

Horizons of Risk: Climate Stress and the Federal Reserve

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Contemporary financial supervision depends on knowledge about risk. Threats to bank soundness and financial stability abound, but they present themselves in amorphous ways. How should supervisors assess their significance? This Article examines a process being employed by the Federal Reserve (Fed) to assess threats posed by climate change. The process, climate scenario analysis (CSA), models the impact of hypothetical climate-related events on financial market participants. Descriptively, the Article argues that the Fed's approach to CSA hews closely to the most prominent supervisory innovation to emerge from the Global Financial Crisis: stress testing. With its CSA experiments, the Fed is adapting techniques and perspectives developed in response to the last crisis to confront threats that may cause the next one. This adaptation is unsurprising, but it comes with significant costs. Normatively, the Article argues that CSA efforts designed to operate like stress tests will miss or misunderstand significant forms of climate-related financial upheaval. While the Fed's CSA framework may be successful in identifying some climate-related threats to the largest, systemically important banks, it is ill-designed to recognize threats across a broad range of climate-related scenarios, and its engagement with the largest banks empowers them to shape CSA to serve their own interests. Further, its focus on bank soundness will lead it to miss forms of financial destabilization that may harm households and businesses even if banks manage their climate risks effectively. To address these limits, the Article argues that the Fed should move away from the stress test template in favor of CSA processes that are easier to administer and take a broader perspective on climate-related threats to the project of financial stability.

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I. INTRODUCTION

Contemporary financial regulation depends on knowledge about risk. Just as risk discourse is the *lingua franca* of rational action within financial firms, it also suffuses the work of agencies that regulate and supervise those firms.¹ In particular, risk talk is central to the practice of prudential supervision—oversight intended to safeguard the soundness of individual banks and the stability of the broader United States financial system.² Threats to prudential goals abound, but they often present themselves in amorphous ways. Agencies must employ processes to gather information, analyze it, and frame informally perceived threats of harm as potential objects of formal governance.³

These learning processes are far from neutral. They shape how regulators perceive market activity and market actors; they also shape regulators’ conceptions of their own roles and statutory mandates. Fifteen years of post-mortem reflections on the dominant risk-analytic processes preceding the Global Financial Crisis (GFC or Crisis) have shown how those processes allowed—and even fomented—the build-up of systemically destabilizing risk exposures among large financial firms.⁴ Standard risk modeling

¹ See, e.g., DANIEL K. TARULLO, *BANKING ON BASEL: THE FUTURE OF INTERNATIONAL FINANCIAL REGULATION* 10, 196 (2005) (discussing the role of the Basel Committee on Bank Supervision in developing a “common language” of bank risk); Clea D. Bourne, *Central Banking in Risk Discourses: “Remaking” the Economy After Crisis*, in *COMMUNICATING RISK* 307 (Jonathan Crichton, Christopher N. Candlin & Arthur S. Firkins, eds., 2016) (examining risk discourses in the wake of the Global Financial Crisis).

² Regarding these prudential mandates, see *infra* Part II.A.

³ For discussion of such practices and their role in risk regulation across the administrative state, see, for instance, William Boyd, *De-Risking Environmental Law*, 48 *HARV. ENVTL. L. REV.* 153 (2024); Sheila Jasanoff, *American Exceptionalism and the Political Acknowledgement of Risk*, 119 *DAEDALUS* 61 (1990).

⁴ See, e.g., Donald C. Langevoort, *Chasing the Greased Pig Down Wall Street: A Gatekeeper’s Guide to the Psychology, Culture, and Ethics of Financial Risk Taking*, 96

techniques and standard supervisory approaches embedded assumptions about markets and administrative institutions that proved disastrously mistaken.⁵ In the wake of the GFC, policymakers implemented a range of epistemic innovations.⁶ The most prominent among these has been supervisory stress testing.⁷ Stress testing refers to the analysis of hypothetical adverse scenarios using data and methods to produce “quantitative view[s] of the value of a portfolio, or even an entire firm” under the conditions specified by the scenarios.⁸ Large banks now must participate in such tests under a watchful supervisory eye as a part of their capital planning processes.⁹ Stress testing and other post-Crisis innovations, too, have been subject to critique, especially in light of their failure during the banking turmoil of 2023.¹⁰ Both indispensable and inherently fraught, the analytical processes at the heart of financial supervision help determine the horizons of what supervisors see, prioritize, and govern.

Because formal learning practices inevitably shape regulatory and supervisory action, critical scrutiny of their assumptions, methods, and implications is essential. To be sure, such scrutiny requires turning attention temporarily away from more direct forms of behavior-changing regulation and supervision. But the ultimate purpose of examining the epistemic foundations underlying regulation and supervision is to reveal ways in which those foundations may fail to serve public values.¹¹ In so doing, it

CORNELL L. REV. 1209 (2011); Geoffrey P. Miller & Gerald Rosenfeld, *Intellectual Hazard: How Conceptual Biases in Complex Organizations Contributed to the Crisis of 2008*, 33 HARV. J.L. & PUB. POL’Y 807 (2010).

⁵ See, e.g., Peter Conti-Brown, *A Proposed Fat-Tail Risk Metric: Disclosures, Derivatives, and the Measurement of Financial Risk*, 87 WASH. U. L. REV. 1461 (2010); Erik F. Gerding, *Code, Crash and Open Source: The Outsourcing of Financial Regulation to Risk Models and the Global Financial Crisis*, 84 WASH. L. REV. 127 (2009).

⁶ See Michael S. Barr, *The Financial Crisis and the Path of Reform*, 29 YALE J. ON REG. 91, 97–108 (2012).

⁷ See Beverly Hirtle & Andreas Lehnert, *Supervisory Stress Tests*, 7 ANN. REV. FIN. ECON. 339 (2015).

⁸ *Id.* at 341. While stress testing had seen some use by public administrators prior to the Crisis, the post-Crisis regime adapted the procedure and increased its importance. See *id.* at 340, 345–52.

⁹ See *id.* at 350.

¹⁰ See Jeremy C. Kress & Jeffery Y. Zhang, *The Macroprudential Myth*, 112 GEO. L.J. 569 (2024); Natasha Sarin & Til Schuermann, *Stress Testing Lessons from the Banking Turmoil of 2023* (Apr. 24, 2024) (unpublished manuscript), available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4811157.

¹¹ See CRISTIE FORD, *INNOVATION AND THE STATE: FINANCE, REGULATION, AND JUSTICE* 45–46 (2017) (highlighting the epistemic work done before the “regulatory moment” in financial risk governance and arguing that the methods and ideological

can clear the ground for tools and frameworks that better align regulatory action with those values. In that spirit, this Article takes a critical look at one learning process the Federal Reserve (Fed) has recently begun employing to understand the financial implications of climate change.

As the regulator and supervisor of many of the country's largest financial institutions, the Fed plays a pivotal role in pursuing the prudential goals Congress has set for the financial system.¹² To anticipate how climate change may pose threats to the achievement of those goals, the Fed has begun employing Climate Scenario Analysis (CSA)—a technique that uses hypothetical futures to model climate-related impacts on financial markets and market participants.¹³ Fed officials have described CSA as a major component of their efforts to conceptualize and understand what they and other financial regulators call “climate-related financial risks.”¹⁴ Between 2023 and 2024, the Fed conducted a “pilot” CSA exercise with six of the largest bank holding companies (BHCs) in the country—Bank of America, Citigroup, Goldman Sachs, JPMorgan Chase, Morgan Stanley, and Wells Fargo.¹⁵ The effort assessed climate risk management practices at the banks—a term I will use to encompass BHCs for ease of reference—and it also sought to enhance the capabilities of the banks and their Fed supervisors to understand, monitor, and manage climate-related risks.¹⁶ The results, published in May 2024, described how the pilot exercise helped bring climate-related threats into supervisory purview.¹⁷ In parallel, the Fed has also promulgated guidance encouraging all banks it supervises with greater than \$100 billion in total consolidated assets to integrate CSA into their risk management routines.¹⁸ Through its experimentation with CSA, the

frameworks employed to assess novel situations determine possibilities before active regulation commences).

¹² See DAVID W. PERKINS, CONG. RSCH. SERV., R46648, BANK SUPERVISION BY FEDERAL REGULATORS: OVERVIEW AND POLICY ISSUES (2020).

¹³ See *infra* Part II.C.

¹⁴ See Michael S. Gibson, Dir. Of Supervision and Regul., Bd. of Governors of the Fed. Rsrv. Sys., Statement Before the U.S. House of Representatives Subcomm. on Fin. Institutions and Monetary Policy: Climate-Related Financial Risks (July 18, 2023), <https://perma.cc/7AD7-L54V>.

¹⁵ BD. OF GOVERNORS OF THE FED. RSRV. SYS., PILOT CLIMATE SCENARIO ANALYSIS EXERCISE: SUMMARY OF PARTICIPANTS' RISK-MANAGEMENT PRACTICES AND ESTIMATES 1 (2024), <https://perma.cc/R4E3-TATC> [hereinafter “FED PILOT REPORT”].

¹⁶ See *id.*

¹⁷ See *id.*

¹⁸ These exhortations come in the form of interagency guidance from the Fed, the Office of the Comptroller of the Currency, and the Federal Deposit Insurance Corporation. See Principles for Climate-Related Financial Risk Management for Large Financial

Fed both develops its own understanding of climate change and also publicly signals an institutional commitment to treating climate change as prudentially significant.

The Fed's early experiments with CSA raise pressing questions regarding how best to scan, and even to envision, the climate-finance interface. Which aspects of that interface does the Fed's approach to CSA illuminate, obscure, or distort? How is the Fed's use of CSA shaping its ability to govern climate-related financial dynamics in service of its statutory mandates? And how might epistemic tools like CSA be reimagined to better navigate the uncertainties of climate change while advancing public values?

The need for some kind of technique to assess climate-related financial risk is apparent. Supervisors need to understand how a range of shocks—unprecedented storms, new fossil fuel regulations, regional housing market upheavals, and more—may interact with the financial system. While some commentators warn that climate change could cause a disaster worse even than the Global Financial Crisis,¹⁹ others argue that climate-focused regulation and supervision are unnecessary because market incentives will guide financial institutions to manage their climate-related risks.²⁰ The recent tenor of debate suggests that financial supervisory engagement on climate risk demands groundwork.

Institutions, 88 Fed. Reg. 74183, 74183, 74187–74189 (2023) [hereinafter “Final Inter-agency Principles”].

¹⁹ See, e.g., Patrick Bolton, Morgan Despres, Luiz Awazu Pereira Da Silva, Frédéric Samama & Romain Svartzman, *The Green Swan: Central Banking and Financial Stability in the Age of Climate Change*, BANK FOR INT'L SETTLEMENTS 1, 65 (2020), <https://perma.cc/YLU4-9QX4> (arguing that climate change could “be the cause of the next systemic financial crisis,” and that such a crisis could, under some conditions, “render central banks and financial supervisors powerless” to mitigate harms).

²⁰ Randal Quarles on *Inflation, Balance Sheet Reduction, Financial Stability, and the Future of the Fed: The Former Fed Vice Chair for Supervision Reflects on Key Issues Facing the Fed*, MERCATUS ORIGINAL PODCASTS: MACRO MUSINGS (July 18, 2022), <https://perma.cc/Z8S7-D3SG> (quoting Randal Quarles as stating that “a dispassionate analysis of that question is that climate change is not much of a risk to the financial system” because “exposures in the financial system turn over so rapidly that the financial system will adjust”); see also Christina Parajon Skinner, *Central Banks and Climate Change*, 74 VAND. L. REV. 1301, 1319–20 (2021) (arguing that “[w]ell-managed banks” are likely to “adjust” to climate-related risks in a safe and sound manner). Others suggest that financial institutions may even profit from borrower demand during increasingly common disaster recovery efforts. See Kristian S. Blicke, Sarah N. Hamerling & Donald P. Morgan, *How Bad Are Weather Disasters for Banks?* (Fed. Rsv. Bank of N.Y. Staff Reps., No. 990, rev. 2022), <https://perma.cc/Z5GK-QTV4>; Bill Nelson & Lauren Anderson, *Is Climate Really a Financial Stability Risk or Solvency Risk for Large Banks?*, BANK POL'Y INST. (Sept. 29, 2022), <https://perma.cc/SH44-8N9K>.

At one level, the challenge of crafting useful learning processes is informational. Sources of climate-related volatility and uncertainty abound. Some are external to the realm of bank balance sheets and financial markets. Rising storms, droughts, and fires defy easy prediction.²¹ Greenhouse gas levels depend on complex interactions between climatic, technological, and political forces.²² New carbon regulations may come abruptly, slowly, or not at all. Other factors contributing to the informational challenge related directly to the financial system. Supervisors lack good information about financial institutions' exposures to carbon-intensive assets.²³ They struggle to understand the potential impact of severe weather on the banking system.²⁴ And the economic, social, and political reactions to climate change will affect behavior in untold ways that add further complexity to the informational challenge.²⁵

At another level, the challenge is political. What role, if any, should financial supervisors play in shaping the broader dynamics of the climate transition? This question has been especially fraught for the Fed. The Fed famously values its independence from short-term political winds, but in today's political environment, engagement with climate-related issues is a surefire way to invite political backlash and the threat of legal challenges.²⁶ As Fed officials have begun to incorporate climate change into the Fed's work as supervisor of the largest financial institutions, they have done so with caution, keen on emphasizing the "narrow" role they play in climate change policy.²⁷ But in the climate context today, even a narrow role can be both significant and fraught. The Fed's endeavors contribute to the ongoing production of a broader

²¹ See William W. Buzbee, *Federalism Hedging, Entrenchment, and the Climate Challenge*, 2017 WIS. L. REV. 1037, 1058–59.

²² See Peter Howard & Michael A. Livermore, *Sociopolitical Feedbacks and Climate Change*, 43 HARV. ENVTL. L. REV. 119 (2019).

²³ See Graham S. Steele, *Confronting the "Climate Lehman Moment": The Case for Macropprudential Climate Regulation*, 30 CORNELL J.L. & PUB. POL'Y 109, 130–37 (2020).

²⁴ See Kevin Stiroh, Exec. Vice Pres., Fed. Rsrv. Bank of N.Y., *A Microprudential Perspective on the Financial Risks of Climate Change*, Remarks at the 2020 Climate Risk Symposium, Global Association of Risk Professionals (Nov. 10, 2020), <https://perma.cc/RP3V-D88E>.

²⁵ See Howard & Livermore, *supra* note 22.

²⁶ See Rachel Siegel, *Federal Reserve's Attention to Climate Risk Draws Ire from Republicans*, WASH. POST (Mar. 18, 2021), <https://www.washingtonpost.com/us-policy/2021/03/18/fed-climate-change-risk/>.

²⁷ Victoria Guida, *Powell Vows that Fed "Will Not Be a Climate Policymaker," POLITICO* (Jan. 10, 2023), <https://perma.cc/YD4K-4K4A>.

administrative-state engagement with climate change.²⁸ And they must be undertaken, at least initially, with low levels of expertise and capacity at hand.²⁹ A complex and unsettled policy environment sets the backdrop for their informational work.

Legal scholars are increasingly examining the interactions taking place in this environment. Existing legal scholarship on CSA has focused mainly on the Fed's statutory authority to pursue it, with high-level commentary on CSA's general (un)attractiveness as a supervisory technique.³⁰ Among those who have delved into CSA's inner workings, Madison Condon has offered trenchant criticism of the models underlying much CSA and has argued for increased interdisciplinary collaboration to develop more informative scenario storylines.³¹ Against the expert tendency toward dry and technical scenario analysis, Hillary Allen has argued that regulators should favor captivating narratives to engage with the broader public.³² And Jeremy Kress has highlighted the problem of CSA efforts failing to consider smaller banks' climate-related risks.³³ This Article builds on these

²⁸ See William Boyd, *The Poverty of Theory: Public Problems, Instrument Choice, and the Climate Emergency*, 46 COLUM. J. ENVTL. L. 399, 408–09, 468–69 (2021). The knowledge-acquisition challenges examined in this Article are hardly the only ones, and they are hardly the most important ones confronting administrative states. See, e.g., Douglas Kysar & Jim Salzman, *Foreword: Making Sense of Information for Environmental Protection*, 86 TEX. L. REV. 1347 (2008).

²⁹ See Madison Condon, *Climate Services: The Business of Physical Risk*, 55 ARIZ. ST. L.J. 147, 153–54 (2023); Peter Conti-Brown & David A. Wishnick, *Technocratic Pragmatism, Bureaucratic Expertise, and the Federal Reserve*, 130 YALE L.J. 636, 699–700 (2021).

³⁰ See David T. Zaring & Jeffery Y. Zhang, *The Federal Reserve's Mandates*, 108 MINN. L. REV. 333, 380–81 (2023); Jeremy C. Kress, *Banking's Climate Conundrum*, 59 AM. BUS. L.J. 679, 718–19 (2022); Hillary J. Allen, *Resurrecting the OFR*, 47 J. CORP. L. 1, 16–17, 23 (2021); Conti-Brown & Wishnick, *supra* note 29, at 699–700; Skinner, *supra* note 20, at 1342–47, 1354, 1360–61 (2021); Steele, *supra* note 23, at 146–48; see also Rosa María Lastra & Christina Parajon Skinner, *Sustainable Central Banking*, 63 Va. J. Int'l L. 397, 432–33 (2023); Rory Van Loo, *Stress Testing Governance*, 75 VAND. L. REV. 553, 604–06 (2022) (highlighting the role climate stress tests could play in raising awareness of climate change); Madison Condon, *Market Myopia's Climate Bubble*, 2022 UTAH L. REV. 63, 122 & n.320 (discussing the possibility of CSA disclosure requirements for securities issuers); Barnali Choudhury, *Climate Change as Systemic Risk*, 18 BERKELEY BUS. L.J. 52, 82, 85–88 (2021) (discussing climate stress tests as a potential complement to climate risk disclosure under the securities laws); Christina Parajon Skinner, *Central Bank Activism*, 71 DUKE L.J. 247, 249–51 & n.6 & n.12 (2021) (noting the politically controversial nature of central bank engagement with climate change and citing climate stress tests as a potential example of mission creep).

³¹ See Madison Condon, *Corporate Scenarios: Drawing Lessons from History*, 48 SEATTLE U. L. REV. 277, 292–303 (2025); Condon, *supra* note 29, at 159–71, 184–86, 190–93.

³² See Hilary J. Allen, *Regulatory Managerialism and Inaction: A Case Study of Bank Regulation and Climate Change*, 86 L. & CONTEMP. PROBS. 71, 92–95 (2023).

³³ See Kress, *supra* note 30, at 718–19.

analyses by situating CSA in the context of the Fed's recent history of supervisory innovation.

In adopting CSA to meet the informational and political challenges of climate-related risk, the Fed has not been working on a blank slate. Rather, the Fed has chosen a version of CSA that builds directly on the model of post-Global Financial Crisis stress testing. At a high level of generality, stress testing is nothing other than one genre of scenario analysis. But it is a distinctive genre in terms of its analytical methods and its supervisory concerns. Analytically, it is a data-heavy, model-dependent technique that yields granular quantifications of stress scenarios' effects on bank capital.³⁴ In terms of its supervisory concerns, stress testing views the resilience of individual bank balance sheets as key evidence of financial stability.³⁵ The Fed's experiments with CSA adapt the basic features of the stress testing process to evaluate a new class of climate-related stress scenarios while retaining stress testing's concern for the resilience of individual financial institutions as a financial-stability touchstone. By adapting and incrementally innovating on the stress testing template, the Fed is leveraging tools forged in response to the last crisis to confront emerging risks that threaten to cause the next.

From one vantage point, this is eminently sensible. It employs capacities the Fed has developed over more than a decade of supervisory stress testing under the Dodd-Frank Act's prudential regime. It also normatively links climate-related risk to the fear that haunts post-GFC policymaking: insolvency at a systemically important, "too big to fail" bank.³⁶ Additionally, pursuing CSA in the form of stress testing may lay the groundwork for the integration of climate-related scenarios into the existing supervisory stress testing process—and from there, potentially into large banks' capital requirements. While the latter prospect is politically contentious, it has long been a policy goal of advocates

³⁴ See JAMES LAM, ENTERPRISE RISK MANAGEMENT: FROM INCENTIVES TO CONTROLS 218–20 (2d ed., 2014). While it is true that "[t]he terms stress testing and scenario analysis are frequently used interchangeably," the idea that stress testing, in particular, requires granular quantification reflects typical usage. *Id.* 218–20; see Richard J. Herring & Til Schuermann, *Objectives and Challenges of Stress Testing*, in HANDBOOK OF FINANCIAL STRESS TESTING 9 (J. Doyme Farmer et al., eds., 2022).

³⁵ See Kress & Zhang, *supra* note 10, at 593.

³⁶ On the significance of this point to the rhetorical work of policy entrepreneurs around the world, see Stine Quorning, *The 'Climate Shift' in Central Banks: How Field Arbitrageurs Paved the Way for Climate Stress Testing*, 31 REV. INT'L POL. ECON. 74 (2024).

seeking to “green” the financial regulatory state.³⁷ Taken together, the incremental innovation of the Fed’s CSA appears as a natural evolution of supervisory practices. But alongside the short-term benefits of incremental policy innovation, the Fed’s approach to CSA comes with serious costs.

The Article argues that by hewing to the post-Crisis stress testing template, the Fed is unduly limiting its climate-related supervision. Three decisions, in particular, merit critique. First, in keeping with the stress testing template, the Fed’s CSA efforts engage only with the largest bank holding companies (BHCs) in the country. While this approach leverages the largest banks’ own resources to understand their own climate-related risks, it also transfers significant discretion to those banks. It thereby enables powerful banks to shape emerging conceptions of climate-related financial risk to serve their own priorities. Further, this approach neglects climate change’s potential harms to regional and local banks. Such banks are often less diversified than their “too-big-to-fail” competitors, leaving them potentially more vulnerable to destabilizing losses from prominent climate-related scenarios.

Second, in keeping with the stress test model, the Fed’s approach to CSA demands granular quantification of expected scenario outcomes. Such granular, quantified analysis requires banks and the Fed itself to expend significant resources, and it is not clear the game is worth the candle. Expensive, time-consuming analytical methods may produce novel and valuable insights, but they also slow down the Fed’s iterative learning cycles, limit the range of climate scenarios that can be considered during any given round of CSA, and can contribute to the dangerous rise of a risk-model monoculture.

Finally, the Fed’s approach to CSA focuses solely on bank soundness as the touchstone of financial stability. Undoubtedly, it is an important component of the concept. But a single-minded focus on bank soundness misses other forms of financial destabilization that may harm households and businesses even if banks manage their climate risks effectively. Such destabilization could stem from, for instance, supervised banks withdrawing patronage from mortgage and insurance markets in regions facing heightened disaster risk or contributing to political dynamics surrounding public provision of financial goods. The Fed’s supervisees contribute to financial stability in more ways than by merely

³⁷ See, e.g., Gregg Gelzinis, *Addressing Climate-Related Financial Risk Through Bank Capital Requirements*, CENTER FOR AMERICAN PROGRESS (May 2021), <https://perma.cc/GL5X-AL66>.

surviving. To understand how climate-related processes may disrupt their broader contributions, the Fed will need to expand its understanding of the nascent idea of climate-related financial risk.

CSA is a potentially valuable information-gathering exercise, and importantly, it is also a risk-framing and horizon-scanning exercise.³⁸ The methods and ideological frameworks employed will help determine how the Fed will govern climate-related risk in the coming years. They will also inform the picture of climate-related risk that the Fed may communicate to a range of audiences. This includes audiences internal to the financial regulatory state, along with non-financial agencies, Congress, and the public. Distortions or omissions in today's CSA may affect the socio-political response to our changing climate.³⁹ In this sense, the Fed's CSA efforts do not merely assess or predict the financial effects of climate change; they alter their production and mitigation over the long term. These feedback effects raise the stakes of basic choices regarding learning processes in the short term.

The Article's critique informs a subsequent discussion of how to expand the Fed's CSA horizons in the context of its institutional culture. To make optimal use of CSA, the Fed would need to move away from the supervisory stress testing template in favor of a process that is easier to administer and takes a broader perspective on potential threats to the project of financial stability. Such a move would require some entrepreneurship within the Fed to escape the gravitational pull of its technocratically conservative culture, but it is not beyond the realm of near-term possibility. A revised approach would shift attention away from the narrow question of whether large banks can stay "dry" in future climate-related storms and toward banks' broader role in climate-resilient financial stability.

In making its arguments, the Article contributes to a burgeoning literature examining the role of financial regulation in relation to climate change. The Fed's experimentation with CSA is but one aspect of the relationship between the financial regulatory state and climate-related risk, alongside the treatment of environmental priorities in securities regulation, the status of fossil fuel-related lending by banks, and much more.⁴⁰ In joining this

³⁸ On the idea of horizon-scanning, see *infra* notes 74–79 and accompanying text.

³⁹ See Howard & Livermore, *supra* note 22.

⁴⁰ See, e.g., Nakita Cuttino, *Private Debt for Public Good*, 76 FLA. L. REV. 637 (2024); Kathryn Judge & Dan Awrey, *The Administrative State, Financial Regulation, and the Case for Commissions*, 35 STAN. L. & POL'Y REV. 49 (2024); Joel Michaels, *Capital*

literature, the Article contributes to the broader project of attempting to orient the administrative state's learning processes toward meeting the regulatory moment posed by climate change.⁴¹ The learning processes employed by institutions like the Fed today lay the foundations for the regulation, supervision, and political discourse of tomorrow.

The Article proceeds in four parts. Part II provides background on the potential role of CSA in the Fed's supervisory toolkit. Part III highlights ways in which the Fed's approach to CSA adheres to the template of supervisory stress testing. Part IV examines costs of that adherence. Part V discusses potential paths forward for the Fed's CSA work and their broader implications.

II. THE PATH TO CLIMATE SCENARIO ANALYSIS

Regulatory perspectives on climate-related financial risk are in the midst of formation and contestation. This Part provides background on CSA as a technique for “discovering, administering, acknowledging, avoiding, or concealing” the financial hazards posed by climate change.⁴² It situates CSA within the context of the Fed's statutory responsibilities.

A. Climate Change as a Supervisory Challenge

Over the past few years, the question of whether the Fed should be a “climate policymaker” has garnered significant attention from scholars, politicians, and Fed officials themselves.⁴³ For the purposes of this Article, the most important aspect of that broad question concerns whether climate change poses significant threats to the Fed's prudential mandates. These include ensuring the soundness of the financial institutions under its supervision⁴⁴

Regulation as Climate Policy, 59 IDAHO L. REV. 127 (2023); Sarah E. Light & Christina P. Skinner, *Banks and Climate Governance*, 121 COLUM. L. REV. 1895 (2021); Jill E. Fisch, *Making Sustainability Disclosure More Sustainable*, 107 GEO. L.J. 923 (2019); sources cited *supra* notes 29–32.

⁴¹ See, e.g., sources cited *supra* note 28.

⁴² ULRICH BECK, *RISK SOCIETY: TOWARDS A NEW MODERNITY* 19-20 (Mark Ritter tr., 1992).

⁴³ See, e.g., sources cited *supra* note 30; Andrew Ackerman, *Raskin Faces Senate Questions over Views on Climate Change, Regulations*, WALL ST. J. (Feb. 3, 2022), <https://www.wsj.com/articles/sarah-bloom-raskin-senate-questions-views-on-climate-change-regulations-11643852661>; Guida, *supra* note 27; Stiroh, *supra* note 24.

⁴⁴ See 12 U.S.C. §§ 1818, 1831p-1, & 1844(c)(2)(A) (2018). Bank safety-and-soundness supervision involves correcting “any action, or lack of action, which is contrary to generally accepted standards of prudent operation, the possible consequences of which, if

and safeguarding the stability of the United States financial system as a whole.⁴⁵ Regarding the prudential aspects of the “Fed as climate policymaker” debate, climate-related phenomena have the potential to affect both responsibilities.

The ways in which climate change may affect the Fed’s prudential responsibilities are typically broken down into two genres of risks: physical risks and transition risks. Physical risks encompass weather-related disasters (think of acute events such as hurricanes, heatwaves, floods, and wildfires) and long-term environmental changes (think of chronic processes such as ocean acidification and sea level rise).⁴⁶ Transition risks encompass political, legal, social, and technological responses to climate change, such as legal prohibitions on carbon-intensive industry, disaster-driven migration, or new “Manhattan projects” for the development of energy sources that reduce net greenhouse gas production.⁴⁷ The array of potential climate-related changes to our physical world and social environment is vast.

Both physical risks and transition risks have the potential to destabilize individual financial institutions and the broader system in which they operate. For individual banks, climate-related risks have the potential to implicate their soundness. Physical risks may produce credit losses due to direct destruction (think of a hurricane that destroys a borrower’s manufacturing plant) or indirect market effects (think of a flood that saps a regional homebuilder of demand for new construction).⁴⁸ Transition risks can also erode the value of banks’ assets or borrowers’ collateral.⁴⁹ As a result of these potential linkages, scholars agree: climate-related concerns are legitimately within the purview of safety-and-soundness supervision.⁵⁰

Climate-related risks also pose a threat to the stability of the broader financial system. Climate risks have the potential to produce macroeconomic shocks with macroprudential consequences. For example, large-scale physical disasters may generate

continued, would be abnormal risk or loss or damage to an institution, its shareholders, or the agencies administering the insurance funds.” 112 CONG. REC. 26445, 26474 (1966).

⁴⁵ See 12 U.S.C. § 1844(c)(2)(A) (2018); Hillary J. Allen, *Putting the “Financial Stability” in Financial Stability Oversight Council*, 76 OHIO ST. L.J. 1087, 1115–23 (2015).

⁴⁶ See Stefano Battiston, Yannis Dafermos & Irene Monasterolo, *Climate Risks and Financial Stability*, 54 J. FIN. STABILITY 1, 3–4 (2021).

⁴⁷ See *id.*

⁴⁸ See *id.*

⁴⁹ See *id.*

⁵⁰ See sources cited *supra* note 30.

correlated losses that strike multiple financial institutions at once.⁵¹ Transition risks similarly could destabilize whole industries and their financial patrons.⁵² The interconnectedness of the financial system creates conditions under which these risks have the potential to cause broad instability.⁵³ But how serious would any particular scenario be? How should the Fed target any “regulatory moment” that governs climate-related financial risk?⁵⁴ These questions generate the institutional demand for formal learning processes that can help guide Fed policy.

B. CSA’s Public Proponents

Experimentation with CSA among financial regulators first began overseas. An early site of effort was the Network of Central Banks and Supervisors for Greening the Financial System (“NGFS”), and it began without Fed involvement.⁵⁵ The group was formed in 2017, with the goal of developing common standards and best practices for climate-related financial risk regulation.⁵⁶ NGFS now comprises members from over 100 government agencies around the world.⁵⁷

Since its earliest days, it has sought to promote the use of scenario analysis as a tool to inform and incite regulatory action.⁵⁸ Its reasons for doing so include supporting climate-related financial disclosures, supporting ongoing research about climate-related financial risk, and engendering alignment between public sector actors and their regulated firms.⁵⁹ The main export of the NGFS has been a set of standardized scenarios for use in CSA exercises.⁶⁰ The scenarios were developed in partnership with climate scientists and economists.⁶¹ They spin out plausible narratives about the global impact of climate change.

⁵¹ See Battiston, Dafermos & Monasterolo, *supra* note 46, at 3–4.

⁵² *See id.*

⁵³ *See id.*

⁵⁴ FORD, *supra* note 11, at 45–46.

⁵⁵ See Adam Tooze, *Why Central Banks Need to Step Up on Global Warming*, FOREIGN POL’Y (July 20, 2019), <https://perma.cc/826L-PLZP> (highlighting the absence of the Federal Reserve from international efforts).

⁵⁶ See *Origins and Purpose*, NGFS (last updated Jan. 30, 2024), <https://perma.cc/P6LD-TCY4>.

⁵⁷ *See id.*

⁵⁸ See NGFS, FIRST PROGRESS REPORT 3–4, 8–9 (Oct. 2018), available at <https://perma.cc/9YDG-QZUU>.

⁵⁹ See *Scenarios Portal: Introduction*, NGFS (last accessed July 28, 2023), <https://perma.cc/7UM5-V888>.

⁶⁰ *See id.*

⁶¹ *See id.*

The Fed only joined the NGFS in 2020,⁶² caution being its watchword on climate-related issues.⁶³ Its reticence reflected a view that climate-related policy issues were controversial and ought to be engaged lightly, if at all, as a defense against claims that the Fed was unduly politicizing its technocratic role in financial administration.⁶⁴

While the Fed was sitting on the sidelines of NGFS, financial supervisors began to conduct climate scenario analyses in earnest. The first to conduct a public CSA was the central bank of The Netherlands, which applied four scenarios to data provided by banks, insurers, and pension funds in 2018.⁶⁵ It was followed soon after by the Bank of England (BoE), the European Central Bank (ECB), and a host of others.⁶⁶ These efforts focused on broad and “economy-wide” possibilities, but they too relied on firm-level financial information.⁶⁷ Since then, CSA has continued its diffusion across jurisdictions.⁶⁸

In light of the international experimentation with CSA, policy entrepreneurs in the United States began clamoring for home financial regulators to join in. Consider, for instance, former Vice-Chair of the Fed and current Director of the National Economic Council Lael Brainard. Over the course of three years, she incorporated climate risks into her public discussions of the Fed’s statutory mandates.⁶⁹ She highlighted the value of CSA to private

⁶² See Michael S. Derby, *Fed Says It Now Has Formal Membership in Global Climate Finance Group*, WALL ST. J. (Dec. 15, 2020), <https://perma.cc/HV2C-AWC2>.

⁶³ See Conti-Brown & Wishnick, *supra* note 29, at 688–92.

⁶⁴ See *id.*

⁶⁵ See Robert Vermeulen, Edo Schets, Melanie Lohuis, Barbara Kölbl, David-Jan Jansen & Willem Heeringa, *An Energy Transition Risk Stress Test for the Financial System of the Netherlands* 12 (De Nederlandsche Bank, Occasional Studies Vol. 16-7, 2018), <https://perma.cc/VY9F-56BK>.

⁶⁶ See Quorning, *supra* note 36, at 74–75.

⁶⁷ Spyros Alogoskoufis, Nepomuk Dunz, Tina Emambakhsh, Tristan Hennig, Michiel Kaijser, Charalampos Kouratzoglou, Manuel A. Muñoz, Laura Parisi & Carmelo Salleo, *ECB Economy-Wide Climate Stress Test: Methodology and Results* 4–5, 7 (European Central Bank Occasional Paper Series No. 281, Sept. 2021),

⁶⁸ See Bank for Int’l Settlements, *Climate Risks: Scenario Analysis—Practical Examples and Challenges*, <https://perma.cc/Z8WR-5Q2C>.

⁶⁹ Lael Brainard, Member, Bd. of Governors of the Fed. Rsrv. Sys., Remarks at the 2021 Federal Reserve Stress Testing Research Conference: Building Climate Scenario Analysis on the Foundations of Economic Research (Oct. 7, 2021), <https://perma.cc/2UDH-LXE9>; Lael Brainard, Member, Bd. of Governors of the Fed. Rsrv. Sys., Remarks at “Transform Tomorrow Today” Ceres 2021 Conference: Financial Stability Implications of Climate Change (Mar. 23, 2021), <https://perma.cc/W6W8-T8R4>; Lael Brainard, Member, Bd. of Governors of the Fed. Rsrv. Sys., Remarks at the “2021 IIF U.S. Climate Finance Summit: Financing a Pro Growth Pro Markets Transition to a Sustainable, Low-Carbon Economy” hosted by the Institute of International Finance: The Role of Financial Institutions in Tackling the Challenges of Climate Change (Feb. 18, 2021),

firms, chastising those that failed to do so as leaving themselves open to “outsized losses on climate-sensitive assets” due to both physical and transition risks.⁷⁰ Further, she touted supervisory climate scenario analyses beyond what firms would choose for themselves, making the case that the Fed should learn from its peers at the BoE, ECB, and other NGFS members in building out climate expertise and capacity.⁷¹ Even as the official position of the Fed was tepid on climate issues, individual actors were promoting the cause.

Alongside such policy entrepreneurship internal to the Fed, CSA also gained support via executive action. In 2021, the Biden White House inaugurated a “whole-of-government” approach to climate change mitigation and adaptation, including an order that the Financial Stability Oversight Council (FSOC), under the leadership of the Treasury Secretary, coordinate a federal assessment of climate-related threats to financial stability.⁷² That FSOC effort in turn recommended CSA play a central role across federal financial regulatory agencies.⁷³ All told, CSA has gained a place in the intellectual culture and official agenda of the U.S. financial regulatory state.

C. CSA as a Learning Process

CSA is the latest prominent branch of the broader family tree of scenario analysis, which encompasses a variety of formal techniques designed to imagine the future. Developed for an age of complex bureaucracies and dynamic environments, scenario analysis came of age last century but has remained vital to organizational planning processes ever since. The rise of CSA reflects the roots of scenario analysis in bureaucratic culture.

<https://perma.cc/LX49-QJ6T>; Lael Brainard, Member, Bd. of Governors of the Fed. Rsrv. Sys., Remarks at “The Financial System & Climate Change: A Regulatory Imperative” hosted by the Center for American Progress: Strengthening the Financial System to Meet the Challenge of Climate Change (Dec. 18, 2020), <https://perma.cc/E3D6-JQ6M>; Lael Brainard, Member, Bd. of Governors of the Fed. Rsrv. Sys., Remarks at “The Economics of Climate Change” a research conference sponsored by the Federal Reserve Bank of San Francisco: Why Climate Change Matters for Monetary Policy and Financial Stability (Nov. 8, 2019), <https://perma.cc/AF89-ZMFG>.

⁷⁰ Brainard, Remarks at the “2021 IIF U.S. Climate Finance Summit: Financing a Pro Growth Pro Markets Transition to a Sustainable, Low-Carbon Economy” hosted by the Institute of International Finance, *supra* note 69, at 1.

⁷¹ See Brainard, Remarks at “Transform Tomorrow Today” the Ceres 2021 Conference, *supra* note 69, at 9–10.

⁷² See Exec. Order No. 14030, 86 Fed. Reg. 27967 (May 25, 2021).

⁷³ FIN. STABILITY OVERSIGHT COUNCIL, REPORT ON CLIMATE-RELATED FINANCIAL RISK 4, 8–9, 89–98 (2021), <https://perma.cc/4YZM-U6YN>.

As a formalized technique, scenario analysis's roots can be found in twentieth-century business management and military planning.⁷⁴ An early adopter—and an ironic one, given this Article's topic—was the multinational oil firm, Royal Dutch Shell.⁷⁵ In 1967, it inaugurated an organized process of “horizon scanning” that prompted managers to explore multiple, creative scenarios to help navigate a changing business environment—and also to prompt strategizing about how to “actively shape a future world optimal for [Shell's] purposes.”⁷⁶ The technique helped prepare Shell to weather the 1973 oil shock,⁷⁷ confronted managers with the seemingly unlikely breakup of the Soviet Union,⁷⁸ and prompted them to grapple with the onset of climate change.⁷⁹ Today, we are living through a planetary warming scenario that Royal Dutch Shell considered years ago.

Financial firms have long employed scenario analysis to grapple with possible upheavals, from currency crises to geopolitical conflicts.⁸⁰ Upon choosing a set of scenarios to analyze, they “identify all the relevant risk factors that will be affected by the scenarios” and draw out the implications for organizational interests.⁸¹ These analyses tend to be heavily, though not exclusively, quantitative.⁸² While Shell was honing its narrative scenarios, financial firms were experimenting with computer simulations of scenario-based shocks to their balance sheets. These analyses, informed by external events, relied on novel software technology to quickly and comprehensively model ranges of outcomes under specified risk conditions.⁸³ Some of these simulations have come to be known as stress tests, a type of scenario analysis that

⁷⁴ See ROBERT R. M. VERCHICK, *FACING CATASTROPHE: ENVIRONMENTAL ACTION FOR A POST-KATRINA WORLD* 239–43 (2010); PHILIP BOBBITT, *THE SHIELD OF ACHILLES: WAR, PEACE, AND THE COURSE OF HISTORY* 715–19 (2002).

⁷⁵ See Jenny Andersson, *Ghost in a Shell: The Scenario Tool and the World Making of Royal Dutch Shell*, 94 *BUS. HIST. REV.* 729, 729 (2021).

⁷⁶ *Id.* at 750.

⁷⁷ *Id.* at 734.

⁷⁸ See PETER SCHWARTZ, *THE ART OF THE LONG VIEW: PLANNING FOR THE FUTURE IN AN UNCERTAIN WORLD* 49 (2012). The nickname for the key scenario was “The Greening of Russia.” *Id.*

⁷⁹ See Andersson, *supra* note 75, at 748–49.

⁸⁰ LAM, *supra* note 30, at 220–21.

⁸¹ *Id.*

⁸² *Id.*

⁸³ See STEPHEN P. BRADLEY & DWIGHT B. CRANE, *MANAGEMENT OF BANK PORTFOLIOS* (1975); see also Dwight B. Crane, Frederick Knoop & William Pettigrew, *An Application of Management Science to Bank Borrowing Strategies*, 8 *INTERFACES* 70 (1977) (discussing the use of interest-rate scenario analysis software by the Federal Land Banks).

focuses on granular quantification of the effects of severe, but plausible stressors on bank balance sheets.⁸⁴

With CSA, the Fed is building on existing ideas of scenario analysis as a suite of learning techniques. But scenario analysis is a big tent, and the Fed faces a range of design choices. It may draw more or less heavily from existing scenario-analysis formats to craft its approach. In the next Part, I describe how the Fed has adhered to the stress testing format that gained prominence in the wake of the Global Financial Crisis.

III. STRESS TESTING AND CSA EXPERIMENTATION

To scholars and policymakers steeped in the contemporary world of financial regulation, the observation that the Fed has developed its approach to CSA as an incremental innovation upon the framework of post-Global Financial Crisis stress testing should hardly be a surprise. The resemblances between the Fed's approach and the post-Crisis stress testing framework are many, as are the reasons why the Fed has taken the approach it has. But the fact that the approach seems obvious or natural does not entail that it is necessary or optimal. In delving into the details of the Fed's incrementalism, this Part surfaces design choices that embed policy priorities and intellectual perspectives, sometimes without explicit articulation. The description offered here lays the groundwork for the evaluation and critique offered in Part IV.

A. Stress Testing as Precursor

As noted above, stress testing refers to a variant of scenario analysis that involves quantified, data-intensive analytic methods. Though stress testing had been a part of financial risk management and supervision for decades, it gained public prominence at the tail end of the Global Financial Crisis.⁸⁵ Its perceived success at the end of the Crisis and in the subsequent years has laid the groundwork as an institutional matter for the Fed's embrace

⁸⁴ See generally HANDBOOK OF FINANCIAL STRESS TESTING, *supra* note 30. For discussion of the supervisory use of stress testing, see, for instance, Kathryn Judge, *Stress Testing During Times of War*, in *id.* at 226–30; John Crawford, *Wargaming Financial Crises: The Problem of (In)experience and Regulator Expertise*, 34 REV. BANKING & FIN. L. 111 (2015); Mehrsa Baradaran, *Regulation by Hypothetical*, 67 VAND. L. REV. 1247 (2014); Robert Weber, *A Theory for Deliberation-Oriented Stress Testing Regulation*, 98 MINN. L. REV. 2236 (2014).

⁸⁵ See Herring & Schuermann, *supra* note 30, at 9.

of CSA. In this sense, post-GFC stress testing serves as a supervisory precursor to CSA.

In the words of then-Treasury Secretary Timothy Geithner, the Crisis was “the big one, the hundred-year storm.”⁸⁶ It raged from 2007 into 2009, when, to finally quell it, Treasury worked with supervisors to put the largest banks through a stress test, publicly demonstrating their soundness.⁸⁷ The process was rigorous and resource-intensive.⁸⁸ And it worked. By publishing good results, the supervisors “helped address lingering uncertainty about the health of major banks” and shored up confidence in the financial system.⁸⁹

Due to this perceived success, policymakers took the stress test idea and ran with it. In 2010, Congress mandated annual exercises similar in structure to the Crisis tests.⁹⁰ These employ a range of scenarios designed to evaluate the resilience of individual firms and the financial system.⁹¹ And in 2011, the Federal Reserve inaugurated tests for large banks aimed to improve their capital planning.⁹² In addition to demonstrating the preexisting health of the biggest banks, these tests aim at rigorously ensuring they possess sufficient capital to withstand the kinds of adverse shocks that the Fed poses.⁹³ If a bank fails its stress test, so be it; they simply must adjust their capital planning to account for the test failure.⁹⁴ Over the years, these tests have become “core

⁸⁶ TIMOTHY F. GEITHNER, *STRESS TEST: REFLECTIONS ON FINANCIAL CRISES 2* (2014).

⁸⁷ See Judge, *supra* note 84, at 226–30.

⁸⁸ The Federal Reserve described some of the labor in the following way: “In early March, firms submitted their projections to the agencies, which included significant amounts of detailed data. Supervisory teams, organized by specific asset classes, revenues, and reserves, evaluated the substance and quality of the initial submissions and, where appropriate, requested additional data or evaluation of the sensitivity of projections to alternative assumptions. The supervisors also developed independent benchmarks based on firm-specific portfolio characteristics against which they evaluated the appropriateness of the firms’ projections for losses and resources that would be available to absorb losses. Results for each firm also were evaluated to assess the sensitivity of the firm to changes in the economy based on projections under the baseline and the more adverse scenarios. The evaluations drew on the expertise of more than 150 senior supervisors, on-site examiners, analysts, and economists from the agencies.” BD. OF GOVERNORS OF THE FED. RSRV. SYS., *THE SUPERVISORY CAPITAL ASSESSMENT PROGRAM: DESIGN AND IMPLEMENTATION 2* (Apr. 24, 2009), <https://perma.cc/C38D-LLBG>.

⁸⁹ Judge, *supra* note 84, at 227.

⁹⁰ See Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111–203, § 165(i), 124 Stat. 1376, 1430–31 (2010) (codified at 12 U.S.C. § 5365(i) (2019)).

⁹¹ See Hirtle & Lehnert, *supra* note 7, at 347–52.

⁹² See Capital Plans, 76 Fed. Reg. 74631 (Dec. 1, 2011) (codified at 12 C.F.R. pt. 225); Hirtle & Lehnert, *supra* note 7, at 350–52.

⁹³ See Hirtle & Lehnert, *supra* note 7, at 350–52.

⁹⁴ See *id.* at 351.

element[s]” of the federal system of financial supervision,⁹⁵ representing a valuable form of active, aggressive bank oversight.⁹⁶

The existence of stress testing has helped supervisors view climate-related financial risk as an object of concern. For years, advocates of climate-aware financial regulation have focused on stress testing as a point of engagement.⁹⁷ In the early 2010s, they began lobbying authorities in many jurisdictions to treat climate-related shocks—especially a hypothetical “carbon bubble” in which swift governmental regulation left fossil fuel assets stranded in the ground—as precisely the kinds of “adverse” scenarios that stress tests are meant to consider.⁹⁸ By framing the dynamics of climate change as sources of systemic stress akin to the stresses of the Global Financial Crisis, advocates have been effective in putting climate issues on even traditionally conservative central banks’ agendas.⁹⁹

Despite its institutional conservatism, the Fed has recently joined the international trend of CSA experimentation. As described briefly in the Introduction, to date, the Fed has conducted a CSA “pilot” exercise with six large BHCs and has promulgated supervisory guidance encouraging large BHCs to adopt CSA practices within their own risk management functions.

As its name indicates, the pilot exercise was explicitly experimentalist in orientation. Begun in January 2023, it was conducted in collaboration with JPMorgan, Bank of America, Citigroup, Wells Fargo, Goldman Sachs, and Morgan Stanley.¹⁰⁰ In announcing the exercise, the Fed’s Vice-Chair for Supervision, Michael Barr, emphasized that the CSA was meant to support the “narrow, but important” goal of “ensur[ing] that banks understand and manage their material . . . financial risks from climate change.”¹⁰¹ By collecting “details on governance and risk

⁹⁵ Capital Planning and Stress Testing Requirements for Large Bank Holding Companies, Intermediate Holding Companies and Savings and Loan Holding Companies, 86 Fed. Reg. 7927, 7928 (Feb. 3, 2021) (codified at 12 C.F.R. pt. 217, 225, 238, and 252).

⁹⁶ See Lev Menand, *Too Big to Supervise: The Rise of Financial Conglomerates and the Decline of Discretionary Oversight in Banking*, 103 CORNELL L. REV. 1527, 1580–83 (2018).

⁹⁷ See Quorning, *supra* note 36, at 74.

⁹⁸ *Id.* at 80–90.

⁹⁹ *Id.* at 90–91.

¹⁰⁰ See BD. OF GOVERNORS OF THE FED. RSRV. SYS., PILOT CLIMATE SCENARIO ANALYSIS EXERCISE: PARTICIPANT INSTRUCTIONS (2023), <https://perma.cc/4NGV-TSNM> [hereinafter “FED PILOT PARTICIPANT INSTRUCTIONS”].

¹⁰¹ Press Release, Bd. of Governors of the Fed. Rsrv. Sys., Federal Reserve Board Provides Additional Details on How Its Pilot Climate Scenario Analysis Exercise Will Be Conducted and the Information on Risk Management Practices that Will Be Gathered over the Course of the Exercise (Jan. 17, 2023), <https://perma.cc/KE38-MYHM>.

management practices, measurement methodologies, risk metrics, data challenges, and lessons learned,” the Fed aimed to build capacity and expertise for future CSA exercises.¹⁰²

The Fed’s pilot was also relatively noncoercive. The effort was not mandated through traditional rulemaking channels. Instead, the Fed enlisted participants in the effort through its time-honored tactics of “moral suasion”—forms of influence resulting from its longstanding relationships with bank personnel and (perhaps more importantly) its array of judicially-unchecked carrots and sticks to employ within those relationships.¹⁰³ The exercise carried no direct regulatory implications attached to it. Unlike the supervisory stress tests integrated into the Fed’s Comprehensive Capital Analysis and Review (“CCAR”), the Fed’s CSA pilot did not inform the banks’ capital requirements.¹⁰⁴ Rather, the pilot was meant to serve merely as a learning endeavor and an expressive signal.¹⁰⁵

In the Fed’s own assessment, the pilot CSA provided clarity about banks’ capacities and challenges in understanding their own climate-related risks. The Fed was satisfied that participant banks used the CSA to “identify . . . vulnerabilities” and “inform strategic planning,” but the banks confronted difficulties stemming from data gaps, lack of fit between available modeling techniques and plausible climate-related risk transmission channels, and the “high degree of uncertainty” they confronted.¹⁰⁶ Among the greatest sources of difficulty were tensions created by scenario standardization and quantification. To produce the outputs requested by the Fed, a number of the participants relied on external vendors for modeling technology and to inform scenario variables.¹⁰⁷ They debated how to quantify the indirect impacts of

¹⁰² See *id.* (quoting Vice-Chair for Supervision Barr as stating, “[t]he exercise we are launching today will advance the ability of supervisors and banks to analyze and manage emerging climate-related financial risks”). In this, it exemplifies an approach to agency action that (rightly) does not view preexisting agency expertise as a necessary source of legitimacy. See Conti-Brown & Wishnick, *supra* note 29, at 643–54.

¹⁰³ See PETER CONTI-BROWN, *THE POWER AND INDEPENDENCE OF THE FEDERAL RESERVE* 235–42 (2016) (describing examples of the Fed’s creative uses of moral suasion); Heidi Mandanis Schooner & Michael Taylor, *Convergence and Competition: The Case of Bank Regulation in Britain and the United States*, 20 MICH. J. INT’L L. 595, 621 (1999) (defining moral suasion).

¹⁰⁴ See Capital Planning and Stress Testing Requirements for Large Bank Holding Companies, Intermediate Holding Companies and Savings and Loan Holding Companies, *supra* note 95, at 7928 (summarizing the use of stress test and CCAR results in the Fed’s capital planning process).

¹⁰⁵ See Press Release, *supra* note 101.

¹⁰⁶ FED PILOT REPORT, *supra* note 15, at 7–11.

¹⁰⁷ See *id.* at 8.

disasters, the cumulative effects of physical and transition dynamics, and the possibility of portfolio rebalancing to mitigate risk over long time horizons.¹⁰⁸ All told, the Fed's public account of the pilot reveals a focus on private-sector CSA developments under Fed oversight, not on aggressive development of the Fed's own CSA capacity.

In addition to the pilot exercise, the Fed has also promulgated guidance establishing CSA best practices for all its supervised banks with over \$100 billion in total consolidated assets.¹⁰⁹ This effort encompasses a few dozen of the largest banks in the country.¹¹⁰ The guidance exhorts banks to integrate CSA into their risk management functions. The goal is to prompt banks to identify potential effects on balance sheets and business models.¹¹¹ They ought to do so, according to the guidance, "in a manner commensurate to the institution's size, complexity, business activity, and risk profile."¹¹² In other words, the guidance makes much of supporting the banks' own efforts to develop effective climate risk management programs.¹¹³ This is the Fed playing the role of slightly coercive management consultant.¹¹⁴

Like the pilot, the guidance does not threaten any explicit consequences—at least not yet. But just as the pilot may pave the way for CSA with regulatory bite, the Fed's guidance may one day help lead to direct attempts by the Fed to change bank decision-making with regard to climate-related threats. As banks adopt CSA, their efforts can be compared to each other's and vetted against the supervisors' own rubrics. CSA could become subject to the routine examinations that determine the extent to which supervisors attempt to cajole banks to change their behaviors. Banks that lag on internal CSA may find themselves dinged for it.

Taken together, the Fed's two CSA efforts show an institution cautiously joining its international peers. Rooted in the perceived

¹⁰⁸ See *id.* at 10–11.

¹⁰⁹ See Final Interagency Principles, *supra* note 18.

¹¹⁰ See National Information Center, *Large Holding Companies*, FEDERAL FINANCIAL INSTITUTIONS EXAMINATION COUNCIL (Sept. 30, 2024), <https://www.ffiec.gov/npw/Institution/TopHoldings>.

¹¹¹ See Final Interagency Principles, *supra* note 18, at 74186.

¹¹² See *id.* at 74188.

¹¹³ See *id.* at 74186–88.

¹¹⁴ As such, it is consistent with some longstanding practices and mentalities of bank supervisors. See Peter Conti-Brown & Sean H. Vanatta, *The Logic and Legitimacy of Bank Supervision: The Case of the Bank Holiday of 1933*, 95 BUS. HIST. REV. 87, 92 (2021); Lev Menand, *Why Supervise Banks? The Foundations of the American Monetary Settlement*, 74 VAND. L. REV. 951, 965 n.55 (2021).

legitimacy of post-Crisis stress testing as a means of highlighting potential threats to the financial system, the Fed's approach to CSA emphasizes bank capacity-building and industry-wide standardization. While largely noncoercive today, the efforts lay groundwork for the integration of CSA into routine, coercive supervisory processes, either alongside or within existing stress tests.

B. Stress Testing as Template

In addition to serving as an institutional entry-point for engagement with climate-related financial risk, the post-Crisis approach to stress testing has also served as a template for the Fed in crafting its CSA efforts. The Fed has hewed to it across three significant design decisions.

First, in keeping with the stress testing template, the Fed's CSA efforts engage in close collaboration with the largest banks in the country. Post-Crisis stress testing was designed to avoid a repeat of 2008, when multiple major financial institutions approached the precipice of insolvency.¹¹⁵ By focusing on hypothetical shocks that may befall those institutions, stress testing aims to ensure that they remain resilient in hard times.¹¹⁶ It also leverages the informational advantages those banks possess regarding their financial exposures and asks them to support the Fed in assessing their resilience.¹¹⁷

The Fed's approach to CSA mirrors, and in some ways exceeds, stress testing in terms of reliance on large banks. In its CSA efforts to date, the Fed has chosen to treat the largest banks as the sole objects of climate-related supervision and as partners in information provision, analysis, and scenario selection. The pilot engaged solely with six too-big-to-fail BHCs, and it relied heavily on them for resources and insights.¹¹⁸ Not only did it defer to the banks regarding data provision and modeling decisions; it also asked them to design their own scenarios to test idiosyncratic aspects of their asset portfolios.¹¹⁹ So, too, does the Fed's climate-related guidance focus on capacity-building at the largest banks.¹²⁰ It is not strongly prescriptive about how to conduct CSA;

¹¹⁵ See Hirtle & Lehnert, *supra* note 7, at 347.

¹¹⁶ See *id.* at 348.

¹¹⁷ See Weber, *supra* note 84, at 2291–94.

¹¹⁸ See FED PILOT REPORT, *supra* note 15, at 1–2.

¹¹⁹ See *id.* at 8–9, 13.

¹²⁰ See Final Interagency Principles, *supra* note 18, at 74186–87.

rather, it largely defers to banks to develop methods for producing CSA results.¹²¹

By leveraging bank resources and enlisting them in the project of ensuring their own resilience, the Fed aims to prevent a “climate Lehman moment”¹²² without taking direct responsibility for prediction and prevention onto itself. This choice reflects complex trade-offs between public and private forms of expertise, and it allocates burdens of effort and investment between Fed supervisors and their supervised banks.

The second design choice where the Fed has followed the stress test model is to demand detailed quantification of scenario outcomes. Stress testing is, by definition, a quantified version of scenario analysis.¹²³ Indeed, its rise within financial firms’ risk management functions was facilitated by innovations in information technology.¹²⁴ Today’s supervisory stress tests rely on vast quantities of data housed within banks’ computer systems, and they require significant computational investments to model how given scenarios might affect the portfolios of contracts represented by bank data.¹²⁵ Quantification is also crucial to post-Crisis stress testing because it provides rigor. Fed supervisors want to understand the types of recessions, market panics, counterparty failures, and interest rate shifts that might imperil their banks. To understand when a shift in a given input may become significant, quantification is valuable.

The Fed’s approach to CSA adopts stress testing’s demand for quantification. Consider, for instance, how the Fed’s approach would apply to a bank that does significant construction lending in the southwest United States. The Fed may want this bank to examine the potential effects of heat waves, droughts, and more on the construction lending business in the coming decade, or the bank may choose to do so itself.¹²⁶ Under a standard approach to CSA, the bank would select a set of “physical shock” scenarios and predict how those different shocks would affect various metrics representing the health of its current portfolio of construction

¹²¹ See *id.*

¹²² See Steele, *supra* note 23, at 113 & n.15 (defining a “climate Lehman moment” as “a systemic financial event” that plunges financial markets into turmoil).

¹²³ See *supra* notes 82–84 and accompanying text.

¹²⁴ See *supra* note 83 and accompanying text.

¹²⁵ See Bd. of Governors of the Fed. Rsr. Sys., 2024 Supervisory Stress Test Methodology—March 2024 (Apr. 12, 2024), <https://perma.cc/8G9X-ZBF9>.

¹²⁶ Cf. Daniel Trotta, *Arizona Restricts Phoenix Home Construction amid Water Shortage*, REUTERS (June 1, 2023), <https://perma.cc/5DMC-2GGT> (discussing an Arizona law restricting homebuilding in light of projected water shortages).

loans: collateral values, probabilities of default, and loan-level risk ratings used to inform the bank's typical risk management process.¹²⁷ This would provide the bank and the Fed quantified insight into potential changes to its construction lending book's risk in the imagined scenarios.

Quantitative analyses are central to the Fed's institutional identity, reflecting bank supervision's dependence on financial accounting and contemporary risk-management practices. But quantitative methods are not the only ones available for CSA. Qualitative techniques involving narratives, dialogues, or expert simulations offer the ability to examine dynamics where quantitative precision either cannot be achieved or is not preferable for other reasons.¹²⁸ Choices over quantification determine what organizationally useful information must look like, and they empower different constituencies within financial firms, supervisory agencies, and the public. In its CSA efforts to date, the Fed has chosen to build on the institutional language of detailed quantification and engage with participants in the supervisory process who have experience in the quantified mode of stress testing.

Finally, a third commonality with stress testing is to focus on bank soundness as the touchstone of financial stability. The idea of stress testing implies the existence of something that can be stressed. For a patient on a treadmill, the thing is their heart. For a bank undergoing supervisory stress tests, the thing is their balance sheet. If the heart fails, the patient will die; if the balance sheet fails, the bank may require support from the FDIC and the Fed.¹²⁹ To stave off catastrophic outcomes like the ones experienced in 2008, supervisory stress tests need to probe how close to failure their hypothetical scenarios would push their subjects.

The Fed's CSA efforts follow the stress testing template by focusing analysis on drivers of banks' capital adequacy. For instance, in the pilot exercise, the Fed asked its participants to estimate how different scenarios would affect probabilities of default and losses given default for various asset portfolios.¹³⁰ These metrics indicate how given portfolios would be expected to perform under adverse climatic scenarios, with the ultimate question being whether they leave the banks vulnerable to unbearable losses. Such metrics also enable the Fed to compare across banks,

¹²⁷ See FED PILOT PARTICIPANT INSTRUCTIONS, *supra* note 100, at 16–19.

¹²⁸ See Condon, *Corporate Scenarios*, *supra* note 31, at 301–03; Weber, *supra* note 84, at 2273–75, 2311–13.

¹²⁹ See Baradaran, *supra* note 84, at 1252.

¹³⁰ See FED PILOT PARTICIPANT INSTRUCTIONS, *supra* note 100, at 13, 21–23.

gaining a relative picture of climate-related resilience. What they do not do is look beyond individual bank soundness. Nor does the Fed's supervisory guidance.¹³¹

Focusing on bank soundness is undoubtedly in keeping with the core statutory mission of federal bank supervision. It also follows from the Fed's general policy of employing CSA to safeguard against a climate-related crisis that resembles 2008. But the choice to focus on bank soundness alone is not inevitable. The Fed also has responsibility to supervise BHCs with an eye toward financial stability.¹³² What does it mean for climate-related risk to threaten financial stability? Though the Fed may not need or want to articulate a complete account of its understanding of an answer to that question, it also need not limit its answer to the goal of keeping large banks "dry in the storm." At the very least, the Fed has the option of incorporating some non-soundness considerations into its CSA, so as ensuring that supervised BHCs contribute to the reliable provision of credit and liquidity throughout the economy.¹³³ In its efforts to date, though, the Fed has remained focused solely on soundness.

IV. LIMITS OF THE STRESS TESTING TEMPLATE

The Fed's CSA efforts mark significant steps in the development of climate-aware financial regulation and supervision in the United States. They exemplify an experimentalist process of learning about a new source of uncertainty and potential upheaval for the financial system. As starting points, they may provide "useful lessons to inform subsequent improvements" to the Fed's climate-related oversight.¹³⁴ In an incrementalist vein, the Fed has focused attention on filling climate data gaps and improving the models that drive today's approach to CSA.¹³⁵ This Part presents a critique that aims a level deeper. It criticizes the Fed's approach to CSA on the ground that it hews too closely to the post-Crisis stress testing template. That template embeds basic risk-analysis and risk-framing choices that fail to meet the challenges of climate-related uncertainty. It too readily embraces large

¹³¹ See Final Interagency Principles, *supra* note 18, at 74184 ("The agencies did not incorporate suggestions . . . that extend beyond the agencies' statutory mandates relating to safety and soundness.").

¹³² See 12 U.S.C. § 1844(c)(2)(A) (2018).

¹³³ See 12 U.S.C. § 5323(a)(2) (2018).

¹³⁴ Brainard, Remarks at the 2021 Federal Reserve Stress Testing Conference, *supra* note 69.

¹³⁵ See FED PILOT REPORT, *supra* note 15, at 2.

banks as partners in developing climate-related risk discourse; it demands too much quantitative precision of scenario outcomes; and it unduly limits analysis of its scenarios' effects on financial stability to the narrow question of whether large banks will remain sound.

A. Large Banks as Discourse Partners

As discussed in Part III.B above, the Fed's stress tests engage closely with the largest banks in the United States, many of which are "too big to fail." As a means of learning more about the possibility of a climate-driven failure of such a bank, the Fed has chosen to focus its CSA efforts on the largest of its supervised banks, as well. Of the more than 4,000 banks insured by the FDIC in the United States, only a few dozen are owned by BHCs presently involved in the Fed's efforts to engage in CSA.¹³⁶ The pilot exercise worked with six of the largest money-center banks; the Fed's guidance limits its attention to banks with \$100 billion in consolidated assets or more.¹³⁷ Making the largest banks in the country the locus of CSA engagement is a policy choice, not a programmatic necessity. It will influence which types of risks become prominent in supervisory, regulatory, and broader public discourse by elevating the perspectives taken by the banks participating in—and exercising a great deal of discretion to craft the contours of—the Fed's CSA efforts.

The Fed undoubtedly has good reasons for engaging exclusively and collaboratively with the largest banks it supervises. Many of the banks in the CSA target set are "too big to fail" institutions. It is excellent policy to safeguard them against plausible climate-related causes of failure and instability. Focusing on the largest banks also ensures that smaller institutions are not competitively hamstrung by disproportionate compliance costs. Finally, the largest banks are best equipped to contribute resources

¹³⁶ See *supra* notes 109–110 and accompanying text (discussing the coverage of the federal banking agencies' CSA proposal); FED. DEPOSIT INS. CORP., STATISTICS AT A GLANCE (Mar. 31, 2023), <https://perma.cc/PS3U-QJYC> (listing 4,672 depository institutions insured by the FDIC).

¹³⁷ See Final Interagency Principles, *supra* note 18, at 74183. A further 4,000 or so federal credit unions also are unlikely to be subject to CSA standards; their regulator, the National Credit Union Administration ("NCUA") has taken an affirmatively hands-off approach to climate risk. While the NCUA has acknowledged the reality of climate-related financial risk, it has not contemplated any programmatic heightened supervision related to it. Instead, the Administration has emphasized that it "does not intend to micromanage" credit union lending choices from a climate risk management perspective. NAT'L CREDIT UNION ADMIN., 2022 ANNUAL PERFORMANCE PLAN 46 (Mar. 2022), <https://perma.cc/M8YK-VGBF>.

to collaborative development of CSA tools and processes.¹³⁸ If the Fed is on the fence about pursuing a given CSA effort, then the incentive and ability of large banks to partner with the Fed may tip the scales in favor of conducting CSA collaboratively. The willingness of the six banks that participated in the Fed pilot illustrates the idea.

But despite these good reasons for collaborating with large banks, countervailing considerations should give the Fed pause. At present, the Fed is delegating many CSA responsibilities to the banks themselves. While this leverages nongovernmental capacity in service of the CSA project, delegation, especially at this stage of CSA's nascent development as a technique, is a risky proposition. In supervising CSA, the Fed cannot act as an all-powerful policing agency, so much as an embedded discourse partner with a nominal advantage in bargaining power but a real disadvantage in information and capacity. The banks' information and capacity advantages are general, in that banks' internal systems almost always produce better knowledge about bank activities for the banks' purposes than they do for the supervisors' purposes.¹³⁹ Further, the banks also have context-specific advantages regarding CSA because they have begun to develop climate expertise for their own purposes. Their power gives them ability to influence the emerging agenda and terms of discourse over climate-related financial risk.

Take the three largest bank holding companies in the United States: JPMorgan, Bank of America, and Citigroup.¹⁴⁰ Together, these three giants hold over \$9 trillion in total assets on their balance sheets.¹⁴¹ For a range of reasons, each has begun engaging in voluntary CSA.¹⁴² Like the Fed's, their efforts are largely experimental. Between 2019 and 2020, for instance, Citigroup

¹³⁸ On the collaborative model generally, see David Zaring, *The Corporatist Foundations of Financial Regulation*, 108 IOWA L. REV. 1303 (2023).

¹³⁹ The proliferation of information that is, in principle, digitally accessible to supervisors does not undermine the point. Rather, the issue arises due to system design and the costs of sifting through the information overload. See Julie E. Cohen, *The Regulatory State in the Information Age*, 17 THEORETICAL INQ. L. 1, 11–16 (2017).

¹⁴⁰ See National Information Center, *supra* note 110.

¹⁴¹ See *id.*

¹⁴² See BANK OF AMERICA, TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES (TCFD) REPORT: MANAGING OUR FUTURE 27–30 (2022), <https://perma.cc/QN6Y-S4A5>; CITIGROUP, TASKFORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES REPORT 2022: CITI'S APPROACH TO CLIMATE CHANGE AND NET ZERO 45–46 (2022), <https://perma.cc/S7EV-UJD5>; JPMORGAN CHASE & CO., 2022 CLIMATE REPORT 42–44 (Dec. 2022), <https://perma.cc/VZ3K-QMTQ>.

conducted four targeted scenario analyses.¹⁴³ One examined the effect of a “sudden” carbon tax on the bank’s oil and gas industry exposures.¹⁴⁴ Another explored the potential effects of extreme weather on the bank’s operations.¹⁴⁵ A third studied potential long-term physical risks to a portfolio of commercial real estate and agricultural collateral.¹⁴⁶ A fourth studied potential long-term transition risks to the same portfolio.¹⁴⁷ Though JPMorgan and Bank of America offer less detail in their public disclosures about scenario design, their approaches appear similar Citigroup’s, in that they examine only subsets of portfolios and only analyze the effect of exemplary risks.¹⁴⁸

How should Fed policymakers evaluate these efforts in light of the public goals of CSA? To be sure, these voluntary efforts may be producing governance effects within the banks. Bank of America states that in 2022, it began incorporating climate-related risk scenarios into the processes that it uses to inform its “capital planning . . . and overall risk management.”¹⁴⁹ Citigroup reported that climate-related risks may lead it to impose internal credit-rating downgrades on counterparties and suggested that in the future, the bank may “need to consider adjustments to . . . credit parameters” that explicitly reflect climate-related risks.¹⁵⁰ Taken together, these efforts represent evidence that banks themselves take the management of climate-related risks to be a part of a prudent risk management program. Their actions lend some support the theoretical claim that “[w]ell-managed banks” will likely be able to “adjust” to climate-related risks in a safe and sound manner.¹⁵¹

But economic theory also suggests that large banks’ incentives to control their exposures to climate-related risk remain weaker than the socially optimal level. All banks benefit from

¹⁴³ See CITIGROUP, FINANCE FOR A CLIMATE-RESILIENT FUTURE II: CITI’S 2020 TCFD REPORT 20 (2020), <https://perma.cc/8WVK-4V3K>.

¹⁴⁴ See *id.*

¹⁴⁵ See *id.*

¹⁴⁶ See *id.*

¹⁴⁷ See *id.*

¹⁴⁸ In 2022, for instance, JPMorgan stated that it had explored transition risk by applying NGFS scenarios to different economic sectors and individual credit counterparties. See JPMORGAN CHASE & CO., *supra* note 142, at 44. See also BANK OF AMERICA, *supra* note 142, at 27 (stating that Bank of America had examined “a subset of energy clients to evaluate transition risk and a subset of mortgages to evaluate potential physical risk impacts”).

¹⁴⁹ Bank of America, *supra* note 142, at 27–30.

¹⁵⁰ Citigroup, *supra* note 142, at 28.

¹⁵¹ Skinner, *supra* note 20, at 1319–20.

governmental support in times of financial turmoil, and the largest, systemically important banks continue to benefit far more than others.¹⁵² This produces a moral hazard problem that, absent countervailing measures, leads to socially wasteful risk-taking. Just as SIFIs are motivated to arbitrage bank capital requirements to amplify their risk, so too do they have incentives to take socially suboptimal precautions with regard to climate-related risk.¹⁵³ Worse, the fact of government support leads to increases in firm size that further create conditions allowing suboptimal risk management absent countervailing measures. Namely, these increases in firm size undermine the disciplinary mechanism of the market for corporate control and produce firm governance complexity that renders large banks “too big to manage.”¹⁵⁴ All told, the governmental oversight of bank risk management represents Congress’s attempt to correct the incentive misalignment at the heart of banking.

The Fed’s approach to CSA gives the large banks ample opportunity to act on their flawed incentives. In the pilot, for instance, the large banks were in charge of designing an “idiosyncratic” physical shock scenario to which to subject themselves.¹⁵⁵ For this, they had the discretion to choose a hazard event that could take place in one of ten geographic regions, as long as the event and the region chosen would be material to the firm’s commercial and residential real estate exposures.¹⁵⁶ While the banks were tasked with providing qualitative justifications for their materiality determinations and for the fit between their hazards and standardized climate projections made by the Intergovernmental Panel on Climate Change (IPCC), the supervisory approach granted them a wide zone of discretion.¹⁵⁷ The banks also took a wide variety of different approaches to calculating the impact of scenarios on their portfolios.¹⁵⁸ Beyond the pilot, the Fed’s

¹⁵² See Saule T. Omarova, *The “Too Big to Fail” Problem*, 103 MINN. L. REV. 2495, 2500–01 (2019).

¹⁵³ See Erik T. Gerding, *The Dialectics of Bank Capital: Regulation and Regulatory Capital Arbitrage*, 55 WASHBURN L.J. 357 (2016).

¹⁵⁴ See Jeremy C. Kress, *Solving Banking’s “Too Big To Manage” Problem*, 104 MINN. L. REV. 171, 173 (2019); Mark J. Roe, *Structural Corporate Degradation Due to Too-Big-to-Fail Finance*, 162 U. PA. L. REV. 1419 (2014).

¹⁵⁵ See FED PILOT PARTICIPANT INSTRUCTIONS, *supra* note 100, at 8.

¹⁵⁶ See *id.* at 14–15.

¹⁵⁷ See *id.* (stating that “[p]articipants should provide a qualitative description and rationale supporting the selection of the particular hazard and geographic region based on materiality for their real estate portfolios” and that selected hazards must be consistent with climatic conditions projected by the IPCC).

¹⁵⁸ See FED PILOT REPORT, *supra* note 15, at 29–30.

supervisory guidance delegates CSA design to the covered banks for incorporation into their risk management and corporate governance practices.¹⁵⁹

When exercising discretion given to them by the Fed, the large banks will take the opportunity to select scenarios and employ techniques of analysis that paint themselves in a good light. Incentives to project overoptimism are endemic due to the basic misalignment between their interests and the social interest discussed above.¹⁶⁰ This was a serious problem with the delegation of risk-management model selection to banks before the Global Financial Crisis;¹⁶¹ it remains a problem facing the designers of today's bank stress tests.¹⁶² When conveying information about their risks to supervisors, they will depict their activities as safer than they are so that they may take on more risk. Banks also wish to avoid creating the appearance of financial distress due to the dynamics of bank runs. When information is thin or costly to acquire, a bank's counterparties and depositors may react to bad news by heading for the exits.¹⁶³ These incentives drive many financial firms to project confidence and stability to their supervisors and the public, no matter the circumstances.

The same incentives will lead them to design overly rosy climate scenarios and employ optimistic models. While it is true that the JPMorgans of the world are engaging in their own CSA exercises without regulatory prompting, that does not mean they are being tough on themselves. Instead, to avoid negative economic consequences, they would be reluctant to disclose serious climate-related risks to their supervisors or the public. Such disclosures would attract scrutiny, remedial sanctions, and reputational damage, thereby dimming sentiment among investors and

¹⁵⁹ See Final Interagency Principles, *supra* note 18, at 75270 ("Management should develop and implement climate-related scenario analysis frameworks in a manner commensurate to the financial institution's size, complexity, business activity, and risk profile. These frameworks should include clearly defined objectives that reflect the financial institution's overall climate-related financial risk management strategies. These objectives could include, for example, exploring the impacts of climate-related financial risks on the financial institution's strategy and business model, identifying and measuring vulnerability to relevant climate-related financial risk factors including physical and transition risks, and estimating climate-related exposures and potential losses across a range of scenarios, including extreme but plausible scenarios.").

¹⁶⁰ See *supra* notes 151–153 and accompanying text.

¹⁶¹ See Erik Gerding, *Code, Crash, and Open Source: The Outsourcing of Financial Regulation to Risk Models and the Global Financial Crisis*, 84 WASH. L. REV. 127, 180–82 (2009).

¹⁶² See Hirtle & Lehnert, *supra* note 7, at 344.

¹⁶³ See Kathryn Judge, *Information Gaps and Shadow Banking*, 103 VA. L. REV. 411, 453–57 (2017).

counterparties. While banks have incentives to avoid climate-related losses, they prefer not to preemptively reveal serious climate-related risks to regulators and the public. Instead, they prefer to appear virtuous by providing assurances of their insulation from serious climate-related risk.

If the large banks are canny in their use of delegated power over the CSA process, they will shape it to fit their own purposes. Scenarios will remain rosy; data demands will be tempered; policy concerns that do not align with the banks' own interests will be relegated to the background or pushed out of the frame. Through such discursive effects, the particular form of collaboration taking shape between large banks and the Fed may place CSA on a bad path for years to come.

While the Fed can attempt to police the large banks' use of discretion, there are reasons to worry it could be ineffectual. Policing the substance of CSA requires knowledge that the Fed does not yet possess. To develop that expertise will require investment in personnel and knowledge not presently core to the Fed's institutional identity.¹⁶⁴ In the context of the stress tests, the Fed has developed the ability to apply a steadying hand through repeated engagement in the calculative details of the exercise.¹⁶⁵ Indeed, the Fed conducts much independent analysis, separate from banks' own calculations, to ensure the reliability of stress test results. In the CCAR program, for instance, "[s]upervisors independently project values for each line of a bank's business, calculate the bank's hypothetical future interest income and fee income, its noninterest expense and charge-off rates" in light of stress scenarios, exercising judgment in crafting their own "holistic picture[s]" of bank financial health along the way.¹⁶⁶ It remains to be seen whether the Fed will have similar wherewithal for CSA.

Instead, a longstanding practice of purely procedural oversight seems to be manifesting itself in some aspects of the early CSA efforts.¹⁶⁷ For instance, the Fed's supervisory guidance on CSA discusses supervising the process of scenario design and analysis, but its engagement with substance is limited to generalities.¹⁶⁸ And in its discussion of the pilot exercise, the Fed has

¹⁶⁴ See Conti-Brown & Wishnick, *supra* note 29, at 648–51; Condon, *Climate Services*, *supra* note 29, at 197–99.

¹⁶⁵ See Hirtle & Lehnert, *supra* note 7.

¹⁶⁶ See Menand, *supra* note 96, at 1580.

¹⁶⁷ On this proceduralist form of supervision, see *id.*

¹⁶⁸ See Final Interagency Principles, *supra* note 18, at 74188.

reported on the banks' modes of analysis without much commentary.¹⁶⁹ It has shied away from suggesting that it may take a stronger hand to the rudder in future efforts.

Apart from the role of incentive misalignment, engaging solely with the largest banks will affect early climate-related risk discourse in another way, too. It will leave smaller regional banks out of the picture. In the climate-related risk context, this is harmful because regional banks and smaller banks focused on particular industries may be on the front lines of physical risk and transition risk. Many regional banks specialize in activities are tied to specific industries and geographies.¹⁷⁰ For instance, some lend heavily to various types of energy companies; some to agricultural companies; some to local real estate ventures.¹⁷¹ Such banks may be particularly susceptible to idiosyncratic physical and transition risks to their concentrated asset portfolios. Indeed, their business models make them more susceptible to climate-driven losses than the largest banks, despite being exempt from CSA coverage.

Climate risk for regional banks is not merely a safety-and-soundness issue, either. In addition, it has potential systemic significance. Its systemic significance is not due to the typical "too big to fail" model that implicitly animates regulators' outsized focus on the largest banks; it is due to the threat of correlated failures.¹⁷² Consider a scenario in which twin disasters hit a region in quick succession. Banks with exposure to commercial real estate, agricultural, and energy assets will all suffer simultaneously; even if any one of them is not systemically important on their own, the prospect of correlated failure may nevertheless strain the financial system. CSA that looks only to the largest banks will fail to prepare bankers and policymakers for such turmoil.

B. Demand for Detailed Quantification

Stress testing aims to develop detailed, quantitative understandings of the effects of adverse economic scenarios on bank

¹⁶⁹ See generally FED PILOT REPORT, *supra* note 15.

¹⁷⁰ See CLIMATE-RELATED MKT. RISK SUBCOMM. OF THE MKT. RISK ADVISORY COMM., COMMODITY FUTURES TRADING COMM'N, MANAGING CLIMATE RISK IN THE U.S. FINANCIAL SYSTEM 32–37 (2020), <https://perma.cc/8HP4-V2UH>.

¹⁷¹ See Kristian Blikle, Cecilia Parlato & Anthony Saunders, *Specialization in Banking* (Nat'l Bureau of Econ. Res. Working Paper Series, Working Paper No. 31077, Mar. 2023).

¹⁷² On the threat of correlated failures generally, see Ian Ayres & Joshua Mitts, *Anti-Herding Regulation*, 5 HARV. BUS. L. REV. 1, 30–32 (2015).

portfolios. Troves of data inform it, and its analytical engine comprises complex models. In keeping with the stress testing template, the Fed is developing CSA to achieve quantitative precision in its analytical outputs. This Subpart argues that this calculative precision comes with disadvantages that may outweigh the insights it produces.

To see just how precise the Fed's CSA aims to be, consider its approach to physical risk scenario analysis in the pilot CSA exercise. Though the process begins with qualitative narratives—for instance, “a severe hurricane (or a series of hurricanes) resulting in both storm surge and precipitation-induced flooding in the Northeast region of the United States”¹⁷³—it moves quickly into quantitative territory. Participating banks are instructed to predict the storm scenario's effects on residential and commercial real estate portfolios not in general terms, but rather in terms of effects on every single loan in the portfolios.¹⁷⁴ They must “provide loan- or facility-level projections” regarding effects on metrics such as probability-of-default and loss-given-default and document assumptions regarding physical impacts, the presence or absence of insurance coverage, and background climatic conditions affecting factors such as sea level rise and precipitation levels.¹⁷⁵ They must do so in standardized data templates developed for the occasion, which demand risk metrics estimated down to the basis point.¹⁷⁶ This is not an exercise in Royal Dutch Shell-style grand-strategic imagination.

To be sure, there are good reasons to engage in CSA with the aim of producing precise, quantified assessments of scenario consequences. Quantified estimates of risk exposures are important components of bank risk management. If the goal is to integrate climate consciousness into banks' risk management functions, then developing modes of precise quantification may increase the likelihood of broad integration. Doing so also leverages existing quantitative expertise within banks and the Fed supervisory corps. Finally, it lays groundwork for incorporating climate-related scenarios into its existing supervisory stress testing process. “Climate stress tests” would attach capital requirements to climate risk management outcomes.¹⁷⁷ Though the idea is politically

¹⁷³ FED PILOT PARTICIPANT INSTRUCTIONS, *supra* note 100, at 13.

¹⁷⁴ *Id.* at 16–17.

¹⁷⁵ *Id.* at 14, 17–18.

¹⁷⁶ *See id.* at 38.

¹⁷⁷ *See Gelzinis, supra* note 37.

controversial,¹⁷⁸ the institutional proponents of CSA may wish to ensure it is possible.

Despite these advantages and strong institutional forces tending toward precise quantification, there are serious disadvantages that counsel in favor of exploring qualitative—or at least, less calculation-intensive—alternatives to today’s version of CSA.

Crucially, the current version of CSA limits the number of scenarios that any given CSA effort can consider. Data-intensive CSA can only be applied to scenarios and subjects for which data are available. And even when data are available, calculating precise outcomes for given scenarios under the Fed’s preferred approach currently seems to be costly. Despite over a year of preparation and a year of active analysis, the Fed pilot only explored variations on four scenarios per BHC.¹⁷⁹ Holding budget constant, a higher “cost per scenario” entails a lower number of scenarios explored.

This approach goes against best practices in the scenario analysis literature. A broad spectrum of scenarios is typically viewed as necessary to make full use of scenario analysis as a tool for planning and risk-management under conditions of uncertainty.¹⁸⁰ Scenarios are not meant to function as predictions; rather, they are meant to play the epistemic role of prompting planners to develop detailed assessments of plausible and sharply divergent futures. Scholars working in fields outside of financial regulation have increasingly embraced scenario analysis for this purpose.¹⁸¹ In the wake of the banking turmoil of 2023, financial regulation scholars have also extolled the virtue of greater

¹⁷⁸ See Pete Schroeder, *Insight: Wall Street Sees First Fed Climate Change Review in 2023*, REUTERS (Nov. 17, 2021), <https://perma.cc/MXE7-C4PM> (quoting Dimon as saying capital implications are “unavoidable” once supervisors “figure out what they really want to stress test”); Press Release, U.S. Sen. Comm. on Banking, Hous., and Urb. Affs., Toomey on Fed’s New “Pilot Climate Scenario Analysis”: A Stress Test By Another Name (Sept. 29, 2022), <https://perma.cc/QD8H-4L5E>; see also Press Release, Better Markets, *Federal Reserve’s Climate Scenario Analysis Is a Welcome First Step in Addressing Climate Risks but Must Have Supervisory Consequences* (Sept. 29, 2022), <https://perma.cc/WT22-S22L> (arguing that “[s]imply having a better understanding of the risks is not enough”).

¹⁷⁹ These were a Fed-specified hurricane, an “[i]diosyncratic [physical] hazard chosen by each participant, and two scenarios designed by the NGFS. See FED PILOT REPORT, *supra* note 15, at 5.

¹⁸⁰ See, e.g., Daniel Farber, *Uncertainty*, 99 GEO. L.J. 901, 934–35 (2011); Rafael Ramírez & Cynthia Selin, *Plausibility and Probability in Scenario Planning*, 16 FORESIGHT 54, 55–56 (2014) (discussing the practice of scenario analysis under conditions of uncertainty).

¹⁸¹ See VERCHICK, *supra* note 74, at 239–49; Van Loo, *supra* note 30, at 588–91.

scenario diversity in the stress testing context.¹⁸² The Office of Management and Budget also encourages executive agencies conducting regulatory analysis to examine wide ranges of plausible scenarios when facing conditions of uncertainty.¹⁸³ On top of avoiding “the pitfall of projecting a single probable future when vastly different outcomes are possible,” the analysis of many scenarios also forces planners into imaginative engagement with a range of possible changes to the environment in which they work.¹⁸⁴

The Fed, at least in principle, agrees with the idea that a wide range of scenarios ought to be employed in light of “the lack of relevant historical data; complex feedback effects that are difficult to model; and uncertain links between climate change and economic and financial outcomes.”¹⁸⁵ The Financial Stability Oversight Council, too, has stated that CSA is best thought of as a tool for helping institutions build resilience in relation to a wide range of climate risks, especially those that may diverge from historical precedent.¹⁸⁶ To make good on the promise of CSA, more scenarios—and scenarios not chosen by firms themselves—are necessary. But the costs of detailed calculation are a hindrance.

Those costs have a second-order consequence, as well. Think back to Subpart IV.A’s concerns about excluding regional banks from the purview of CSA. The attractiveness of including them trades off against concerns over undue compliance burdens. Any attempt to extend a resource-intensive version of CSA to regional banks would likely face strenuous opposition. Only a stripped-down version of CSA would have a chance.

A second disadvantage of the Fed’s current commitment to detailed quantification in CSA is that it demands the use of standardized scenarios and models. These models are substantively problematic, and their standardization gives rise to worries about the problem of model monoculture.

At present, banks must rely heavily on components developed by the NGFS. The NGFS storylines that produce different

¹⁸² See Sarin & Scheurmann, *supra* note 10, at 4.

¹⁸³ See Office of Mgmt. & Budget, Circular A-4 at 18, 39 (Sept. 17, 2003); see also Office of Mgmt. & Budget, Circular A-4 at 28, 68 (Draft for Public Review, April 6, 2023) (proposing revisions to Circular A-4).

¹⁸⁴ See VERCHICK, *supra* note 74, at 239–49; Farber, *supra* note 180, at 935.

¹⁸⁵ FED PILOT PARTICIPANT INSTRUCTIONS, *supra* note 100, at 4.

¹⁸⁶ See FIN. STABILITY OVERSIGHT COUNCIL, *supra* note 73, at 89–90.

configurations of physical and transition risks may be classified within the following matrix.¹⁸⁷

	Climate Targets Met	Climate Targets Not Met
Disorderly Transition	<i>Disorderly:</i> Sudden and unanticipated response is disruptive but sufficient enough to meet climate goals	<i>Too little, too late:</i> We don't do enough to meet climate goals, the presence of physical risk spurs a disorderly transition
Orderly Transition	<i>Orderly:</i> We start reducing emissions now in a measured way to meet climate goals	<i>Hot house world:</i> We continue to increase emissions, doing very little, if anything, to avert physical risks

Grouping the scenarios in these storylines can, in theory, motivate engagement and ground deliberation among participants in a CSA.¹⁸⁸ The two quadrants in the lefthand column envision a future where global society gets its greenhouse under control. The “Orderly” scenarios depict a world in which “climate policies are introduced early and become gradually more stringent,” resulting in global decarbonization paired with lower intensities of physical and transition risk.¹⁸⁹ By contrast, the “Disorderly” scenarios imagine decarbonization policies adopted on a slower schedule, with “divergen[ces] across countries and sectors,” resulting in higher transition risk.¹⁹⁰ Turning to the two quadrants in the righthand column, these represent comparative failures to decarbonize global economies. The “Hot House World” scenarios envision a world where “some climate policies are implemented in some jurisdictions,” but they are weak and allow a severe trajectory for physical risk.¹⁹¹ Finally, the “Too Little, Too Late” scenarios would

¹⁸⁷ The chart and language therein comes from Patrizia Baudino & Jean-Philippe Svoronos, *Stress-Testing Banks for Climate Change: A Comparison of Practices*, BANK FOR INT'L SETTLEMENTS FIN. STABILITY INST. 14 (July 2021), <https://perma.cc/HC8M-JMF7>. See *Scenarios Portal: Introduction*, NGFS (last accessed July 28, 2023), <https://perma.cc/7UM5-V888>; *Scenarios Portal: Explore Scenarios*, NGFS (last accessed July 28, 2023), <https://perma.cc/KPF5-HYBV>.

¹⁸⁸ See generally JAMES A. DEWAR, ASSUMPTION-BASED PLANNING: A TOOL FOR REDUCING AVOIDABLE SURPRISES 128–45 (2002) (discussing the role of “vivid” stories in effective scenario analysis).

¹⁸⁹ *Scenarios Portal: Introduction*, *supra* note 187.

¹⁹⁰ *Id.*

¹⁹¹ *Id.*

envision a disorderly transition coming even later in time, thereby exacerbating physical risks.¹⁹² The Fed’s pilot CSA employs the NGFS scenarios, specifically those fitting the “Hot House World” and “Net Zero 2050” storylines.¹⁹³

The prospect of heavy reliance on NGFS raises an important concern: the prospect of what financial economists call “model monoculture.”¹⁹⁴ Model monoculture refers to the situation where the risk management technologies employed by financial firms conform to a single approach and therefore succeed and fail together.¹⁹⁵ Given that every model at best imperfectly maps to reality, model monoculture makes the entire financial system less stable. That is why supervisors have endeavored to avoid it in the stress testing context, for instance by shielding banks from information about each other’s internal models and results¹⁹⁶ and maintaining secrecy over models employed by supervisors for their own analysis.¹⁹⁷

In the context of CSA, there are substantive reasons to want to avoid model monoculture centered on NGFS, in particular. They rely on standardized models of transition pathways, which inform separate models for physical and macroeconomic impacts.¹⁹⁸ The transition pathway models are known as process-based integrated assessment models (“IAMs”), and they bear the imprimatur of the Intergovernmental Panel on Climate Change (“IPCC”).¹⁹⁹ These produce a high-level picture of decarbonization and its results, which inform a projection of global temperature outcomes and attendant physical risk outcomes.²⁰⁰ Those temperature projections in turn feed into a damage function that

¹⁹² *Id.*

¹⁹³ See FED PILOT PARTICIPANT INSTRUCTIONS, *supra* note 100, at 8.

¹⁹⁴ Hirtle & Lehnert, *supra* note 7, at 344–45; see Condon, *supra* note 29, at 198 (noting that “ubiquitous use of one model can magnify its blind spots”).

¹⁹⁵ See Greg Feldberg & Andrew Metrick, *Stress Tests and Policy*, 3 J. FIN. CRISES 1, 11 (2021); Hirtle & Lehnert, *supra* note 7, at 344–45. Note that this meaning of “model monoculture” is closely related to, but slightly different, from the concern over incentives to adopt correlated asset portfolios in response to similar modeling practices across banks. See Feldberg & Metrick, *supra* note 195, at 5.

¹⁹⁶ See Feldberg & Metrick, *supra* note 195, at 5.

¹⁹⁷ See Itay Goldstein & Yaron Leitner, *Stress Testing and Disclosure: Theory, Practice, and New Perspectives*, in HANDBOOK OF FINANCIAL STRESS TESTING 208 (J. Doyme Farmer et al., eds., 2022).

¹⁹⁸ See Irene Monasterolo, María J. Nieto & Edo Schets, *The Good, The Bad and the Hot House World: Conceptual Underpinnings of the NGFS Scenarios and Suggestions for Improvement* 10 (Banco de España, Occasional Paper No. 2302, 2023), <https://perma.cc/G9M3-CB9Y>.

¹⁹⁹ *Id.*

²⁰⁰ *Id.*

employs annual temperature and precipitation to predict regional productivity.²⁰¹ Taken together, these interconnected models represent a standardized approach promoted by NGFS for sketching out potential futures at a scale granular enough to inform financial policymaking.

They bear the imprimatur of sophisticated scientists and economists, but these NGFS modeling decisions are all contestable—and indeed hotly contested.²⁰² In particular, critics have questioned the ways in which the models fail to capture regional variation in climatic impacts; abstract from climatic tipping points, such as the collapse of long-standing seasonal ocean currents and patterns of ice formation; neglect the potential for deep political instability; abstract from the reflexive influence of finance itself; and rely on the maturation of speculative technologies for energy production and carbon capture.²⁰³ While all climate models reflect difficult decisions about these and similar issues, the costs of mistakes grow in the context of model monoculture. Indeed, they are the flip side of the network effects that the NGFS itself celebrates surrounding the use of their scenarios.²⁰⁴ By building a large part of the Fed’s climate-related learning process atop the NGFS scenarios, they themselves may become systemically significant. That significance is itself risky, and it is a risk driven by the Fed’s demand for detailed quantification.

C. The Touchstone of Bank Soundness

The third problem with adhering to the stress testing template for CSA relates to the deeper framing of what “counts” as a statutorily significant climate-related financial risk. The prior Subparts examined ways in which the Fed’s CSA efforts may fall short of providing a comprehensive and accurate view of climate-related soundness risks among its supervised institutions. But now consider a future in which, with the help of CSA, the Fed’s

²⁰¹ *Id.*

²⁰² See Condon, *supra* note 31, at 292–94; Condon, *supra* note 29, at 167–71; Irene Monasterolo, *Climate Change and the Financial System*, 12 ANN. REV. RESOURCE ECON. 299, 300–01, 307–08 (2020); Madison Condon, *Damage Functions (or Why I Am Mad at Economists)*, LPE PROJECT (June 13, 2023), <https://perma.cc/WL8T-BAF7>.

²⁰³ See sources cited *supra* notes 198 & 202; Clifford Rossi, Matthew Lightwood & Robert Brammer, *Fed’s Climate Scenario Pilot Is a Waste of Time and Resources*, AM. BANKER (Feb. 3, 2023), <https://perma.cc/RU7C-HBLQ>.

²⁰⁴ See NETWORK OF CENTRAL BANKS AND SUPERVISORS FOR GREENING THE FIN. SYS., NGFS CLIMATE SCENARIOS FOR CENTRAL BANKS AND SUPERVISORS 2 (June 2021), <https://perma.cc/CJX8-Y2A9> (discussing the process of improving the NGFS scenarios between yearly iterations).

supervisees do remain resilient throughout the climate transition. This imagined future would no doubt be better than one in which a climate-driven financial crisis contributed another vector to the dynamic “polycrisis” of our times.²⁰⁵ But it would only reflect half of the story.

To remain resilient against climate-related risks, financial institutions need to practice effective risk management, and that risk management comes with a dark side. Successful climate risk management by big banks will have downstream effects on the real economy, and it will have effects on the politics of financial provision. These effects are important to the statutory project of financial stability, and they pose challenges to the vindication of the broader, functional goals of the financial regulatory state. But they will not appear in the official picture of climate-related financial risk produced by CSA efforts administered according to the Fed’s current stress test template. At present, the Fed’s CSA efforts are *only* oriented toward the soundness of large banks. This frame is important but limited. Crucially, it fails to engage with the secondary effects of climate-related risk management undertaken by the banks the Fed supervises. This failure leaves important sources of financial destabilization beyond the Fed’s horizons.

To understand the collateral consequences of effective climate risk management, consider bank exposure to the residential mortgage market. Though mortgage lenders are not on the front lines of climate-related losses in the same way insurers are, they still bear downside risk in cases of physical disaster.²⁰⁶ When they do, they respond in predictable fashion: by rationing credit, increasing prices, or exiting markets altogether.²⁰⁷ Such price increases and provider exits from mortgage markets can transmit

²⁰⁵ See Jonathan Zeitlin, Francesco Nicoli & Brigid Laffan, *Introduction: the European Union Beyond the Polycrisis? Integration and Politicization in an Age of Shifting Cleavages*, 26 J. EUR. PUB. POL’Y 963, 963 (2019) (analyzing how “several simultaneous crises . . . affecting multiple policy domains” can “fractur[e] the cohesion” of a polity); Adam Tooze, *Welcome to the World of the Polycrisis*, FIN. TIMES (Oct. 28, 2022), <https://perma.cc/3CKN-MD6X> (employing the term to analyze the dynamics of climate change).

²⁰⁶ See Carolyn Kousky, Mark Palim & Ying Pan, *Flood Damage and Mortgage Credit Risk: A Case Study of Hurricane Harvey*, 29 J. HOUS. RES. S86, S89–S91 (2022); see Parinitha Sastry, *Who Bears Flood Risk? Evidence from Mortgage Markets in Florida* (Dec. 2, 2022) (unpublished manuscript) (finding that lenders ration credit when required to retain Florida flood risk).

²⁰⁷ See Sastry, *supra* note 206; Jesse M. Keenan & Jacob T. Brandt, *Underwaterwriting: from Theory to Empiricism in Regional Mortgage Markets in the U.S.*, 162 CLIMATIC CHANGE 2043 (2020).

valuable signals to households and businesses that it is time to adapt to climate change. But they also create financial instability for households in regions where mortgage access dries up. Worse, the harms of these effects may fall in ways that exacerbate racial and wealth-based inequality.²⁰⁸

How will climate-related risk factors in the mortgage market influence banks that the Fed supervises? Large banks that hold mortgage debt and various other forms of housing finance-related assets may scrutinize their activities and take self-protective action. The Fed's current CSA framework certainly is not blind to this reality. For instance, the banks involved in the Fed's pilot were keen to highlight that "their ability to rebalance their portfolios over the forecast horizon could significantly mitigate risk."²⁰⁹ But the question of how risk-mitigation by large players might affect market functioning is left unasked. That question would require looking beyond the soundness of large banks for effects on financial stability.

Under authority provided by the Dodd-Frank Act, the Fed may examine its supervised banks with an eye toward financial stability. Specifically, the Fed can do so to learn about "the financial, operational, and other risks within the bank holding company system that may pose a threat to . . . the stability of the financial system of the United States."²¹⁰ While Congress did not define the concept of financial stability directly, it did enumerate considerations for FSOC to weigh when determining whether an institution's failure would pose a financial stability threat.²¹¹ These include effects on access to credit among households and businesses, especially those in "low-income, minority, or underserved communities."²¹² The concept of financial stability, according to Congress itself, is more capacious than the Fed's CSA frame.

In addition to the mortgage market, the Fed's CSA work to date leaves other potentially destabilized portions of the financial

²⁰⁸ These possibilities were recently given the monikers of "underwaterwriting" and "bluelining" in the context of flood risk, to refer to risk-averse pricing and market coverage decisions, and to evoke the unjust history of residential redlining. See Keenan & Brandt, *supra* note 207.

²⁰⁹ FED PILOT REPORT, *supra* note 15, at 11.

²¹⁰ 12 U.S.C. § 1844(c)(2)(A) (2018); *cf. also* 12 U.S.C. § 5365(i)(1)(B)(iii) (2018) (enabling the Fed to "develop and apply such other analytic techniques as are necessary to identify, measure, and monitor risks to the financial stability of the United States" when stress testing nonbank SIFIs and large bank holding companies).

²¹¹ See 12 U.S.C. § 5323(a)(2) (2018).

²¹² See *id.* For a detailed look at the concept of financial stability, see Allen, *supra* note 45.

system unexamined. For instance, the collateral consequences of effective climate-related risk management may be even more stark in the realm of insurance. BHCs both support and rely upon firms in many insurance markets, and those firms contribute crucial threads to the social safety net.²¹³ Homeowners' insurance, for instance, enables households to prepare for exigencies and hedge against the risk that their residences may lose significant value in an instant.²¹⁴ Indeed, without homeowners' insurance, it is impossible to obtain a standard mortgage.²¹⁵ Farmers similarly risk ruin without crop insurance, and businesses routinely hedge against upheaval by insuring their property, plant, and equipment.²¹⁶

But insurance transfers risk; it does not eliminate it. While the insurance contracting process can lead purchasers to mitigate their risks, for instance by investing in defenses against storm damage, there remains a residual risk that the insurer has chosen to bear.²¹⁷ When risk rises or becomes more volatile, insurers might attempt to raise prices or even exit a market altogether. To raise prices, insurers in many states must file for state regulatory approval.²¹⁸ When approval is not forthcoming—as has recently been the case for insurers like State Farm and Allstate in California, for instance—insurers can decide to stop writing new policies in a state.²¹⁹ Both types of climate response can be salutary, in that they protect insurers themselves against insolvency, and they transmit important signals through the marketplace about the real costs of living and working in places and businesses affected by climate-related risk.²²⁰ But the responses can also act to

²¹³ See Tom Baker & Karen McElrath, *Whose Safety Net? Home Insurance and Inequality*, 21 L. & SOC. INQUIRY 229, 229–31 (1996).

²¹⁴ See *Homeowners Insurance*, NAT'L ASSOC. OF INS. COMM'RS (last visited May 31, 2023), <https://perma.cc/6RU6-3C49>.

²¹⁵ See *id.*

²¹⁶ See LAM, *supra* note 34, at 111–26; Joseph W. Glauber and Keith J. Collins, *Crop Insurance, Disaster Assistance, and the Role of the Federal Government in Providing Catastrophic Risk Protection*, AGRI. FIN. REV. Fall 2002, at 81, 81–82.

²¹⁷ See CAROL A. HEIMER, *REACTIVE RISK AND RATIONAL ACTION: MANAGING MORAL HAZARD IN INSURANCE CONTRACTS* (1985).

²¹⁸ See Daniel Schwarcz, *Ending Public Utility Style Rate Regulation in Insurance*, 35 YALE J. ON REG. 941, 944–45 (2018).

²¹⁹ See Alyssa Lukpat, *Allstate Stops Selling New Home-Insurance Policies in California, Citing Wildfire Risks*, WALL ST. J. (June 5, 2023), <https://www.wsj.com/articles/all-state-stops-selling-new-home-insurance-policies-in-california-citing-wildfire-risks-28271741#>.

²²⁰ On the state's uneasy role in governing those incentives, see Omri Ben-Shahar & Kyle D. Logue, *The Perverse Effects of Subsidized Weather Insurance*, 68 STAN. L. REV. 571 (2016).

deprive households and businesses of a necessary form of financial provision.

The collateral consequences of private risk management related to insurance do not end there. When private financial institutions fray the social safety net by exiting a market that provides socially necessary financial products,²²¹ government-backed institutions often fill in—as has happened with the rise of Florida’s state-backed Citizens Property Insurance Corporation and comparable state-level public insurance providers.²²² Such institutions themselves must engage in prudent risk management or, failing that, seek increased governmental support.²²³ As the sociologist Rebecca Elliott has recently shown in a detailed study of the National Flood Insurance Program, the provision of such support tends to flow to those with organized political power.²²⁴ No wonder, then, that public provision of catastrophe insurance and disaster relief can have a range of disparate impacts across protected classes.²²⁵

Under any reasonable conception of financial stability, the hollowing-out of a region’s insurance or mortgage market would represent a financially destabilizing phenomenon. Yet, despite their significance, the collateral consequences of effective climate-related risk management will be left outside the frame of the Fed’s CSA efforts in their present guise. That is because those efforts are oriented toward the institutional core of the financial system. In essence, they ask: will large banks be able to survive coming storms? The question is important. But mere survival of the financial system’s core cannot be the lone objective of climate-aware financial regulation. Rather, it must also ensure that the

²²¹ See Baker & McElrath, *supra* note 213.

²²² See Carolyn Kousky, *Managing Natural Catastrophe Risk: State Insurance Programs in the United States*, 5 REV. ENV’T ECON. & POL’Y 153, 153–55 (2011); Joshua Chaffin, *A Broken Insurance Market Threatens Florida and Its Star Governor*, FIN. TIMES (Oct. 1, 2022), <https://perma.cc/3LAP-2ZZZ> (“As coverage has become scarce and expensive, record numbers of homeowners have flocked to a state-run insurer of last resort, Citizens Property Insurance Corp.”).

²²³ See Chaffin, *supra* note 222 (“If [Citizens Property Insurance Corporation’s] reserves are overwhelmed, taxpayers could face exposure.”); Leslie Scism & Arian Campo-Flores, *Florida Lawmakers Approve Property-Insurance Overhaul, Sending Bill to DeSantis*, WALL ST. J. (Dec. 14, 2022), <https://www.wsj.com/articles/florida-lawmakers-approve-property-insurance-overhaul-sending-bill-to-desantis-11671048780>.

²²⁴ See REBECCA ELLIOTT, UNDERWATER: LOSS, FLOOD INSURANCE, AND THE MORAL ECONOMY OF CLIMATE CHANGE IN THE UNITED STATES (2021); see also MICHELE LANDIS DAUBER, THE SYMPATHETIC STATE: DISASTER RELIEF AND THE ORIGINS OF THE AMERICAN WELFARE STATE (2013) (providing a legal and political history of public claims for disaster relief in the United States).

²²⁵ See Ben-Shahar & Logue, *supra* note 220.

financial system continues to serve its public purposes. On this front, the Fed's CSA efforts are missed opportunities to encompass a broader view of climate change's potential effects on BHCs' role in promoting financial stability.

V. POTENTIAL FUTURES FOR CSA

As with any risk-recognition technique, different approaches to CSA reflect the priorities and institutional conditions of their administrators.²²⁶ Right now, the Fed is employing CSA as an incrementally altered variant of its existing stress tests. This approach expresses a particular view about what "counts" as a normatively significant climate-related financial risk, but it is not locked into place.²²⁷ This Part explores possibilities for reform.

Subpart V.A describes possible alterations to the Fed's CSA initiatives that would expand the horizons of risk that they encompass. These center on possibilities for a lighter-touch CSA that aims to explore a wider range of scenarios and develop climate-related expertise inside the Fed itself. These possibilities would eschew detailed quantification and thereby free the Fed from its current reliance on data and analytical effort provided by large banks. They would also enable the Fed to produce valuable information about how climate-related upheavals may affect the provision of financial stability beyond merely ensuring that large banks stay "dry in the storm."

The shifts proposed in Subpart V.A would admittedly push against the tendencies of existing Fed supervisory culture. Subpart V.B discusses the prospects for reorienting that culture to support a different approach to CSA by augmenting personnel and its prevailing institutional role-definitions.

A. Experiments in CSA Form and Focus

Part IV critiqued the Fed's current approach to CSA on the grounds that it relies too heavily on the largest banks as partners in developing climate-related financial risk discourse, sacrifices flexibility by demanding detailed quantification of scenario outcomes, and neglects supervisory concerns beyond the touchstone

²²⁶ Cf. MICHAEL POWER, ORGANIZED UNCERTAINTY: DESIGNING A WORLD OF RISK MANAGEMENT 14–18 (2007) (discussing the organizational construction of risk analysis).

²²⁷ Put another way, if CSA, as a sociotechnical knowledge practice, "has politics," then its politics are contingent and malleable. Cf. Langdon Winner, *Do Artifacts Have Politics*, 109 DAEDALUS 121, 128 (1980) (distinguishing between technologies that are "relatively flexible" in their political import and those that "are by their very nature political in a specific way").

of bank soundness. To respond to each of these criticisms in future iterations of CSA, the Fed should consider pursuing a few complementary reforms.

First, to reduce the need for banks' granular data and analysis, the Fed should consider experimenting with qualitative forms of CSA. Rather than seeking to render precise predictions about the many connected climatic, social, economic, and financial phenomena leading to imagined scenario outcomes at the portfolio and asset level, qualitative approaches to CSA seek to understand the nuts and bolts of relationships between climate scenarios and banks' business lines.²²⁸ Which banks would, given their current balance sheets, be most likely to suffer significant losses under various climate-related scenarios? To answer this kind of question, the Fed needs basic information it can collect from preexisting supervisory filings and securities disclosures. It need not look beyond high-level data sources, and it need not put precise numbers on what "significant" means. How might those banks respond to the threats of the scenarios if they become probable? To answer this kind of question, the Fed needs a dynamic account of climate-related behavior, but it need not require quantification at all.

To develop qualitative CSA, the Fed could turn to narrative-based approaches to scenario analysis. These would rely on structured dialogue and collaboration between experts and Fed personnel.²²⁹ As Hillary Allen and Madison Condon have argued, narrative-based approaches are particularly suited for deliberations about climate-related harms due to the uncertainty and complexity attached to our nascent understanding of what might be coming our collective way.²³⁰ For Allen, narratives can provide accessible and engaging perspectives on sources of potential harm that financial regulatory discourse all too often leaves in the realm of the technocratic.²³¹ And Condon highlights that qualitative, expert-driven storyline exercises can both pick up where quantitative modeling leaves off and inform users' understanding of the science underpinning quantitative models.²³² The Fed is not a

²²⁸ Cf. R.J. Swart, P. Raskin & J. Robinson, *The Problem of the Future: Sustainability Science and Scenario Analysis*, 14 GLOBAL ENVTL. CHANGE 137, 139–42 (2004) (describing distinctions between quantitative and qualitative approaches to scenario analysis).

²²⁹ Qualitative scenario analysis can take forms similar to war games, table-top exercises, and other formalized methods of bringing expert judgment to bear on uncertain future scenarios. See generally DEWAR, *supra* note 188; Crawford, *supra* note 84.

²³⁰ See Condon, *supra* note 31, at 297–301; Allen, *supra* note 32, at 90–96.

²³¹ See Allen, *supra* note 32, at 90–96.

²³² See Condon, *supra* note 31, at 297–301.

stranger to qualitative scenario exploration; for instance, it conducts dialogue-based scenario analysis exercises as a means of cybersecurity risk assessment and planning.²³³ Fed personnel responsible for qualitative CSA could build on preexisting process knowledge, even if it is less robust than preexisting knowledge about stress tests.

Because qualitative CSA could be less data- and computationally-intensive, it could also be developed in-house at relatively little cost. Policymakers distinguish between “top-down” and “bottom-up” scenario analysis.²³⁴ In “top-down” efforts, supervisors themselves design scenarios and conduct analyses of financial institution-provided data to produce results.²³⁵ By contrast, “bottom-up” approaches rely on financial institutions to conduct analysis of their own data to game out scenarios.²³⁶ As the Fed pilot demonstrates, bottom-up scenario analyses can also rely on financial institutions to design their own scenarios.²³⁷ Narrative-based approaches suit themselves to top-down analysis, where the Fed itself would get to select the form and participants in expert discussions.

A qualitative (or quant-light) version of CSA would simultaneously reduce the Fed’s reliance on large-bank partners and enable the Fed to bring a wider range of regional and small banks into the CSA fold. Right now, including smaller banks in a CSA exercise like the pilot would impose unduly burdensome compliance costs on them; so, too, would bringing them within the bounds of the Fed’s climate guidance. But if the Fed itself were analyzing a host of scenarios in-house, it could gather existing data on a wider range of banks to learn about their potential behavior in a range of potential futures without burdening them with disproportionate compliance obligations.

Consider, for instance, Texas Capital Bancshares, the 71st largest BHC in the country.²³⁸ Right now, it is not covered by the Fed’s climate guidance, and it presents nothing like the type of

²³³ For instance, exercises known as the “Hamilton series” are designed to “improv[e] responses to a range of cyber-threat scenarios” with the involvement of personnel from the Fed Board, the Treasury Department, and banks. See BD. OF GOVERNORS OF THE FED. RSRV. SYS., CYBERSECURITY AND FINANCIAL SYSTEM RESILIENCE REPORT 16–17 (2024), <https://www.federalreserve.gov/publications/files/cybersecurity-report-202407.pdf>.

²³⁴ See *Climate Scenario Analysis: Emerging Supervisory Practices – Executive Summary*, BANK FOR INT’L SETTLEMENTS at 1–2 (Aug. 2024), https://www.bis.org/fsi/fsisummaries/exsum_22203.pdf.

²³⁵ See *id.* at 1 & n.2.

²³⁶ See *id.* at 1 & n.3.

²³⁷ See FED PILOT PARTICIPANT INSTRUCTIONS, *supra* note 100, at 14–15.

²³⁸ See National Information Center, *supra* note 110.

too-big-to-fail soundness concern exemplified by the focus of the Fed's pilot CSA. But Texas Capital has recently expanded its exposure to energy-sector assets far more aggressively than any larger bank has.²³⁹ Which scenarios pose the most acute threats to Texas Capital's capital adequacy given its current balance sheet composition? How will it go about adjusting its portfolios in various potential futures? Taken together with other, similarly-situated banks with concentrated industry and regional exposure, subjecting banks like Texas Capital to a lower-tech version of CSA would still generate valuable insights about how markets and policies may interact with the banking system going forward.

A further advantage of qualitative CSA is that it need not be solely focused on financial institution balance sheets. Instead, it can roam where numbers run out. All it needs to do is to prompt formal deliberation about the material consequences of an imagined future. It can ask questions about climate-related effects on financial stability that a quantified stress test approach cannot. Consider the Fed's Pilot CSA. It was not designed to offer any insight whatsoever into the potential downstream effects of climate risk on households, businesses, or public finance. The closest it came to contemplating such matters was to ask participating banks to imagine a world without insurance as a climate-risk "shock absorber."²⁴⁰ But this type of inquiry investigates the harm of insurance-market collapse *on banks*, not on the parties who banks supposedly exist to serve. A reoriented CSA would instead ask the banks to game out their own reactions to insurance-market collapse. Would they stop lending in certain markets? Would they alter terms and conditions in contracts with certain counterparties? Answers to such questions would shed light on how the banking system's response to climate-related risks may affect its interactions with the broader economy.

Similar questions could be asked about the effects of a variety of acute physical risks or transition scenarios. Critics might accuse such a reorientation of reaching beyond the Fed's core concerns,²⁴¹ but the Dodd-Frank Act gave the Fed the authority to examine bank holding companies and their subsidiaries as a

²³⁹ See *Bankers Ratcheting Up Oil Deals Drive Deepening Market Split*, ENERGYNOW (Sept. 11, 2024) <https://energynow.com/2024/09/texas-capital-ratchets-up-oil-deals-as-other-banks-quit-market/?amp>.

²⁴⁰ See FED PILOT PARTICIPANT INSTRUCTIONS, *supra* note 100, at 13–18.

²⁴¹ Cf. Skinner, *Central Banks and Climate Change*, *supra* note 20, at 1345 (stating that climate stress tests "would necessarily focus on the extent to which bank balance sheets have capacity to remain resilient over some period of time during a recession-type scenario").

means of developing information about the stability of the U.S. financial system.²⁴² While reasonable interpreters may disagree about the breadth of that authority, text elsewhere in the Dodd-Frank Act indicates that the concept encompasses the experience of destabilization for households and businesses.²⁴³ Climate-related risks may be causes of such destabilization, and CSA can helpfully shed light on the possibilities.

The idea of a lighter-touch CSA with a broader perspective on financial instability not only fits within the existing statutory framework; it also responds to critics that argue CSA is unnecessary in light of financial institutions' survival instincts. Climate risks, these critics argue, are "entirely manageable" for the financial institutions facing them.²⁴⁴ Risk management, after all, is core to the business of finance. The rare firm that mismanages its climate risk may fail, but well managed firms—surely the vast majority—will simply figure out how to stay profitable in the new world.²⁴⁵ Indeed, some financial institutions may even thrive in a changing climate.²⁴⁶ Recent evidence suggests that disasters often increase demand for loans, which can increase profits for the firms ready to supply them.²⁴⁷ If good banks will thrive through climate change, why should the Fed spend supervisory resources worrying?

Such a grim argument should hold no sway with Fed policymakers. Set aside the question whether banks really are ready to surf the economic waves of a changing climate. The argument itself asks Fed supervisors to disregard the people seeking the disaster loans, as if their financial experience sits outside the "financial system of the United States." The Fed should reject the premise. It should instead embrace a form of CSA that, at least in part, looks toward the financial futures of the households and businesses of the real economy—the ultimate beneficiaries of financial stability.

CSA efforts are only interim steps on the path to financial supervision that serves those ultimate beneficiaries. But though CSA itself cannot resolve the tensions that climate change may bring to the fore, it can shape perspectives by transforming inchoate "possibilities of danger" into "risk objects"—representations of

²⁴² See *supra* notes 210–212 and accompanying text.

²⁴³ See *id.*

²⁴⁴ Nelson & Anderson, *supra* note 20.

²⁴⁵ See sources cited *supra* note 20 and accompanying text.

²⁴⁶ See Nelson & Anderson, *supra* note 20.

²⁴⁷ See *id.*

risk that policymakers and the public recognize as legitimately susceptible to governance.²⁴⁸ By recalibrating CSA to make it less costly to conduct, and by reorienting CSA toward a broader idea of what “counts” as a normatively significant climate risk, the Fed would be supporting a broader vision of finance’s role in the process of climate change mitigation and adaptation.

B. Institutional Conditions for Broader CSA

To develop its CSA experiments beyond the stress test template, the Fed should consider ways to shift its institutional role-definition and augment its personnel. Both aspects of institutional change would be pushing against the very forces that made incrementalist adaptation of the stress test template seem like the obvious first step for climate-aware financial supervision at the Fed. But path-dependence in supervisory learning practices is hardly a force of nature. The Fed can and has innovated its supervisory methods many times.²⁴⁹ To meet the moment, it should do so again.

Today’s CSA embodies the “narrow” perspective the Fed under Jerome Powell has come to take regarding climate-related financial risk.²⁵⁰ It also embodies a narrow conception of supervisory engagement with supervisees. It exemplifies the ideal of supervisors as managerial partners—even as public stand-ins for management consultants.²⁵¹ The Fed’s rhetoric around climate-aware supervision, for instance, focuses on “support[ing]” banks’ efforts at incorporating climate-related concerns into their existing risk management functions²⁵² and “ensur[ing] that banks understand and manage their material . . . financial risks from climate change.”²⁵³ But mere support of banks’ own risk-management best interests is not enough to meet the moment. If the Fed is going to live up to its Congressional responsibility as a steward of financial stability, it must expand its horizons in terms of its own role-definition. This may mean engaging more directly

²⁴⁸ See POWER, *supra* note 226, at 8–9 (defining the concept of a risk object).

²⁴⁹ See, e.g., Hilary J. Allen, *Regulatory Innovation and Permission to Fail: The Case of Suptech*, 19 N.Y.U. J.L. & BUS. 237, 260–66 (2023).

²⁵⁰ See Press Release, Bd. of Governors of the Fed. Rsrv. Sys., Federal Reserve Board Provides Additional Details on How Its Pilot Climate Scenario Analysis Exercise Will Be Conducted and the Information on Risk Management Practices that Will Be Gathered over the Course of the Exercise (Jan. 17, 2023), <https://perma.cc/KE38-MYHM> (discussing the “narrow, but important” responsibility of the Fed to safeguard bank soundness).

²⁵¹ See sources cited *supra* note 114 and accompanying text.

²⁵² See Final Interagency Principles, *supra* note 18, at 74186.

²⁵³ See Press Release, *supra* note 250.

in expounding a view of the financial stability project as it relates to climate change.

To do so, the Fed may wish to consider personnel additions, too. The Fed has a formidable research bureaucracy to experiment with broader modes of climate-related analysis.²⁵⁴ At present, it is dominated by economists.²⁵⁵ There are many good reasons why the Fed should employ lots of economists, but as a cultural matter, it creates conditions where “the way to the Fed’s heart and mind is through quantitative language,” and it suffers from the disciplinary blinders economics sometimes fashions for itself.²⁵⁶ As a number of legal scholars have recently argued, the addition of experts drawn from fields related to climate science, and even professional forecasting, could support effective supervisory engagement with the complexities of climate change.²⁵⁷ They could complement the economists and policymakers who are steeped in the stress test mentality. Those experts’ work is essential, but it is incomplete.

As the Fed develops climate-related supervisory expertise, it may also want to embrace its role in informing engagement with climate-related risk across the federal government. The Fed is a conversation partner not only with banks, but also with the larger administrative state, with Congress, and with the public.²⁵⁸ How should other agencies understand the financial-system effects of their own climate-related risk regulation? How should Congress think about legislative responses to financial upheavals driven by climate-related phenomena? Right now, the outputs of the Fed’s

²⁵⁴ See Conti-Brown & Wishnick, *supra* note 29, at 664–65.

²⁵⁵ See *id.*

²⁵⁶ Emma Coleman Jordan, *The Hidden Structures of Inequality: The Federal Reserve and a Cascade of Failures*, 2 U. PA. J.L. & PUB. AFF. 107, 169 (2017).

²⁵⁷ See Van Loo, *supra* note 30, at 589 (“[A]dministrative agencies could create a forecaster, futurist, or strategist position. Regardless of the name, the job description would emphasize creating and analyzing contingencies. These strategists’ predictions would serve as the bases for simulations.”); Allen, *supra* note 30, at 16–17 (“New types of expertise, particularly the involvement of climate scientists and environmental economists, will be needed . . .”).

²⁵⁸ See Allen, *supra* note 32 (discussing the role of engaging the public); Christopher J. Walker, *Federal Agencies in the Legislative Process: Technical Assistance in Statutory Drafting*, ADMIN. CONF. U.S. 40 (2015), <https://perma.cc/V3B6-88J4> (“[O]fficials at the Federal Reserve indicated that the agency does not just assist in technical drafting of legislation, but it also shares the agency’s economic and policy expertise by briefing congressional staffers on the cutting-edge research being published by economists and policy analysts at the Federal Reserve. A fair amount of the Federal Reserve’s interaction with Congress involves such education efforts about the expert analytic/empirical research capacity that the agency possesses and is willing to share with Congress.”). Cf. Christopher J. Walker, *Legislating in the Shadows*, 165 U. PA. L. REV. 1377 (2017) (discussing the roles of agencies in the legislative process).

CSA efforts have relatively little to offer these policymaking audiences. Treating its role in policymaking discourse as an important one could motivate the Fed to focus on climate change's potential implications for financial stability and to broaden its vision for climate-related learning through CSA.

V. CONCLUSION

The Fed has recently begun experimenting with CSA as a technique for recasting climate change's myriad effects in financial terms. In theory, the Fed's efforts should be able to shed light on an uncertain and volatile future. In practice, however, the substance and process of CSA on the ground provide reasons to worry that the Fed's efforts may produce unduly sanguine and narrow views of climate risk. Policymakers and scholars alike who have celebrated CSA as an important step in the process of developing a climate-aware approach to financial supervision should update their views and pursue reforms. In particular, they should weigh the downsides of the Fed's reliance on the stress test template for CSA. At present, the Fed's approach focuses solely on the capital adequacy of the largest banks, and it relies on them to produce precisely quantified estimates of balance sheet outcomes. This approach will bring some potential harms into view, but it risks leaving many out. To achieve the goals of prudential supervision, the Fed should consider a lighter approach to CSA that could be extended to more banks and could explore the financial destabilization that may harm households and businesses even if financial firms manage their climate risks effectively. Only then will CSA effectively support a supervisory program that meets the moment.