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Global Finance and Urban Adaptation: Governing Climate Risk in Miami, Florida

by

Savannah P Cox

A dissertation submitted in partial satisfaction of the

requirements for the degree of

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in

City and Regional Planning

and the Designated Emphases in

Global Metropolitan Studies,

Science and Technology Studies, and

Development Engineering

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Stephen J. Collier, Chair

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Abstract

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Savannah P Cox

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In recent years, a growing chorus of policymakers, scholars, and activists has begun to suggest that financial markets will play important roles in urban climate adaptation. By pricing future climate risks into existing risk rating and investment-making practices, working with city officials to assess local climate risks and beneficial courses of action, and more, these individuals have stressed that financial markets will greatly shape which cities can (and cannot) adapt to climate change, how cities adapt to climate change, and who benefits from adaptive infrastructure in cities. These are significant claims, with significant implications for climate justice: they speak to key distributional questions of how climate risk and security are distributed across space and time in cities, and who has the authority to make those distributional calls.

With these concerns and claims in mind, this study examines how finance is beginning to shape urban adaptation and resilience pathways through the exemplary case of Miami, Florida. I focus the analysis on three large-scale adaptation and resilience measures that are already underway in the highly climate vulnerable, financialized, and unequal city: the \$400 million Miami Forever Bond, the Miami Forever Climate Ready Strategy, and the Resilient305 regional resilience plan. Across the measures, I explore how climate-linked investment concerns and shifts in practices of valuation among bond rating agencies, real estate and bond market investors, and (re)insurance companies are beginning to shape the what, when, and where of urban adaptation in Miami: that is, what urban adaptation practically consists of; how far into the future urban adaptation measures are meant to extend, and where urban adaptation measures are sited within the city. I use ethnographic research methods, such as extended interviews with city officials, financial experts, and climate activists; participant observation of financial industry, local government, and activist meetings, conferences, and workshops; and media analysis of climate-linked shifts in financial practice, ongoing and planned adaptation measures in Miami, and local responses to these adaptation measures.

Study findings are as follows. First, I find that local adaptation and resilience measures are key terrains where the significance of climate change for financial markets—and the significance of finance-driven adaptation for local climate outcomes—are being forged and negotiated. Second, in the absence of pre-baked consensus on how to act locally on climate risk, I observe that finance-driven adaptation and resilience measures in Miami multiply, rather than foreclose, sites of political contestation over the city's future and present-day adaptation and resilience decision-making processes. Third, and finally, I find that local investments in adaptation and resilience are unpredictable: insofar as Miami officials direct resilience and adaptation dollars to projects that support existing patterns of urban accumulation, they also make significant investments in anti-displacement measures, confounding critical accounts which have often reduced adaptation and resilience to the latest iteration of urban growth machine politics.

The study makes three important contributions to the disciplines of urban planning and human geography. First, at a topical level the research encourages planning scholars to direct their attention to the highly consequential, yet still relatively understudied, field of finance when it comes to conducting inquiry on the politics and uneven outcomes of urban adaptation planning. Second, the research offers a novel way to analyze finance in relation to urban adaptation and resilience. Bringing literatures from the interdisciplinary field of the Social Studies of Finance to bear to the case of finance-driven adaptation in Miami, the analytical approach developed and deployed across the dissertation enables researchers to account for the geographically-contingent ensemble of power struggles, social relations, and expert practices that help shape (and reshape) what finance-driven adaptation measures, and urban adaptation and resilience more broadly, ultimately do and spell for urban climate futures. Third, and finally, by incorporating the practices and strategies of local climate justice activists into my account of finance-driven adaptation, the dissertation contributes to an emergent research agenda within financial geography which calls for tracing the work of activist movements as they attempt to rework the means of public finance toward more transformative ends.

TABLE OF CONTENTS

Acknowledgments	ii
Introduction	1
Chapter 1 Inscriptions of Resilience: Bond Ratings and the Government of Climate Risk in Greater Miami, Florida	16
Chapter 2 “Accounting” for Climate Justice: Fiscal Fights over Climate-Changed Urban Futures	29
Chapter 3 Making Climate (In)Visible: the Politics of Climate Transparency in Climate-Changing Miami	42
Chapter 4 Design-Driven Resilience and the Limits of Geographic Critique	55
Conclusion	69
References	73
Appendix	89
Notes	97

Acknowledgments

By the time I arrived in Miami, on January 13, 2021, approximately 2.2 million people had died of COVID-19. My mother helped me move to this strange, new city in a strange and shocking time. One week earlier, we sat in horror as we watched footage of hordes of Americans storm the U.S. capitol in a desperate attempt to reverse the results of a free and fair election. The following week, in Miami, we discussed how uneasy we felt among what, that evening, we decided to call a crowd. There were maybe a dozen people scattered around us at an outdoor restaurant.

We were together then, and we are together now as I write this from her home, before I make my next move, and we are lucky.

It was still a strange time to conduct fieldwork.

On the one hand, it felt self-indulgent. Why should I expect anyone to answer my bizarre e-mails about municipal bonds? What was the “field” and why did it even matter? On the other hand, I was alive and healthy and millions at that point were not, and for reasons over which they had little to no control. It didn’t seem right to take that for granted, either. This was the limbo in which I found myself, and in which I remained, for a significant amount of time while conducting this research. It’s a limbo whose effects I’m still wrestling with, which I think helps explain why I find writing a conventional acknowledgment difficult to do.

Miami was, for better or worse, a good teacher. A couple months later, in late March, I walked to Ocean Avenue at dusk to see what “Spring Break” would look like that year. The palm trees that dotted and swayed in the adjacent park were wrapped in soft white lights. Just west of the trees, I heard the gentle hum of a crowd, occasionally punctuated by laughter. An endless stream of people flowed slowly north and weaved in and out of the street’s pastel-colored hotels. Miami was a pageant. And while I still didn’t want to take part in that pageant, it helped to see it.

The first friend I made in Miami was a 73-year-old former Black Panther named Michael. He was from Louisville, like me. We exchanged phone numbers at a Miami Climate Alliance event after he gave representatives of a large climate justice organization who attended the event a hard time. Making use of a microphone and the stage, Michael called the organization’s representatives a bunch of Florence Nightingales trying to *do good*, and said he was beyond tired of all the *good* that they were doing. Finally, I thought, a cynic. Though that wasn’t exactly the right interpretation. On weekends, I would drive Michael around while he distributed food to folks who needed it. We would eat Goldfish crackers in the car, and I would laugh as he talked smack about the city and told me stories about the people he was delivering food to, and about the histories of the neighborhoods that we drove through. On one occasion, he asked me to manage a political campaign for his 35-year-old protégé, François, as he ran for Commissioner in District Five. Things had to change in this city,

Michael told me. Miami was undergoing what he called a climate invasion: the Florence Nightingales, the “carpetbagger” developers, as he called them, and the mayor’s office were all cashing in on climate, and the people whose neighborhoods they had begun to invade just couldn’t afford to lose any more.

For ethical reasons, I didn’t ultimately help run François’ campaign. But I did make his federal court date. Eight years prior, François had been brutalized by a Miami police officer as he walked home from a Miami Heat game. The cop was never criminally charged, so François pursued a civil case. He had to wait nearly a decade for his day in court, and Michael asked me if I would show up to support him. I watched as a jury looked at blown up images of François’ bruised and battered body as well as video footage of the officer beating him and then, a few hours later, dismissed the case. That evening, I asked François how he felt about the ruling. He sighed and said it hurt but he wasn’t surprised. This is Miami, he told me. Then, he gestured to his very pregnant partner, Rhoda, and said that it was time to get back to work. That weekend, I found him back at Miami Peniel Church of Nazarene in Little Haiti, laughing and speaking in Haitian Creole as he and Michael distributed care packages to those who lived in the neighborhood.

As I spent time with Michael and François, I started to move out of limbo. I also began to think more clearly about the other teachers whose guidance and support had helped lead me to Miami and to the ways that I hoped to reflect on my time there. First, I thought about my parents—both journalists, always curious, always seeking out the human story in anything that they wrote about, and always urging me to do and be the same. I heard the West Virginian twang of my grandma, barely five feet tall and fearless, who reminded me that if she could live through Hitler, Vietnam, *and* Reagan I could accomplish something through COVID and Trump so please stop with the waterworks and keep moving. I thought of my partner, Nat, whose deep patience and sensitivity made me feel OK when I found it challenging to keep moving. Then, my best friends at Berkeley, Alli and Pol, whose sonic ambition and inquisitiveness had brought them from Spain and South Africa to California, and whose sharp wit, humor, and grace made the worst moments of the PhD process bearable and the best moments that much brighter. I reflected on the generosity of my colleague and mentor, Kevin, whose important work in Miami inspired me to devote my attention to the city as well. I also thought about my actual teachers at Berkeley. Teresa taught me to treat the everyday as art—not because everyday life is beautiful, but because it warrants close, careful study and rigorous interpretation. Marion and Neil opened up the explosive, consequential world of economics and financial markets to me in ways that were absolutely vital. Sarah instilled in me a belief that the environment is far more than the sum of its parts, and that the material world must be taken seriously. Even though the pandemic meant I would not meet him in person, when I was contemplating a significant life decision, Zach helped give me the confidence I needed to say no. Most importantly, Stephen introduced me to the dazzling, modest, and sometimes frustrating world of inquiry: approaching new events, formations, and problems with questions, not immediate diagnoses, and maintaining the reflexivity required to begin developing substantive answers to them.

I am so lucky to have chosen a field where I am likely to meet new, extraordinary teachers like these for years to come. But even if the journey stopped here, the lessons they have taught me would be more than enough for a life well lived. Thank you.

Introduction

Overview

On May 15, 2018, Francis Suarez, the Mayor of Miami, and Daniel Stander, the former global managing director of catastrophic risk management firm Risk Management Solutions (RMS), posed together in a photo. In it, they held a placard that proclaimed that day as “Risk Management Solutions Day” in the City of Miami. The photo was taken days after the annual Exceedance conference, a three-day risk management event sponsored by RMS. The event drew dozens of executives from global (re)insurance firms, credit rating agencies, central banks, and catastrophe modeling companies, as well as urban planners and risk officers in local government, to the Florida metropolis to talk all things risk. The proclamation, written by Suarez, extends his gratitude for the central role that risk management firms like RMS have played in shaping the ways that the City of Miami understands, plans for, and finances its local resilience and adaptation efforts.

Indeed, by the time Suarez issued the proclamation, Stander had been working with Miami government officials for years to help them calculate the financial risks that climate change poses to the city and the benefits of addressing these risks through resilience and adaptation planning. More recently, in March 2017, city officials called upon Stander’s expertise to help persuade the five-person City Commission to bring the \$400 million Miami Forever Bond, a first-of-its-kind general obligation bond meant to finance a first round of resilient infrastructure projects in the city, to a general vote. What was his pitch? As Stander told me of his expert testimony, “Basically, I told the Commission that the economic impacts of sea level rise will be felt [in Miami] long before the physical impacts, long before anybody actually gets properly wet. Because the potential to get properly wet will play through the financial system as risk.” He then painted the Commissioners a picture of the impacts that this “potential” could have. “I told them it will impact frankly everything. It will impact insurance rates, it will impact lending and the availability of capital, which in turn will impact not just real estate prices but also the construction industry and the real estate industry, and so on. I basically said that the whole insurability, affordability, viability questions will come before the waters themselves” (personal interview, 18 June 2018). Stander then suggested that the commissioners’ support of the Miami Forever Bond, and the resilient and adaptive infrastructure investment for which the bond provides capital, would help the city stave off these impacts. To many of those who attended the meeting, Stander’s framing of the importance of the bond worked. As Wayne Pathman, the former Chair of the Miami Sea Level Rise Committee, told me, “I think it helped move the needle in that particular situation because the mayor ultimately was successful [in getting the commission to push the bond to a general vote] and in getting the citizens of Miami to tax themselves, which is unusual” (personal interview, 26 July 2019).

Stander's presence in these local deliberations over resilience planning is striking. It speaks to how a specific, but important and interlinked, set of financial actors and concerns are driving significant adaptation and resilience measures in Miami. Indeed, in a process of what I term finance-driven adaptation, the interlinked, evaluative practices of bond rating agencies, real estate firms, and (re)insurance companies both (1) push city officials to address their climate risks through investments in adaptation and resilience and (2) stand to shape the city's broader resilience and adaptation trajectories. The passage of the Miami Forever Bond, too, is striking. As Pathman indicated, many Miami residents identify as fiscally conservative. Moreover, the metropolitan region has long been known for its climate skepticism (Goodell, 2013). Given the challenging local political context in which the bond was passed, climate finance experts have begun to depict the bond as an early answer to a daunting question with which city governments around the world are increasingly grappling: how to pay for climate adaptation (see, e.g., Coffee, 2018). Of course, the Miami Forever Bond is just one answer among several that Miami officials have developed in response to the scenario that Stander outlined in Miami City Hall. In its drafting and promoting by city officials, the bond can be read as one element within a broader web of finance-driven adaptation and resilience measures in Miami. Other significant responses include Resilient305, a regional resilience plan launched in 2019, and the Miami Forever Climate Ready Strategy, a local climate action plan published in 2021.

The many local responses that Miami officials are drafting to the possibility of looming financial losses present several important questions. For one, how are financial actors like those that Stander represented estimating the risks that climate change poses to cities like Miami? How are these estimates translated into actions by local officials and voters? What specific instruments, practices, and interactions allow finance-driven adaptation to happen? Finally, and more broadly, how is finance, and the potential for financial loss, shaping the what, where, and when of urban climate adaptation? That is, what urban adaptation practically consists of, where adaptation measures are sited within a city, and how far into the future these measures are meant to extend?

This dissertation investigates these questions by exploring ongoing, large-scale adaptation and resilience measures that are presently underway in Miami, Florida: the Miami Forever Bond, the Miami Forever Climate Ready Strategy, and the Resilient305 regional resilience plan. Of course, many cities are undertaking large-scale adaptation and resilience measures. What makes Miami exemplary in relation to the financial pressures introduced above is its combination of extreme physical and economic vulnerability to climate change. Like many coastal cities, the metropolitan region of 2.7 million people is low-lying: it stands an average of just six feet above sea level. Unlike many of these cities, the ground above which Miami stands is full of small holes. These holes allow rising water to seep up and into the city, rendering traditional flood defenses like sea walls ineffective. The city also has a highly financialized economy: over the past several decades, Miami officials have relied heavily on international trade, banking and real estate investments, and debt issuance to pay for basic goods and services (Sassen and Portes, 1993; Sealey, Burch and Binder 2018; Taylor, 2020). Revenues from the city's massive, luxury real estate market make up a bulk of Miami's budget. Because that market is literally fixed to low-lying and already flooding coasts, experts have deemed Miami "ground zero" for the economic impacts of climate change (Union of Concerned Scientists, 2015). Importantly, climate-linked destabilizations in the city's luxury real estate market may have knock-on effects in middle and working-class neighborhoods, including gentrification and displacement (Taylor and Aalbers, 2022). In other words, extreme, intersecting vulnerabilities like these make Miami an important and useful site to study finance-driven adaptation

and resilience in action. So what kinds of adaptation pathways was finance beginning to shape?

By the time that I arrived in Miami, many locals had begun to develop answers to that question. For one, they feared that finance-driven adaptation would end up supporting those who invested in Miami—not those who lived there. Moreover, and relatedly, residents worried that the imperative to shore up property markets would mean that their voices would not be heard by officials chasing bond ratings. Local fears like these were supported by a growing body of critical scholarship on the role of finance in urban adaptation. Analyzing finance-driven adaptation in relation to broader patterns of urban accumulation, critical urban scholars stress that the logics of finance all but assure that investments in adaptation and resilience will drive processes of gentrification, be channeled to valuable infrastructural systems and projects within cities, and skip over projects that can benefit the poor (see, e.g., Ajibade, 2022; DuPuis and Greenberg, 2019; Fainstein, 2015). Focusing on the case of adaptation bonds and municipal bond markets, for instance, Bigger and Millington (2020) argue that the imperative to generate investor returns pushes bond-financed urban adaptation projects toward high-value assets, such as metropolitan transit systems, and displaces the costs of adaptation onto the urban, racialized poor, in the form of higher transit fares. Moreover, and as Leitner et al (2018, p. 1277) argue, the imperatives of finance “render urban resilience technical and managerial,” and thus hollow out space to substantively consider and debate alternative understandings of resilience that are developed by locals.

These arguments are crucial in understanding the work that finance may do in relation to urban adaptation and resilience. But what if the winners and losers of finance-driven adaptation aren't as clear cut in practice and the “logics” of capital, as they relate to urban adaptation and resilience, are in fact only emerging? In order to develop an analytical approach to finance-driven adaptation that could account for emergence and the numerous ways that finance stands to shape adaptation, I turned to literatures within the Social Studies of Finance. Rather than analyze finance to reveal how particular logics work within it, scholars contributing to these literatures treat the development of financial markets and practices as contingent and contested (Callon, 1998; De Goede, 2005; Preda, 2001). In my case, these literatures enabled me to (1) unpack the emergent relationships between financial market practice on climate change and urban adaptation and (2) include practices and processes that appear to be “outside” finance, such as those within urban planning efforts like the Miami Forever Climate Ready Strategy and Resilient305, into my inquiry on finance-driven adaptation.

Interrogating the role of finance in urban adaptation and resilience from this analytical vantage point elicited some important findings. For one, I observed local government officials steering finance-driven investments in adaptation and resilience to projects that secured valuable assets within the city *and* to those that benefited historically-marginalized residents. Second, I found that rather than ushering in the latest wave of techno-managerial rule of the climate-changing city, the financial imperative to act on climate risk helped structure a terrain of intense, ongoing political dispute over the future of the climate-changing city: specifically, over who has the authority to make decisions in its name and determine what “counts” as resilience in the first place. The emergence of this terrain was possible because of the significant, and persistent, uncertainties about how to estimate and act on climate risk among local government officials, activists, and the extra-local financial actors who have a stake in the city's future. Third, and finally, I found that the logics of finance didn't simply drop down into Miami's adaptation and resilience measures. Rather, these measures became key sites where the significance of climate change for financial markets—and, equally, the significance of

financial market action on climate change for local climate action—were forged and negotiated. These findings on the role of finance in urban adaptation and resilience also have implications for how urban adaptation and resilience might be theorized more generally, and upon which I will expound later in the dissertation.

The remainder of the introduction is organized as follows. First, it elaborates on the case of Miami. In order to illustrate the extent to which real estate markets have influenced the city's development, present-day climate vulnerabilities, and ongoing climate action, the introduction briefly discusses the city's history. It then explores the role of finance within Miami's adaptation and resilience trajectories; builds out the methodological approach outlined above, and discusses how the approach was used to constitute sites of inquiry in Miami. Finally, the introduction expounds on the research findings and presents an overview of the ground that each chapter covers.

Paradise on a Swamp

In her 1987 monograph of Miami, Joan Didion (p. 11) wrote that the city is “long on rumor and short on memory.” While Didion directed this observation to the rush of *exilio* cash, ambition, and ideas that flowed to Miami during Cold War dramas abroad, the same principle applies to the city's founding. Unlike many settler colonies in what would become the United States, following the 19th century dispossession of indigenous people, the area that eventually became Miami sat largely unoccupied for centuries.¹ And for good reason: the hot, humid swampland was largely inhospitable. Solid ground was hard to come by, given the massive, multi-million-acre floating forest called the Everglades that made up the majority of Florida's southern tip. And unlike many other swampy settler colonies in North America, there was little relief to be found in areas of higher elevation. The highest parts of the region, which many in Miami jokingly refer to as Mount Everest, stand just 11 feet above sea level—a mere five feet higher than the region's average of six feet above sea level.

In other words, as Florida passed among colonial hands and eventually landed in those of the United States, there was quite little “stuff”—be it an established planter class, as with many other southern settler colonies, or the institutional knowledge of the land that comes with these classes—that outsiders could use to make sense of the region and how it might relate to, or be useful in, ongoing development processes throughout the U.S. This was especially true in southern Florida which, due to the inhospitable physical geography described above, was even more isolated from plantation-oriented development than its northern Florida counterparts (see, e.g., Carson, 1956; Portes and Stepick, 1993).

A small number of settlers in southern Florida sought to change that. And they peddled not industry or agriculture per se but the promise of both to bring about the development that they desired. At the turn of the 20th century, American industrial elites were experiencing not just the fruits of the turn toward industrial capitalism but an absolute buffet. Massive investments in railroad infrastructure enabled an intense scaling up of agricultural production and circulation across the country. In an event that journalists at the time described as “orange fever,” by the mid 1890s central and northern Florida citrus farmers were producing five million boxes of fruit per year, after having a stock of just 10,000 citrus trees a few decades prior (Weeks, 1977). But a sudden and severe freeze derailed the citrus frenzy. In the winter of 1894 and early 1895, temperatures in Florida fell below freezing for weeks. Known as the Great Freeze and compared to the Great Fire of Chicago by historians, the event prompted mass crop die offs; drastic drops in fruit box production (falling

from six million to 100,000 boxes) and property values (from \$1,000 to \$10 per acre) (Sanders, 1980).

As markets sank, the few landowning families in South Florida saw an opportunity to raise their profiles. The story goes that during the Freeze, word spread that a handful of sparsely populated and difficult-to-reach Florida settlements had managed to harvest and ship small amounts of produce. As these rumors circulated, prominent families within these settlements made their third attempt to convince oil and railroad magnate Henry Flagler to extend his railroad network to Biscayne Bay (Frank, 2017). This time, the families attached a bouquet of orange blossoms to their solicitation. The particularly fragrant act of persuasion seemed to work. Convinced that this area would be the “home of the citrus industry of the future because it is absolutely immune from devastating freezes,” the emissary whom Flagler sent to the Bay negotiated an agreement with the families. In exchange for half of their land, which Flagler would be legally entitled to use for agricultural and commercial development, the families would get their railroad line (Portes and Stepick, 1993; Wiggins, 1997).

Of course, railroads have seldom been good for all who encounter their tracks. As with many American cities, the railroad’s siting in South Florida would help lay the literal groundwork for the region’s racialized development strategy. As Miami scholars Alejandro Portes and Alex Stepick (1993, p. 72) argue, after black railroad laborers followed Flagler’s orders and voted to incorporate what became the City of Miami in 1898, they were sent “back over the tracks.” Meanwhile, capital poured in through the railroad, millionaires clamored to develop their piece of “freeze-proof” paradise, and tourists were willing to pay top dollar to bask in it. And land, based on local settler holdings, was deeded to give whites exclusive ownership of bayfront property. Black populations, by virtue of the same deeding processes, were forced to remain across the Flagler railroad tracks, in a more highly elevated, inland neighborhood called Colored Town that would eventually be renamed Overtown (ibid, 1993). Throughout the early- and mid-20th century, any attempts that black residents made to abandon the squalid conditions of Colored Town for other parts of Miami were met with physical violence, murder, and eventually legal disenfranchisement vis-à-vis voting intimidation, excess policing, and redlining (ibid, 1993; Connolly, 2014; Rose, 2015).

The Rise of Real Estate

Beyond marking the birth of the city’s racialized development strategy, this moment also marks the emergence of real estate as a potent political force in the region—a force which would regularly squash scientific studies on the region that suggested anything other than bright futures. Indeed, just as non-white Miamians were forced into cramped conditions in the city’s burgeoning urban core, presently known as District 5, federal government dollars and real estate interests pushed forward Progressive-era engineering projects that sought to transform the city’s surrounding wetlands, the Everglades, into productive, tax-generating farmland and residences (Meindl, 2000). State and local appetites for cash preempted close study of whether these desires could even be realized: wetlands dredging had begun before the first engineering feasibility study had been completed, and before the state of Florida had even acquired the funds to pay for the entire reclamation effort. And the reclamation efforts were expensive. Staring down an increasingly depleted government coffer and the barren political future that it assured him, the then-governor of Florida sold half a million acres of swampland to a real estate developer in a last-ditch effort to continue dredging the South Florida canals (Meindl et al, 2004). Almost immediately after, dozens of real estate offices popped up in the region, enticing small investors and individual buyers to cash in on what they described as the last

remaining parts of the U.S. frontier.

Real estate success in the region hinged on newcomers believing that their investments were sound. Thus, and in a pattern that will soon become familiar, when scientific reports suggested otherwise, developers worked to have them buried. When the engineering feasibility report was eventually drafted in 1908, for instance, many of its contents did not play well with developers. While the report noted that draining the Everglades was possible, it stated that reclaimed areas would not be habitable or fit for agricultural production for decades. Outraged, real estate developers stopped the distribution of the report and convinced its author to revise many of his statements such that they would be more optimistic (ibid, 2004; McCally, 1999). Although many findings from the report were subsequently debunked, and the methodologies undergirding them were widely criticized by external observers, the findings had “worked.” By the end of World War II, large portions of the Everglades had been converted to farmland. The vast dredging efforts had drawn in and sustained federal government support for capital projects in the region, and thus secured the stability of the agricultural hinterlands that supported the nearby city’s growth. Moreover, feasibility report findings had facilitated the rise and consolidation of a real estate industry whose holdings would give it outsized power in shaping the region’s development.

Over time, the real estate industry would transform the erstwhile *terra incognita* into a global hub for speculative real estate investment and finance, leading some to deem 21st century Miami the “Wall Street of the South.” The Miami metropolitan region draws in millions of dollars in tourism and tax revenue each year (Ariza, 2020a). Indeed, just about half of Miami’s general revenue comes from property tax revenues—twice the national average among U.S. municipalities² (City of Miami, 2020a). Ariza (2020a, 2020b) persuasively demonstrates how Miami’s real estate driven economy has created economic path dependence. Because the city relies heavily on luxury real estate investment to pay for public infrastructure, its political economy is driven by real estate interests: these interests shape housing policy, help elect (or depose) local politicians, and influence how far into the future electeds think (e.g., typically in three-year time periods, the time it usually takes to complete construction on a new building). Importantly, the city’s real estate-shackled economy means that failure to meet the perceived demands and concerns of this particular, wealthy few will likely leave Miami officials with few resources to pay for basic goods and services for the many. And the need for those basic goods and services is high. Owing at least somewhat to the city’s highly racialized development strategy, Miami’s “infrastructural investments in whiteness”³ have helped make the city one of the most unequal in the United States. To briefly illustrate that inequality: as of 2018, 35 billionaires lived in South Florida (around 5 percent of U.S. total), while nearly 40 percent of Miami-Dade County households are classified as working poor, and nearly 20 percent live below the poverty line, the majority of them black (Florida, 2018).

The extreme physical landscapes, highly racialized inequalities, and path dependent economies that help make up Miami already make for a fragile city. As many climate experts have noted, the onset of climate change—expressed locally through sea level rise, excess storms, and heat—threatens to make life in Miami even more fragile, and across several axes of vulnerability (Union of Concerned Scientists, 2015). The city is already undergoing some of these changes. The Greater Miami region has seen sea levels rise by about half a foot since the early ’90s and is now experiencing sunny day flooding: the temporary inundation of low-lying areas due to high tides. By 2040, experts estimate the area will see between 8 and 12 inches of sea rise. Fast forward a few decades, and infrastructure planners are bracing for up to 24 inches of sea rise by 2060, and 5 to 6 feet of sea rise (the average height of the city above sea level) by 2100. These numbers pose massive problems for the city and

the region's existing physical infrastructures. Half a foot of sea rise threatens the basic operations of the region's drainage system, which helps keep Miami from returning to its previous swampland form. A foot of sea rise will leave 10 percent of the region's land area underwater. Two feet of sea rise will render hundreds of thousands of residential septic tanks useless. And if sea rise reaches five feet, 800,000 people stand to be displaced (Ariza, 2020b; Climate Central, n.d.).

The economic vulnerabilities of the Greater Miami region to climate change are similarly dramatic. Real estate service Zillow has calculated that Miami-Dade County contains a little over a quarter of *all* U.S. homes at risk from rising seas (Ariza, 2020b). Along with existing experiences with sunny day flooding, researchers suggest that figures like these may help explain why Miami may have already lost up to \$465 million in coastal property values from 2005 to 2018 (Keenan et al, 2018; McAlpine and Porter, 2018). By 2050, approximately \$15-23 billion in Miami property could be underwater (Risky Business Project, 2014). Of course, and as RMS executive Daniel Stander stated in the opening vignette, these losses could come far earlier, and with dire consequences: a sudden, climate-linked fall in investor confidence in the region's future may spell a (perhaps permanent) drop in the city's tax base.⁴ A cratered tax base, in turn, will make it that much harder for the city to pay for measures that reduce physical and social climate vulnerabilities, particularly through bonding (see, e.g., Meyer, 2014).

Miami “Forever?” When Climate Risk Becomes Financial Risk

That Miami officials are beginning to act on climate change through investment in resilience and adaptation speaks to the power of the possible futures that climate models, academic scholarship, and dramatic expert testimony help create and circulate. To better understand the significance of finance in particular for local climate action, this section explores how concrete changes in financial markets related to climate change; past experience with significant financial loss among city officials, and ongoing work with actors in the financial world have begun to shape contemporary adaptation and resilience measures in Miami.

Unlike many cities, which often begin to draft and implement adaptation and resilience measures in the wake of a recent disaster event, Miami has not suffered a significant disaster loss since 1992. That year, Hurricane Andrew tore through the region, killed dozens, and produced \$15.5 billion in insured losses (McChristian, 2012). The absence of Andrew-level devastation does not mean that city officials are coming to the resilience and adaptation planning table with blank slates, however. Memory of the 2008 financial crisis still looms large in the minds of many officials. For good reason: the Brookings Institute ranked Miami as one of the hardest-hit global cities of the crisis, citing its dependence on speculative property markets and tourism (Istrate and Nadeau, 2012). And, along with many other cities in the U.S., it is a crisis from which Miami has only recently recovered. It isn't very surprising, then, to see references to the financial crisis in local adaptation and resilience efforts (in the first page of Resilient305, for instance, authors refer to the 2008 crisis as the caliber of catastrophe that the plan is meant to avoid). Nor is it surprising to see that these efforts began popping up in the immediate aftermath of the crisis.⁵ Soon after the financial crisis, local officials in South Florida formed county-level sea level rise task forces charged with producing recommendations on how to prepare for rising seas, and which they drafted with the help of finance-related organizations like Risk Management Solutions.

The seeming need to act on climate change was heightened by the 2012 announcement of proposed changes to the National Flood Insurance Program, a public flood insurance program in the United States, which would remove subsidies from its flood insurance policies such that they reflect true flood risk. In many ways, these subsidies made life in South Florida possible.⁶ Without any action taken to reduce the area's flood risks, a push toward actuarial pricing would, in the words of a 2014 sea level rise report, mean that the region "[risks] losing insurability and financial support for our future" (Miami-Dade County, 2014, p. 11). That sense of urgency was heightened when, as one financial officer told me, bond rating agency analysts began incorporating climate change into the series of questions that they asked him in their regular meetings—a process that these agencies would formalize a couple years later in 2017⁷ (personal interview, 14 August 2018).

Where technical models and maps worked to quantify and price the climate risks that the city faced, *Rolling Stone* pieces like "Goodbye, Miami" and documentaries like "Saving Miami," starring actor Jack Black, started to give the city a global reputation as a risky city. For many officials, popular treatment of Miami as the coming sunken city of Atlantis could also trigger financial losses. This possibility made for a further objective of local adaptation and resilience measures: managing the perceptions of outsiders. But insiders, too, had begun to speak out. Starting around 2016, local hedge fund managers and mayors of smaller towns in the region drew local headlines and the ire of local real estate developers and Miami officials when they made public statements about the need for average homeowners in low-lying areas to seriously consider abandoning South Florida due to the medium-term economic risks that climate change posed to the region (Harris, 2018; Kolbert, 2015). A 2018 report bolstered these controversial remarks when it showed that rates of property value increases were higher in more highly elevated parts of the city than lower-lying areas (Keenan et al, 2018). This report, along with national stories about developers harassing low-income residents in highly-elevated neighborhoods, like Little Haiti, to sell their homes gave Miami yet another reputation that officials didn't want: the birthplace of climate gentrification (see, e.g., Ivanova, 2020).

The series of extra-local financial pressures, circulating representations of and discourses about Miami help explain why the city's climate adaptation and resilience strategies look the way that they do. For instance, while many urban adaptation and resilience efforts are discussed, deliberated, and promoted at the local level, in Miami many of these efforts shoot straight to national and international scales. One can observe this feature of Miami's adaptation style via the successful efforts of Francis Suarez, the current Mayor of Miami, to become head of the Global Commission on Adaptation, and in his 2018 *New York Times* op-ed on the Miami Forever Bond, which he wrote with former United Nations Secretary General Ban Ki-moon (Suarez and Ki-Moon, 2018). We can also see the importance of finance in the 2021 rollout of the Miami Forever Climate Ready Strategy, whose data-driven and transparent features (such as greenhouse gas inventories) officials say will "reduce uncertainty for the community and the private market," give investors "comfort" and thus allow Miami to "thrive" amid a changing climate (personal interview, 16 June 2019; City of Miami, 2021a). Finally, we can see the imprint of finance in recent adaptation and resilience measures, such as the Resilient305 Strategy and the Miami Forever Bond. These plans and financial instruments take on a range of adaptation and resilience measures. What brings them together is the promise that appears within their seemingly mundane pages and their flashy external promotion: that the specific adaptation and resilience actions within them will keep the city's bond ratings and property values high, and local flood insurance premiums low, while also advancing equitable adaptation. These are weighty claims. And as one can learn from the many previous assurances that local authorities have made to residents and outsiders about the region and its future, claims like these are not always to be

trusted. So the question is: how would finance-driven adaptation play out?

Investigating a Field in Flux

By the time I arrived in Miami, locals had already begun to develop answers to that question. Many residents believed that what they called the “financial world” was the puppet master behind many of Miami’s adaptation and resilience efforts. For locals, this world was mainly populated by the uber-rich who treat Miami as a tax haven, the development tycoons with endless desires to build and sell, as well as the rating agencies, (re)insurance companies, and bond investors seeking a safe, profitable bet over the near- to medium-term. For that reason, many residents suspected that resilience and adaptation would benefit those who earned their incomes through their investments in Miami properties, not through living and working there. If resilience and adaptation efforts were ultimately about shoring up property and bond markets, then, many residents also feared that the highly promoted and celebrated participatory exercises baked into ongoing adaptation and resilience efforts were a charade: one trick, among others, that officials would use to secure community buy-in while directing taxpayer dollars to adaptation and resilience projects from which communities do not benefit.

Importantly, an emerging Marxian literature on the role of finance in urban adaptation and resilience efforts supported many of these claims. Many scholars taking up these perspectives analyzed the role of finance as instrumental to broader patterns of urban accumulation. Drawing on Harvey’s (2001) concept of the spatial fix, Ajibade (2022, p. 1) for instance argues that investments in urban adaptation and resilience are fixes:⁸ capital-intensive projects, such as the greening of urban infrastructure, that “rework local and global metabolic flows and circulations in the interest of capital and power” (Christophers, 2018). Authors taking this approach stress that the logics of finance largely determine why adaptation and resilience efforts ultimately serve the interest of capital and power. The imperative for large returns on investment and the capturing of financial flows, for example, all but ensures that urban adaptation and resilience dollars will be directed to high-value assets and projects at the expense of the urban, often racialized poor (see, e.g., Bigger and Millington, 2020; Fainstein, 2015; Gould and Lewis, 2016). Moreover, these scholars often frame local activists as resistant to finance-driven adaptation and resilience. Taking up the concept of the “right to the city,”⁹ DuPuis and Greenberg (2019, p. 3) characterize activist objections to ongoing resilience efforts in New York City as organized opposition against “capitalist schemes” and in favor of “resilience projects that will provide broader amenities to all.”

These accounts usefully raise the question of how finance-driven adaptation and resilience relate to broader processes of urban accumulation. They also raise key questions of who benefits from finance-driven adaptation and resilience efforts, and why. These questions are of particular importance in Miami, given its stark levels of inequality and the centrality of finance in its development and adaptation strategies. But in Miami, things seemed to be less clear-cut than what critical accounts would anticipate. It was true that many individuals I encountered were deeply concerned about the scenario that Stander described in the opening vignette: that the city’s climate risks may become financial risks and crater the city’s economy. Capital planners and resilience officers, for instance, worried that lack of investor confidence in the city’s future would leave Miami officials without the resources they needed to pay for holistic resilience and adaptation measures. Similarly, climate justice activists feared that the financial world’s grip on official imaginations of,

and planning for, adaptation and resilience would push equity-oriented components of local and regional adaptation and resilience plans to the side. Within the financial world, bond rating agency analysts were concerned that incorporating climate risks that extend beyond a 20-to-30-year bond life span into its present-day rating practices might expedite the scenario that Stander described.

Despite the centrality of finance in relation to ongoing and planned adaptation and resilience measures, these individuals were unsure how, when, or if Stander's scenario would take shape in Miami. They were equally unsure what to do about it. The pervasiveness of this uncertainty in relation to finance-driven adaptation and resilience pushed me to pose a methodological question: how to take up key Marxian questions of who gets what and why in a field whose practices around climate change seemed to be both changing and in-the-making.

Accounting for finance

To answer those questions, I turned to literatures within the Social Studies of Finance (SSF). At a broad level, literatures within this field stress the need to account for finance and its profound implications for daily life (De Goede, 2005).¹⁰ Rather than assuming that finance works in a particular way, the task is to thoroughly examine how the “complex interplay of rationalized financial representations (and instruments) on the one side, and local forms of knowledge...on the other” shapes what we call finance (Preda, 2001, p. 17). When tracing interplays like these, SSF-oriented scholars stress that finance can (and does) operate in many ways, and for many interests. This knowledge, in turn, requires researchers to treat the development of financial practices, markets, and finance more broadly as contingent, contested, and ultimately political (Callon, 1998; *ibid*, 2005; Preda, 2001). Importantly, treating finance as political does not narrowly entail analyses that “reveal” how the logics of capital work through finance and why, as some Marxian accounts might have it. Instead, politicizing finance refers to rendering “visible and debatable” the contingencies, power struggles, technical practices, and social relations that help shape financial markets (*ibid* 2005, p. 25; Leyshon and Thrift, 1997).

Within these literatures, two ways of accounting for finance stood out as particularly useful for my work in Miami: (1) opening up the black box of financial practices and (2) including practices and processes that appear to be “outside” finance into inquiry on finance-driven adaptation. Black boxes¹¹ refer to devices, practices, or organizations that are opaque to outsiders, often because their contents are regarded as “technical” (MacKenzie, 2005, p. 555). What does it mean to dig into the black box of finance? In purely methodological terms, it entails “examining and describing the mundane side of financial information; not only how it is produced and distributed but...the mundane methods for documenting the veridicality, reliability, and relevance of financial information; the categories [employed] in producing, handling, and channeling information, and the knowledge and skills required by these activities” (Preda, 2001, p. 16). In all of these exercises, the goal is not to uncover a coherent logic at work in the field but to highlight the constant commotion taking place within it (*ibid*, 2001). Fieldwork, here, can look like many things: from tracing the judgments that state-owned banks make when allocating loans to private firms, to following the “creative tinkering” of financial theorists as they develop their seemingly rule-obeying theories (Firth et al, 2009; MacKenzie, 2003, p. 831). In these examples and many more, the analytical payoff lies in allowing researchers to examine finance as something that “plays itself out” through a series of relationships, negotiations, and struggles in particular places, not as an entity that operates in some

“mythical transnational space” (ibid, 2005, p. 20; Leyshon and Thrift, 1997).

Outside of opening the black box, these literatures offered a way to include seemingly non- or beyond-financial practices and processes into analyses of financial markets. Inasmuch as SSF-oriented inquiry can include an obvious cast of financial theorists and the equations they make, scholars within this subfield suggest that researchers can and should push the boundaries of inquiry into finance such that it includes the many “unrecognized producers” of finance, inclusive of activist organizations, journalists, and individual homeowners, among many others (De Goede, 2005; Langley, 2008, p. 11). Why? Because changes in the practices of unrecognized producers are crucial to “the constitution of contemporary finance” and, relatedly, because they “open up new avenues of inquiry into the politics of contemporary finance” (ibid, 2008, p. 14).

Gordon, Thrift, and Tickell (2004) make this point explicitly when they bring TV news shows into their analyses of institutional investment and mutual fund practices. As news shows and investment markets have become increasingly embedded in everyday life, the authors argue that TV news producers and executives have had to pay more attention to developments within investment markets, just as executives from these markets have had to pay more attention to the large audiences to which news shows speak and the emotions that the shows conjure and transmit to their viewers. Over time, the authors detail the ways in which the practices of institutional and mutual fund investors have both shaped, and been shaped by, news cycles, media consumers, and ratings imperatives—specifically with respect to how value is thought of, generated, and circulated. The authors stress that the ability of financial markets to generate close, co-constitutive ties to domains beyond finance, in this case news media and daytime TV, is not of purely academic importance. If changing financial practices have led to sweeping crises à la Enron, the authors conclude, it is imperative to open our eyes to the myriad sites and practices that might inspire such changes, no matter how minor or unrelated they may appear at first glance (ibid, 2004, p. 306).

Accounting for finance-driven adaptation in Miami

Of course, in Miami I wasn’t opening up the black box of a specific financial theory or the organizational structure of a specific set of financial actors. And the “minor” site I sought to explore in relation to finance was urban planning, not news media. But these analytical orientations nevertheless had valence for the ways I constituted my fields of inquiry. To open up the black box of finance-driven adaptation and resilience in Miami, it seemed essential to first focus on the emergent and opaque relationship between (1) changing financial market practices of valuation around climate change and (2) the concrete forms and features of local resilience and adaptation measures. How was it, I wanted to know, that these changing practices were beginning to shape the forms of adaptation and resilience in Miami? And conversely, how might these emerging local forms of adaptation and resilience shape financial practices of valuation around climate risk and resilience?

I first traced the interactions among: (1) the practices of bond rating agencies and analysts as they acquired knowledge on climate risk and translated it into place-specific bond rating processes, (2) the actions taken by Miami officials seeking to protect property values and bond ratings through investments in adaptation and resilience, and (3) the strategies of climate justice activists¹² as they developed their positions on resilience and adaptation. Tracing these interactions and their effects entailed extended interviews with rating agency analysts and risk management experts, as well as local developers, officials, and activists, and analysis of documents on climate risk and resilience that

they produced and circulated among each other. Analysis also consisted of observing public hearings and industry events where these emerging understandings of, and actions on, adaptation and resilience were introduced and discussed.

As the research evolved, I also incorporated “minor” plans and debates into my inquiry on finance-driven adaptation and resilience, such as the Miami Forever Climate Ready Strategy and the Resilient305 regional resilience plan. While financial practices were not directly deployed in these plans or debates over them, finance was at stake. On the one hand, officials, expert publics, and activists involved routinely suggested that these plans were intended to signal to financial markets that the City of Miami was “doing something” on climate change, and thus meant to encourage future investment in the city. On the other hand, local responses to the specific contents and mechanisms of these plans stood to change the work that the plans would do, and thus the “signal” that the plans would send to the financial world. Investigating the ways that finance inflected (and, to some extent, stood to be inflected by) these plans involved observation of public meetings and workshops associated with both plans, as well as interviews with vocal activists, workshop attendees, and local officials who made connections between the plans and the financial world. I also analyzed public-facing documents, media reports, and activist social media channels related to the plans to examine how local beliefs, concerns, and fears about finance figured into and mediated both plans and debates over them.

Negotiating and Contesting Urban Climate Futures through Finance-Driven Adaptation

Bringing that analytical approach to bear on the case of finance-driven adaptation and resilience measures in Miami elicited some surprising findings. Of course, fears about the doomsday scenario that Stander relayed in City Hall reverberated across my field sites. But so, too, did ideas of how to manage these fears and prevent the doom spiral of mass property devaluations, rating downgrades, and drops in insurance coverage. And as these ideas took flight in the form of specific adaptation and resilience plans, as well as flashy demonstrations in their name, so too did local counter plans and counter demonstrations. In some cases, these counter plans and demonstrations altered the forms and features of the resilient, investment-worthy city that Miami officials so carefully tried to curate and project to the financial world. In short, I found a much more dynamic field than what Stander, residents, many scholarly accounts, and even I had anticipated.

First, financial logics did not simply descend onto adaptation and resilience measures in Miami, as some critical scholarship might suggest. Rather, these measures were important terrains in which the significance of climate change for financial markets—and, equally, the significance of financial market action on climate change for local climate outcomes—were being forged and negotiated. City officials, for instance, took on a range of resilience measures to “give comfort” to rating agency analysts, bond market investors, and (re)insurance firms *and* to determine which measures these actors would deem valuable (personal interview, 16 June 2019). These measures included the creation of the Miami Forever Bond and the array of resilience and adaptation projects that it helped pay for; the greenhouse gas reduction plans and storm water management plans that help compose the comprehensive Miami Forever Climate Ready Strategy; as well as innovative, design-driven public-private resilience planning partnerships with high profile organizations, such as the Rockefeller Foundation. On other occasions, Miami officials used regular meetings with rating agency analysts to help “set the terms” of what counts as a climate resilient or vulnerable city—a marked contrast to the usual relationships between rating agencies and municipal officials, wherein

agency analysts transmit their already hardened expectations to evaluated municipalities through the rating process (see, e.g., Hackworth, 2007).

Second, the concrete outcomes of finance-driven adaptation and resilience in Miami were unpredictable. The central (yet still somewhat emergent) role of finance in Miami adaptation and resilience trajectories afforded some significant, and expected, wins to the urban growth machine. For instance, the intensifying interactions among rating agency analysts and officials around climate change risks helped make resilience shorthand for creditworthiness to many officials. This translation helps explain why millions-worth of initial Miami Forever Bond funds have gone to high value assets in the city, such as the low-lying financial center of Brickell Avenue. It also helps explain why one key action item from the Resilient305 plan included the development of opportunity zones¹³ in low-income neighborhoods, and why boosted credit ratings and property values are listed as key benefits of adaptation within the Miami Forever Climate Ready Strategy. It is also true that concerns about the financial world limited the imaginations and actions of local government. Fearful that climate “doom and gloom” may trigger mass property devaluations, for instance, I show that city officials are still reticent to openly disclose the full scope of their climate risk exposure or even use the word “emergency” in relation to any of their climate action. In the eyes of activists and expert publics, these fears have paradoxically kept city officials from making more substantial investments in adaptation and resilience, the seeming logic being that if specific climate actions taken seem small, then so too do the climate risks.

And yet, finance-driven adaptation measures also ended up addressing longstanding patterns of inequality within Miami. The Miami Forever Bond, for instance, allocated \$100 million to affordable housing and amenities in low-income neighborhoods.¹⁴ Funds from the first tranche will support the construction of new and ongoing affordable housing units in low-income neighborhoods like Liberty City; a pilot program to prevent climate-linked displacement in neighborhoods like Little Haiti,¹⁵ as well as the renovation of existing parks in these neighborhoods and the construction of new ones. These developments, as I discuss in the dissertation, represent a marked departure from the norm in municipal finance expenditures in Miami. Moreover, as part of their Resilient305 plan and Miami Forever Climate Ready Strategy, Miami officials have prioritized the majority non-white areas of Miami Gardens, Overtown, and Homestead for the development of resilience hubs: neighborhood centers whose resilience programming, community leadership training, and disaster relief supplies are meant to bolster civic infrastructure and local workforce training.

Third, where some critical accounts suggest that finance-driven adaptation and resilience measures hollow out meaningful debate, I found that these measures actually multiplied the sites of political debate and contestation. Across the adaptation and resilience plans and financing mechanisms that I studied, I observed area climate activists strategically rallying around them to support their own political agendas, rather than categorically resist them. With respect to the Miami Forever Bond, Miami Climate Alliance activists successfully fought for the construction of a diverse Citizens Oversight Board whose members could audit how Miami Forever Bond projects are selected and implemented. The goal here, per activists, was to “change bureaucratic systems that didn’t really work for people” in Miami and ensure that funds don’t just go to wealthy neighborhoods (personal interview, 15 July 2018).

Meanwhile, the local participation sought by the Resilient305 planning process catalyzed the creation of hyperlocal counter-plans, such as the Housing Justice is Climate Justice Plan. These plans push back on many of the market-oriented resilience “solutions” offered within the pages of the

Resilient305 plan and continue to mediate battles over what resilience in Miami practically becomes. Elsewhere, activist organizations like Parents for Future used the transparency-oriented elements of the Miami Forever Climate Ready Strategy to take on longstanding patterns of corruption and climate denialism in the city. Moreover, the Resilience Action Forum—part and parcel of the transparent Climate Ready Strategy—has formalized a channel of communication between residents and urban administration, granting rare opportunities for residents to dialogue with, and debate, officials regarding how to prepare for the city’s climate-changed future.

In a city whose highly centralized governance structures have largely inhibited the development of community boards and plans like those of New York and San Francisco (see, e.g., Angotti, 2011), the creation, formalization, and durability of the Citizens Oversight Board, the Resilience Action Forum, and the Housing Justice is Climate Justice Plan are significant. These boards, fora, and plans may not change fundamental political economy questions of who gets what right now, but they certainly raise them. Moreover, as key, early outcomes of finance-driven adaptation in a highly-financialized, unequal, conservative, and climate vulnerable city, these boards, fora, and plans call for modes of inquiry on finance-driven adaptation that embrace rather than ignore the unexpected.

Overview of the dissertation

The remainder of the dissertation is organized as follows. Chapter One investigates the role of bond rating agency practices in shaping Miami resilience and adaptation measures. I first explore how agency analysts are accounting for climate risk in their rating practices, and how these practices are beginning to shape the ways that Miami officials understand, and act on, climate risk through investments in resilient infrastructure. I show how, on the one hand, existing categories of creditworthiness—such as the size of an urban economy—have helped frame local officials’ understandings of what resilient infrastructure should do, and its general importance. On the other hand, I argue that the still-emergent status of resilience as an object of knowledge among rating agencies, local officials, and activists has helped create and sustain a field of struggle over the meanings and forms of resilience. For instance, I show how officials have used nascent rating agency understandings of resilience to help “set the terms” of their evaluation and defer devaluation, just as activists have used the ambiguities of the term to demand that affordable housing count as resilient infrastructure.

Chapter Two dives into the field of struggle introduced in Chapter One. It focuses on the Miami Forever Bond, the racialized histories of local municipal finance in which the bond intervenes, and the competing imaginaries of resilience that have shaped and reshaped the work that the bond does. Where many city officials view the Miami Forever Bond as instrumental in ensuring that the city remains strong and attractive to external investment as the climate changes, local climate justice activists envision the bond as a key mechanism in addressing longstanding, highly racialized inequalities in the city that climate change stands to exacerbate. Intrigued by these activists’ strategic rallying around finance-driven adaptation, this chapter details the ways in which the Miami Climate Alliance, a consortium of social and environmental justice organizations in the city, worked to advance procedural and distributive justice through the bond: first, by broadening who can have a say in municipal finance decision-making and second, by allocating a significant amount of bond dollars to affordable housing in climate-gentrifying neighborhoods.

Chapters Three and Four explore the “minor” sites of inquiry on finance-driven adaptation: the Miami Forever Climate Ready Strategy and the Resilient305 regional resilience plan. In Chapter Three, I examine the Miami Forever Climate Ready Strategy and the role of transparency within it—a surprising feature of the plan given the city’s long history of highly centralized and opaque governance styles. To examine the role of transparency in the plan and in relation to finance-driven adaptation more broadly, I explore three components of the plan where demonstrations of transparency feature prominently: the Mayor’s Resilience Action Forum, the Citizens’ Oversight Board, and the Storm Water Master Plan. Across these sites, I detail how city officials have strategically disclosed local climate risk and action to create positive orientations toward the city’s future. I argue that officials have promoted climate transparency in the plan to defer unplanned adaptation: sudden drops in property values that will permanently crater the city’s economy. But these demonstrations of transparency have become a lightning rod. In this chapter I also detail the ways in which activists, residents, and expert publics have conducted counter demonstrations meant to destabilize official efforts at creating positive orientations to the future, and to demand climate action that centers on rapid decarbonization and eventual retreat from the shores.

The fourth and final chapter examines the Resilient305 Strategy and the design technique of synthesis¹⁶ at work within it. On the one hand, I show how synthesis helped produce many planning recommendations—chief among them the creation of new opportunity zones to enhance climate equity—that ultimately would promote the creation of new markets in low-income, majority black neighborhoods in Miami. On the other hand, I show how synthesis produced overflows: opaque knowledges and experiences that resist the framing process and challenge the market-oriented recommendations that emerged from them, as evident in the Miami Climate Alliance’s “Housing Justice is Climate Justice” plan. Building on the analytical approach to studying resilience that I have developed across this dissertation, this chapter then advances a mode of critique on resilience that traces processes of framing and overflowing (Callon, 1998; 2009): how expert efforts to render resilience an actionable, “technical” problem produce sites of contestation over what counts as a resilient city and who has the authority to enact it, and that continue to mediate what the resilient city practically becomes. The conclusion reflects on case findings and the analytical approach I developed during the project, and briefly discusses sites where future research along the lines of inquiry developed here can be conducted.

CHAPTER 1

Inscriptions of Resilience: Bond Ratings and the Government of Climate Risk in Greater Miami, Florida¹

On the afternoon of June 29, 2019, lifelong Miami Beach resident Bob Kunst walked toward the edge of his street and stared out into the waterways of Biscayne Bay. He didn't like what he saw. The 78-year-old career activist pointed out one newly constructed "abomination," a Ritz Carlton Hotel, which stretched along the coast to his right. Across the waters, he lamented the sight of several boxy mansions that he said had overtaken his historically middle-class neighborhood like kudzu. But he especially disliked what he couldn't see: two massive pipes that the City of Miami Beach had recently installed to channel storm water into the regional waterway. Both pipes were buried a few feet below Kunst. Both pipes, the City claimed, were meant to develop resilience to the effects of climate change, even though subsequent studies suggested the pipes may have degraded local ecosystems, a key defense against climate change.¹⁷ "This whole resilience thing is such a sham," Kunst muttered. For Kunst and other residents interviewed, the City was installing this "worthless" infrastructure with one item in mind: credit ratings (personal communication, 29 June 2019).

Greater Miami government officials, too, have tied recent resilience investments to credit ratings. In an April 2019 missive between the Mayor of Miami Beach and the City Manager, for instance, the mayor indicated that the Miami Beach must continue to invest in resilient infrastructure to maintain its strong credit ratings.¹⁸ Nearly two years later, at the 2021 United Nations Climate Adaptation Summit in which Miami elected officials led a session on resilient cities, the mayor pointed once again to credit ratings as a key driver of his city's resilience plans. In this speech, he noted that rating agency decisions to improve the city's municipal bond rating following a series of resilient infrastructure investments signaled that Miami Beach is "on the right track" in preparing for climate change. Even better, the mayor suggested, the city could see future "financial returns" if it made more investments along these lines (Climate Adaptation Summit, 2021).

But given the significant uncertainties regarding how best to prepare for climate change and evaluate climate risk, let alone the contested meanings of resilience (Meerow and Newell, 2016), how do rating agency analysts and local government officials arrive at a shared understanding of what "counts" as resilience? What might these shared understandings spell for the government of climate risk in U.S. cities and the work that resilience does in relation to urban political economies? This paper investigates these questions through a case study of resilience planning efforts in the highly financialized¹⁹ and highly climate vulnerable region of Greater Miami, Florida,²⁰ as they articulate

¹ This chapter was previously published as a solo-authored article in *Environment and Planning A: Economy and Space* in October 2021.

with the changing practices of rating agencies. I argue that the practical meanings and infrastructural forms of resilience in Greater Miami are increasingly an effect of the observational practices of rating agencies. Even still, rating-driven resilience investments in the region are wide-ranging. This is at least partially because rating agency and city government understandings of resilience are just emerging, which in turn creates a new set of practical dilemmas and political opportunities for Greater Miami officials and residents as they prepare for climate change impacts. On the one hand, lack of clarity on what “counts” as resilience makes it difficult for officials in Greater Miami, a well-resourced but fiscally conservative metropolitan region, to know in advance what specific investments rating agencies will reward. On the other hand, the ambiguity is politically useful. Social and environmental justice activists have strategically mobilized particular meanings of resilience to successfully demand affordable housing (Grove et al, 2020a), which rating agencies have described as examples of resilient behavior, just as some Greater Miami officials have seized the term’s ambiguities to, in the words of one risk management expert, “see what they can get away with” in rating agency analyses (personal interview, 14 June 2019). Thus, even as the observational practices of rating agency analysts increasingly inform the significance of resilience among Greater Miami officials—in terms of its meaning, investment-worthy physical forms, and general importance—its status as a still-emergent object of knowledge means that resilience retains a degree of plasticity and can be mobilized for different purposes and toward different ends.

The first section of the paper situates these arguments within a wider set of scholarly literatures that examine the power that credit rating agencies and credit ratings are said to possess regarding the operations and behavior of governments. Because the issue of climate change is a novel object of concern among rating agencies, and because the meanings of resilience remain contested in scholarly and policy literatures alike, this section introduces Science and Technology Studies (STS)-inspired scholarship on inscriptive devices as useful analytics in (1) analyzing how resilience comes to have specific, shared meanings among rating agency analysts and Greater Miami governments and (2) assessing how rating work on resilience may drive further inequalities in and between cities as the climate changes (Latour, 1987; Mitchell, 2005; Rose, 1999). Sections II and III present the main empirical analysis of the paper. Section II investigates how analysts at Moody’s Investors Services are acquiring knowledge about a municipality’s resilience and vulnerability to climate change and are inscribing that knowledge into existing municipal bond rating practices. Section III discusses some of the initial effects of rating agency action on resilience, detailing the series of investments that Greater Miami government officials have undertaken in order to demonstrate their resilience to market actors such as rating agencies, as well as local responses to these investments. Section IV concludes with a broader discussion of the implications and limits of the case and identifies avenues for future research.

In developing these arguments with a focus on inscription, this paper makes two key interventions in ongoing debates in economic and urban geography. First, it contributes to recent work in economic geography which treats the practices and perspectives of market actors, such as rating agencies, as fundamental in critical analyses of climate governance and in doing so also advances calls for inductive modes of research on the politics of resilience (Anderson, 2015; Christophers, 2019; Grove et al, 2020a; Langley and Morris, 2020). Second, this article responds to a significant body of economic and urban geography scholarship which has stressed the need for analyses of how “green” or “sustainability” fixes are materially and discursively constructed in cities (see, e.g., Hølgersen et al, 2015; Long, 2016; Temenos and McCann, 2012). Moreover, by tracing rating agency action on resilience, the paper offers a window into how key players in the 2008 financial crisis are beginning to create key epistemic conditions that may help (1) exacerbate economic inequalities in

and among cities as the climate crisis intensifies and (2) reinforce the view among city governments that urban resilience efforts and infrastructures must predominantly work to shore up existing regimes of capital accumulation, not transform them (Webber et al, 2020).

The analysis is based on 28 interviews with officials and analysts at Moody's Investor Services, Greater Miami municipal officials and residents,²¹ 30 hours of participant observation at municipal finance, Greater Miami government, and financial industry meetings, as well as documentary analysis of relevant rating agency, government, and media publications. Moody's Investor Services is a suitable site from which to generalize about rating agency thought on climate risk because it is the first of the three rating agencies that corner the ratings market to announce climate-linked changes in its bond rating methods. Scholars have shown that these firms tend to exert isomorphic behavior: that is, mirroring one another's practices with minor differences in procedures (Sinclair, 2005). This tendency suggests that many elements of Moody's' actions will likely be borrowed or mimicked by the rest. I selected Greater Miami because the region is an exemplary and early "edge" case of how highly financialized cities are responding to changing, climate-linked market conditions through investments in urban resilience (Taylor, 2020; Wakefield, 2019). Thus, elements of what transpires in Greater Miami as it responds to changing rating practices may be seen in other, highly financialized cities as climates change, inviting comparative projects in this rapidly growing arena.

"Little Machines:" Putting Credit Ratings to Work on Urban Resilience

A considerable amount of literature from the fields of economic sociology and economic geography has examined how credit ratings function as what Miller and Rose (1989) call *technologies of government*: the "humble and mundane" mechanisms by which authorities seek to instantiate self-regulating government. While ratings are now consequential at multiple scales of government, they haven't always held the power that scholars commonly attribute to them now. Many identify the mid-to-late 20th century as a pivotal moment in which the authority of credit rating agencies, and the treatment of the states whose creditworthiness they evaluate, began to assume the taken-for-granted form we see today (Hackworth, 2007; Sinclair, 2005). As Lemoine (2017) argues, it was in the post-Bretton Woods era that states increasingly depended on capital markets for investment and, as a consequence, that states were no longer considered to be sovereign "authorities" over their economies. Instead, they became economic "things" whose claims to sovereignty are measured against the evaluations and concerns of external financial actors such as rating agencies (Lemoine, 2017, p. 315).

This analysis holds at the municipal level in the United States. In the past few decades, twin processes of market liberalization and federal government rollbacks on regular investments in municipalities have decreased the centrality of the bank in municipal lending practices;²² increased the range and type of actors who purchase, issue and evaluate municipal debt; and have cultivated an economic climate whereby "entrepreneurial" cities are increasingly reliant on capital market investment to reproduce themselves (see, e.g., Ponder, 2017; Ponder and Omstedt, 2019). Municipal bond markets, a key capital pool into which municipalities have tapped over the same period of time, have seen a significant amount of growth. From 1980 to 2020 for instance, the market has ballooned 875 percent, growing from a \$400 billion market to a \$3.9 trillion market (Municipal Securities Rulemaking Board, 2020).

Rating agencies play a critical role in the structure of this market, making up what Sinclair (2005, p. 52) calls the “cognitive life” of capital markets. This moniker comes from the daily practices of CRAs: soliciting and absorbing an array of information about a debt issuer, comparing this information to a set of weighted “rules of thumb” about creditworthiness—such as tax base size, median family income, and debt-to-revenue ratios—and eventually rendering their judgment on the issuer’s creditworthiness in the form of a grade rating. These practices stand in contrast to the individual credit score, which is typically of algorithmic origin, easy to model, and draws from a larger set of specific quantitative behaviors over a given time (Poon, 2009). In fact, government credit rating methods are remarkably qualitative—so much so that rating agencies routinely refer to themselves as mere “market observers” and to their government credit ratings as “opinions” (Fourcade, 2017, p. 105).

Even so, the development of these “opinions” is practically challenging and politically charged (Besedovsky, 2017). In their efforts to make qualitatively distinct municipalities comparable, for instance, rating agencies introduce value-laden categories that promote norms such as budget flexibility, which effectively create deficits in municipalities whose budgets are more limited than others’ (Omstedt, 2020). For these reasons, rating agencies are not so much “neutral” observers as they are productive of new forms of fiscal control, surveillance, and policing (Hackworth, 2007). As Fourcade (2017, p. 106) argues, ratings—always made against an ideal type of government behavior—compel governments to adjust their behavior in order to “move up the ladder.” Indeed, ratings themselves may be treated as inscriptive devices: items such as maps, statistics, and charts that work to reduce the complexities of a given space, such as a city, into stable, durable, and comparable forms such that these spaces can be governed from a distance (Latour, 1987; Mitchell, 2005). As Rose (1999, p.37) puts it, inasmuch as these inscriptions should be regarded as technical accomplishments—reducing a physically distant world to paper is, after all, hard work—they must also be viewed as “little machines” that, in Fourcade’s terms, produce movement among the objects, subjects, and spaces they claim to merely depict. In the case of sovereign credit ratings, Fourcade shows how nations seeking to “upgrade” their rating may implement austerity programs that create conditions for further economic and political crisis—and thus shape how nations become culturally regarded as broken or failed. Moreover, governments feeling the pressure to be classified as “fiscally responsible” are likely to sidestep debate on what makes for a responsible government in the first place, favoring instead the pre-packaged, investor-oriented views of the rating agencies (Jones et al, 2020). As democracies are reduced to the terms of investors and rating agencies, governments too are reduced to “easily duped...customers” (Ross, 2017, p. 27).

This literature is enormously helpful in directing scholarly attention to “micro-level” financial practices and technologies as they relate to the disciplining of (local) states and macro-level changes in political economy (Berndt and Boeckler, 2009; Braun, 2016). But baked into many of these arguments is an assumption that the rating’s disciplinary power on a given issue has already been formed and is awaiting “transmission” to a government that can always be disciplined in a predictable way on the issue at hand. This assumption is often warranted. After all, indicators of a municipality’s “fiscal responsibility” have been established for decades. Climate change, however, presents a novel set of practical problems for rating analysts. Through what means, for instance, are analysts to assess a municipality’s specific vulnerabilities to climate change? Are some vulnerabilities or climate risks more harmful than others? If so, over what time period? Once assessed, how should these vulnerabilities be incorporated into existing rating practices? While dramatic increases in sea level rise may be decades away, what are analysts to make of what is happening today: namely, the implementation of resilience projects in cities around the world? Indeed, analysts are left with one

question that has vexed countless scholars for at least the past decade: just what kind of thing *is* resilience (Anderson, 2015)?²³

In answering these questions, I analyze published bond ratings and methods on resilience as inscriptive devices. Doing so helps illuminate the strategic reductions and framings that allow some features and forms of resilience to be made salient and others to be made invisible, and that are instrumental in enabling “objective” comparison of climate-vulnerable cities and the transmission of these ideal features and forms to city governments through the rating process. Beyond helping resolve basic empirical questions mentioned above, a focus on inscriptions of resilience makes two important contributions to critical scholarship on resilience and “green” urban economies more broadly. First, it advances scholarly calls for inductive modes of inquiry on the politics of resilience, specifically as they relate to the role(s) that risk rating mechanisms play in constituting urban resilience as a public problem (Collier and Cox, 2021; Grove et al, 2020). Second, in attending to the extra-local expert practices that help shape local development-oriented policy agendas and investments that selectively attempt to accommodate environmental concerns—coined the sustainability fix by While et al (2004) and further developed by others—inscription work contributes to urban and economic geographic scholarship that has suggested that these fixes be treated as material and discursive constructions, but has only recently engaged with expert practices of valuation (see Knuth, 2020; Taylor, 2020). By tracing agency practices on climate risk and resilience, we see how resilience efforts often support existing regimes of capital accumulation (Webber et al, 2020), and how key actors in the 2007-08 financial crisis may be helping to lay the epistemic groundwork for future economic crises and inequalities in and among cities, this time as they relate to climate change impacts and a city’s supposed resilience and vulnerability to them.

“We Want to Make Sure Nothing Crazy’s Going On:” the Work of Making Resilience

This section details how Moody’s analysts are attempting to make sense of, and inscribe, climate vulnerability and resilience into their rating practices. Analysts are not starting from a blank slate: the firm is accumulating novel inscriptions (e.g., climate projections and historical weather indices) and combining them with existing ones (e.g., categories of assessment, such as property tax base).⁹ For analysts interviewed, the addition of novel climate inscriptions is changing their interpretations of existing inscriptions: past bond ratings act as a strong indicator of an issuer’s resilience and vulnerability to climate change. As discussed in the conclusion, this shifting significance may help produce uneven economic outcomes in U.S. cities as climates change.

Identifying climate risks

The November 2017 report announcing Moody’s’ incorporation of climate resilience and vulnerability into its municipal bond rating methods begins by disaggregating the term “climate risk” across physical, temporal, and geographical lines. After listing physical events that are projected to occur as climates change—such as severe heat, drought, and rising sea levels—the report authors slot the events into two temporal categories: climate trends (events that take place over longer periods of time, such as sea level rise) and climate shocks (events, such as flooding, that take place over the short-term). The main purpose of these classifications is to demarcate the temporal limits of the firm’s climate risk accounting: the firm suggests it will almost exclusively consider climate shocks in its analyses, in part because its analysts can immediately observe the impacts of climate

shocks on an issuer's infrastructure, economy, revenue base, and environment—all of which they already evaluate when issuing a rating.²⁴

That doesn't necessarily mean that cities can simply ignore the longer-term threat of climate trends, however. As one Gulf Coast lead analyst told me, "Some of the bonds we evaluate go well into the future, like 20-30 years. I can't tell you what will happen in 30 years, but based on the science we know that the challenges are coming. So even if the rating doesn't change today, absence of any initiatives or infrastructural improvement makes you more vulnerable to what the science is telling us. And if we believe we see a mismatch between what an entity does and the risks they face related to climate change over time, their rating will likely change" (personal interview, 3 February 2021).

For now, these "beliefs" are made or negated via regular surveys issued to, and interviews with, city government officials.²⁵ From there, the firm draws on climate projections from NOAA and the National Climate Assessment to attribute particular climate trends and shocks to various geographic regions of the United States. Doing so allows Moody's to further geographically disaggregate "climate risk" and create regional and county-level climate risk profiles that the firm then distributes to its state and regional analysts for their own rating purposes. Concurrently, Moody's representatives issue climate-specific surveys to rated local governments in order to gather what one Moody's representative described as "qualitative intel" on geographically-specific climate risks. "Our analysts are speaking to the 14,000-plus issuers we rate on a one-one basis all the time," this representative said. "So [our analysts] can actually ask management questions about their planning processes, what their exposure is and how they interpret that. That's the qualitative intel we get beyond the raw numbers about the size of the economy, the income statements, the balance sheet, and that [intel] is important for informing our view about climate risks at a very local level" (personal interview, 1 February 2019).

The firm also gathers "intel" from the press. "Sometimes when you talk to an issuer they're not really sure what the climate on the ground is," one Moody's state lead analyst told me. "Reading local newspapers is...the first thing I do in the morning to make sure nothing crazy is happening...I can see what the problems are, if there are any climate issues people are pushing local governments on and how government is responding to it. This helps fill out my analysis" (personal communication, 2019, 15 February). A last, but increasingly important, analytical "filler" comes from recently-contracted work with climate data firms. At a county-by-county level, climate data analysts provide Moody's analysts with weather index-based "pictures" of a given issuer, which are meant to provide more detailed information on the hazards to which an issuer has historically been exposed, and how these past exposures may translate to physical climate change risks in the future (personal interview, 25 September 2019).

"Forming" resilience and vulnerability

As Moody's analysts develop climate risk profiles, they also begin to link specific physical, fiscal, and institutional infrastructural forms to climate resilience and vulnerability. Importantly, many of these infrastructures (such as tax base and capital plans) are already considered in Moody's rating scheme. We can view this step as an act of commensuration: making disparate elements available for comparison (Espeland and Stevens, 1998). Once identified—often through surveys issued to city management, interviews with capital planners, and basic desk research—these infrastructural forms function as shorthand indicators of climate resilience and vulnerability.

With respect to physical infrastructures, Moody's works with city governments to learn what types of physical assets are most vulnerable to climate risks, and the physical infrastructures the city plans to install (or has installed) to develop resilience against these vulnerabilities. Moody's curates its survey questions according to the climate risk profiles it has created. If Moody's analysts have identified flooding and sea level rise as their primary climate risks, for instance, analysts ask questions like "how are sea level rise and flooding risks incorporated into capital planning" and "have there been any zoning/long-term planning adjustments downtown and along the waterfront to mitigate future flooding" (City of Miami Beach, 2018).

Survey responses find their way into credit rating outlooks and reports for the rated government in question—and into the types of physical infrastructures that Moody's analysts associate with resilience and vulnerability. For instance, a 2019 report on New York City lists wastewater treatment facilities, power plants, and hospitals as particularly climate vulnerable because the New York City officials identified them as such in its survey responses. The report then describes the city's post-Hurricane Sandy completion of coastal defenses—such as drainage pipes and hardened boardwalks—as "resilient" infrastructure that will decrease the vulnerability of these physical assets (Samuels et al, 2019). A May 2019 credit opinion on Houston, TX., similarly praises the city for drafting a plan that calls for the development of an extensive system of floodwalls, seawall improvements, and pump stations to manage flooding, which Houston identified in surveys as its primary climate risk. In the next sentence, the firm writes that resilience to climate change will hinge on continued investments in these types of public infrastructures (Kushimo et al, 2019). In both cases, we see a certain reflexivity: urban infrastructures are resilient or vulnerable insofar as cities identify them as such, which in turn helps inform rating analyst evaluations and characterizations of resilient and vulnerable physical infrastructures.

Existing fiscal infrastructures—such as a city's tax base and budget—are increasingly tied to climate resilience and vulnerability as well. In its surveys to cities, Moody's always asks—no matter the stated climate risk—how much money has been spent to mitigate the city's primary climate risk(s), if the government anticipates federal funding for mitigation projects, and how much the primary climate risk(s) have impacted city budgets and budget projections. Of course, they ask this because municipal budget analysis makes up a key part of their existing rating scheme: if budgets expand significantly to incorporate investments in resilient infrastructure, and if these investments are financed primarily by the city without any plans for additional revenue generation, the city in question may become more economically "vulnerable" to climate change. That is why Moody's representatives routinely equate the promise of federal government aid with resilience in general.²⁶ As one analyst told me:

"One of the big equalizers between a small southern town and a big city is that regardless of their own local financial wherewithal, there's an expectation that if a natural disaster occurs, and honestly even before the disaster occurs, the federal government will marshal the necessary resources to help that place recover in the short-term and for the longer-term rebuild" (personal interview, 13 February 2019).

At a local level, analysts associate climate risk management-minded debt issuance with strong institutional leadership—another indicator of resilient fiscal infrastructure. Speaking about a \$400 million bond the City of Miami issued to install storm water pumps and that contributed to her decision to raise the city's credit rating, one analyst noted that "Miami is a big, fast-growing city. I'm

sure they have a ton of ideas of things they could spend \$400 million in capital dollars on...so the fact that they prioritized [flooding] shows a commitment to keeping Miami attractive to residents, developers, and tourists. It shows that they're serious about resilience" (personal interview, 15 February 2019).

Lastly, Moody's analysts link various institutional infrastructures—here meaning participation in reputable knowledge-sharing networks and in-house experience with disaster management—with resilience. In credit outlooks issued on local governments throughout the country, Moody's regularly cites government involvement in initiatives like 100 Resilient Cities and the 2017 Paris Climate Agreement as "credit-positive" behavior, the logic being that sustained participation in global climate knowledge networks facilitates the constitution of more "comprehensive" resilience strategies that address the climate shocks for which Moody's says it accounts in its ratings methods (Kushimo et al, 2019; Gomez and Lee-Allen, 2019). Analysts interviewed have also indicated that a local government's history with disaster management helps with evaluating a city's institutional resilience and vulnerability to climate change. "It's a huge credit strength when we know that the [issuer] is not sort of building an emergency response apparatus from nothing, or from, like, 'oh, we had a snowstorm here ten years ago,'" one lead analyst said. "When we know that cities really know what they're doing, they know the FEMA process, the state process, they know who their contacts are, which departments are in charge of what, this prior experience is really an advantage" in the rating process (personal interview, 17 February 2019).

Inscribing climate resilience and vulnerability into existing credit risk categories and rating methods

After identifying, classifying, and giving specific "forms" to climate resilience, Moody's inscribes climate risk and resilience into existing (and distinct) municipal credit risk categories and rating methods. In its November 2017 report, Moody's illustrates how these climate risks can become credit risks, such as economic disruption, physical damage, health and public safety, and population displacement. In the category of economic disruption, for example, the firm writes that climate shocks can drive "economic disorder," with apparent symptoms being property loss, supply chain disruption, and declining agricultural production (Wertz et al, 2017). The prognosis is grim: sudden events like these will "weaken [the issuer's] revenue base while simultaneously confronting them with current or long-term costs for recovery," such as higher insurance premiums and rebuilding costs.

The firm then offers an example of how it accounts for climate risk in its Local Government General Bond Obligation methodology, which is separated into four weighted factors: economy/tax base (30%); finances (30%); management (20%), and debt/pensions (20%). In doing so, Moody's does not just offer a sample *translation* of climate risks into credit rating methods. It also provides early *characterizations* of what it considers to be a resilient or vulnerable city in an epoch of climate change—which, to reiterate, are largely formed on the basis of existing rating methods and what issuers tell them. In the economy/tax base factor, for example, Moody's writes that "small economies" and "issuers with economies concentrated in sectors exposed to climate risks" are at "high vulnerability" to climate change. In contrast, it claims that issuers with "large, diverse economies" are more resilient to the effects of climate change and will suffer lower credit impacts from climate risks—even if these large cities have a similar physical risk exposure to their smaller peers. As one analyst told me of how she evaluates wildfire risk in the Pacific Northwest, "We're looking at, you know, we're more concerned about smaller places, like Paradise [California]...but if

it's a larger, like a decent-sized city with maybe one edge on the WUI [wildland-urban-interface], we are not going to be as concerned as if it's these small little subdivisions essentially" (personal interview, 12 May 2020). Debtor cities—those with “already high debt obligations”—are particularly vulnerable to climate change, and largely because these cities will struggle to “accommodate new burdens into their existing debt portfolios.” Cities with less debt are comparatively more resilient, mainly because they “[have] capacity to incorporate obligations to finance capital improvements” (Wertz et al, 2017).

Here, and perhaps surprisingly, an issuer's past matters much in Moody's present evaluation of its resilience or vulnerability to climate change. For instance, while a Moody's report discloses that Virginia Beach has significant flood risks, because of its “*history* of strong financial management, adherence to policies to maintain satisfactory reserves, liquidity and debt levels,” the firm *believes* that the coastal city is a leader in climate resilience. In contrast, Moody's analysts and reports consistently describe relatively poor U.S. territories and cities like Puerto Rico and New Orleans, whose ratings the firm downgraded in the wake of two recent hurricane events, as vulnerable to climate change. In justifying these classifications, Moody's analysts often point to the lowered ratings themselves. Because Moody's downgraded the City of New Orleans from Baa1 (investment grade) to Ba1 (speculative grade) due to its “observation” of how the city responded to Hurricane Katrina, for example, many reports and analyst remarks framed New Orleans as a worst-case example of vulnerability to climate change (Wertz et al, 2017; personal interviews, 2, 12, 14 February 2019).

Indeed, *past judgments* of a city's creditworthiness, as expressed through the inscriptive device of prior municipal bond ratings, play a critical role in Moody's *present construction* of a city's resilience or vulnerability to climate change. This, as I discuss in the conclusion, has significant implications for the amplification of urban inequalities as climates change. For now, however, it is necessary to examine the extent to which these combined and consolidated inscriptions of resilience are “sent back” to the physically distant municipalities whose resilience the firm increasingly evaluates, and their effects (Latour, 1987, p. 259). For that, I turn to the case of Greater Miami.

Spaces of Negotiation

For many of the Greater Miami officials I interviewed, Moody's' announced changes have compelled them to act on resilience—if not simply to better communicate their existing work on the matter. Describing the announcement as something that “weighs heavy” in her mind, one official said that these changes are “incredibly important and should help direct our policies and how we build” in the future (personal interview, 31 January 2018). For this reason, officials working within Greater Miami resilience offices—whose funding has been consistently precarious and may be even more so due to COVID-19 revenue shortfalls—conveyed that the agency's announcement was helpful in garnering the necessary political will to act on climate change. “Moody's' announcement really reinforced the need for our community to make proper planning investments,” one resilience officer said. “It was really very useful...Some people are just more responsive to the economics conversation, so the rating announcement elevates our work to that broader community that ultimately has to be part of the planning and investment strategy, and that might not otherwise be interested in resilience planning, or being taxed for it” (personal interview, 31 January 2019).

Nevertheless, the content of what “counts” to CRAs as resilience—and thus what city officials should do to “act” on resilience themselves—remains frustratingly unclear. As one resilience officer told me,

“They’re [Moody’s] still kind of figuring it out, which is, not to be critical, but I think some of the things we hope get clarified over time is, how more specifically the rating agency is going to monitor and measure resilience [...]. For the credit rating agencies, they want to understand your reserves, your debt, your property values, your growth. And these are very easy things for them to measure. Vulnerability to climate change? Strategies to reduce those vulnerabilities? They’re really not very clear. So we feel that we’re constantly learning and doing so much all the time, strategically and in operations. So we want to make sure that we really are able to get that effort reflected and understood.” (personal interview, 23 April 2019)

Another risk management officer put it in plainer terms. “Rating agencies like Moody’s really hold the key to our future as climates change...The problem is that we really just don’t know how they’re thinking about resilience, and it would be really helpful for Moody’s to share that with us so we get a better sense of what’s worth doing and what’s not” (personal interview, 13 April 2019). In other words, many of these officials would like credit ratings to govern more: that is, to specify concretely what actions Greater Miami governments can take to be “rewarded” for their work, and thereby indicate what they can do to avoid punishment in the form of a downgrade. In the absence of such clarity, Greater Miami governments have undertaken an array of resilience interventions that they believe should be rewarded by rating agencies—and that they think they can help make “count” as resilience in the eyes of agency analysts. As one county official told me, “Look, we know we are going to get regulated [on climate risk] eventually. What I keep saying, and keep trying to do in my work [on resilience], is say ‘hey, why don’t we help set the terms?’” (personal interview, 22 April 2021). For this official, “[setting] the terms” entails in-depth discussions with analysts in which officials discuss their climate risks and attempt to educate analysts on the concrete ways that they are planning to address them, along with the quantitative value of these risk-mitigating interventions.

In addition to more substantive term-setting, other Greater Miami officials have indicated that such a resilience “fix” can be achieved through linguistic performance. As discussed in the previous section, because Moody’s analysts presently use inscriptions such as surveys, newspapers, and interviews to gain specific knowledge on a city’s resilience initiatives, cities *are resilient* insofar as city officials successfully *demonstrate resilience* through survey and interview responses, as well as popular media coverage of their resilience activities.²⁷ As one capital planner told me, “part of my job is overseeing projects and building resilience through them.” The other part, he grinned, “is storytelling.” These stories, which he says he assembles through resilience plans and projects as well as the public-facing narratives he crafts around them, are first and foremost meant to persuade global financial actors such as rating agencies that his city will remain “an investee of choice” well into the 21st century (personal interview, 16 June 2019). A financial officer characterized his performance of resilience in Moody’s’ interviews and surveys as follows:

“We decided to beef up [our statements], just anticipating ‘OK, it looks like there’s a lot of questions about these topics [on climate change] these days, so let’s just go ahead and include language there.’ Now if we were, let’s say, trying to hide a little bit of—that we haven’t done much, we wouldn’t have done that [‘beefed up’ their answers to survey

questions]. But because we feel like we've done a lot, we wrote a lot, so they would see it and value it." (personal interview, 27 June 2019).

Much of this "a lot" refers to the significant resilient infrastructure investments Greater Miami governments have undertaken. As discussed in the opening vignette, government officials are increasingly tying the value of resilient infrastructures to sustained creditworthiness. In the City of Miami, both critics and proponents of the Miami Forever Bond, a \$400 million bond meant to finance a suite of resilient infrastructure in the City, have cited credit ratings, alongside insurance premiums, as key drivers of the Bond's issuance (personal interviews, 23 and 28 June 2018 and 2019). And indeed, Moody's analysts have praised the City of Miami for the November 2017 passage of this Bond, tying its decision to finance resilience projects—which include storm water pump and pipe installations, road raising, and affordable housing construction—as one key reason they upgraded the City's municipal bond rating in later months (personal interview, 15 February 2019).

What are we to make of all these developments as they relate to the role of credit ratings in Greater Miami resilience planning? For one, the developments suggest that rating agency power is extending to the protection of physical infrastructure systems as climates change. Moreover, ratings also legitimate, and indeed motivate, significant government spending on resilience efforts. But not all resilience efforts are of equal value, and emerging rating agency thought on what counts as resilience also works to make that so. Because Moody's analysts presently privilege existing indicators of economic strength and physical infrastructures in the development of their understandings of resilience, arguments that debt-financed resilience initiatives must first (if not exclusively) focus on the security of vital systems are strengthened to the point that they become, in the eyes of Greater Miami officials detailed in the opening vignette, apolitical imperatives. Indeed, that the City of Miami has—after years of public battles over the future of an independent Office of Resilience—collapsed the Office into its Public Works Department may provide some clues regarding the durable forms that resilience will take, at least somewhat due to the growing role that CRA practices are playing in Greater Miami resilience planning.

But the rating does more than that. Because rating agency action renders resilience a legitimate category of government spending, resilience efforts become equivalent to other government spending and debt on collective items, such as pensions. This practical equivalence, paired with the still somewhat ambiguous meaning of resilience, helps create and sustain a field of struggle regarding what "resilient" Greater Miami should look like, and to whom resilience to climate change is substantively owed. Municipal debt issuance stands at the heart of these struggles, and Greater Miami residents have already taken many of them on. As one climate justice activist told me of his work, "We are in a constant battle with the city...as to whether investments will go to shore up infrastructure or protect our really vulnerable populations from displacement" (personal interview, 6 June 2019). In the City of Miami, residents long excluded on the basis of race from municipal decision-making processes have mobilized Miami's "Forever" resilience bond—and the multiple possible meanings of resilience—to demand never-before-seen levels of participation in urban planning and to reconfigure the audiences to which bond-financed resilience efforts are meant to speak (Grove et al, 2020a). In the City of Miami Beach, "anti-resilience" coalitions led by Kunst, introduced in the opening vignette, have formed around the belief that bond- and fee-financed resilience projects are meant to maintain financial market investments as climates change, not to protect vulnerable residents and ecosystems. As research has linked these investments to recent ecosystem degradation, local coalitions have delayed or thwarted significant portions of fee- and bond-funded resilience projects (Wakefield, 2019). These struggles are ongoing, and work to counter

increasingly dominant conceptions of resilience that rating agency action on resilience has helped stabilize. At the same time, and perhaps paradoxically, the sustainability of these struggles stems at least partially from the fact that rating agencies have helped constitute resilience as a legitimate, and increasingly vital, object of government and infrastructure investment.

Discipline and Dupe? New Terrains of Inequality on the Bond Market

This paper has investigated the role of credit ratings in urban resilience, specifically through a case study of Greater Miami resilience planning. Mobilizing STS-inspired literature on inscriptive devices in order to contribute to ongoing urban and economic geography scholarship on the politics of urban climate governance and environmental fixes, I have argued that what “counts” as resilience in Greater Miami is increasingly an effect of the observational practices of rating agencies. For this reason, arguments that resilience efforts must shore up the already-existing Greater Miami regional economy are strengthened, putting more radical understandings of resilience (e.g., transforming the regional economy in the face of climate change) at a disadvantage. That is not to say that alternative understandings of resilience are immediately discounted. As I have shown, the still emergent status of resilience as an object of knowledge among rating agency analysts and government officials means that resilience retains a degree of plasticity and can be mobilized for different purposes and toward different ends.

But the ability to negotiate one’s resilience and vulnerability with rating agency analysts is not distributed evenly across U.S. municipalities, owing in large part to already-existing rating practices and decisions. As I have attempted to show, and corresponding with much critical scholarship on credit ratings, rating agency observations are not neutral, even and especially as they take climate into account. Indeed, as analysts begin to cast their eyes toward the issue of climate change, already existing inscriptive devices—prior bond ratings—take on a new, and important, meaning: they function as strong indicators of a municipality’s likely resilience and vulnerability to climate change. This may have the effect of unduly penalizing poor U.S. municipalities and territories for their pasts, while rewarding wealthier municipalities whose futures, thanks to climate change, will look less and less like their creditworthy presents. In the words of one risk management expert, historically creditworthy “cities can sound and look like they’re doing a lot and get away with it, when in fact they’re doing quite little.” In short, this expert suggested, resilience efforts in historically creditworthy cities may be little more than a “credit gimmick” (personal interview, 13 June 2019). Indeed, and contra Ross (2017, p. 27), it is not only (local) states that are “easily duped” in highly financialized political economies. Rating agency analysts may be fooled, too. In the case of resilience, at least for now, we might examine the uneven power relations between rating agencies and municipalities a bit differently: it is not simply about who “dupes” whom, but also about which (local) states have the capacity to “dupe” rating agency analysts in the first place.

With that said, there are important limitations to this analysis that should be addressed through further scholarly inquiry. For one, this analysis draws largely from the words of rating agency analysts and the public-facing documents that they produce on the subject. Rating agencies are notoriously secretive regarding their practices—so much so that one climate data analyst interviewed said that even she does not know precisely how rating agency analysts are using the data she provides (personal interview, 26 September 2019). While I have attempted to make up for lack of access with supplementary materials (e.g., interviews with Moody’s analysts; non-public facing documents such as surveys sent to municipalities, and interviews with aligned experts and city

officials who have taken part in rating processes), the practices described in this paper should be supplemented with further interviews and observation in order to develop a thicker description of rating agency work on resilience. Second, comparative work in less financialized cities, or highly financialized cities outside of the U.S., is needed to deepen the analysis presented here. Furthermore, that agency analysts and executives have routinely pointed to New Orleans and Puerto Rico as highly climate vulnerable speaks to the need for further research on the role of racism and colonialism in the establishment of relations of domination among bond market actors and how they may be reproduced and/or extended as climates change (see, e.g., Ponder, 2021).

Third, the developments described in this paper may change rapidly given the infancy of the field. While what Besedovsky (2017) describes as the *traditional rating paradigm* persists with respect to rating agency analysis of climate resilience and vulnerability thus far, it may be replaced or complemented with elements of what she calls the *structured finance paradigm*. This paradigm, which can be found in mortgage-backed securities markets, is marked by its use of inscriptive devices such as algorithms and simulations and is increasingly “colonizing” traditional paradigms and practices, such as the more descriptive and “qualitative” work presently deployed by municipal bond rating agencies (ibid, 2017, p. 20). Highly place-specific climate models and projections lend themselves to this paradigm, and Moody’s’ recent, and growing, work with climate data firms may be indicative of how the techniques, mechanisms, and rationalities of structured finance are seeping deeper into traditional rating paradigms. Thus, further study is needed to examine if, how, and why structured finance practices and their respective inscriptive devices come to occupy rating agency thought and action on U.S. municipal climate risk, and the disputes and effects that this occupation may bring about. It may be through this recombinant inscription work that historically creditworthy cities like Greater Miami are finally—and fatally—made vulnerable to climate change by their projected futures, not made resilient by their performed presents and observed pasts.

CHAPTER 2

“Accounting” for Climate Justice: Fiscal Fights over Climate-Changed Urban Futures”

On December 11, 2018, members of the Miami Climate Alliance (MCA), a consortium of grassroots climate and social justice organizations across Miami-Dade County, held an emergency conference call. The call was prompted by a just-published *Miami Herald* article on how the City of Miami planned to spend the first tranche of the Miami Forever Bond, a first-of-its-kind \$400 million general obligation bond meant to finance climate-resilient infrastructure in the city. To their dismay, the initial round of projects had little to do with what the MCA had advocated for. For those on the call, the *Herald* piece signaled the possible erasure of hard-fought political victories, such as \$100 million allocated for affordable housing and meaningful participation in Bond project selection and allocation processes among historically marginalized communities.

During the call, Alliance members discussed possible means of intervention. Members quickly turned to the issue of metrics—specifically the forms of expertise and evaluative techniques that city officials used to prioritize Forever Bond projects. “Was this based on physical vulnerability or financial impact?” one member asked. “And who’s producing these assessments?” Another member “[worried] that [the City is] going to make decisions based on millage [rates]...in lieu of [participatory] process.” How, those on the call wondered, could they publicly contest these techniques and forms of assessment—and, as a consequence, push the City of Miami to advance the more progressive political agenda of the Alliance?

While these questions continue to preoccupy Miami Climate Alliance members, they also speak to the initially puzzling political significance that these activists have given to urban resilience finance and municipal bonds. Why is this puzzling? For one, Alliance activists are doing what many critical scholars of urban climate governance say cannot be done. They are treating technocratic accounting methods and market-oriented governance tools—so characteristic of Swyngdeouw’s (2009) “post-political city”—as potent political instruments in their efforts to resist the reproduction of Miami’s racialized political-economic status quo as climates change. This leaves us with at least two pressing questions if we are to learn from activist movements typically seen as “on the margins” (Rice et al, 2022). First, why and how is it that Miami Climate Alliance members have seized upon municipal debt as a key site of political claims-making? Second, how might the case of the Miami Forever Bond affirm *and* call into question the “critical conventional wisdom” on the role of markets and market instruments, such as municipal bonds, in the pursuit (or negation) of the climate-just city (Collier, 2011, p. 9)?

In this chapter, I advance two related arguments. First, the Miami Forever Bond, by its very design, convenes competing imaginaries of “resilient” Miami. A dominant imaginary, held by bond and city officials, ties the Forever Bond and its related projects to imagined futures of economic prosperity as climate change. An alternative imaginary, held by the Miami Climate Alliance, links the bond and associated projects to a resilient future wherein longstanding, highly racialized inequalities in Miami are substantively addressed (Connolly, 2014; Grove et al, 2020a, 2020b). As I show, MCA members have used the Forever Bond to pursue what Nancy Fraser (2005) calls the “how” of justice: problematizing the rules that determine who counts (and does not count) as part of a given political community. The Alliance does so through two techniques: reconfiguring expertise and the meaning of resilience. Second, I suggest that urban adaptation finance mechanisms like the Miami Forever Bond should be analyzed as dynamic political sites upon which battles over the (un)even distribution of urban climate risk and security will increasingly be waged and resolved. It is important to note at the outset that neither argument marks an attempt to “redeem” market-oriented climate governance. Rather, and following the lead of the climate activist thought detailed here, the goal of this chapter is to better understand how instruments of urban adaptation finance can be (re)made to resist unjust, climate-changed futures—as well as their limits in advancing climate-just urban futures.

These arguments are based on dozens of interviews with Miami Climate Alliance members, financial experts, and city officials who have worked on the Forever Bond; six weeks of fieldwork consisting of observation of Climate Alliance and partner organization meetings; and content analysis of relevant contemporary and archival documents (e.g., Miami Forever Bond documents, news media coverage of past bond issuances; publicly available correspondence between the Climate Alliance and the City of Miami government; and Climate Alliance outreach and campaign strategies related to the Miami Forever Bond, which MCA members shared with me upon request).

The chapter proceeds as follows. I first review critical scholarship on urban adaptation and resilience finance and the role of municipal bonds within them. Drawing on Actor-Network Theory-inspired scholarship on markets, I propose alternative ways of analyzing municipal bonds in relation to urban adaptation and resilience. The next three sections focus on the main empirical material of the paper. In order to contextualize the broader significance, surprising politics, and unexpected initial outcomes of the Miami Forever Bond, I begin the empirical sections with a brief history of municipal finance in Miami and the racialized development strategy that key municipal finance measures helped support. I then dive into the construction of the Miami Forever Bond and explore the competing imaginaries of resilience at play within the bond. Finally, I conclude with a discussion of what the Miami Forever Bond and activist mobilizations around the bond offer for scholarship on urban adaptation finance and urban climate justice.

Bond Markets and Climate (In)justice in the City

Critical urban scholars have long been concerned with the role of markets and market logics in shaping urban climate governance. Building on Harvey’s (1989) theories of urban entrepreneurialism, geographers have suggested that contemporary urban climate governance efforts are “framed” by neoliberal practices, such as market-oriented interventions (Whitehead, 2013, p. 1348). In a foundational article on the subject, Hodson and Marvin (2009, p. 200) argue that cities around the world are increasingly working with international firms to position themselves as “*the* context for action” on climate change. The authors’ reasoning is straightforward. Where the onset of climate change can render cities economically vulnerable to disaster, it can also form the basis of

comparative urban economic advantage. Through concerted efforts and strategic partnerships to demonstrate their “resilience” to climate change, city governments can make themselves more attractive to private investment while also helping spur the construction of new markets and modes of capital accumulation. For Fainstein (2015), city governments are thus likely to invest in resilience projects that secure the urban economy and its supporting infrastructures and to abstain from investing in projects that primarily benefit the poor. As city governments continue to work with risk management experts in drafting local resilience plans, urban climate governance may be “rendered technical,” which hollows out the possibility of political debate and weakens government commitments to social justice and equity (Leitner et al, 2018, p. 1282).

Urban resilience finance, such as insurance and bond instruments that municipalities use to pay for adaptive infrastructure like raised roads, has recently emerged as a chief object of urban scholarly inquiry. This interest comes in part because urban resilience finance poses a significant practical problem to city governments themselves. Indeed, the massive projected costs of climate resilience measures—to the tune of hundreds of billions per year globally—have encouraged cash-strapped city governments to finance climate projects through municipal bonds (Puig et al, 2016). In a nutshell, U.S. municipalities issue general obligation or revenue bonds to finance basic goods and services, such as public hospitals. Bond investors make money on the interest rate of the bonds, which are backed by an attached revenue stream or the issuer’s taxing authority (Cestau et al, 2019).

Beyond their appearance as a seeming “solution” to the problem of financing resilience, instruments of urban adaptation finance are of interest because they purportedly reproduce and exacerbate inequality. Suggesting that environmental risk management in New York City, New York and Cape Town, South Africa is increasingly mediated by financial logics and concerns, Bigger and Millington (2019, pps. 1 and 6) argue that the use of municipal debt for adaptation and resilience both *re-inscribes* existing urban inequalities and *displaces* further financial and environmental risks onto populations least able to bear them, and that “no amount of earmarked debt for adaptation will fundamentally reshape broader urban riskscapes in egalitarian ways.” Such views are consistent with common critical geographical perspectives on financialization, which suggest that “investments are diverted to those that deliver financial results rather than those that benefit local communities” (Aalbers, 2019, p. 10).

However, the treatment of urban resilience finance as a monolithic object that always acts in a particular way leaves us with few analytical tools or conceptual guidance to make sense of the *political significance* that the Miami Climate Alliance has attached to the Miami Forever Bond, as well as the *significant political victories* that the Alliance has garnered for low-income communities of color in Miami through the Bond. These accounts do not help explain how a financial instrument such as a municipal bond can both (re)produce inequality in cities and be (re)made to blunt the reproduction of such inequalities. If we are to learn from activists “at the margins,” one of the goals of recent scholarship on urban climate justice and public finance, we must give both perspectives equal consideration (August et al, 2021; Rice et al, 2022).

Actor-Network Theory-inspired (ANT) work on market formation, or what Çaliskan and Callon (2010) call marketization, helps us grasp at the nitty-gritty “how” that we are tasked with considering: that is, how urban adaptation finance markets and their constitutive parts are pieced together and made to work, and thus how some of their effects might be resisted and made to work differently. For those taking a marketization approach, markets and their effects should not be taken for granted. Instead, markets and constitutive market devices are best seen as practical, mutable, and

temporary achievements (Callon, 2007). This is because the construction of these devices requires a significant amount of material, political, and technical investments, none of whose efficacy is guaranteed. As Fields (2018, p. 2) reminds us in her account of the construction of the post-financial crisis single-family rental asset class, the provisional stabilization of these investments is precisely what “[allows] financializing projects to come to fruition.” Their disarray or destabilization is what “causes [financializing projects] to fail.” Conceptually, then, we can understand urban adaptation finance and the specific instruments that help make it up as *sociotechnical agencements*: combinations of statements and material, technical devices that can act in certain ways pending how they are put together.

What does it mean to analyze urban adaptation finance from this perspective? For one, it reminds us that conflicts, disputes, and relationships of domination are always at work within urban adaptation finance (Knuth, 2022; Li, 2007). In other words, the perspective introduced here allows us to understand urban adaptation finance as political. Here, “political” does not simply refer to revealing the particular financial logics at work in instruments of urban adaptation finance; it also refers to treating the development of these instruments as contingent and contested (De Goede, 2005). In attending to the construction of the Miami Forever Bond, I also pay attention to the visions of desirable “resilient” futures that underlie Miami Climate Alliance and Miami government thought on the kind of work the bond should do, and how both groups have attempted to realize their respective visions through the Miami Forever Bond process. I understand these visions as *sociotechnical imaginaries* (Jasanoff 2015a, 2015b). Multiple imaginaries can exist within a given entity, in our case the City of Miami. By transmitting and embedding ideas about ideal futures into durable institutions, practices, and materials, such as those of municipal bonds and public works projects, sociotechnical imaginaries work to “condition and constrain” normative visions of (un)just futures (ibid, 2015a, p. 14). Imaginaries are often competing: powerful institutions such as legislatures may work to “[elevate] some imagined futures above others,” just as alternative futures can be advocated for and embedded “from below the seats of power” (ibid, 2015a, p. 4; ibid, 2015b, p. 323). Tracing these imaginaries and their conflictive interactions can help account for the power imbalances and the unique, value-laden roles of human imagination that ANT-inspired approaches to the study of markets can sometimes miss. The next section, to which I now turn, offers a brief history of municipal finance in Miami, and upon which competing resilience imaginaries at work in the Miami Forever Bond have been built.

Shafted by “Progress:” Black Miami and Municipal Bonds

Historian Destin Jenkins (2021) begins *The Bonds of Inequality* with a simple, yet fundamental, claim: any question about municipal financing is also a question about inequality. Why? Because ethical and political choices of “who or what is worthy of debt” stand at the heart of any decision to borrow (ibid, 2021, p. 1). In the United States, Jenkins argues, these choices are highly racialized. Throughout the 20th century, black neighborhoods were routinely deemed unworthy of debt just as municipal debt, often issued under the banner of “civic progress,” advanced white interests and consolidated white power in American cities and suburbs. Indeed, for Jenkins municipal debt “made possible the well-paved streets, downtown parking garages, new sports arenas, and rehabilitated art spaces for the white middle- and upper-class urbanite” just as the absence of municipal debt investments in black neighborhoods “entrenched spatial neglect” and poverty (ibid, 2021, p. 69).

Although Jenkins built his claims from his investigations into the history of San Francisco’s debt issuances, one can observe similar dynamics at play in Miami’s development throughout the 20th century. Throughout the early- to mid-20th century, numerous Miami officials pitched the idea that they could transform the population into “good citizens” through bond-financed investments in public works. In Miami, investments included the expansion of highway systems; the construction of schools and parks; sewage and water supply systems, as well as state of the art cultural centers to avoid “embarrassment when we ask celebrities to appear in school assembly halls and other inadequate buildings,” as one 1946 *Miami Herald* article put it.

Importantly, and as the bond promotional material in Figure 1 conveys (see Appendix), in Miami the imagined “public” beneficiary of, and authority over, future public works projects was almost always a white, middle- to upper-class male. Existing laws helped cement that imaginary into the built environment: for decades, only freeholders—those who could prove that they held property in their name—could vote on bond referenda. Miami’s highly racialized property markets permitted very few non-white residents (let alone non-white men) to become property owners, which meant that very few non-white residents could have a say in how and where debt was issued (Connolly, 2014). It should not come as a surprise, then, to observe that the majority of debt-financed infrastructure projects throughout this period were sited in or near white neighborhoods, or supported institutions that advanced white interests.²⁸ Meanwhile, Miami’s black urban core remained mired in poverty and poor renting conditions that, over the decades, continued to worsen at least in part because few freeholders were willing to issue municipal debt for improvement projects in these neighborhoods (see Grove et al, 2020a, 2020b; Rose, 2015; Figure 2 in the Appendix). By the start of the 1960s, just under half of nonwhite Miami families lived below the poverty line—the vast majority in the neighborhoods of Overtown and Liberty City (presently known as District 5). And as historian NDB Connolly notes (2014, p. 273), at this time around 83 percent of black Miamians worked as domestic or unskilled laborers, the second highest rate in the country.

Where mid-1960s civil rights reforms afforded many new possibilities for upward political and economic mobility among black Americans in many U.S. cities, Miami’s unique position within the Cold War diminished many of these prospects for black Miamians. Over the same time, the city saw a sudden and rapid arrival of Cuban refugees, whose needs officials at multiple scales of government prioritized through employment assistance, income support, medical care, and college loans. As these refugees made quick leaps to Miami’s middle class and “inner circles of power,” Stepick et al (2003, p. 87) argue that the vast majority of black Americans “remained on the outside,” where they continued to endure infrastructural and debt inequalities that, coupled with local events of police violence, would eventually culminate in Miami’s infamous 1980 riots and the razing of Liberty City.

Before the riots, however, came the promise of progress. In 1972, county officials presented a series of historic bond referenda called the “Decade of Progress” to voters. The sweeping \$634 million program (approximately \$4.5 billion in 2022 dollars) sought to transform Miami into a world-class metropolitan region. Among the 200-plus projects on offer, voters could determine whether they wanted to invest in a first-of-its-kind rapid transit system; the construction of world-class memorial hospitals; vast park systems; sports arenas; community colleges, and social services, among others. Black voters and leaders in Miami played an essential role in the bonds’ passage (see, e.g., *Miami Times*, 1972a). Garth Reeves, the publisher of the black-owned *Miami Times*, was quick to support the referenda, believing it could help advance black mobility in Miami, and gave it a significant amount of coverage in his newspaper. And black residents, many of them in Liberty City and Overtown, came out in droves to vote yes. And yet, as Reeves’ paper observed in a 1972 op-ed on

the subject, the two provisions that would have helped black Miamians the most were the only ones to fail at the ballot box. The *Times*' "Progress" post-mortem is worth quoting in full:

"Many blacks are very dissatisfied with Tuesday's bond vote results. It might have been a decade of progress for the white community, but it was more of a decade of retrogression for the poor and disadvantaged minorities of Dade County. This paper reluctantly supported the bond issue and urged its readers to vote for it. We were quite aware that many of the projects would mean very little to the average black person. But we pointed out that the \$10 million to establish a revolving loan fund to help families with low and moderate incomes rehabilitate their homes was a good idea, although the amount of this bond should have been more like \$100 million. Then too there was the \$71 million provision for public buildings which contained provision for 25 day care centers for children of working mothers.

So what happens? The 'good' voters of Dade County pass the eight bond issues that directly affected their welfare, and voted down to defeat the two issues that would help poor minorities the most. Both the bonds that provided the loan fund and day care centers were the only losers on the ballot. And before you say that blacks didn't turn out to vote – black precincts had a higher turnout percentage than whites on Tuesday. We regret the loss of the loan fund the most. The housing situation for low income blacks is getting to the chaotic stage and we don't see a whole lot of people giving a damn about the problem... If we keep on 'progressing' in this fashion, when the country celebrates its 200th birthday in 1976, poor blacks might well be sleeping in the streets" (The Miami Times, 1972b).

The failure of these specific Progress bond issues would sour Reeves and many others like him to the prospect of turning to bonds—and in some instances, turning to government in general—when it came to addressing inequality in Miami. As the *Times* concluded, "it is time that the progressive-minded citizens of the community wake out of their contented slumber and call on private enterprise to do the job that government is not doing. If this area can lead the nation in building luxury high rise apartments for the wealthy, surely it can build more decent shelter for the ill housed" (ibid, 1972b). A decade later, when Miami officials wanted to pass another series of bonds—this time promising a decade of development, not progress—Reeves and many other black residents were not willing to help foot the bill. "We have been shafted by bond issues in the past," Reeves told a *Herald* reporter in 1982. "We have supported every previous bond issue but I don't think we can support any more. The last decade of progress set us back a decade. I don't see anything there [the new bond issue] for poor people" (Stein, 1982). Coupled with the then-recent rise of white tax revolts in South Florida and the demographic growth and consolidated power of fiscally conservative Cubans in Miami, the pessimism that black Miamians felt about others' willingness to invest in black futures would sound the death knell for this bond and others like it for years to come (Stepick et al, 2003). This enduring, cross-racial aversion to local debt issuance in the name of progress and even development begs the question: what was so special about "Forever?" The next two sections help answer it.

"We're Showing the World that We're Doing Something!"

By the time that the outgoing Regalado administration introduced the Miami Forever Bond to a general vote in November of 2017, a version of it had already failed to pass the five-member

commission the year prior. Why was this? As Francis Suarez, then one of the three city commissioners who voted against the 2016 bond proposal, told a *Miami Herald* reporter, the bond was too hastily prepared: commissioners barely had any time to review its contents before it was scheduled for a vote. Moreover, and in the words of another city commissioner who also voted no, Frank Carollo, “[The Mayor’s Office] is requesting \$275 million with just eight pages of justification. I’ve seen street namings with more information than what’s been provided” (Smiley, 2016a, 2016b).

The aging Cuban-American mayor, apparently determined to address sea level rise following a series of 4 a.m. chats about climate change with his son, an underwater photographer and climate activist,²⁹ went back to the drawing board. Rather than present the bond as a standard series of pump stations, road improvements, and workforce housing, as his administration had done previously, this time the Regalado administration pitched the bond as essential to securing the city’s future.

Notably, the Regalado administration turned to key actors from the financial world to make that pitch. Working in tandem with Wayne Pathman, a land use attorney and Chair of the Sea Level Rise Committee who had been supportive of the previous bond, the Regalado administration invited global risk management executives to testify about the grim financial futures that Miami would face if a majority of the five commissioners did not push the bond to a general vote. “By the time I had brought Daniel [Stander, of Risk Management Solutions, one of the risk management experts] in, I had been talking about the economic impacts of sea level rise for years, but they [the commissioners] weren’t listening enough,” Pathman told me. “Daniel was the first person I’d met who was not only saying the same things I was saying, and that to be fair others in Miami have also been saying, but was saying them from a much more expert position. So Daniel could really give what me and the mayor wanted some teeth” (personal interview, 18 July 2018). The teeth seemed to be sharp enough. The death spiral of property devaluations, rating downgrades, and soaring insurance premiums that Stander suggested a Miami Forever Bond-less Miami could face helped “people start talking about climate change not just as an ecological issue in the future...but as something that’s much closer on the horizon and that is actually eating people’s pockets” (personal interview, 18 July 2018).

As chatter spread from City Hall, Stander’s testimony helped officials outside of the City Commission and Sea Level Rise Committee imagine the resilient future that the Miami Forever Bond could help bring about: one of sustained investment and growing tax bases as sea levels rise. As one resilience official told me very matter-of-factly, while he and his colleagues “live in the little world of Miami,” the “financial world is changing [its practices] on climate risk.” For this expert, the Miami Forever Bond “[shows] the [financial] world that we’re doing something,” which can “change how we are evaluated by investors² [...] and make us the investee of choice” as the climate changes. Importantly, the “little world” of Miami—that is, the everyday experiences and concerns of residents—barely appears in expert imaginaries of resilience. Describing his work as a form of storytelling, a senior Forever Bond manager told me that the bond is about “our image...first and foremost on a global level [to] the people in insurance, finance, investment. Then national, where we’ve gotten a lot of bad press. And then in the state legislature.” After a pregnant pause, the manager finally added, “and I guess, you know, local” (personal interview, 14 June 2019).

But the “financial world” does more than constitute the ideal bond audience for city officials. The supposed concerns of this world also help frame and legitimate proposed Miami Forever Bond interventions. In one promotional video for the Miami Forever Bond, for instance, local real estate developer Marcelo Fernandes stands at the edge of one of his properties, where high, choppy waters occasionally splash above his sea wall and bleed into his yard. “As a developer it’s important to get

this bond going so the city can keep up with developers building the right way, for the future,” Fernandes says in the video. “We [in real estate development] can build individual properties to be sustainable, but if the infrastructure below us isn’t there, it doesn’t do us any good.” In keeping with the city’s history of developing in partnership with real estate, Fernandes concludes, “we have to work together to keep real estate values high, people moving in here, and create an inexpensive and sustainable future” (field notes, 23 August 2020). For many Miami officials, “working together” through the Miami Forever Bond looks like prioritizing the security of vital infrastructures from *future* physical vulnerabilities over “secondary” concerns such as *existing* social vulnerabilities within the city. While stating that issues of gentrification and affordable housing are as important as the economic risks of climate change, one senior city official told me that “if we don’t deal with these [economic] risks, we’ll never get to these other issues [like gentrification]” (personal interview, 19 July 2018).

In many ways, the events and concerns that led to the initial construction of the Miami Forever Bond correspond well with the claims of critical urban scholars detailed in previous sections. City officials imagine that the Miami Forever Bond will allow them to demonstrate their resilience to a “global” market audience, which they believe can form the basis of comparative economic advantage as the climate changes. The seeming concerns, needs, and preferences of the “financial world,” whose authority climate change only seems to elevate, have inched ever further into municipal governmental thought on and imaginations of the resilient public good: the reproduction of the political economic status quo—but with storm water pumps (Wakefield, 2019). How is it, then, that Miami Climate Alliance members succeeded in making important parts of the Miami Forever Bond address the “little world” of Miami and its racialized political economy?

The “Little World” Takes Center Stage

The apparent “economic necessity” of the Miami Forever Bond failed to push the bond, or the dominant imaginaries of resilient Miami that undergirded it, beyond debate. The meaning of resilient Miami, and quite literally how it ought to be built, was still up for grabs. A year later, the Regalado administration returned to City Hall to pitch its revamped, global finance and development-approved Miami Forever Bond to the city’s five commissioners. Each of these commissioners represents different geographic districts of Miami—many of which remain ethnically and racially segregated despite decades of official desegregation. The ethno-racial formation that Miami commission districts help physically demarcate, and that commissioners can and often do help reproduce through their votes on items like bond issues, generated some concerns for officials tasked with drafting the bond and the list of the possible projects that it would support (personal interview, 3 March 2021). Would District 2, whose commissioner represents the low-lying, already flooding, and largely white neighborhoods of Miami, try to gobble up all the bond funds? Would commissioners in the majority-Latino districts of 1, 3, and 4 balk at taxpayer dollars supporting existing social and physical vulnerabilities within the city that they historically believed they had very little to do with—and from which they had very little to benefit by addressing (Portes et al, 2003)? And how would the city secure the buy-in of District 5, the majority-black, highly elevated set of neighborhoods whose seemingly biggest climate risk had to do with displacement, not sea level rise? Put simply, one former budget director who helped craft the Forever Bond told me recounted in laughter, “we still kept it [the specific set of proposed projects in the bond] vague!” (personal interview, 3 March 2021). As I will soon show, the vagueness that the budget director believed

Miami's existing ethno-racial formation required for the bond to pass *also* helped the Miami Climate Alliance, and their allies in city commission, make the bond do further political work.

But for now, back to City Hall. In commission meetings about the Miami Forever Bond, which took place in the summer months of 2017, the financial instrument became a site to address two ongoing problems and grievances among local Miamians, which have ostensibly little to do with climate change: excess taxation and affordable housing. When the commission vote took place mid-July, one commissioner dubbed the Forever Bond “Taxing Miami Forever” and promised to campaign against the bond if it made it to a general vote. This perspective received the support of area labor union leaders, who called debt issuance for sea level rise “hysteria” and suggested that Miami officials instead devote Miami Forever funds to union back payments and benefits after the city's recession-era austerity measures were overturned that year (Smiley, 2017).

Commissioner Keon Hardemon, who represents the majority-black District 5 and with whom the Miami Climate Alliance lobbied over the Miami Forever Bond, suggested that the biggest existential threat that the city faces is not climate change but the affordable housing crisis. Indeed, Miami ranks seventh in the world in terms of unaffordable housing—above London and New York—which experts tie to high housing costs and dramatic, racialized income inequality (Cox and Pavletich, 2019). “Every community is not going to be receptive to sea level rise and flood prevention,” Hardemon said. “That is not their issue. They'll look at you and say, ‘What are you talking about?’” In exchange for a yes vote, toward the end of the evening Hardemon demanded that the affordable housing provisions extend beyond a “token” \$20 million to \$100 million because he is “tired of hearing that poor people will no longer be able to live here [in Miami].” Moreover, Hardemon stipulated that the distribution of funds must be based on a formula used to distribute federal community block grants (based on poverty, overcrowding, and populations of each district), which ensured that District 5 would receive the bulk of the initial \$100 million. A final Commissioner cast the deciding vote, this time in favor of the bond, even though he said “voters...are not going to understand it” (Smiley, 2017).

Once the bond made it out of initial legislative uncertainty, it entered the realm of general politics, thereby generating and responding to a new set of debates and actors that could (re)shape the Miami Forever Bond's fate. The Miami Climate Alliance was one of the most significant organizations involved. As one former Chief Resilience Officer of Miami told me, the bond would not have passed if the Alliance, whose previous political victories included the creation of the County's Office of Resilience and the first-ever Chief Resilience Officer, had not supported it (personal interview, 14 June 2019). And initially Alliance leadership weren't sure if they would support the bond, either. As Albert Gomez, one of the founders of the Miami Climate Alliance said, “It's [the Forever Bond] very broad with not a lot of strings attached or a lot of guidance on how they're going to spend the money.” Echoing concerns that *Miami Times* publisher Garth Reeves had articulated decades prior, Gomez concluded, “there's just no guarantee it's [the bond] is going to support the most disaffected communities” (Smiley, 2017). In a separate meeting with me, Gomez said he also believed that as initially drafted the Miami Forever Bond was about shoring up bond ratings and insurance premiums and speaking to “people who don't actually live here [in Miami]” (personal interview, 26 June 2019).

A recipient of these activist concerns himself, Hardemon insisted that the most important thing to do with respect to supporting disaffected communities is “create the money we need to address the problems we have.” By the time the city “[works] out an extensive plan, dollar for dollar,” the

commissioner reasoned, “the moment [to create the money for housing] has passed. But the housing will continue to be unaffordable. We have to find a way to keep [it] affordable, and the way you do that is by reinvesting in existing housing. You make those homes resilient and you bring them to code” (ibid, 2017).

The Climate Alliance eventually got on board with Regalado and Hardemon—himself beginning to set his sights to a seat at the County Commission—so long as both would also work with the organization to “change bureaucratic systems that don’t really work for people” and thus help the Alliance embed its visions of resilience into the Miami Forever Bond (personal interview, 15 July 2018). What did these imaginaries substantively consist of? For one, addressing highly-racialized inequalities through the systematic *(re)allocation* of resources to historically marginalized communities of color through the bond, and through investments that do not “further gentrify our communities” (Miami Climate Alliance, 2018). Moreover, resilience imaginaries included the formal *(re)valuation* of the voices of said communities such that they are equal to those of their wealthy, white and propertied counterparts. For Climate Alliance members I interviewed, the material changes involved in this resilience imaginary, and the funding that the Miami Forever Bond provided for them are of urgent importance: because longstanding practices of Jim Crow segregation had confined poor people of color to renting in highly-elevated parts of the city, these individuals are particularly susceptible to displacement as the city increasingly attaches higher-elevation luxury development to its resilience efforts (Ariza, 2020a). Two key embedding techniques—which I refer to as reconfiguring expertise and resilience—were important in the MCA’s work.

With respect to expertise, the Climate Alliance began by challenging Miami government understandings of who and what counts as an “expert.” As Grove et al (2020a) detail, the valorization of technocratic expertise has long served to exclude minority—and particularly black—participation in substantive political decision-making processes in the Greater Miami region. Over time, the valorization of technical expertise (which in practice has often boiled down to property-related knowledge) has had the effect of unevenly distributing the costs and benefits of the region’s economic development, typically across racial lines (Stepick et al, 2003). Many Alliance members said that the Bond would likely yield similar results if they did not intervene. Thus, they worked to reconfigure expertise on two fronts. First, they advocated for the creation of a Citizens Oversight Board, which would oversee and provide guidance on bond project selection and allocation processes. Board members were only to be composed of those who lived in Miami, and who did not stand to benefit directly or indirectly from the Miami Forever Bond. Moreover, and in a missive that Climate Alliance members sent to Hardemon and Regalado lobbying for an oversight board, they wrote that a racially and socioeconomically diverse board was essential for the passage of future adaptation and resilience bonds (Miami Climate Alliance, 2018).

Why? To return to Jenkins’ (2021) argument, because the Miami Forever Bond and future bonds like it were also about racialized inequality and (lack of) trust in government. Addressing the decades of disinvestment that the *Miami Times* so thoroughly chronicled, Alliance members wrote in the memo that “throughout the years, government has not paid sufficient attention to our vulnerable populations, leaving many communities with broken promises and failed policies that further deepen the divide between rich and poor and diminish trust in government. We believe this bond has the potential to counteract the distrust and apathy that inequality brings, and instead to elevate the voices and wellbeing of those who are most vulnerable to sea level rise, hurricanes, poverty, homeless, and other factors that threaten our ability to be resilient and thrive as a city.” Following weeks of protracted politicking with the city government, the activist organization succeeded in

altering board qualifications to incorporate community leadership as a form of expertise. They also “stacked the deck” and appointed three of their own members on the seven-member Oversight Board (personal interview, 17 July 2018). As a result, this individual said, “we got a Citizens’ Oversight Board that’s not just made up of white males with PhDs. This way, we can do what we can to make sure that these funds will be used in a way that benefits community members, not just downtown, not just people who invest in Miami” (personal interview, 7 February 2019).

Second, the Climate Alliance ensured that members who had participated in MCA affiliate-held climate trainings—multi-week workshops meant to make low-resource Miami locals “experts” in climate science basics—attended, and spoke at, public meetings related to the Miami Forever Bond. This second tactic effectively concedes that local knowledge and community leadership are, in spite of their addition as Oversight Board member qualifications, not enough on their own to make authoritative political claims about the specific resilience efforts that the bond should prioritize. But it also underscores how, even within the exclusionary strictures of technical expertise, MCA members are still working to create sites for political representation. As one MCA climate training organizer told me, “we hear over and over again from people that they get made fun of [by city government] if they don’t have the rhetoric, or the right terminology, on climate change and adaptation... Even though they know what’s happening on their terms, they won’t speak about it publicly out of fear of embarrassment or humiliation. So, we workshop,” (personal interview, 7 February 2019).

Inasmuch as expert language involved climate science, it also involved municipal finance. Bond talking points that Alliance-affiliated organizations offered for individuals speaking at commission hearings included discussion of how bond investments would create “local, living-wage jobs” at a time when bond ratings were at an all-time high, making the Forever Bond not only the right thing to do but very “cost effective” (Metayer, 2017). As they conducted these trainings and circulated these talking points privately, Alliance members also “made sure we got at least 20 people from Overtown and Little Haiti at every meeting related to the Bond. Having them speak the [expert] language and make clear demands made it impossible for [the City] to ignore them.” In other words, this individual laughed, “we like to throw [the commissioners] off and startle them by showing up and talking like them while also asking for other things” (personal interview, 17 July 2018).

In addition to mobilizing expert publics at bond meetings, and as can be seen in Figure 3, Alliance organizers reconfigured the meaning of the term resilience so it would resonate with residents long-excluded from political decision-making in the “little world” of Miami.³⁰ Describing their digital communication strategy with low-income racial minorities in Overtown, Liberty City, and Little Haiti, one Alliance member said that they “framed the Bond and resilience in terms of things people care about—we basically said with the bond, we’d get housing, equity, and real representation in government” (personal interview, 17 July 2018). In fact, and as with grassroots organizing around resilience in other U.S. cities, in promoting the bond to residents in District 5, Alliance members barely used the term resilience at all (Collier et al, 2016). Instead, they presented images of black Miamians laughing and strolling amid decent housing, and racial minorities enjoying public parks—a marked contrast from the usual pictorial representation of who benefits from Miami bond issuances (see Figures 1 and 3 for comparison). Activists indicated that this tactic was essential to their campaign’s success. “Once we conveyed to our grassroots people that we were getting pieces of equity in the bond,” one member told me, “there was a big rallying cry behind it” (personal interview, 28 June 2018).

In November of 2017, the Miami Forever Bond passed with a 56 percent majority. Districts 5 and 2—Hardemon’s district and the historically white, low-lying and already flooding neighborhoods whose residents historically voted in favor of bonds—voted most strongly in favor of Miami Forever, whereas those in Districts 3 and 4 (majority Hispanic) voted against it. Voting in District 1—majority Hispanic and whose commissioner voted for the bond—was mixed (Isbell, 2017). Since then, and despite the routine struggles that the Miami Climate Alliance faces with the City of Miami (some of which I detailed in the opening vignette), the MCA has seen further political victories. Its members and allies in historically excluded neighborhoods have gained seats within the Citizens Oversight Board, which those involved have suggested is politically meaningful. Since its passage, the Bond has helped fund affordable housing construction and public transportation expansion in the low-income, racial minority neighborhoods of Liberty City, Little Havana, and Allapattah; as well as a pilot home rehabilitation program to prevent climate gentrification and displacement in low-income neighborhoods, among others (Kallergis, 2019). Moreover, officials have succeeded in pursuing matching funds for future affordable housing projects. Notably, the affordable housing projects proposed in the Miami Forever Bond are some of the first projects to have actually broken ground in the city.

Discussion and Conclusion

It is easy to dismiss these successes as piecemeal. And in fact, many Climate Alliance members would tend to agree, having called these successes only the beginning of a long “war” with the city (personal interview, 17 July 2018). As one member who helped spearhead the Forever Bond grassroots outreach strategy told me, “there’s a real power struggle around whether money is just going to shoring up infrastructure and leaving our very large, vulnerable working-class population without the assistance they need to be prepared for storms, extreme heat, food security, or climate gentrification.” But, and importantly for the argument of this chapter, he added that his organization believes that “the Miami Forever Bond is something that can address these things.” The bond, and others like it, will remain significant sites in Climate Alliance efforts to resist the reproduction of an unequal political economic status quo as climates change while further embedding their own resilience imaginaries into the political economic machinery of the city.

But, as I have also attempted to demonstrate, it is not just any local vision of a resilient future that the Miami Climate Alliance has sought to elevate in its ongoing political struggles with the city. Instead, it is a resilient future where low-income racial minorities who have historically been denied meaningful voice in political decision-making processes can author(ize) the forms of resilience that the city takes, and thereby advance a more just climate urbanism from below (Grove et al, 2020b; Silver, 2022). Thus, inasmuch as the Alliance fights that I have recounted here are about municipal finance, they are also about what Nancy Fraser (2005) calls “misrepresentation,” wherein political boundaries are wrongly framed to exclude specific individuals and communities from authoring justice claims. For Fraser (*ibid*, 88), the issue of the frame—that is, the decision rules and processes that determine who or what “counts” (or does not count) as a member of a given political community—is the “central question of justice” in a world whose challenges are increasingly global in scope. This is because the frame structures who is (and is not) recognized as a subject of justice, and to whom resources are (and are not) justly distributed. That the Climate Alliance is problematizing the frame through a municipal bond—supposedly impossible in a highly financialized, “post-political” city such as Miami—makes following their work even more important

for scholars, activists, and practitioners seeking to confront the climate crisis in just, equitable, and creative ways.

But even if Miami adaptation finance remains a battle of competing imaginaries and is not yet a post-political *fait accompli*, it is important to note that the players and the imaginaries that they seek to advance through the Forever Bond are not equal. As I detailed in the opening vignette, activists are attempting to advance alternative futures *through* the language and procedures of municipal finance—and *against* a deeply-rooted sociotechnical imaginary that has historically tied visions of the “good life” in Miami with rapid, racialized economic growth and investments in public works (Connolly, 2014; Jenkins, 2021). This imaginary, I have tried to show, is still at work in city official thought on the Miami Forever Bond. And by accepting the terms of municipal finance in their climate advocacy work, Miami Climate Alliance activists are in some ways dependent on them. Over time, the sustained usage of financial expert knowledge and vocabulary among Alliance members may have the effect of *reinforcing* expert authority and technocracy, thereby having the somewhat paradoxical effect of *destabilizing* the very alternative imaginaries that Alliance members are still working to stabilize vis-à-vis the Miami Forever Bond. Thus, while financial instruments such as municipal bonds will likely be increasingly prevalent in urban resilience and adaptation efforts, they should still be treated as one site among many in which activists should engage city planners and policymakers in their fights for urban climate justice.

I have also attempted to show that assuming that urban resilience and adaptation finance only follows one path risks passing over its status as a site of intense *political* contestation over the meaning of resilience and the concrete form(s) that it takes. In my case, urban adaptation finance serves as such a site through the very *technicalities* of the Miami Forever Bond process: convening the practices, concerns, histories, and imaginations of (extra-)local actors who design, evaluate, and purchase pieces of the Miami Forever Bond with those of residents who may (or may not) vote to pass the bond in the first place, and who may have very different understandings of the “good” resilient life and how it is best achieved.

This argument is not of purely academic importance. If it is the case that, at least in the United States, urban resilience and adaptation continue to be financed in part through debt issuance—and to-date, there is no indication otherwise—it is of utmost importance to continue to treat debt, and circulations of finance more broadly, as intensely political fields of struggle in collective fights for a more just climate urbanism (Knuth, 2022; Silver, 2022). Likewise, scholars might avoid the urge to read the tools and techniques of market-oriented urban governance as devoid of politics and the possibility of political space. This, too, is an imaginary of sorts, and one whose analytical dominance among researchers seems only to grow as the climate changes. It is worth taking seriously. But if we are to follow the lead of activists introduced here, we should still try to resist it.

CHAPTER 3

Making Climate (In)visible: The Politics of Climate Transparency in Climate-Changing Miami

On January 23, 2020, former Chief Resilience Officer of Miami Jane Gilbert addressed the City Commission regarding the Miami Forever Climate Ready Strategy. The recently published document, Gilbert said, is Miami's "first comprehensive plan" to address the significant problems that climate change poses to the city. Economic losses are chief among the problems that the plan is meant to address. "[Credit rating agency] Moody's has been asking us more questions," Gilbert told the Commission. "Luckily the city so far has not only maintained but improved its credit rating. This is mostly due to the great fiscal management of our administration but also because of how we're responding to climate threats through the Miami Forever Bond." Raising a copy of the plan for the Commissioners to view, she concluded that the city could remain creditworthy by implementing the 86 action items³¹ within the strategy (field notes, 23 January 2020).

Many Miami officials, including Gilbert, have suggested that the Forever Strategy's focus on "data-driven, transparent decision-making" is one key reason why the city stands to maintain its strong bond ratings as the climate changes. By creating greenhouse gas inventories, flood monitoring systems, climate data repositories, and GIS platforms, as well as virtual public fora where officials regularly explain Miami's climate risks and action on them to residents and other relevant stakeholders, these officials suggest that transparency can help "reduce uncertainty for the community and the private market³²" and thus "help Miami not just adapt but thrive amid the increasing risks of climate change" (field notes, 23 January 2020). Notably, the "open," data-driven approaches to urban governance that the Miami Forever Climate Ready Strategy encapsulates stand in sharp contrast to the opaque decision-making practices and back door deals that scholars have long attributed to Miami politics and that residents have long described as corruption (see, e.g., Grove et al 2020a). And yet, the approaches at work within Miami Forever have fallen under significant local criticism. In interviews, activists, expert publics, and elected officials alike have referred to the strategy's approach to climate disclosure as everything from "fluff" to "Orwellian" to "Machiavellian." If the city is to have any future at all, these individuals have said, local officials must use climate transparency to generate a sense of urgency toward the future, not false complacency through fuzzy accounting (personal interviews, 5 April 2021; 9 August 2021). As importantly, many of these individuals have begun to enlist elements of the Miami Forever Strategy in their efforts to render climate change an emergency that requires massive public intervention in the present.

This paper explores why transparency has (1) emerged as a key objective and practice of climate adaptation in Miami and (2) become central in local battles over the city's future. I argue that

officials are using climate transparency in their climate strategy to defer unplanned adaptation in Miami: sudden, mass property devaluations that will crater the city's economy and thus Miami's ability to weather coming storms. Given the significant climate vulnerabilities and risks that Miami faces, this argument may seem counterintuitive. Wouldn't disclosure of the city's climate vulnerabilities and risks only expedite the arrival of the calamitous futures that officials seek to avoid? Not necessarily. Drawing from interdisciplinary literatures on the technopolitics of demonstrations and the government of the future, I read climate transparency as generative: it helps organize particular orientations toward the climate-changed future (such as urgency or positivity) as well as particular actions on the future (such as abandonment of or investment in a given locality) in the present. Rather than simply "reduce uncertainty for the community and the private market," as Miami officials put it, the vast climate monitoring systems, carbon inventories, and public fora that help make up the Miami Forever Strategy are also intended to generate positive orientations to the city's future among residents and the private market. The productive capacity of transparency thus helps explain why the strategy meant to instill confidence in the city's future has conjured skepticism and distrust among local stakeholders, and why residents, expert publics, and activists alike have begun to use official fora and sites of climate transparency in their broader efforts to make Miami officials take more transformative action on climate change, such as rapid decarbonization and retreat. These ongoing developments in Miami thus push us to treat climate transparency as a lightning rod in wider political battles over, and representations of, climate-changed urban futures.

In advancing these claims, the paper makes three contributions to the fields of urban and economic geography. First, where scholars of climate urbanism have read the datafication and "opening up" of climate-changing urban environments as an attempt to govern existing urban geographies (see, e.g., Long and Rice, 2019), I suggest that they also be read as attempts to govern climate-changed urban futures. But local attempts to govern climate-changed futures are fraught. Drawing on literatures from technopolitics, I understand demonstrations of climate transparency as arguments: formal and informal acts meant to persuade "community and private market" opinion on the truth of Miami's resilient future and that may, in turn, spur counter arguments through the form of counter demonstrations of climate transparency (Stark and Paravel, 2008). This leads to the second contribution of the paper. While climate transparency may be an exercise in controlling and disciplining the environment, as a substantial body of critical urban geographic scholarship suggests, I detail the ways that climate transparency can "slip out of [official] control," and thus open up sites of political contestation that threaten the realization of the resilient futures that present-day transparency efforts seek (ibid, 2008, p. 49). Third, and finally, by reading climate transparency as generative, this paper contributes to a growing set of literatures within economic geography and political ecology that underscore the performative dimensions of climate governance (see, e.g., Bracking, 2015; Bridge et al, 2021; Langley et al, 2020; Paprocki, 2019).

The arguments advanced in this paper draw on 18 months of fieldwork in Miami. Over this time, I conducted over 60 hours of participant observation at relevant Miami Forever meetings and events; conducted documentary analysis of dozens popular media, policy reports, and news briefs on the Miami Forever strategy; and conducted 40 interviews with residents, climate activists involved with the strategy, as well as government officials who drafted it. I selected Miami for analysis for several reasons. First, the metropolitan region is one of the most physically vulnerable cities to climate change in the world (Conyers et al, 2019). Second, its political economy is deeply yoked to the judgments, fears, and aspirations of investors of all stripes—a relationship that indeed is responsible for the city's founding and that, as Gilbert's presentation makes clear, will continue to play an important role in shaping the city's future (Grove et al, 2020a; Portes and Stepick, 1993; Taylor and

Aalbers, 2022). Taken together, these elements make Miami an ideal site from which to critically examine the epistemic and affective work that climate transparency does with respect to urban climate governance.

The paper proceeds as follows. First, I situate these arguments within a broader set of literatures on climate transparency and climate urbanism. I then draw from interdisciplinary literatures on governing the future and technopolitics to examine climate transparency as both generative and political: insofar as demonstrations and practices of climate transparency may seek to produce specific orientations to the climate-changed future, they also create conditions for their own dispute. The third section presents the main empirical material of the paper through a focus on three key sites of climate transparency within the Miami Forever strategy: the Resilience Action Forum, the Citizens Oversight Board, and the Storm Water Master Plan. In this section, I detail the ways in which city officials have attempted to create positive orientations toward the city's climate-changed future through strategic demonstrations and presentations of climate risk and action on it. I also discuss how residents, activists, and expert publics have used these demonstrations to cast doubt on the city's climate strategies and produce counter demonstrations of climate transparency. In the concluding sections I reflect on the significance of the case for existing scholarship on urban climate governance and the role of climate transparency within it.

What Kind of Thing Is Climate Transparency?

Over the past decade, transparency has emerged as a key norm and practice in many climate governance mechanisms. These mechanisms include frameworks within multilateral treaties, such as the United Nations Framework Convention on Climate Change (UNFCCC), as well as investor-oriented programs such as the Carbon Disclosure Project and the Task Force on Climate-Related Financial Disclosures. The rationales for transparency vary, reflecting what Gupta and Mason (2016, p. 82) call the “heterogeneous and fragmented nature of climate governance.” However, many transparency advocates stress that by making a given entity's relationship to climate change visible—be it through regular reporting of its carbon emissions, the systematic disclosure of actions taken to reduce these emissions, and so on—transparency is uniquely disposed to enhance accountability; mutual trust; informed choice and participation, and generate “sound scientific” decision-making (Gupta and Mason, 2014; *ibid*, 2016; Konrad et al, 2021).

As many transparency-oriented climate governance initiatives have kicked off, a considerable body of critical literature has shown that many initiatives don't live up to their promises.³³ But perhaps, as Turnhout et al (2014, p. 583) argue, the numerous accounting and monitoring practices that make up transparency efforts are not necessarily about good governance and scientific decision-making in the first place. Instead, these authors read transparency as an expression of what they term *measurementality*: “a neoliberal governance logic that emerges...from privileging scientific techniques for assessing and measuring the environment as a set of standardized units which are further expressed, reified, and sedimented in policy and discourse” and that “[provides] the basis for centralized control, coordination, and exchange.”

Urban studies scholars have stressed that this logic is pervasive in climate urbanism: the ways in which “urban areas are lived, governed, and imagined” amid climate change (Castán-Broto and Robin, 2021, p. 716). *Measurementality* is at work, for instance, in the creation of urban carbon inventories, heat indices, and resilience indices, all of which are made openly and easily available to

residents (Leitner et al, 2018; Rice, 2010). Beyond reflecting numerical information on the climate-changing urban environment, Long and Rice (2019, p. 997) stress that transparent measurements like these “serve to justify local climate policies...that [extend] disciplinary action at the institutional, neighborhood, or individual level” and ultimately depoliticize climate change and its governance in cities³⁴ (see also Bulkeley and Newell, 2015; Rice 2014a, 2014b). But where these authors zoom in on how climate transparency (re)shapes existing urban geographies and urban spatial practices, I am interested in the work that climate transparency does in explicit relation to urban futures. How might the mechanisms and practices of climate transparency at work within a city like Miami create specific local and extra-local orientations to that city’s climate-changed future? How, and toward what end, might these orientations to the future be enrolled in broader adaptation strategies?

This paper adopts the perspective, developed by McCormack (2012) and others, that disclosure should be analyzed as generative: the activities and techniques that constitute disclosure (such as data visualizations, presentations, and so on) contribute performatively to the perception of a particular future and render that future an actionable public concern in the present. Scholars broaching the question of how futures are governed through disclosure have explored a range of future events, from inflation to recession to pandemics (Lakoff, 2009; Langley, 2015; McCormack 2012, 2015). For many of these authors, the futures that techniques of disclosure depict are affective and epistemic facts. Following Zaloom (2009, p. 247), I take this to mean that the indicators, models, and presentations that individuals deploy to portray future events “organize *feeling* as well as thought and action” toward a future event in the absence of the event itself (emphasis mine).

Stark and Paravel’s (2008) investigation of the PowerPoint presentations that former Secretary of State Colin Powell deployed to justify U.S. intervention in Iraq is particularly illustrative in this respect. Although there were ultimately no weapons of mass destruction in Iraq, the ensemble of video, audio recordings, satellite imagery and maps that Powell stitched together in these presentations was enough to persuade government officials of the existence and future use of weapons of mass destruction (WMDs) in Iraq *and* generate fears of the global instabilities and insecurities that they and their allies would face if those weapons were allowed to proliferate. And as is now well known, the feelings, thought, and action toward a possibly nuclear Iraq that Powell’s presentations helped organize would steer the United States into nearly a decade-long war that cost trillions of dollars and tens of thousands of lives.

As powerful as acts and techniques of disclosure are, they are also susceptible to critique and contestation.³⁵ In the same paper, Stark and Paravel (2008) note that because Powell’s PowerPoints were circulated immediately online, interested individuals were able to examine them as they wished, and cut and paste materials from the slides, along with their comments, on other websites. Was the satellite imagery depicting the transport of WMDs any good, for instance? Why was it, others asked, that the conversations Powell presented weren’t played in their entirety? What was he hiding? Soon enough, the elements that made up Powell’s argument had “slipped out of the control of the demonstrator...generating new elements of uncertainty and skepticism where the facts had once been black boxed” (ibid, 2008, p. 49). Far from paving the road to an easy invasion abroad, these demonstrations of nuclear futures had become fodder for numerous counter demonstrations that sought to undermine the epistemological and affective bases for the war.

These literatures offer essential perspectives in analyzing how the climate transparency at work within the Miami Forever Strategy can shape attitudes toward the city’s climate-changed future. Rather than read disclosure as the neutral presentation of climate risk and action through a series of

(virtual) public meetings, open data sets, and plans, these literatures enable us to understand how disclosure can also be made to instill local and extra-local beliefs that the city will remain the “Wall Street of the South” well into the future, and thus defer unplanned adaptation in the present and near- to medium-term future. Equally, these literatures illuminate why official efforts to control (extra-)local perceptions of the future through strategic disclosure of climate risk and action become lightning rods: productive of skepticism, doubt, and (in)formal challenges to their own carefully curated argumentation.

The remaining sections investigate three key sites where the future of Miami is generatively disclosed within the Miami Forever Climate Ready Strategy: the Resilience Action Forum; the Citizens Oversight Board of the Miami Forever Bond, and the Storm Water Master Plan. In each of these sites, I pay attention to how officials frame the city’s climate risks and action on them, and to the orientations to Miami’s future that officials attempt to produce through these framings. I also explore the skepticism and counter demonstrations that these acts of disclosure have begun to elicit.³⁶ In doing so, the paper makes three contributions to scholarship within urban and economic geography. First, it extends climate urbanism engagements with measurementality to the question of how urban futures are produced and governed. Second, by tracing “the dynamic and conflictual nature of disclosure” at work within the Miami Forever Strategy, the paper pushes scholarship on climate urbanism to read climate transparency as contested and fraught, not just as a depoliticizing extension of surveillance and control to new domains of urban life (Gupta and Mason, 2016; Kinchy and Schaffer, 2018, p. 22). Third, and finally, a focus on Miami officials’ demonstrations of climate transparency and the resilient urban futures they intend to enact builds on a growing body of scholarship that explores the performative elements of climate governance (Bracking, 2015; Bridge et al, 2021; Langley et al, 2020; Paprocki, 2019).

Sites of Disclosure, Sites of Doubt

The Resilience Action Forum

Though a version of the Resilience Action Forum predated the publishing of the Miami Forever plan, the forum’s goals were motivated by a more recent event: local backlash over the city’s proposed 2020-2021 budget, which had slashed the Office of Resilience’s budget and collapsed the office, meant to operate transversally across all departments, under public works (field notes, 20 October 2020). Angered, activists waged a successful social media campaign that highlighted the city’s hypocrisy on climate change and that quickly made headlines beyond Miami. By Mayor Francis Suarez’ own admission at a November 2020 meeting, the Resilience Action Forum is intended to generate a sense of trust and “comfort” among residents that city officials are taking “climate change and resilience seriously...and working to build a Miami that will truly last forever” (field notes, 23 November 2020).

Demonstrations of the city’s commitment to climate action hinge, at least in part, on visual and procedural consistency (see Figure 4 in the Appendix for an example of what a typical forum session looks like). For years, the hour-long Resilience Action Forum took place on the last Tuesday of every month via Zoom—a venue initially selected due to COVID-19 safety precautions but that city officials made permanent in order to ensure wider accessibility. In each meeting, a familiar cast of administrative characters—capital planners, budget officers, resilience administrators, and

community development directors—greet participants, many of them from local activist circles such as the Miami Climate Alliance and whose videos are by default turned off. During meetings, city officials provide updates on the Miami Forever Strategy. Sometimes these officials use PowerPoint presentations; in other instances, they offer updates simply through spoken word, whose tones range from upbeat to dry and detached. Common across these updates is the presentation of before and after images meant to denote progress on a given resilience project (such as storm water pipe installations) and data visualizations that demonstrate where the city “is” in relation to broader, long-term objectives, such as the completion of the Storm Water Master Plan and the creation of extreme weather indices. After officials complete these demonstrations, the event opens up for general discussion: participants can enter their questions in the chat, which are then read aloud and answered by any number of officials. Once the hour is up, the meeting is uploaded to the city’s YouTube channel.

As Stark and Paravel (2008) would anticipate, these demonstrations of commitment and consistency—as made more accessible and circulatable through their recording and posting online—have become fodder for counter demonstrations of local government complacency and inconsistency. Take, for instance, the city’s demonstrations on its commitment to carbon neutrality. Officials regularly pitch this component of the Miami Forever Strategy—formally known as the Miami Forever Carbon Neutral Plan—as evidence of Miami’s global leadership in transformative climate action.³⁷ Developed in consultation with international climate organization C40 Cities, officials have told Resilience Action Forum participants that the science-driven action items in the plan—such as the electrification of city vehicles, updating the city’s bike master plan, and requiring new buildings to be solar-powered—will allow the city to meet Paris Agreement carbon benchmarks and “preserve Miami forever, for everyone.” In substantiating these claims, officials often present graphs like Figure 5 (see Appendix).

Activists have used these graphs and the recordings in which they are housed to paint a darker picture. In one June 2021 meeting, for instance, representatives from the organization Parents for Future underscored that the city had changed its tune on emissions reductions targets without formally notifying anyone: in February 2021, officials said that while the city wouldn’t be able to comply with C40 recommendations (95% reduction in emissions by 2035), they could commit to a 60% reduction by 2035. In a May 2021 meeting on the same subject, however, city officials shifted the targets to 50% by 2035, without acknowledging that this amounted to a significant slippage in ambition. Why was it, these representatives asked, that city officials weren’t forthcoming about what these changes meant? What’s more, what prompted them to make these changes in the first place? Were officials ever, for that matter, going to admit that all of their possible reduction plans blow past the 1.5 degrees Celsius carbon budget (as indicated in Figure 6)?

Put on the spot, officials on the call said that they could not simply follow the best science in setting these targets. Instead, they needed to follow C40’s scientific guidelines in relation to a scale of what they called “political acceptability:” that is, determining whether the creation of science-driven carbon policy would be “very difficult” given “strong stakeholders who could find some action disagreeable” or “something that everyone is cool with” (field notes, 23 May 2021). In response, Parents for Future representatives inquired as to whether city officials had considered whether future generations would be “cool with” politically acceptable reductions targets that can only be met through carbon capture technologies that don’t exist yet and that shift the cost of climate action onto future generations. Suggesting that this slippage in reduction targets smelled of familiar Miami

corruption and not science, representatives used forum meetings and social media to demand an audit of the city's decision-making practices regarding emissions reduction targets.

These sustained pressures within the Resilience Action Forum, as well as the strategic altering of official demonstrations of climate transparency that they circulate on social media platforms, have forced city officials to conduct an independent audit of the city's own emissions reduction targeting practices, as well as (quietly) declare a state of emergency on climate change. Indeed, inasmuch as Parents for Future members have used the Resilience Action Forum to question the city's curious carbon emissions plan, they have also used it to ask why the city will not list the climate emergency declaration on the front page of its official website (especially when the COVID-19 emergency appears there). Officials have countered that they won't post the declaration on its homepage, or publicly use the term "emergency" in relation to the city's climate vulnerability because, in Suarez' words, doing so could spread seemingly politically unacceptable, market-rattling sentiments of "doom and gloom" (field notes, 25 May 2021). Nevertheless, Parents for Future representatives have suggested that the utterance is politically useful: they can use the declaration, gained through strategically waged controversies over climate transparency, to counter official statements which downplay the significance of climate change for Miami's future (personal interview, 26 August 2021).

Citizens Oversight Board

If, as one resilience official said in an interview, the Miami Forever Bond is a "confidence tool" meant to prop up investor beliefs that the city will remain a profitable investment for generations to come, the Citizens Oversight Board is meant to instill a belief among locals that taxing themselves in the name of resilience-building will pay dividends in years to come, and that officials will take board member recommendations seriously when devising and selecting future resilience projects. Generating these sentiments among locals is not of minor significance: in Miami, a majority of commissioners and residents must vote to pass general obligation bonds like Miami Forever. In other words, to shore up investor confidence in the city's economic future officials must first shore up local confidence in government. As one official told me, "these [climate change risks] are billion-dollar problems. We are going to have to sell this thing [the Miami Forever Bond] 10 more times. So we have to show that it's actually working" (personal interview, 18 February 2021).

I have discussed how the Citizens Oversight Board was constructed elsewhere. Here, I want to focus on how Forever Bond officials attempt to demonstrate the value of the bond to its sitting board members in relation to the city's future, and on some of the responses that these demonstrations have inspired. Where officials used demonstrations in the Resilience Action Forum to generate feelings of comfort among participants, demonstrations to Oversight Board members are intended to generate a sense of authority among the everyday citizens who comprise the eight-member volunteer board. One can observe this goal at work in how board meetings are physically conducted. Meetings take place four to five times a year in City Hall, where individuals from the volunteer committee sit in the commissioner daïs, which allows them to look down on invited speakers, many of them city officials and contracted partners working on various Miami Forever Bond projects. In meetings, which can last anywhere from one to two hours, board members call on various officials to provide them with updates on Forever Bond projects, partnerships, bidding, and so on, and respond to their questions. As with the Resilience Action Forum, recordings from the

Citizens Oversight Board meetings (see Figure 7 in the Appendix) are also posted on the city website and Miami government TV channel.

Government employees often use PowerPoints and data visualizations when speaking to board members. When compared to external presentations of the Miami Forever Bond projects, the bond presentations given at board meetings seem rather dull (see Figures 8 and 9 for comparison). Plain presentations, some bond officials have told me, are by design. “Francis [Suarez, the Mayor of Miami] can do his flashy branding exercises all he wants,” one official said. “But in these meetings, it’s just about quantifying what we’re doing, showing our progress and introducing our partners to get that community buy-in that we know we’ll need going forward” (personal interview, 14 June 2019). Whether conducted by government employees or private sector partners, presentations often depict improvement. Depictions of improvement can take the form of simple “before and after” photos on a given project; renderings of future parks for which bond funds will help pay; or numerical tables that feature clip art and show how many projects have been completed and how many matching funds have been secured (see Figure 9).

But where these purposefully bland presentations and open-ended discussions among board members and officials are intended to make members feel like authorities with open, unfettered access to the methodical practices at work in building the city’s “forever” future, board members—well aware of the city’s longstanding patterns of corruption and back door deals—have suspected that a lot of the real work on the bond is taking place elsewhere. They direct those suspicions to local elected officials, who they believe want to sell residents on the importance of resilience, and to convince external observers that the city is acting on climate risks, while channeling resilience funds to projects that do not address climate change.³⁸ As one board member said of the first board meeting, “A lot of electeds like to see ribbon cuttings...so when we first kind of gather, there’s this first push for \$58 million...and we’re all like taken aback. We just started this meeting and now you’re pushing \$58 million worth of projects? Where’s the engagement?”

Worried that officials would “give members and residents the runaround on resilience” with what they called “fluff” presentations while siphoning important climate funds to pet projects behind closed doors, board members and activist allies have repurposed board meetings as key sites in their climate advocacy work. In a June 2022 meeting, for instance, one board member surprised officials by beginning the session with recent drone footage of standing water and submerged cars in neighborhoods that don’t usually flood. The clip lasted for several minutes, and featured video of vans floating in the streets and residents standing by the side of the street, helpless (see Figure 10). “What we’re seeing is Little Havana, not Brickell or Biscayne Boulevard³⁹” the board member said at the meeting. “It’s easy to forget why we’re here. But this is why...and this is why money on resilience has to be front and center.” Rather than proceed with the meeting agenda as originally scheduled, this individual called for public comment, and the activists with whom she had previously encouraged to attend the meeting submitted proposals for strict resilience project selection criteria.

This board member said she plans to deploy drone footage in future climate advocacy work with city officials. “We were sort of able to shock everyone with this [footage] and get them talking about the real issues we’re facing and how to handle it. You look at that footage and you have to admit that everywhere is getting water now and we can’t pretend it’s just here and there and so maybe we don’t have to do as much...there’s a lot of attention and urgency we can draw from [the footage] to spend the [Miami Forever Bond] money the way we want and pass the kind of legislation we want.” In a subsequent meeting with members of the Miami Climate Alliance, this board member discussed how

they could use the drone footage to influence how the City Commission spends the remaining \$300 million of the Miami Forever Bond (personal interview, 10 June 2022; field notes, 6 June 2022).

The Storm Water Master Plan

For many officials, disclosing the contents of the Storm Water Master Plan poses the most challenges to their goals of creating positive orientations to the city's future. Why? On the one hand, the plan is highly technical. As the most comprehensive flood risk assessment the city has conducted to-date, its 504 pages contain in-depth information about current storm water infrastructure conditions and needs as the climate changes and the sea level rises. Discussing the engineering solutions developed within its pages requires explanation of arcane performance metrics such as "level of service," as well as how the storm water models were developed, among other complexities. On the other hand, what appears in the plan simply doesn't look good. Among the recommendations within the plan are a seven-fold increase in stormwater pump use; construction of 90 miles-worth of sea walls; the expansion of drainage pipe widths from three to eight feet; and the installation of thousands of injection walls that shoot excess water deep below the city (City of Miami, 2021b). Elsewhere, the plan describes longer-term infrastructure projects the city could consider, such as converting roads into canals; creating elevated road networks, and floating homes. To put it in Mayor Suarez' framing, recommendations like these represent the kind of "doom and gloom" that could rattle residents and investors and thus catalyze unplanned adaptation. For this reason, and as one resilience officer told me, "there's a very fine line [the city] needs to walk about facing and communicating the risks ahead of us, but communicating it with solutions in mind" (personal interview, 16 June 2019).

So how do officials go about walking this line in public meetings and statements about the plan? For one, officials tend to cap discussions of "Miami Forever" at 40-50 years into the future. They do so for two reasons. First, and as one former resilience officer told me, because officials need to plan for the lifespan of the infrastructure that they're creating, which is often 40 years. Second, and more germane to their concerns about unplanned adaptation, because a 40-year time horizon captures all the time frames that officials believe investors and residents will care about. "40 years is already beyond any mortgage cycle," this officer told me. "We also found in our community outreach that most residents think at maximum around a 10-year time horizon...but it's really more in the five-year frame. So this plan is already way beyond that, too. So [the 40-year horizon] gives residents a comfort level, it gives investors a comfort level, you know, insurance and reinsurance actually only insure on an annual basis. So they're [(re)insurers] not even thinking that far out." And if officials disclosed what 2100 and beyond hold for the city, as discussed within the textbook-length plan? "We're just not gonna go there," the officer laughed (personal interview, 16 June 2019).

The "fine line" that officials feel they must walk with respect to disclosure of long-term climate risk helps explain the jarring range of demonstration techniques at work in public meetings about the plan. In all but one virtual public meeting following the plan's 2021 rollout, official presentations began with a video—highly uncommon in Miami Forever public meetings (see Figure 11 for a screenshot). Amid b-roll and stills of the city skyline at dusk; Miami's massive highway infrastructure; swaying palm trees; and upbeat music that includes pipe organs, twee guitars and a finger-snapping sound effect, the voice of Chief Resilience Officer Alan Dodd tells viewers that he and the city are "excited to launch the new Storm Water Master Plan, which will serve as our roadmap to resilience" (field notes, 29 April 2021). The video ends with an image of two city logos

and the recently revamped Office of Capital Improvements slogan, which in all caps reads “Building Miami **Forever**” (emphasis theirs). Immediately after, those involved with the plan’s drafting—mainly contracted engineers and officials from the Department of Public Works—blast off into a 35-minute scripted reading of the plan’s making and value, which on average devotes approximately 12 seconds to the plan’s minimum price tag of \$3.8 billion (around three times the city’s annual budget) and that does not include cost of maintenance.

Although official discussion of the plan’s cost amounted to less than one percent of the presentation’s airtime, the plan’s price tag took up a bulk of public questions. How, as city commissioner Ken Russell asked—first learning the details of the plan at this public meeting, too—was the city planning on securing those funds? Did the city have a federal-level lobbying body ready? As another resident asked, over what period were those funds needed? None of the hosts of this particular meeting jumped to answer the questions. The individual that did answer them, a deputy resilience officer, said that they did not yet know how they would secure funding to implement the plan, but, following a nervous laugh, that they would need around \$100-150 million per year starting now, since initial projects are meant to take place over the next 20-30 years. This officer’s supervisor, Alan Dodd, quickly intervened to note that he was sure there would be plenty of opportunities to acquire these resources, and then moved discussion on (field notes, 12 May 2021).

As shocking as the plan’s disclosed price tag was to many on the call, for one journalist the “real story” was about what the plan itself did not include: infrastructure improvements within some neighborhoods that are already experiencing significant flooding. “So when I was looking at the plan I saw that parts of Shorecrest [a Miami neighborhood] are basically not going to be saved—there’s parts of it where no infrastructure is going. I thought, ‘OK, that’s the story here.’” Speaking to the limits of counter demonstrations of climate transparency in Miami—especially when its demonstrators are guaranteed a wider audience than your average activist, and that includes many players in the “private market”⁴⁰—the journalist recounted a story of effective censorship: their editor cautioned that publishing word that a Miami neighborhood is “dead” due to climate change could spread elsewhere and cause market scares. The silencing was familiar. “People at real estate conferences will say they won’t invest in Miami,” this journalist told me. “Sometimes quotes [from these conferences] will get tweeted out, or covered in industry websites, but then are subsequently retracted or deleted.” Why? Mainly, the reporter reasoned, because “no one wants to be caught stirring the pot that leads to mass property devaluations” (personal interview, 9 September 2021).

Climate Transparency’s (Un)controllable Futures

Given the possible political blowback, one might assume that strategic disclosure of climate risk and action is something that members of the Suarez administration would prefer to keep to themselves. But Suarez, at least, is open about it. As he said of the climate challenges that Miami faces in a *Forbes* interview, “A lot of it [the challenge] is perceptual” (Shimron, 2021). To make his case, Suarez asked the interviewer why it is that most people don’t know that New York has suffered more hurricane damage than Miami in the past decade. Moreover, why is it that most people don’t know that, unlike many other American cities, residents of Miami have agreed to tax themselves to pay for a series of resilient infrastructure projects that will “create a Miami that’s going to be here forever?” Why, in other words, can’t changing attitudes toward the city’s future be a key component of the city’s climate adaptation strategy? If these changes in disposition result in Miami living to see another day

(or forever, as Suarez would have it), does it really matter that it comes through some strategic silence, mood-setting, and epistemic gymnastics in the present?

Interestingly, some Miami officials who have publicly called for adaptation measures involving managed retreat and degrowth have offered support of Suarez' reasoning. As one marine scientist and Climate Resilience Committee member told me, "there's a lot of fear circulating about Miami right now, so it's really important for the city to show that this city is going to be all right, and that [Miami] is actually this very environmentally and engineeringly progressive place." This individual pointed to the Netherlands in justifying why perception management should remain a key dimension of climate adaptation in Miami, and why perception management through transparent climate action can help the city realize the environmental progressivism for which Suarez and others are currently seeking a reputation. "People just *believe* in that place and the way they do things, man," he said. "So [the Netherlands] *can* do those [environmentally progressive] things. If Miami can establish that reputation through showing they're doing stuff, and like quantifying it, then maybe they [city leadership] can come out and say, 'Hey, we think this [environmentally progressive thing] is important'" and then implement it (personal interview, 16 June 2019). Others are less optimistic about the prospect that perception management will yield more sustainable urbanism in practice. Per a different member of the Climate Resilience Committee, "political discourse is at one level, reality is at another level. Whatever bullshit stories he [the mayor] makes up along the way, all these platforms about making Miami great, it's all just about funding short-sighted adaptation things. Now he says he's going to be carbon free by 2050. I don't pay attention anymore because it's absurd. I see them [city officials] saying things, and then they go in completely opposite directions⁴¹" (personal interview, 23 February 2021).

At some level, what many officials, activists, and residents seek from Miami government is the kind of techno-managerial consensus, disciplining, and sense of urgency that critical scholars of emergency governance and climate urbanism suggest are characteristic of data-driven disclosure techniques. But in Miami, at least for now, those prospects remain elusive. For better or worse, city officials recognize that the techniques drawn upon to "know," depict, and disclose the city's climate-changed future, as well as action on it in the present, are intimately intertwined with the development of local (and, importantly in Miami, extra-local) attitudes toward it. Practically speaking, this means that in Miami, transparency "works" insofar as it generates positive orientations toward the future among local constituents and climate-jittery investors elsewhere. When demonstrations of transparency elicit negative responses, or offer opportunities for residents and expert publics to probe officials on their climate accounting and action, transparency no longer "works" and may need to be taken off the table.

The instrumentality of climate transparency perhaps helps explain why key sites of climate sunlight discussed in the previous section have begun to fade into darkness. Following activist success using Resilience Action Forum meetings and materials to push the city to declare a climate emergency and conduct an independent audit of its emissions reduction plan, for instance, city administrators announced that the forum would move from monthly to quarterly meetings. Meanwhile, the Citizens Oversight Board has begun to meet irregularly. Describing his position as "handicapped from the start," one member told me he was considering abandoning the post and focusing his climate efforts elsewhere (personal interview, 15 May 2021). The news story focusing squarely on the specific neighborhoods that will likely be lost to sea level rise, through the absence of planned infrastructure investment in the Storm Water Master Plan, has still not been written.

And yet, counter demonstrations will still find their way to the financial world. In 2017, for instance, Francis Suarez and Phil Stoddard, the former Mayor of South Miami, spoke together at a public conference on climate impacts in Miami. Stoddard, a biologist and professor, was outspoken about the need for managed retreat and degrowth given the long-term risks that the metropolitan region faces. “And just like that,” Stoddard told me, “Francis reaches over and grabs my microphone, and says, ‘what Mr. Stoddard means is that Miami is going to be here forever.’” This wasn’t the first time something like this happened to Stoddard. “People here really want to shut me up because they think I’ll ruin the party. But the thing is, [after Suarez took his microphone] I get in the elevator at the end to leave and these businessmen pile in with me and ask ‘Mayor Stoddard, is all the stuff you’re talking about really true?’ And I say ‘yeah, unfortunately it is.’ None of them want to say it out in the open, but they all want to know because their finances depend on it.” Stoddard also scale jumps to circulate his own argument about Miami’s future. “Locals [local reporters] are stuck. But when Jeff’s [Goodell, a writer at the *Rolling Stone* and for whom Stoddard was a key informant in a 2013 article on Miami’s climate risks] first piece came out, the Chamber of Commerce had an emergency meeting. They were like ‘what do we do about this bad press? We gotta suppress this.’” But at that point, Stoddard told me, the ink had already dried and the spotlight had shifted to Miami, whose identity and future the *Rolling Stone* article and others like it had started to call into question (personal interview 19 May 2022).

Some investors interviewed backed Stoddard’s story up. “When I read it [the *Rolling Stone* piece] I was like ‘oh wow, I have to go to ground zero,’” one municipal bond market investment executive told me. “I usually think about places like Bangladesh, so hearing that Miami was like this too was totally fascinating and made me rethink what I thought was going on there” (personal interview, 14 May 2021). Notably, stories like those in the *Rolling Stone* piece—coupled with glaring absences in other, more technical documents—have started making others within the municipal bond world skeptical of the transparency at work within Miami Forever. “They’re like ‘look, I’m disclosing the data and the risks and everything I’m doing. Look at how good and holier than thou I am. Why wouldn’t you give me money compared to the other person who is not disclosing and not as forward thinking as me?’” one senior municipal bond research analyst told me of his read of the data-driven and transparency-oriented elements of the plan. Then, turning his computer monitor toward me, with the city’s 2019 municipal bond securities report on the screen, he countered, “but I want you to ask them [the city] where their disclosure on climate risk is [in this report]. Tell them an investor wants to know. Because I just searched for the word climate change [in the report]. Zero. I searched for the word climate. Zero. I searched for the word sustainability. Zero. I need to figure it out, like ‘hurricane?’ There’s also no ‘risk.’ So there’s no climate and there’s no climate change and there’s no risk. This is their annual report and they’re not telling me what is going on! I mean, this is scary. I’ve read all the stories about Miami. Why aren’t they disclosing their actual risks?” (personal interview, 21 June 2021).

Conclusions

In this paper, I have attempted to develop one answer to this investor’s question: because disclosure of actual climate risk could catalyze unplanned adaptation. To prevent, or at least delay that mode of adaptation, Miami officials disclose bright futures. It is impossible to say how long these techniques of deferral can last, and whether the mounting counter arguments developed by local officials, activists, and expert publics described here will manage to cast a permanent pall over Miami’s resilient future in the eyes of key players in investment markets. Nevertheless, empirical

developments like these—stories of confidence, corruption, forever, and emergency as they are produced and dissected through seemingly technical means—push urban geographers to think about the work that techniques and mechanisms of climate transparency do within climate-changing cities in new ways. It is not simply that they advance gloomy, surveillance-ridden urban environments at the cost of meaningful debate over the city’s future, as some critical climate scholars would have it. Though they can do that. Nor is it simply that transparency mechanisms and techniques provide their viewers with clear-eyed information on climate risk for use in holding elected officials accountable. Though they can do that, too.

In this paper, I have introduced another vantage point from which one can critically engage with the roles of climate transparency in the contemporary city. Specifically, I have shown how systems of climate transparency can be made to generate specific orientations toward the climate-changed future, and how these orientations toward the future can be used to govern in the present. By foregrounding these relationships, the arguments developed within this paper deepen scholarly understandings of the power and politics of measurement within the climate changing city. The article’s empirical focus on sites of generative disclosure also contributes to scholarship on the performative dimensions of emergency and climate governance: where scholars have shown how the use of technical devices helps generate senses of urgency that justify significant intervention in the present, in Miami I have shown how officials have used similar devices to project confidence, which are intended to push significant intervention—such as mass decarbonization, managed retreat, and strategies of degrowth within the city—into a future that many officials hope will never arrive.

In the meantime, there is a need for more research on the relationship(s) between specific forms of climate transparency and urban climate futures that I have explored here. Certainly, the disclosure of climate metrics within and of climate-changing cities can organize feeling, thought, and action that fall somewhere in between senses of urgency and confidence, and which justify interventions that take place, and endure, somewhere between the immediate present and the indefinite future. We should figure out what those metrics are, how they are generatively disclosed, and why they take hold in some cities over others. After all, we may not have forever.

CHAPTER 4

Design-driven Resilience and the Limits of Geographic Critique²

In a world of cascading climate catastrophes, shrinking budgets, and growing demands for public services, building resilience seems impossible to oppose. The term, as defined by the Rockefeller Foundation's 100 Resilient Cities (100RC) initiative, refers to individual and systemic capacities to anticipate, recover from, and transform amid shocks and stressors. In its six years of operation, 100RC oversaw the development of countless resilience efforts in cities around the world, with proponents describing the initiative as “critical for the global wellbeing of humanity” (Rodin, 2013). The Rockefeller Foundation's sudden decision to shutter the 100 Resilient Cities program in April of 2019⁴² thus came as a shock to many observers. However, for Rajiv Shah, the Foundation president who announced the program's closure, the reasoning was simple: 100RC was not delivering enough “measurable” results for vulnerable people (Bliss, 2019). Shah's demands are anathema to the 100RC program, which adopted an open-ended, long-range approach that resulted in what one program reviewer described as “a gazillion things going on” under the banner of building resilience.

As shocking as this announcement was to 100RC proponents, it is equally surprising when read against dominant critical accounts of the program. By the time 100RC closed shop, critical scholars, many of them geographers, had produced a significant body of research on resilience. Much of this research has argued that 100RC and similar urban resilience efforts amounted to the latest round of neoliberal urban governance, wherein politics and the political are “rendered technical” and market-oriented economic growth is prioritized over social protections (Leitner et al, 2018, p. 1276; Bigger and Webber, 2020). But in Shah's words, and contradicting critical assertions like these, the 100RC program closed because it wasn't neoliberal enough. That is, 100RC initiatives could *not* be shoehorned into the highly technical program monitoring practices that Shah, with a background in the metrics-heavy fields of health economics and international development, needed to see to continue Rockefeller Foundation support for 100RC operations.

The tortured road of 100RC thus calls into question how we understand contemporary urban environmental politics and produce geographic thought that guides our analyses of these politics. In this paper, we ask three interrelated questions: First, what elements of resilience programming exceeded neoliberal program monitoring techniques? Second, what does this excess tell us about the politics of resilience? And third, how does this excess complicate conventional styles of geographic critique—both of resilience and environmental politics in the Anthropocene more broadly?

² This chapter has been previously published as a co-authored journal article (with Kevin Grove and Allain Barnett as second and third authors) in *The Geographical Journal*.

To answer these questions, we bring literature on the biopolitics of resilience, technopolitics, and Black geographies to bear on the case of Greater Miami resilience planning. This case offers a unique window on the politics of resilience. On the one hand, 100RC-driven resilience planning in Greater Miami and the Beaches (GMB, the 100RC umbrella term for the region) is recalibrating how racialized exclusion—and thus value—is produced throughout the metropolitan economy (Grove et al, 2020a). On the other hand, and to borrow from the program reviewer’s terminology quoted above, the 100RC planning process *also* utilized designerly techniques to fold “a gazillion things” into its resilience strategy. These twin developments, we argue, confound a straightforward reading of resilience-as-neoliberalism. Instead, Miami resilience planning featured multiple, competing forms of resilience that variously emphasized equity and expanded public service provisioning in a region where urban governance remains highly exclusionary along racial and class lines.

Though the case of Greater Miami is in some ways unique,⁴³ it enables geographers to expand the field’s conceptual and analytical limits and examine a wider range of experimental practices in knowing and governing the urban in the Anthropocene (Wakefield, 2022). In this paper, we thus situate GMB resilience initiatives within broader technopolitical struggles over *how* the urban can be rendered calculable in the Anthropocene. We do so by engaging with Michel Callon’s (1998, 2009) work on framing and overflowing.⁴⁴ These terms refer to the disputes that emerge as actors deploy technical devices in their efforts to render an issue or uncertain future calculable. Paying attention to framing and overflowing thus allows us to analyze the “rendering technical” process differently from deductive strands of critical geographic thought. Where many critical geographers have used the presence of technical devices, financial interests, and market actors to deduce that resilience is neoliberalism—and thus that resilience has a clear, pre-baked set of politics—we follow these devices and the actors who deploy them to examine how efforts to “frame” resilience as a calculable problem produce spaces of contestation that allow social and climate justice activists to develop and press for alternative visions of resilient Miami.

This analytical focus on framing and overflowing offers a distinct slant on both resilience and urban environmental politics more broadly, for it treats Miami resilience as a site of productive tension between the designerly techniques of resilience planning and the Black geographies of the region’s racialized urban political economy. On the one hand, it draws attention to techniques, strategies and practices of design that, through the 100RC resilience process, attempted to introduce a distinct style of calculative reasoning into core urban problems of public service provisioning. Importantly, this style of reasoning does not seek to impose one-size fits all policy solutions to problems of social and ecological complexity. Instead, it seeks to reform the decision-making processes through which those problems are identified in the first place. In the process, designerly techniques *ontologize* difference. By this, we signal an onto-epistemological effect in which designerly practices attempt to decouple empirically observable socio-ecological inequalities from the ongoing histories of embodied struggle within and against forms of anti-Black violence that conditioned Miami’s regional political economy, and render these experiences as transparent interests that offer one partial and bounded form of knowledge on a complex urban system. When creatively synthesized with other equivalent forms of bounded knowledge, such as public surveys, development interests, or hazard and vulnerability maps, design-driven resilience can make racialized difference *useful* for re-visioning the region’s complex challenges, and developing pragmatic solutions to them.

On the other hand, these designerly techniques could not fully capture the knowledges and experiences developed through these histories. In its very efforts to frame difference as partial,

bounded interests, design-driven resilience produced overflows: spaces of contestation generated by the very framing (or design) process itself. In these spaces, we show how activists have developed and introduced alternative approaches to resilience based on the opaque Black geographies that exceed and refuse designerly efforts to ontologize and instrumentalize these geographies. Activist approaches work to counter-frame resilience in terms of the region's longstanding history of segregated local economic development and exclusionary governance.

What does this mean for how we conduct geographic critique? First, in the case of resilience, it is not enough for critique to “reveal” the underlying socio-spatial difference behind resilience proponents' claims to truth and universality. As we show, such critiques are easily swallowed by resilience through the very process of designerly synthesis, which renders critiques of resilience epistemologically equivalent to other forms of knowledge on resilience and urban life: all offer partial, bounded knowledge that can be functionally synthesized to identify novel problems and develop provisional solutions to urban complexity. Second, this case shows that deductive reasoning, characteristic of much geographic critique, struggles to account for the specific mechanisms, logics and techniques of power that multiply and synthesize difference, whose wider biopolitical effects can differ substantially from conventional critical accounts of market-oriented governance. Drawing on work in Black geographies and technopolitics, we practice a style of critique that refuses the compulsion for both designerly synthesis *and* deductive, conjectural epistemologies as the central mechanism of critique. The mode of geographic critique that we deploy traces processes of framing and overflowing, paying particular attention to the situated knowledges and experiences that exceed formal framing efforts.⁴⁵ The rationale for this form of critique is as pragmatic as it is simple. Following the activists whose work we describe here, it is through strategic intervention based on these opaque, overflowing knowledges and experiences that urban resilience and environmental politics are most likely to meet their transformative potential, and that emancipatory urban futures are most likely to be had.

We develop this argument over five sections. First, we detail the designerly roots of resilience thinking, and advance an approach toward critical engagement with resilience that is attuned to how design-driven resilience planning attempts to frame urban socio-ecological complexity, and the overflowing it generates. Second, we situate competing visions of resilience within GMB within Miami's Black geographies. Third, drawing on fifteen months of participant observation in Miami resilience planning activities, and thirty-five interviews with actors involved in Miami resilience planning, we examine how designerly techniques and practices mobilized in 100RC GMB resilience planning strove to synthesize difference in ways that made histories of racial violence, segregation, and exclusion transparent to government knowledge and intervention. Fourth, we describe how activists seized on the overflowing of 100RC resilience planning to lay claim to and transform South Florida urban futures. In the concluding section, we discuss the significance of this case for the practice of geographic critique in the Anthropocene.

Design as Limit to Conventional Geographical Critique?

To-date, dominant critical approaches to resilience have been strongly influenced by first-cut critiques of the concept (Smirnova et al, 2021). By demonstrating the links between resilience theory and neoliberal governance, these critiques helped historicize and contextualize the more problematic, universalizing claims from resilience proponents (Walker and Cooper, 2011). But at the same time, their sedimentation into “commonsensical” critical knowledge has made further critical

engagement with resilience more difficult. This is because subsequent critiques have increasingly come to rely on what Clive Barnett (2017) describes as ontological modes of reasoning: deductive, categorical analyses that hinge on identifying certain familiar forms (such as the biopolitical production of risk-bearing subjects or critiques of centralization) and then drawing conjectural lines of equivalence between these forms and neoliberal governance. From this angle, resilience is always guilty by association: a fatally compromised concept that cannot escape its formal neoliberal shackles.

The problem is not that this mode of critical reasoning is “wrong.” Many resilience initiatives do produce neoliberalizing effects (Welsh, 2014; Grove, 2014). And these effects, as with expressions of actually-existing neoliberalism (Peck and Theodore, 2019), are geo-historically variegated. The issue is that analytically equating resilience to neoliberalism can blind analysis to significant, and surprising, developments taking place on the ground under the banner of resilience. As a growing body of scholarship has shown, resilience has no internal coherence. It is instead an essentially contested concept that can be deployed in a variety of situations in diverse, sometimes contradictory ways (Anderson, 2015; Collier and Cox, 2021; Grove, 2018; Wakefield, 2020). Moreover, by confining their scope of inquiry to the deductive identification of familiar forms associated with neoliberal governance, dominant approaches offer little analytical support in identifying other epistemologies and techniques of power at work in resilience efforts.

An emerging body of second-cut critical scholarship offers a different style of critique. Rather than conjecturally suturing neoliberalism onto resilience, this work traces alternative intellectual lineages that situate resilience thinking in the geo-historical specificity of second-order cybernetics and the ongoing transformation of modern scientific reasoning around designerly sensibilities. The difference is subtle but important. As David Chandler (2014) has demonstrated, neoliberal thought is a form of *first-order* cybernetics. First-order cybernetic reasoning assumes a closed system, in which the observer is positioned outside the system (Dillon and Reid, 2009). This assumption preserves the possibility for a transcendent, universally-applicable measure of value—such as the market—to determine the optimal distribution of resources within a complex system, such as a national economy. In contrast, second-cut critical scholarship has emphasized how resilience thinking expresses a form of *second-order* cybernetics (Chandler, 2014; Grove, 2018). Here, the observer is situated *within* the complex system, and therefore no transcendental measure of value can guarantee optimal system performance. To put it in Elinor Ostrom’s (2007) influential terminology, when dealing with complex systems, there are “no panaceas.”

Second-cut critiques of resilience have increasingly focused on the constitutive influence of designerly styles of reasoning on resilience thinking (Grove, 2018; Chandler, 2018; Nelson, 2020; Wakefield et al., 2021). And for good reason. As per design studies scholar Richard Buchanan (1992: 83), design is a “liberal art of technological culture” that anticipatorily intervenes in and governs *through* indeterminate futures⁴⁶ (Grove, 2018). Design involves, in cybernetic behavioral scientist Herbert Simon’s famous formulation, “devis[ing] courses of action aimed at changing existing situations into preferred ones” (Simon, 1996: 129). Design thus does not focus on optimizing an output. Instead, it problematizes the process through which problems are posed and solutions to address the problem are identified. In Simon’s (1955) terminology, design focuses less on normatively identifying the “ideal” solution, and instead develops ways to intervene in a given state of affairs to produce sub-optimal yet “satisficing” outcomes.

Design studies scholars emphasize that design involves a distinct style of knowledge. Rather than the analytic, explanatory knowledge of the social and natural sciences, or the hermeneutics of the arts, design produces knowledge through *synthesis*: it yokes different forms of knowledge into provisional, pragmatic solutions to specific problems of complexity (Cross, 1982).⁴⁷ Approached as a distinct style of thought, designerly synthesis has strongly influenced heterodox thought in several fields. For example, field-defining work by scholars in new institutional economics (Buchanan, 1959; Ostrom, 1990, 2009), and ecology and environmental management (Holling, 1995, 2001; Gunderson and Holling, 2002; Lee, 1993) explicitly drew on designerly sensibilities to recalibrate what “science” could be in economics and ecology, and how science could be practiced in relation to complex or “wicked” problems (Rittel and Webber, 1973).

The genealogical linkages between design thinking and resilience theory have been detailed elsewhere (Grove, 2018; Nelson, 2020). However, we can briefly signal the influence of the former on the latter. Resilience theorists in ecology, for instance, mobilized Simon’s vision of complexity to create ecological understandings of the adaptive cycle (Holling, 1986) and panarchy (Holling, 2001; Gunderson and Holling, 2002). Both lay the conceptual foundations of resilience theory (Walker and Salt, 2006). To develop their understanding of adaptive management, resilience scholars drew directly on Simon’s (1955, 1997) sympathetic critique of neoclassical models of rationality. In general, Simon posits that individuals operating within complex systems possess bounded—not total—rationality, and therefore make not *optimal* but *satisficing* decisions: stepwise, adaptive searches that pragmatically meet the individual’s goals, even if results may not be optimal. Simon’s reformulation of rationality allowed resilience ecologists to reconceptualize decision-making processes such that scientists and practitioners could collaboratively develop simulation models of future systemic performance and deliberate over more or less desirable outcomes (Holling, 1978; Lee, 1993). Following the model of a Simonian decision tree, these deliberations guided policy interventions, whose effects led to further rounds of reflective model refinement and deliberation.

In this light, we can see how the Rockefeller Foundation’s concerns with 100RC reflect the designerly roots of resilience thinking. As Foundation president Rajiv Shah picked up on in his criticisms of the 100 RC program detailed above, resilience approaches strive to change how decisions are made in the face of social and environmental complexity. These approaches do not lend themselves to the kind of efficiency calculations, predicated on commensurability, total knowledge, and optimization, that Shah sought to institutionalize in the Foundation. When we consider these designerly roots of resilience thinking, the key question for analysis changes: it is not so much about deductively demonstrating *that* resilience efforts “render” difference and inequality technical. This step is, after all, implicit in the design process. Instead, the question is *how* and to what effect resilience efforts attempt to reconfigure urban decision-making processes such that difference and inequality become useful in devising pragmatic, place-based solutions to complexity.

Here, we suggest that a technopolitical approach, which pays attention to the techniques and strategies deployed in constructing resilience as a problem on which governments can act, is helpful in answering these questions (Collier and Cox, 2021). For one, it shows us that designerly elements—such as calculative devices and synthesis—are irreducible to familiar neoliberal forms, and that outcomes of their use are open-ended (e.g., Heyck, 2015; Escobar, 2018; Goh, 2021). It also allows us to understand design-driven resilience programs as highly political, provisional outcomes of framing and overflowing: that is, as political disputes opened up in response to expert efforts to convert indeterminate issues of complexity into a specified set of resilience problems (Callon, 2009). This is about more than details. By following what resists the frame—that is, the opaque knowledges

and experiences that refuse or elude the designerly synthesis process—we can develop alternative styles of geographic critique that avoid the trap of deductive reasoning and the cybernetic clutches of design. This maneuver enables critical geographic analyses of resilience—and environmental struggle more broadly—to account for political economic and ecological dynamics that resonate across neoliberal urban reforms and design-driven urban resilience planning, without analytically reducing the latter to an expression of the former. In this process, geographical critique can draw out, rather than silence, specific resilience strategies and practices that seize on the concept’s plasticity within wider struggles over alternative urban futures.

To illuminate the stakes of taking seriously these nuanced distinctions, we turn to the case of Greater Miami resilience planning. We examine the region’s histories of racial and environmental violence, how and to what effect design efforts attempted to frame these experiences as bounded knowledge, and analyze the important spaces of contestation that these framing efforts opened up.

Opaque Geographies of Racialized Resilience in Miami-Dade County

Greater Miami resilience initiatives blend conventional and surprising infrastructural and institutional reform projects. Projects range from highly publicized road-raising and pump installations in the City of Miami Beach (CoMB), affordable housing and public transportation initiatives in the City of Miami (MIA), data-sharing and visualization platforms in MIA and Miami-Dade County (MDC) local governments, and the creation of institutions to enhance community participation and oversight on local government boards, such as MDC’s Climate Change Advisory Task Force and MIA’s Climate Resilience Committee. The region’s three major local governments—MDC, MIA and CoMB—also participated in the Rockefeller Foundation’s 100 Resilient Cities program, under the moniker of “Greater Miami and the Beaches” (GMB). In consultation with Rockefeller Foundation staff and consultants from Arup,⁴⁸ a global design consultancy and strategic 100RC partner, the 100RC program created a 2017 preliminary resilience assessment and in May 2019 launched GMB’s Resilient305 resilience strategy, designed to organize resilience initiatives across the jurisdictionally fragmented region.

The Resilient305 Strategy stands out for positioning equity as a cross-cutting theme: indeed, the 59 action items in the Strategy seek to address the region’s extreme levels of income inequality and ethnic and racial segregation. The inclusion of equity is surprising on multiple fronts. First, while resilience proponents both in and outside of the 100RC program have long touted the possibilities for resilience planning to offer holistic solutions to socio-economic and environmental inequalities, very few 100RC participating cities integrated equity into their resilience strategies (Fitzgibbons and Mitchell, 2019). GMB’s outlier status is even more remarkable given how its history of anti-Black violence, segregation, and racially exclusionary governance continue to shape social and political life in the region (Connolly, 2014; Grove et al, 2020b). As architect Grey Read (2008) emphasizes, there are “multiple Miamis:” distinct social worlds of extreme luxury, wealth, and leisure exist alongside equally extreme poverty, insecurity, and abandonment. These worlds are intimately intertwined. The production of wealth through real estate development, rental housing, and high-end tourism depended on racial segregation, anti-black violence that sustained color lines, and racially exclusionary governance that established a zero-sum approach to local politics and ensured local government acted to the benefit of white, downtown development interests. This racial formation, which sustained Jim Crow era capital accumulation, regularly recalibrates in response to various

pressures such as the Civil Rights movement, race riots in the 1980s, and more recently, global financial turbulence and extreme weather events associated with climate change (Grove et al, 2020a).

The socio-spatial differences that compose “multiple Miamis” are thus products of a contextually specific racial formation that sustains capital accumulation in the metropolitan region. As we have demonstrated elsewhere (Grove et al, 2020a), these diverse experiences of racial violence, segregation, and exclusion have conditioned distinct understandings of social and environmental vulnerabilities, which feed into distinct understandings of resilience. On the one hand, propertied interests often approach resilience as a problem of *future* threats that climate change and global economic turbulence pose to continued growth in property values. This is a “centripetal” vision of resilience that attempts to *center* the meaning of resilience around a singular focus on property (and the racial privileges afforded to the propertied). Importantly, this vision of resilience tends to be shared by officials in local government, whose operations are financed through property tax revenues and are thus dependent on sustained growth in the local real estate market. Centripetal visions of resilience have also influenced the scope of 100RC resilience efforts: for instance, the 2017 100RC preliminary resilience assessment emphasized the 2008 housing crisis and its impacts on local governments as key examples of future shocks that the local economy may experience (Murley et al, 2017).

On the other hand, those who have been the targets of racialized violence, segregation and exclusion tend to approach resilience as a problem of present and future insecurities resulting from the historical and continued neglect that local government shows towards minority issues. This is a “centrifugal” vision of resilience that *disperses* the concept’s meaning across socially and spatially diverse experiences of vulnerability. This vision of resilience is held by many social and climate justice organizations, and their allies in local government, who have mobilized around resilience to draw attention to long-ignored issues such as affordable housing, public transportation, and more recent issues such as environmental gentrification. Key for our purposes, while many social and climate justice advocates have actively participated in 100RC processes, this vision of resilience has figured prominently in number of alternative resilience initiatives. These include the Miami Climate Alliance’s (MCA’s) get-out-the-vote efforts in support of the successful 2017 Miami Forever Bond; its creation of a Citizen’s Oversight Board that provides public accountability over Bond-financed resilience initiatives; local social and climate justice organizations’ 2018 Serious Games community-based emergency scenario planning activities, and the MCA’s 2020 “Housing Justice is Climate Justice” plan.

Black geographies literatures help contextualize these distinct visions of resilience from the perspective of *struggle* (McKittrick, 2007). Centrifugal visions of resilience gesture toward what Clyde Woods (2007, 2017) calls “specialized geographical knowledge,” alternative forms of knowledge grounded in the experience of recurring racial violence that cannot be fully accessed or comprehended through Western scientific methods. As Katherine McKittrick (2006) emphasizes, this contextually specific experience creates a “Black sense of place,” or alternative ways of inhabiting place in a world that seeks to categorize and keep in place Black subjects. These are forms of knowledge and subjectivity that, in the words of Stefano Harney and Fred Moten (2013, p. 50), “cut the regulatory force” of formal, institutionalized knowledge and its deployment in various governance arrangements. Where governance attempts to render all spaces and subjects transparently knowable and governable through the identification of “interests” that can be addressed through policy, Black geographies signal subject positions, forged through centuries of racial violence, whose existence threatens the possibility of governance, precisely because their

exclusion from the figure of “humanity” historically conditioned the liberal subject of interests in the first place (Hartman, 1997; Sexton, 2010; Wilderson, 2020).

From the perspective of struggle, centrifugal visions of resilience raise key questions about the ethical and political effects of design-driven resilience efforts, specifically around how design processes engage socio-spatial difference. The next section explores how the designerly techniques and practices resilience planners deployed in 100RC events attempted to frame this racially and biopolitically variegated landscape as transparent forms of bounded knowledge on Greater Miami’s complex resilience challenges, instrumentally available to designerly synthesis.

Designing Equitable Resilience?

Proponents and critics of resilience alike have recognized how resilience lacks a single, unified definition (Brand and Jax, 2007). For some advocates, this lack of clarity impedes the wider operationalization of the concept for policymakers (Meerow et al., 2016). For others, this conceptual multiplicity gives resilience transformative potential. The latter perspective featured centrally in the 100RC approach to resilience planning, which required member cities to develop their own understandings of resilience. Working with a general understanding of resilience as an urban system’s ability to withstand, recover from, and even transform in the face of short-term shocks and long-term stressors, the 100RC process asserted that each member city faced its own challenges, and brought a distinct array of knowledge, skills and capacities that reflect their own social, economic, cultural, and environmental characteristics. Reflecting the designerly ethos we discussed in Section II, resilience planning could mobilize these diverse experiences to, first, *multiply* the perspectives available to decision-makers on their region’s unique complex social and ecological challenges, and second, *synthesize* these diverse perspectives to create clearly defined problems and resilience solutions. Thus, rather than attempting to optimize city “performance” around an externally defined and universally applicable measure of “resilience,” the 100RC program instead sought to transform the *process* through which urban governance regimes defined problems of complexity and developed solutions to address them (Naef, 2022).

This designerly ethos has conditioned how formal resilience planning engages with the socio-spatial difference embodied in Miami’s Black geographies. Figure 12 depicts the resilience planning timeline that guided the design process of GMB’s resilience strategy. The first step was a September 2016 kick-off event that brought together multiple stakeholder groups. The event included over 200 participants from local government, civil society (which, importantly, included representatives from social and climate justice organizations such as the MCA), and the private sector, mixed into 25 tables of 10 participants each, with a volunteer facilitator guiding small group breakout discussions throughout the day. A mix of local government officials, community organizers, and local university faculty, including one of the authors, facilitated these breakouts, after participating in a one-morning training event led by Arup designers. Throughout the event, participants engaged in a variety of activities intended to collectively think through the city’s “resilience challenges.” In 100RC language, this means contextually specific shocks and stressors that disrupt systemic functioning and hold out the threat of catastrophic breakdown.

To put this in Callon’s (2009) terms, the challenge in these initial stages of resilience planning is one of problem-formation: how might indeterminate issues of social and ecological complexity be rendered into more determinate problems that can be addressed through resilience initiatives? One

of the key tools for structuring this reflection is Arup's City Resilience Index (CRI), depicted in Figure 13. The index breaks down resilience into four overarching dimensions: economy and society, infrastructure and ecosystems, leadership and strategy, and health and well-being. It disaggregates each "dimension" into three goals, and then further disaggregates these into qualitatively measurable "indicators." This index structured the breakout discussions: facilitators asked participants to name and collectively rank-order what they thought were major shocks and stressors. Participants then identified indicators where they thought the city's performance was relatively strong, and areas where they thought the city's performance was weak. Facilitators gave each participant three green and three red stickers, which they placed on indicators they thought were appropriate.

The language of "relative" is important because it indicates that these measurements are not absolute or quantified, but a synthesized assessment meant to provide decision-makers with an actionable, qualitative model of what local governance is and is not doing well (GMB, 2016). GMB's strengths reflect local governments' experience with disaster response and preparedness: workshop participants scored "ensures continuity of critical services" highest and gave good marks to "meeting basic needs" and "fosters long-term, integrated planning." Weaknesses, as depicted in Figure 14, partially reflect GMB's history of segregated, suburban development-driven growth and highly racialized governance. Participants scored "provides reliable communications and mobility" as the greatest weakness, reflecting the region's notorious gridlock and lack of reliable public transportation. They also recognized that the region struggled to "empowe[r] a broad range of stakeholders," "suppor[t] livelihoods and employment," "ensur[e] social stability, security and justice," and "provid[e] and enhance[e] natural and manmade [sic] assets" (Murley et al, 2017).

In designerly terms, these activities are what Richard Buchanan (1992) calls "placements." This refers to any technique that allows a designer to visualize a problem from different perspectives. Importantly, placements are unique to individual designers or design teams. By multiplying the perspectives from which designers can view particular issues—urban complexity, in this case—placements help designers and their clients synthesize these perspectives into clearly defined problems and tractable, if partial, solutions to these problems.

100RC resilience planners deployed multiple placements to expand the scope of problem-identification. Following the kickoff event, the region's CROs used data from breakout groups along with roughly 2,000 public surveys on resilience challenges, and input from experts in local government and private sector consultants, to produce a Resilience Assessment that identified six "discovery areas" (Murley et al, 2017). These are areas where, in 100RC terminology, complexity presents unique challenges and opportunities. In analytical terms, these are sites where existing governance practices and techniques might be reimagined and recalibrated. These discovery areas are thus sites of problematization, in two senses: First, in Foucauldian terms, they are sites of critical reflection on the limits of existing governmental practices, the focal point of interventions designed to introduce new styles of governance (Collier, 2009; Foucault, 2008; Wakefield, 2019b). Second, following Callon, discovery areas are outcomes of expert efforts to render the inchoate issue of resilience into a set of discrete, actionable problems.

Staying with Callon, we can see how resilience planning practices framed Greater Miami's indeterminate and opaque Black geographies as transparent, bounded interests that could be addressed through resilience initiatives. Historical experiences of negligent public service provisioning, racial segregation, and violence were gradually sifted into specific discovery areas. For

example, the resilience assessment slotted issues of affordable housing and public transportation quality and accessibility into the “Advancing + Adapting: How We Live And Move” discovery area. It folded questions of income inequality and underserved public schools into “Building Prosperity: An Economy For All,” and integrated questions of social and spatial vulnerability to hazards into “Robust Recovery: PREPlanning for POSTRecovery” [sic] (Murley et al, 2017). In effect, these framing moves rendered embodied experiences of racial violence and abandonment detailed in Section III not only *technical problems*, but *useful system inputs*: in becoming recognized and valued as part of the Greater Miami system, experts could address these problems to improve systemic performance (Grove et al, 2020a).

These discovery areas allowed resilience planners to instrumentally utilize experiences of social and environmental vulnerability—forged through decades of anti-Black violence, discrimination, and segregation—to develop novel, contextually-specific resilience solutions. Subsequent focus group workshops organized around discovery area themes convened individuals from around the region to share their experiences, interests, and goals related to specific discovery areas with resilience officials. In further consultation with 100RC consultants, GMB’s CROs synthesized these diverse knowledges into pragmatic resilience solutions: the Resilient305 Strategy’s 59 action items, arrayed across fourteen objectives and three goals. The action items, in turn, identify specific activities that can address the negative impacts of racially uneven social and environmental vulnerability on systemic functioning. These activities include maximizing opportunity zones to increase private sector investment in marginalized communities, enhancing energy efficiency to increase home affordability, and utilizing inclusive zoning and municipal finance to increase affordable housing. In other words, these agenda items seek to *accommodate the systemic effects* of historical and contemporary forms of racialized violence and exclusion.

To be clear, this planning process drew attention to longstanding, seldom addressed inequalities, which social and climate justice advocates in Miami and cities elsewhere acknowledge (Collier et al., 2016). That said, design-driven planning processes cannot account for the totality of centrifugal visions of resilience that focus on addressing historical and current inequalities. This inability comes at least partially because much of the epistemological substance behind these visions stands outside the technical, ethical, and political imperatives and epistemologies that frame centripetal resilience and its focus on future-oriented threats to property and proprieted interests.⁴⁹ Put simply, what falls outside that frame is not synthesized.

The process of framing socio-ecological complexity through design-driven resilience planning thus had the effect of framing Black geographies as one partial perspective, ontologically and epistemologically equivalent to other experiences and forms of technical and lay knowledge of social and environmental change. The challenge for resilience planners is simply to design ways of synthesizing these perspectives into actionable items that can improve system performance. Designerly techniques are thus ontogenic: they work to create a world that frames socio-spatial differences produced through decades of racialized, political struggle as ontological differences, nothing more or less than distinct, bounded understandings of the complex urban system of GMB.

However, as we suggested above, the epistemological and ethical demands that designerly thinking placed on difference—namely, that it present itself as a rational abstraction or bounded interest—did not fully encompass the forms of social and spatial difference produced through the century-long imposition of, and resistance to, racialized development in South Florida. What design did

produce was overflowings. The next section examines these overflowings and considers how they confound conventional critical geographic narratives of resilience.

Overflows and the Limits of Critique

While the 100RC Greater Miami resilience process played out between 2016-2019, South Florida social and climate justice advocacy groups developed initiatives that framed resilience in ways that explicitly focused on minority communities' everyday vulnerabilities and insecurities. These framing efforts contrasted markedly with the resilience framings that resulted from the 100RC process. A brief comparison of the MCA's "Housing Justice in the Face of Climate Change" report and the affordable housing components of the Resilient305 Strategy illustrates the differences. The MCA published its report in late 2020 following a two-year collaborative planning process between members of the MCA and the University of Miami School of Law's Environmental Justice Clinic.⁵⁰ The report is structured around thirteen demands, which include: the establishment and local government resourcing of community land trusts that give community control over land use and housing rents; the creation of inclusionary zoning and a vacancy tax to deter speculative land sales; the adoption of rent control measures to promote housing affordability, and the creation of a Tenant's Right to Counsel program that provides legal support for low-income renters facing eviction. The report also includes a call for a moratorium on opportunity zone developments in Greater Miami "until each community has provided input into a community-driven plan about their priorities and the types of development they would like to see within their neighborhoods" (MCA, 2020, p. 13)⁵¹.

Notably, the report ties Greater Miami's well-known problems with housing availability and affordability to existing regulatory regimes that privilege the property rights and land claims of real estate developers over communities. For example, the plan's authors stress that lax enforcement of existing land use and development regulations such as community benefit agreements, public notice processes, and neighborhood design standards "generally reflects a larger pattern of urban neglect and also has a marked negative impact on neighborhood health, connectedness, and resilience" (MCA, 2020, p. 12). More importantly, they situate their demands in Florida's history of racialized local economic development. Their top long-term priority is for county commissioners to declare a "housing state of emergency," a legal maneuver which would allow the county government to implement many of these measures and prevent the Florida state government from preemptively banning municipalities from using all available regulatory tools to address the housing crisis. As historian NDB Connolly (2014) demonstrates, these legal assemblages are rooted in Jim Crow-era property regimes that have enabled the enrichment of white developers and property owners through the immiseration and denial of basic rights and land title to impoverished Black residents.

Considerations of the region's history of racialized development, and its continued impact on land development and property rights struggles, do not appear in the Resilient305 Strategy, even though they were raised at 100RC planning events (Grove et al, 2020b). To be sure, some demands from the MCA report appear in the Resilient305 Strategy, such as inclusionary zoning in low-income Black communities, which in part reflects MCA participants' involvement in public 100RC planning activities. At the same time, the Resilient305 Strategy treats housing as a technical problem of decreasing housing quality and affordability. This treatment reduces wider social, environmental, and institutional conditions to a functional essence that can shape housing provision in the Greater Miami urban system. For example, the Resilient305 Strategy recommends maximizing opportunity

zones to promote private investment in low-income communities and building community wealth while promoting resilient development investments. At best, this recommendation ignores how developers have utilized these zones to enrich white-identifying downtown development interests through the displacement of low-income communities.

The differences between these plans require much more space to properly analyze. But for our purposes, they illustrate how the housing justice visions of the MCA plan and the local economic development recommendations of the Resilient305 Strategy reflect conflicting sides in a century-long struggle over racialized property development in South Florida (Taylor and Aalbers, 2022). Importantly, these sides cannot be synthesized. This is because recognizing alternative forms of property rights and communal land holdings in minority communities would directly undermine the exclusionary mechanisms of the region's dominant racial formation that sustains its real estate market. Set in relation to work on Black geographies outlined above, the MCA plan signals opaque histories of racial violence that overflow formal, design-driven resilience planning *precisely because their synthesis would "cut the regulatory force" of those planning efforts* (Harney and Moten, 2013, p. 50). Their recognition within formal resilience planning activities is unthinkable, because it would call into question the geo-historically specific racializing assemblages that condition urban governance and capital accumulation in South Florida.

Thus, the articulation of alternative visions of resilience in Miami, embodied in the MCA plan, are political, practical and ethical, because they call into question the techniques of racialization that make Greater Miami capital accumulation possible. In this sense, resilience is unescapably political, although not for the reasons conventional geographic critique might suggest. Resilience in Miami cannot simply be read as the imposition of a top-down neoliberal governance agenda that relies on privatization, marketization and responsabilization to secure urban capital accumulation in the face of environmental uncertainties. Rather, as in other contexts like New York City (Wakefield, 2020), resilience is a site of problematization: existing forms of knowledge and urban governance techniques are subjected to critical reflection and, in this case, design-informed intervention. While designerly synthesis may often produce effects that reinforce neoliberal governance agendas (Ranganathan and Bratman, 2019), these effects are contingencies of framing and overflowing processes at work in geographically specific resilience planning efforts.

In Greater Miami, resilience planning allowed community organizers to take up and reformulate their existing concerns with social and climate justice in light of growing interest in, and demand for, resilience among local government, global investment organizations, and high-profile philanthropies. Importantly, organizer visions of resilience emerged out of experiences and knowledges created through a century of violent racialized development. These visions are founded on opaque epistemologies that exist on the constitutive outside of the frame, and that cannot be addressed by designerly practices of synthesis without calling into question the racialized political and libidinal economies that sustain Greater Miami capital accumulation. Thus, the ethical and epistemological demands that design imposes on difference—namely to make itself amenable to pragmatic, functional synthesis—runs aground against opaque and incommensurable geographies of struggle.

Conclusions

As we know, the Rockefeller Foundation shuttered 100RC in July of 2019, just after GMB released its Resilient305 Strategy. Where design-driven resilience planning “worked” for Greater Miami

government officials, at least those operating within the frame of centripetal visions of resilience, it did not for Rockefeller leadership, who wanted to see more measurable impacts for their resilience investments. Nor did design-driven resilience planning necessarily work for economically and socially vulnerable communities in Greater Miami. As previously discussed, elements of their centrifugal visions of resilience that made it into the synthesis process were functionally reduced: histories and experiences of racial and environmental violence mattered, and thus factored into design techniques and practices, insofar as they could be made useful in reducing system vulnerability. Difference, insofar as it could be rendered intelligible to government knowledge, intervention, and control, was indeed ontologized. Meanwhile, the opaque, Black knowledges and experiences that design tactics could not fully access remained outside the frame.

One could easily despair at these events. But when analyzed through a technopolitical lens, the case of Miami pushes us to consider at least one other perspective. By eluding designerly efforts of synthesis, these Black geographies make up overflowings that continue to mediate ongoing political battles over what resilience in Greater Miami practically becomes. Centrifugal visions of resilience circulating among social and climate justice advocates in South Florida speak to the political plasticity of resilience: they have driven public interest in unconventional resilience initiatives, such as the Miami Forever Bond and its Citizens' Oversight Board, and are producing alternative resilience plans, such as the MCA's "Housing Justice is Climate Justice" statement. Where design-driven resilience planning sought to render social and spatial difference legible as diverse interests in the local economy, these alternative visions refuse to become fully legible to policymakers. Black geographies of Miami's history of racial violence, segregation and exclusion are ultimately irreducible to interests that can be serviced through design-driven governance innovations. These centrifugal visions of resilience directly call into question the social and psychological investments in (white) property that underwrite South Florida governance, for these visions originate not in the desire to secure continued growth in property values, but in the everyday practices and forms of knowledge bound up in surviving and resisting the recurring, racialized inequalities that structure property values in South Florida in the first place. Resilience planning has thus opened for question the field of possible issues that might be relevant for local governance in a way that is unique given the region's history of exclusionary governance. In this light, resilience marks a domain of technopolitical struggle over the possibilities for redesigning boundaries between the state, the public, and science.

What, then, are we to make of the case of design-driven resilience planning in Greater Miami as it relates to geographic critique? How might this case push us to think differently about conducting critique? For one, the case shows that it is not just design that deploys framing moves in its operations. Critical geographic thought does, too. As with design, these frames can be useful: the deductive modes of reasoning that characterize influential critical scholarship on resilience have played an important role in historicizing and contextualizing the more problematic, universalizing claims from resilience proponents. But, and as with any frame, some things exceed them. These include technologies of power, such as designerly synthesis, that influence the uneven outcomes, and broader biopolitical effects, of resilience efforts despite not being immediately recognizable as "neoliberal." They also include the confounding developments and battles that continue to take place under the banner of resilience. Drawing on work in Black geographies and technopolitics, we have introduced and applied one way to critically account for these technologies and events. It is an inductive mode of critique that pays close attention to framing *and* the opaque, historically and contextually-specific knowledges and experiences that refuse to be framed or synthesized, and work to counter-frame dominant conceptions of resilience—critical and conventional alike.⁵² To play on

Ostrom's (2007) designerly phrasing, and contra the consoling certainty afforded by deductive modes of reasoning, there are "no panaceas" in taking this analytical approach. But there are overflowings. And it is here where some of the most powerful, transformative critiques of resilience lie. We should not let them exceed us.

Conclusion

The empirical developments that I have described throughout this dissertation speak to two interlinked, and increasingly pervasive, contemporary problems: how to evaluate the climate risks that a city faces on the one hand, and how to act on these risks through investments in urban adaptation and resilience on the other. While there are many ways to evaluate climate risk and act on it at a local level, key players in financial systems have thus far played important roles in both. Over the past decade, for instance, (re)insurance companies and risk management firms have worked with city officials around the world to estimate the value of various possible resilience interventions over the medium- to long term (Collier and Cox, 2021). Over the same time period, development banks have begun to design and implement pilot climate finance mechanisms for cities with few financial resources, just as cities with access to bond markets have begun to issue bonds to help pay for initial resilience and adaptation plans (Ponder, 2021; Webber et al, 2020).

As the relationships between cities and financial markets have seemed to deepen around the need for urban resilience and adaptation, the following belief has become increasingly prevalent across activist, scholarly, and policy circles alike: that the logics and inner workings of financial markets will help determine which cities can (and cannot) adapt to climate change; where adaptive and resilient infrastructures are sited within cities, and who benefits from them. These are massive claims, with similarly vast implications for climate (in)justice. After all, they speak to how climate risk and security will be distributed across space and time, and who has the authority to make those distributional decisions in the first place.

Given the stakes, I decided to take these claims on from the highly climate vulnerable, highly unequal, and highly financialized city of Miami, Florida, where large-scale adaptation and resilience measures were already under way. I wanted to know the following: first, how were key financial actors estimating the risks that climate change poses to cities like Miami? Second, how were these estimates being translated into actions by local officials and voters? Third, and finally, what became of these actions? How, in other words, was finance-driven adaptation actually playing out in a city where, in principle, we should see the imprint of finance most clearly? I took these questions to three large-scale adaptation and resilience initiatives in Miami: the Miami Forever Bond, the Miami Forever Climate Ready Strategy, and the Resilient305 regional resilience plan. Why? Mainly because finance—understood broadly as a set of actors whose concerns, investment and evaluative practices on climate change will greatly shape the city’s future—was at play in all of them. In some measures, like the Miami Forever Bond, finance was an explicit driver. In others, finance was a chief suspect among locals trying to determine what had prompted these measures and their content.

In Miami, I found a field both changing and in the making. Local adaptation and resilience measures were key terrains where the significance of climate change for financial markets—and the significance of finance-driven adaptation for local climate outcomes—were being forged and

negotiated. In Chapter One, for instance, I showed how rating agency surveys on climate risks and past bond ratings functioned as inscriptions of resilience: two-way relations that allowed for shared understandings of what counts as urban climate vulnerability and resilience to be made, and made durable, among local financial officers and rating agencies. I also found that officials drafted many elements of the Miami Forever Climate Ready Strategy and Miami Forever Bond in order to, in their terms, “comfort” investors and secure their confidence in the city’s future.

Second, and relatedly, in the absence of pre-baked consensus on how to act on climate risk, I observed finance-driven adaptation and resilience multiply the possible sites of political contestation. Basic questions of what counted as resilient infrastructure, and how city officials were determining their greenhouse gas emissions reduction targets, became thorny political issues, wrapped up in fundamental questions of who has the authority to shape the city’s future. Because significant sums of money—and in many ways the future of Miami—were on the line in answering questions like these, activists and residents strategically engaged finance-driven adaptation measures to advance their own interests. These interests included addressing longstanding patterns of corruption and exclusive governance practices in the city, as I discuss in Chapters Two and Three. And when strategic engagement on the “inside” of a given resilience measure didn’t work, as I show in my discussion of the Resilient305 plan in Chapter Four, activists used popular interest in resilience and their own growing political capital to produce counter plans with which Miami elected officials and resilience officers must contend to this day.

Finally, what initially became of finance-driven adaptation measures were unpredictable. Bolstering activist concerns and critical accounts, for example, resilience became shorthand for creditworthiness among Miami officials. This translation helped (1) justify collapsing the Office of Resilience into Office of Capital Improvements and Public works *and* (2) direct Miami Forever dollars and Resilient305 recommendations to economy-strengthening physical infrastructure projects. But finance-driven adaptation and resilience measures also addressed existing patterns of inequality. Even as Forever Bond dollars flowed toward storm water pump and piping stations in the city’s financial district, these dollars and other scarce city resources were also channeled to the construction of affordable housing; the launch of pilot programs to prevent climate-linked displacement in low-income neighborhoods, and the development of resilience hubs that support disaster recovery and local workforce training in low-resource neighborhoods.

Accounting for urban resilience?

My approach to the study of finance-driven adaptation in Miami hopefully has some resonance for how scholars can reflect, and conduct research, on urban resilience in the future. And that approach begins by shifting the mode of reasoning used when examining urban environmental change, inclusive of the advent of resilience planning. In Chapter Four, I provide a much more comprehensive account of the mode of reasoning at work in first-cut critical scholarship on resilience. But just to briefly recap that mode of reasoning and why it matters: first-cut critiques of resilience strongly influenced dominant critical approaches to resilience in the fields of urban studies and human geography (see, e.g., Davoudi, 2017; Potter, 2020). In these scholarly works, authors have attempted to demonstrate links between resilience thinking and neoliberal modes of governance, and thus have gone on to deduce that resilience in general can be read as an expression of neoliberalism (see, e.g., MacKinnon and Derickson, 2010; Walker and Cooper, 2011; Watts, 2015). In advancing critiques like these, first-cut authors have provided important rebuffs to the

truth claims of mainstream resilience boosters. Their critiques helpfully direct scholarly attention to the ways that resilience agendas stand to individualize risk and shift responsibility to matters of collective concern from governments to markets. They also help researchers see how, as processes of individualization and marketization take place under the banner of a given resilience agenda, the least well-off stand to suffer most. But this first cut of critical scholarship has also made further critical engagement with resilience challenging—mainly because the deductive modes of reasoning at work within that scholarship can often silence, or at least push analytical attention past, the empirical developments that confound critical expectations and that speak to other political rationalities and movements at work within resilience efforts.

And it is to developments like these—the surprising victories for affordable housing and procedural justice in a bond initially intended to give “comfort” and “confidence” to investors elsewhere, the unanticipated opportunities to negotiate what counts as urban resilience, and so on—to which scholars must devote more attention going forward. Why? In part because these developments offer practical examples of how to bring about some of the changes for which critical scholarship so passionately calls and yet so routinely suggests is unlikely under the banner of resilience (see Grove, 2019, for an elaboration on this point). More importantly, because many locals and activists with whom I have worked in Miami have found the developments described throughout the dissertation important on their own terms—terms which may have little, if anything, to do with the critical diagnoses of scholars discussed above. For instance, one grassroots disaster recovery organization based in Little Haiti has used local interest in resilience to advance black radical principles of self-determination. Among other resilience measures, organization representatives have come out strongly in favor of community resilience hubs: the neighborhood-scale disaster preparedness and recovery, workforce training, and community centers that were built out of the “neoliberal” Resilient305 and 100 Resilient Cities planning processes discussed in Chapter Four. Some critical scholars of resilience have identified programs and centers like these as an expression of responsabilization: a process, often associated with patterns of neoliberalization, wherein the duty to protect oneself from future dangers is shifted from the government to the community or neighborhood scale (see, e.g., Coaffee, 2013). But in private meetings with the Mayor of Miami-Dade County, which I have attended, Little Haiti organization representatives have advocated for even more hubs, as they align with their understandings of climate justice. “The hubs aren’t just providing for us with this broken, welfarist mentality that has kept us poor for decades,” one representative told the mayor. “They’re [investments in the hubs] actually giving us the means to invest in ourselves and our communities and shape our own futures” (field notes, 22 April 2022).

The differences between this individual’s advocacy for community-level resilience programming and scholarly critiques of resilience are subtle but important, for they embed resilience in distinct political trajectories that have entirely different sets of political stakes. But if researchers follow the path advanced by first-cut critical scholarship on resilience, they are unlikely to pick up on these differences—let alone poke around local resilience efforts long enough to observe how subtle, but consequential, distinctions in local understandings of resilience emerge, circulate, collide, and, in the case of the community resilience hubs, take on durable physical forms.

“Hot” climate futures

Throughout the dissertation, I have attempted to develop a way to critically engage urban resilience that can pick up on distinctions like these. How? First, by treating urban resilience less as an

ontological condition and more as a geographically-contingent ensemble of power struggles, social relations, and technical practices that help shape and reshape urban climate futures. Second, by focusing analytical attention on the specific practices that municipal authorities deploy in their efforts to govern climate change—in this case bond ratings, transparency, and synthesis. Why? Because when researchers zoom in on specific practices of governing as they encounter a novel problem or set of problems, such as climate change and what it means to build resilience to it in cities, they can better identify and analyze instances where the meaning of these problems and what to do about them are up for grabs. Indeed, and to borrow from Michel Callon (2009), problems like how to build resilience to climate change are “hot:” the uncertainties at work within them cannot ever fully be done away with, no matter how many expert practices one throws at them. If anything, and as I have shown, expert practices throw climate uncertainties into sharp relief, generating intense disputes over what urban resilience even is in the first place, let alone what must be done to build it.

There are many more practices that stand to shape fights over urban resilience and what it practically becomes, and to which researchers should pay attention going forward. In this dissertation, I have focused on resilience finance and municipal bond markets, but the analytical approach developed here should be extended to multiple sites and scales of resilience finance and funding. Why? On the one hand, and as I indicated at the outset of this conclusion, because massive amounts of resources are rapidly being marshalled to adaptation and resilience measures *by* and *for* governing bodies at multiple scales. These measures include the development of trust funds for individuals and localities which have lost, or stand to lose, significant amounts of money due to climate change impacts that cannot be reduced through physical adaptation planning. They also include novel risk transfer mechanisms to which cities are increasingly turning to help finance disaster recovery and, in cities and towns that are unable to enter bond markets on their own, the creation of experimental, regional-level bonds to help pay for climate-resilient infrastructure.

On the other hand, other scales and sites of adaptation and resilience finance warrant scholarly attention because the activists and officials who have inspired my approach have already begun to tackle them. Take, for instance, a recent exchange on a Miami climate WhatsApp group. In early August, one member shared a link to a *Rolling Stone* article on the climate provisions within the recently passed Inflation Reduction Act, titled “The Biden Climate Bill: Will it Save Us?” In response, another individual wrote, “So overall I think the answer is clearly no, this bill is a half measure that comes nowhere near what needs to be in place for ‘us’ to be ‘saved.’” But, this individual continued, “it clearly has some potentially transformative implications in terms of the sheer amount of money laid out for various industries. I think a lot of what was initially exciting about the original bill—the environmental justice objectives—has been lost. Nevertheless, seems like there’s some ambiguity as to how this will all play out and that it may come down to how communities organize to receive and shape the funds...So now’s our chance Miami. How can we best learn about the local implications and opportunities?”

Those within the 200-plus member chat discussed possible roads forward and strategized about how and where specific buckets of federal funds could best be used locally. “Forever” may not be in the cards for the city that these individuals call home—or, for that matter, for many climate vulnerable cities beyond Miami. But these individuals continue to devise action around the ample ambiguities over who or what can shape urban climate futures. We should follow them.

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Appendix

Figure 1: Cartoon from the *Miami Herald* about local bonds (Miami Herald, 1946).

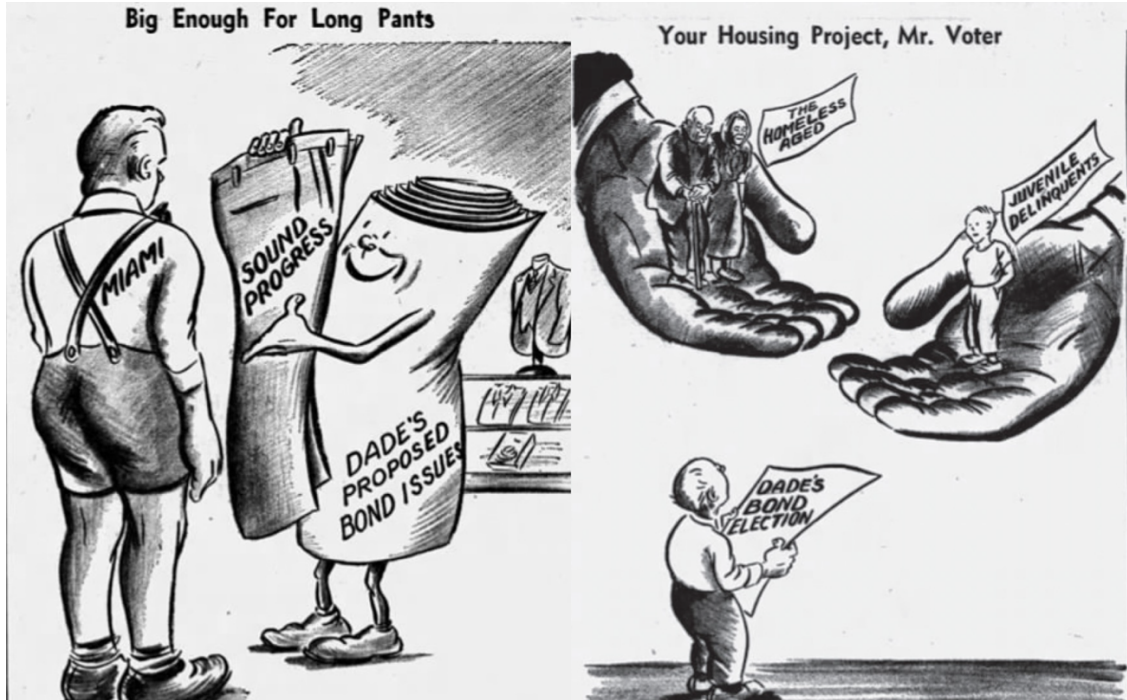


Figure 2: City of Miami Commission Districts Map (L) and poverty rates (R) (City of Miami, 2019).

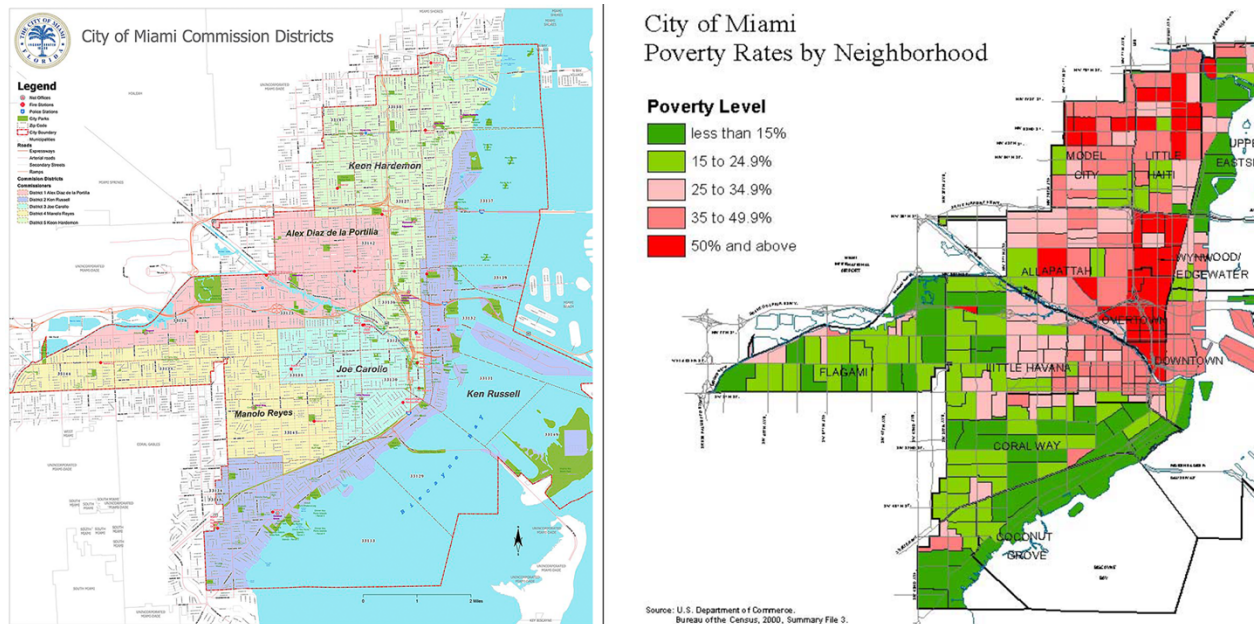


Figure 3: Miami Forever Bond promotional material circulated by the Miami Climate Alliance (Miami Climate Alliance, 2017).

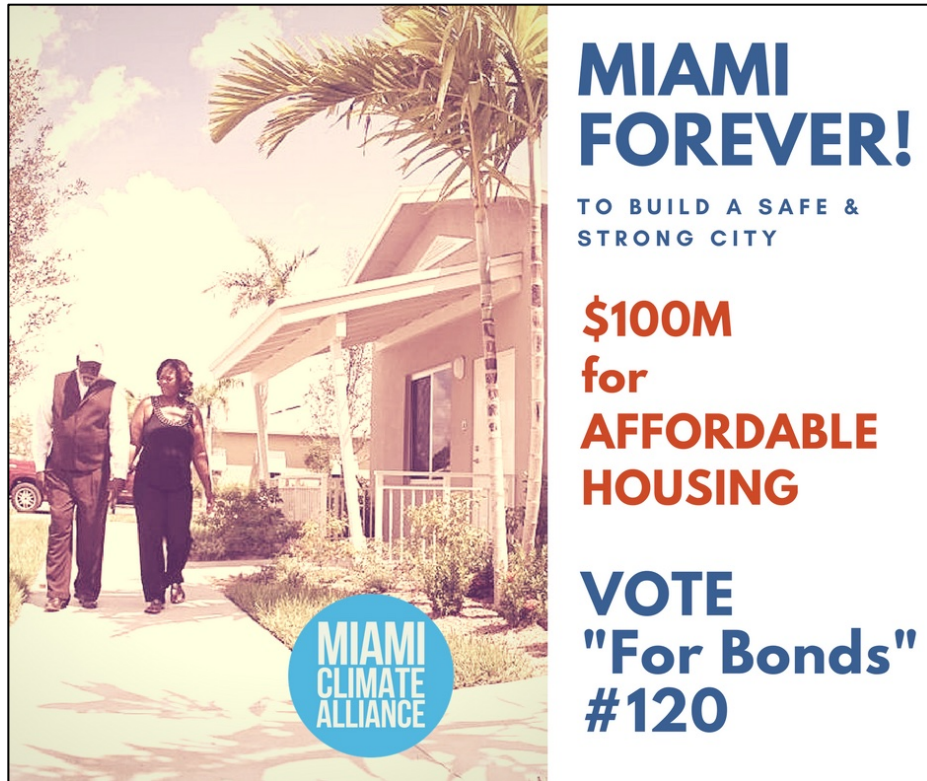


Figure 4: Screenshot of Resilience Action Forum YouTube playlist and November 2020 meeting (City of Miami, 2020b).

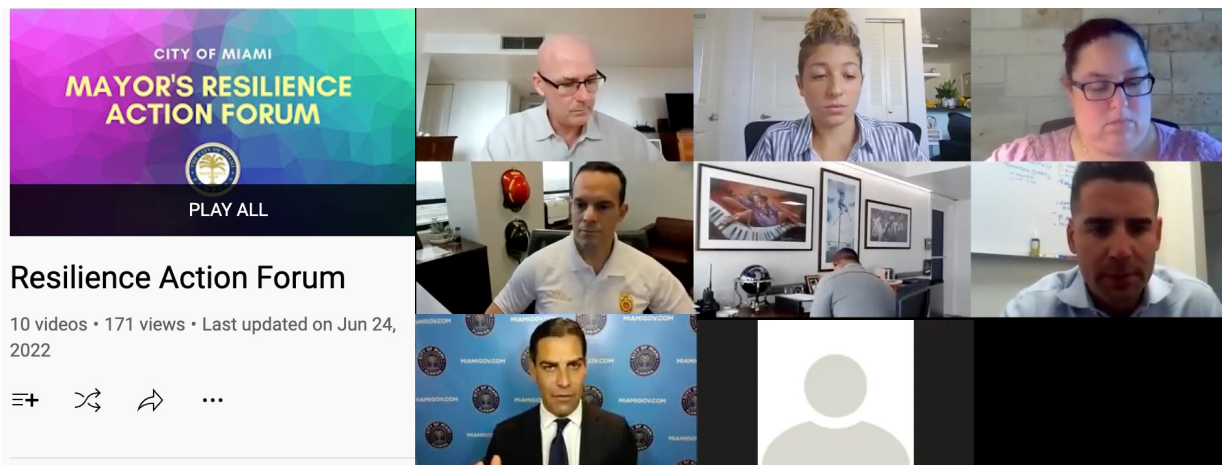


Figure 5: Screenshot from Resilience Action Forum meeting that depicts the city’s carbon emissions reductions targets (City of Miami, 2021c).

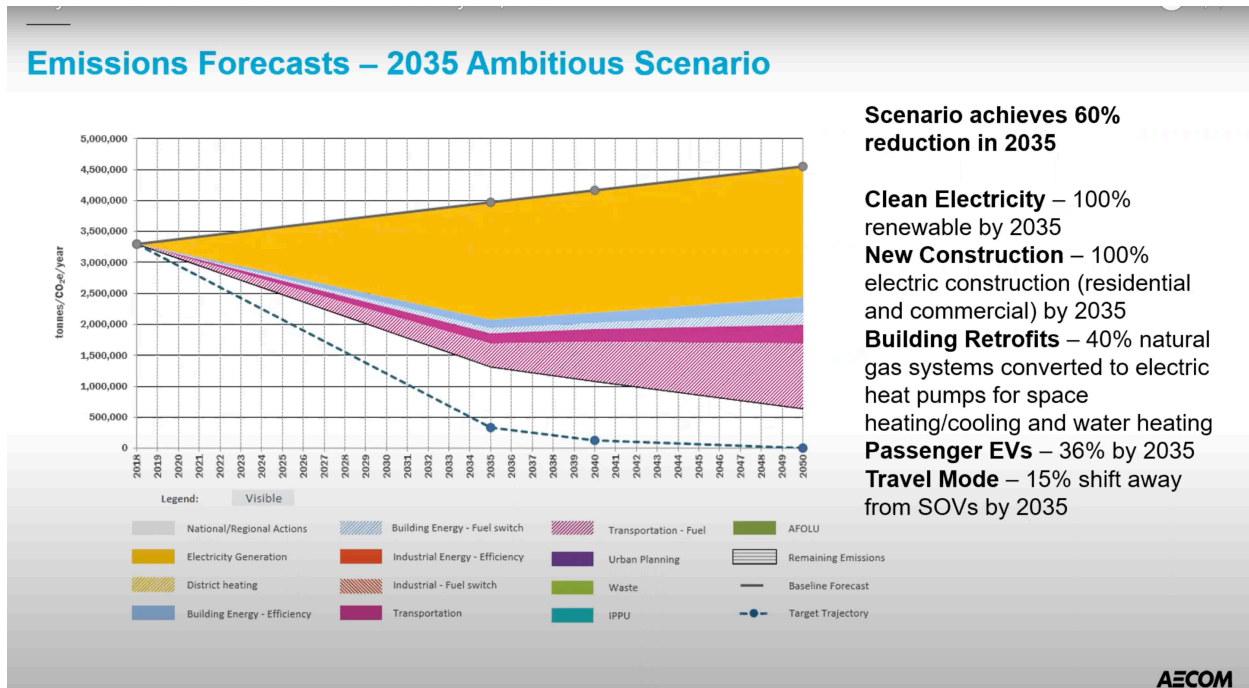


Figure 6: Parents for Future revisions of the city’s emissions strategy (Parents for Future, 2021).

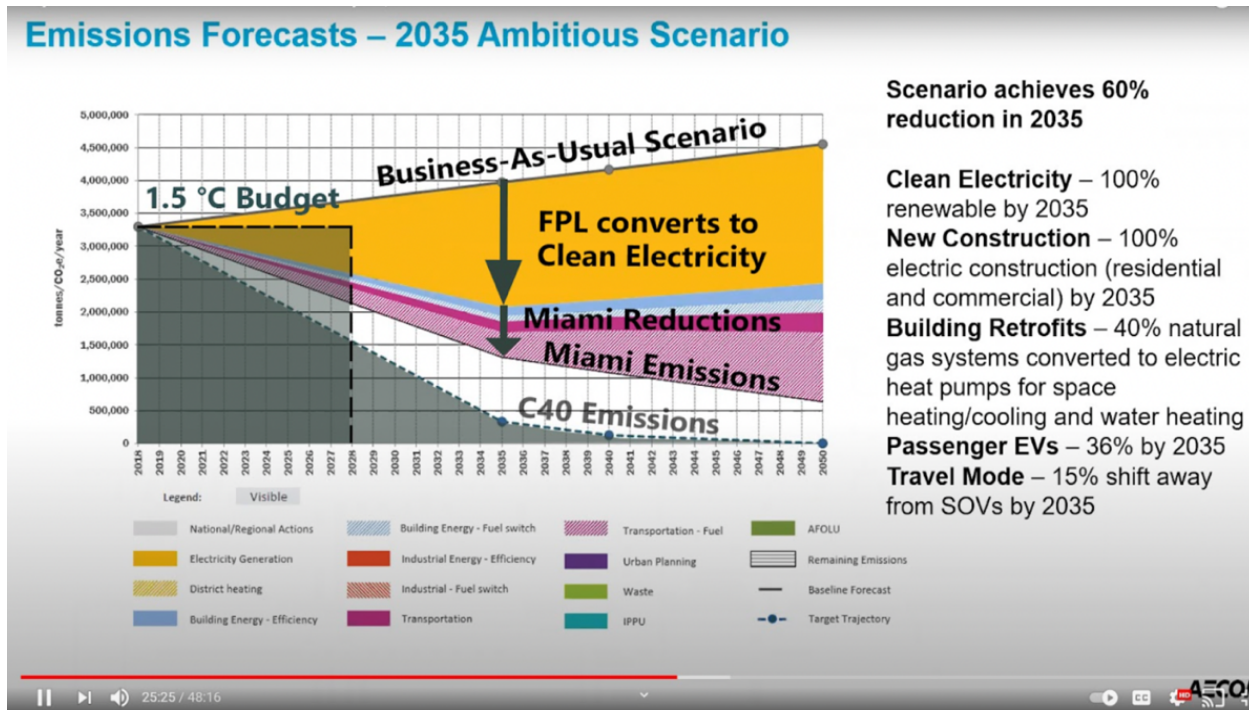


Figure 7: Screenshot of February 2021 Citizens’ Oversight Board meeting (City of Miami, 2021d).

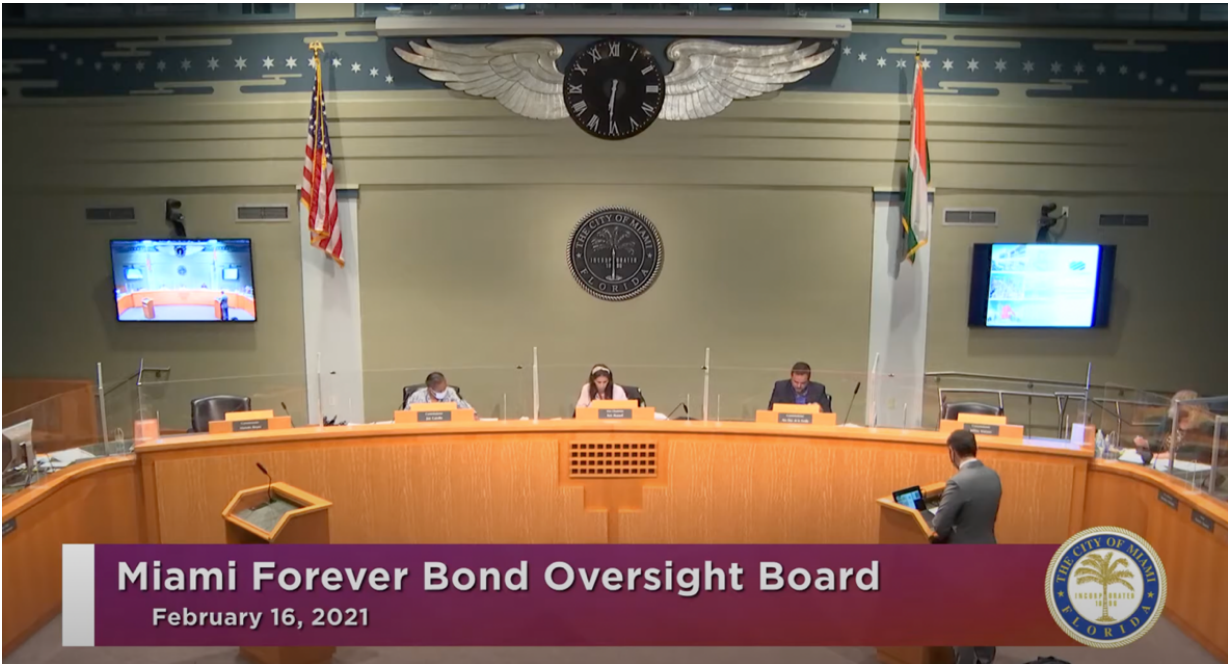


Figure 8: Screenshots of Mayor Francis Suarez’ promotion of the Citizens Oversight Board and Miami Forever Bond projects (Suarez, 2018).



Figure 9: Screenshots of presentations at Oversight Board meetings (City of Miami, 2021d).

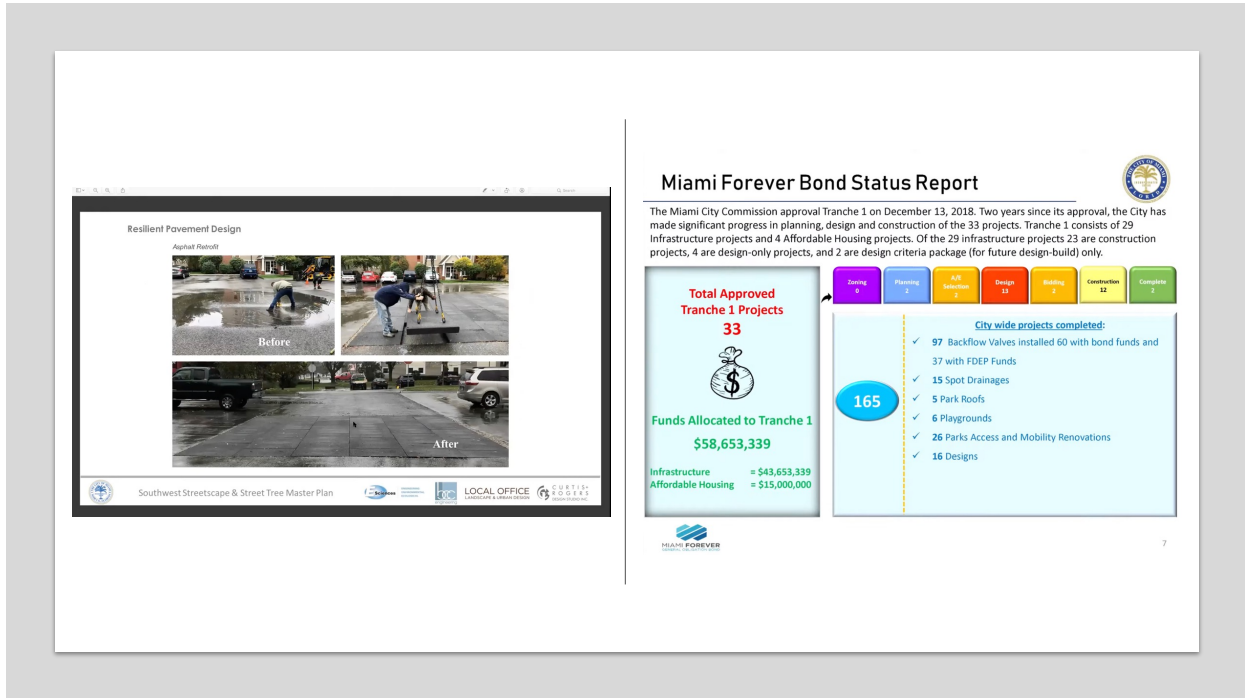


Figure 10: Screenshot of drone footage presented at a June Oversight Board meeting (WXChasing, 2022).



Figure 11: Screenshot from public meeting of the Storm Water Master Plan (City of Miami, 2021e).



Figure 12: Resilience planning timeline, “Greater Miami and the Beaches Resilience Strategy,” (Murley et al, 2017).

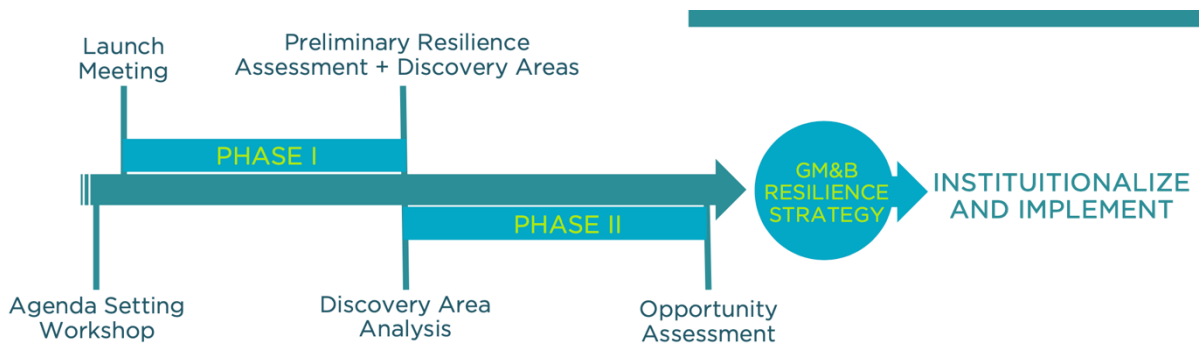
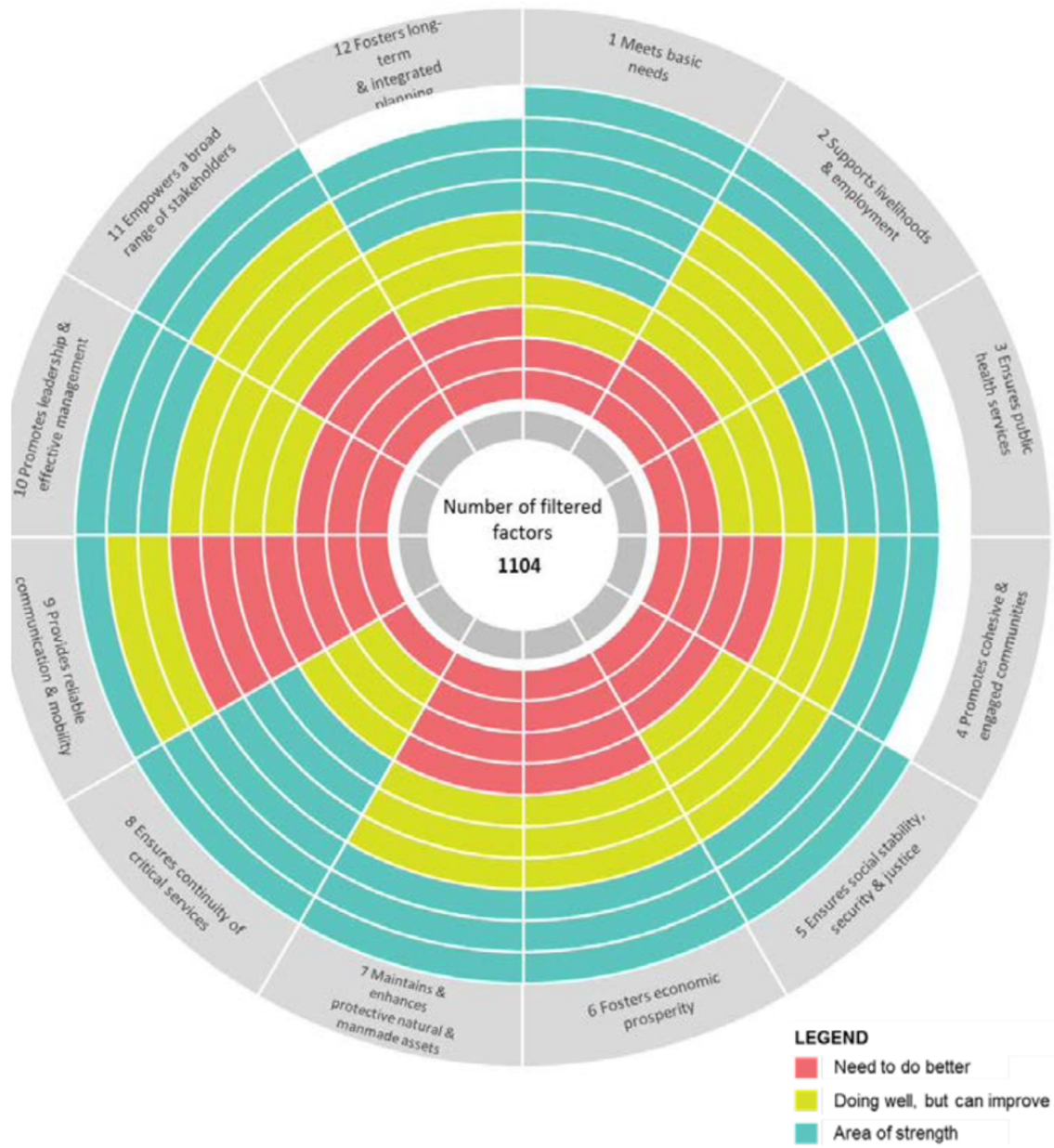


Figure 13: City Resilience Index from the Rockefeller Foundation and Arup, “City Resilience Framework” April 2014 (Murley et al, 2017).



Figure 14: Results of the 2016 Greater Miami & the Beaches City Resilience Diagnostic from “Greater Miami and the Beaches Resilience Strategy” (Murley et al, 2019).



NOTES

Introduction

¹ An 1890 census shows that fewer than 2,400 people called south Florida home.

² In 2017, the Urban Institute reported that local property tax revenues make up an average of 24% of the general revenue.

³ Historian Destin Jenkins (2021) uses this term to describe how public spending decisions in cities are directed toward projects that aid and abet white people's control of urban life.

⁴ Taylor and Aalbers (2022) identify two more possible economic impacts for those who call Miami home. First, many of Miami's middle class, which has most of its wealth tied up in homes, stand to have their savings wiped out: rising insurance premiums and drops in property values may leave hundreds of thousands with a technically worthless property that, through insurance hikes, they cannot afford to maintain and cannot sell. Second, climate-linked rises in property values in higher elevated neighborhoods may push longtime, low-income renters out of the neighborhood and into more affordable, albeit lower lying, areas, thereby compounding their vulnerability to climate change in a process that scholars have termed climate gentrification.

⁵ The city created its first climate action plan, *Mi Plan*, in 2008, and published its first regional climate action plan, the Southeast Florida Regional Compact on Climate Change, in 2010.

⁶ See Elliott (2021) for a comprehensive account of the NFIP's role in shaping development and contemporary vulnerabilities to climate change.

⁷ By 2018, the three largest bond rating agencies—Moody's Investor Services, Standard and Poor, and Fitch—announced that they would begin accounting for climate risk in their evaluations of municipal creditworthiness.

⁸ Many scholars of political ecology have taken up Harvey's spatial fix in their analyses of contemporary urban environmental governance (see, e.g., Holgersen and Malm (2015) and Long (2016) on sustainability fixes, as well as Johnson (2015) and Taylor (2020) for climate-related risk fixes in real estate and insurance).

⁹ The Marxian concept challenges the notion that cities exist primarily to drive capitalist modes of accumulation. Those who take it up stress that cities can be shaped by more than financial elites and rent seeking actors, and can become "places to congregate, create community, and collectively build new worlds" (ibid, 2019, p. 353; Harvey, 2008).

¹⁰ There is no single, overarching theory or methodology at work within the interdisciplinary field. De Goede (2005) nevertheless identifies three main concerns among those contributing to SSF scholarship: re-socializing finance (e.g., repopulating abstract, "rational" financial markets with human traders who are fallible, make decisions based on normative assumptions); emphasizing performativity; and re-politicizing finance (showing how financial markets and their forms are not given, but constructed in ways that are contingent and contestable).

¹¹ The meaning and use of "black box" vary within the field. Scholars drawing from Latour's (2003) use of the term within Actor Network Theory use black boxing to interrogate how technical systems function whereas others use it to make the underlying values, interests, and cultures at work in seemingly technical entities visible (see, e.g., Purdon (2015) for an example of the latter).

¹² While not technical practices per se, the strategies that these activists developed and deployed made use of the technical procedures of bond financing (such as voting, public oversight boards, and selection criteria), and thus seemed important to include in my efforts to open up the black box of finance-driven adaptation in Miami. As I will explain in Chapter Two, these technics-oriented strategies played a significant role in reshaping what counts as resilient infrastructure and who has a say in resilience spending decisions.

¹³ Opportunity zones are tools that allow people to invest in distressed areas for economic growth purposes while receiving tax benefits.

¹⁴ Miami officials are using bond allocations to pursue matching federal and state-level funds for affordable housing.

¹⁵ City officials have said that rehabilitation is meant to prevent some forms of climate displacement: if low-income property owners on highly elevated land can afford to fix their homes, they're less likely to sell them to developers (Flechas and Harris, 2018).

¹⁶ Synthesis refers to the ways in which designers yoke together different, situated knowledges—gained through participatory planning exercises—to create provisional solutions to complex problems.

Chapter 1

¹⁷ A 2016 NOAA study found that the City's "resilient" storm water infrastructure was directing significant amounts of human and animal fecal matter into Biscayne Bay, a 428-square mile lagoon in South Florida (Wendel, 2016).

¹⁸ Per the document: "...[W]e have been able to maintain our strong credit ratings through our proactive efforts to ... invest in our aging infrastructure and adapt to climate change by using the best available science and knowledge. We must continue to act along these lines as climate resilience will continue to be a consideration for future ratings." (City of Miami Beach, 2019).

¹⁹ By highly financialized, I mean that Greater Miami largely relies on international trade, banking and real estate investments, and debt issuance to reproduce itself.

²⁰ Greater Miami refers to cities in Miami-Dade County, which include the City of Miami and Miami Beach.

²¹ Some informant names have been anonymized.

²² It is important to note that though the general presence of commercial banks in municipal markets decreased over this time period, their private equity branches continued to invest in these markets.

²³ Resilience has multiple and competing definitions (Meerow and Newell, 2016). In the field of urban security, for example, resilience refers to infrastructure hardening to prevent significant disruptions from disaster events such as terrorist attacks (Coaffee and Rogers, 2008). In urban ecology, resilience refers to infrastructural and institutional changes designed to allow a city—taken as a coherent socio-ecological system—to absorb, withstand, and adapt to unpreventable disruptions (Brand and Jax, 2007). The latter understanding has become the basis for mainstream urban resilience efforts, particularly those promoted by the Rockefeller Foundation and the United Nations.

⁹ See Christophers (2019) for an illustrative example of how existing organizational structures shape what investors take into account regarding climate risk disclosure.

²⁴ Subsequent rating downgrades corroborate this claim: the majority followed hurricane and wildfire damage.

²⁵ For one risk expert, this intelligence derives from remarkably basic questions (personal communication, 2019, 15 June). In a survey issued to the City of Virginia Beach Office of Resilience, for instance, Moody's simply asks the City to "discuss sea level rise and other climate risks," leaving the depth of discussion up to the municipal issuer in question (City of Virginia Beach, 2016).

²⁶ One analyst suggested that this is why top-down, federal interventions like a Green New Deal would help cities maintain their creditworthiness. "State or federal governments have a lot more resources than local governments," this analyst said. "So if vulnerable areas get additional funding for infrastructure to reduce their exposure, that's certainly credit positive for local governments" (personal communication, 2021, February 3).

²⁷ See, e.g., the 2018 *New York Times* op-ed that the Mayor of Miami wrote with former UN Secretary General Ban-Ki Moon about the resilient future that the City of Miami will realize with its "Miami Forever" resilience bond.

Chapter 2

²⁸ Some notable exceptions included the passage of bond funds for segregated beaches.

²⁹ See Smiley (2017) for a detailed account of how the exchanges between the father and son prompted the mayor to make sea level rise a chief concern of his administration.

Chapter 3

³¹ In Miami, a majority of the city's five commissioners must approve of planning recommendations like these before they can break ground.

³² Here, Gilbert is referring to bond rating agencies, bond investors, (re)insurance companies, and real estate investors.

³³ For instance, the myriad details that make up many transparency-oriented procedures of the UNFCCC have led Gupta et al (2021) to conclude that they run the risk of becoming little more than ritualized performances of accountability. Moreover, scholars suggest that climate transparency efforts are based on a fundamental misread of what kind of problem climate change is. As Ameli et al (2020) argue in their work on the TFCDD, the hypothesis that full disclosure of risks will bring financial investment in line with public interests on climate change fails to capture the broader political economic rationales for investing in carbon intensive or climate risky enterprises in the first place.

³⁴ Here, depoliticization can be understood as the reduction of climate change to an issue of "techno-managerial consensus...so that nothing really has to change" (Swyngedouw, 2011, p. 264).

³⁵ The authors write that non-digital forms of demonstration, like newspaper articles and television, limit the possibility of counter demonstrations because they often exist in one, centralized form.

³⁶ The encounters and demonstrations I describe in these sections are exemplary, not exhaustive: they represent key, and common, motifs and dynamics that emerged throughout my observations. Moreover, many of these descriptions are based on virtual observation, given that much of this research took place during the COVID-19 pandemic and nearly all public meetings were shifted online.

³⁷ As I discuss in Chapter One, Miami's participation in global climate knowledge sharing networks like C40 Cities are viewed favorably by rating agencies.

³⁸ This is a familiar concern among Miamians: over the decades the City Commission has gained a reputation as a legislative branch whose members privately enrich themselves at the expense of local taxpayers.

³⁹ These high-income areas routinely flood.

⁴⁰ As I discuss elsewhere, rating agencies and investors alike turn to local newspapers in their efforts to assess Miami's investment risk and value.

⁴¹ For many interviewed, those “opposite directions” include Suarez' most recent effort to make Miami a global capital of cryptocurrency, a digital currency whose energy-intensive production generates a significant amount of carbon emissions (Shimron, 2021).

Chapter 4

⁴² The Rockefeller Foundation subsequently launched the Global Resilient Cities Network (GCRN), which sought to help 100RC participants maintain the coalitions they had forged through 100RC. Because GCRN seeks to maintain existing relations—not create new, or design-driven, resilience programming for individual cities—its operations are distinct from those we examine in the 100RC planning process and are beyond our analytical scope. The existence of the GCRN nonetheless speaks to the conceptual persistence of resilience among urban planning, environmental management, and international development experts (Wakefield et al., 2021).

⁴³ For instance, the region's economy is highly speculative; financialized, and racialized. Moreover, the region's geology makes climate change an existential threat—not simply a long-term challenge.

⁴⁴ Callon (1998) first introduced “overflowing” in reference to elements that exceed framing efforts in market-making projects. His interest in overflowings is not part of a broader effort to denounce market-making as ineffective—or to make any normative assessments of expert practice—but to stress that novel forms of political space are often created in technical exercises and practices that are intended to remove the possibility of political dispute. We follow Callon in our use of the term in relation to design practice: the goal isn't to evaluate whether synthesis and the overflows it produces are “good” or “bad,” but to underscore that synthesis opens avenues for political claims- and counterclaims making.

⁴⁵ On “tracing,” see David Collier's (2010) work on process tracing.

⁴⁶ This makes design like other styles of anticipatory action such as preparedness and preemption (see, e.g., Anderson, 2010).

⁴⁷ This form of synthesis differs from typical geographic understandings. For geographers, synthesis refers to a form of scholarly bricolage that uneasily holds different forms of knowledge to enhance our understanding of human-environment relations and *draw out* multiple forms of spatial and socio-ecological practices (Castree, 2016; Larsen and Harrington Jr., 2021). In contrast, designerly synthesis involves the *integration* of multiple perspectives to develop pragmatic solutions to wicked problems (Grove and Rickards, forthcoming).

⁴⁸ Per Arup, its role in 100RC included training and capacity-building with city officials; planning and facilitation of stakeholder engagement activities; technical and strategic advice on effective resilience actions; and project management. In Miami-Dade, consultants oversaw the resilience planning process.

⁴⁹ While there is not space to elaborate the point, we want to emphasize the epistemological as well as ethical and political dynamics at play here. As Kristie Dotson (2014) argues, epistemological innovations, such as those represented by design-based resilience planning techniques, can still reinforce epistemological oppressions that render some experiences and knowledges nonsensical and unspeakable (see also Derickson, 2022). In other words, a focus on equity in resilience planning can still reproduce the epistemological silencing of the “perspective of struggle” (McKittrick, 2007) or a “blues epistemology” (Woods, 2017).

⁵⁰ The Environmental Justice Clinic has been one of the few local academic institutions that consistently advocates on behalf of South Florida minority communities subjected to social and environmental degradation.

⁵¹ Opportunity zones are a US Department of Housing and Urban Development program that offers tax incentives for development in low-income communities. In Miami, real estate developers often utilize this program to build mega-developments that displace low-income communities and exacerbate housing affordability problems (Taylor and Aalbers, 2022).

⁵² For a much more detailed discussion on similar ethico-epistemological issues in geographic work on displacement, see Derickson (2022).