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**Regulatory Managerialism and Inaction: A Case Study of Bank
Regulation and Climate Change**

Forthcoming, Journal of Law & Contemporary Problems

Hilary J. Allen¹

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I. PREFACE

In November of 2029, Hurricane Penelope struck New York City as a category two storm. Work had started on a wall to protect Manhattan from rising sea levels and storm surges, but the work was incomplete, and significant damage to Manhattan real estate was sustained. While almost all that real estate was insured, insurance companies were compromised by the sheer magnitude of the losses. Even with significant federal subsidies, they were unable to meet their full commitments on insurance policies. Some commercial real estate firms, who had never really recovered from the shift to remote working during the Covid pandemic, decided to cut their losses and file for bankruptcy. Banks with outstanding loans to these firms were left to foreclose upon the damaged properties. At the same time, given their own difficulties, many insurance companies were drawing down revolving lines of credit from their banks. Many of these insurance companies also refused to renew policies, undercutting the value of the foreclosed properties.

Banks like the megabank Crest Bank began to simultaneously accumulate significant losses on their loans and experience significant

¹ Professor of Law, American University Washington College of Law. Many thanks to the participants in this symposium for ideas and feedback, and particular thanks to Julie Cohen and Ari Ezra Waldman both for their detailed feedback and edits of earlier drafts (and for convening such a wonderful group!). Thanks also go to Madison Condon and Yevgeny Shrago for helpful conversations about climate-related financial risks.

demand for funding that they had not expected to extend. Even before that, though, they experienced unprecedented operational problems. Although Crest Bank used cloud computing services to store some of their data, they still continued to host their core data about customer accounts and balances on their own servers, many of which were located in New Jersey. Penelope's storm surge flooded some of the data centers near the coast; others further inland flooded as a result of Penelope's record rainfall. Like many similarly situated banks, Crest Bank sought to access their back-ups, which *were* stored in the cloud hosted by dominant cloud service provider Cumulus. Unfortunately, Cumulus was not prepared for so many banks to access and download so much data from its cloud at the same time, and its servers buckled under the increased demand. This led to outages at several banks, including Crest Bank, that lasted more than twenty-four hours. During that time, customers of the affected banks were unable to withdraw money or make any payments – and all of this occurred at a time when many people needed to travel, stay in hotels, or make emergency purchases to deal with Penelope's aftermath.

Social media posts began to circulate that were reminiscent of the aftermath of Hurricane Katrina: people found themselves stuck in places that were overcrowded and lacking in basic sanitation because they couldn't access their funds to buy gas or pay for a hotel room elsewhere. The Federal Reserve looked on in horror at these banking outages. None of the tools in its emergency toolkit could respond to these technological problems, and the inexorable shift to cashless transactions had complicated the Fed's traditional backup strategy of making physical cash available in the aftermath of natural disasters.

The outages shook what was already shaky confidence in some of the country's leading banks. Bank stock prices had already fallen and the spread on credit default swaps had already spiked after banks experienced climate-related losses earlier in the year. Several large banks had suffered significant losses on their West Coast residential mortgage portfolios after a particularly ferocious wildfire season. Crest Bank was still reeling from the fallout from Category 3 Hurricane Fiona, which had hit oil and gas production in the Gulf of Mexico in the summer. The energy companies Tawny and Russet were particularly dependent on the United States for production, as many other countries had heavily taxed carbon-producing energy creation (and banks headquartered in those countries were prohibited from funding carbon-producing energy sources, so Tawny and Russet were also particularly dependent on US banks for funding). Following Fiona, Tawny and Russet reached out to their banks to seek amendments to their term loan agreements. Seeing no alternative other than bankrupting Tawny and Russet, Crest Bank agreed to modify the loans, reducing the amounts of periodic repayments.

Granite Bank, also headquartered in New York, had done a better job at preparing for climate change than most other US banks. It did have some residential mortgage exposures on the West Coast and in Manhattan, but its residential loan book was diversified enough that it could absorb the losses it sustained in those markets. Granite Bank had long ago stopped lending to brown energy firms, and so it was not directly impacted by Hurricane Fiona. Penelope damaged its primary data center, but it stored its backups in a proprietary cloud that used geographically distributed servers and was able to access them immediately. Notwithstanding its good planning, though, Granite Bank was operating amidst a broader panic that was engulfing the banking system.

Like most big banks, Granite Bank participated in the repo markets, where it borrowed from and loaned to other big banks for short-term funding. Notwithstanding its comparatively strong position, Granite Bank was nervous about market conditions and didn't want to risk a default by Crest Bank, which was in the process of selling off assets (it wasn't entirely clear whether Crest Bank had enough equity to absorb the losses it had sustained). Granite Bank's refusal to engage in repo transactions with Crest Bank spooked other banks, which also began to curtail their repo exposure to Crest Bank. Within a few days, Crest Bank was facing insolvency and sought a bailout from the Federal Reserve.

Granite Bank and other comparatively strong banks hadn't just stopped lending to Crest Bank. As they battened down the hatches to deal with the unfolding financial crisis, they significantly curtailed their lending to *everybody*. As businesses found themselves unable to borrow, they curtailed *their* plans for expansion and instead moved into retrenchment mode, laying off employees and defaulting on existing loans. Unemployment rose and the economy tipped into recession amidst the compounding natural disasters and financial crisis. In a tragically predictable turn of events, the vulnerable communities that had been most directly affected by wildfires, Fiona, and Penelope, now bore the brunt of the joblessness and homelessness resulting from the implosion of the banking system. But the misery occasioned by the financial crisis did not spare those who had been spared by the natural disasters; nationwide, property crimes and suicides surged as people struggled to survive, or eventually gave up.

II. INTRODUCTION

The chief goal of financial regulation is to protect our economy from the enduring harm inflicted by financial crises.² The story in the Preface shows how both the physical impacts of climate change itself, and the

² Jeff Gordon has called this the “apex goal” of financial regulation. Jeffrey N. Gordon, ‘Dynamic Precaution’ in *Maintaining Financial Stability: The Importance of FSOC*, in *TEN YEARS AFTER THE CRASH* (Sharyn O’Halloran & Thomas Groll eds., 2018).

economic dislocations sure to accompany transitions away from carbon-intensive energy sources, could threaten the stability of our banking system. The Preface also introduces us to the kinds of social harms that could flow from such a climate-inspired financial crisis. Unfortunately, the regulatory managerialist turn in banking regulation has set regulatory agencies up for inaction in the face of such harms. Regulatory managerialism has been described as both a set of practices and an ideology designed to foreground private sector managerial approaches within the administrative state.³ In this Essay, I will explore how a key part of the banking regulatory framework known as “regulatory capital” has come to epitomize managerialist practices and ideology – and how that turn might be reversed so that banking regulation has a better chance of protecting the public from harm in the future.

Regulatory capital requirements are complicated, but they exist to ensure that banks don’t rely entirely on borrowed money to fund their investments. If left to their own devices, banks tend to borrow more than is socially desirable because they can pocket the resulting gains but socialize many of the associated losses.⁴ In addition, banks’ shareholders and creditors typically lack incentives to rein in excessive risk taking until it is too late to do anything other than panic.⁵ Protecting the stability of the banking system therefore falls to regulators, and capital requirements are a linchpin of their efforts. By requiring banks to fund at least some percentage of their investments with their own money (equity), regulatory capital requirements ensure that banks are better able to absorb losses on their investments.

As regulatory capital requirements are currently applied, the amount of equity funding required is calculated using complicated mathematical modelling techniques borrowed from the private sector. This approach is designed to tailor the amount of required equity funding to the risks that a particular bank faces, and it is predicated on the assumption that those risks can be accurately assessed in advance. Given the uncertainty surrounding climate change and its likely impacts on banks, though, this assumption is unlikely to hold.⁶ Such modeling techniques are particularly likely to underestimate the costs of low-probability but high-consequence harms, and

³ [Cohen/Waldman Introduction]

⁴ Anat Admati *et al.*, *Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is Not Socially Expensive*, 2 (Oct. 22, 2013).

⁵ As David Min argues, bank shareholders may often benefit from the bank’s risk-taking in the short-term, and many of the bank’s creditors (including depositors) do not wish to expend the effort needed to monitor the bank’s risk-taking until it is too late. David Min, *Understanding the Failures of Market Discipline*, 92 WASH. U. L. REV. 1421, 1470 (2015).

⁶ See Notes 92-94, *infra*, and accompanying text.

so the current approach to capital regulation is likely to result in banks having insufficient capital to absorb climate-related financial risks.⁷

The seeming technocratic neutrality of the risk models used to calculate capital requirements helps insulate banks' limited equity funding from critique. Ultimately, though, these models are not neutral in application. Instead, they prioritize industry productivity and effectiveness over crisis prevention.⁸ In other words, the current iteration of regulatory capital requirements is very sensitive to banks' concerns about efficient capital allocation, but less sensitive to the needs of the public.⁹ If banking regulators continue to defer heavily to private sector methods of conceptualizing harm, the result will be regulatory *inaction* that neglects regulators' statutory mandates to ensure that the banking system operates safely.

When banking regulators have followed the industry-supported path of inaction in the past, it has sometimes resulted in irreversible and catastrophic harm for the public. For example, in its assessment of the causes of the financial crisis of 2008, the Financial Crisis Inquiry Commission bluntly concluded that "widespread failures in financial regulation and supervision proved devastating to the stability of the nation's financial markets."¹⁰ Fast-forward to the 2020s, and some financial regulators are suggesting that they are powerless to take meaningful action on climate-related financial risks, at least until enough data is generated to populate their models.¹¹ Asking regulators to craft narratives about climate-inspired financial crises could prompt them to take a break from their models, to use a different approach to thinking about the kinds of climate-related financial regulation that are needed to avoid a repeat (or worse) of 2008.

This Essay advocates for more precautionary regulation of climate-related financial risks, calling for banks to fund their investments with bigger

⁷ On so-called "black swan" low-probability, high-consequence events, *see* Nassim Nicholas Taleb, *BLACK SWAN: THE IMPACT OF THE HIGHLY IMPROBABLE*.

⁸ "Over the final decades of the twentieth century, the language of regulatory oversight became highly financialized, focused narrowly on values like efficiency as framed and measured through the lens of cost-benefit analysis." Cohen & Waldman, *supra* Note 3 at []. *See also* Jodi Short [on "public entrepreneurs"].

⁹ William Boyd notes that regulatory managerialist turn has also helped displace precaution in the context of health, safety, and environmental regulation: "Earlier, more precautionary commitments marked by a healthy respect for uncertainty and the desire to find simple, workable approaches to setting standards to protect workers and the public were increasingly viewed as misguided and unrealistic."

¹⁰ FIN. CRISIS INQUIRY COMM'N, *THE FINANCIAL CRISIS INQUIRY REPORT: FINAL REPORT OF THE NATIONAL COMMISSION ON THE CAUSES OF THE FINANCIAL AND ECONOMIC CRISIS IN THE UNITED STATES*, xviii (2011).

¹¹ In its 2022 Annual Report, the FSOC's primary recommendations with respect to climate-related threats to financial stability are the collection of more data and the development of more analytical tools. Financial Stability Oversight Council, 2022 ANNUAL REPORT, 77 (available at <https://home.treasury.gov/system/files/261/FSOC2022AnnualReport.pdf>).

and simpler equity cushions and for regulators to use discretionary supervisory techniques that are more robust to uncertainty. Such a precautionary approach would inevitably be more costly and less efficient for banks, and so regulators will need strong public support if they wish to deploy this kind of regulation. This Essay will therefore explore how banking regulators could open up an active “storytelling” channel of communication with the public. Regulation that prevents financial crises, like a lot of other regulation designed to prevent social harms, can be invisible when it works: the optimal outcome is that nothing bad happens. Telling stories about the very human harms that could arise from climate-related financial crises can help members of the public to understand and appreciate the stakes involved, and mobilize in support of precautionary regulatory action as an alternative to the managerialist tools currently used.

III. BANK REGULATION

A. *Regulatory Capital Requirements*

Banks are highly regulated because the broader economy depends on them for credit and payment processing services, but the bank business model has inherent fragilities.¹² In particular, banks typically fund their investments in illiquid assets (like loans) with short-term funding sources (like deposits) that could evaporate if confidence in the bank were damaged, and so banks are subject to what is known as prudential regulation that is designed to keep them “safe and sound.”¹³ Bank capital regulation is a cornerstone of prudential regulation, and it proceeds from a relatively simple idea. By requiring banks to fund their investments with a specified minimum amount of equity (as opposed to borrowed money), capital regulation ensures that banks are more likely to be able to absorb losses and less likely to fail (and also less likely to engage in fire sales of their assets that could drive down prices and hurt other market participants).¹⁴ Capital regulation is necessary because banks are otherwise incentivized (particularly by the tax code) to prefer debt financing to equity financing for their investments.¹⁵

Unfortunately, bank capital regulation is not simple in execution. Capital requirements are typically expressed as ratios, and the required ratios derive from international standards promulgated by the Basel Committee on Banking Supervision (the “BCBS,” an international group of bank supervisors that is “the primary global standard setter for the prudential regulation of banks”).¹⁶ These standards are then implemented into national law by the relevant regulatory authorities. Of all of the BCBS’s ratios, the

¹² John Armour *et al.*, PRINCIPLES OF FINANCIAL REGULATION, 279 (2016).

¹³ *Id.*

¹⁴ Hilary J. Allen, *Let’s Talk About Tax: Fixing Bank Incentives to Sabotage Stability*, 18 Ford. J. CORP. & FIN. L. 821, 835-837 (2013).

¹⁵ *Id.* at 837.

¹⁶ *The Basel Committee – overview*, available at <https://www.bis.org/bcbs/>.

risk-based capital ratio is generally viewed as the most important.¹⁷ Risk-based capital requirements require banks to fund a certain percentage of their “risk-weighted assets” with capital.¹⁸ The standard approach for risk-weighting assets involves sorting the assets in a bank’s investment portfolio into the various risk-weight categories determined by the BCBS, sorting contingent liabilities into categories determined by the BCBS regarding how likely those contingent liabilities are to crystallize, then multiplying any contingent liability by the “credit conversion factor” and multiplying all the assets by the risk-weightings deemed appropriate by the BCBS. When added together, these make up a bank’s risk-weighted assets.¹⁹ This approach to risk-weighting is “purely quantitative and rel[ies] on sophisticated statistical and stochastic modelling tools.”²⁰

As with many managerialist tools, these model-based risk-based capital requirements are intended to promote efficiency – in this case, to optimize the deployment of capital by only requiring banks to fund their investments with the smallest possible capital cushion deemed necessary according to the bank’s apparent risk profile. There are, however, many reasons to be skeptical of using “efficiency” as the yardstick by which we judge regulatory practices. Efficiency, in the Kaldor-Hicksian optimal allocative efficiency sense, is insensitive to distributional inequalities and so regulation will be acceptably “efficient” as long as someone’s gains offset someone’s harms.²¹ A laser-eyed focus on efficiency can therefore redound to the benefit of the banking industry that would see its costs increased or profitability reduced (at least in the short-term) were more stringent capital

¹⁷ Dennis Kelleher, Tim P. Clark and Phillip Basil, *Protecting Our Economy by Strengthening the U.S. Banking System through Higher Capital Requirements*, BETTERMARKETS, 4 (Dec. 22, 2022), available at https://bettermarkets.org/wp-content/uploads/2022/12/BetterMarkets_Strengthening_US_Banking_System_12-22-2022.pdf.

¹⁸ Although not the focus of this Essay, the definition of “capital” itself is complex and includes more than just equity funding: “Capital can take many forms, ranging from the simplest and most loss-absorbent “Common Equity Tier 1” (which includes common equity and retained earnings) to more complicated debt-equity hybrid forms of funding.” Hilary J. Allen, Testimony before the U.S. House of Representatives Committee on Financial Services Subcommittee on Consumer Protection and Financial Institutions, Hearing on *Addressing Climate as a Systemic Risk: The Need to Build Resilience within Our Banking and Financial System*, 10 (Jun. 30, 2021) (hereinafter, Allen Climate Testimony).

¹⁹ Richard Scott Carnell *et al.*, THE LAW OF FINANCIAL INSTITUTIONS (7th Ed.), 212-215 (2021).

²⁰ Hugues Chenet, Josh Ryan-Collins, Frank van Lerven, *Finance, climate-change and radical uncertainty: Towards a precautionary approach to financial policy*, 183 ECO. ECON. 1, 3 (2021).

²¹ Hilary J. Allen, *Putting the “Financial Stability” In Financial Stability Oversight Council*, 76 OHIO ST. L. J. 1087, 1109-10 (2015).

requirements implemented – at the expense of larger capital cushions designed to minimize public harm.²²

Other reasons to be wary of judging regulatory tools primarily by the efficiency criterion are supplied by the literature on complex systems and the “robust-yet-fragile” dilemma. When too much emphasis is placed on maximizing the efficiency dimension of a complex system, the system will be robust in terms of its speedy functioning in normal circumstances, but fragile when confronted with any change in how the system operates.²³ The fragility occasioned by an over-commitment to efficiency should especially concern us in contexts of uncertainty, where we do not even have a concrete understanding of the types of changes a system might face, let alone their probability of occurring.²⁴ In these circumstances, the literature on complex systems would suggest having some redundancy built into the system, to allow for reconfiguration when there is a shock to the system.²⁵ This redundancy may reduce the efficiency of the system in normal times in order to guard against potential system failure in the future.²⁶ But highly optimized risk-based capital requirements provide little such redundancy.

Many have criticized the BCBS’s risk-based capital requirements for their insufficiency.²⁷ Anat Admati and her colleagues, for example, have argued that the BCBS’s standards “still allow banks to remain very highly leveraged”, and that banks should be required to “have more equity funding so that inevitable variations in asset values do not lead to distress and insolvency.”²⁸ Haldane & Madouros, also prominent critics of the BCBS’s risk-based capital requirements, focus their critique on the complexity of the models used for risk-weighting, noting that greater complexity affords more opportunities for banks to game the rules and also likely undermines the reliability of the models’ output.²⁹ Risk models tend to be particularly limited

²² Admati and her colleagues argue that arguments that increased equity cushions are too expensive are often based on “a confusion between private costs to banks (or their shareholders) and social costs to the public.” Admati *et al.*, *supra* Note 4 at i-ii. Cohen & Waldman note that regulatory managerialism is tightly linked to neoliberal ideology, which “refigures regulatory oversight as expert stewardship designed to maximize welfare (defined largely in terms of economic growth and industrial profit) by bringing competition and efficiency into government.” Cohen & Waldman, *supra* Note 3 at [].

²³ J.B. Ruhl, *Managing Systemic Risk in Legal Systems*, 89 IND. L.J. 559, 575-6; 594 (2014).

²⁴ “There is a fundamental distinction between the reward for taking a known risk and that for assuming a risk whose value itself is not known”; “true uncertainty [is]... “not susceptible to measurement.” FRANK H. KNIGHT, *RISK, UNCERTAINTY AND PROFIT* 21 (1921).

²⁵ Ruhl, *supra* Note 23 at 579-80.

²⁶ *Id.*

²⁷ For a catalogue of some of these critiques, see Kelleher *et al.*, *supra* Note 17 at 10.

²⁸ Admati *et al.*, *supra* Note 4 at i.

²⁹ Andrew G. Haldane & Vasileios Madouros, Speech at the Federal Reserve Bank of Kansas City’s 366th economic policy symposium, “The changing policy landscape” titled

when their variables are impacted by the behavior of other variables on which the model relies (a circumstance known as “endogeneity”, that is a feature of any complex adaptive system).³⁰ Furthermore, risk-based capital requirements depend on historical understandings of risk probabilities, and these historical understandings aren’t always predictive.³¹

The BCBS uses even more complex approaches to risk-weighting for the largest banks, permitting those banks to depart from the standardized approach to risk-weighting and instead use their own internal risk-management models to calculate the risk-weightings for their investment portfolios.³² The United States has not entirely followed the BCBS in this practice: under what is known as the Collins Amendment, the largest banks must calculate their risk-based capital requirements using both their internal risk models and the BCBS’s standardized approach, and then abide by the stricter one.³³ Practically speaking, the standardized approach has come to be the binding constraint on most US banks.³⁴ However, as we have already explored at length, even the BCBS’s standardized approach to risk-weighting suffers from significant complexity in its pursuit of risk-sensitivity.

Many of the prominent critiques of risk-weighted capital requirements can be reframed as critiques of regulatory managerialism. If regulatory managerialism foregrounds private sector managerial approaches within the administrative state, regulatory managerialism has been taken to its logical endpoint where regulatory compliance is delegated to banks’ own internal models (as it is with the BCBS’s approach for the largest banks).³⁵ Even the BCBS’s standardized approach is based on concepts of risk-management drawn from the banking sector, and therefore seems to be underpinned by an

The Dog and the Frisbee, 7; 18 (Aug. 31, 2012). Reporting requirements have also fallen prey to too much complexity: after highlighting that in 2011, bank holding companies’ reports to the Federal Reserve entailed 2,271 different columns of data, Haldane & Madorous argue that “there is a case for re-considering the wider disclosure agenda... The explosion in banks’ reporting over the last decade has not conspicuously helped in pricing bank risk.” *Id.* at 12; 22.

³⁰ Chenet *et al.*, *supra* Note 20 at 5.

³¹ Haldane & Madouros, *supra* Note 17 at 5-6. In a similar vein, Beckert has observed that “The use of normal distributions to predict future events is highly questionable in complex and open situations that are characterized by newness and singularity. If one assumes that the future is open and uncertain because economic events are nonlinear and vary with time, the intrinsic value of assets cannot be assessed with any true precision.” Jens Beckert, IMAGINED FUTURES: FICTIONAL EXPECTATIONS AND CAPITALIST DYNAMICS, 42 (2016).

³² Carnell *et al.*, *supra* Note 19 at 223.

³³ Michael S. Barr, Howell E. Jackson, and Margaret E. Tahyar, FINANCIAL REGULATION: LAW AND POLICY, 314-15 (2016). Haldane & Madorous have described the Collins Amendment as a simplifying tool because it has the practical effect of limiting reliance on banks’ complex internal models, Haldane & Madouros, *supra* Note 17 at 19.

³⁴ Alessandro Aimone, *We need to talk about Collins*, RISK.NET (Feb. 11, 2019), available at <https://www.risk.net/risk-quantum/6376441/we-need-to-talk-about-collins>.

³⁵ Short, *supra* Note 8 at [].

assumption that banks have techniques and abilities to assess the risks they pose for society that are superior to the simpler methods that regulators developed in the past.³⁶

Risk-based capital regulation also follows the *ideology* of regulatory managerialism, in the sense that more complex risk-weighted capital requirements are often justified as allowing more efficient allocation of capital than simpler, blunter rules would.³⁷ Admati *et al.* convincingly argue, though, that the current framework is not efficient *from society's perspective* and instead favors the banking industry's preference for lower capital requirements over protecting society from harm.³⁸ This is an example of the seemingly technocratic and neutral techniques of regulatory managerialism operating in a way that favors a particular constituency.

Elsewhere in this volume, Jodi Short observes that the versions of private sector tools being used by regulatory agencies are often more limited than the versions used by the private sector itself.³⁹ A private sector entity, for example, might deviate from the most efficient approach in order to protect its reputation. By tying capital regulation to mathematical risk models, regulators are neglecting the fact that their reputation with the public could be harmed significantly if banks have insufficient capital to withstand a future crisis. Haldane & Madouros have also noted that regulators are increasingly relying upon banks' internal risk-management models not just for capital regulation, but also to help regulators to discharge their supervisory functions more broadly.⁴⁰ This suggests that the whole enterprise of banking supervision has taken too much of a managerialist turn.

If the risks that we are concerned about could result in broad social harms, we shouldn't assume that banks and their complex models have a comparable advantage in risk management.⁴¹ As I have explained at length elsewhere, "private market participants lack the incentives, the information, and the ability to coordinate behavior needed to address" the systemic risks

³⁶ Haldane & Madouros note that the much simpler Basel 1 concord was only 30 pages long. Haldane & Madouros, *supra* Note 17 at 6.

³⁷ Jamie Dimon, JPMorgan CEO and long-time critic of capital requirements, recently exemplified this line of thinking when he said "The continued upward trajectory of regulatory capital requirements on America's already fortified largest banks, particularly when not reflective of actual risk, is itself becoming a significant economic risk... This is bad for America, as it handicaps regulated banks at precisely the wrong time, causing them to be capital constrained and reduce growth in areas like lending, as the country enters difficult economic conditions." Hannah Levitt, *Dimon Blasts Higher Capital Requirements as Bank CEOs Head to Washington*, BLOOMBERG (Sept. 20, 2022).

³⁸ Admati *et al.*, *supra* Note 4 at i.

³⁹ Short, *supra* Note 8 at [].

⁴⁰ "Regulatory-imposed floors do little by themselves to simplify the underlying regulatory architecture. Only by removing internal models from the regulatory framework can this be achieved." Haldane & Madouros, *supra* Note 17 at 19.

⁴¹ Short, *supra* Note 8 at [].

that cause financial crises – and prevent their attendant harms.⁴² We also shouldn't assume that banks have a comparable advantage if the threats faced are not in fact calculable risks but are instead uncertainties, and uncertainties driven by events transpiring outside of the banks themselves. When facing uncertainty, regulators should reassert simpler harm reduction approaches based on a more clear-eyed and distributionally sensitive view of the societal harm that could flow from the threats the banking system faces. In other words, financial regulatory agencies should reject the worst practices of regulatory managerialism by wresting control back from bank-style risk management approaches, and instead be guided more by rules of thumb designed to prevent harm to the public. A precautionary approach can supply such a rule of thumb.⁴³

B. A Precautionary Approach

It's helpful to explain here what I mean by “precaution”, as there are many formulations of precaution, some of which are more defensible than others. The strongest form of precaution is the most *indefensible*, because it is internally self-defeating: “regulation that seeks to avoid a risk will necessarily create other substitute risks, and the [strongest form of the] precautionary principle is prevented from endorsing these substitute risks by its own internal logic.”⁴⁴ A more moderate form of precaution, on the other hand, is more workable and would urge regulators to “block activities that are, on balance, likely to be dangerous, notwithstanding that doing so will create some inadvertent harm by preventing the beneficial aspects of the activity.”⁴⁵ This form of precaution can act to shift the burden to the regulated entity to demonstrate why they should be allowed to proceed with an activity, instead of the status quo of requiring regulators to demonstrate why they shouldn't.⁴⁶ Instead of slow, cautious, and incremental regulatory changes, a precautionary approach favors a bold and comprehensive regulatory response that can be tailored back if it becomes clear that particular risks are not of concern. This form of precaution is justified when the potential harm is irreversible and catastrophic, like the irreversible and catastrophic social harm that can flow from financial crises.⁴⁷

Past financial crises have harmed the broader economy by restricting the supply of credit needed to fuel growth, and emergency interventions deployed after those crises erupted have struggled to fully contain them.⁴⁸ In

⁴² Hilary J. Allen, DRIVERLESS FINANCE: FINTECH'S IMPACT ON FINANCIAL STABILITY, 221 (2022).

⁴³ Chenet *et al.*, *supra* Note 20 at 10.

⁴⁴ Hilary J. Allen, *A New Philosophy for Financial Stability Regulation*, 45 LOY. U. CHI. L.J. 173, 203-4 (2013).

⁴⁵ *Id.* at 204.

⁴⁶ *Id.* at 179.

⁴⁷ *Id.* at 191.

⁴⁸ Allen Climate Testimony, *supra* Note 18 at 4-5.

the future, crises may also harm the broader economy in ways without historical precedent – for example, shutting down digital payments processing needed for basic transactions.⁴⁹ The potential for harm from financial crises is sometimes minimized, however, by framing it as “merely economic”, neglecting the breadth and depth of the possible human cost.⁵⁰ The potential harm is also sometimes minimized by focusing too closely on the fates of financial institutions and markets, and neglecting their spillovers for everyday people. Though the broader economy will ultimately recover from a crisis, many people (particularly the most vulnerable members of society) may be left behind when it does.⁵¹ Research on the impact of the financial crisis of 2008 and wealth inequality lays bare the reality that even when financial asset prices recover relatively quickly, those without significant financial assets can continue to experience the economic harm wrought by the crisis in a way that leaves them more vulnerable and marginalized than they were prior to the crisis.⁵²

Notwithstanding this potential for harm, the United States has not really embraced precaution when it comes to financial regulation⁵³ (it also tends to be less precautionary than European jurisdictions when it comes to climate change).⁵⁴ The United States is known, however, for being more precautionary when it comes to matters of national security.⁵⁵ This precautionary approach gives national security agencies more freedom to take steps to respond to perceived harms: in their interviews with government bureaucrats, law professors Bernstein and Rodriguez found that national security personnel felt particularly empowered to be proactive in responding to emergent threats, even in the absence of clear statutory authority.⁵⁶ And the Pentagon is “the only U.S. government agency to have never passed a comprehensive audit,” but has faced few consequences as a result.⁵⁷ The pendulum may have swung too far here – precaution should still be tempered by some form of accountability – but these examples illustrate how a

⁴⁹ Allen, *supra* Note 42 at 180-1.

⁵⁰ *Id.* at 30.

⁵¹ *Id.* at 24.

⁵² See, for example, Bridges *et al.*, *Credit, Crises and Inequality*, Bank of England Staff Working Paper No. 949 (Nov. 2021).

⁵³ Allen, *supra* Note 42 at 30.

⁵⁴ Jonathan B. Wiener, *Whose Precaution After All? A Comment on the Comparison and Evolution of Risk Regulatory Systems*, 13 *Duke J. Comp & Int'l L.* 207, 226 (2003).

⁵⁵ *Id.* at 229.

⁵⁶ “[P]articularly from agencies with national security remits, we heard confirmation of a high-level justification often given for executive action: that dealing with emergent problems “when there’s not time for legislation to take its course” can prompt creative statutory and legal interpretation.” Anya Bernstein & Cristina Rodriguez, *The Accountable Bureaucrat*, YALE L. J. (forthcoming), 57.

⁵⁷ Connor Echols, *The Pentagon fails its fifth audit in a row*, RESPONSIBLE STATECRAFT (Nov. 22, 2022), available at <https://responsiblestatecraft.org/2022/11/22/why-cant-the-dod-get-its-financial-house-in-order/>.

precautionary approach can liberate agencies from too much thrall to managerialist tools.

A precautionary approach entails “ignoring information that is of little help, using experience (rather than data) and discretion, developing coping strategies and thinking about the future in qualitative terms.”⁵⁸ This kind of approach is particularly useful for grounding decision-making under uncertainty. Risk-based mathematical models require data about the probabilities of certain risks manifesting in order to make assessments of what steps (if any) to take in response to those risks, and so these models provide little guidance in circumstances where there is no historical precedent – and therefore no data on probabilities.⁵⁹ In these circumstances, decision-makers face uncertainty rather than risk, and they need different tools.⁶⁰ In environments of uncertainty, regulatory approaches driven entirely by risk models will inevitably delay action while regulators seek the data needed to perfect their models. This is tantamount to regulatory agencies abdicating their duty to protect the public from harms in the interim – and yet, such a result may be depicted as a neutral outcome. To minimize the very human harm of financial crises, alternative precautionary tools and an alternative precautionary perspective are needed. This is only becoming more clear as the complexity of the financial system is being overlaid with the complexity of climate change.⁶¹

IV. BANK REGULATION AND CLIMATE CHANGE

A. *Climate-Related Risks to Banks*

The U.S. Global Change Research Program (a joint project of thirteen federal agencies) reported in 2018 that:

*In the absence of significant global mitigation action and regional adaptation efforts, rising temperatures, sea level rise, and changes in extreme events are expected to increasingly disrupt and damage critical infrastructure and property, labor productivity, and the vitality of our communities.*⁶²

There is scientific consensus that our climate is changing in ways that will be disruptive to our economy, and there is also a high-level global consensus

⁵⁸ Chenet *et al.*, *supra* Note 20 at 10.

⁵⁹ Haldane & Madouros, *supra* Note 17 at 5; 8.

⁶⁰ On the distinction between risk and uncertainty, *see* Knight, *supra* Note 24 at 21.

⁶¹ On these compounding uncertainties, *see* Graham S. Steele, *Confronting the ‘Climate Lehman Moment’: The Case for Macroprudential Climate Regulation*, 30 CORNELL J. L. & PUB. POL’Y 109, 116; 131 (2020).

⁶² U.S. Global Change Research Program, *Fourth National Climate Assessment*, 25 (2018), available at https://nca2018.globalchange.gov/downloads/NCA4_Ch01_Summary-Findings.pdf.

among financial regulators that the consequences of climate change are likely to threaten both individual banks and financial systems more broadly.⁶³

Climate related threats to the financial system are typically grouped into two broad categories: physical risks and transition risks. Physical risks concern “the possibility that the economic costs and financial losses from the increasing severity and frequency of extreme climate-change related weather events might erode the value of financial assets, and/or increase liabilities.”⁶⁴ Transition risks, on the other hand, are less about the direct impacts of climate change and more about how financial institutions, markets, and systems might be impacted by steps taken to respond to climate change. Transition risks arise out of “the process of adjustment towards a low-carbon economy, including shifts in policies designed to mitigate and adapt to climate change, which would affect the value of financial assets and liabilities.”⁶⁵ These kinds of climate-related risks could interact with one another, and with other kinds of financial risks, in a way that throws financial institutions and markets into disarray and causes a financial crisis.⁶⁶ The Preface to this Essay is just one illustration of how this might happen.

While the broad contours of climate-related financial risks are widely accepted, our climate is such a complex system that there are many uncertainties about the specifics of how different physical risks will play out.⁶⁷ Indeed, environmental-focused organizations have developed hundreds of possible scenarios representing “non-desirable warmer futures.”⁶⁸ The uncertainty about how physical risks will evolve necessarily creates significant uncertainty about how policymakers will respond to those physical risks, with the result that transition risks will also be unpredictable.⁶⁹ This

⁶³ Steele, *supra* Note 61 at 152. “[T]he probability of financial risks from climate change materializing is high, if not a certainty.” *Id.* at 120.

⁶⁴ FIN. STAB. BD., STOCKTAKE OF FINANCIAL AUTHORITIES’ EXPERIENCE IN INCLUDING PHYSICAL AND TRANSITION CLIMATE RISKS AS PART OF THEIR FINANCIAL STABILITY MONITORING, 2 (2020).

⁶⁵ *Id.* at 2. “Carbon emissions have to decline by 45% from 2010 levels over the next decade in order to reach net zero by 2050. This requires a massive reallocation of capital. If some companies and industries fail to adjust to this new world, they will fail to exist.” Bank of England, *Open Letter on Climate-Related Financial Risks* (Apr. 17, 2019) (available at <https://www.bankofengland.co.uk/news/2019/april/open-letter-on-climate-related-financial-risks>).

⁶⁶ Financial Stability Oversight Council, *supra* Note 11 at 74.

⁶⁷ “The interactions between solar radiations and the atmosphere are not the only relationships needed to model the future state of the climate and, more broadly, the environment. The ocean, biosphere, cryosphere, pedosphere and lithosphere also interact together, and are both sensitive to and influence climate and the environment. On top of this, human – particularly industrial – activity acts as a major force.” Chenet *et al.*, *supra* Note 20 at 4. There is particular uncertainty about the impact of reaching tipping points that may have an unexpectedly large impact). Steele, *supra* Note 61 at 132.

⁶⁸ Chenet *et al.*, *supra* Note 20 at 3.

⁶⁹ Regarding “the uncertainties of both the physical impacts of the climate crisis and the policy implications of the solutions,” see Yevgeny Shrago and David Arkush, LOOKING

uncertainty limits the ability of risk models to assess banks' exposure to climate-related risks in any predictive way.⁷⁰ Climatologist Andy Pitman has stated bluntly that using these climate models to assess financial risk isn't just flawed, it's counterproductive, because such models encourage overconfidence in our ability to granularly assess banks' climate-related risk exposures.⁷¹

B. Climate-Related Bank Regulation

Notwithstanding that there is uncertainty about the *precise* impacts of climate-related risks on banks, it is clear that banks will increasingly face climate-related risks.⁷² It is also clear these risks could have systemic impacts that banks cannot and will not address on their own.⁷³ Regulation is needed, but it is fair to say that most regulatory efforts relating to climate-related financial risks have not been particularly interventionist thus far. The focus has instead been on requiring disclosures about risk exposures, and in using scenario analysis as a way to learn more about how risks might manifest.⁷⁴ In its 2022 annual report outlining threats to the stability of the United States financial system, the Financial Stability Oversight Council largely limited its climate-related recommendations to data collection and disclosure.⁷⁵

More meaningful regulatory interventions are being debated, though. Should these be used simply to shield financial institutions and markets from physical and transition risks? Or should financial regulation be used more aggressively (like a sword) to also reduce physical risks? The latter "sword" approach might entail central banks playing a proactive role in coordinating climate change responses by political actors (recognizing that central banks cannot solve climate change on their own), or implementing measures that encourage green investments and discourage brown investments by banks.⁷⁶ A sword approach might even go so far as prohibiting financial institutions

OVER THE HORIZON: THE CASE FOR PRIORITIZING CLIMATE-RELATED RISK SUPERVISION OF BANKS, 28 (Jun. 2022), available at https://rooseveltinstitute.org/wp-content/uploads/2022/06/RI_Climate-Related-Risk-Supervision_202206.pdf.

⁷⁰ For a detailed discussion of financial model limitations in the face of climate change, see Patrick Bolton *et al.*, *The green swan: Central banking and financial stability in the age of climate change*, 25 *et seq.* (Jan. 2020), available at <https://www.bis.org/publ/othp31.pdf>.

⁷¹ "The argument I hear is that it's better than nothing," he said. "That is profoundly false, it is just plain wrong." Kate Mackenzie, *What smart people get wrong about climate change extremes*, BLOOMBERG (Sept. 11, 2021).

⁷² Bolton *et al.*, *supra* Note 70 at 3.

⁷³ On climate as systemic risk, see Financial Stability Oversight Council, *supra* Note 11 at 74. For a discussion of why regulation is needed to address systemic risk, see Note 42 and accompanying text.

⁷⁴ Chenet *et al.*, *supra* Note 20 at 2. See also Lael Brainard, *Building Climate Scenario Analysis on the Foundations of Economic Research* (Oct. 7, 2021), available at <https://www.federalreserve.gov/newsevents/speech/brainard20211007a.htm>.

⁷⁵ Financial Stability Oversight Council, *supra* Note 11 at 78.

⁷⁶ Bolton *et al.*, *supra* Note 70 at 4.

from making brown investments, likely sparking transition risks in the shorter-term with the goal of limiting physical risks in the longer-term.⁷⁷

This “sword vs shield” debate has become politically charged, particularly in the United States. Proponents of the more aggressive sword posture take the view that a particularly effective way to limit brown industries and the warming they cause is to limit the funding they rely upon – which includes loans from the banking industry.⁷⁸ According to this view, the financial system simply cannot be expected to adapt to the long-term risks inherent in a world suffering significantly from the physical risks of climate change, and so the only way to protect that system from complete failure is to limit emissions in the first place.⁷⁹ Anything less is tantamount to a failure of inaction – and the longer regulators delay in acting, the more destructive the consequences of their inaction will be.⁸⁰

Critics of this approach, however, consider it to be getting “outside of the lane” of financial regulation.⁸¹ The strongest critics disagree that financial regulation should be engaging with the issue of climate change at all: during the Trump Administration, US financial regulatory agencies were notably absent from international discussions about climate change and financial regulation.⁸² During the Biden Administration, this has changed somewhat, with most US financial regulatory agencies joining the Network for Greening the Financial System (a group of central bankers and financial regulators working on “environment and climate risk management in the financial sector”).⁸³ Still, the recent scuttling of a Federal Reserve Board nomination because of the nominee’s views on climate change suggests that even a more modest “shield” approach (i.e. seeking only to make the financial system

⁷⁷ For an example of a call for sword approach, see Shrago and Arkush, *supra* Note 71 at 10-11. See also Chenet *et al.*, *supra* Note 20.

⁷⁸ “In its latest Financial Stability Review, the ECB notes that Eurozone bank lending to carbon-intensive firms, as a percentage of total lending, has increased since 2015.” Chenet *et al.*, *supra* Note 20 at 3. A recent joint report from the Center for American Progress and the Sierra Club found that just eight banks financed emissions that are equivalent to 80 million homes’ energy use for one year. Center for American Progress & The Sierra Club, *Wall Street’s Carbon Bubble: The Global Emissions of the US Financial Sector*, 6 (Dec. 2021), available at https://static1.squarespace.com/static/61ac8233d16d7417cc6589e3/t/61b84bc6383f9b0e20216046/1639467980190/us_financed_emissions_USL_FIN.pdf.

⁷⁹ Steele, *supra* Note 61 at 114-15.

⁸⁰ Boyd points out a similar concern about timeliness informed OSHA’s adoption of its benzene standard in the late 1970s: “The fact that benzene was a known carcinogen was enough to trigger protective action. And moving quickly was central to ensure that workers received the protections they were promised under the statute.” Boyd, *supra* Note 9 at [].

⁸¹ See, for example, Christina Parajon Skinner, *Central Banks and Climate Change*, 74 VAND. L. REV. 1301, 1364 (2021).

⁸² Hilary J. Allen, *Resurrecting the OFR*, 47 J. CORP. L. 1, 16 (2021).

⁸³ NGFS, *Origin and Purpose*, available at <https://www.ngfs.net/en>.

more resilient to physical and transaction risks, rather than to reduce the incidence of those risks in the first place) remains a political hot potato.⁸⁴

Why should banking regulators pay less attention to climate-related threats to the financial system than other kinds of threats? Some critics of climate-focused bank regulation use the limitations of risk modeling in the face of uncertainty as a justification for such a differentiated approach. For example, in an argument for restraint by the Federal Reserve when it comes to climate-related financial risks, Christina Skinner has argued:

*The public expects and assumes that the Fed's judgments about the economy are guided by data, just as its judgments about the financial system must be informed by sound models, metrics, and projections. If decisions about economic forecasts or firms' exposure to risk appear too hypothetical or subjective, they may not be considered credible. Credibility requires accuracy. Missteps and errors by the Fed can undermine the public's confidence in its ability to expertly manage financial and economic crises.*⁸⁵

In many ways, this reflects an impoverished view of banking regulation. It narrows the focus of banking regulators to what can be precisely measured rather than what matters, and in doing so, calls for any uncertain harms to be ignored (climate scientists are already sounding the alarm that institutions are too focused on the “outcomes we can predict with high confidence,” to the exclusion of risks associated with new and evolving weather patterns, as well as the exclusion of risk arising from interacting or compounding weather events).⁸⁶ This kind of critique misses that members of the public have different and shifting perspectives about what the correct “lane” is for financial regulation, and these perspectives will influence perceptions of the Federal Reserve’s credibility.

The Federal Reserve certainly lost credibility in the eyes of the public in the wake of the 2008 crisis, as a result of its failures to preemptively intervene.⁸⁷ The public backlash to a future climate-related crisis may be even

⁸⁴ In 2022, “President Biden’s nominee for a top regulatory post at the Federal Reserve has withdrawn after opposition from fossil fuel interests dashed her hopes of confirmation in the closely divided Senate. Sarah Bloom Raskin had drawn criticism from Senate Republicans for arguing that bank regulators should pay more attention to the financial risks posed by climate change.” Scott Horsley, *Fed nominee Sarah Bloom Raskin withdraws after fight over her climate change stance*, NPR (Mar. 15, 2022), available at <https://www.npr.org/2022/03/15/1086717729/fed-nominee-sarah-bloom-raskin-withdraws-nomination-climate-change>.

⁸⁵ Skinner, *supra* Note 81 at 1355.

⁸⁶ Mackenzie, *supra* Note 71.

⁸⁷ Of all the regulatory failures that contributed to the 2008 crisis, the “prime example” was the Federal Reserve’s failure to exercise its authority under the Home Ownership and Equity Protection Act (1994) to make rules addressing many of the predatory practices common in the subprime mortgage market. “The Federal Reserve was the one entity

more severe, if the usual central bank tools end up having a limited capacity to contain or mitigate a climate-inspired crisis once it starts.⁸⁸ Many people already believe that the Federal Reserve should be focused on preventing climate-related financial crises; once such a crisis occurs, their numbers are likely to swell.⁸⁹ Ultimately, people don't want financial crises to happen at all – after the fact, they are unlikely to differentiate between crises caused by climate change and crises caused by other kinds of triggers. Given the uncertainty regarding the precise manifestation of climate-related financial risks, a long period of inaction seems guaranteed if the Federal Reserve (and other central banks and financial regulators) wait until there are concrete data, models, and projects to guide their decision-making. But as Guido Calabresi once put it, “there is no reason to assume that in the absence of conclusive information no government action is better than some action...in uncertainty increase the changes of correcting an error.”⁹⁰

If financial regulators take more concrete action (of either the sword or shield variety) to address climate-related financial risks, bank capital regulation is likely to be a primary focus of regulatory efforts.⁹¹ Bank capital regulation will need to be adjusted, however, to even begin to address the uncertainties inherent in climate change.⁹² To use the example of Crest Bank from the Preface, if we were to tie Crest Bank's capital requirements to the output of a model, to be effective, that model would not only need to use climate data to try to figure out the likelihood that in the same year, a Category 2 storm would hit Manhattan, a particularly furious wildfire season would hit the West Coast, and a Category 3 hurricane would hit the Gulf of Mexico (bearing in mind that historical data recorded in cooler times may not be

empowered to do so and it did not.” The Federal Reserve was roundly criticized for this failure of inaction. FIN. CRISIS INQUIRY COMM'N *supra* Note 10 at xvii.

⁸⁸ “Pursuing the current trends could leave central banks in the position of “climate rescuers of last resort”, which would become untenable give that there is little that monetary and financial flows can do against the irreversible impacts of climate change. In other words, a new global financial crisis triggered by climate change would render central banks and financial supervisors powerless.” Bolton *et al.*, *supra* Note 70 at 65.

⁸⁹ See, for example, Shrago and Arkush, *supra* Note 71; Chenet *et al.*, *supra* Note 20. Elsewhere in this volume, Short observes that “regulatory managerialism has fully absorbed the insight that outsourcing can lower production costs, [but] it has largely ignored the substantial and potentially catastrophic costs of governance and reputational risk. It pushes agencies toward outsourcing maximalism without regard to these costs and risks.” Short, *supra* Note 8 at []. Outsourcing climate regulation to inadequate bank-style risk modeling entails huge reputational risk for banking regulators.

⁹⁰ Guido Calabresi, *Transaction Costs, Resource Allocation, and Liability Rules – A Comment*, 11 J.L. & ECON. 67, 70 (1968).

⁹¹ Skinner, *supra* Note 81 at 1307. For an argument in favor of using capital regulation to penalize investment in brown assets, see Chenet *et al.*, *supra* Note 20 at 7.

⁹² The BCBS recently suggested moves in this direction, encouraging banks to include a “margin of conservatism” in their calculation of risk-weighted assets to “to account for the fact that historical data are less satisfactory to capture climate-related financial risks.” Basel Committee on Banking Supervision, *Frequently Asked Questions on Climate-Related Financial Risks*, 12; 14 (Dec. 8, 2022), available at <https://www.bis.org/bcbs/publ/d543.pdf>.

predictive of future weather patterns); it would also have to be granular enough to assess the likelihood that particular properties or ventures would be impacted by those weather events.⁹³ The model would also have to estimate the likelihood that insurance companies would be adequately reserved, the willingness of businesses to continue operating under the strains of climate events and other business problems, the likelihood and volume of government support, the resilience of third party vendors like cloud providers in times of emergency, and how bank customers and financial markets would interpret and react to all of the above (and people and markets don't always behave the way we expect them to).⁹⁴ And this is no doubt an incomplete list of considerations. It seems safe to say that what Crest Bank is dealing with here are not risks with known probabilities, but true uncertainties, and that no model could precisely predict how these events would transpire.

Limiting bank capital requirements to the bare minimum predicted by mathematical risk-management models will inevitably leave the financial system more fragile. As Madison Condon has observed, everyone tends to rely on the same climate-related models, populated with the same data, and this universal reliance will compound their flaws.⁹⁵ Having more redundancy in a system helps with adaptation to unexpected events, and Haldane & Madouros counsel that a blunter, less efficient tool (like a simple leverage ratio that calculates capital as a percentage of a bank's *total* assets) will be more effective than tailored capital requirements in uncertain circumstances.⁹⁶ To that end, I have previously testified that the BCBS should mandate new equity buffers to address climate change (and also other, unrelated uncertainties).⁹⁷ Those equity buffers should be calculated as a percentage of a bank's total assets, rather than risk-weighted assets.⁹⁸ Failing that, national authorities should at the very least use their existing authority (known as the countercyclical buffer) to require banks to fund an additional 2.5% of their risk-weighted assets with equity.⁹⁹ National authorities also have the authority to require the largest banks to fund more of their risk-weighted assets with equity, and the current percentages could be increased

⁹³ Condon has used the equation "Risk = Hazard x Exposure x Vulnerability," as illustrated by the following example: "The probabilities of a Category 5 hurricane landfall for example, must be combined with information on exposure (which assets are in the path of the hurricane?) and vulnerability (which assets were built after an upgraded building code was adopted?)" Madison Condon, *Climate Services: The Business of Physical Risk*, forthcoming ARIZ. ST. L. J. 11 (manuscript on file with author).

⁹⁴ "[F]inance is at the heart of the economy; is social and political; and is composed of non-stationary relationships that exhibit secular change. These features undermine the ability of science to precisely and reliably estimate the effects of financial regulations, even retrospectively." John C. Coates IV, *Cost-Benefit Analysis of Financial Regulation: Case Studies and Implications*, 124 YALE L. J. 882, 1003 (2015).

⁹⁵ Condon, *supra* Note 93 at 31; 41.

⁹⁶ Haldane & Madouros, *supra* Note 17 at 15-16.

⁹⁷ Allen Climate Testimony, *supra* Note 18 at 10.

⁹⁸ *Id.*

⁹⁹ *Id.*

to provide more cushion to absorb climate-related uncertainties.¹⁰⁰ These latter approaches, which tinker with the risk-based capital requirements instead of replacing them with leverage ratios, will still perpetuate the unnecessary complexity of existing capital regulation. At least such actions would add some redundancy to the existing requirements, though.¹⁰¹

To be clear, any precautionary approach to climate-related financial risks must by necessity be more multi-faceted and wide-ranging than bank capital regulation. In addition to noting the role of redundancy in promoting a system's robustness, the literature on complex systems also emphasizes the importance of sensors and feedback mechanisms that allow a system to adapt to changes.¹⁰² In a similar vein, I have also called for a shift in emphasis from risk-based capital rules to the banking supervision process, which allows regulators to monitor banks and external events, exercise discretion, and make precautionary judgment calls in ways that can evolve to meet the changing realities of climate-related financial risks.¹⁰³ Through the supervision process, regulators can make qualitative determinations about whether a bank's safety and soundness (or the stability of the financial system more broadly) is likely to be impacted by the way it handles climate-related financial risks – not just based on conversations and data obtained from the bank, but also based on regulators' experience with analogous risks and reasonable expectations of future change. Banking regulators can then require changes in a bank's risk management processes, even if the cause for concern cannot be precisely quantified.¹⁰⁴

V. STORYTELLING AS AN ANTIDOTE TO THE MANAGERIALIST TURN

This Essay has made the case for precautionary regulation in the face of climate-related financial risks, but the managerialist turn can inhibit such a precautionary approach in two key ways. First, it can limit regulators' field of vision to that which can be precisely measured. Second, the impenetrability of managerialist regulatory strategies can cut the public out of the conversation about regulation (ensuring that regulators only hear from industry).¹⁰⁵ Both of these problems can lead to inaction in the face of public

¹⁰⁰ *Id.*

¹⁰¹ Shrago and Arkush, *supra* Note 71 at 9.

¹⁰² Ruhl, *supra* Note 23 at 581-583.

¹⁰³ Allen Climate Testimony, *supra* Note 18 at 11-12; *see also* Shrago and Arkush, *supra* Note 71 at 1-2. Cohen & Waldman note that these more informal ways of regulating can be captured by industry and transformed into light-touch regulation. Cohen & Waldman, *supra* Note 3 at []. However, as I have argued previously, it is not inevitable that principles-based regulation will be deregulatory. Robust principles-based regulation will be the best way to achieve certain outcomes. Hilary J. Allen, *Regulatory Sandboxes*, 87 GEO. WASH. L. REV. 579, 602 (2019).

¹⁰⁴ Shrago and Arkush, *supra* Note 71 at 5.

¹⁰⁵ "This opaque technocracy...creates a feedback loop in which the organizational structures, processes, and vernaculars of managerialism silence and marginalize anti-managerial voices and traditions." Cohen & Waldman, *supra* Note 3 at [].

harm; telling stories can help ameliorate both of these problems. In particular, this Section will explore how regulators can deploy storytelling to help generate public support for precautionary regulation that will never get it exactly right, but will increase the likelihood of regulation preventing or at least mitigating harm.¹⁰⁶ To quote William Boyd from elsewhere in this volume, “[t]he goal in all of this is to turn risks back into harms and harms back into matters of public concern.”¹⁰⁷

A. *Storytelling as a Way of Thinking About Harms*

Obviously, regulators won’t act if they have honestly missed the possibility of harm, and misunderstood that intervention was needed. People (regulators included) often struggle to connect the dots with financial stability problems, to understand in the abstract how A could combine with B, C, and D to culminate in financial crisis E. Asking regulators to come up with stories about what could potentially go wrong in an uncertain future can spur creative thinking about how to connect those dots, freeing them from the confines of their models and historical experience. These kinds of storytelling exercises can also encourage regulators to think further ahead (many of the risk-management models used by banks only have timelines of three-to-five years, but climate-related risks are likely to take longer than that to manifest).¹⁰⁸ The Preface is an example of such a dot-connecting, timeline-stretching exercise. Its goal is not to predict the future, but to work through the types of problems that might occur and think about precautionary steps that might be taken in advance of those problems.

Unless regulators engage in this kind of hypothetical thinking, they will be unable to develop the experience and tools necessary to deal with a crisis until it is too late.¹⁰⁹ For example, Crest Bank clearly did not have enough capital to absorb all of the climate-related risks it faced, but even Granite Bank – which seemingly did everything right – suffered amid the market uncertainty and cut off lending to the broader economy. This suggests a need for universal increases in capital as a buffer against uncertainty.¹¹⁰ The Preface also highlights the importance of knowing the exact physical location of bank assets.¹¹¹ This story could help alert regulators to the need for a

¹⁰⁶ Akerlof and Shiller point out that stories are particularly relevant to *confidence*, with confidence being “a view of the world – a popular model of current events, a public understanding of the mechanism of economic change as informed by the news media and by popular discussions.” George A. Akerlof & Robert J. Shiller, *ANIMAL SPIRITS: HOW HUMAN PSYCHOLOGY DRIVES THE ECONOMY, AND WHY IT MATTERS TO FOR GLOBAL CAPITALISM*, 55 (2010).

¹⁰⁷ Boyd, *supra* Note 9 at [].

¹⁰⁸ Shrago and Arkush, *supra* Note 71 at 9-10.

¹⁰⁹ John Crawford, *Wargaming Financial Crises: The Problem of (In)Experience and Regulator Expertise*, 34 REV. BANKING & FIN. L. 115, 117 (2014-2015).

¹¹⁰ See Notes 97-101 and accompanying text.

¹¹¹ Condon, *supra* Note 93 at 11-12.

precautionary “physical identifier” project for bank assets in advance of a climate-related financial crisis (the similar need for standardized “legal entity identifiers” wasn’t recognized until regulators were struggling with the morass of Lehman Brother’s failure in 2008).¹¹²

Elsewhere in this volume, Frank Pasquale explores how scenario analysis can serve as an alternative to managerialist cost-benefit analysis in the administrative sphere. Scenario analysis is, at heart, a story – a way of making sense of the future by crafting a narrative that is informed by data, experience, and intuition.¹¹³ Scenario analysis has already been embraced by regulators around the world as an important early step in assessing climate-related financial risks.¹¹⁴ However, the scenarios developed in such exercises tend to be dry, complicated, and analytical and therefore unlikely to be accessible to or resonate with the public. Scenario analysis therefore does little to address the second problem identified above: the inability of the public to engage with the regulatory exercise.

B. Storytelling to Build Public Support for Precautionary Regulation

Even when regulators appreciate the potential for harm, they may suffer intense pushback from industry that makes it challenging for them to take precautionary action.¹¹⁵ If they have internalized critiques of bureaucratic inefficacy, regulators may also have creeping doubts about their ability to address the harms they have identified.¹¹⁶ If, however, regulators can tell stories that bring the public into conversation with regulatory concerns, that could generate public support that invigorates regulatory action and acts as ballast against industry pushback.

Particularly when dealing with complex matters, it can be difficult for members of the public to engage with regulators, to understand their deliberations, and to dispute or otherwise voice their concerns in a way that regulators take seriously. Given the current complexity of bank capital regulation, it’s not surprising that everyday people don’t meaningfully challenge these approaches to call for greater protections. All too often, any feedback the public does give is dismissed as unhelpful, because it lacks specificity.¹¹⁷ Regulators often seem “most alive to the concerns of what they

¹¹² For a discussion of LEIs, see Hilary J. Allen, *Resurrecting the OFR*, 47 J. CORP. L. 1, 9 (2021).

¹¹³ Pasquale at []

¹¹⁴ Chenet *et al.*, *supra* Note 20 at 2; Brainard, *supra* Note 74.

¹¹⁵ “Until safety and soundness problems become obvious, safety and soundness regulation has no political constituency.” Carnell *et al.*, *supra* Note 19 at 237.

¹¹⁶ Short, *supra* Note 8 at [] (“civil servants have internalized these critiques in ways that have been debilitating”).

¹¹⁷ Bernstein & Rodriguez, *supra* Note 56 at 53-54; see also Kimberly D. Krawiec, *Don’t “Screw Joe the Plummer”*: *The Sausage-Making of Financial Reform*, 55 ARIZ. L. REV. 53, 70-71 (2013).

referred to as “stakeholders,” meaning not the public generally but the regulated players whose own work and operations would be affected by the policymaking under consideration.”¹¹⁸ When it comes to banking regulation and climate change, those “stakeholders” will be the banks, who would prefer not to have more stringent regulation imposed as a response to climate change.¹¹⁹ But while banks may be the most informed about how regulation will inhibit their efficiency in the short term, they are not the most informed about how a climate-inspired financial crisis could occur, nor are they the most informed about the extent to which vulnerable members of the public would be harmed by such a crisis.

If banking regulators want to give members of the broader public the opportunity to meaningfully engage with them about harms the public cares about, then they need to develop new and more accessible communications channels. Regulatory agencies have often invented new ways of interacting with their publics, and if regulators construct new storytelling channels that better convey the harms they are worried about, then the general public may be better positioned to engage with the regulatory process in a cogent and compelling way (particularly if the stories emphasize the need to dispense with impenetrably complex risk-based capital requirements in favor of simpler equity buffers that are easier for the public to understand).¹²⁰

Overly-mathematized and efficiency-focused approaches to capital regulation sanitize bank risk-taking by erasing the human stakes of the harms that financial crises cause. Storytelling is a way for regulators to explain in an accessible way the human harms they foresee.¹²¹ The Preface to this Essay is an attempt at such an explanatory story about the harms that could occur if regulators fail to take action in the face of climate change, but to really make it stick, it helps to have “[s]tories with gripping visuals and good punch lines, stories that make intuitive sense, that make sensual sense—to your eyes, to your ears, to your touch.”¹²² If regulatory agencies are willing to put in the effort to craft such stories, those stories can serve as a means of educating the public about why inaction is so problematic. It is even possible that public

¹¹⁸ Bernstein & Rodriguez, *supra* Note 56 at 52.

¹¹⁹ Cohen & Waldman note that this state of affairs has in many ways been engendered by the regulatory managerialist turn: “regulatory managerialism privileges organizational voices and interests over public voices and interests.” Cohen & Waldman, *supra* Note 3 at [].

¹²⁰ On construction of new channels of accountability between bureaucrats and the broader public, *see* Bernstein & Rodriguez, *supra* Note 56 at 7.

¹²¹ The more complex something is, the less intuitive sense it makes and the more metaphor is needed to make it accessible. R Krulwich, *Tell me a story*, 71(3) ENGINEERING AND SCIENCE 10, 13-14 (2008). A narrative can also help people to “cognitively organize new information.” Michael D. Jones, Mark K. McBeth, and Elizabeth A. Shanahan, *Introducing the Narrative Policy Framework* in THE SCIENCE OF STORIES: APPLICATIONS OF THE NARRATIVE POLICY FRAMEWORK IN PUBLIC POLICY ANALYSIS (Michael D. Jones, Elizabeth A. Shanahan & Mark K. McBeth, eds.), 2 (2014).

¹²² Krulwich, *supra* Note 121 at 13; *see also* Jones *et al.*, *supra* Note 121 at 2.

support for regulatory action generated though such stories could endure through changes in agency leadership, making sharp swings towards inaction politically less tenable in the future.

Imagine if each administrative agency kept on staff a small group of entertainment professionals, charged with producing content to illustrate the threats that the agency is grappling with, and with disseminating that content in different contexts (ranging from feature length films to Tik-Tok length social media posts). Climate change is a particular concern for many regulatory agencies, so an alternative or supplemental approach could be to develop a type of “Black Mirror” streaming series on climate change. Each episode could profile the climate-related harm a particular administrative agency is most worried about, by telling the story of an individual impacted by that harm.

There are some legal restrictions on regulators’ communications activities (although many of these are tied to the use of Congressionally-appropriated funds and therefore would not apply to the banking agencies, which have other sources of funding).¹²³ Any applicable restrictions would have to be complied with, but even compliant communications are likely to be criticized by opponents of climate-related financial regulation as manipulative propaganda.¹²⁴ As the next Part will explore, the construction of stories inevitably involves deliberate choices, and it is true that the audience may not appreciate this and be misled into believing that the story they hear is the only version of reality.¹²⁵ To limit any “propaganda” impact of such stories, the stories should avoid lionizing the agency itself and focus instead on the harms the agency is trying to prevent (in this regard, it also helps that banking agencies don’t rely on Congressionally-appropriated funding and their leaders can only be removed for cause – these independence measures presumably lessen incentives for these agencies to aggrandize themselves).¹²⁶

While it is impossible to eliminate all concerns about these stories serving as a form of propaganda, in my view, these concerns are outweighed by the problems that come from *not* telling these stories (especially because the opponents of precautionary regulation have no compunctions about telling their own stories).¹²⁷ Precautionary regulation by definition happens before

¹²³ As Short notes, “In making their own communications, agencies must carefully consider how to structure their messages to comply with these restrictions, but they should not be constrained in their ambitions.” Short, *supra* Note 8 at [].

¹²⁴ For a managerialist take on concerns about the public sector engaging in marketing and persuasion efforts, see MARK H. MOORE, CREATING PUBLIC VALUE: STRATEGIC MANAGEMENT IN GOVERNMENT 186 (1995), as cited in Short, *supra* Note 8 at [].

¹²⁵ Peter Brooks, SEDUCED BY STORY: THE USE AND ABUSE OF NARRATIVE, 14 (2022).

¹²⁶ For details of the banking agencies’ independence, see Carnell *et al.*, *supra* Note 19 at 86-87.

¹²⁷ Jones *et al.*, *supra* Note 121 at 2.

a crisis, so there must be some method other than past experience for crystallizing the need for that regulation in the minds of a broad audience.¹²⁸ Inaction seems to be the inevitable alternative.

People tend to avoid thinking about worst-case scenarios because of psychological tendencies to ignore low probability events, even if those events are potentially of high consequence.¹²⁹ From an evolutionary perspective, these tendencies were likely an advantage that prevented our brains from being overloaded with unnecessary concerns, but in the context of the complex web of modern life, these kind of mental short-cuts can backfire (Kahneman has described these shortcuts as “System 1” thinking, and contrasted them with more deliberative and reasoned “System 2” thinking).¹³⁰ If the public is engaged in System 1 thinking while regulators are trying to communicate using System 2, those regulators are put “in the awkward position of defending expert risk perceptions as more valid or rational than the public’s.”¹³¹ A story can help make expert risk perceptions more “available” to the general public by making them more accessible to System 1 thinking.¹³² Story-telling has become the dominant form of meaning making in our society for a reason – literary theorist Peter Brooks argues that story-telling is so effective that it is crowding out other, drier forms of account (like the scenarios deployed in scenario analysis).¹³³ If regulators depend entirely on these other, drier forms of account, they are likely to lose the war of ideas to opponents of regulation deploying stories of their own.¹³⁴

¹²⁸ “Actors use imaginaries of future situations and of causal relations ...as interpretative frames to orient decision-making *despite* the incalculability of outcomes.” Beckert, *supra* Note 31 at 9.

¹²⁹ “[P]eople tend to ignore [worst-case scenarios] because they subconsciously avoid thinking about unlikely, terrifying events.” Rory Van Loo, *Stress Testing Governance* 75 VANDERBILT L. REV. 553, 554 (2022). See also Hu, “Individuals tend to ignore low probability catastrophic events.” Henry T.C. Hu, *Misunderstood Derivatives: The Causes of Informational Failure and the Promise of Regulatory Incrementalism*, 102 YALE L.J. 1457, 1488 (1992-1993).

¹³⁰ Daniel Kahneman, *THINKING FAST AND SLOW* (2013).

¹³¹ Lori S. Benneer, *Economic Analysis, Risk Regulation, and the Dynamics of Policy Regret*, in *POLICY SHOCK: RECALIBRATING RISK AND REGULATION AFTER OIL SPILLS, NUCLEAR ACCIDENTS AND FINANCIAL CRISES*, 54 (2017).

¹³² “Through the mechanism of plot, stories can help make causal relationships apparent, helping audiences process complex information even when they are engaging in fast thinking.” Brett Davidson, *Storytelling and evidence-based policy: lessons from the grey literature*, 3 PALGRAVE COMMUNICATIONS, 3 (2017).

¹³³ Brooks discusses the “seeming obliteration in the public sphere of other forms of expression by narrative.” Brooks *supra* Note 125 at 18.

¹³⁴ “[W]hen communicating science or policy expert information, scientists and experts are communicating using and assuming system 2. People, however, are usually receiving the information emotionally, in system 1. The differences, then, between experts and laypeople may erect barriers if experts are using types of logic and communication aimed at influencing individuals using system 2 thinking.” Crow & Jones, *supra* Note 146 at 219.

Concerns about audiences being manipulated by stories share some similarities with the behavioral critiques that have been made of precautionary approaches: it has been argued that precaution entrenches certain cognitive biases (most relevantly, the availability heuristic, loss aversion, and probability neglect), and in so doing, entrenches people's most irrational fears and desire for policies addressing those fears.¹³⁵ I have previously responded to these critiques of precautionary approaches by noting that the starting point matters. When the harm in question is potentially high-consequence but largely ignored or neglected (like the possibility of a climate-inspired financial crisis), a precautionary approach is more likely to undercorrect than to overcorrect.¹³⁶

I would respond to claims of manipulation-by-storytelling in a similar way: the relevance of the critique depends on who the storyteller is, and where they're starting from.¹³⁷ We should acknowledge that climate-related banking regulation is not starting from a neutral position. Instead, it is starting from the position that a significant percentage of the US population has a deep-seeded skepticism of regulators' motives, and that skepticism has been intentionally cultivated through stories from those who benefit from the absence of regulation.¹³⁸ Climate-related banking regulatory efforts are also starting from a position where a significant percentage of the US population is skeptical of the scientific consensus on climate change. Again, this skepticism was intentionally curated using narrative.¹³⁹ Climate-related banking regulation is starting from a position where almost no one understands the paths through which climate-related financial risks could spark a financial crisis.¹⁴⁰ And finally, where climate-related banking regulation is successful, it will be invisible in the sense that the result will be that nothing bad happens (or that a bad thing that does happen would have been worse in the absence of regulation).¹⁴¹ It seems likely that telling effective stories about the impact of climate-related financial crises in these circumstances is more likely to undercorrect, rather than overcorrect, public apathy about inaction by banking regulators.

¹³⁵ Hilary J. Allen, *A New Philosophy for Financial Stability Regulation*, 45 LOY. U. CHI. L.J. 173, 204-6 (2013).

¹³⁶ *Id.*

¹³⁷ Brooks observes that many narratives are "self-serving." Brooks *supra* Note 125 at 5.

¹³⁸ Short points out that regulatory managerialist rhetoric has had a hand in cultivating these perceptions: she notes that "regulatory managerialism discourse tends to amplify government customers' "horror stories about particular regulatory encounters" rather than equipping regulators with the tools and strategies to tell and amplify their own stories." Short, *supra* Note 8 at [].

¹³⁹ Jones *et al.*, *supra* Note 121 at 2.

¹⁴⁰ Some central bankers have argued that we need an "epistemological break...ie a redefinition of the problem at stake when it comes to identifying and addressing climate-related risks." Bolton *et al.*, *supra* Note 70 at 65.

¹⁴¹ "[H]ow can a regulatory agency show that a financial crisis would have occurred *but for* its efforts?" Hilary J. Allen, *A New Philosophy for Financial Stability Regulation*, 45 LOY. U. CHI. L.J. 173, 190 (2013).

C. Using the Narrative Policy Framework to Construct Stories

For guidance on how to tell a good story to better engage the public, we can turn to the Narrative Policy Framework (“NPF”) developed by Jones, McBeth & Shanahan.¹⁴² The NPF observes that regardless of the content, the formational elements of a narrative will always be the setting, characters, plot, and moral. Crow and Jones have used this NPF structure to create a practical guide for structuring narratives designed to support policy change: I will use that guide to suggest how to turn the example from the Preface into a story that can build public support for precautionary, climate-focused bank regulation.¹⁴³

In NPF, the “setting” refers to the relevant “facts on the ground” that provide the context within which the story will unfold.¹⁴⁴ When it comes to climate-related financial risks, the setting is highly contested. The major sites of contestation are the science on climate change, and the appropriate role for financial regulators. If the setting of the story is not congruent with the listener’s beliefs, it’s unlikely to be effective in convincing them.¹⁴⁵ Regulators may therefore want to consider constructing two different stories with different settings. Of course, stories with different settings may result in calls for different policy prescriptions, but both the settings articulated here are designed to generate support for banking regulators to take a proactive, precautionary approach to climate-related financial risks.¹⁴⁶

The first story, like the Preface, can be tailored towards those who already believe that climate change is a threat, and that government has a role to play in responding to it. It might proceed from the understanding that Crest Bank’s loans and data centers faced physical risks, that its loans to brown energy companies Tawny and Russet faced transition risks, and that Crest Bank was unlikely to internalize the costs of those risks unless it was required to. Crafting a second story, for those who are more skeptical of climate change and financial regulation, will be more of a challenge. One possibility might be to appeal to the comfort with national security-related precaution that is often exhibited by Americans who are otherwise skeptical of government intervention.¹⁴⁷ One rarely hears that banking regulators should “stay in their lane” when it comes to cybersecurity, and so the story could be set in the context of a cyberattack that damages a bank’s assets and operations, with spillover effects for other banks and the broader economy. This story could draw parallels between its events and what has befallen Crest Bank,

¹⁴² Jones *et al.*, *supra* Note 121.

¹⁴³ Deserai Crow & Michael Jones, *Narratives as tools for influencing policy change*, 46 *POLICY & POLITICS* 217 (2018).

¹⁴⁴ *Id.* at 220.

¹⁴⁵ *Id.* at 222.

¹⁴⁶ *Id.* at 225.

¹⁴⁷ Wiener, *supra* Note 54 at 229.

showing that climate-related physical risks can impact banks in ways similar to cyberattacks.¹⁴⁸

Characters are what truly bring stories to life, and NPF suggests that the character archetypes that are most important to a narrative are heroes, victims, and villains.¹⁴⁹ How these roles are cast can potentially alienate audiences, if they do not conform with their pre-existing notions of good guys or bad guys.¹⁵⁰ In our narrative, the obvious candidates for villains are the banks resisting requirements to hold more capital and otherwise prepare for climate-related uncertainty, in order to line their own pockets. Casting the banks as villains may not alienate too many people, as banks have not enjoyed a particularly favorable reputation with anyone in recent years. However, casting the banks as villains implicitly casts the regulators as their heroic adversaries. For the sizable portion of the US population that views regulation with significant skepticism, casting regulators as heroes will be alienating (it will also play into claims that the stories are agency propaganda). In any event, research on narrative theory suggests that highlighting the plight of sympathetic, humanized victims is often more effective than pointing fingers at villains.¹⁵¹ It may also be more accurate, as well as more effective, to avoid identifying heroes and villains when dealing with the impact of climate change on financial stability, as there are so many contributing factors to a financial crisis that it is hard to say that anyone in particular is to blame.¹⁵²

The narrative should therefore focus on sympathetic victims, telling the story of individual people hurt by a financial crisis.¹⁵³ This can prime the audience to care enough to seek to understand the complicated mechanics of how financial crises can happen.¹⁵⁴ Importantly, the focus in this kind of story should be on the victims of the financial crises (e.g. the ones who lose their jobs, or can't pay for gas because of a payments outage), rather than the victims of the precipitating natural disasters. The goal here is to illustrate the harms of climate-inspired financial crises, not the direct harms of physical climate events (although extremely scary stories can be told elsewhere about these direct harms, to build support for climate policies more broadly).¹⁵⁵

¹⁴⁸ Hilary J. Allen, *Reinventing Operational Risk Regulation* (manuscript on file with author).

¹⁴⁹ Crow & Jones, *supra* Note 146 at 220.

¹⁵⁰ *Id.* at 227.

¹⁵¹ *Id.* at 222-3.

¹⁵² Hilary J. Allen, *The Pathologies of Banking Business As Usual*, 17 U. PA. J. BUS. L. 861, 910 (2015).

¹⁵³ On the importance of having sympathetic, individualized victims as characters, see Crow & Jones, *supra* Note 146 at 222.

¹⁵⁴ *Id.* at 225.

¹⁵⁵ If there is significant climate change, the problems of financial crises are likely to be dwarfed by pandemics, mass starvation, mass migration, war, and other geopolitical and social instability. On possible catastrophic outcomes, see Luke Kemp *et al.*, *Climate*

One challenge with any precautionary approach is convincing people of the need for regulation before a problem manifests in an irreversible and catastrophic way. An effective plot can make the possibility of such an outcome accessible and plausible to the general public. According to NPF, “[p]lots are organising devices that link characters to each other via motive and relationships and situate the story and its occupants in time and space.”¹⁵⁶ Plots are therefore more than the sketch of events in the Preface, but like the Preface they can be used to illustrate how a problem could potentially evolve into harm.¹⁵⁷ When trying to crystallize for the public what future harms might look like, the obvious choice of fictional genre is science fiction: there is a broad literature on the role sci-fi can play in helping us make sense of the various trajectories that future may take.¹⁵⁸ A new subgenre known as “cli-fi” has recently emerged to perform the function of delineating possible futures in the era of climate change – many of which depict “a nightmarish new reality unleashed by a catastrophic [climate] event.”¹⁵⁹ This kind of textured plot that emphasizes consequences for humans is more likely to stick with audiences than a dry scenario.

The moral “is the point of the story, usually manifesting as a policy solution or a call to action.”¹⁶⁰ A fleshed out version of the story in the Preface should make it clear to the public that climate change can cause the types of financial crises that banking regulators have always worried about. The moral of this story – being the need for a more precautionary approach to banks’ exposure to climate-related risks – can be boiled down to a familiar adage: “better safe than sorry,” or “a stitch in time saves nine.” In many ways, the moral is the most important part of the story, as it is the moral that can convince the public that regulation of climate-related financial risks is firmly in banking regulators’ “lane,” and therefore deserves their support. This moral also establishes that failures of inaction are reason for public outcry, encouraging members of the public to hold shirking banking regulators accountable for their inaction *before* such a crisis occurs.

VI. CONCLUSION

Endgame: Exploring catastrophic climate change scenarios, 119 PNAS (Aug. 1, 2022), available at <https://www.pnas.org/doi/10.1073/pnas.2108146119>.

¹⁵⁶ Crow & Jones, *supra* Note 146 at 220.

¹⁵⁷ *Id.* at 222.

¹⁵⁸ “Science fiction authors extrapolate from the issues of the day, predicting what might happen if the world continues on one course or another.” Jorge L. Contreras, *Science Fiction and the Law: A New Wigmorean Bibliography*, 13 HARV. J. SPORTS & ENT. L. 65, 71 (2022) (in this Article, Contreras also offers a canon of sci-fi resources for lawyers).

¹⁵⁹ Claire Armitstead, *Stories to Save the World: The New Wave of Climate Fiction*, THE GUARDIAN (Jun. 26, 2021).

¹⁶⁰ Crow & Jones, *supra* Note 146 at 220.

As famed sci-fi author Arthur C. Clarke put it, “science fiction is something that could happen—but usually you wouldn’t want it to.”¹⁶¹ By highlighting what bad things might happen in the future, the genre allows for precautionary course corrections in the present.¹⁶² Jorge Contreras has summed up the beneficial role that sci-fi stories can play in the development and the application of the law as follows:

*Science fiction offers the ultimate legal hypothetical. It is not only analytical, as a government report or law review article can be, but also emotive. It portrays characters living with the consequences of different regulatory and legal regimes. And if the characters are believable, and the legal rules are plausible, then “experience,” as it is, can be simulated where none existed before. Works of science fiction thus serve as extended thought experiments, the best of which achieve character empathy that can give purchase to policy arguments and analysis.*¹⁶³

While this Essay’s storytelling recommendations are designed to lay the groundwork for precautionary regulation of climate-related financial risks, those risks shares features with many other problems that regulators grapple with in our modern era. Many regulators must grapple with planning for an uncertain future, knowing that their policies will be judged by a polarized population with different baseline accepted truths. The prescriptions offered about storytelling in this Essay may therefore have broader relevance for other regulatory agencies seeking to think through future harms, and to generate support from the public they are charged with protecting from those harms.

¹⁶¹ ARTHUR C. CLARKE, *Foreword*, in THE COLLECTED STORIES OF ARTHUR C. CLARKE ix (2000).

¹⁶² “By mapping out possible futures, as well as a good many improbable ones, the science fiction writer does a great service to the community.” *Id.* at x.

¹⁶³ Contreras, *supra* Note 158 at 73.