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Key Themes from 2023-2024 Climate-related Financial Risk Advisory Committee Meetings

This is a summary from members of the Climate-related Financial Risk Advisory Committee (CFRAC). This document represents the collective views of the CFRAC members and may not reflect the views of any individual member. Neither the Financial Stability Oversight Council nor the Chairperson of the CFRAC has expressed any view regarding the analysis, findings, or conclusions contained herein.

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This report can be found at <https://home.treasury.gov/system/files/261/CFRAC-Key-Themes-20250115.pdf>.

Background

In the Financial Stability Oversight Council's (FSOC's or Council's) 2021 Report on Climate-Related Financial Risk (FSOC Climate Report), FSOC identified climate change as an emerging threat to U.S. financial stability.¹ Climate-related physical and transition risks can manifest as and amplify traditional risks, such as credit, market, liquidity, operational, compliance, reputational, and legal risks. Climate-related financial risks could also contribute to financial instability through channels including financial intermediaries experiencing significant losses, impairment of financial market functioning, or the sudden and disruptive repricing of assets. The FSOC Climate Report recognized that as climate change continues, climate-related risks to the financial system are increasing and the economic costs from climate change are expected to grow.

The Climate-related Financial Risk Advisory Committee (CFRAC or Committee) is an external advisory committee to the Council.² The CFRAC was established in 2022 in response to a recommendation in the FSOC Climate Report. The purpose of the CFRAC is to assist the Council in gathering information on, conducting analysis of, and making recommendations to identify, assess, and mitigate climate-related risks to the financial system, consistent with the Council's purposes and duties under the Dodd-Frank Wall Street Reform and Consumer Protection Act.³ The CFRAC consists of experts from an array of backgrounds, including climate science experts, non-governmental research institutions, academia, the financial services industry, and government agencies with climate expertise. The CFRAC held its first meeting in March of 2023 and met seven times in 2023 and 2024.

1 Financial Stability Oversight Council (FSOC). 2021. "Report on Climate-Related Financial Risk." Available at <https://home.treasury.gov/system/files/261/FSOC-Climate-Report.pdf>

2 A current list of CFRAC members is available at <https://home.treasury.gov/policy-issues/financial-markets-financial-institutions-and-fiscal-service/fsoc/advisory-committees>.

3 Financial Stability Oversight Council (FSOC). 2022. "Charter of the Climate-related Financial Risk Advisory Committee of the Financial Stability Oversight Council." Available at https://home.treasury.gov/system/files/261/FSOC_20221003_CFRAC_Charter.pdf

Key Themes from CFRAC Meetings: 2023-2024

This document highlights seven themes encapsulating the primary topics most frequently discussed during the CFRAC meetings in 2023 and 2024. While the summary is intended to capture the overall sentiment of the Committee, this document is not meant to reflect uniform consensus of views and individual members may have disagreed on specific points. The themes highlighted below are also not intended to capture all topics associated with climate-related financial risk. The summary of each theme reflects the discussion on each topic that took place during the CFRAC meetings and are not formal policy recommendations.

1. Climate risk amplifies impacts to the financial system by compounding existing risks

The first theme is that impacts from climate risks may compound and amplify traditional financial risks to the financial system. Climate risk is a driver of traditional financial risk types, potentially leading to value loss through strategic, market, credit, and operational risks. The Committee consequently discussed how climate risks should be integrated into current risk management processes and monitored alongside traditional financial risk metrics.

Climate risk has the potential to affect financial stability through sources of risk that may be highly correlated or flow through the financial system and economy through similar pathways rather than through a single shock. As a result, evaluating how climate-related stresses are correlated with and can compound existing economic and consumer pressures will be crucial to fully assessing the potential financial impacts of climate change. While progress has been made in identifying the channels through which physical and transition risks can amplify other types of financial risks, the Committee recognized that further work is needed to understand where these risks may be correlated.

The financial impacts of climate risk may compound in ways that are not simply additive, leading to outcomes that can be greater than the sum of the impacts from the individual risks. Thus, the Committee considered it important for climate risks to be evaluated for their potential to trigger shocks and create vulnerabilities to both correlated and non-correlated shocks, potentially leading to systemic risk.

Given the complex interactions between climate risk and financial risk types, it is beneficial to bring together experts from consumer groups, industrial sectors, government, financial institutions, and non-governmental organizations. This collaboration can help connect and broaden specialized perspectives and foster more comprehensive and effective risk management strategies.

2. Smaller financial institutions are particularly exposed to climate-related financial risks

The second theme is that transmission of climate risks through the financial system can result in differential impacts on different types of financial institutions. The Committee discussed that smaller financial institutions are more vulnerable to both transition and physical climate risks as drivers of financial risk as their geographic concentrations and reduced diversification create circumstances that could make a given shock more consequential. Regional impacts and localized effects on these institutions could lead to spillover effects with transmission channels distinct from those of non-climate-related risks. Current climate

scenarios analyses often do not have the regional or sectoral granularity to comprehensively assess the financial impact of climate risk for these smaller institutions with concentrated portfolios.

For smaller institutions in particular, it will be important to incorporate climate-related financial risk into existing governance and risk management practices; consider how climate-related scenario analysis can be used to build knowledge and capacity to manage those risks and discover gaps in methodologies and data; and make it possible for resources to be tailored, flexible, and cost-effective.

3. Property insurance is a transmission channel of climate risk to the financial system

The third theme is that property insurance is a primary mechanism by which physical climate risk affects multiple transmission channels and thereby poses risk to financial stability. The role that property insurance plays in transferring risk away from consumers and banks, and the markets that support that risk transfer (e.g., private insurance, government-provided insurance, and residual markets), are therefore critical when considering how climate risks could affect overall financial stability. Accordingly, the challenges currently exhibited in the insurance market were a consistent point of discussion by the Committee, with a particular focus on how the resulting conflict between insurance affordability and availability for both homeowners and renters affects the transmission of risk from consumers to the broader financial system and can delay effective action by policymakers and regulators.

Climate change and the associated rise in the frequency and severity of extreme weather events are some of the factors disrupting the insurance market in the United States. The Committee discussed how differences across state insurance regulators can affect how insurers approach risk-based pricing that adequately accounts for these changing risks while also considering affordability for consumers. Impacts from these market disruptions, such as the decrease in affordability and accessibility of coverage, influence consumer choices on whether and how much insurance to purchase, particularly in low- and moderate-income (LMI) communities, which could affect whether consumers remain uninsured or underinsured in areas with high climate risk. The Committee noted that without insurance, banks can see an increase in risk to their balance sheets (e.g., via increased credit risk and higher debt-to-income ratios). This flow of risk suggests that monitoring the status of insurance affordability, accessibility, and take-up by consumers may provide leading indicators of where the cost of physical climate risk sits and therefore where the greatest risk of instability resides within the broader financial system. In evaluating such metrics, it is important to consider the impact of localized effects such as state regulation, the role of residual markets, building codes, and land-use decisions.

4. Climate risk's impact on consumers and housing brings risk to the financial system

The fourth theme is that consumers' reaction to climate risk and their decision-making can impact the financial system through various transmission channels. The Committee focused on housing given its role in wealth creation in the United States for homeowners and the impact of housing costs on renters. As consumers react to climate change by making decisions about where to live and the level of insurance to obtain, these choices can affect property values and the likelihood of mortgage defaults, which may affect risk to financial institutions.

The Committee reviewed research that showed that while large climate-related migration shifts within the United States have not yet been seen, short-distance, within-county migration following a climate event suggests the role that climate risk plays in consumer decision-making. Additional research was presented that indicated reduced employment growth and a decline in housing prices in counties that have experienced modest but persistent physical risks. The Committee discussed potential actions needed to mitigate these negative impacts, highlighting a phased approach to such action to support consumer transition while managing unintended consequences, particularly for LMI communities. Rapid repricing of properties due to migration, physical risk impact, or more transparent disclosure of extreme weather risks could result in adverse economic impacts to consumers and financial institutions. Financial institutions with concentrated regional exposure may be particularly susceptible to rapid repricing risks, which could also amplify other sources of financial risk.

Timely, transparent, and equitable disclosure of extreme weather risks can lead to more informed consumer decisions, which may further influence property values and consumer decision-making. Disclosures may also affect preparedness, particularly where risks are community-wide (e.g., flood and wildfire). The Committee discussed the potential for consumers and communities to benefit from public engagement and education on these risks and potential impacts on costs, affordability, and loss. Open-source, public access to climate risk data could help consumers, communities, and small financial institutions, particularly those that may have more concentrated geographic exposure, mitigate these risks through avoidance, risk-adjusted pricing, or investments in resilience.

5. The import of data and metrics to monitor potential impacts to the financial system

The fifth theme is that there are many factors to consider when evaluating the usefulness of data and metrics to monitor climate risks' potential impacts on the financial system. Recognizing that climate risk can impact individual consumers as well as entire economies, no single metric can adequately capture the full scope of climate-driven financial risks. The Committee discussed how a comprehensive set of metrics is necessary to assess climate risk effectively but extremely challenging to construct. These metrics should span various domains, including consumer, industry, and macroeconomic-level metrics, with a critical focus on interpreting and understanding how these metrics reflect risks.

Physical climate-related risk metrics, such as unpaid mortgage balances in flood-prone areas, the incidence of physical risk events exceeding \$1 billion, the insurance protection gap, and transition risk metrics, such as corporate greenhouse gas emissions, should be systematically monitored alongside existing financial metrics that assess consumer and industry financial health and financial stability. This integrated approach facilitates the identification of both established and emergent relationships among these indicators, while recognizing that they may not be directly correlated.

The Committee discussed concerns with directly correlating higher exposure to specific industries, assets, and climate risk drivers with increased financial risk. The financial risk associated with climate change is modulated in a non-linear fashion influenced by the pace of response. For instance, a rapid reduction in exposure to mortgages in high climate risk areas by banks could trigger swift asset revaluation, leading to financial market instability. Conversely, a company with high emissions but a robust transition plan may exhibit greater financial resilience to transition risk than a company with lower emissions but a weak decarbonization strategy.

Prudent utilization of climate risk data and metrics should facilitate decision-making by stakeholders such as policymakers, regulators, financial market participants, and consumers based on high-confidence outcomes, such as the correlation between rising global temperatures and the increased frequency of severe weather events.

Forward-looking data for physical and transition risks inherently contain uncertainties, necessitating scenario analysis to evaluate a spectrum of potential outcomes. It is crucial to recognize and account for these uncertainties to make informed decisions, leveraging available data effectively without allowing uncertainty to impede progress in mitigating and monitoring climate risk. Existing risk management processes generally evaluate uncertainty by weighing the financial consequences of inaction against the costs of action. Climate risk should be integrated into these frameworks to ensure comprehensive risk assessment and management.

6. Transition risk contributes to the vulnerability of the financial system, but is less clearly understood

The sixth theme is that transition risks can contribute to vulnerabilities in the financial system. Transition risk arises from geopolitical, business-driven, policy-driven, or other sources and can impact financial markets. The Committee observed that transition risk is more likely to exacerbate other vulnerabilities in the financial system rather than being the source of a systemic shock itself.

The Committee discussed how transition risks can manifest as traditional financial risks (as laid out in, for example, the Sustainability Accounting Standards Board framework⁴) or create vulnerabilities to other shocks. The traditional financial risks associated with transition risk can be experienced on both sides of a firm's balance sheet through revenue and asset value erosion and increases in costs and liabilities. Financial institutions are primarily affected by the transition risks of the non-financial industries they finance. Policy volatility and geopolitical risks can lead to macroeconomic volatility and financial market impacts. Geopolitical risks unrelated to climate may form the underpinnings of increased climate policy volatility or misalignment of supply and demand that has impacts on financial markets. The rate of change in U.S. exports of traditional energy versus imports of renewable energy inputs could create current account imbalances and currency volatility.

The Committee observed that transition risk was not being experienced in real time in the same way that physical risk is being experienced by consumers and the transmission channels by which transition risk passes through the financial system are less direct. For this reason, the Committee focused considerably more attention on physical risk, which is likely the more immediate source of concern. At the same time, the Committee believes more research on transition risk and its potential impact on the financial system would be beneficial.

4 Sustainability Accounting Standards Board. 2023. "Climate Risk Technical Bulletin." Available at <https://sasb.ifrs.org/knowledge-hub/climate-risk-technical-bulletin/>

7. Inequitable impact of climate risk and resultant risks to financial institutions

The seventh theme is that climate-related financial risks are likely to disproportionately affect LMI communities. Throughout each charge, a consistent cross-cutting theme was the inequitable impact from climate-driven transmission channels of financial risk on LMI communities, including tribal areas. Much like how climate risk can amplify existing financial stresses by compounding risks to the broader financial system, climate risk can also amplify the risks that LMI communities face as they are more vulnerable to climate risk and have fewer resources available to mitigate and respond to such risks.

The Committee noted that LMI communities are more exposed to climate-related weather risks due, in part, to the legacy of redlining; areas that were historically racially redlined tend to exhibit greater weather risk, particularly due to flood. In addition, the loss of adequate and affordable insurance for both homeowners and renters poses greater risk to LMI households as they tend to lack the financial cushion to manage shocks. This heightened exposure and vulnerability to climate-related weather events increases the risk of displacement for those living in LMI communities, further challenging community-wide efforts to promote climate resilience. Furthermore, the community and regional banks that serve LMI communities are more likely to experience greater climate-related instability risks compared to their larger counterparts, further weakening the financial support structure of these communities. All these inequitable impacts speak to the need to support LMI communities as they seek to manage and mitigate climate-related risks and to the value of monitoring the risk transmission channels that disproportionately affect them. The enhanced vulnerability of these communities contributes to the risk flowing through the transmission channels summarized above and, ultimately, the risk posed to the U.S. financial system.

The Committee discussed how the impact of both physical and transition climate risks on financial stability could be reduced through the implementation of a phased and integrated set of policy actions across governments, communities, and financial institutions. An effective policy response would mitigate the longer-term impacts on businesses and the overall economy while reducing the potential impacts from financial shocks on smaller institutions and consumers, particularly those in LMI communities.

Topics for Future Learning

In addition to the topics most frequently discussed during the meetings, the Committee discussed potential topics for future charge presentations.

1. With climate change as an emerging and significant threat that had not been previously considered in the mandates and modes of economic and financial system stability, what changes should be made with respect to the supervision of financial markets, monitoring of stability, and the timeframes considered by policymakers in their evaluation of policy options?
2. How does insurance market regulation address the growing risks from extreme weather? Given the role of insurance in providing stability within the financial markets, what policy responses are helpful for monitoring and managing those risks?
3. For transition risk, how would volatility brought on by market imbalances (e.g., supply and demand imbalances) translate to risks to the financial system? What data and metrics could be used to monitor these imbalances?
4. Building on one of the charge presentation's observation that chronic risks can have a negative impact on macroeconomic growth within a region, which metrics could be utilized to monitor exposure to financial institutions that might lead to risks to the financial system?
5. Explore whether it is feasible to crowdsource analysis of financial stability climate risk drivers to gather and analyze information on climate-related risks to the financial system. If determined to be feasible, then propose a specific approach, considerations for who is asked to provide information, how provided data would be managed and analyzed, and the resulting deliverables.
6. How do physical and transition climate risks ultimately land on the federal balance sheet? What role do specific areas play (e.g., risk to government-sponsored enterprises, role of mortgage-backed securities markets) and should it be managed differently?
7. What role should the government play with respect to providing open data sources on the sources and status of climate risk to the financial system? How might such data serve efficiency or equity objectives? What transmission channels would most benefit from this open data and how?

Appendix: Summary of CFRAC Charge Presentations

For most CFRAC meetings, select CFRAC members were charged with responding to a question or series of questions in the form of a presentation. Below are summaries from the nine CFRAC charge presentations. Additional detail about the charge presentations can be found in the [minutes of the CFRAC meetings](#).

Charge 1: What climate-related financial risk drivers (physical or transition risk-related, either individually or combined) are most likely to result in a systemic stability concern? What should be prioritized for monitoring for potential financial stability risks considering the Climate-related Financial Risk Committee's responsibilities?

By: James Stock, Wendy Cromwell, and Emily Grover-Kopec

The first charge presentation provided a conceptual framework for how physical and transition climate risks could affect financial system risk. The framework considered shocks that are large enough to threaten systemic stability; shocks that are small but correlated and may contribute to a large aggregate impact or intensify because of existing amplifiers in the financial system; and climate-related conditions or events that exacerbate the vulnerability of the financial system to shocks. However, the presenters hypothesized that it is unlikely a single shock would rise to the level of causing stability concerns and that we should therefore focus on areas of clustered risk, such as sources of risk that are either directly correlated at their root cause or that can flow through the financial system via similar transmission channels.

The presenters prepared a non-comprehensive mapping of physical and transition risk flows through the framework, and illustrated three examples of key clusters of climate risk:

1. A significant portion of the overall risk flow derives from physical risks and geopolitical transition risks that impact macroeconomic activity;
2. The impact of policy-driven transition risks and/or volatility of policy flows to equity valuation; and
3. Property valuations are exposed to a wide variety of both physical and transition risks.

The presenters concluded by providing several international examples of the transition risk portion of the framework and advised that these case studies bear monitoring.

Charge 2: How does climate-related financial risk compound more traditional sources of financial risk? How would you measure and monitor both acute and chronic physical risks as a financial risk amplifier?

By: Viral Acharya, Catherine Ansell, and Cecilia Martinez

The second charge presentation included two parts: the first part included case studies to demonstrate how climate risks interact with weak economic conditions as well as the different effects of acute and chronic physical risks; and the second part included a discussion of approaches and considerations for how banks perceive the complexity of climate risks.

In the first part of the presentation, presenters described an analysis that found that areas that experience acute climate stressors experienced employment growth for certain sectors (e.g., reconstruction services) immediately after the acute stress event. Conversely, the study found that areas that suffered from chronic physical climate stressors experienced more negative impacts on employment and house prices, particularly if there was an ongoing recession, as compared to areas that experienced only acute climate stressors. Presenters also described a study that found that counties that experienced heat stress saw

decreases in the number of establishments, employment, and household income growth. On the other hand, the study found that counties that did not experience heat stress saw instances of growth.

In the second part of the presentation, presenters discussed how climate risks can be a driver of traditional risk types, such as strategic, credit, market, and operational risk. Presenters described a case study which identified two channels through which changes in insurance coverage and pricing could impact banks by driving credit losses: (1) insurance coverage gaps that result in an inability to repair homes following a disaster event; and (2) increasing costs of insurance leading to higher debt-to-income ratios.

Charge 3: What scenario narratives, data characteristics, statistical methods, and/or modeling strategies would be well-suited for transition and physical risk scenario development and analysis?

By: Noah Kaufman, Allen Fawcett, and William Pizer

The third charge presentation described transition risks and outputs that a transition risk analysis might want to capture, such as price volatility changes, shifts in economic activities, trade tensions, and reliability of the energy systems. Presenters described how transition risk vulnerabilities may vary for different stakeholders, such as workers, households, firms, financial institutions, and government. They posited that financial sector-wide transition risks are an aggregation of risks to individual firms from changes in policy, technology, or private sector behavior that affect the profitability of the firms' capital and labor force.

The presenters described a recent pilot climate scenario analysis exercise undertaken by the Federal Reserve Board to learn about large banking organizations' climate risk management practices and challenges, which used scenarios from the Central Banks and Supervisors Network for Greening the Financial System that incorporated carbon prices to better understand transition risk effects. Presenters described potential alternative approaches to improve scenario analysis of transition risks, including scenarios that reflect a U.S.-specific climate policy pathway; scenarios that reflect rapid progress in key decarbonizing technologies; and new macroeconomic tools specifically designed to focus on analyzing transitions to lower carbon economies.

The presenters noted that destabilizing financial risks are more likely to be the consequences of rapid and unexpected events, such as technology breakthroughs and shifts in consumer sentiment. These events are difficult to incorporate into economic models and projections. The presenters explained that the likely pace of transition could still result in dislocation of jobs and business activity as well as financial market volatility.

Charge 4: Building off the framework presented at the July meeting, develop a set of narratives that flow from physical risk through the insurance market. Discuss the possible effects to other areas of the financial system, such as housing, and who ultimately bears the burden of these risks.

By: Catherine Ansell, Laura Bakkensen, Tracey Lewis

The fourth charge presentation described how climate change has historically affected and could affect the insurance market in the future; how those effects could flow through the financial system and the economy; private and public-run insurance markets; and who bears higher insurance costs due to climate change. Presenters noted that climate change is one of several factors, including inflation, that have affected losses in the insurance sector recently. Presenters discussed how insurance market failure may look different depending on the perspective; for example, financial institutions that invest in insurance companies may be more concerned about insolvency whereas consumers may be more concerned about policy unavailability or unaffordability.

Presenters described the diverse insurance market landscape that includes both private and public markets as well as general property and casualty insurance and specific-hazard insurance. Presenters noted that

climate change adds a layer of complexity to insurance companies' modeling of potential losses, because historical losses may not describe the full distribution of future losses, which include tail events with very high losses. Presenters discussed the effects of heterogeneity in insurance market regulation across fifty states that affect both the extent to which insurers can price expected increases in climate-related property damage into insurance premiums as well as the availability and use of policies issued by state-run insurance markets, which has increased in recent years.

Presenters described how the costs of increasing climate risk could flow through the insurance market to consumers, either through increasing premiums or through taxes that subsidize public market plans that do not adequately capture the risk. Presenters noted that losses of adequate and affordable insurance have implications for minority and low- and moderate-income homeowners. Presenters concluded by highlighting potential policy responses, including public reinsurance and community planning for resilience.

Charge 5: Distributional outcomes of risk pricing: While providing appropriate incentives, policy approaches that price climate risk into insurance, mortgage rates, or other homeowner costs may result in higher costs of living in certain neighborhoods, which could raise equity concerns as well as issues for fair lending requirements for financial institutions. Discuss the interplay of equity/fair lending in pricing climate risk into climate-vulnerable areas and how regulators and financial institutions could navigate these two, at times competing, priorities.

By: Ivan Frishberg, Karen Diver, and Julie Leonard

The fifth charge presentation described the equity implications of who bears the costs for the current underpricing of climate risks, noting that those with fewer resources were at greater risk. The presenters focused their presentation on housing and homeownership, because of its role in wealth building in the United States, and they also focused on the communities affected by climate risks. The presenters noted that policy solutions to address the equity implications of pricing in climate risk would require a whole-of-government approach.

The presenters considered different scenarios that could impact consumers, such as unmanageable increases in insurance premiums that affect consumer choices on where to buy and ultimately reduce values for some homes. Presenters noted that a slower pace of market shifts in response to climate risks could moderate the size of the effect on consumers but may shift risks and potentially increase risks in the aggregate. Presenters also recognized the potential fair lending implications for pricing in climate risks and recommended that both the mortgage and insurance sectors consider equity-oriented principles that protect wealth building for the most financially vulnerable as the market and policy makers develop solutions to address climate risks.

Presenters described the potential effects climate change could have on vulnerable communities, including displacement or residents with social ties to the community, as well as the important role that communities could play in helping to plan for climate resilience. In recognition that natural disasters do not stop at jurisdictional borders, the presenters noted the importance of communities working together for disaster planning and recommended that communities focus on engaging citizens in risk mitigation efforts.

Charge 6: Building off the framework presented in the July CFRAC meeting, how would you design a reverse stress analysis to determine what climate-related events (physical or transition risk-related) could result in a financial stability concern?

By: Peter Wilcoxon and Viral Acharya

In the sixth charge presentation, presenters provided two options for designing a reverse stress analysis to determine what climate-related events could result in a financial stability concern.

For the first option, the presenters showed how a multi-sector model of the economy could be used to reverse-engineer the specific shock or combination of shocks that would cause a bank's probability of loss to exceed a model-specified level of tolerance set at 30 percent. The presenters demonstrated how the method would work using two banks with different portfolio mixes and sizes. The presenters noted this approach could be extrapolated to apply to the banking sector as a whole and could provide a method for systemic reverse analyses for a wide range of transition and physical risk shocks.

For the second option, the presenters described an alternative approach to a reverse stress analysis using market price data to develop proxies for physical and transition risk. The presenters described a method to model the threshold level of climate stress needed to cause a bank to reach a target stressed equity-to-debt ratio of 0.04. The presenters noted that no single transition risk or physical risk event met this threshold, but they found that combinations of hypothetical market and climate risk stresses could cause banks to pass this threshold level.

Charge 7: Following up on the panel on climate-related financial risk at the October meeting, describe the pros and cons of potential transition risk metrics that can be used for risk analysis.

By: Ilmi Granoff, Janine Guillot, and Michael Panfil

In the seventh charge presentation, the presenters described how: (1) transition risk could flow through and ultimately manifest in conventional financial measures; (2) transition risk to financial institutions primarily results from transition risk to non-financial industries that are financed by such institutions; and (3) systemic transition risk should be evaluated in terms of its ability to trigger shocks and create vulnerabilities to other shocks, thereby translating to systemic risks.

The presenters described the strengths and weaknesses of using aggregated greenhouse gas (GHG) footprint as a measure of transition risk, noting the widely varying risks implied in different exposures to emissions. The presenters noted that a disaggregated form of GHG emissions that differentiates upstream, operational, and downstream components could provide more useful signals about how exposures translate into transition risks.

The presenters described how transition risk can ultimately manifest as traditional financial risks. The presenters provided example transition risk factors for a range of industries building from the framework developed by the Sustainability Accounting Standards Board (SASB) to identify how climate risks could ultimately impact financial statements and provide useful information for understanding transition risk in financed entities.⁵ The presenters emphasized that transition risk was at least as likely to manifest in conventional financial statements as asset or revenue erosion than novel costs or liabilities.

The presenters noted that transition risk is likely to lead to a buildup of valuation imbalances in the financial system that accumulates over time and that transition risk is less likely to manifest as a systemic shock by

5 Sustainability Accounting Standards Board. 2023. "Climate Risk Technical Bulletin." Available at <https://sasb.ifrs.org/knowledge-hub/climate-risk-technical-bulletin/>

itself but rather, cause a vulnerability to shocks through widespread and correlated degradation in asset quality or earnings across institutions.

Charge 8: What data on human response factors should be considered when assessing climate risk and financial stability?

By: Emily Grover-Kopec, Ed Kearns, and Tracey Lewis

In the eighth charge presentation, the presenters highlighted recent news articles and research describing how human responses to climate risk could filter up through the financial institutions and into the larger economy, with a particular focus on individuals' choices on migration, insurance, and mitigation measures.

On the micro level, the presenters described recent research that found evidence that providing information about climate risk affects homebuyers' choices about where to live. The presenters also described research that suggests homebuyers may choose to be underinsured even in high climate risk areas.

The presenters noted that two of the primary pathways of how climate risk would most likely influence financial institution's balance sheets are through property valuations and default risk, both of which could be influenced by human responses to climate change. As an example, the presenters described recent research that found property values in the U.S. do not adequately account for flood risk.

The presenters also noted that human responses to climate change have the ability to affect the greater community and the economy, recognizing that the effects will be disproportionately borne by more vulnerable communities with fewer resources to pay for adaptation and mitigation measures.

Charge 9: Some smaller financial institutions may face disproportionately larger climate-related financial risks than their larger counterparts, but with fewer resources to identify, measure, and monitor these risks. What should smaller financial institutions do to manage these risks? What information, data, or resources are needed to help smaller financial institutions manage climate-related financial risk?

By: Ed Kearns and Julie Leonard

In the ninth charge presentation, the presenters analyzed shifts in the risk of small financial institutions' portfolios over time due to climate change and described challenges and opportunities for small financial institutions to better manage climate-related financial risks.

Using modeled portfolios based on branch locations, the presenters described an assessment of the likelihood of losses in banks' portfolios from climate events in the future. The presenters noted that their analysis found that smaller banks tended to have higher levels of climate risk exposure due to geographic concentration in high-risk parts of the country compared to large banks, which have more geographically distributed portfolios in high and low climate risk areas. The presenters noted that given these risks, it is important for smaller financial institutions to be able to model their climate risks.

The presenters posited that the key challenges to managing climate risks for small financial institutions relate to governance, including a lack of focus on potential opportunities; data, including data gaps that make it difficult to pinpoint collateral locations; and resources, including high costs for financial models and consultants. The presenters noted that solutions include focusing on the reason why climate-related financial risk management is important for small financial institutions; working with regulators to help identify reliable and inexpensive resources for small financial institutions to use to assess climate risks in their portfolios; and providing ample time for small institutions to prepare for climate risks.