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The real estate risk fix: Residential insurance-linked securitization in the Florida metropolis

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Abstract

Insurance-linked securitization (ILS) plays an increasingly important role in the protection of valuable real estate markets from devaluation due to climate risk. This paper critically investigates ILS in the Florida context, where billions of dollars of residential hurricane wind exposure are securitized on behalf of re/insurers and institutional investors each year. Building on Harvey's seminal concept of the spatial fix, it is argued that ILS represents a real estate risk fix. ILS transforms uncertain property catastrophe exposures into a liquid asset class, and in doing so turns institutional investor funds into re/insurance capacity for capital-hungry 'peak peril' re/insurers. Securitization helps to sustain the circulation of capital through risky built environments by absorbing the catastrophe exposures of mortgages and other forms of property-linked finance. In this way, ILS provides a fix for the Harveyian spatial fix, one which momentarily offsets growing environmental barriers to property-led accumulation. The paper shows how specific modes of urbanization and property finance, waves of 'natural' catastrophe, patterns of public and private institutional intervention, transnational flows of risk capital, and the creation of new market-making devices have constituted ILS as a provisional (if extractive) fix. To this end, the paper furthers our conceptual and empirical understandings of the operation of ILS and re/insurance at specific urban conjunctures, while also highlighting key dilemmas associated with securing the real estate-finance system from climate risk.

Keywords

Insurance, real estate, securitization, Florida, climate risk

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Introduction

Climate change poses a global property catastrophe conundrum: land, real estate, and asset-linked financial products underpin contemporary capitalism (Fernandez and Aalbers, 2016), yet many high-value properties are increasingly vulnerable to devaluation by disaster (Alpine and Porter, 2018; Burgess and Rapoport, 2019; Hallegatte et al., 2013; Keenan et al., 2018; Sjöblom et al., 2018).

Insurance-linked securitization (ILS) plays an increasingly important role in protecting this propertied order of accumulation from climate risk. ILS serves as a transformer: capital drawn largely from US and European institutional investors[1] is transfigured into reinsurance, or insurance for insurers. This primarily occurs through the securitization of annual policyholder premiums collected by retail property insurers (Cummins, 2008a; Johnson, 2014).[2] ILS buyers promise to pay the issuing re/insurer after the occurrence of a predefined scenario, like a Florida hurricane that generates high insured losses. These reserves of ILS capital are premised as a means to offset the costs of re/insuring the growing loss exposure enmeshed within high-value property policies. By securing the 'resilience' of catastrophe-prone re/insurance markets, ILS perhaps serves as the single most important financial market device for reproducing the 'real estate/financial complex' (Aalbers, 2013) against growing climate risks.

By the beginning of 2018, ILS capital provided more than US$82 billion of protection (Aon Benfield, 2018). Yet despite this global promise, today upwards of half of all ILS capital remains invested in a single peril: Florida hurricanes, largely covering the hurricane wind exposure enmeshed in the state's six million residential insurance policies (Seo, 2015).

In this paper, I critically investigate how ILS functions as a real estate risk fix in the context of Florida's residential insurance market. I show how this risk fix marketizes billions of dollars of excessive Florida residential re/insurer catastrophe exposure on behalf of institutional investors each year, and in doing so plays a decisive role in enabling the reproduction of the state's risky real estate-dominated political economy – at least for now.

Fixing capital into ILS provides a new outlet for investors, attractive in so far as in so far as it is seen to be uncorrelated with the ebbs and flows of the economy, and to provide portfolio diversification. The flow of capital from ILS investors to re/insurers extends the underwriting capacity of the latter, offsetting a long-standing industry challenge to adequately capitalize firms against high-loss, low-frequency disasters, like a major Miami hurricane or Los Angeles earthquake. By absorbing excessive re/insurer exposure to residential risk, ILS has therefore been celebrated as a way to stabilize crisis-prone property catastrophe insurance markets.

This first fixing dynamic enables a second and broader fix, one which momentarily satisfies a structural addiction to re/insurance capital within the real estate/financial complex. Real estate investors, lenders, and owners typically rely on re/insurance to underwrite their short-term disaster exposure (Burgess and Rapoport, 2019), and to thus sustain accumulation practices within catastrophe-prone property markets. At the same time, property tax-reliant local governments in Florida and beyond rely on the stability and liquidity of real estate markets, and by extension re/insurers, to finance and deliver public services. In this way, ILS can be understood as a fix for the Harveyian spatial fix (Harvey, 1981), one which maintains the switching of capital in and out of the built environment, and the broader political and economic order which is constituted thereby, even as climate risks grow.

This paper examines ILS and its limits across three parts. First, I develop a conceptual framework for understanding ILS as a real estate risk fix. I begin with Johnson's (2015) path-breaking analysis of re/insurance, which mobilizes Harvey's concept of the spatial fix

to extend a vital critique of ILS, yet remains empirically and conceptually incomplete in that it does not sufficiently contend with the spatial particularity of ILS. I argue for a complementary approach to understanding the 'urban' foundation of ILS, which focuses of the infrastructural role of re/insurance within contemporary urban-financial systems, and on the provisional and fragile character of this role.

In the second part of the paper, I critically map the origins and operations of ILS as a real estate risk fix in Florida in relation to four interlocking crises: of exposure, calculation, capital, and returns. This arc is not intended to provide a linear history nor a causal analysis of ILS. Rather, I show how sustained efforts to manage the catastrophe exposure of Florida's risky residential real estate sector through re/insurance markets have prompted waves of crisis and restructuring, which have ultimately entangled South Florida cul-de-sac homes with ILS investors at significant and growing scale. I use these inflections of crisis and change to explore the ways in which specific modes of urbanization and property finance, waves of ecological catastrophe, patterns of public and private institutional intervention, flows of risk capital, and the creation of new market-making devices have converged to generate an actually existing geography of ILS, one which marketizes billions of dollars of Florida residential real estate risk each year.

In Harveyian fashion, the fragile and provisional nature of this fix is revealed in troubling patterns of crisis-to-come in the Florida residential re/insurance context. I find clear evidence of an 'underwrite to securitize' (Johnson, 2015) regime at work, according to which Florida insurers sell consumer policies expressly to channel risk for securitization. This new frontier of 'value grabbing' (Andreucci et al., 2017) deepens existing intra- and inter-urban patterns of uneven development. Moreover, it generates questions about how these risk capital flows might otherwise be directed to create less extractive forms of climate adaptation in Florida cities and beyond. At the same time, the peculiar case of ILS in Florida raises questions about how other risk fixes are forming across the real estate–finance complex. In the third and final section of the paper, I discuss these emerging tensions and open-ended questions, and reflect on what they mean for academic and political projects which seek to understand and engage with climate finance in urban contexts.

Research approach

This analysis draws upon findings from doctoral study on real estate climate risk governance in Florida, which investigated how and why Florida cities continued to urbanize in high-risk coastal settings despite growing recognition of the state's exceptional vulnerability to tropical cyclones and rising seas. Fieldwork uncovered a strong tendency among Florida elites (including elected officials, planners, and real estate interests) to assign re/insurers great responsibility for managing climate risk.

Despite general consensus around the importance of re/insurers, study participants were generally unfamiliar with the technical workings, strengths, or limits of Florida's re/insurance sector. In recognition of this knowledge gap, I conducted three lines of research which sought to critically assess how re/insurers govern real estate climate risk in Florida, the insights of which have informed the analysis presented here.

First, I examined the restructuring of the global property re/insurance sector after the unexpected market failures generated by Hurricane Andrew (1992), which is often cited as a transformational event within Florida's building, planning, and re/insurance sectors. Through a survey of re/insurance academic and grey literatures, I sought to understand the conditions that facilitated the (re-)marketization of residential wind risk in Florida through ILS. This initial analysis inspired a forensic financial analysis of the scope of ILS

market activity within Florida's residential re/insurance sector, which I constructed using annual statutory financial documents from 2015 for a subset of 28 Florida retail insurers, State of Florida financial examination reports, and re/insurance industry reports related to these retail insurers and their risk capital providers.

Second, I examined the evolution of the State of Florida re/insurance public policy landscape after Hurricane Andrew through a survey of key legislation, public institution reports, and secondary literature analysis, seeking to understand how state involvement in the market has shifted alongside other urban and environmental management policies and priorities.

Finally, I conducted 14 open-ended interviews with re/insurance subject matter experts, including senior executives at Florida residential insurers and their global industry counterparts. Interviews focused on the historic, current, and future insurability issues facing Florida's real estate sector. Interviews within the sector were undertaken alongside a larger interview programme comprising 60 participants, through which additional 'external' perspectives on re/insurance and climate risk were obtained from real estate investors and sales professionals, planners, environmental advocates, and elected officials.

Locating ILS in the city

The financialized global economic system increasingly seeks new 'socio-ecological fixes' (Castree and Christophers, 2015; Ekers and Prudham, 2015) to cope with the creative destructive potentialities of climate risk. The half-trillion dollar global property re/insurance sector plays a decisive role in securing financialized capitalism from devaluation due to climate risk by extending a crucial 'promise to pay' to high-exposure (that is, sufficiently high-risk and high-value) geographies, largely within the Global North. Through conversations with a wide range of actors across the global real estate–financial sector value chain, re/insurance was cited as perhaps the single most important mechanism for marketizing and managing climate risk within the built environment (see also Burgess and Rapoport, 2019).

Despite this important infrastructural role within the contemporary real estate–finance system, and the broader urban political economies constituted thereby (Christophers, 2011; Fernandez and Aalbers, 2016; Gotham, 2006; Rogers and Koh, 2017), re/insurance studies have largely been confined to a mainstream insurance and actuarial research tradition descended from neoclassical economics.

However, a growing subset of critical insurance studies brings social science perspectives to bear on this opaque financial market. Across this scholarship, re/insurance markets are rendered in conjunctural terms, as artefacts of intersecting calculative practices and capital market imperatives, various formations and layers of statecraft and institutional intervention, social mobilization, and contested imaginaries, among other dynamics.

For example, Squires (2003) connects the consequences of exclusionary property insurance underwriting practices to racialized forms of redlining with US housing markets, while Peacock and Girard (1997) show how race and ethnicity relate to post-disaster insurance settlements and patterns of housing recovery. Elliott's analyses of flood insurance risk mapping and rate-making practices reveal disputed 'values at risk' (2018) and fluid imaginations of state welfare (2017) in contexts in which communities must reckon with entrenched paradigms of development against amorphous future flooding scenarios. Grove traces the financialization of disaster risk management through insurance market-making in the context of postcolonial Caribbean nation-building (2012), and the associated attempts to inculcate subjects of risk (2010).

A major contribution of this emergent scholarship has been to problematize the growing role of institutional investor capital within the re/insurance sector in recent years (Johnson, 2013, 2014, 2015). Channelled through ILS and other forms of collateralization, this flood of capital is often uncritically framed as a triple win within mainstream re/insurance studies and internal industry debates, one which is seen to extend the underwriting capacity of re/insurers, provide a new and uncorrelated investment outlet for capital, and deliver the benefits of market inclusion to those hitherto trapped in a global disaster 'protection gap', respectively (for examples, see: Bermuda: Re+ILS, 2017; Hudson, 2016; Rodin, 2015).

In an important critique of this paradigm, Johnson (2015) understands the rise and role of institutional investment capital within the (re)insurance sector as a Harveyian (1981, 2001) 'catastrophic fix' for a crisis of overaccumulation within capital markets, in which investors turn to catastrophe risk-linked asset classes to offset declining investment opportunities. While this influx of capital may satisfy the needs of capital-hungry re/insurers and risk-seeking investors for now, Johnson postulates that an 'underwrite to securitize' regime may be emerging within the sector, according to which re/insurers sell policies to consumers expressly to securitize the premiums drawn from them. Such a dynamic recalls the 'originate to securitize' frenzy which ultimately produced the subprime mortgage and foreclosure-turned- Global Financial Crisis and its aftermath (Aalbers, 2009).

This alarming parallel prompts Johnson to consider whether securitization may be laying the ground for new geographies of urban-financial crisis. Johnson (2015) asks if the availability of low-cost catastrophe re/insurance capital vis-à-vis investors may prove popular with insurance regulators, real estate developers, and homeowners in the near term, while at the same time exacerbating the long-term vulnerability of disaster-prone places. The suppression of re/insurance rates could further problematic real estate investment in risky settings, enabling the continued appreciation of asset prices and deepening the dependence of communities on external risk capital to finance risk exposures. Should this flow of risk capital be interrupted, new forms of 'splintering protectionism' stand to form within cities, marked by 'a patchwork of high risk, high reward areas where insurance is available only to those with the ability to pay rising premiums, leaving the state to manage the retreat and relocation of less remunerative properties and populations' (Johnson, 2015: 2503).

While compelling, Johnson's formulation is incomplete in two interrelated ways. First, despite recognition of the 'highly particular footprint' of re/insurance securitization (Johnson, 2014: 157), such analysis does not consider the asymmetrical role of Florida residential hurricane risk in the constitution of the market, which today accounts for up to half of the basis of outstanding ILS issuance (Seo, 2015). Second, Johnson's capital market-centric analysis does not account for the formative role of specific modes of urbanization when analysing the proliferation of ILS. For Johnson, it is a crisis of overaccumulation within capital markets which is 'displaced to the built environment' (2015: 2517) – not a crisis within the built environment which makes possible the construction of the market.

The Florida empirical corrective suggests that ILS operates through a highly specific geography of housing development and finance, largely vis-à-vis insured residential properties in relatively high-wealth, high-risk coastal communities. This prompts us to critically investigate ILS beyond the spaces of capital market institutions, in relation to the political economy of urbanization in Florida.

In the context of a broader legacy of 'fix thinking' (Bok, 2018) within geographical political economy, two ideas illuminate a path toward understanding ILS as a real estate risk fix: the notion of re/insurance as infrastructure, and attentiveness to the provisionality of this infrastructure.

One feature of Harvey's fix thesis concerns the ways in which infrastructural innovations facilitate expanded forms of accumulation across increasingly broad spatial horizons, and at quickening pace (Harvey, 1981, 2001; see also Jessop, 2006). Following Harvey, property catastrophe re/insurance needs to be understood as an infrastructure for specific forms of accumulation. This demands recognition of the ways in which re/insurance operates as a vector of accumulation in its own right, but also more broadly appreciating the crucial role it plays in governing ecological–financial barriers faced by other forms of accumulation constituted through the built environment.

Within the US context, re/insurance and mortgage markets are structurally linked through federal housing policies which require all government-secured loans to be backed by insurance (Kunreuther, 1996). In this way, the exposure of the multi-trillion-dollar housing finance system to several perils – including wind and fire risk – are more or less absorbed by the former sector. Accordingly, re/insurance alienates housing-linked capital flows from the geographical contingencies of specific disasters, in so far as the latter represent sufficiently profitable underwriting domains.[3]

By extension, re/insurance also indirectly underwrites the union of disparate forms and flows of capital circulation and accumulation: for home finance and property taxation (and property tax-based public finance) on Main Street, for securitization and secondary market exchange on Wall Street, and for further rounds of financial engineering and exchange based on the former practices. In relation to climate risk, the financial architecture of contemporary US urbanism is, in many ways, structurally dependent on re/insurance.

This infrastructure is temporal as much as spatial. Re/insurers trade in annualized fixed asset exposures. As such, property market actors rely on re/insurance to quite literally buy time for sustained accumulation through the built environment. Yet the rhythms of this market do not neatly align with the horizons of fixed asset investment and property-linked finance, nor do they fully account for the medium- to long-term potentialities of growing climate risks. Take, as examples, concerns that the conventional 30-year mortgage underwritten in Miami will not be insurable for the full term of the loan (Harris, 2018), or organized political pressure to stop insurance actuaries from incorporating more aggressive potential hurricane scenarios within the rate-making process (Weinkle, 2019). These examples show how the marketization of real estate climate risk through annual insurance premiums is temporally frictional, in ways which are subject to destabilization and renegotiation.

Second, and by extension, this bargain between capital, catastrophe, and the built environment is provisional and fragile, precisely because it is constituted in relation to a wide and unruly range of material uncertainties and stakeholder interests which extend far beyond the decision-making rooms at Lloyds of London. Much like other forms of housing-linked finance which seek to 'fix' investment across spatial and temporal horizons, re/insurance markets are constructed through shifting and multi-scalar assemblages of regulatory frameworks and public policy projects, market-making devices and instruments, and networks of expertise and exchange (see, as examples, Fields, 2018; Wyly et al., 2009). Disruptions in capital markets can upend re/insurance market norms and create market failures for their policyholders (Johnson, 2015), but so too can housing affordability issues drive public policies which dislocate re/insurance business models (Medders et al., 2013; Weinkle, 2015, 2019). Paying attention to historically and geographically contingent inflections of market crisis and restructuring reveals practical limits within financial market arrangements, while also highlighting how topographies of power, interest, and influence evolve over time within market spaces, and how such shifts alter distributional outcomes across geographies.

These dual insights from geographical political economy help us to conceptualize ILS as a real estate risk fix. While this fix acts as its own vector of accumulation (following Johnson, 2015), I also propose that we understand it as a 'fix for the fix' – as an infrastructure which secures broader flows of property-linked accumulation within the context of a broader financialized economic system, and within the geographies of high-value, high-exposure real estate like those of Florida. Yet this link is inherently provisional: the entanglement of interests and expertise distributed across the realms of finance, housing and development, and climate risk science and governance opens up a wide variety of opportunities for conflict and destabilization, such that any fix is subject to new patterns of crisis and negotiation.

ILS: From Florida re/insurance crises to the risk fix

In this section, I map the ways in which ILS emerged over the course of entwined and cascading ecological, urban, and financial crises, ultimately assuming a critical role within the reproduction of Florida's re/insurance market. This story begins with Hurricane Andrew's destructive metro Miami landfall in 1992, and continues through the subsequent efforts of global re/insurers, Florida market regulators, and various other stakeholders to marketize the state's unruly 'peak peril' residential hurricane exposure. I recount this arc in four acts, which reveal how crises and their responses – of (a) exposure, (b) calculation, (c) capital, and (d) returns – have constituted ILS as a real estate risk fix vis-à-vis the Florida metropolis.

The crisis of exposure

Hurricane Andrew's metro Miami landfall generated more than US$25 billion in Florida losses, including the destruction of tens of thousands of homes and damage to hundreds of thousands more (Smith and McCarty, 1996) – at the time, the costliest 'natural' disaster in US history (Rappaport, 1993). Andrew also served as a formative crisis within the re/insurance sector and the broader domain of disaster management because 'few anticipated the true extent of damage a major storm could cause in the modern age of large coastal populations and high value properties' (McChristian, 2012).

The storm unearthed a twofold crisis of exposure, which initially appeared in specific patterns of re/insurance market crisis, and in turn revealed a vital yet tenuous link between the re/insurance sector and Florida's real estate-driven political economy.

The first dimension of this crisis related to the failure of specific Florida residential insurers and their global reinsurers to accurately account for their exposure to hurricane wind risk. Without adequate capital reserves or reinsurance, several Florida residential insurers struggled to pay claims and were declared insolvent, leaving the public to finance US$400 million in unpaid claims (Lecomte and Gahagan 1998: 107). Catastrophe reinsurance costs skyrocketed, and the remaining insurers reduced their Florida exposure and increased consumer rates to offset losses (McChristian, 2012; Weinkle, 2015). Less than one year after Andrew, consumer rates within high-risk coastal communities increased by up to 200%, and deductibles by 500% (US House Committee on Banking, Finance and Urban Affairs, 1993).

Nearly overnight, residential insurance became one of the single most expensive costs of owning a home in Florida. This re/insurance market disruption represented a direct threat to the stability of Florida's housing market, and marshalled concerns from both homeowners and elite real estate interests that this crisis could cascade into a much broader urban-

financial collapse, as home values dropped and property tax-dependent government revenues declined (US House Committee on Banking, Finance and Urban Affairs, 1993; Weinkle, 2015).

One relatively discrete financial market crisis thus revealed a larger crisis of exposure: that of the vulnerability of Florida's real estate-dominated political economy to re/insurance market conditions. This latter crisis was fundamentally rooted in how and where Florida urbanized in ecologically fragile settings, and how the catastrophic consequences of risky development practices came to be managed through insurance markets.

Florida's growth is largely concentrated in low-lying coastal regions, such that 80% of the value of the state's estimated US$4 trillion real estate market is today found in waterfront counties (Doggett, 2015). This growth largely occurred during the post-war era, underwritten by federal government subsidies in physical and financial infrastructure spending, and underpinned by a pro-growth local state which has long favoured development demands over ecological considerations (Audirac et al., 1990; Catlin, 1997; Stephenson, 1997).

By the new millennium, the primacy of the real estate sector within Florida political economy would contribute to the state's asymmetrical prominence in the subprime lending and foreclosure crisis (Aalbers, 2009), and in subsequent efforts to restore the housing–finance link through new forms of housing financialization (Fields, 2018). Real estate and construction continue to have an outsized role in Florida urban regions relative to other metropolitan areas (US Bureau of Economic Analysis, 2019).[4] Real estate transaction fees and property value-linked taxation also remain the largest source of revenue for Florida local governments in the absence of a statewide income tax (Florida Tax Watch, 2017). For these reasons, the reproduction of real estate markets was and remains the driving force of Florida's political economy.

Re/insurers became instrumental figures in the governance of catastrophe risk in Florida due to the union of modern mortgage markets and consumer insurance policies. The latter was linked to the former through government requirements that all state-backed loans, including those sold by government-sponsored enterprises on secondary markets for securitization, be covered by catastrophe insurance (Kunreuther, 1996). This created a structural interdependency between mortgage finance and property re/insurance more broadly, and between consumer residential insurance affordability and local political economic stability in Florida specifically. Absent affordable and sustained access to re/insurance capital, the Florida real estate sector would face significant disruption and devaluation – with or without a 'natural' disaster.

The post-Andrew crisis of exposure therefore represented a significant rupture, one which called into question the long-cultivated primacy and centrality of re/insurers as catastrophe underwriters. This crisis demanded a fix, one which reasserted the capacity of re/insurers to calculate and trade in 'peak peril' exposures.

The crisis of calculation

Following Andrew, a crisis of calculation emerged within the re/insurance sector. This crisis related to how to model low-probability, high-value 'tail' loss scenarios like Andrew, and how to assert this calculative power to adequately capitalize the financial risk represented by specific catastrophic perils among the sector's firms – while at the same time assuaging the market affordability and transparency demands of market regulators and their stakeholders.

Prior to Andrew, global re/insurers relied on past loss records to write property catastrophe risk (Clark, 1986). Because actuarial projections for a major hurricane loss event had

not sufficiently accounted for the rapid rate of urbanization in Florida, the sector systematically undervalued its exposure to an Andrew-sized loss (McChristian, 2012).

Catastrophe models ('cat models') emerged as a fix for this calculative crisis, because they offered a means to render infrequent loss scenarios in forward-looking and probabilistic terms (Clark, 1986; Grossi and Kunreuther, 2005; Weinkle and Pielke, 2017). Cat models objectified uncertain exposures in stochastic terms, simulating thousands of hypothetical hurricane wind loss events against individual firm portfolios and aggregate industry underwriting exposures (Clark, 1986). Models mobilized an assemblage of knowledge and practice – meteorological expertise on storm intensity, land elevation data, loss data related to specific building standards, and firm-level financial acumen – into a new actuarial synthesis: the loss exceedance probability curve (Grossi and Kunreuther, 2005: 31).

As a 'collective device of calculation' (Callon and Muniesa, 2005), cat models were instrumental in the development of ILS in two ways. First, models furnished re/insurers with a substantially more expansive understanding of property catastrophe exposure, which opened up new avenues to visualize and manage risk within and between firms. Re/insurers could explore their financial performance against a wide range of hypothetical loss scenarios, and could augment the results by adding or reducing exposure within specific market segments. In recent years, investments in 'big data' capture, including increasingly granular geophysical data, more extensive property loss records, and highly detailed building performance analyses have only enhanced this calculative power.

In so far as cat models enabled disparate property risks to be envisioned at the aggregate firm level with new clarity, they also equipped re/insurers with a means to disaggregate and trade risks among external partners more nimbly. Modelled outputs generated a currency of risk, one which enabled firm-level risk exposures to be collapsed into singularized and exchangeable market objects. Residential insurers leveraged modelled outputs to construct bespoke reinsurance programmes, through which obligations for 'tail' catastrophe loss scenarios were divided into tranches and ceded to multiple external risk capital providers in the form of ILS and other risk transfer mechanisms (Johnson, 2013). In other words, models enabled re/insurers and their intermediaries to sell 'risk' in new ways, not only in terms of an expanded offering of contractual promises-to-pay, but also as a more 'scientific' way to see and objectify catastrophe uncertainties.

Cat models thus shaped the post-Andrew re/insurance landscape in a second way, by making the industry's internal actuarial practices commensurable with the imperatives of market regulators and 'third party' investors, like fund managers. For Florida regulators concerned with the solvency and stability of the sector, modelled outputs served as an objective calculus of risk, which could be used to validate the 'actuarial fairness' of the rate-making practices, to conduct stress tests of the reinsurance programmes of individual insurers, to compare and benchmark firm performances across the sector, and to perform and validate norms of 'sound' risk management before a consumer audience that remained sceptical of the sector's pricing tactics after Andrew and subsequent storms (Weinkle, 2019; Weinkle and Pielke, 2017).

At the same time, cat models became essential devices for turning hurricane risk into a liquid, investment-grade asset class for hedge and pension fund managers without underwriting expertise. ILS product architects, including catastrophe bond brokers, leveraged the models to engineer a range of investment products with varying geographical and probabilistic exposures and institutional sponsors, optimized to harmonize underlying insurer risks with the loss appetite of investors. Institutional investors from beyond the opaque property catastrophe sector could now purchase positions in Florida hurricane risk issued by a single insurer, or could opt for products with hybrid exposure to Gulf Coast storms and

Japanese typhoons, for example, as part of their own investment optimization strategies. As a tool of commensuration, cat models helped to transform amorphous climate uncertainties into exchangeable risk objects, into 'just another asset class'.

The crisis of capital

Hurricane Andrew and subsequent disasters also unearthed a crisis of capital, which reflected structural limits to capitalizing re/insurers underwriting in regions with high spatial concentrations of 'peak peril' risk. This market mismatch was a function of the uneven distribution of insurable exposure. As one ILS market architect explained, '80% of the property is in 20% of all the locations' yet the re/insurance market was purpose-built to spread risk horizontally across geographies, and has historically lacked the institutional capacity to adequately diversify its exposure to high concentrations of insured risk (Seo, 2015).

Re/insurers sought to transcend this geographical imbalance by attracting new forms and flows of capital to the sector (Loubergé et al., 1999; Seo, 2015). Of many experiments in pricing and trading weather-linked derivatives in the 1990s, including catastrophe options offered by the Chicago Board of Trade and on the Bermuda Commodities Exchange, catastrophe bonds emerged as the first successful ILS instruments in the mid-1990s (Bouriaux and MacMinn, 2009; Cummins, 2012).

Over time, further 'alternative risk transfer' products were developed to extend and complement the use of catastrophe bonds, including 'sidecars' and industry loss warranties (Cummins, 2012). ILS funds also emerged alongside 'traditional' debt and equity reinsurers, expressly established to manage risk capital investments on behalf of institutional investors. Such funds found increasing success in marketing this growing array of ILS products as an 'alternative beta' – that is, uncorrelated with the ebbs and flows of the stock market (Jaeger et al., 2010).

A networked offshore geography emerged to facilitate ILS, with Bermuda at its centre. Bermuda's nascent reinsurance sector expanded significantly after Andrew to become the centre of the Florida hurricane risk trade (Cummins, 2008b). Bermuda facilitated a crucial form of 'place arbitrage' within the sector. Listing and trading ILS through Bermuda special-purpose offshore vehicles enabled re/insurers, ILS funds, and their investors to speculate on catastrophe risk while crafting and containing their tax liabilities and other financial risks, at minimal operational cost and with limited regulatory scrutiny (Cummins, 2008b).

The scope and expansion of this new risk capital market remained modest prior to 2005, however. Between the first catastrophe bond issuance in 1997 and 2004, the sector saw roughly US$5.2 billion of ILS issuance (Aon Benfield, 2018) – a modest figure in a sector with upwards of 100-fold this capacity outstanding at any given moment.

Yet, after Hurricane Katrina (2005) and multiple high-cost Florida hurricanes between 2004 and 2005 exhausted industry capital reserves, 'reinsurance capacity poured into the industry . . . to take advantage of the spike in price', recalled one Moody's executive (Artemis, 2015). Insured losses for Hurricane Sandy (2012) once again triggered an influx of investor capital into the sector (Seo, 2015). At the same time, post-2008 macroeconomic conditions drove a hunt for new and diverse asset classes as 'investors stumbled upon cat risk while searching for better returns in a low interest rate, post-financial crisis environment' (Artemis, 2015). Between 2006 and 2018, outstanding ILS issuance expanded from US$9.2 billion to US$36.8 billion, outpacing the broader re/insurance sector's growth by sevenfold (Aon Benfield, 2018: 5).

The crisis of returns

In so far as the rise of ILS appeared to resolve this crisis of capital, it gradually ushered in a crisis of returns as the outsized inward volume of institutional investor capital eroded profit margins within the re/insurance sector (Johnson, 2015). From 2006 to 2018, global catastrophe reinsurance rates declined by 39.6%, and US-only rates by an even greater 49.8% (Guy Carpenter, n.d.). Annual property catastrophe renewals became a 'knife fight' (Montross, 2014) as re/insurers turned to mergers, acquisitions, partnerships, and substantial investment in digital platform technologies in search of ways to extract greater returns from the sector's ever-thinning value chain (Johnson, 2015; Kent, 2016; Meckbach, 2018).

The Florida residential market represented an attractive window of opportunity in the context of this crisis of returns. As global catastrophe rates deteriorated, ILS investors and reinsurers looked to Florida to source risk, troves of which were trapped within the state's residential insurer portfolios in the aftermath of Andrew and subsequent storms. Over the post-Andrew horizon, large national insurers and their subsidiaries gradually ceded market share to Florida 'specialist' residential insurers and to the Citizens Property Insurance Corporation, the latter a state-run 'residual' insurer required by law to sell residential policies deemed too risky by privately operated insurers (Fitch Ratings, 2016; Medders et al., 2013). The portfolios of these public and private Florida specialist firms contained exceptionally concentrated hurricane catastrophe exposures, which had proven difficult to marketize under past reinsurance market conditions (Medders et al., 2013).

Reinsurers and ILS investors turned to Florida specialists to originate 'raw' risks.[5] Gaining greater control over the full spectrum of the reinsurance value chain, from retail underwriting through to securitization, became essential for securing industry returns. Florida hurricane risk provided a tried and true basis for growing the volume of ILS activity – and thus realizing opportunities to capture revenue from various risk transfer services, ranging from brokerage commissions to risk modelling fees.

Forensic analysis of the reinsurance purchases of 28 Florida specialist insurers[6] reveals how this institutional pathway became central to the securitization of real estate climate risk. I find that the 28 specialists, including Citizens and 27 private firms, collectively spent US$2.95 billion, or 50 cents of every policyholder premium dollar earned, on reinsurance coverage in 2015 alone. This annual premium was collected against roughly 2.9 million residential policies, equal to 48% of the total policies outstanding statewide at the end of 2015, with a total insured value of US$931.8 billion. While the underwriting patterns of the 28 firms varied in size and scope, they averaged roughly US$209.2 million in annual direct premium written, of which 94.3% was drawn from Florida and 78.7% covered residential policies.

Florida specialist reinsurance purchases were secured through an expansive global network of 164 distinct reinsurance institutions registered in 36 insurance jurisdictions (e.g. Bermuda, Switzerland, New York), woven through 1078 observed specialist-reinsurer relationships.[7] No less than US$529.6 million of this policyholder premium was sent to ILS institutions, where it was securitized for catastrophe bonds or otherwise collateralized through 'off book' capital market instruments like sidecars. This projection doubtless undercounts the full extent to which premiums went to ILS markets.[8] Yet this sum alone was sufficient to purchase an estimated US$8–10 billion of coverage – equal to roughly one-third of the estimated total outstanding ILS issuance of US$26.0 billion in 2015.[9]

The link between Florida specialist residential risk and institutional capital was orchestrated through extensive public and private institutional interventions. The State of Florida

played a decisive role by channelling large volumes of residential insured risk to global reinsurers, including ILS investors, through several direct and indirect measures. This role appeared directly in the form of reinsurance placements made on behalf of Citizens beginning in 2011, which included record-setting ILS issuances through its Bermuda-registered Everglades Re subsidiary, and later through reinsurance placements made on behalf of the state-operated Hurricane Catastrophe Fund.

The State of Florida also indirectly channelled residential risk to capital markets by transferring hundreds of billions of dollars of residential property exposure from Citizens to the 27 private specialist firms between 2011 and 2015, through a legislatively mandated programme known as 'depopulation'. Private insurers were invited to select policies from Citizens, in exchange for public subsidies. Over this five-year window, the net insured exposure of Citizens was reduced by US$320 billion and 1.2 million policies, largely driven by depopulation (Gilway, 2015). The effectiveness of depopulation was in part contingent on global catastrophe reinsurance market conditions, which enabled the private specialists to assume large volumes of risk from Citizens, and in turn cede it to external partners, while also maintaining profit and solvency targets (McCarty, 2015).

More recently, the State of Florida adopted a further role as a direct ILS investor. Between 2017 and 2019, the State Board of Administration allocated no less than US $765 million to five ILS funds using state retirement fund proceeds (Artemis, 2019a). This has left the State of Florida as a significant issuer, investor, regulator, and backstop of the re/insurance institutions and investors active in the Florida hurricane risk trade.

Private re/insurance institutional action played a critical role in consolidating the link between Florida's residential insurance sector and capital markets, with ILS investors and global reinsurers directly informing the underwriting and risk transfer activities of several specialists. Public records and media statements reveal that at least 15 of the 27 private specialists were purposely established or substantially restructured in order to assume risk from Citizens, for example.

Extensive networks of expert leadership and industry-insider ownership patterns enabled many specialists to leverage their access to Florida risk on behalf of risk capital markets. At least three specialist start-ups included former Citizens senior figures on their leadership boards. Moreover, dozens of individuals with prior experience in the reinsurance sector, and Bermuda-based ILS funds in particular, comprised the executive and board membership of several specialists. For example, senior executives at one specialist insurer collectively held prior positions at eight reinsurers, including one who served as chief underwriting officer at Aeolus Capital, one of the oldest Bermuda-based ILS funds. Further, no fewer than six private specialists were partially owned or received significant investment from reinsurers and ILS funds. In the case of one specialist, two global reinsurers together maintained a 56.2% interest in the firm, while a third major reinsurer provided the initial debt investment to seed operations.

The business activities of multiple specialists evolved to incorporate a new function as a 'fronting' agent, or risk wholesaler, for ILS funds and reinsurers. One start-up specialist exemplified this function by solely assuming highly risky South Florida 'wind only' policies during the Citizens depopulation process, and in turn ceding every premium dollar collected from policyholders to reinsurers in exchange for commissions. Other specialists used similar arrangements, including wholly owned ILS vehicles, to directly channel policyholder premium to investors in order to capture lucrative fees.

The sustained surge in investor interest in Florida residential risk, and the growth of fronting practices in particular, provides clear evidence of an 'underwrite to securitize' regime at work in the contemporary re/insurance sector (Johnson, 2015). Increasingly

large shares of Florida policyholder premiums flow not to traditional insurers and their reinsurers, but directly to offshore special-purpose entities for securitization and sale to institutional investors. While market proponents may argue that this shift further helps to capitalize Florida's residential re/insurers and externalizes the exceptional exposure baked into the state's catastrophe-prone property market, so too does it represent a bald effort to profit from the structural vulnerability of Florida residential policyholders.

The four inflections of crisis and response rendered here – of exposure, calculation, capital, and returns – show how this risk fix was orchestrated over time, with re/insurers successively pioneering profitable horizons in response to the challenges generated by earlier marketization strategies. Interplays between re/insurance institutional transformations, demands from institutional investors and state regulators, and material patterns of urbanization have come together through trial and error to form the current juncture, with ILS front and centre as the decisive financial mechanism for marketizing Florida's unruly real estate exposure. Far from simply reproducing the pre-Andrew status quo, the proliferation of ILS has actively expanded the institutional capacities and imaginative horizons for property risk calculation and accumulation in Florida cities and beyond (Rodin, 2015; Taylor, in press).

Discussion

In this paper I have critically investigated the emergence of ILS as a real estate risk fix vis-à-vis the Florida metropolis. By way of concluding discussion, I tend to two sets of questions: First, how does this case contribute to larger debates in geographical political economy, and to the study of real estate, finance, and climate risk governance specifically? Second, what does this specific fix portend for patterns of property protection and precarity in Florida cities? How might these particular insights inform further investigation and intervention at the urban intersections between climate risk and finance more broadly?

A fix for the spatial fix

While this paper has purposefully focused on the task of situating ILS within its unique historical geographical juncture, I propose that ILS needs to also be understood as more than yet another instance of financialization, or simply a new frontier for Harveyian 'fixing' (Bok, 2018; Johnson, 2015). Instead, I see ILS as a fix for the Harveyian spatial fix, as an expansive assemblage of properties, institutions and regulations, capital flows, and embodied expertise which work in concert to secure specific geographical circuits of property-led accumulation. Uncertain climate risks are transfigured into semi-liquid value, thereby enabling institutional investment capital to stand in as a reserve of property protection. For the time being, such reserves appear sufficient to maintain broad market confidence in re/insurance as the primary device for de-risking the real estate–finance system.

Crucially, the points of tangency between ILS and the broader real estate-finance complex remain geographically distinct. The footprints of properties enrolled in ILS are confined to regions with sufficiently valuable and well-defined catastrophe exposure to warrant interest from re/insurers and their investors. Within this territorial frame, the scope of properties enrolled in securitization is further refined by asset type and financing strategy, with mortgaged residential properties comprising a great share of the Florida basis of ILS. Beyond the horizon of this fix are (non-)market devices which protect Florida renters, for example. Should this sorting mechanism persist, we should expect already existing patterns

of 'splintering protectionism' (Johnson, 2015) to deepen within vulnerable communities, with 'protection gaps' growing between homeowners and renters.

The ILS case raises the question about what other 'fixes' may be emerging to govern the unruly potentialities of real estate climate risk within financial institutions and at-risk places. Although re/insurance is cited as a key driving force of real estate climate risk governance within the spaces of institutional real estate finance (i.e. among asset managers and investors), other techniques are emerging to govern the exposure of asset managers and investors (Burgess and Rapoport, 2019; Taylor, in press). More work is needed to assess how such techniques are being deployed across the broader real estate–finance system, and how they complement or counter the calculative logics and interests embedded within re/insurance-based risk governance strategies.

Moreover, asset exposures and risk governance regimes widely vary across urban geographies. The Florida land regime's unique dependence on hurricane re/insurance is a function of how local political and economic structures evolved in response to specific geophysical vulnerabilities and particular entanglements with the real estate–finance system. Before ILS emerged as a central feature of Florida's real estate risk fix, a series of institutional and landscape interventions converged to produce the material basis for this re/insurance-reliant regime. Further studies might map the ways in which broader transnational real estate–finance structures interface with distinctive property regimes and local geographies of risk governance to produce other fixing formations, which operate beyond re/insurance securitization.

Storm clouds on the horizon

Finally, I wish to reflect on the provisional and fragile character of this real estate risk fix, and how this opens up avenues for critique and praxis. For Harvey (2001), the spatial fix leads to new formations of crisis. As capital abandons one domain in favour of higher returns (i.e. investment in the 'productive' economy in favour of the built environment, or the reverse), it produces disruptions with significant political economic consequences. Following this approach, one can identify three open-ended tensions which manifest in the Florida case, and which suggest arenas for alternative ideation.

The first relates to the tension between the consumer affordability of insurance and the profitability of risk securitization. Affordability concerns have long served as the impetus for public policy interventions in Florida's residential re/insurance sector. These include concerns that insurance unaffordability could lead to housing abandonment or displacement (mortgagors without insurance are in default of their loan), to asset devaluation and destroyed equity (as home prices are adjusted downward to account for the higher cost of ownership), or to shifting patterns of ownership and housing opportunity (as community demographics transform from residents who rely on mortgages to access housing, to those wealthy enough to buy with cash and self-insure). At the same time, the Florida case has also revealed stark patterns of 'underwriting to securitize', according to which residential hurricane risk is sorted and sourced expressly to feed investor demand for ILS (Johnson, 2015). Brought together, these observations speak to the ways in which insurance can become a vector of housing precarity, rather than protection. This tension suggests that a careful, if elusive bargain between affordability and profitability is crucial to the stability of the present-day re/insurance-led risk management regime in Florida and beyond. More research is urgently needed to understand how insurance contributes to housing vulnerability in places like Miami, where racialized housing inequities and unequal exposures to climate risk are already transforming low-income communities of colour (Green, 2019).

Second, there is a striking contradiction between Florida public policymaker desires for a property catastrophe finance system which is reliable over the long term, and their addiction to re/insurance to underwrite problematic growth patterns for short-term political and economic gain. At surface view, the sustained growth of ILS issuance appears to validate the pro-market thesis that risk capital enhances the resilience of specific re/insurance sectors. Yet when looking at the market from the vantage of Florida's booming property market, the current arrangement also defers risk management responsibilities to external capital providers, and by extension deepens the long-term exposure of the state's real estate-dominated political economy to risk capital market disruptions. In the event that multiple years of untenable global re/insurer losses trigger the retreat of ILS capital, as Moody's recently signalled as a possibility (Artemis, 2019b), how would Florida re/insurers procure affordable protection on behalf of policyholders? Should coverage become unaffordable, or outright unavailable through the private re/insurance system, what happens to places which disproportionately rely on property markets to generate employment and create public and private wealth, as in Miami? Sustaining near-term growth also underlines a future financial conundrum: faced with the inevitability of retreat, as many coastal communities are likely to find themselves in the face of rising seas, who will pay to write off Florida's multi-trillion dollar coastal property market, and what, following Elliott (2017) and Ranganathan and Bratman (2019), thus becomes of our collective capacity to fund more just adaptation pathways?

Third, the Florida case points to the need for transformative rather than extractive practices of climate adaptation finance. Billions of dollars of policyholder premiums flow one way from Florida policyholders to re/insurers annually, feeding an inherently uneven set of relationships between sectors (housing and finance), between market hinterlands (like suburban Florida) and familiar urban command and control nodes (London, New York, Zürich), and between the use values and exchange values of re/insurance (as a mechanism of mutual aid, as a vehicle of accumulation). London's re/insurance sector generates upwards of a fifth of 'The City's' gross value added and employs tens of thousands by pairing capital with risk from key geographies like Florida, for example (London Market Group, 2014). Yet recall that a major source of ILS investment comes from pension funds, including Florida public sector employee retirement contributions (Artemis, 2019a). Recognition of the sociality of climate finance and risk (Christophers et al., 2018) raises questions about how flows of re/insurance capital, particularly those with a domestic vintage (like Florida pension contributions), might be steered toward adaptation investment measures which transform the underlying geographical basis of risk. Such a transformative agenda might place greater emphasis on risk reduction over risk transfer by prioritizing investment in institutions and infrastructures that reduce the material exposure of communities through anti-poverty measures, retrofits, retreat, and reinvigorated growth management practices, as examples.

For now, however, workers toil on half-built high rises, which steadily encroach on Miami's sprawling waterfront. Late afternoon storm clouds gather above the Magic City skyline, the blue-green of Biscayne Bay turns to granite-grey, and the seas continue to rise.

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Notes

1. It is estimated that 50–60% of ILS investment comes through dedicated ILS funds, which operate akin to hedge funds, with money managers and pension funds representing the next largest sources (Artemis, 2012; Deloitte Center for Financial Services, 2016: 8). In terms of geographical origin, 59% of ILS investment is projected to originate from the USA, with Europe (25%), Bermuda (11%), Japan (1%), and Australia (1%) following (Deloitte Center for Financial Services, 2016: 8).
2. The term ILS is broadly used to describe risk transfer products that are collateralized by 'third party' or 'alternative' capital (e.g. direct institutional investors). While ILS is generally associated with catastrophe bonds, it can also refer to collateralized reinsurance products that closely resemble traditional reinsurance risk transfer products.
3. The scope of catastrophe re/insurance markets varies widely from region to region, largely determined by the extent to which a given peril can be profitably marketized. In the US context, for example, the peril of flood is excluded from common residential insurance policies, and is instead covered through the federal government's National Flood Insurance Program.
4. For example, real estate and construction combined to account for 20.7% of private industry GDP in US metropolitan areas in 2017, versus 27.5% in the Miami–Ft. Lauderdale–West Palm Beach metropolitan area, according to Bureau of Economic Analysis estimates.
5. Reinsurers and ILS investors cannot directly write consumer policies, and therefore rely on retail insurers (and state market regulators) to access risk.
6. This cohort of firms was selected because they represented roughly half of the Florida residential sector, and because each of the 27 private firms assumed high-risk policies from Citizens from 2011 to 2015, through depopulation.
7. Extracted from Schedule F, Part 3 of case firm financial statements. I excluded reinsurance transactions below US$10,000 in this calculation.
8. This estimate does not include premium which was ultimately securitized through retrocession, or reinsurance for reinsurers. Nor can it fully account for hybrid reinsurance partnerships between traditional reinsurers and ILS specialists, due to ambiguities in the attribution provided in insurer statutory financial statements, and due to a lack of secondary data against which to validate estimates.
9. I calculated this assuming a rate-on-line near the 2015 5.8% average recorded on the Willis Capital Markets Issuance tracker. Internal cost of capital estimates from a major Florida specialist were used to validate this estimate. The total cover can be estimated by dividing the rate-on-line by the premium ceded.

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