concerns about reduced solvency and lack of access to risk management, risk reduction, and risk transfer solutions (UNEP-FI 2024). This issue is further aggravated by the rising cost of risk transfer solutions offered by insurance. This example is starting to become reality.
- Exclusion of high-carbon entities from financial services: Companies in fossil fuel industries and their value chains may face restricted access to financial services such as debt financing, brokerage, and insurance because of the risk of stranded assets. Without access to "transition finance," these entities may struggle to evolve.
- High costs of climate-related information (Volz and Knaack 2023) or even a total lack of it: Complying with non-financial disclosure requirements, such as climate risk assessments or carbon accounting, becomes complex or even impossible.
- The risk of information asymmetry, a classic issue in the banking sector.

Recommendation 1: Explicitly incorporate financial inclusion issues into financial and regulatory policies

Financial inclusion issues must be explicitly incorporated into regulatory frameworks. One approach is to improve access to information, data, and methodologies, which can help reduce information asymmetry, a major driver of financial exclusion. Another strategy is to explicitly include vulnerable groups (which are often at risk of financial exclusion) in alignment frameworks by integrating social criteria into the "do no harm" or "contribute" factors of taxonomies. One such framework is the "Just Transition Portal" proposed by Trade and Industrial Policy Strategies (TIPS) in South Africa.[18] A "just transition" approach to transition finance and transition plans can also promote inclusion. Applying a double materiality perspective to impact analyses can help identify groups prone to financial exclusion by assessing their vulnerability across three key dimensions: scale, scope, and irreversibility. Finally, when public resources are mixed with private resources (or any other regulatory incentive mechanism) in de-risking structures, the inclusion of public resources can be made conditional on protective and inclusion measures. Through its initiatives, AFD supports efforts to explore approaches in this area (see Box 3).

[17] Pro-climate monetary policies are considered expansionary.

[18] See: https://www.tips.org.za/just-transition

Box 3: AFD support for the Alliance for Financial Inclusion (AFI)

AFI is an international network of central banks, finance ministries, and financial sector regulatory authorities. It serves as a platform for sharing and disseminating best practices in the development of public policies that promote financial inclusion. Since 2019, AFD has been actively supporting AFI's initiatives.

Recently, AFD's support for AFI has centered on **green financial inclusion**. The decades-old separation between green finance and inclusive finance has become outdated and ineffective. The concept of inclusive green finance that AFI promotes recognizes that inclusive financial services have a key role to play in managing the effects of climate change by enhancing the climate resilience of their clients and protecting the environment they operate in.

A geographical focus has been established to target the most vulnerable regions, ensuring that support reaches those areas most in need. The activities financed will cover a range of themes, including **adaptation, insurance, climate-related financial risks, and disaster management**.

Financing is organized into three main areas of work that are aligned with AFI's first three strategic objectives for 2024–2028:

- **Knowledge**: Strengthening members' knowledge and expertise through biannual peer-to-peer exchanges, publications written by regulators for regulators, technical training via webinars, and the development of a regional roadmap for inclusive green finance in the Pacific.
- **Practice**: Implementing public policies through grants and technical assistance, fostering partnerships to facilitate policy execution, and conducting peer assessments to eliminate bottlenecks.
- **Impact**: Promoting inclusive green finance on a global scale by participating in platforms such as the G20 and COP, engaging in dialogue with standard-setting bodies, and launching communication campaigns that highlight the impact of international climate policies and events.

2.
The case of emerging markets and developing economies

In both AEs and EMDEs, a similar challenge exists in financing the transition: "not enough is being done." Despite some encouraging signs (IEA 2023), particularly from EMDEs, two fundamental questions persist: "Is there enough money to finance projects?" and "Are there enough projects?" The answer lies at the intersection of these two elements: "Are there enough projects with a risk–return profile that appeals to investors?" This question is especially critical because transition financing is capital-intensive and, therefore, highly sensitive to the cost of capital (see Appendix 1). For EMDEs, several factors have recently strengthened the case for mobilizing more private capital to finance the Sustainable Development Goals (SDGs) and climate agendas. These include high levels of public debt, the persistent financing gap for the 2030 Agenda and the Paris Agreement, declining official development assistance (ODA), and decreased Chinese financing. However, the financial and technical absorption capacity of EMDEs must be taken into account (Sward *et al*. 2024). Although EMDEs are highly diverse, they all have substantial needs for long-term financing and liquidity in the event of climate shocks. In fact, two-thirds of global energy transition investments will be made in these countries. Furthermore, their vulnerability to fluctuations in global capital costs and availability requires careful financial management to navigate the uncertainties of the transition, even as their attractiveness to investors improves (García López and Stracca 2021). At the same time, investment incentives remain closely tied to global liquidity conditions. Another challenge is that EMDEs' financial systems, which are often composed mainly of banks, struggle to provide sufficient long-term financing of the kind typically supplied by institutional investors or foreign direct investment (FDI). This long-term financing is crucial for technological catch-up and integration into green value chains (see Appendix 1). The development of capital markets and support for public development banks could play a key role in addressing these financing constraints.

2.1 – Toward targeted and proportional support for regulatory policies

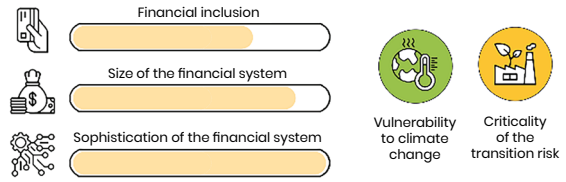
To help guide financial and regulatory policy choices with an approach that is both **proportional and targeted**, this *Policy Paper* proposes a classification framework (see Figure 3) **that takes into account the specific characteristics of EMDEs**. While this classification offers **general guidelines**, financial policies must ultimately be tailored to the socioeconomic priorities of each country. We have selected a sample of **18 countries** where AFD operates. These countries have a diverse range of financial system structures and levels of exposure to climate change and transition risks. We then group these countries according to their similarities using the following **five criteria**:

- The **relative size of their financial system**, measured as the sum of financial assets (banking, insurance, and financial markets) as a percentage of GDP.
- The **sophistication of their financial system**, approximated by the IMF's financial development index.
- The level of **financial inclusion**, based on the percentage of adults with an account at a formal financial institution, using FINDEX data.
- The country's **vulnerability to the effects of climate change**, as measured by the ND-GAIN Index.
- The degree of **exposure to transition risks**, evaluated by AFD using a transition risk score.

These criteria result in four groups of countries with the following characteristics:

Figure 3 - Cross-classification of countries by financial systems and climate risk exposure

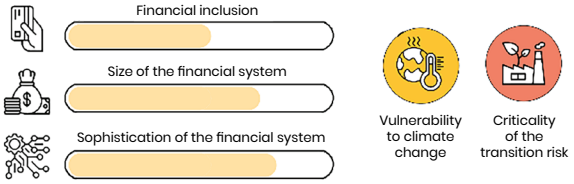
Group A



This group consists of countries with low to moderate vulnerability to the effects of climate change and moderate exposure to transition risks. Their financial systems are well developed and sophisticated, with relatively high levels of financial inclusion. This group includes emerging markets whose financial systems are made up of internationally active financial institutions, deep and relatively liquid capital markets, and a diverse range of financial actors.

Brazil, Turkey

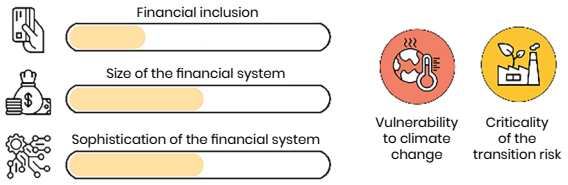
Group B



This group consists of financialized economies with moderate to high levels of financial inclusion and sophisticated financial systems. However, unlike the countries in Group A, these economies face high vulnerability to one or both of the two major types of climate risk: physical risks (Indonesia, Nigeria, and Vietnam) and transition risks (South Africa, Indonesia, Nigeria, Vietnam, and Mexico).

South Africa, Indonesia, Nigeria, Vietnam, Mexico

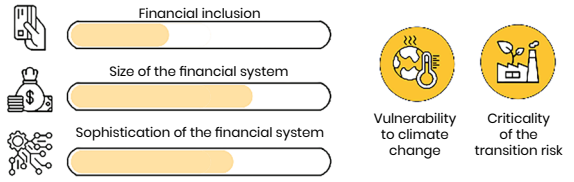
Group C



This group consists of countries with high vulnerability to the effects of climate change but low exposure to transition risks. The development and sophistication of their financial systems vary significantly, ranging from low (Niger and Senegal) to high (Pakistan). They all have a low to moderate level of financial inclusion.

Bangladesh, Niger, Pakistan, Rwanda, Senegal

Group D



This group consists of countries with financial systems that are more developed and sophisticated than those in Group C, but which remain incomplete. They are moderately exposed to the effects of climate change and to transition risks.

Egypt, Ghana, Morocco, Tunisia, Peru

2.1.1 – Specific, one-off support

Aimed at Group A and Group B countries, this involves supporting macroprudential transition risk assessments, promoting a "just transition," and strengthening alignment frameworks. The objective is to mobilize both the domestic and external financial resources needed to facilitate a transition that requires long-term capital.

Countries in Group A and Group B are characterized by sophisticated financial systems that play a significant role in their economies—particularly Group B, where financialization is high and exposure to climate risks (both physical and transition) is substantial. While these countries generally have well-structured financial institutions and qualified human resources, they may still require **specific, one-off technical expertise**. Support for regulators in these countries may include, for example, developing **climate scenarios tailored to their geographical and sectoral specificities** that will enable them to analyze the transmission channels of climate change in their national economies, from a **macroprudential** perspective. AFD's support for Mexico's central bank is a case in point (see Box 4).

Box 4: AFD support for Mexico's central bank (Banxico)

In 2022, AFD partnered with the Bank of Mexico (Banxico) and the Economic Commission for Latin America and the Caribbean (ECLAC) to adapt and develop a suite of climate scenario modeling and analysis tools for the Latin American and Caribbean region. The objective of this initiative is to inform public policy decision-making and enable climate stress testing within the financial system.

The project will be based on an integrated approach that combines the GCAM with the CLIMRISK physical risk model and the GEMMES macroeconomic model, developed by AFD (AFD n.d.b). Combining these models makes it possible to assess two types of climate risks at the same time: physical risks and transition risks.

The GEMMES modeling tool, developed by AFD, will shed new light on transition risk by extending the traditional climate stress test exercise to incorporate macroeconomic stability considerations specific to Mexico, including balance of payments pressures, foreign exchange reserves management, and just transition issues.

These countries also face significant transition risks and must navigate complex decarbonization trajectories: **phasing out fossil fuel assets** and associated sources of revenue while simultaneously supporting the greening of the energy mix, all while maximizing social and economic benefits. To achieve this, some countries in this group, such as South Africa, Vietnam, and Indonesia, have established Just Energy Transition Partnerships (JETPs) with AEs that provide financial support for their transition efforts.

Some Group B regulators have already made progress in mobilizing climate finance by implementing national climate finance strategies and **improving transparency and accountability**. For instance, Indonesia's Financial Services Authority (OJK) published its first Sustainable Finance Roadmap in 2015, which outlines priorities for 2015–2019. These strategic efforts have generally been accompanied by financial sector initiatives aimed at mobilizing green financial investment. Regulators in Indonesia and South Africa, for instance, have introduced **green bond issuance frameworks to help drive climate investments in financial markets**. South Africa issues nearly 75% of the green bonds in Africa, making it the continent's leading issuer. Meanwhile, Indonesia, with USD 5 billion in green bond issuances, was the leading green bond issuer among ASEAN countries in 2020.

In 2021, a coalition of G7 countries committed USD 8.5 billion in financial support to facilitate South Africa's just energy transition. In 2022, an international initiative involving the same countries and engaging the private sector pledged to mobilize USD 20 billion to accelerate Indonesia's decarbonization trajectory.

In this context, financial regulators have a crucial role to play in strengthening local financial systems and mobilizing the additional financing required to support these transitions.

Box 5: AFD support in Indonesia: A gradual approach in a country highly exposed to transition risk

AFD has been involved in climate finance in Indonesia's financial sector for over a decade. Initially, AFD's support focused on strengthening the green financing capacity of financial institutions. This has included credit lines to Bank Mandiri, Indonesia's largest bank, for the financing of renewable energy and energy efficiency projects in 2010 and 2012; to Bank Bukopin in 2013; and later to PT SMI, with whom AFD has maintained a partnership for financing climate projects since 2015.

Since 2020, AFD has also supported financial sector reform alongside the World Bank through a series of three public policy budget financing (PPBF) programs. These programs aim to deepen Indonesia's financial sector, enhance its efficiency, and strengthen its resilience. Under this framework, **AFD and the World Bank have facilitated the implementation of several measures to green Indonesia's financial sector**:

- Publishing Indonesia's green taxonomy in early 2022, classifying economic activities into three categories based on their environmental impact: "green" for activities with a positive environmental impact, "yellow" for activities with neutral environmental effects, and "red" for activities with a negative environmental impact.
- Establishing a financing mechanism to mitigate the financial impact of climate shocks and natural disasters, enabling faster disbursement of financial aid to affected populations.
- Laying the legal groundwork to develop a carbon market through the creation of a carbon exchange.

AFD is also conducting a study to analyze the **risks and opportunities of Indonesia's low-carbon transition in the context of the just energy transition**. The study first examines the transition exposure of assets with concentrated transition risks, such as coal mines, ports, refineries, gas pipelines, coal-fired power plants, state-owned enterprises, and local authorities. It then assesses the financial impact at a granular level, evaluating the exposure of the assets concerned and their value chains. The second phase of the study examines how these transition risks affect financial institutions by assessing the current or future exposure of their balance sheets to these carbon-intensive assets. This provides a comprehensive view of financial sector transition risks.

2.1.2 – Incremental support

Aimed at Group C and Group D countries, this support focuses on implementing micro- and macroprudential approaches, with a particular emphasis on climate risk concentration. AFD's efforts also center on enhancing dialogue among actors and supporting capacity-building.

These countries are characterized by a smaller financial sector relative to the national economy, lower levels of financial inclusion, and a less sophisticated financial system. As a result, compared to Group A and Group B countries, the volume of exposure of financial systems to climate-related financial risks is, in principle, less likely to trigger a systemic financial crisis in these countries. However**, idiosyncratic risks can be significant because of highly concentrated exposure at the sectoral or individual level**. This kind of concentrated exposure can even result in sovereign risk, where a country's liquidity or solvency may be particularly vulnerable to climate shocks.

AFD therefore seeks to provide financial supervisors in these countries with **incremental support** in managing **climate-related financial risks**. A prerequisite for such support is securing the commitment and involvement of the senior leadership of the regulatory and supervisory body in question. **Strengthening institutional expertise in this area requires significant financial and, more importantly, human resources**. Likewise, financial supervisors should establish a dedicated project team (a variety of structures can work) tasked with specifically addressing climate-related financial risks. This team must also be capable of disseminating knowledge throughout the organization. An initial phase may involve raising awareness among financial sector actors through workshops, webinars, training sessions, etc.

Once these foundational steps are in place, more targeted actions can be undertaken by supervisors, including identifying which financial institutions are most exposed to climate-related financial risks; developing tools for risk supervision, such as climate scenarios and stress tests; and designing microprudential regulations, including risk measurement frameworks and reporting requirements. AFD-financed support in Rwanda illustrates this **incremental approach** (see Box 6).

Box 6: Supporting the implementation of Rwanda's Sustainable Finance Roadmap

Rwanda has long been a pioneer in climate and environmental policy. Major studies have been conducted to assess the impact of climate change on Rwanda's economy, with one 2022 study estimating potential losses at between 5% and 7% of GDP by 2025. In response, the government has fully integrated climate change considerations into its national development program. In 2020, Rwanda also became the first developing country to submit an updated Nationally Determined Contribution that committed it to reducing emissions by 38% by 2030.

A shift in investment strategies and financial actors' practices sends a strong market signal to help jump-start a low-carbon transition. In this context, several initiatives have been launched in Rwanda since 2022 to align national resources with the climate trajectory. One key measure is its Sustainable Finance Roadmap, which seeks to integrate climate priorities throughout the country's financial sector. The roadmap is designed to:

- Incentivize actors in Rwanda's financial system to take climate-related financial risks into account;
- Increase the volume of green finance to support the country's NDC targets.

Since 2023 and the signing of a public policy budget financing agreement, AFD has been supporting the National Bank of Rwanda (BNR) in implementing a financial regulatory framework to improve both climate risk management and green financial flows. Over the next three years, this commitment will focus on:

- Developing climate scenarios and conducting climate stress tests for the financial sector;
- Establishing a Center for Sustainable Finance within the BNR to build capacity and coordinate sustainable finance actions among national actors;
- Publishing guidelines for national financial actors on disclosing climate-related financial flows and the climate risks inherent in their activities.

For Group C countries, support focuses on promoting financial inclusion and developing financial systems to help mitigate climate-related physical risks.

Limited access to financial services among certain economic actors and sectors is a widespread issue in many developing countries, but it is particularly pronounced in most **Group C** jurisdictions. In Pakistan, for example, financial inclusion is a key factor in combating climate change and its effects. Pakistan's agricultural sector accounts for 23% of the country's GDP, but it receives only 4% of the credit granted by financial institutions,[19] even though it was severely impacted by the extreme floods in the summer of 2022. Likewise, women's access to banking services remains exceptionally low: Just 3% of bank accounts in the country are held by women.[20]

The role of access to savings and credit services in climate resilience is twofold. First, it enables households, companies, and local authorities to finance investments that help them adapt to the effects of climate change. Second, these services provide a financial safety net in the event of climate shocks that help individuals and companies cope with a temporary loss of income, for example.

To promote financial inclusion, regulators must first implement national strategies that (1) structure demand by enhancing financial education and consumer protection, (2) adapt financial supply through innovation, improved access to resources, and regulatory or tax incentives, and (3) create a favorable institutional framework with strong regulatory oversight, credit bureaus, and judicial infrastructure.[21] These strategies also serve as a foundation for tackling climate issues. **Decentralized financial systems** play a key role in reaching remote areas and serving populations that are financially excluded

[19] State Bank of Pakistan, 2021-2022

[20] Global Findex 2021

[21] See "Integrating Inclusive Green Finance Policies into National Financial Inclusion Strategies," Alliance for Financial Inclusion. https://www.afi-global.org/publication/integrating-inclusive-green-finance-policies-into-national-financial-inclusion-strategies/

and often highly exposed to climate risks. However, in some jurisdictions, such as **Niger**, improving the microfinance sector remains a significant challenge for regulators (see Box 7).

Box 7: AFD support for the Central Bank of West African States to promote financial inclusion

The regional financial inclusion strategy of the West African Economic and Monetary Union (WAEMU) aims to:

- promote an effective legal and regulatory framework with strong supervisory mechanisms;
- stabilize and strengthen the microfinance sector;
- encourage financial innovations that expand access for excluded populations;
- promote financial education and consumer protection for financial service users;
- and implement a fiscal framework and policies that promote financial inclusion.

Since 2018, AFD has been working in close collaboration with the Central Bank of West African States (BCEAO) to support the first two pillars of this strategy. This partnership has funded assessments of fragile microfinance institutions (MFIs) to identify risks and vulnerabilities, procurement of software to improve MFI payment processing systems, and a study on strengthening the regulatory framework for the microfinance sector.

Beyond access to savings and credit services, promoting financial inclusion also involves developing and expanding **guarantee mechanisms** that can help reduce the risks associated with financing the most vulnerable economic actors. Such mechanisms are already in place in jurisdictions with intermediate levels of financial sophistication, such as Morocco, where the public financial institution TAMWILCOM provides guarantees to facilitate lending. These mechanisms are typically designed to promote financial inclusion for micro, small, and medium-sized enterprises (MSMEs), as well as the agricultural sector. In **Ghana**, for example, the Ghana Incentive-Based Risk-Sharing System for Agricultural Lending (GIRSAL) offers loan guarantees that cover up to 70% of the amount borrowed by agricultural actors. This mechanism could be further refined to specifically target crops and agricultural investments that enhance climate resilience.

In addition to guarantees, regulators can establish **refinancing lines** with preferential interest rates and maturities dedicated to investments that support climate adaptation. A useful precedent is the State Bank of Pakistan's refinancing mechanism for renewable energy investments. A similar approach could be adopted to support climate resilience investments, **provided that objective eligibility criteria are established and sufficient budgetary resources are available**.

Finally, the promotion of risk transfer products, such as insurance solutions adapted to climate risks, can significantly reduce the financial risks associated with lending to certain vulnerable actors. Their adoption in some EMDEs has been limited, however, as a result of the following challenges, which require targeted solutions:

- limited availability and quality of meteorological and climate data, which hampers risk assessment;
- low insurance penetration in domestic markets;
- the weakness of the regulatory frameworks that define what qualifies as "insurable';
- limited fiscal space to establish sovereign support mechanisms.

All these initiatives can benefit from international donor support and financing mechanisms, which can provide **concessional financing** needed to facilitate implementation. Financial regulators can play a key role in accelerating the implementation of such actions by helping **local financial institutions gain access to international climate financing mechanisms, such as dedicated climate funds**.

For Group D countries, particularly those most exposed to climate risks, support focuses on improving the capacity of financial institutions to mobilize financing.

When national financial systems reach a certain level of maturity, as in Group D countries, financial regulation can play a crucial role in mobilizing additional financing and redirecting capital toward a low-carbon transition. Despite moderate levels of financial inclusion, the

development of capital markets and the expansion of banking services enable the implementation of ambitious climate finance measures. The first step is often to develop national roadmaps and strategies for climate or sustainable finance that are aligned with financial inclusion strategies. These strategies, created in collaboration with stakeholders, set priorities over a number of years and typically begin with raising awareness and building the capacity of financial actors.

The next phase involves introducing national green or sustainable taxonomies, which improve transparency and help redirect investments toward green projects. Some countries, such as Egypt and Morocco, are in the process of developing such taxonomies. Regulators in these countries can also promote the development of climate-focused financial products through green product labeling schemes and tax incentives. They can also support the development of green bonds, following the example of the Moroccan Capital Market Authority's initiative.

Finally, as climate risks continue to rise, expanding insurance solutions is becoming increasingly important. Climate-related losses remain largely uncovered in developing countries: while about 50% of climate-related losses were covered in developed markets in 2020, this figure falls to 10% in emerging markets and is often zero in lower-income developing countries. To address this gap, regulators can help develop suitable risk transfer mechanisms with the support of donors and international expertise (such as the Global Shield).

2.2 – Establishing sustainable finance norms and standards: The challenge of representativeness

A recent survey reported by the NGFS (2024) indicates that financial institutions in EMDEs define **their transition priorities as including more than just climate mitigation: they include a broader set of objectives related to adaptation and sustainable development, which aligns with Article 2.1(c) of the Paris Agreement. However, among the FRCBs involved in international standard-setting, those from highly financialized economies are significantly overrepresented relative to those from EMDEs**. This raises concerns about the relevance and applicability of approaches, frameworks, standards, and tools developed in AEs when applied to EMDEs. The relevant question, then, is: How can financial standards and frameworks be tailored to different national contexts while ensuring interoperability across jurisdictions?

The non-financial (sustainability and climate) standards ecosystem is both dense and fragmented. To prevent excessive fragmentation, several initiatives have emerged—notably from the G20 (G20 Sustainable Finance Platform) and ASEAN—to establish frameworks of interoperability and, in some cases, equivalence across jurisdictions. Likewise, a number of financial regulators have developed bridges between different standards to facilitate the harmonization or integration of norms and standards (e.g., ESRS/GRI, ISSB/ESRS, ESRS/TNFD[22]). Whether regulatory or voluntary, these frameworks share a common foundation: the transparency and disclosure of non-financial information. They are based on the following premise: the functioning of financial systems, particularly market finance, relies on centralized, standardized, and auditable information and data. This enables the creation of a new asset class: sustainable or climate-aligned assets. A standardization process—or at the very least, the establishment of common guidelines—is underway, and there is a risk that certain approaches will be favored at the expense of others.

Figure 4 is a synthetic representation of the sustainable finance ecosystem. This ecosystem has become increasingly dense and complex and includes a growing number of initiatives, methodologies, and standards. Figure 4 shows the interconnected nature of the various actors and

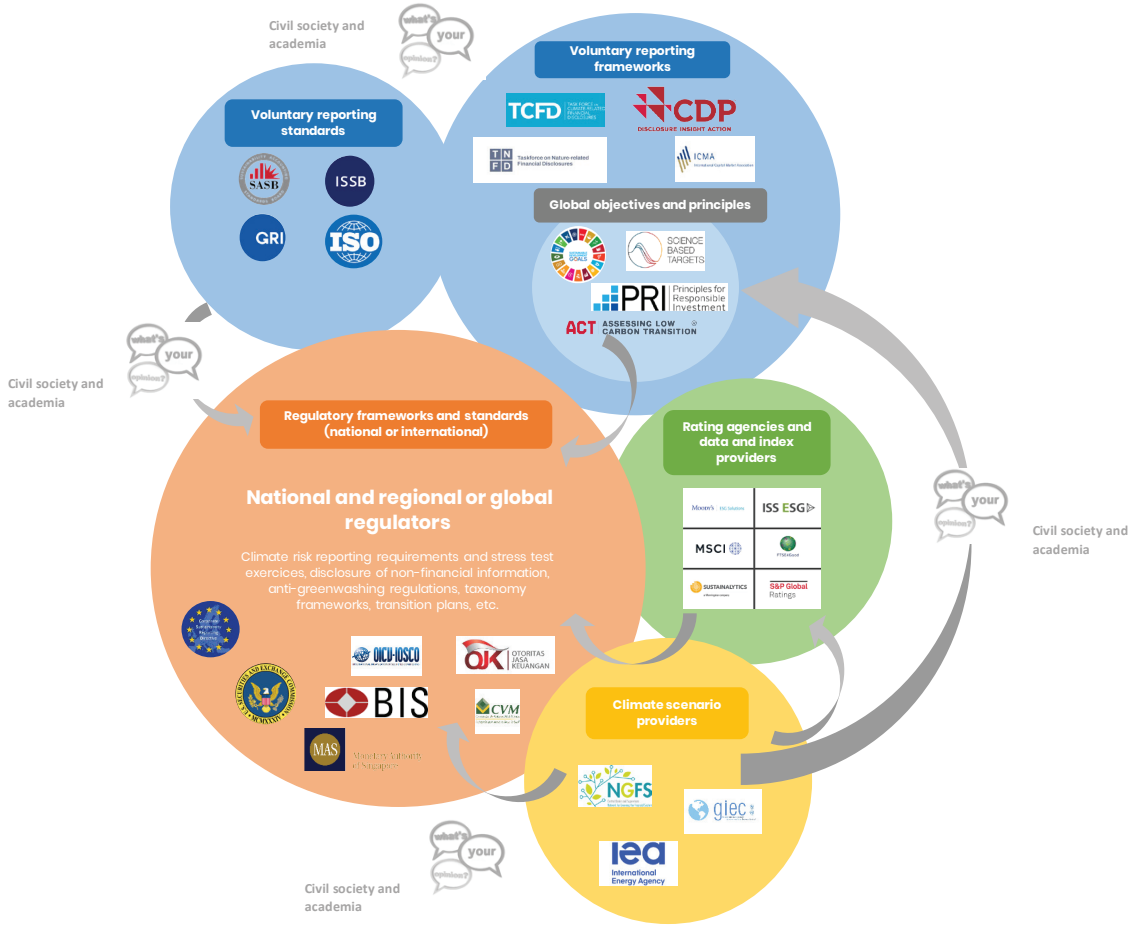
[22] ESRS/GRI: European Sustainability Reporting Standards/Global Reporting Initiative
ISSB/ESRS: International Sustainability Standards Board/European Sustainability Reporting Standards
ESRS/TNFD: European Sustainability Reporting Standards/Taskforce on Nature-Related Financial Disclosures

approaches in the sustainable/climate finance ecosystem while emphasizing the importance of civil society and research institutions in offering critical and pluralistic perspectives and in fueling debate and evaluating the strengths and weaknesses of the different methods. This role is particularly important given the incorporation of voluntary initiatives (such as the TCFD, the TNFD, and the Science Based Targets Initiative, or SBTi) into regulatory frameworks, sometimes with only minimal modifications.

In many cases, the development of standards has been left to voluntary initiatives, which have taken on the task themselves. While this fills a regulatory gap, it also raises questions about positioning and potential conflicts of interest (Tett and Mundy 2023). It also highlights the importance of data and scenario providers: These entities are essential contributors to the deliverables required by regulators. However, their importance introduces a significant risk of information asymmetry (Fan *et al.* 2021). Furthermore, many of these methods are based on global scenarios, which often fail to account for the specificities of national trajectories and scenarios, resulting in a major disconnect with local climate policies.

Figure 4 also underscores the broader strategic aspects mentioned above, which go well beyond regulatory standards. Some authors argue that the divisions of responsibility between (a) regulators and (b) private sector-led initiatives (frameworks, methodologies, principles, data, indices, etc.) are becoming increasingly blurred, as these private sector initiatives end up influencing capital allocation decisions (Smoleńska and van't Klooster 2022; Fichtner *et al.* 2024). In conclusion, regulators in EMDEs must develop a comprehensive understanding of the processes and content (such as climate scenarios and data) that they use in the exercise of their mandates. Ideally, they should also take on a more active role in shaping this ecosystem to ensure that their perspectives are better reflected, particularly by engaging in regional coalitions that promote shared priorities, such as climate adaptation and resilience.

Figure 4 - Simplified ecosystem for the creation of sustainable finance frameworks and standards



Source: authors.

Appendices

Appendix 1 - Specificity of EMDEs in terms of climate and macrofinancial aspects

Specificities related to climate and development issues	Specificities related to financial systems and macrofinancial elements
A substantial financing gap[23] for the implementation of development trajectories and meeting the SDG agenda This primarily concerns the financing of transport and energy infrastructure, as well as social infrastructure and adaptation needs, which are further compounded by multiple vulnerability factors. These infrastructures will need to be climate-resilient and contribute to reducing vulnerabilities, which increases their short-term costs, despite the long-term benefits they provide (Hallegate *et al.* 2019). As a percentage of GDP, investment needs for transition and adaptation[24] are higher in EMDEs, even though debt servicing already accounts for a significant share of their GDP.	**Insufficient "long" and "patient" capital necessary for climate financing** EMDEs are generally less financialized than AEs, with less-developed financial systems and a lack of financial actors with long-term liabilities, such as insurers and pension funds, which are essential for providing a depth of financing maturities. As a result, financial systems in EMDEs are often bank-dominated, relatively undiversified, and less inclusive, with underdeveloped capital markets. In some cases, having a bank-dominated system is a deliberate policy choice. FDI could help ease these financing constraints, but it is more influenced by onshoring and friendshoring trends. FDI also tends to flow toward regions with incentive-based industrial policies (Georgieva 2023).
Divergent mitigation trajectories and unreached emission peaks Many EMDEs, with the exception of the major emerging economies, are more focused on avoiding future emissions than on reducing current emissions. In many cases, emission peaks have not yet been reached, and demand substitution is a less immediate challenge for EMDEs than it is for AEs. This is largely a result of demographic trends and the development catch-up process, including in infrastructure expansion. However, these dynamics vary by country. Brazil already has a low-carbon heavy industry sector, while India's is more carbon-intensive. Indonesia has few heavy industries but a highly carbon-intensive energy system. Meanwhile, Africa accounts for just 6% of global primary energy consumption. With the exception of the major industrialized emerging economies, emissions abatement needs in EMDEs are primarily concentrated in the extractive industries, such as mines, ports, and refineries, rather than on industries like steel, cement, and chemicals, which remain underdeveloped.	**Capital-intensive investments are sensitive to the cost of capital, and there is a shortage of non-debt capital** This challenge is particularly acute in adaptation financing but also extends to the broader investment needs of the transition. It is the result of the limited fiscal space and low tax revenue mobilization in many EMDEs. Moreover, energy transition investments are capital-intensive. They require significant upfront financing and are typically 70% to 80% debt-financed, which makes them highly sensitive to the cost of capital.[25] Many EMDEs face a scissor effect, with the fall in tax revenues and foreign exchange reserves linked to the phase-out of fossil fuels, coupled with the increased need to import the technologies required to green current and future energy needs (technologies, patents, solar panels, batteries, power grid control systems, etc.). For EMDEs that have transition minerals, capturing the added value of industries downstream of these resources is a strategic priority, as an income substitution strategy.

[23] While high-income countries are expected to allocate less than 2% of their GDP to low-carbon, climate-resilient economic growth, this share exceeds 8% in low-income countries.

[24] Several African countries already allocate between 2% and 9% of their budgets to unplanned expenditures in response to extreme weather events (Songwe and Adam 2023)..

[25] According to Hayes and Brusseler (2024), "The International Energy Agency [IEA] estimates that a 2 percentage point increase in the cost of capital inflated a solar or wind project's 'levelised cost of electricity' (the average unit electricity cost over the lifetime of an asset) by a staggering 20 per cent."

Specificities related to climate and development issues	Specificities related to financial systems and macrofinancial elements
Climate-related financial risks to consider primarily at the systemic level and through contagion chains Macrofinancial stability and the balance of public finances are particularly exposed to climate risks. EMDEs are less financialized, and their financial systems are often retail-focused, making them less directly exposed to systemic risks through real assets, but more exposed to macrofinancial risks because of their high exposure to sovereign risk (they have a strong bank-state nexus). Moreover, climate risks are often explicitly or implicitly transferred to sovereign balance sheets because the real sector is largely publicly owned.	**Very high exposure to liquidity cycles and fluctuations in the cost of capital on international markets in hard currencies** The latest CGFS ten-year report (2021) shows that over the past decade, despite improvements in EMDEs' pull factors, push factors from AEs, which are still driven mainly by global liquidity conditions rather than risk factors, have had a stronger influence. This has effectively neutralized the positive impact of reforms undertaken in EMDEs. As a result, balance of payments and liquidity crises remain a major vulnerability factor for many EMDEs. Financing through domestic resources can help mitigate this risk.
Weaker technological and industrial maturity in EMDEs than in AEs This gap stems from the low level of integration of green industry value chains, as well as the need for technological catch-up, which in turn necessitates technology transfer and innovation. FDI, targeted partnerships, and R&D investment can help address this factor.	**Central bank mandates that go beyond financial and price stability** These mandates include sustainable development objectives and support for public policy initiatives. This broader mandate makes it possible to consider the implementation of more interventionist monetary and credit allocation policies. However, macrofinancial stability remains a primary objective in economies subject to numerous exogenous shocks.
The role of the Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC) principle in the Paris Agreement Although this principle informs negotiations on "loss and damage" climate finance, it is not reflected in the frameworks and standards of sustainable finance, and it is largely absent from the scenarios most commonly used in micro- and macroprudential exercises.	**The need for EMDEs to adapt to a global financial system driven by an increasingly fragmented creditor base** The financial landscape is now characterized by a growing share of non-bank financial institutions, which tend to be more procyclical and liquidity-driven. Additionally, risk appetite frameworks are increasingly shaped by non-financial factors. For example, the "Big Five" emerging economies (Turkey, Indonesia, South Africa, India, and Brazil) are particularly sensitive to this factor because of their current account deficits.

Appendix 2 - Monetary policies and credit allocation policies

Monetary policies

In recent years, several arguments have been put forward in favor of more coercive financial regulations, the use of more interventionist monetary instruments, and even the revision and expansion of central bank mandates. Given that financial and price stability remain the dominant mandates, let us first consider the main arguments that have been put forward:

- A disorderly transition, toward which the global economy appears to be heading, could create systemic risks. This calls for precautionary regulatory measures (Chenet *et al*. 2021; Monnet and van't Klooster 2023) that clarify the financing of the transition beyond a purely risk-based approach, which is insufficient for aligning incentives and reducing systemic risks. A risk-based approach can even exacerbate social exclusion.
- Climate and sustainability risks could disrupt production systems and value chains, leading to inflationary pressures, which would directly impact central banks' price stability mandate. In this scenario, given the systemic nature of climate risks, central banks could even fail to fulfill their stability mandate (Couppey-Soubeyran 2020).
- Current prudential regulations have shown limited transformational power, particularly because of the shortcomings of climate risk modeling and the inadequate degree to which financial actors integrate these risks into decision-making.
- Paradoxically, an accelerated or disorderly transition could also result in "greenflation" and jeopardize stability. This is a transition risk.
- Finally, restrictive monetary conditions, such as high interest rates, could significantly deter investment in renewable energies, since the upfront cost of such projects is often high.

Monetary policies that promote specific sectors and expand credit for green investments can have redistributive effects, and, as a result, they may conflict with other central bank objectives, particularly financial and price stability.[26] Historically, such redistributive or targeted monetary policies were more common. Some were successful; others were not.

Finally, given the sweeping powers of central banks, it is important to consider imposing limits on their mandates and ensuring strong public accountability. Acting on multiple mandates, including social and ethical issues such as a just transition or inequalities (Bolton *et al*. 2020), can raise questions about regulators' democratic legitimacy and their accountability frameworks. Ultimately, the responsibility and legitimacy for implementing climate policies lies with governments, while central banks and regulators may consider targeted support policies in coordination with governments as part of a "legitimate promotional approach" (Bowman 2022). Central bank action can also be justified through the application of a precautionary principle to manage long-term systemic risks (Chenet *et al*. 2021).

[26] Pro-climate monetary policies are considered expansionary.

Credit allocation policies (CAPs)

These are financial policies that were widely used following the Second World War, particularly in planned economies. Their primary objective is to explicitly direct credit channels (whether through banks or markets) toward specific sectors and activities in support of industrial and planning policies. CAPs influence both the volume of credit and its price (*i.e.*, the interest rate). While they were highly popular in AEs in the decades following the Second World War, they began to be phased out in the 1980s, with the rise of market economies and concerns about market distortions. As a result, debt financing (through banks and markets) largely replaced CAPs (Bezemer *et al.* 2023). However, some EMDEs continue to engage in these policies, alongside the resurgence of green protectionism and industrial policies.

The historical track record of CAPs is mixed. Certain Asian countries, notably South Korea and Japan, have implemented dirigiste CAPs with notable success (Werner 2003). There have also been successes in Italy, Germany, and France (Bezemer *et al.* 2023; Mikheeva and Ryan-Collins 2022; Monnet 2018). CAPs were also widely used in AEs during the postwar decades, particularly through public banks and other agencies in coordination with fiscal and monetary policies. The use of CAPs in certain Latin American countries, however, resulted in failure. With the global shift toward market economy systems, CAPs were largely abandoned in AEs, as central bank mandates became increasingly focused on stability and included neutrality and independence requirements. CAPs assume that market-determined interest rates and credit volumes are not always reliable indicators of efficient credit allocation (Stiglitz and Weiss 1981; Wolfson 1996; Ramskogler 2011).

Although CAPs have been formally abandoned in most AEs, unconventional policies in the post-GFC (global financial crisis) era—mainly macroprudential policies aimed at mitigating systemic risks (De Nicolò *et al.* 2012; Cerutti *et al.* 2017)—have indirectly reintroduced CAP-like mechanisms, since they influence supply (*e.g.*, through differentiated risk weightings for different financial products). Macroprudential policies have also been used to influence demand (*e.g.*, through loan-to-value or loan-to-income ratios in the real estate sector). Other CAPs were introduced as part of the expansion of the post-GFC monetary system. The Bank of England's Funding for Lending Scheme directed credit toward SMEs and households (Churm *et al.* 2015), while the ECB's Targeted Longer-Term Refinancing Operations (TLTROs) provided eurozone banks with four years of subsidized loans and refinancing for loans granted to non-financial corporations and households to stimulate demand. Likewise, quantitative easing programs (asset purchases) favored the non-financial sector over the financial sector. These implicit or indirect CAPs persisted during the COVID-19 crisis. CAPs therefore still exist in implicit form, but always as part of a stability mandate.

However, CAPs have risks and limitations (Campiglio *et al.* 2018). They can lead to distortions in financial markets and prevent certain actors from accessing credit. They can also result in political interference in the lending practices of banks and other credit providers. Finally, CAPs can counteract other central bank objectives.

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List of acronyms and abbreviations

AE	advanced economies
AFI	Alliance for Financial Inclusion
ASEAN	Association of Southeast Asian Nations
BCEAO	Central Bank of West African States
BNR	National Bank of Rwanda
CAP	credit allocation policies
CBDR RC	Common but Differentiated Responsibilities and Respective Capabilities
CSR	corporate social responsibility
ECLAC	Economic Commission for Latin America and the Caribbean
EBA	European Banking Authority
ECB	European Central Bank
EMDE	emerging markets and developing economies
ESRS	European Sustainability Reporting Standards
FDI	foreign direct investment
FRB	Federal Reserve Board
FRCB	financial regulators and central banks
GFC	global financial crisis
GIRSAL	Ghana Incentive Based Risk Sharing System for Agricultural Lending
GRI	Global Reporting Initiative
GSSSB	green, social, sustainable, and sustainability linked bonds
ISSB	International Sustainability Standards Board
LTS	long-term strategies
MFI	microfinance institution
MSME	micro, small, and medium-sized enterprises
NAP	national adaptation plans
NGFS	Network for Greening the Financial System
NDC	nationally determined contributions
ODA	official development assistance
PPBF	public policy budget financing
PT SMI	PT Sarana Multi Infrastruktur (Persero)
SBTI	Science Based Targets Initiative
TCFD	Task Force on Climate Related Financial Disclosures
TNFD	Taskforce on Nature Related Financial Disclosures
WAEMU	West African Economic and Monetary Union

Glossary

ALIGNMENT

The extent to which the strategy and objectives of an entity (such as a state, local authority, company, financial institution, or project) **contribute** over time to a national or global trajectory. This includes both ambition and the means of implementation. Alignment can be assessed in terms of decarbonization, temperature objectives, or broader goals such as those outlined in the Paris Agreement, which encompass resilience, adaptation, development, etc. The concept of **contribution** is sometimes used in this context. Alignment can be considered at various levels, including state, local authority, investment, financial or non-financial company, and portfolio.

ARTICLE 2.1 (C)

"Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development."

CLIMATE FINANCE

In the sense of alignment with the Paris Agreement.

CLIMATE-RELATED RISKS

"Financial risks posed by the exposure of financial institutions to physical or transition risks caused by or related to climate change, for example, damage caused by extreme weather events or a decline in asset value in carbon-intensive sectors" (NGFS 2024).

CLIMATE/ SUSTAINABLE FINANCE STANDARD

A specific quality requirement for reporting. It contains detailed non-financial criteria that define what should be disclosed on a particular topic. Standards imply an orientation toward the public interest, independence, and public consultation that reinforces the credibility of disclosure requirements. The standard does not necessarily prescribe quantitative measures or norms, while a **climate/sustainable finance framework** serves as a broader contextual guide for understanding information that defines the orientation of information but not the collection or reporting methodology itself. Frameworks can be used when no well-defined standard exists.

CREDIT ALLOCATION POLICY

Policies that intentionally steer credit allocation toward certain preferential sectors while restricting lending to others. These measures may involve preferential or differentiated interest rates and are typically implemented by governments, with central banks sometimes acting as executors.

DOUBLE MATERIALITY Financial materiality, or "single materiality" (outside-in), considers how external economic, social, and environmental factors impact a company, including both risks (negative impacts) and opportunities (positive impacts). Impact materiality (inside-out), meanwhile, considers the positive and negative impacts of a company's activities on its economic, social, and natural environment.

ECONOMIC POLICIES Economic policies encompass budgetary, fiscal, and industrial measures, as well as environmental standards and regulations, carbon pricing, and carbon markets. These policies are often designed to influence and guide actors in the real economy.

FINANCIAL POLICIES Financial policies include prudential regulations and policies on the disclosure of non-financial information, but also monetary policies and credit allocation policies.

FINANCIAL REGULATION Non-prudential regulation is targeted at market actors and mechanisms and includes measures such as taxonomies and reporting obligations. **Prudential** regulation operates at two levels: **macroprudential regulation**, which addresses systemic risks, and **microprudential regulation**, which addresses idiosyncratic risk. Prudential regulation is targeted at banks and insurance companies. Its purpose is to ensure the stability of the financial system through tools such as stress tests. Financial regulation also governs market finance through dedicated regulatory bodies.

FINANCIALIZATION The increased use of financial capital or financial instruments and infrastructures (securitization, stock exchange, takeover bids) in the goods and services economy. Actors can be banks, insurance companies (some of which are bank-owned), institutional investors, etc.

IDIOSYNCRATIC FINANCIAL RISK Also known as intrinsic risk, idiosyncratic risk pertains to the vulnerabilities of an individual entity in the financial system, such as the materialization of a risk linked to internal governance problems or the credit risk of a given bank.

INDUSTRIAL POLICY (IP) State-led measures designed to correct market failures and pick "winners" through, for example, sectoral policies. It is inherently interventionist and can take two main forms: horizontal and vertical. Horizontal IP applies to all companies, regardless of sector, location, or technology, and includes measures such as R&D tax credits and accelerated depreciation, which lower the cost of capital investment. Vertical (or targeted) IP favors specific sectors or companies through measures such as tax credits for renewable energy (Shih 2023).

SUSTAINABLE DEVELOPMENT TRAJECTORY

A sustainable development trajectory is one that is low-carbon and resilient to socio-environmental risks, including climate change, as defined by the Paris Agreement. AFD understands sustainable development trajectories in terms of **strong sustainability trajectories** (AFD n.d.c).

SUSTAINABLE FINANCE

Financing that contributes to a sustainable development trajectory.

SYSTEMIC FINANCIAL RISK

The materialization and propagation of a risk through an event that can affect and compromise the stability of the entire financial system through propagation chains. More often than not, there is a fear that the effects will spread to the real economy (as in the 2008 global financial crisis).

TRANSITION FINANCE

Financing of investments that contribute to and align with the transition while avoiding lock-ins (EU definition).

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