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Bank for International Settlements (BIS)  
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## **Discussion Paper on the role of climate scenario analysis in strengthening the management and supervision of climate-related financial risks**

MSCI<sup>1</sup> welcomes the opportunity to discuss the role of Climate Scenario Analysis (CSA) in strengthening the management and supervision of climate-related financial risks. As a leading provider of sustainability and climate data and analytics to the global financial industry, MSCI has collected climate and sustainability-related disclosures from thousands of companies globally for over two decades and developed tools to assist financial institutions in analyzing climate and sustainability risks within their investment and lending portfolios.

The Annex provides detailed answers. We have the following key comments set out for your kind consideration:

- 1. Addressing Challenges in Climate Scenario Analysis:** Key challenges in CSA include data limitations, model uncertainties, and the complexity of integrating climate risks into existing frameworks. The Central banks should provide specific climate scenarios and examples of acceptable models to ensure comparability and effectiveness in risk assessments. More granular scenarios reflecting sectoral and regional differences in decarbonization feasibility are essential.
- 2. Key areas of CSA methodology development:** Methodologies and capabilities need enhancement in incorporating non-linear impacts, networked impacts, and market pricing-in dynamics, especially for bank trading books. Additionally, CSA exercises should be robust and challenging, considering multiple plausible scenarios aligned with the latest climate science.
- 3. Addressing additional key features in CSA:** To improve climate risk disclosures, it is crucial to distinguish between acute and chronic hazards, as they pose different financial risks. Acute hazards, such as floods and wildfires, cause immediate impacts, while chronic hazards, like rising sea levels, develop gradually but can be equally significant. Additionally, integrating biodiversity and nature-related risks into CSA methodologies can provide a more comprehensive evaluation of climate-related risks.
- 4. Enhancing Supervisory Exercises for Climate Risk:** The Supervisory exercises can be made more effective and efficient by standardizing reporting methodologies and data requirements while allowing flexibility in managing individual portfolios. Establishing globally accepted disclosure requirements and providing clear guidance on best practices

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<sup>1</sup> MSCI ESG Ratings, research and data are produced by MSCI ESG Research LLC, a subsidiary of MSCI Inc.

can enhance climate risk reporting. Flexibility in risk management allows financial institutions to tailor their strategies to their unique portfolios, and regular updates to scenarios and methodologies ensure that risk assessments remain relevant and accurate.

Please do not hesitate to contact us to discuss our submission.

Yours sincerely,

**/s**

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**Q1. How does the role of Climate Scenario Analysis (CSA) vary based on the objectives listed above, and are there other prudential objectives where CSA could be relevant?**

**Response:**

The role of Climate Scenario Analysis (CSA) varies significantly based on the objectives, such as risk identification, risk management processes, internal and supervisory capital and liquidity assessments, and assessment of business model resilience and business strategy building.

1. **For risk identification**, CSA helps in identifying and quantifying potential climate-related risks, both physical and transition, over different time horizons. In risk management processes, CSA aids in understanding the possible long-term impacts of climate change on business models and investment strategies.<sup>2</sup>
2. **For internal and supervisory capital and liquidity assessments**, CSA ensures that financial institutions meet the requirements set by regulators regarding climate risk disclosures and stress testing. We have observed that financial authorities, including regulators and supervisory bodies, around the globe are increasingly involved in assessing climate-related financial risks and conducting stress tests for banks to quantify their exposure to these risks. Such exercises have been completed in the Netherlands, France, the United States, Japan, and Germany, and are underway in the E.U., U.K., Australia, Singapore, and Canada.<sup>3</sup> More countries are expected to integrate climate-related risks into macroprudential regimes for the financial sector in the future.<sup>4</sup>
3. **In the assessment of business model resilience and business strategy building**, CSA helps financial institutions understand the potential impacts of climate change on their long-term strategies and business models.
4. **Other prudential objectives** where CSA could be relevant include capital adequacy assessment, where CSA can help in determining the capital buffers needed to withstand climate-related shocks, and liquidity management, where it can assist in understanding the impact of climate risks on liquidity positions.<sup>5</sup>

**Q2. What are the key challenges in the application of CSA and how can they be overcome?**

**Response:**

We have observed that the key challenges in the application of CSA include data limitations, model uncertainties, and the complexity of integrating climate risks into existing risk management frameworks. We suggest that:

1. Data limitations can be addressed by improving data collection and reporting requirements.
2. Model uncertainties can be mitigated by using a range of models and approaches (for example, qualitative, quantitative, narrative-based) and thoughtful use of scenarios to capture different aspects of climate risks.

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<sup>2</sup> [The Use of Scenario Analysis in Disclosure of Climate-related Risks and Opportunities](#) (TCFD, September 2021)

<sup>3</sup> [Climate Risk Landscape 2024](#) (UNEPFI, April 2024)

<sup>4</sup> [Adapting central bank operations to a hotter world: current progress and insights from practical examples](#) (NGFS, July 2024)

<sup>5</sup> [ECB's economy-wide climate stress test](#) (ECB, September 2021) and [TCFD Climate Scenario Analysis](#) (TCFD, September 2021)

3. The complexity of integration can be managed by developing standardized methodologies on the one hand, and on the other by expecting or allowing regulated entities to develop their own views on climate and implementing them in their modelling.

Using different models and scenarios leads to results that are not easily comparable. Whilst this gives banks some flexibility for self-examination, it is important for the market to be able to effectively compare the results of a prescribed scenario analysis across various banks. In order to achieve this objective, the central banks may consider providing banks with a minimum set of specific climate scenarios to consider and align with the most up-to-date internationally accepted scenarios.

We further suggest that the central banks provide examples of acceptable Representative Concentration Pathways (RCPs), Integrated Assessment Models (IAMs) and/or Shared Socioeconomic Pathways (SSPs) that banks should utilize during scenario analysis. It would also be helpful to prescribe the precise time horizons that the scenario analysis should cover.

The NGFS has delivered several examples of acceptable climate scenario modeling characteristics.<sup>6</sup> The most recent set of climate scenarios was published on September 06, 2022: "NGFS Climate Scenarios for central banks and supervisors".<sup>7</sup>

Lastly, providing training to decision makers across the entity is vital to ensure understanding and integration of climate into all the lines of defense.

### **Q3. What are the key areas where CSA methodologies and capabilities need to be further developed to be useful and relevant for the different objectives listed in this paper?**

#### **Response:**

CSA methodologies and capabilities need further development in areas such as the incorporation of non-linear impacts, networked impacts, and market pricing-in dynamics (particular for bank trading books). Additionally, there is a need for more granular scenarios that reflect sectoral and regional differences in decarbonization feasibility. Enhancing the robustness and challenge of CSA exercises by considering multiple plausible scenarios and aligning them with the latest climate science is also crucial.<sup>8</sup>

Disclosure by regulated entities on their "central climate assumptions"—which represent the most probable future climate conditions they anticipate and to which they are managing their portfolios—would provide clarity to the markets and other stakeholders.<sup>9</sup>

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<sup>6</sup> [NGFS Scenarios Portal](#)

<sup>7</sup> [NGFS Climate Scenarios for central banks and supervisors](#) (NGFS, September 2022)

<sup>8</sup> [Assessing climate change risks to our financial system](#) (Bank of Canada, January 2022)

<sup>9</sup> [The Use of Scenario Analysis in Disclosure of Climate-related Risks and Opportunities](#) (TCFD, September 2021)

**Q4. Are the key features listed above appropriately calibrated for a range of CSA exercises, and should other features be considered?**

**Response:**

The key features listed are generally well-calibrated for a range of CSA exercises. However, additional features that could be considered include the differentiation between chronic and acute physical risks, the inclusion of location-specific data (for example defenses) for acute hazards, and the use of regional and sector data and models for chronic impacts.<sup>10</sup>

To improve climate risk disclosures, it is crucial to clearly distinguish between acute and chronic hazards. Acute hazards cause immediate impacts, such as infrastructure damage and supply chain disruptions, while chronic hazards develop more gradually but can pose similar financial risks. Applying a range of climate scenarios across short-, medium-, and long-term time horizons helps recognize potential differences in outcomes. Additionally, integrating location-specific analysis for acute risks and regional analysis for chronic risks can provide more accurate assessments. Establishing a data quality hierarchy for hazard types and providing clear guidance on relevant risks can further enhance transparency and comparability in disclosures.

In assessing climate risks, supervisors should also look to reflect other emerging risks which are closely tied to climate change. This includes nature-related concerns and biodiversity loss, with more than half of the world's economic output being either highly or moderately dependent on nature and biodiversity. The International Sustainability Standards Board (ISSB) has already highlighted biodiversity as one of the three priority sustainability areas.<sup>11</sup>

Furthermore, integrating biodiversity and nature-related risks, as highlighted by the Taskforce on Nature-related Financial Disclosures (TNFD), can offer a more comprehensive evaluation of climate-related risks. The TNFD framework is pivotal in bridging the relationship between nature, business, and financial capital, positioning nature-related risks alongside climate risks. The TNFD recommendations<sup>12</sup> are structured around four pillars, consistent with the ISSB.

**Q5. How does the design of CSA exercises vary depending on the objectives? Please elaborate on the main usage-specific considerations for each of the different objectives.**

**Response:**

The design of CSA exercises varies depending on the objectives. The main usage-specific considerations for each of the different objectives are as follows:

1. **For risk identification**, the focus is on identifying and quantifying potential risks over different time horizons and under various scenarios. This necessarily varies depending on business line, geography and sectoral bias of the loan book/trading book.

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<sup>10</sup> [MSCI GeoSpatial Asset Intelligence](#)

<sup>11</sup> [ISSB to commence research projects about risks and opportunities related to nature and human capital](#) (IFRS, April 2024)

<sup>12</sup> [Final TNFD Recommendations](#) (TNFD, September 2023)

2. **For risk management processes**, the emphasis is on understanding the impacts on counterparty business models/strategies and their place in the economy. This necessitates more detailed, multi-horizon models with linkages between sectors and economies.
3. **For internal and supervisory capital and liquidity assessments**, the design must ensure that the CSA meets the specific requirements set by regulators, such as stress testing and disclosure standards. The estimation of distributions, where used, should be conscious of both the scientific uncertainty in physical risk and the human/systemic uncertainty in transition risk.
4. **For the assessment of business model resilience and business strategy building**, the design should help financial institutions understand the potential impacts of climate change on their long-term strategies and business models. It should thus be flexible, with capacity to reflect the bank's own views and particular exposures.

Usage-specific considerations include the selection of appropriate scenarios, the time horizons considered, and the granularity of the analysis.

**Q6. What additional usage-specific considerations are relevant for each of the different objectives of CSA listed in this paper and why?**

**Response:**

Additional usage-specific considerations include the need for forward-looking models and metrics to measure, manage, and disclose physical and transition climate-related risks.

1. **For risk identification**, it is important to consider the Climate Value-at-Risk (CVaR) of counterparties under a range of scenarios and across multiple time horizons.
2. **For risk management processes**, understanding the potential impacts of climate change on future risks and opportunities is crucial.
3. **For internal and supervisory capital and liquidity assessments**, ensuring that the CSA is robust, challenging, and aligned with the latest climate science is essential.

**Q7. Which scenario and scenario features are used for the different objectives listed (i.e., internally developed, those from scenario builders, or a combination of the two)?**

**Response:**

We suggest that the major banks should be able to form their own views on scenarios and work with model vendors to develop scenarios tailored to their central/management view and suitably challenging stress (or reverse stress test) scenarios.

More generally, different objectives may require different scenarios and features.

1. **For risk identification**, a combination of internally developed scenarios and those from established scenario builders like NGFS, IEA, and IPCC can provide a comprehensive view of potential risks.<sup>13</sup>

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<sup>13</sup> The Network of Central Banks and Supervisors for Greening the Financial System (NGFS), International Energy Agency (IEA) and Intergovernmental Panel on Climate Change (IPCC)

2. **For risk management processes**, internally developed scenarios that reflect the specific context and business model of the institution may be more relevant.
3. **For internal and supervisory capital and liquidity assessments**, using scenarios from recognized scenario builders ensures consistency and comparability with other financial institutions.
4. **For the assessment of business model resilience and business strategy building**, a combination of internally developed scenarios and those from established scenario builders can provide a comprehensive view of potential risks and opportunities.

**Q8. What features and measures could be adopted in the future to enhance the utility of currently available scenarios (e.g., NGFS, IEA, IPCC)?**

**Response:**

To enhance the utility of currently available scenarios, features such as the inclusion of tipping points, physical impacts not currently captured, societal impacts like migration, compound risks, and the calibration of physical damages could be adopted. Additionally, providing more granular sectoral and regional scenarios, and incorporating the latest climate science and policy developments, would improve the relevance and accuracy of the scenarios.<sup>14</sup>

**Q9. What alternative or novel approaches could supervisors consider for CSA and how might these be used for prudential purposes?**

**Response:**

In exploring alternative or novel approaches for CSA, supervisors could consider dynamic stochastic general equilibrium (DSGE) models, Agent-based models, and Causal/Bayesian network analysis. These advanced methodologies can capture the complex interactions and feedback loops in the financial system, providing a comprehensive understanding of systemic risks and helping in designing more effective prudential measures.

1. **Dynamic Stochastic General Equilibrium (DSGE) Models:** DSGE models can simulate the impact of various climate policies and shocks on the economy, allowing for the analysis of long-term economic impacts and intertemporal trade-offs. For example, DSGE models can assess how carbon pricing affects different sectors of the economy and the overall macroeconomic stability.
2. **Agent-Based Models (ABMs):** ABMs simulate the actions and interactions of individual agents (such as households, firms, and governments) to assess their effects on the economic system. ABMs can capture heterogeneity among agents, allowing for a detailed analysis of how different entities respond to climate risks and policies. They can model complex adaptive systems and emergent behaviors not easily captured by traditional models. For example, ABMs can simulate how individual banks might respond to climate shocks and the resulting impact on financial stability.
3. **Causal/Bayesian Network Analysis:** Causal/Bayesian networks can model the probabilistic relationships between different climate-related events and financial outcomes. They are

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<sup>14</sup> [Lael Brainard: Building climate scenario analysis on the foundations of economic research](#) (BIS, October 2021)

useful for scenario analysis where uncertainty and complex interdependencies are present. For example, these models can be used to assess the likelihood of different climate scenarios and their potential impacts on asset values and financial stability.

## **Q10. How could the effectiveness and efficiency of supervisory exercises be improved?**

### **Response:**

The effectiveness and efficiency of supervisory exercises can be significantly improved by focusing on standardizing reporting methodologies and data requirements while allowing for flexibility in managing individual portfolios.<sup>15</sup> Some of the aspects where effectiveness and efficiency of supervisory exercises can be improved are as follows:

#### **1. Standardization of Reporting:**

- i. **Methodologies and Data Requirements:** Establishing a common set of globally accepted disclosure requirements for banks would provide investors and other market participants with the data needed to make informed judgments about the climate-risk profile of individual banks and would also support comparative assessments between banks. For this reason, MSCI welcomed the alignment of BIS's proposed Pillar 3 frameworks<sup>16</sup> with existing international climate standards such as those developed by the ISSB<sup>17</sup> to ensure the interoperability of uniform climate-related disclosure frameworks and help establish a global common baseline for sustainability-related reporting.
- ii. **Clear Guidance on Best Practices:** Regulators should provide detailed guidance on best practices for climate risk reporting, including templates and examples. This helps financial institutions understand what is expected and facilitates more accurate and comprehensive disclosures.

#### **2. Flexibility in Managing Portfolios:**

- i. **Tailored Risk Management:** While reporting standards should be uniform, the management of climate-related risks should be flexible to accommodate the unique characteristics of each institution's portfolio. Financial institutions should have the freedom to develop and implement their own risk management strategies that reflect their specific risk profiles, business models, and operational contexts.
- ii. **Adaptive Strategies:** Financial institutions should be encouraged to use a variety of risk assessment tools and methodologies, such as scenario analysis and stress testing, tailored to their specific needs. This flexibility ensures that risk management practices remain relevant and effective in addressing the unique challenges posed by climate change.

#### **3. Regular Updates to Scenarios and Methodologies:**

- i. **Reflecting Latest Developments:** Scenarios and methodologies should be regularly updated to incorporate the latest scientific research and policy developments. This

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<sup>15</sup> [Lael Brainard: Building climate scenario analysis on the foundations of economic research](#) (BIS, October 2021)

<sup>16</sup> [Disclosure of climate-related financial risks](#) (BIS, November 2023)

<sup>17</sup> [ISSB issues inaugural global sustainability disclosure standards](#) (IFRS, June 2023)



ensures that risk assessments remain relevant and accurate in the face of evolving climate risks and regulatory landscapes.

- ii. **Continuous Improvement:** Financial institutions should be encouraged to continuously refine their risk management practices based on new insights and feedback from supervisory reviews. This adaptive approach helps maintain the effectiveness and resilience of financial systems in the long term. There are scientific bodies that provide regular updates on climate science, which can inform the development of more accurate and relevant scenarios for risk assessments.
4. **Advanced Analytics and Technology:** Leveraging advanced analytics and technology can automate data collection and analysis processes, reducing the administrative burden on financial institutions and improving the timeliness and accuracy of data. Additionally, implementing real-time data monitoring systems can help financial institutions and regulators quickly identify and respond to climate-related risks, enhancing the overall resilience of the financial system.
5. **Collaboration and Information Sharing:** Encouraging collaboration among financial institutions, regulators, and other stakeholders can facilitate the sharing of best practices and innovations in climate risk management, including participation in industry forums, working groups, and joint research initiatives. Additionally, establishing platforms for sharing climate-related data and risk assessments can help financial institutions learn from each other's experiences and improve their own risk management practices, driving continuous improvement and innovation in managing climate risks.