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Lessons from U.S. Coastal Wind Pools About Climate Finance and Politics

Donald Thomas Hornstein
University of North Carolina School of Law, dhornste@email.unc.edu

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LESSONS FROM U.S. COASTAL WIND POOLS ABOUT CLIMATE FINANCE AND POLITICS

DONALD T. HORNSTEIN*

Abstract: The financial costs of extreme weather are profound, not only in terms of the distress of those immediately affected but also in broader, more long-term macroeconomic and public budgetary effects. This Article focuses on the role that private and public insurance can play, both positively and negatively, on these effects. It also provides one of the most detailed analyses in the legal literature to date on the finances of three state residual-risk wind pools in the Gulf and Southeastern United States that have been created specifically with hurricane risks in mind.

INTRODUCTION

Insurance is the world's largest industry because it offers products that are regarded as essential to financial resilience in the face of risk.[1] But, as applied to the risk of loss from catastrophic weather, the role of the insurance industry is mixed. On the one hand, the industry participates in global climate initiatives such as the United Nations December 2015 climate conference in Paris, and offers products for weather-related risks through both traditional reinsurance markets and newer financial markets in catastrophe bonds ("cat bonds") and other types of insurance-linked securities.[2] On the

*Aubrey L. Brooks Professor of Law, University of North Carolina School of Law, and Member, Board of Directors, NC Insurance Underwriting Association ("NCIUA"). All views expressed herein are my own as a law professor, and are not intended to represent the views of the NCIUA, or even to reflect my views as a Board member. Special thanks to Shannon O'Neil for outstanding research assistance.

[1] *See* Evan Mills, *Insurance in a Climate of Change*, 309 SCI. 1040, 1040 (2005) ("As the world's largest industry, the [insurance industry] would be the third largest country if its $3.2 trillion in yearly revenues were compared with national gross domestic products . . . .").

[2] *See* GENEVA ASS'N, CLIMATE RISK STATEMENT OF THE GENEVA ASSOCIATION (2014) https://www.genevaassociation.org/media/878686/ga2014-climate-risk-statement.pdf [https://perma.cc/X6T3-NN9V]; MUNICH RE, ROAD TO PARIS: 2015—A CRUCIAL YEAR FOR CLIMATE CHANGE (2015), https://www.munichre.com/site/corporate/get/documents_E-1635640145/mr/assetpool.shared/Documents/0_Corporate%20Website/1_The%20Group/Focus/Climate%20Change/munichre-road-to-paris-2015.pdf [https://perma.cc/5B99-UDN7]; J. David Cummins & Pauline Barrieu, *Innovations in Insurance Markets: Hybrid and Securitized Risk-Transfer-Solutions, in* DIONNE'S HANDBOOK OF INSURANCE 547, 552 (2d ed. 2013) (although new issues of cat bonds dropped in 2008–

other hand, at least in the United States, the insurance industry is largely absent from most primary climate-related markets. Since 1968, the insurance industry in the United States has refused to cover flood losses.[3] And in the early 21st Century, most major insurers have fled voluntary wind coverage just as surely as they fled flood insurance fifty years ago.[4] There is a growing literature on flood insurance and, especially in the United States, on the National Flood Insurance Program that has replaced the private market.[5] But there has been much less written about wind insurance and the state-by-state residual risk programs that now dominate markets in hurricane-prone regions of the Southeastern and Gulf states. This Article seeks to help fill that gap.

I. WHY IT MATTERS: THE PERILS OF NOT GETTING THE FINANCING QUESTION RIGHT

Before pivoting to state wind programs in the United States, it is helpful to step back and contemplate the worldwide consequences of not having in place a financial plan for weather catastrophes. Consider Hurricane Ivan and the economic effects of natural disasters on developing countries generally. Ivan came ashore in September 2004 as a Category 3 hurricane in both the United States and Grenada.[6] In the United States, although it caused $22.5 billion in damages (in 2014 dollars) and registered as the sixth costliest hurricane in U.S. history, Hurricane Ivan only affected less than 0.2% of

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2009, the market "recovered quickly and 2010 was the third largest year on record with new issuance of $4.3 billion"); Giuseppe Turchetti et al., *Natural and Man-Made Disasters: Challenges & International Perspective for Insurance*, *in* INTERNATIONAL DISASTER RESPONSE LAW 685, 697 (Andrea de Guttry et al. eds., 2012).

[3] *See* Donald T. Hornstein, *The Balkanization of CAT Property Insurance: Financing and Fragmentation in Storm Risks*, 11 RUTGERS J.L. PUB. POL'Y 9, 13–14 ("'[W]ater' or 'flood' exclusions became standard in private, all-risk property insurance when the NFIP was created by the National Flood Insurance Act of 1968.").

[4] *See infra* note 76 and accompanying text (describing how, as private insurers left voluntary wind markets, the rise of quasi-public coastal policies issued by state residual risk "insurers of last resort" grew by 1517 percent between 1990 and 2012).

[5] *See* Ernest B. Abbott, *Flood Insurance and Climate Change: Rising Sea Levels Challenge the NFIP*, 26 FORDHAM ENVTL. L. REV. 10, 10 (2014); Sarah Fox, *This Is Adaptation: The Elimination of Subsidies Under the National Flood Insurance Program*, 39 COLUM. J. ENVTL. L. 205, 205 (2014); Jennifer Wriggens, *Flood Money: The Challenge of U.S. Flood Insurance Reform in a Warming World*, 119 PENN. ST. L. REV. 361, 361 (2014).

[6] *See* ERIC. S. BLAKE & ETHAN J. GIBNEY, NAT'L WEATHER SERVICE, THE DEADLIEST, COSTLIEST, AND MOST INTENSE UNITED STATES TROPICAL CYCLONES FROM 1851 TO 2010 (AND OTHER FREQUENTLY REQUESTED HURRICANE FACTS) 1, 9 (2011), http://www.nhc.noaa.gov/pdf/nws-nhc-6.pdf [https://perma.cc/Z2HD-H537]; Angela Levins, *Remembering Hurricane Ivan 10 Years Later, the Storm That Wouldn't Die*, AL.COM (Nov. 2, 2015, 4:48 PM), http://www.al.com/news/mobile/index.ssf/2014/09/remembering_hurricane_ivan_10.html [https://perma.cc/23NA-Y2YJ].

U.S. gross domestic product (GDP) and the United States was easily able to absorb nationally the acute costs that the storm imposed regionally.[7] In contrast, in Grenada, Ivan caused $900 million in damages, affecting almost 200% of Grenada's GDP, requiring the country to spend much of the next five years recovering from the direct effects of this single storm and resulting a decade later in Grenada's public-debt-to-GDP ratio of 110%, leaving the country with "limited room to engage in public investments and social spending."[8] Hurricane Ivan's effect on Grenada captures the effects, worldwide, that natural disasters can have on developing economies.[9] Thus, in 2015, U.N. member states convened in Sendai, Japan for the Third World Conference on Disaster Risk Reduction, noting that dollars spent in disaster recovery are unavailable for poverty reduction, improved education, and food security—expenditures necessary to progress toward the U.N.'s (then-proposed, now recently adopted) Sustainable Development Goals.[10]

Countries with more developed economies are also at risk of long-term financial impacts. Although there is a fairly robust debate in the macroeconomic literature about the long-term effects on GDP caused by losses due to violent weather, there are reasons to fear that cumulative expenditures on catastrophic weather, even in a highly developed country such as the United States, are far from benign.[11] In 2012, the year Superstorm Sandy hit the

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[7] *See* BLAKE & GIBNEY, *supra* note 6, at 9 tbl.3a; *Hurricane Ivan*, WORLD PUB. LIBRARY, http://www.worldlibrary.org/Article.aspx?ArticleId=0000961346&Title=hurricane%20ivan [https://perma.cc/M6RE-RWTC]. Measured in 2004 dollars, Hurricane Ivan caused an estimated $18.82 billion in damage in the United States, less than 0.2% of the U.S. GDP in 2004, which was approximately $12.27 trillion. *See* STACY R. STEWART, NAT'L HURRICANE CTR., TROPICAL CYCLONE REPORT: HURRICANE IVAN 1, 9 (2004), http://www.nhc.noaa.gov/data/tcr/AL092004_Ivan.pdf [https://perma.cc/5RYB-XA6P]; *GDP at Market Prices (Current US$)*, WORLD BANK, http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?page=2 [https://perma.cc/XBQ7-P9ZA].

[8] *See About Grenada: Economy*, OFFICIAL WEBSITE OF THE GOV'T OF GRENADA (May 7, 2013, 10:42 AM), http://www.gov.gd/economy.html [https://perma.cc/6PGS-WUKR].

[9] *See Grenada Economy 2016*, THEODORA.COM, http://www.theodora.com/wfbcurrent/grenada/grenada_economy.html [https://perma.cc/HB6K-PJH8] (citing 2016 WORLD FACT BOOK OF THE UNITED STATES CENTRAL INTELLIGENCE AGENCY).

[10] *See* UNITED NATIONS, SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION: 2015–2030, at 5–11 (2015), http://www.unisdr.org/files/43291_sendaiframeworkfordrren.pdf [https://perma.cc/7JAW-63FY]; *see also* Donald T. Hornstein, *The Insurance Industry on the Cusp of COP 21: Lessons from Flood Insurance Reform in the US and UK*, *in* FUTURE DIRECTIONS OF CONSUMER FLOOD INSURANCE IN THE UK, REFLECTIONS UPON THE CREATION OF FLOOD RE 7, 7 (Johanna Hjalmarsson ed., 2015) (stating that worldwide, the problem is getting worse as uninsured losses exceed insured losses at an increasing rate, putting pressure on public expenditures, desperately needed elsewhere, to try to help fill the gap).

[11] *Compare* Eric Strobl, *The Economic Growth Impact of Hurricanes: Evidence from US Coastal Counties* 2, 4 (IZA & Ecole Polytechnique, Discussion Paper No. 3619, 2008), http://ftp.iza.org/dp3619.pdf [https://perma.cc/8VGW-LHCP] ("Hurricane strikes do not appear to be economically important enough to be reflected in national economic growth rates."), *with* Solomon

United States, the federal government made almost $100 billion in unplanned expenditures for extreme weather events, representing that year's single largest nondefense discretionary outlay, amounting to more than total federal expenditures that year for either transportation or education.[12] Although these federal budget outlays were unusually high in 2012, there exists in the United States (a) an internal political dynamic that results in an ever-escalating rate of presidential disaster declarations, (b) added to the ability and proclivity under current congressional budget rules to provide disaster payments through emergency appropriations outside of normal budget procedures or politically-imposed budget caps,[13] (c) which occurs while there exists substantive rate suppression by which both federal flood-insurance and state wind-insurance rates are kept below actuarially-fair levels,[14] (d) that results in the moral hazard of encouraging more development in at-risk areas,[15] (e) which results in ever-escalating economic losses even

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M. Hsiang & Amir S. Jina, *The Causal Effect of Environmental Catastrophe on Long-Run Economic Growth: Evidence from 6,700 Cyclones* 1 (Nat'l Bureau of Econ. Research, Working Paper No. 20352, 2014), http://www.nber.org/papers/w20352.pdf [https://perma.cc/9ALK-2LHE] ("[W]e find robust evidence that national incomes decline, relative to their pre-disaster trend, and do not recover within twenty years. Both rich and poor countries exhibit this response . . . ."), *and* Goetz von Peter et al., *Unmitigated Disasters? New Evidence on the Macroeconomic Cost of Natural Catastrophes* (Bank for Int'l Settlements, Working Paper No. 394, 2012), http://www.bis.org/publ/work394.pdf [https://perma.cc/VHP6-K8BN] ("[M]ajor natural catastrophes have large and significant negative effects on economic activity, both on impact and over the longer run."). *See generally* Julie Borowski, *Recent Tornadoes and the Broken Window Fallacy,* FREEDOMWORKS BLOG (June 2, 2011), http://www.freedomworks.org/content/recent-tornadoes-and-broken-window-fallacy [https://perma.cc/8UZW-P68T] (explaining that suffering a natural disaster is not a boon to local economies).

[12] *See* DANIEL LASHOF & ANDY STEVENSON, NAT. RES. DEF. COUNCIL, WHO PAYS FOR CLIMATE CHANGE? U.S. TAXPAYERS OUTSPEND PRIVATE INSURERS THREE-TO-ONE TO COVER CLIMATE DISRUPTION COSTS 3 (2013), http://www.nrdc.org/globalwarming/files/taxpayer-climate-costs-IP.pdf [https://perma.cc/6AR7-YDEV] ("In 2012, the federal government spent $96 billion to clean up the disastrous effects of climate disruption.").

[13] *See* Philip O. Shapiro, Note, *A Sustainable Budget Should Endure Any Storm*, 17 N.Y.U. J. LEGIS. & PUB. POL'Y 595, 607–17, 610 n.80 (2014).

[14] *See* Omri Ben-Shahar & Kyle D. Logue, *The Perverse Effects of Subsidized Weather Insurance* 3–5 (U. Mich. Law Sch. Law & Econ. Working Papers, Paper No. 111, 2015), http://repository.law.umich.edu/cgi/viewcontent.cgi?article=1221&context=law_econ_current [https://perma.cc/H7CE-6VRU] ("As a result of government intervention in property insurance markets, through either rate regulation or direct government provision of subsidized insurance, private markets no longer generate prices signals regarding the cost of living in severe weather regions. The cost of insurance is suppressed . . . .").

[15] *See* Hornstein, *supra* note 3, at 24 n.85 ("22 studies show an increase in disaster losses in recent decades, [with] 14 of them accredit[ing] conflating factors, including wealth/population increases in areas of weather-related risk . . . .") (citing Laurens M. Bouwer, *Have Disaster Losses Increased Due to Anthropogenic Climate Change?*, 92 BULL. AM. METEOROLOGICAL SOC'Y 39, 41–42 (2011)); *see also* BLAKE & GIBNEY, *supra* note 6, at 6 ("Continued coastal growth and

if storm strength/frequency itself is no worse than that which existed historically,[16] (f) and that definitely results in even-more-escalating economic losses when climate change affects sea levels or storm frequency/intensity,[17] such that (g) whatever the combinations of (a)-(f) the United States is as a factual matter already spending such an increasingly large part of the federal budget for weather disasters that researchers at the National Bureau of Economic Research estimate that, over the next seventy-five years, it will require aggregate expenditures between $1.2–$7.1 trillion (depending on assumptions of growth and discount rates)—roughly the same level of expenditure as that necessary in the United States over the same time period to keep Social Security solvent.[18] Accordingly, even in a country as rich, geographically diversified, and financially sophisticated as the United States, if we stay with our current spending plan for catastrophic weather, it may in this century undermine our own ability to maintain our standard of living. In short, we're roughly in the same boat as Grenada. Indeed, without getting its weather finances right, the whole world will be in the same boat as Grenada. British economist Nicholas Stern estimates that, worldwide, government expenditures for catastrophic weather by 2050 could range between $850 billion to $1.3 trillion *annually*.[19] In a world in which there are no free lunches, this level of annual expenditure will come at the expense of economic development and worldwide standards of living.[20]

At this point, it is worth emphasizing how private insurance can improve overall economic resilience, and why the world is worse off when it lacks functioning insurance markets to stand between human losses and governments-as-insurers-of-last-resort. First, to start with the obvious, the more private insurance is engaged, the more of a financial buffer exists between storm losses and the need for governmental expenditures.[21] The Lon-

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inflation will almost certainly result in every future major landfalling hurricane (and even weaker hurricanes and tropical storms) replacing one of the current costliest hurricanes.").

[16] BLAKE & GIBNEY, *supra* note 6, at 6.

[17] *See* Hsiang & Jina, *supra* note 11, at 3 ("It is expected that the frequency and intensity of cyclones will change in response to climate change, which our results indicate may have important economic consequences.") (citations omitted).

[18] *See* J. David Cummins et al., *Federal Financial Exposure to Natural Catastrophe Risk, in* MEASURING AND MANAGING FEDERAL FINANCIAL RISK 61, 63 (Deborah Lucas ed., 2010) (noting that net present value of the unfunded liability of next 75 years' worth of federal extreme weather expenditures to be between $1.2 trillion and $7.1 trillion, in comparison to the net present value over the same time period of a projected Social Security shortfall of $4.9 trillion).

[19] *See* Donald T. Hornstein, *Insurance at the Energy-Water Nexus*, 48 U. RICH. L. REV. 1033, 1041 (2014).

[20] *See* Hsiang & Jina, *supra* note 11, at 1, 16 ("Both rich and poor countries exhibit this response, with losses magnified in countries with less historical cyclone experience.").

[21] *See* Hornstein, *supra* note 10, at 7.

don Market Group reported in 2014 that, as to worldwide natural disasters, only about 25–30% of losses are insured, with 65–70% uninsured, a gap that is actually widening.[22] This is an especially bad scenario in developing economies because, as was the case in Grenada, it means that more *public* money will be spent on disaster recovery and will therefore be *less* available for the public expenditures necessary to reach goals in education, public-health, and poverty-reduction.[23] More broadly, uninsured catastrophe losses have macroeconomic costs: they negatively affect economic growth whereas "well-insured catastrophes . . . can be [financially] inconsequential or a positive for growth over the medium term as insurance payouts help fund reconstruction efforts."[24]

Second, a properly priced private insurance regime sends market signals to insureds to avoid particularly risky undertakings (because premium prices will skyrocket) and/or to adopt cost-effective precautionary measures that reduce risk.[25] As one study found as to weather catastrophes, "[i]nsurance arrangements . . . contribute to prevention and disaster management *ex ante,"* for example, by providing incentives "to establish advanced building codes."[26] Insurance payouts also are targeted at "those facilities that private agents had deemed important enough *ex ante* to warrant insurance coverage, often ones that serve a productive purpose."[27] This is one reason why catastrophe coverage via insurance is thought "to contribute more toward economic recovery than *ex post* compensation in the form of aid or government relief programs."[28]

In addition, the benefits from private insurance markets are magnified in a world where worst-case scenarios themselves are deteriorating. In the United States, for example, catastrophe models show that damages from previous storms that struck populated areas would today be much worse due to the increased numbers and higher values of at-risk properties.[29] Similar

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[22] *See id.*

[23] *See About Grenada: Economy*, *supra* note 8.

[24] *See* von Peter et al., *supra* note 11, at 1.

[25] Haitao Yin et al., *Does Private Insurance Reduce Environmental Accidents?*, REG., Summer 2012, at 26, 37 (stating that an analogous effect was documented in a study by Haitao Yin, Howard Kunreuther, and Mathew White, where there was found to be a dramatic decline in leaks from underground fuel tanks when gas stations were required to carry private cleanup and liability insurance; the study found that the insurance pricing structure gave "[gas] tank owners economic incentives to invest in equipment that reduce[d] the chance of accidental fuel tank leaks").

[26] *See* von Peter et al., *supra* note 11, at 4, 16.

[27] *Id.* at 21.

[28] *Id.*

[29] *See* KAREN CLARK & CO., INCREASING CONCENTRATIONS OF PROPERTY VALUES AND CATASTROPHE RISK IN THE US 5 (2015), http://www.karenclarkandco.com/news/publications/pdf/KCC_Industry_Exposure_Report.pdf [https://perma.cc/39L3-X6KE]; Press Release, Ins. Info. Inst.,

vulnerabilities are also reflected in an analysis of several meteorological near-misses. Thus, to return to Hurricane Ivan in 2004, at one point the storm was projected by tracking models to present a one-in-four chance of a "direct hit" on New Orleans which, had it occurred, could have imposed total losses in excess of $100 billion, an amount exceeded only by Hurricane Katrina two years later, reducing the chances that New Orleans would have been rebuilt at all.[30] A decade later, at the onset of the 2015 Atlantic hurricane season, disaster modelers predicted that if Miami were to be hit by a Category 5 storm (a storm with a 1-in-100 chance of occurring), the losses could cost $250 billion.[31] There is a real danger of being thinly capitalized in the face of such an event, even to a political entity as vibrant as the State of Florida.[32] In September 2008, when Hurricane Ike briefly threatened Miami with a Category 4 strike, an earlier warning from the Fitch ratings agency in March 2008 had already warned that if a major storm were to "hit[] Florida, 'the fragile [insurance] market could effectively collapse.'"[33]

Having underscored the value of private insurance markets, however, how do we explain the flight from primary coverage of catastrophic weather risks by private insurers? In a word, the most frequently given rationale is that such risks are "uninsurable."[34]

Catastrophe Losses Will Double About Every 10 Years, Says Leading Catastrophe Modeling Expert at PCS Conference (Apr. 25, 2006), http://www.iii.org/press-release/catastrophe-losses-will-double-about-every-10-years-says-leading-catastrophe-modeling-expert-at-pcs-conference-042506 [https://perma.cc/5VHK-QYR8] (noting that one expert predicts that catastrophe storm losses could follow a perverse variation of Moore's Law and "double about every ten years due to increases in the numbers and values of properties at risk").

[30] *See* Shirley Laska, *What if Hurricane Ivan Had Not Missed New Orleans?*, 78 SOC. INQUIRY 2, 174, 177–78 (2008); *Hurricane Katrina Statistics Fast Facts*, CNN (Aug. 24, 2015), http://www.cnn.com/2013/08/23/us/hurricane-katrina-statistics-fast-facts/ [https://perma.cc/9KJZ-HRNC] (citing FEMA's estimate that Hurricane Katrina caused $108 billion in damages).

[31] *See* Ryan Yousefi, *100-Year Hurricane Could Cost $250 Billion if It Hit Miami*, MIAMI NEW TIMES (Apr. 16, 2015, 11:30 AM), http://www.miaminewtimes.com/news/100-year-hurricane-could-cost-250-billion-if-it-hit-miami-7572520 [https://perma.cc/98DX-3TJ5].

[32] *See* Michael Grunwald, *Could Florida Survive the Big One?*, TIME (Sept. 5, 2008), http://content.time.com/time/nation/article/0,8599,1839219,00.html.

[33] *Id.*; Press Release, Fitch Ratings, Fitch Comments on Florida Homeowners Insurance Market (Mar. 24, 2008, 11:28 AM), https://www.fitchratings.com/site/fitch-home/pressrelease?id=413634 [https://perma.cc/GN8W-825A].

[34] *See* Véronique Bruggeman et al., *Insurance Against Catastrophe: Government Stimulation of Insurance Markets for Catastrophic Events*, 23 DUKE ENVTL. L. & POL'Y F. 185, 194 (2012) (catastrophe insurance needs to be bundled with ordinary car and home insurance because otherwise damage from catastrophic events "would normally be considered uninsurable").

II. WHY WE LACK PROPERLY FUNCTIONING PRIVATE INSURANCE MARKETS FOR CATASTROPHIC WEATHER—THE STANDARD ECONOMIC ARGUMENT

When insurers claim that weather catastrophes are "uninsurable," they typically mean that the normal risk-transferring advantages of insurance do not apply when catastrophes occur.[35] Insurance works best when the underlying risks are randomized and independent because it offers a win-win proposition for both buyer and seller.[36] Take, for example, a woman contemplating automobile liability insurance. The buyer (driver) does not know whether she will get into an auto accident in the upcoming year, let alone whether she might cause the accident; thus, the "variance" that she will suffer a financial loss is high.[37] But she knows that there is some chance that she might cause an accident with resulting personal injury or property damage, potentially exposing her to legal costs and thousands of dollars of liability.[38] The insurer, although also not knowing whether this particular driver will cause an accident, nonetheless knows statistically to a very level of confidence how many accidents overall are likely to occur in the territories it insures.[39] Because of the law of large numbers, the variance in the statistical likelihood of accidents overall is quite low; that is, the number is very predictable.[40] The insurer also knows statistically the overall expected costs of those accidents and the overall expected costs of providing legal representation to its insureds.[41] Based on this information, the insurer knows how

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[35] *See, e.g.*, Christopher C. French, *The Role of the Profit Imperative in Risk Management*, 17 U. PA. J. BUS. L. 1081, 1109 (2015) ("Insurers justify their refusal to insure catastrophic risks such as earthquakes on the basis that the losses are essentially 'uninsurable' because the risks of loss are highly correlated . . . .").

[36] *See* J. David Cummins, *Should the Government Provide Insurance for Catastrophes?*, 88 FED. RES. BANK ST. LOUIS REV. 337, 337 (2006) ("Insurance works best for high-frequency, low-severity events, which are statistically independent and have probability distributions that are reasonably stationary over time.").

[37] *See* JUDY FELDMAN ANDERSON & ROBERT L. BROWN, EDUCATION & EXAMINATION COMMITTEE OF THE SOCIETY OF ACTUARIES, RISK AND INSURANCE 4 (2005) (in the case of an automobile driver's risk, "if we look at a particular individual, we see that there can be an extremely large variation in possible outcomes").

[38] *See id.*

[39] *See* Cummins, *supra* note 36, at 342 ("Intuitively, the law of large numbers says that the sample mean becomes arbitrarily close to the population mean as the sample size increases. Thus, the expected loss is highly predictable in a sufficiently large sample.").

[40] *Id.* at 342–43 ("The U.S. market for personal automobile insurance is an example of a locally insurable market.").

[41] *See* ANDERSON & BROWN, *supra* note 37, at 4–5 ("[I]f an insurer sells *n* policies to *n* individuals, it assumes the total risk of *n* individuals. In reality, the risk assumed by the insurer is smaller in total than the sum of the risks associated with each individual policyholder.").

much money it needs to collect from insureds to cover its expected losses—the actuarially fair price.[42]

In this sense, insurance is one of the world's oldest applications of "Big Data," an attribute of the industry facilitated by its partial exemption from antitrust laws specifically to allow insurance companies to gather and share data collectively so that actuarially fair prices can be determined.[43] Because it is worth it to insureds to pay a "premium" over the actuarially fair price to transfer the high-variance, worst-case risk of a financial wipe-out to the insurer—which "smoothes" the risk by spreading it across thousands or tens of thousands of other, similarly situated insureds—both sides of the exchange profit.[44] Thus, conventional economics predicts that insurance will emerge because rational, self-interested individuals will find it advantageous to pay the premium, and rational, self-interested organizations will find it profitable to enter the business.[45] And, certainly, there is ample empirical evidence that the conventional economic explanation is predictive: by many metrics, insurance is the largest industry in the world, with annual premium income of $3.2 trillion.[46]

Storm losses, however, are different—or so claims the conventional economic dogma.[47] Here, the variance is high(er) for both insured and insurer.[48] For insureds, the chance that their property will be affected in any given year by, say, a hurricane, is both uncertain and rare, triggering the well-documented tendency of many people to discount such risks via non-rational heuristics and mental biases against low-probability/high-risk events (it won't happen to me).[49] Thus, the market for storm insurance will

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[42] *See id.* at 2–5.

[43] *See* Anthony J. Alt, *Congress' Self-Inflicted Sisyphean Task: The Insurance Industry's Federal Antitrust Exemption and the Insurance Industry Competition Acts of 2007 and 2009*, 16 CONN. INS. L.J. 399, 418 (2010) ("The purpose of the . . . antitrust exemption was to allow for cooperative rate-making efforts among insurance companies so that they could 'underwrite risks in an informed and responsible way' . . . .").

[44] *See* Cummins, *supra* note 36, at 342 ("Individuals are averse to pure risk and are willing to pay amounts greater than the expected value of losses in return for transferring risk to an insurer.").

[45] *See id.* ("The amounts greater than expected losses that individuals and businesses are willing to pay for risk transfer give rise to gains from trade that have motivated the development of the insurance and reinsurance industries.").

[46] *See* Mills, *supra* note 1, at 1040 ("As the world's largest industry, the [insurance industry] would be the third largest country if its $3.2 trillion in yearly revenues were compared with national gross domestic products . . . .").

[47] *See* Donald T. Hornstein, *Reclaiming Environmental Law: A Normative Critique of Comparative Risk Analysis*, 92 COLUM. L. REV. 562, 605–10 (1992) (collecting typologies and sources of these types of mental errors).

[48] *See id.*

[49] *See id.*

be less vigorous than for risks that are viewed as more routine.[50] Data on penetration rates of hurricane insurance in the United States bear this out.[51] In the aftermath of Hurricane Katrina, evidence indicates that approximately 40% of those suffering losses had failed to purchase adequate—or any—flood insurance.[52]

But it is also the case that storm losses are different even for statistically-minded insurers, who do not themselves rush to offer storm insurance. One reason is that, from a Big Data perspective, the methodologies for calculating future storm losses are more fraught than mining data for common events such as automobile accidents. For example, in hurricane-insurance rate setting at both the federal and state levels, it was customary to project future losses by using a simple historical baseline, going back twenty or thirty years, to obtain average losses that were assumed to represent the likely outcome in the near future.[53] The failure of this approach to reflect real-world changes in both the value of insured properties (more recent extensive and expensive development at the coast) and changes in hurricane frequency or intensity was captured in 1992 when Hurricane Andrew caused the insolvencies of ten Florida insurers and led to years of rapid rate increases, insurer abandonment of coastal insurance altogether, or both.[54] Although insurers and regulators began using more long-term climatology models to capture a bigger statistical picture, Hurricane Katrina's $45 billion in insured losses in 2005 still exceeded the losses that those models had

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[50] *See* U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-08-7, NATURAL DISASTERS: PUBLIC POLICY OPTIONS FOR CHANGING THE FEDERAL ROLE IN NATIONAL CATASTROPHE INSURANCE 25 (2007) (describing how of 60,196 homes with severe wind damage from hurricanes in 2005, 38% did not have insurance against wind loss); Dwight Jaffee et al., *Long Term Insurance (LTI) for Addressing Catastrophe Risk* 4 (Nat'l Bureau of Econ. Research, Working Paper No. 14210, 2008) (considering both wind and flood insurance, 41% of damaged homes from the 2005 hurricanes in the United States were uninsured or underinsured).

[51] *See* U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 50, at 25; James A. Knox Jr., *Causation, the Flood Exclusion, and Katrina*, 41 TORT TRIAL & INS. PRAC. L.J. 901, 911 (2006); Jaffee et al., *supra* note 50, at 4. Of the NFIP-eligible homes in the New Orleans area, only 30% had flood insurance. Knox, *supra*.

[52] *See* Knox, *supra* note 51, at 911.

[53] *See* Sarah M. Tran, *Updated Hurricane Models: A New Opportunity to Insure Against Climate Change*, 14 B.U. J. SCI. & TECH L. 73, 85 (2008) ("Under the traditional approach . . . regulators determine what they consider to be reasonable rates for a given exposure by averaging annual statewide loss data over approximately twenty to thirty years.").

[54] *See* Hornstein, *supra* note 3, at 25 (noting that between 2001 and 2006, rates for homeowners' insurance in Florida rose 77%); Douglas R. Richmond, *Insurance and Catastrophe in the Case of Katrina and Beyond*, 26 MISS. C. L. REV. 49, 52–53 (2006–2007) (discussing Florida insolvencies); s*ee also* Tran, *supra* note 53, at 86 ("[T]he shortcomings of using historical premium and loss experience with respect to catastrophes like hurricanes are clear.").

predicted.[55] In turn, this has led to the use of statistical models that are more sensitive to very recent changes in coastal property valuations as well as to meteorological trends, such as El Niño events or climate change, that can make future weather different from the past.[56] Most insurers outsource this element of Big Data to private modeling consultants such as Risk Management Solutions ("RMS") or AIR Worldwide ("AIR") who use propriety models that carry with them their own complications: skepticism by ratepayers and insurance regulators, as well as their uncertain effect on ratings by agencies such as A.M. Best, Fitch, and Standard & Poor's on which insurers depend for access to capital.[57]

Finally, even if actual hurricane losses could be reliably predicted, it can be difficult for insurers to smooth them across insurance pools, thus avoiding unexpected losses and potential insolvency. First, because storm losses occur across entire neighborhoods and regions, the losses are neither randomized nor independent, but instead are "correlated" losses requiring payoffs all at once and therefore posing particular threats to insurers' capital.[58] Second, because insurance is typically offered, and regulated, intra-state, there can be geographic limitations to the insurance pools across which insurers can spread their correlated losses.[59] As importantly, the local nature of insurance regulation makes state insurance commissioners, who regulate the rates insurers can charge for storm risks, subject to political pressure from voters whose cognitive dissonance predisposes them to downplay storm risks in the first

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[55] Tran, *supra* note 53, at 88.

[56] *See* Carolyn Kousky & Roger M. Cooke, *The Unholy Trinity: Fat Tails, Tail Dependence, and Micro-Correlations* 1 (Res. for the Future, Discussion Paper No. 09-36-REV, Nov. 9, 2009), http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-DP-09-36-REV.pdf [https://perma.cc/YNW8-UMMV] (standard diversification approaches to risk can fail "when loss distributions are characterized by fat tails, tail dependence, or micro-correlations").

[57] Tran, *supra* note 53, at 88 ("The closed nature of these models could potentially impede regulators' ability to determine the reasonableness of the filed rates."); *see, e.g.*, ILL. DEP'T OF INS., FINDING A REPUTABLE INSURANCE COMPANY: USING FINANCIAL RATING AGENCIES 1 (2009) (urging consumers to use financial visibility data compiled on insurers by such ratings agencies as A.M. Best, Fitch, and Standard & Poor's); Chad Hemenway, *Cat Modeling: Ingrained in the Industry, Embroiled in Controversy*, PROPERTY CASUALTY 360° (Mar. 18, 2011), http://www.propertycasualty360.com/2011/03/18/cat-modeling-ingrained-in-the-industry-embroiled-i (noting that the 2011 RMS model increased hurricane risks almost overnight by 150 percent); s*ee also* Karen Clark, *How Can Rating Agencies Better Gauge Carrier Cat-Risk Exposure?*, PROPERTY CASUALTY 360° (May 16, 2011), http://www.propertycasualty360.com/2011/05/16/how-can-rating-agencies-better-gauge-carrier-cat- ("The rating agencies are not making consistent comparisons across companies with respect to catastrophe risk.").

[58] *See* Cummins*, supra* note 36*,* at 343 ("If risks are dependent, the amount of equity capital needed per risk to achieve a given insolvency target becomes [greater] . . . .").

[59] *See* Alt, *supra* note 43, at 400–02 (explaining how the federal 1946 McCarran-Ferguson Act makes "the business of insurance" the province of state, not federal, regulation).

place, and who will criticize insurers' arguments for rate increases to the extent that they are based upon proprietary risk data given to them by consultants such as AIR or RMS, data that is not particularly transparent.[60] Insurers routinely cite all of these reasons—the standard economic dogma—when they claim that storm risks are "uninsurable."[61] And, empirically, insurers do seem to put their money where their mouth is. Since 1968, insurers in the United States have in fact excluded flood losses from standardized coverage.[62] In the section below, I turn to wind.

III. WIND INSURANCE COVERAGE IN THE AMERICAN SOUTHEASTERN AND GULF STATES

A. The State of the Private Market

If there is a private market for wind insurance in the Southeastern and Gulf states, most large private insurers want little part of it. Since 2004, Allstate Insurance (the "good hands" people) has dropped approximately 320,000 policies with wind exposure in Florida, 12,000 policies in South Carolina, and announced that it would not write new policies in Maryland and Virginia.[63] In 2009, Nationwide Insurance ("on your side") dropped 60,000 coastal properties in Florida.[64] In 2008, Farmers Insurance ("Insurance University") threatened to leave North Carolina markets altogether rather than be forced to participate in the state's coverage of coastal wind risks, and in 2011–2012, the Farm Bureau of North Carolina followed suit by significantly reducing its residential wind writings at the coast.[65] Even those insurers who remain increasingly offer "hollow[ed] out" coverage with higher deductibles and co-payments and lower overall policy limits, thereby effectively forcing

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[60] S*ee* Tran, *supra* note 53, at 88 ("[S]ome consumer advocates fear that insurance companies could use the proprietary nature of the models to raise rates unscrupulously.").

[61] *See, e.g.*, French, *supra* note 35, at 1109 (insurers claim catastrophic risks are uninsurable).

[62] *See* Hornstein, *supra* note 3, at 13–14.

[63] *See* ENVTL. DEF., BLOWN AWAY: HOW GLOBAL WARMING IS ERODING THE AVAILABILITY OF INSURANCE COVERAGE IN AMERICA'S COASTAL CITIES 17 (2007), http://emerginglitigation.shb.com/Portals/f81bfc4f-cc59-46fe-9ed5-7795e6eea5b5/7301_BlownAway_insurancereport.pdf [https://perma.cc/CVQ9-R29V]; Amy Clark, *Allstate's 'Good Hands' Wave 'Bye Bye,'* CBS NEWS (Dec. 21, 2006, 6:25 PM), http://www.cbsnews.com/news/allstates-good-hands-wave-bye-bye/ [https://perma.cc/K6TA-UWAK].

[64] *See* Jeff Harrington, *Insurer to Drop 60,000*, ST. PETERSBURG TIMES, Oct. 8, 2009, at 1B.

[65] *See* Michael Adams, *North Carolina Farm Bureau to Raise Homeowners' Rates, Drop Policies,* INS. J. (Feb. 27, 2012), http://www.insurancejournal.com/news/southeast/2012/02/27/237291.htm [https://perma.cc/3VCV-DYYG]; Brian H. Kern, *Farmers Insurance to Pull Out of North Carolina Homeowners' Market,* INS. J. (Aug. 14, 2008), http://www.insurancejournal.com/news/southeast/2008/08/14/92787.htm [https://perma.cc/R46M-2N6U].

insureds to pay more for less.[66] In Florida, when an unprecedented sequence of four hurricanes swept the state in 2004, those who *had* insurance bore between fifteen and twenty percent of the financial losses.[67]

B. The Rise of Quasi-Public State Residual-Risk Wind Pools

In the place of an effective private market, there has arisen a political market for governmental action. Mindful of the fact that 53% of the U.S. population lives at or near coastal areas (voters), politically mindful coastal states have created public programs known generically either as "FAIR" plans ("Fair Access to Insurance Requirements"), Joint Underwriting Associations, or Wind Pools.[68] In 2002, Florida created the Citizens Property Insurance Corporation.[69] In 2003, Louisiana created the Louisiana Citizens Property Insurance Association.[70] Texas has created the Texas Windstorm Insurance Association, Mississippi the Mississippi Windstorm Underwriting Authority, and South Carolina its Wind and Hail Underwriting Association.[71] These plans, and others, typically reflect the structure of "residual" or "assigned risk" pools in which the state conditions the right to sell insurance in the state with (forced) participation in these high-risk pools.[72] Although the constitutionality of such structures has been questioned by some, including Professor Richard Epstein, state courts have rejected challenges that the arrangements constitute takings requiring compensation under the Takings Clause of the Fifth Amendment of the U.S. Constitution and have similarly rejected challenges that the arrangements violate substantive due

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[66] *See* J. ROBERT HUNTER, CONSUMER FED'N OF AM., THE INSURANCE INDUSTRY'S INCREDIBLE DISAPPEARING WEATHER CATASTROPHE RISK: HOW INSURERS HAVE SHIFTED RISK AND COST ASSOCIATED WITH WEATHER CATASTROPHES TO CONSUMERS AND TAXPAYERS 1–4 (2012), http://www.consumerfed.org/pdfs/InsuranceRegulationHurricaneRiskDisappearingCoverageStudy2-12.pdf [https://perma.cc/V6ES-SF3Q].

[67] *See* EVAN MILLS ET AL., CERES, AVAILABILITY AND AFFORDABILITY OF INSURANCE UNDER CLIMATE CHANGE: A GROWING CHALLENGE FOR THE U.S. 5 (2005), http://www.c2es.org/docUploads/Ceres%20--%20Insurance%20&%20Climate%20Change%202005.pdf [https://perma.cc/SFS6-4ECG].

[68] AM. INS. ASS'N, WHAT ARE "RESIDUAL MARKETS" FOR PROPERTY INSURANCE? (n.d.), http://www.aiadc.org/File%20Library/Resources/Industry%20Resources/PROPERTY---National---Residual-Market-Descriptions-White-Paper-295953.pdf [https://perma.cc/Z7KP-5JNM]; KRISTEN M. CROSSETT ET AL., NAT'L OCEANIC & ATMOSPHERIC ADMIN., POPULATION TRENDS ALONG THE COASTAL UNITED STATES: 1980–2008, at 1 (2004), http://oceanservice.noaa.gov/programs/mb/pdfs/coastal_pop_trends_complete.pdf [https://perma.cc/X3H3-YGVT].

[69] *See* FLA. STAT. § 627.351(6) (2015).

[70] *See* LA. STAT. ANN. § 22:2293 (2015).

[71] *See* MISS. CODE ANN. § 83-34-3 (2015); S.C. CODE ANN. §§ 38-90-810 to -890 (2015); TEX. INS. CODE ANN. § 2210.001 to .705 (West 2015).

[72] *See generally* TOM BAKER & KYLE D. LOGUE, INSURANCE LAW AND POLICY 624–34 (3d ed. 2013) (describing generally the structure of residual risk insurance programs).

process.[73] Initially created as "insurers of last resort" for homeowners who could not find affordable (or any) private coverage, these programs soon came to dominate the market for wind insurance in Southeastern and Gulf states. Florida Citizens had, by 2007, become Florida's largest insurer of first resort and the fourth-largest property insurer in the nation.[74] The North Carolina Coastal Property Insurance Pool covers approximately 70% of the State's beach properties.[75] Nationally, compared to $55 billion in insured

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[73] *See* State Farm Mut. Auto. Ins. Co. v. State, 590 A.2d 191, 207 (N.J. 1991) ("Since we hold that the [arrangement in question] does not, on its face, impose a confiscatory taking, *a fortiori* we find that it meets the minimal requirements for constitutionality under a substantive due process analysis."); *id.* at 198–99 (quoting Nebbia v. New York, 291 U.S. 502, 525 (1934)) ("[T]he guaranty of due process . . . demands only that the law shall not be unreasonable, arbitrary or capricious, and that the means selected shall have a real and substantial relation to the object sought to be attained."); s*ee also* Country-Wide Ins. Co. v. Harnett, 426 F. Supp. 1030, 1035 (S.D.N.Y. 1977) *aff'd* 431 U.S. 934 ("Regulation of the insurance industry, in order to provide adequate protection of the public, is surely a proper subject for the state's exercise of its police power . . . . The law accomplishes a legitimate public goal and any contract right must yield to it."); People *ex rel.* Lewis v. Safeco Ins. Co. of Am., 414 N.Y.S.2d 823, 829 (N.Y. Sup. Ct. 1978) ("[I]t is, therefore, unnecessary to determine the further issue of whether the Superintendent's application of [the laws at issue] has crossed the threshold of appropriating the defendants' property without just compensation . . . ."); Richard A. Epstein, *Exit Rights and Insurance Regulation: From Federalism to Takings*, 7 GEO. MASON L. REV. 293, 298 (1999); Steven Plitt & Daniel Maldonado, *When Constitutional Challenges to State Cancellation Moratoriums Enacted After Catastrophic Hurricanes Fail: A Call for a New Federal Insurance Program*, 27 BYU J. PUB. L. 41, 64 (2012) ("Insurance companies can also argue that any statutory or regulatory scheme which precludes an insurance company from allocating the company's resources as it sees fit, forcing it to suffer net economic losses both within and outside the Gulf states, results in a taking of its "property" without just compensation in violation of the Fifth Amendment . . . . Any showing that beneficial use has been denied will fail because any "compelled" insurance contract would still belong to the insurer and policyholders would still pay the insurance company all required premiums.").

[74] Tom Zucco & Jennifer Liberto, *Citizens' Business Booms,* TAMPA BAY TIMES (June 26, 2007), http://www.sptimes.com/2007/06/26/Business/Citizens__business_bo.shtml [https://perma.cc/7ZFN-KE5C] ("Citizens currently has about 1.3-million homeowner policies, and its commercial business is growing by 1,000 percent this year. That makes Citizens the fourth-largest property insurer in the nation."); *see, e.g.*, FLA. STAT. § 627.351(2)(b)(5)(b) (2015) ("It is the intent of the Legislature that the rates for coverage provided by the association be actuarially sound and not competitive with approved rates charged in the admitted voluntary market such that the association functions as a residual market mechanism to provide insurance only when the insurance cannot be procured in the voluntary market."); *see* Jean Gruss, *The Insurer of First Resort*, BUS. OBSERVER (Jan. 20, 2011), http://www.businessobserverfl.com/section/detail/the-insurer-of-first-resort/ [https://perma.cc/U9AC-CSUD] ("When it was created after Andrew, Citizens was supposed to be the insurer of last resort . . . . Today, the state-owned agency has become the largest residential-property insurer in Florida . . . .").

[75] LRC COMM. ON PROP. INS. RATE MAKING, MINUTES: NOVEMBER 2, 2011, at 8 (2011), http://www.ncga.state.nc.us/DocumentSites/Committees/PIRMC/2011-November%2002/Approved%20Minutes.pdf [https://perma.cc/DRU9-Z9P2].

assets in such plans in 1990, state-run residual risk plans had by 2012 over $880 billion in loss exposure, an increase of 1517 percent.[76]

IV. HOW STATE WIND POOLS ARE FINANCED

Not all state residual programs are structured identically, and many of them are still undergoing periods of significant experimentation and revision. The merits of these programs are difficult to evaluate in a vacuum. Even though "market-making" institutions in general may be lauded as creative ways in which government can interact with markets, in the case of these particular residual-market insurance mechanisms, their link to actual public-welfare improvements depends on the details.

This Section analyzes three such programs: those adopted in North Carolina, Texas, and Florida. The North Carolina Coastal Property Insurance Pool reflects an approach that, having undergone significant legislative reform in 2009, utilizes a pay-it-forward financial structure designed to have in place, at the beginning of each new hurricane season, financial coverage in the event of a 1-in-100-year probable-maximum-loss ("PML"), the standard target for catastrophic insurance used by private insurers in the United States.[77] The Texas Windstorm Insurance Association reflects a different financial strategy, one that depends mostly on the Association's ability to float post-event bonding in the event of a catastrophe.[78] And the Florida Citizens Property Insurance Association reflects an entity that in some ways has been the most experimental of all wind pools. At times, it covers excess risk with both post-event financing and use of a uniquely Floridian in-state reinsurance facility, and more recently by use of the most aggressive depopulation, or "take-out" program, in the country, seeking to encourage and even subsidize the emergence of a new type of private insurance market for catastrophic-wind risk, and to shed policies into it.[79]

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[76] ROBERT P. HARTWIG & CLAIRE WILKINSON, INS. INFO. INST., RESIDUAL MARKET PROPERTY PLANS: FROM MARKETS OF LAST RESORT TO MARKETS OF FIRST CHOICE 3 (2014), http://www.iii.org/sites/default/files/docs/pdf/paper_residualmarketupdate_2014.pdf [https://perma.cc/W6R5-BLLG].

[77] *See generally* N.C. INS. UNDERWRITING ASS'N, COASTAL PROPERTY INSURANCE POOL: MANUAL OF RULES AND PROCEDURES (2015), http://www.ncjua-nciua.org/DocLib/Operational Docs/CPIP_MOR.pdf [https://perma.cc/DKG9-PBUN] (detailing guidelines for the NCIUA); *see also* KAREN CLARK & CO., *supra* note 29, at 1 (noting that the 1-in-100-year PML is the insurance industry's standard, but that it may nonetheless significantly understate the true financial risks of catastrophic weather).

[78] *See infra* notes 147–170 and accompanying text.

[79] *See infra* notes 171–203 and accompanying text.

A. The North Carolina Insurance Underwriting Association

Created by the North Carolina General Assembly in 1969, the North Carolina Insurance Underwriting Association ("NCIUA" or the "Association") is not a state agency.[80] Instead, it is a nonprofit entity tasked with providing "as an insurer of last resort" property insurance (including wind coverage) for residential and commercial properties on North Carolina's Barrier Islands and on the most exposed parts of the State's coastal counties.[81] Half of the NCIUA's board of directors are elected by the insurance industry with the other half appointed by the state insurance commissioner from among independent insurance agents or the public.[82] The NCIUA does not set insurance rates for coverage, a task in North Carolina that belongs to the N.C. Insurance Commissioner and the N.C. Rate Bureau.[83] Participation in the NCIUA is mandatory for all insurers offering property insurance anywhere in the state, regardless of whether they write coverage at the coast.[84] But participation in annual profits and losses from coastal coverage reflected each insurer's pro rata share of the overall state market.[85] Thus, in the case of a $10 million overall loss in coastal coverage (a stormy year), a company with a 5% market share of the overall state property insurance market would be given an "assessment," requiring it to reimburse the NCIUA $500,000 (5% of the overall loss). Until 2009, insurers would also similarly share in profitable years, dividing underwriting profits in quiet years (few storms).[86] The Association's books were settled annually, with assessments or disbursements based on a designated, prior "storm" year (e.g., the Association's accounts for 2006 would be settled for storms occurring in calendar year 2001), allowing a sufficient lag time to reflect all disbursements and final accountings for losses in the storm year, and to allow the Association to carry forward enough retained earnings to operate in the upcoming year.[87] There were provisions to incentivize insurers to write coverage directly on coastal properties by giving them "credit" against any annu-

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[80] *See* N.C. GEN. STAT. § 58-45-10 (2015) (creating the NCIUA).

[81] *See id.*

[82] *See* N.C. INS. UNDERWRITING ASS'N, PLAN OF OPERATION OF THE NORTH CAROLINA INSURANCE UNDERWRITING ASSOCIATION 13–14 (2015), http://www.ncjua-nciua.org/DocLib/OperationalDocs/CPIP_PO.pdf [https://perma.cc/XSF2-MGM2].

[83] *See* N.C. GEN. STAT. § 58-45-15; *see also* N.C. INS. UNDERWRITING ASS'N, *supra* note 82, at 8 (showing how rates are calculated).

[84] See N.C. GEN. STAT. § 58-45-10.

[85] *See id.* § 58-45-25(a).

[86] *See id.*

[87] *See id.* § 58-36-10(3) ("In the case of property insurance rates under this Article, consideration may be given to the experience of property insurance business during the most recent five-year period for which that experience is available.").

al assessments they owed as members of the Association for properties they insured directly as individual insurers.[88] This was not unimportant, as there was no limit to the amount of overall losses for which members could be assessed.[89] Thus, in the event of a $1 billion loss, an insurer with a statewide 5% market share could be assessed $50 million. The ability of insurers to immediately pass on this assessment to policyholders statewide was not assured, and required approval of the (elected) state insurance commissioner.[90]

Prior to significant legislative redesign in 2009, Figure 1[91] below illustrates the NCIUA's financial structure—what regulators and insurers refer to as its "tower" —for financing storm losses in calendar year 2008, the last year before new legislation took effect.

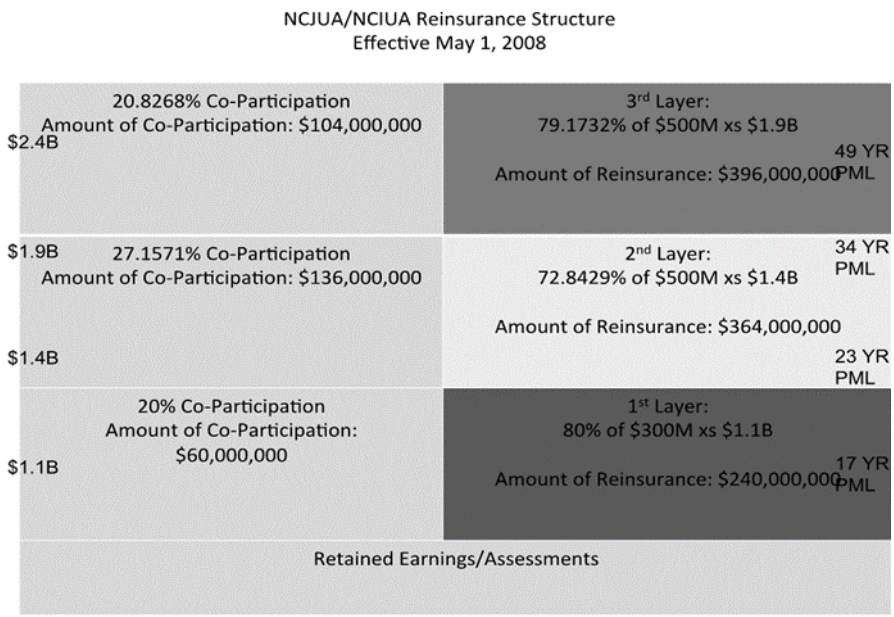
[88] *See id.* § 58-45-25(b).

[89] *See id.* § 58-45-25(a) ("Each member of the Association shall participate in the expenses, profits, *and losses* of the Association in the proportion that its net direct premium written in this State during the preceding calendar year for residential and commercial properties outside of the beach and coastal areas bears to the aggregate net direct premiums written in this State during the preceding calendar year for residential and commercial properties outside of the beach and coastal areas by all members of the Association, as certified to the Association by the Commissioner.") (emphasis added).

[90] *See id.* § 58-45-25(b).

[91] Email from Alvin Ashworth, NCIUA Director of Finance and Accounting, to author (Apr. 10, 2014) (on file with author).

Figure 1—NCIUA Financing Tower, 2008



There are three features of Figure 1 that are noteworthy. First, there are problems with the "top" of the tower. NCIUA financing projected funds capable of covering an annual loss of only $2.4 billion, a loss predicted to occur once every 49 years.[92] In contrast, the industry norm is (and was then) to have in place financing for a one-in-one-hundred-year storm (known as "probable maximum loss" or the "100-year PML").[93] Although, as previously mentioned, there was no statutory limit on the ability of the Association to impose assessments on member companies in the event of storm losses beyond the 1-in-49-year PML, it is revealing that the member com-

[92] *See North Carolina House, Senate Agree on Beach Plan Insurance Bill*, INS. J. (Aug. 6, 2009), http://www.insurancejournal.com/news/southeast/2009/08/06/102828.htm [https://perma.cc/3Y4G-WLZD]; *see also* Chad Hemenway, *N.C. Beach Plan Reform Bill Advances in House; Assessment Concerns Remain*, INSURANCENEWSNET.COM: PROPERTY & CASUALTY NEWS (July 15, 2009, 3:09 PM), https://insurancenewsnet.com/oarticle/NC-Beach-Plan-Reform-Bill-Advances-in-House-Assessment-Concerns-Remain-a-108045 [https://perma.cc/9LPM-YHCK] ("[T]he Beach Plan is responsible for financing the payment of losses that exceed the total from surplus . . . and reinsurance (currently about $2.4 billion.").

[93] KAREN CLARK & CO., *supra* note 29, at 1 ("Insurers typically manage their potential catastrophe losses to the 100-year PMLs . . . .").

panies refused to specifically demarcate that possibility on the NCIUA's 2008 financing plan.[94]

Second, there is weakness, or at least ambiguity, in the "bottom" of the tower.[95] The bottom of the tower reflects financing for the first $1.1 billion in losses, amounts of loss that were the most likely to occur.[96] Yet the tower does not identify any concrete dollar amount of retained earnings that were available (effectively in cash) to handle these losses.[97] Rather, the bottom and the left side of the tower reflects the Association's ability to obtain money from member companies, if needed, by "assessments." Although there were certainly several hundreds of millions of dollars in retained earnings that the Association would have on hand going into calendar year 2008 to cover losses, it is revealing that the financing tower does not specify precisely how much money the Association carried over into 2008 (and therefore didn't take out as underwriting profit in 2007 to distribute among member companies) and how much it attributed to its ability to raise by assessment, if needed.[98] This reflects the possibility that, even as to a 1-in-49-year PML, the Association could have faced a short-term liquidity problem after a catastrophe.[99]

Third, there is both strength and weakness in the tower's middle layers.[100] On the positive side, the middle layers of the Association's tower reflect the Association's use of reinsurance which, generally speaking, is an increasingly common and acceptable way of advance financing for contingent risks.[101] Just to illustrate the general points made earlier in the Article, in the second layer, one can see that the Association had negotiated and prepaid for a reinsurer who would cover a layer of $300 million by providing "80% of $300 million" ($240 million in coverage) that would be made available once the Association had experienced a single storm event causing

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[94] *See* Figure 1. Figures 1–8 in this Article can be found at http://ealr.bclawreview.org/files/2016/05/hornstein-graphics.pdf [https://perma.cc/9GWP-QFPG].

[95] *See id.*

[96] *See id.*

[97] *See id.*

[98] *See* Kern, *supra* note 65 ("North Carolina's hurricane assessment process kicks-in if losses exceed the system's financial capability . . . , insurers are assessed based on the percentage of homeowners business they have in the state and the amount of writing along the coast . . . .").

[99] *See* AM. ACAD. OF ACTUARIES, INSURANCE INDUSTRY CATASTROPHE MANAGEMENT PRACTICES 12 (2001), https://www.actuary.org/files/catmonograph_june01.4.pdf/catmonograph_june01.4.pdf [https://perma.cc/XT5M-XVG3] ("Generally, the liquidity (or illiquidity) of an insurer after a catastrophe does not cause insolvency . . . . It is the magnitude of the event and the fact that the company does not have sufficient surplus to pay claims that is the defining factor.").

[100] *See* Figure 1, *supra* note 94.

[101] *See id.*

$1.1 billion in damage.[102] Hence the nomenclature "xs $1.1 billion" (in excess of $1.1 billion).[103]

But, on the weakness side, this $300 million layer would also require $60 million in assessments against member companies, as reflected in the left-hand side of the tower's second layer.[104] Put another way, rather than pay forward for coverage for the entire layer, the Association was promising to pay later, via assessments, if and when such losses came to pass; a strategy, one notices, that is repeated in layers 3 and 4 as one moves up the tower.[105] Finally, although most observers might not notice it, the reinsurance layers of the tower have single "attachment" points.[106] For example, the second layer reflects a reinsurance contract that requires a single storm causing $1.1 billion in losses, after which the reinsurer's obligations for additional losses from that storm become triggered (the attachment point).[107] Not apparent from such an arrangement is that, once activated by the single storm, the reinsurance obligation does not "reset" and become available for losses that might be caused by a second (or third or fourth) serious storm during that storm season.[108] Considering that the 2004 storm season featured a record-breaking *four* named hurricanes that scoured Florida in a single year, it is noteworthy that the Association provided effectively no "aggregate" coverage in the middle layers to guard against the same thing happening in North Carolina in its then-upcoming season.[109]

North Carolina's 2008 financing tower is an excellent reference point to highlight public policy changes that occurred in North Carolina in 2009. To begin, it is revealing that, despite the weaknesses in storm-loss protection already evidenced in the NCIUA's financing structure, there was little

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[102] *See id.*

[103] *See id.*

[104] *See id.*

[105] *See id.*

[106] *See id.*; *Glossary of Reinsurance Terms*, CAPTIVE.COM, http://www.captive.com/news/newsstand/articles/glossary-of-reinsurance-terms [https://perma.cc/ANQ3-M6Z2] (defining *attachment point* as the "dollar amount under an excess of loss reinsurance contract at which a ceding (primary) insurer's retention requirements have been met, and the point at which the reinsurance will respond to a loss").

[107] *See* Figure 1, *supra* note 94.

[108] *See* MUNICH RE, REINSURANCE: A BASIC GUIDE TO FACULTATIVE AND TREATY REINSURANCE 25 (2010), https://www.munichre.com/site/mram/get/documents_E96160999/mram/assetpool.mr_america/PDFs/3_Publications/reinsurance_basic_guide.pdf [https://perma.cc/YR4S-PDTQ] (describing how "per occurrence" excess of loss reinsurance covers "losses arising from a single major natural disaster," but "aggregate" stop-loss excess reinsurance provides reinsurance "for losses incurred during the treaty term, usually one year, in excess of . . . a predetermined dollar amount").

[109] *See id.*

evidence of public concern before 2008.[110] There were no political hearings, no corrective legislation, and no media stories about North Carolina's relatively soft financial precautions against massive storm losses. Given the financial devastation caused by the four-hurricane season in Florida in 2004, and the even-larger financial devastation caused in Louisiana and the Gulf states by Hurricane Katrina in 2005, this is, in itself, noteworthy.[111] Although the point is perhaps too obvious to state, the situation in North Carolina reflected a remarkable political ambivalence toward future costs and possible worst-case scenarios.[112]

Ironically, it was *insurers'* non-ambivalence toward these same risks that finally got the state's attention. In 2008, precisely because of the nation's massive storm losses in 2004 and 2005, Farmers Insurance notified the state insurance commissioner that it was preparing to leave North Carolina entirely rather than participate further in the NCIUA.[113] From Farmers' perspective, and despite the representations in the NCIUA's financing tower, the Association had the legal power, and indeed the obligation, to impose on all property insurers in the state, a potentially limitless assessment should a huge storm cause massive property losses on the North Carolina coast.[114] Insurers found it difficult to plan for the financing of these uncertain assessments.[115] Because a massive cash-flow problem could threaten its profitability, its obligations to shareholders, or even its solvency, Farmers

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[110] *See, e.g.*, ELI LEHRER, JOHN LOCKE FOUND., NORTH CAROLINA'S BEACH PLAN: WHO PAYS FOR COASTAL PROPERTY INSURANCE? 5 (2008) http://www.johnlocke.org/acrobat/policyReports/beach_plan_reform.pdf [https://perma.cc/683T-HT9F] (starting to sound an alarm about coastal insurance in North Carolina in 2008 but referring to the "Beach Plan" as otherwise "little-known").

[111] *See* Ann Green, *Storm Surge: Lessons from Katrina*, COASTWATCH, Autumn 2006, https://ncseagrant.ncsu.edu/coastwatch/previous-issues/2006-2/autumn-2006/storm-surge-lessons-from-katrina/ [https://perma.cc/PB2C-YFBG] ("No one knows how North Carolina would fare if a devastating storm like Katrina hit. However, the state has one of the oldest hurricane construction codes in the country, first implemented in the 1960s and improved over time . . . [and] '[t]here is a low probability that North Carolina will get a storm with the water level as high as it was during Katrina . . . .'") (quoting Spencer Rogers, a civil engineer).

[112] *See id.*

[113] *See* Kern, *supra* note 65.

[114] *See id.* (quoting Jack Hannigan, Farmers Senior Vice President and Chief Marketing Officer as informing agents and policyholders that "Farmers regrets having to non-renew our homeowners' customers, but the current hurricane assessment process has forced us to make this difficult business decision").

[115] *See* N.C. GEN. ASSEMBLY, JOINT SELECT STUDY COMMITTEE ON THE POTENTIAL IMPACT OF MAJOR HURRICANES ON THE NORTH CAROLINA INSURANCE INDUSTRY: REPORT TO THE 2009 SESSION OF THE GENERAL ASSEMBLY 9 (n.d.), http://ncleg.net/Library/studies/2009/nr35.pdf [https://perma.cc/89T3-B8FL] (citing Mr. Bradley Lemons, Nationwide Insurance, as noting that "the current system does not allow for any predictability in the amount of assessments and the inability to plan for a maximum assessment makes it difficult and expensive for insurers to purchase their own reinsurance in the private market").

made a credible threat to leave the state.[116] Moreover, because the threat was credible, it quickly amplified into a politically salient issue.[117] As, under the Association's structure, storm assessments were made on a market-share basis, Farmers' departure would magnify the market share of the state's remaining insurers and amplify the assessments to which they were exposed.[118] Other insurers intimated that they, too, would consider leaving the state entirely.[119] The state insurance commissioner recognized this as a "ticking time bomb," and the General Assembly created a study commission to consider statutory changes.[120]

By 2009, the study commission had finished its work and the General Assembly had statutorily revised both the NCIUA and a related association, the North Carolina Joint Underwriters Association (or "FAIR Plan"), which covered noncoastal properties.[121] At the coast, the NCIUA was to administer the North Carolina Coastal Property Insurance Pool (the "Wind Pool") to which the legislature made four especially important changes.[122] First, member companies would no longer be able to withdraw "surplus" each year from underwriting profits the Wind Pool might record during relatively quiet, non-stormy years.[123] Rather, premiums would be carried over as retained earnings that, over time, could accumulate to cover the first layer of storm costs in future years.[124] Depending on the details of their structures, the IRS increasingly took the position that, unlike the case with private in-

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[116] *See* DONALD L. GRIFFIN, PROP. CASUALTY INS. ASS'N OF AM., PCI STATEMENT REGARDING PROPERTY INSURANCE RATEMAKING IN NORTH CAROLINA 3–4 (2011), http://www.ncleg.net/DocumentSites/Committees/PIRMC/2011-December%201/PCI_Don%20Griffin.pdf [https://perma.cc/Z5EW-5PSH] ("[A]n internal audit of the Beach Plan found that deficits could threaten the plan's ability to pay claims, bankrupt small insurers and force carriers out of the North Carolina marketplace . . . . Indeed, significant assessments did cause some private insurers to non-renew many of their policies in the state and stop writing new policies.").

[117] *See* LEHRER, *supra* note 110, at 5 (quoting North Carolina Insurance Commissioner-Elect Wayne Goodwin stating that, "North Carolina's Beach Plan is a Ticking Time Bomb").

[118] *See* GRIFFIN, *supra* note 116, at 3 ("Since private insurers in North Carolina are statutory required to support the Beach Plan through rate subsidies and assessments, [the consulting firm] Milliman determined that a large event could easily result in insurance company assessments of approximately $6.2 billion, while medium and small events could create assessments of $2.9 billion and $1.4 billion, respectively.").

[119] *See* LEHRER, *supra* note 110, at 7 ("Speaking with the author on a not-for-attribution basis, representatives of two other sizeable insurers confirmed that they had developed plans to leave the North Carolina market if conditions warranted.").

[120] *See supra* notes 110, 117 and accompanying text.

[121] *See* N.C. GEN. STAT. § 58-45 (2015).

[122] *See id.*; *see also id.* § 58-45-1(a) (2014) ("It is hereby declared by the General Assembly of North Carolina that an adequate market for essential property insurance is necessary to the economic welfare of the beach and coastal areas of the State of North Carolina. . . . ").

[123] *See id.* § 58-45-25(b1).

[124] *See id.*

surers, retained earnings from some residual risk organizations such as the Wind Pool are not taxable but instead are allowed to accumulate tax free to pay for losses on the inevitable rainy day.[125] Moreover, as retained earnings grew during the quiet years, it elevated the attachment point at which reinsurance would be needed, thus lowering reinsurers' risks and accordingly the prices of reinsurance.[126]

Second, in exchange for member companies no longer able to profit-take during quiet years, the overall assessment during non-quiet years, for which the industry as a whole would be responsible, was capped at $1 billion (still to be shouldered by individual companies by their particular market share in the statewide property insurance market, the expenses for which are taken into consideration by the insurance commissioner when rates are set). Third, at the top of the tower, the Wind Pool was expected to create a financing structure accounting for losses that might be incurred in a severe storm season at the 100-year PML level.[127] And, fourth, in the event of costs beyond the 100-year PML level, the state's insurance commissioner was allowed to impose a "catastrophe recovery charge" on policyholders statewide, capped at a 10% annual surcharge on the cost of an insured's property coverage.[128]

To appreciate the difference made by these statutory changes to North Carolina's storm-risk financing strategy, Figure 2[129] shows the Wind Pool's financing tower for calendar year 2012:

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[125] *See generally* JAMES W. NEWMAN, JR., FLA. CATASTROPHIC RISK MGMT. CTR., FLA. ST. U., INSURANCE RESIDUAL MARKETS: HISTORICAL AND PUBLIC POLICY PERSPECTIVES 54–60 (2010), http://stormrisk.org/sites/default/files/Insurance%20Residual%20Markets%20White%20Paper%20-%207-22-10.pdf [https://perma.cc/2RYT-DZUX] (recounting IRS letter rulings and policies regarding residual-entity tax exemptions).

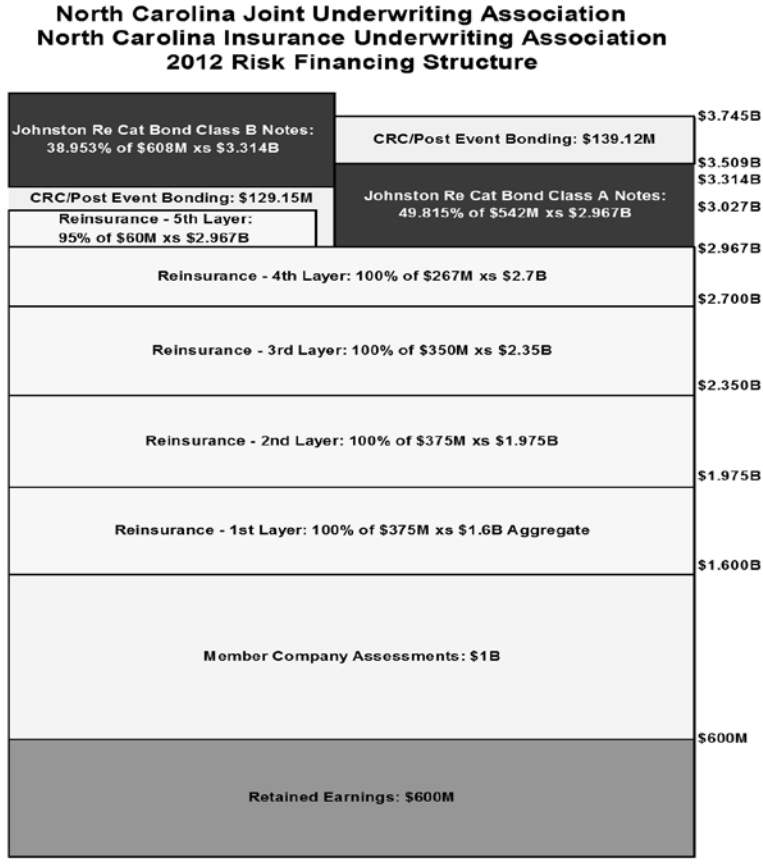
[126] *See* N.C. GEN. STAT. § 58-45-25(b2).

[127] *See id.* § 58-45-47(a).

[128] *See id; see also* Figure 2, *supra* note 94.

[129] *See* Leslie Scism, *Insurance Pool's Coverage to Coastal Carolina Ebbs*, WALL ST. J. (Sept. 14, 2009, 12:01 AM), http://www.wsj.com/articles/SB125288603617007331 ("The state's overhaul is the latest—and one of the stiffest—by hurricane-prone states to rein in exposure for the state-created "insurers of last resort" and line up resources to pay for it . . . . [F]ew legislatures have moved as aggressively as North Carolina's, according to the trade groups.").

Figure 2—Wind Pool 2012 Financing Tower



In contrast to North Carolina's 2008 financial strategy, the 2012 financing tower reflects a number of improvements.[130] First, the top of the tower now matches insurance-industry best practices regarding 100-year-storms by arranging financing up to the industry-standard 100-year PML, a severe storm registering $3.74 billion in losses. In contrast, as the top of the tower in Figure 1 reflects, the former North Carolina Beach Plan had accounted for financing only to the $2.4 billion costs of a 1-in-49-year storm.[131] Second, the bottom of the tower also reflects more solid financial footing.[132] No longer are "retained earnings" and "company assessments"

[130] *See* Figure 2, *supra* note 94.
[131] *See* Figure 1, *supra* note 94.; Figure 2, *supra* note 94.
[132] *See* Figure 2, *supra* note 94.

bundled together in an undifferentiated way, but instead retained earnings of $600 million are registered as on-hand and ready for immediate disbursement.[133] Further, the industry's entire $1 billion liability is treated as the second layer to be exhausted in its entirety prior to any reinsurance, a financial strategy designed to raise the attachment point for the Pool's first reinsurer and thereby lower the rate-on-line at which the reinsurance could be purchased.[134] Third, the Wind Pool negotiated with its first reinsurer to provide aggregate coverage, which meant that the entire $375 million layer would be available throughout the entire storm season to cover the accumulated costs of multiple storms, not requiring each individual storm to reach the attachment point of $1.6 billion.[135] And, fourth, at the top of the tower, the Wind Pool arranged for a catastrophe bond (cat bond), the Johnson Re bond, a foray into alternative risk finance that allowed for the purchase of coverage at a lower price than would have been charged by a reinsurer located at the same layer.[136]

Finally, before leaving the example of North Carolina, Figure 3[137] below reveals the Wind Pool's 2013 financial tower, the latest nonproprietary data currently available that reflects further improvements in the ability of a state to arrange for storm coverage:

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[133] *See id.*

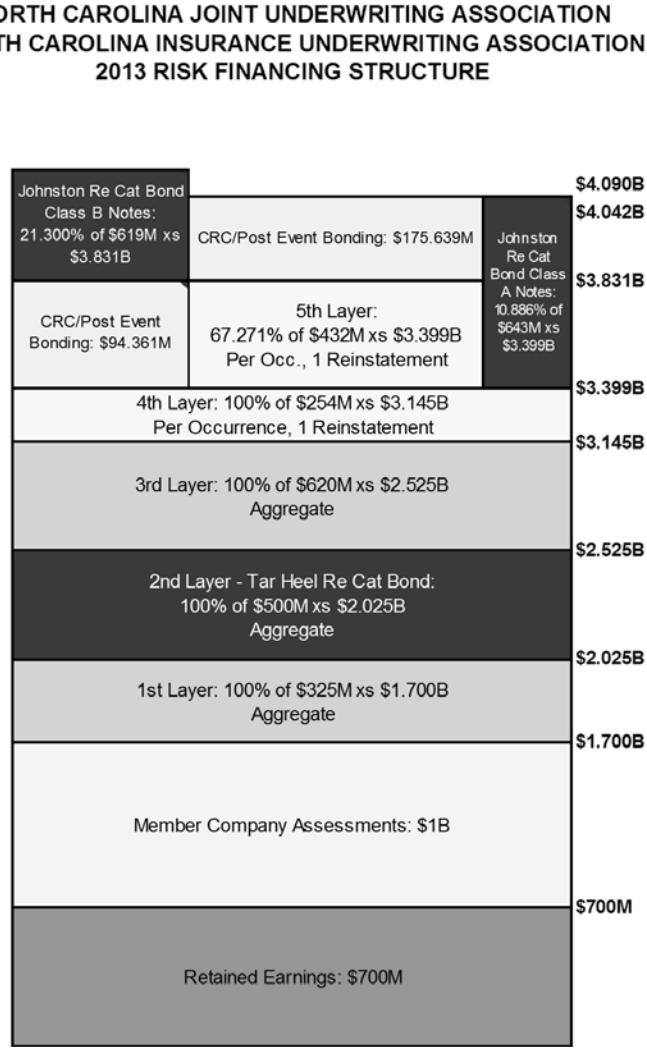
[134] *See supra* note 106 and accompanying text (explaining attachment points).

[135] *See supra* note 108 and accompanying text (explaining aggregate coverage).

[136] *See* Véronique Bruggeman, *Capital Market Instruments for Natural Catastrophe and Terrorism Risks: A Bright Future*?, 40 ENVTL. L. RPTR. 10,136, 10,141 (2010) ("[C]at bonds have a moderating effect on reinsurance prices and prevent reinsurance prices from increasing any faster than they did."); Thomas Berghman, Note, *A Market Under(Writing) the Weather: A Recommendation to Increase Insurer Capacity*, 2013 U. ILL. L. REV. 221, 250 (2013) ("The issuing of a cat bond starts with the creation of a unique type of reinsurer called a special purpose vehicle (SPV) . . . . The primary reinsurer's contract is backed up by the SPV through the issuance of the cat bond.").

[137] Email from Alvin Ashworth, NCIUA Director of Finance and Accounting, to author (Mar. 31, 2016) (on file with author)

Figure 3—N.C. Risk Pool Financing Tower, 2013



Three features of catastrophe funding are reflected in Figure 3. First, at the bottom of the tower, retained earnings had grown to $700 million, $100 million more than in 2012, reflecting a relatively quiet 2012 storm year and the tax benefits of using a non-private insurance entity. Second, there is a huge cat bond in the middle of the tower, offering a $500 million tranche, and appropriately named "Tar Heel Re," one of the largest cat bonds

worldwide in 2013.[138] Its position relatively low in the tower (at least compared to the Wind Pool's previous Johnson Re cat bond) reflects the Wind Pool's concern that reinsurers were not sufficiently competitive in their rate quotes given that 2012 was a relatively quiet year for storms in the United States.[139] By arranging for capital-market financing relatively low in the tower, the Wind Pool sent a market signal to reinsurers that alternative risk transfer was, in fact, a viable alternative to traditional reinsurance.[140] Third, the market signal was apparently received by traditional reinsurers. As in 2013, one notices that at *two* layers of reinsurance (just below and just above the cat bond), the Wind Pool was able to acquire aggregate reinsurance coverage, as opposed to only one such layer in 2012.[141] Altogether, in 2013, the North Carolina Wind Pool continued its financial strategy of arranging coverage ahead of time, through retained earnings, member assessments, cat bonds, and reinsurance for a 100-year PML coastal event.[142]

It is worth contrasting, although in much less detail, North Carolina's storm-financing strategy with alternative strategies followed in two of the highest-risk Gulf or Southeastern states, Texas and Florida. Each of these states is considered at high risk for storm damage partly because both states have been located within many historical storm tracks and partly because each of these states has significant property valuations in harm's way.[143] A point often lost in debates over the rising cost of catastrophes is that mount-

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[138] *See Tar Heel Re Cat Bond Grows to $500m, Follows Trend on Lower Pricing*, ARTEMIS (Mar. 25, 2013), http://www.artemis.bm/blog/2013/03/25/tar-heel-re-cat-bond-grows-to-500m-follows-trend-on-lower-pricing/ [https://perma.cc/D3P6-7AGG] ("The Tar Heel Re cat bond began marketing as a $200m single tranche of notes. Market sources told us the tranche has grown and is now being marketed, thanks to significant investor demand . . . at an expected size of $500m. That makes this cat bond one of the largest single tranche of cat bond notes ever recorded.").

[139] *See NCJUA/NCIUA Pleased with 'Enhanced Coverage' from Tar Heel Re Cat Bond*, ARTEMIS (Apr. 17, 2013), http://www.artemis.bm/blog/2013/04/17/ncjua-nciua-pleased-with-enhanced-coverage-from-tar-heel-re-cat-bond/ [https://perma.cc/82NF-MXM4] (quoting Chi Hum of GC Securities concluding that "[a]mongst residual market entities, NCJUA/NCIUA has pioneered the optimization of traditional reinsurance and capital markets capacity to achieve a more robust program in terms of price, trigger, and duration for the benefit of the member companies and the policyholders of North Carolina").

[140] *See id.*

[141] *See* Figure 3, *supra* note 94.

[142] *See id.*

[143] *See* Daniel S. Wilks et al., *Statistical Extension of the National Hurricane Center 5-Day Forecasts*, 24 WEATHER & FORECASTING 1052, 1053 fig.1 (2009), http://journals.ametsoc.org/doi/pdf/10.1175/2009WAF2222189.1 [https://perma.cc/37UY-SV5E] (showing storm-track probabilities of hurricanes hitting Florida and Texas); *see also* Andrew Freedman, *Top 5 Most Vulnerable U.S. Cities to Hurricanes*, CLIMATE CENT. (June 6, 2012), http://www.climatecentral.org/news/top-5-most-vulnerable-us-cities-to-hurricanes [https://perma.cc/PED2-KG6H] (describing how Florida and Texas having three of the five most vulnerable U.S. cities based on storm track, hurricane frequency, and populations at risk).

ing outlays for storm damage reflect as much the value of what a storm hits, as the growing frequency or magnitude of the storms themselves.[144] Thus, in 2013, Florida was second in the nation in the value of insured coastal property (the built environment), with a total of approximately $2.8 trillion in exposed property; Texas was third, with $1.1 trillion.[145] In contrast, in 2007, the value of North Carolina's insured coastal properties was only $163.5 billion—reflecting the fact that North Carolina really has no major urban areas at the coast.[146]

B. The Texas Windstorm Insurance Association

In 1971, after Hurricane Celia reinforced the financial risks of storm losses, the Texas legislature created the Texas Catastrophe Property Insurance Association, since renamed the Texas Windstorm Insurance Association ("TWIA").[147] Perhaps no other state residual-risk organization has had such a star-crossed recent history as TWIA—the subject of class action litigation, a special session of the state legislature, and a recent brush with receivership.[148] Although there is evidence that at least some of TWIA's problems may have been self-inflicted, TWIA also legitimately sought to develop innovative methods of modeling post-event losses attributable to wind that otherwise had been the subject of years of post-hurricane "wind-versus-water" litigation throughout the Southeast and Eastern states.[149] TWIA's

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[144] *See, e.g.*, HOWARD C. KUNREUTHER & ERWANN O. MICHEL-KERJAN, AT WAR WITH THE WEATHER 3 (2009) (explaining that the key socioeconomic factors causing increased dollar losses from hurricanes are the real-estate developments in hazard-prone areas and the increased value at risk).

[145] *See Insured Property Values in Coastal States Top $10 Trillion; Florida Has Most at Risk; Miami Ranks 2nd Among Metros*, INS. J. (June 17, 2013), http://www.insurancejournal.com/magazines/features/2013/06/17/295207.htm [https://perma.cc/PG7Z-6YYU] (citing data provided by AIR Worldwide in chart).

[146] *See* AIR WORLDWIDE, THE COASTLINE AT RISK: 2013 UPDATE TO THE ESTIMATED INSURED VALUE OF U.S. COASTAL PROPERTIES 4 (2013), https://www.air-worldwide.com/publications/white-papers/documents/the-coastline-at-risk-2013 [https://perma.cc/E9RZ-QJ84].

[147] Kim A. Yelkin & David T. Weber, *Texas Enacts Windstorm Insurance Reforms; Will They Be Enough?*, INS. J. (July 30, 2009), http://www.insurancejournal.com/news/southcentral/2009/07/30/102629.htm [https://perma.cc/G9Y5-EU2Q].

[148] *See* Richard J. Fidei & Erin T. Siska, *Top Ten Insurance Regulatory Issues and Trends of 2012*, 2013 EMERGING ISSUES 6880, 6880; Michael S. Wilson, *A Procedure for Segregating Damages from Wind and Flood Water*, 16 TEX. TECH. ADMIN. L.J. 141, 154–63, 174 (2014); *see also* JOHN W. POLAK, TEX. WINDSTORM INS. ASS'N, 2015 ANNUAL REPORT CARD 8 (2015), https://www.twia.org/wp-content/uploads/2015/06/TWIA-2015-Annual-Report-Card-incl-CAT-Plan.pdf [https://perma.cc/TBW5-CHP5] ("[The Department of Insurance] placed the Association under Administrative Oversight in February 2011 . . . .").

[149] *See* Fidei & Siska, *supra* note 148, at 6880 ("TWIA was placed into receivership in February 2011 amid concerns expressed about TWIA's claims handling and alleged administrator mis-

innovation sadly left them strategically open to a tradition of class-action litigation in Texas precisely because the innovation was designed to make decisions statistically across a class of insured properties.[150] Despite these recent controversies, TWIA is an interesting residual-risk program to evaluate because it highlights the use of policyholder assessments as a financial tool, and in particular the use of post-event financing secured by a stream of annual policyholder and insurer post-event assessments that was not reflected in the financial toolbox used in North Carolina.

To some extent, TWIA's governing structure has played a role in this choice of financing mechanism. Until very recently, TWIA's board of directors consisted of equal numbers of insurance-industry representatives and representatives from those first-tier counties most at risk for storm damage, and three other members, only one of whom must reside in a non-first-tier county.[151] Thus, even though TWIA could propose rate increases—subject to approval by the Texas Department of Insurance only if they exceeded five percent increases—it should surprise no one that coastal property premium rates remained systematically low and inadequate to cover anything close to a 1-in-100-year PML event.[152] A 2011 consultant's report indicated that rate increases of 45% on residential property would be necessary to cover TWIA's exposures, and a more recent report in 2015 indicated that rates were still 22% below actuarially-fair levels.[153] Although TWIA could

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conduct and conflicts of interest."); Wilson, *supra* note 148, at 154–63 (explaining TWIA's development of statistical and engineering protocols to help attribute losses to wind). *See generally* Hornstein, *supra* note 3, at 16–21 (recounting recent "wind versus water" post-hurricane litigation in Southeastern courts).

[150] *See* Wilson, *supra* note 148, at 167–73 (noting that in Texas there were available 18% penalties, prejudgment interest awards, and attorneys' fees in the 25–33% range, that drove class action lawsuits).

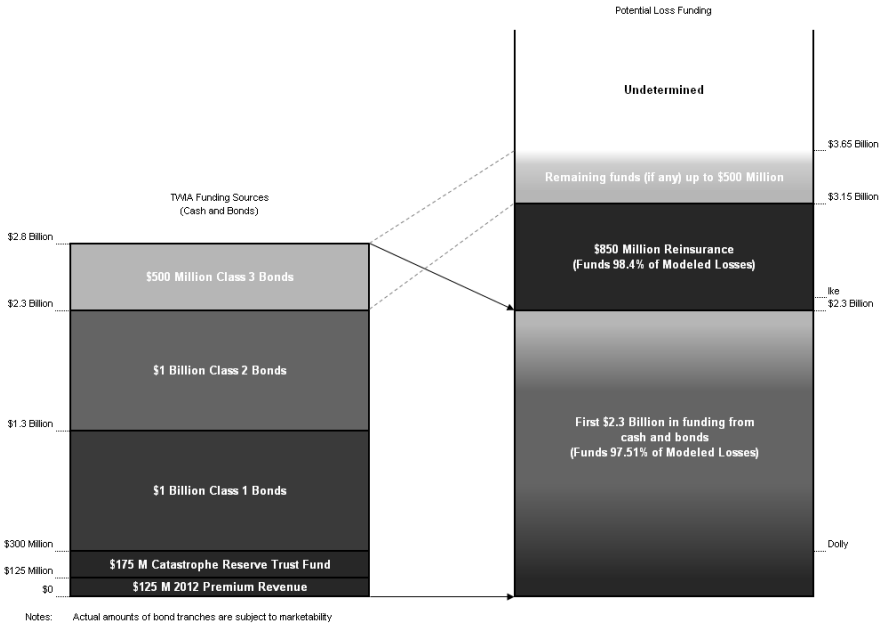
[151] *See generally* POLAK, *supra* note 148, at 3 (noting that recently, the Texas legislature enacted SB 900, which will change the composition of the board by reducing the public and industry representatives from four to three, and increasing non-coastal representatives from one to three).

[152] *Compare* Figure 4, *supra* note 94 (illustrating the financials considered by TWIA in 2012), *with* Figure 5, *supra* note 94 (revealing that, in 2012, Texas hadn't accounted for sufficient funding for the $4.9 billion loss that it estimated in 2015 would be needed for a 1-in-100-year storm season). *See also* Email from Gina Schwitzgebel, Gen. Manager, NCIUA to author (Apr. 10, 2014) (on file with author) (showing that two version of TWIA's 2013–2014 financing plan, one version showed financing for 1-in-100 year storms as "undetermined" while another version alluded to assessments against member insurance companies to obtain financing, followed by policy surcharges on customers thereafter).

[153] *See* ALVAREZ & MARSAL INS. ADVISORY SERVS., LLC, RESTRUCTURING OPTIONS REPORT 11 (2011), http://www.tdi.texas.gov/reports/documents/twiarestructure.pdf [https://perma.cc/A7HU-AAA4]; Josiah Neeley, *Insurance Bills Could Have a Big Impact on Texas,* R ST. (May 20, 2015) [hereinafter *Insurance Bills*], http://www.rstreet.org/op-ed/insurance-bills-could-have-a-big-impact-on-texas/ [https://perma.cc/8WC6-XW9Q]. The improvement in Texas rate adequacy

also set aside funds in a special Catastrophe Reserve Trust Fund, TWIA has generally chosen to raise funds through public securities, typically offered post-event and secured by TWIA's ability to impose a range of assessments.[154] To illustrate, the following financial tower, Figure 4,[155] is one that TWIA considered in 2012:

Figure 4—TWIA Proposed Financial Tower, 2012



In contrast to North Carolina's financial strategy, there are three important features of TWIA's tower that is represented above in two parts, the left-hand chart being TWIA's plan for financing the lower layers of its financial obligation to policyholders (up to $2.8 billion), and the right-hand chart the upper layers (up to $3.15 billion and, if any funds remained, up to

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could reflect the fact that TWIA can impose rate increases of 5% annually without departmental approval, something that it has done consistently in recent years. *See* Josiah Neeley, *TWIA Raises Rates Ahead of Board Restructuring*, R ST. (Aug. 13, 2015) [hereinafter *TWIA Raises Rates*], http://www.rstreet.org/2015/08/13/twia-raises-rates-ahead-of-board-restructuring [https://perma.cc/NTX7-VCHM] ("The 5 percent hike in premiums was approved on a 5-4 vote . . . . It is the fifth consecutive year the board has approved a 5 percent increase.").

[154] *See* POLAK, *supra* note 148, at 28; *Insurance Bills*, *supra* note 153. *See TWIA Raises Rates*, *supra* note 153.

[155] *See* Email from Gina Schwitzgebel, Gen. Manager, NCIUA to author (Oct. 1, 2012) (on file with author).

$3.65 billion).[156] First, compared to North Carolina's 2012 plan (Figure 2), there is relatively little money on hand in the bottom-most layer, even including the state's Catastrophe Reserve Trust Fund.[157] Through a combination of low premium rates and a relatively active recent series of storms, the state had mostly spent each year what it brought in, leaving only $300 million in assets, half of North Carolina's bottom layer, despite Texas having much greater financial and meteorological exposures than did North Carolina.[158] Second, rather than spend dollars up front to fund in place reinsurance for the next levels of risk (layers 3, 4, and 5 on the left), the state relied on the sale of bonds, mostly post-event bonds backed by an assortment of assessments.[159] A focus on this use of bonding as a financial mechanism is discussed immediately below.

Third, the top of Texas' tower (right side) vaguely describes a financial plan to cover losses above $3.65 billion as "undetermined," which was an amount *far* below the industry's prudent contingency benchmark 1-in-100-year PML event (which, by way of reference, in 2015 in Texas was $4.9 billion).[160] In short, a simple snapshot of TWIA taken in 2012, based on its financial plan alone, would have revealed a fairly contingent financial structure on which was based a tradition of chronically underpriced insurance rates enabling overdevelopment of the Texas coast in areas of hurricane danger, a we'll-worry-about-it-when-it-happens financial plan for post-event bonding, and no real financial plan at all for a worst-case event within the insurance industry's 1-in-100-year PML planning horizon.

TWIA's use of bonds in layers 3, 4, and 5 raises three other issues. The first involves a matter of timing and whether the bonds are to be arranged post-event or pre-event. Prior to the enactment by the Texas legislature of House Bill 3 in 2011, TWIA could only issue post-event bonds, which incurred the risk that a serious storm would require financing at a time the bond market was weak or, as was the case with Hurricane Ike that caused enormous damage to Texas in 2008 at the height of the financial crisis, virtually nonexistent.[161] Second, the ability to raise funding after-the-fact helps to suppress rate adequacy *ex ante*, which only magnifies the moral hazard

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[156] *See* Figure 4, *supra* note 94.
[157] *See id.*
[158] *See id.*
[159] *See id.*
[160] *See* POLAK, *supra* note 148, at 6, 30.
[161] *See* Chad Hemenway, *Reform Bill Gives TWIA Ability to Issue Pre-Event Bonds*, PROPERTY CASUALTY 360° (June 29, 2011), http://www.propertycasualty360.com/2011/06/29/reform-bill-gives-twia-ability-to-issue-pre-event.

that low rates will actually incentivize building poorly in harm's way.[162] And finally, the various assessment pools available for bond financing raise questions of cross-subsidies and fairness.[163] Not all of the implications are bad. For example, as seen below, under TWIA's newest financing tower, "Class I securities," the first layer of debt financing, are to be secured with assessments solely on TWIA policyholders.[164]

At least in this situation, those who most benefited from the artificially lower rates caused by post-event financing will be the first on the hook in the event that more is needed. In contrast, in North Carolina, should retained surplus not be enough, an assessment is made on North Carolina insurers generally (whether or not they write at the coast), a statewide financial contingency for which presumably North Carolina insurers obtain statewide rates. On the other hand, TWIA "Class II securities," the next layer in the tower, are repaid 30 percent by assessments on insurance companies generally (presumably accounted for in statewide rates), and 70 percent on a mix of TWIA policies as well as on *non*-TWIA coastal homeowners/wind policies, coastal business fire insurance, and coastal personal/commercial auto policies, forcing those who did not benefit from low TWIA rates to pay for the losses suffered by TWIA policyholders who did enjoy those rates.[165] Finally, TWIA "Class 3 securities" are placed on those

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[162] *See TWIA Raises Rates*, *supra* note 153 ("TWIA has a longstanding problem, in that the rates charged by the agency for its policies are not nearly enough to meet expected future claims."). As to the link between a *post-hoc* bonding strategy and unduly low rates *ex ante*, see Letter from Robin Smith Wescott, Florida Office of Insurance Consumer Advocate to Federal Insurance Office, to Director McGrath, Federal Insurance Office 1–2 (June 24, 2013) (on file with the Boston College Environmental Affairs Law Review) ("[The state] has relied heavily upon . . . bonding capacity . . . to pay claims in the event of a hurricane . . . . These events have facilitated lower rates in the marketplace; lower than what most would deem actuarially sound."). As to the link between poor insurance design generally and losses suffered during Hurricane Ike on the Bolivar Peninsula, see *Gulf Coast Construction Deemed 'Woefully Inadequate' for Storm Surge*, INS. J. (Oct. 5, 2009), http://www.insurancejournal.com/magazines/features/2009/10/05/158797.htm [https://perma.cc/9RDH-TQXP] (describing how homes on the Bolivar Peninsula in Texas built to higher elevations than those required by FEMA's base-flood-elevations under the National Flood Insurance Program survived Hurricane Ike storm surge, while those built only to the federal requirements did not).

[163] *See* ROBERT P. HARTWIG & CLAIRE WILKINSON, INS. INFO. INST., RESIDUAL MARKET PROPERTY PLANS: FROM MARKETS OF LAST RESORT TO MARKETS OF FIRST CHOICE 19 (2011), http://www.iii.org/sites/default/files/ResidualMarketUpdate2011rh.pdf [https://perma.cc/8LUK-EVXT] (detailing how a study by the Insurance Research Council found that "63 percent of those from interior counties and non-coastal states believe policyholder subsidies for wind damage coverage in coastal areas are unfair").

[164] *See* Seth Chandler, *Insurance Commissioner Tries to Fix Fatal Bug in Windstorm Statute*, TEX. WINDSTORM (Mar. 4, 2014), http://catrisk.net/tag/twia/ [https://perma.cc/C8FG-YACL].

[165] *See id.*

insurers in the state who are forced to participate in TWIA, again externalizing costs across the state for benefits received primarily at the coast.[166]

With this financial baseline in mind, TWIA's finances since 2012 have improved. Due to a series of incremental rate increases, some legislative and administrative changes, and a few years of relatively mild weather, TWIA's 2015 financial tower at Figure 5[167] shows somewhat greater resilience:

Figure 5—TWIA Financial Tower for 2015

Again, there are three noteworthy points about TWIA's change of circumstances between 2012 and 2015. First, due to relatively mild weather, funds have built up in the bottom of the tower (increasing from $300 million in 2012 to $600 million in 2015), and surplus funds also allowed for an enhanced reinsurance program at the top of the tower (now including TWIA's use of catastrophe bonds as well), providing for coverage up to the industry standard 1-in-100-year PML event.[168] But, second, TWIA still continues to substitute the sale of public securities after a storm event for having enough funds on hand ahead of time through adequate premium rates to pre-pay for full coverage up front, as does North Carolina.[169] Which leads,

[166] *See id.*

[167] *See* TEX. WINDSTORM INS. ASS'N, 2015 MEDIA BRIEFING BOOK 7–8 (2015) https://www.twia.org/wp-content/uploads/2015/10/TWIA_Media_Handbook_October_2015.pdf.pdf [https://perma.cc/4F9A-4LMT]. *See generally* POLAK, *supra* note 148 (discussing TWIA's finances).

[168] *See supra* notes 29, 77 and accompanying text.

[169] *See supra* notes 29, 77 and accompanying text.

third, to the danger not only that TWIA operates as a vehicle to enable suppressed rates that carry with them the moral hazard of encouraging development in harm's way, but also the danger that a storm could coincide with poor economic conditions in which no one would want to buy TWIA's Class 1 public securities or even its somewhat-better-secured Class 2 public securities.[170]

C. The Florida Citizens Property Insurance Corporation

For the purposes of focusing on state-level catastrophe financing, it is instructive, lastly, to consider Florida, the state most at risk of suffering weather catastrophe losses.[171] In 2002, Florida Governor Jeb Bush oversaw the creation of the state's residual-insurance entity, the Florida Citizens Property Insurance Corporation ("Florida Citizens"), as an "insurer of last resort" allowed to offer rates only if they were "higher than the private market."[172] But the possibility of severe rate increases following a series of hurricanes that struck Florida in 2004 and 2005 led Governor Charlie Christ and the Florida legislature in 2007 to abandon that requirement.[173] Rates were decreased, eligibility requirements relaxed, and a substantial increase in subsidized reinsurance for Florida Citizens was authorized to be provided by the Florida Hurricane Catastrophe Fund ("FHCF"), a state reinsurance facility created in 1993.[174] The predictable result was a huge increase in Florida Citizens' book of business—it soon became Florida's largest property insurer, "with more than a million policies and $400 billion in exposure."[175] By 2012, Florida Citizens considered two alternative financial

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[170] Indeed, TWIA has had trouble being able to issue Class I bonds. *See supra* notes 29, 77 and accompanying text.

[171] *See* R.J. Lehmann, *Lasting Reforms for Florida's Property Insurance Market,* 75 JAMES MADISON INST.: BACKGROUNDER, Jan. 2015, at 1, 3, http://www.rstreet.org/wp-content/uploads/2015/01/2015-Insurance-Study-FINAL.pdf [https://perma.cc/L9HY-SAQC] (describing how Florida has more property at risk than all other "hurricane alley" states combined, a total coastal exposure in excess of $2.9 trillion).

[172] *See* Carolyn Kousky, *Managing Natural Catastrophe Risk: State Insurance Programs in the United States*, 5 REV. ENVTL. ECON. & POL'Y 153, 163 (2011). Excellent background treatment of the organizational origins of Florida Citizens is found in NEWMAN, *supra* note 125, at 25 (describing how Florida Citizens formed in 2002 when Florida Residential Property and Casualty Joint Underwriting Association and the Florida Windstorm Underwriting Association were combined)*; see also* Evan Lehmann, *How Jeb Bush Handled Risky Business in a Disaster-Prone State,* CLIMATEWIRE (July 6, 2015), http://www.eenews.net/stories/1060021245 [https://perma.cc/HBR2-J6S2] (illustrating how Governor Bush oversaw the creation of Florida Citizens).

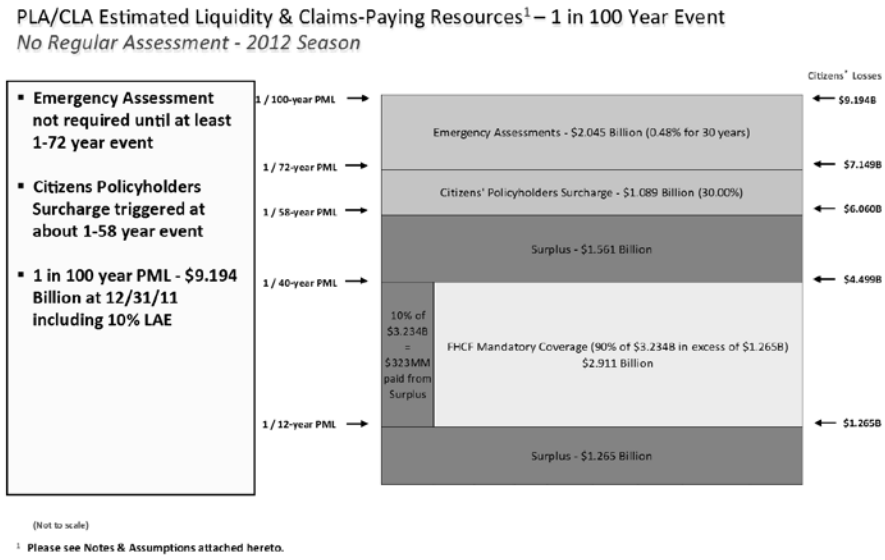
[173] *See* CITIZENS PROP. INS. CO., 2012 SEASON ANALYSIS 4 (2012) (on file with the author); Kousky, *supra* note 172, at 163.

[174] *See* NEWMAN, *supra* note 125, at 32.

[175] *See* Kousky, *supra* note 172, at 163.

strategies to handle its worst-case obligations, depicted below in Figures 6 and 7:[176]

Figure 6—Florida Financial Tower, 2012 (alternative version A)



In "Version A" of Florida's 2012 financial tower, shown in Figure 5 above, there are four salient features. First, rather than turn first to retained earnings (shown above as "surplus") before considering other options, Florida spreads out its use of surplus over the first three tranches. Normally, this would come at a cost because it would lower the attachment point at which private reinsurance would first be engaged, and thus raise reinsurance rates because there was greater risk to the reinsurer of having to pay.[177] But, second, Florida gets around this problem by showing in its second tranche payments from the FHCF, the public reinsurance facility operated and funded by the state itself.[178] The idea of having government-provided reinsurance as a financing strategy has been criticized because it concentrates losses within-state rather than spreading them more efficiently globally through private reinsurance, but is not without rough analogs in such other

[176] *See* Email from Gina Schwitzgebel, Gen. Manager, NCIUA to author (Sept. 28, 2012) (on file with the author).

[177] *See supra* note 106 and accompanying text (explaining attachment points).

[178] *Hurricane Catastrophe Fund*, FLA. STATE BD. OF ADMIN., http://www.sbafla.com/fhcf/ [https://perma.cc/ESK9-97VP].

public insurance programs as federal terrorism insurance and California earthquake insurance.[179] The FHCF in 2012 was capitalized at $18 billion, capital backed by the State's authority to impose assessments on policyholders (not insurers) holding home, auto, boat, and motorcycle policies.[180] Third, Figure 6 also reflects the possibility of overlapping consumer charges to reimburse Florida Citizens for past payments, as reflected in the fourth layer, to impose on all Florida Citizens property insureds (alone) a surcharge of approximately $1 billion.[181] Fourth, rather than turn to the capital markets for alternative risk financing, Version A of the Florida Citizens tower would impose at the top tier a $2 billion emergency assessment on the State's property insureds.

Florida also considered an alternative financing plan in 2012, shown below as Figure 7:[182]

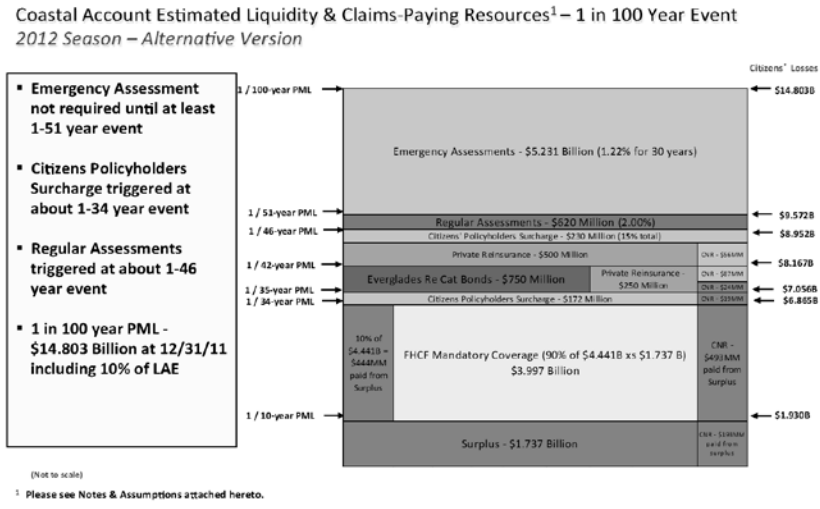
[179] *See* Lehmann, *supra* note 171, at 7 ("The [Florida] Cat Fund turns the principle of diversification on its head by concentrating Florida's peak hurricane risk within the state, rather than spreading it around the world, as private reinsurers do."). *See generally* CAL. EARTHQUAKE AUTH., THE EARTHQUAKE INS. AFFORDABILITY ACT (n.d.), http://www.earthquakeauthority.com/media/SiteAssets/Pages/Media-Resources/Earthquake%20Insurance%20Affordability%20Act%20-%20%20Protecting%20Homeowners%20and%20Taxpayers.pdf [https://perma.cc/88V8-Q72N]; Anne Gron & Alan O. Sykes, *Terrorism and Insurance Markets: A Role for the Government as Insurer?* 36 IND. L. REV. 447, 447 (2003).

[180] *See* Press Release, Reuters, Fitch Affirms Florida Hurricane Catastrophe Fund Finance Corp. at 'AA' (Apr. 24, 2012, 1:16 PM), http://www.reuters.com/article/idUS203666+24-Apr-2012+BW20120424 [https://perma.cc/AJM8-QE3N].

[181] *See* Figure 6, *supra* note 94.

[182] *See supra* note 176 and accompanying text.

Figure 7—Florida Financial Tower, 2012 (alternative version B)



Alternative B in Florida Citizens' 2012 financial tower reflects changes that were beginning to sweep catastrophe insurance markets worldwide.[183] First, a huge surge in private capital flooding reinsurance and alternative-risk-financing (cat bond) markets worldwide had so driven down the price of private coverage that Florida actively contemplated updating its financial plan to take advantage of this development.[184] Thus, Alternative B would turn to capital markets to provide alternative risk financing through the Everglades Re Cat Bond (4th layer), perhaps reflecting increasing concern that over-extending the FHCF was exerting too great a drag on Florida's credit rating.[185] Second, for similar reasons, Florida considered going to the private reinsurance market (4th and 5th layers), rather because the cost of private reinsurance had become competitive with FHCF pricing.[186] Third, in the 7th layer, the state began experimenting with the idea of a "regular" assessment in addition to the 8th layer "emergency" assessment, illustrating the risk that, in Florida, policyholders were increasingly facing a variety of different and sometimes overlapping surcharges and assessments in addition

[183] *See* Figure 7, *supra* note 94.

[184] *See, e.g.*, Myles Neligan & Ben Berkowitz, *Analysis: Investors Turning to Reinsurance for Juiced Returns,* REUTERS (May 29, 2012, 3:15 PM), http://www.reuters.com/article/us-reinsurance-investors-idUSBRE84S17H20120529 [https://perma.cc/D3ZR-RQ69]; *see* Figure 7, *supra* note 94.

[185] *See* Figure 7, *supra* note 94.

[186] *See id.*

to rising Florida Citizens rates.[187] In short, assessment-fatigue was beginning to become a political issue in Florida.[188]

But perhaps the most valuable insight from studying Florida's approach to storm insurance is the degree to which "depopulation" has become a major financial strategy. Depopulation is a program whereby a residual entity deliberately adopts mechanisms to shed its policyholders into the private market.[189] Certainly it is not a new idea. In the mid-1990s, Florida Citizens' precursor began a depopulation program that provided bonuses of $100 per policy to new insurance companies willing to accept these risks for a minimum of three years.[190] The results were unsurprisingly mixed, given the insurability issues that led most major insurers to abandon the private wind market in the first place. Many of the policies returned to Florida Citizens at the end of three years, and some of the new companies went bankrupt for lack of capital with the 2004 and 2005 hurricanes, "requiring the state to cover their losses through the state guarantee association."[191] Nonetheless, with the election of Florida Governor Rick Scott, a free-market-oriented Republican, the idea of depopulating Florida Citizens received a major political push.[192] In 2013, Governor Scott signed Senate Bill 1770, designed to return Florida Citizens to its previous status as an insurer of last resort, partly by prohibiting subsidized coverage for new construction in environmentally sensitive areas and partly by creating a "clearinghouse" by which existing policyholders would be steered to private carriers but with temporary protection against rate increases.[193]

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[187] *See id.*

[188] *See, e.g.*, News Release, Fla. Chamber of Commerce, Elimination of Hurricane Tax Assessments Means More Money in the Pockets of Floridians (Dec. 22, 2014), http://www.flchamber.com/article/elimination-hurricane-tax-assessments-means-money-pockets-floridians/ [https://perma.cc/SH5V-CPEK].

[189] *See, e.g.*, *Florida Citizens Depopulation Program Frequently Asked Questions*, HERITAGE INS., http://www.heritagepci.com/resources/faqs/ [https://perma.cc/Y7EU-RMC8].

[190] *See* Kousky, *supra* note 172, at 165.

[191] *Id.*

[192] *See Florida Homeowners Insurance Bill Passes This Week*, LIVE INS. NEWS (May 2, 2013), http://www.liveinsurancenews.com/florida-homeowners-insurance-bill-passes-this-week/ [https://perma.cc/9WVA-4ZTQ]; *Governor Scott Signs Bill to Reform Citizens,* FLGOV.COM, http://www.flgov.com/governor-scott-signs-bill-to-reform-citizens-2/ [https://perma.cc/9ZZE-WESP] ("[T]his law helps protect the environment by removing subsidies for new construction in environmentally sensitive coastal areas."). The bill also prevents Florida Citizens "from insuring homes valued at over $1 million, a cap that gets lowered gradually until it reache[s] $700,000 in 2017." Chad Hemenway, *Florida Gov. Scott Signs Bill to Reform Last-Resort Insurer,* PROPERTY CASUALTY 360° (May 30, 2013), http://www.propertycasualty360.com/2013/05/30/florida-gov-scott-signs-bill-to-reform-last-resort.

[193] *See Governor Scott Signs Bill to Reform Citizens*, *supra* note 192.

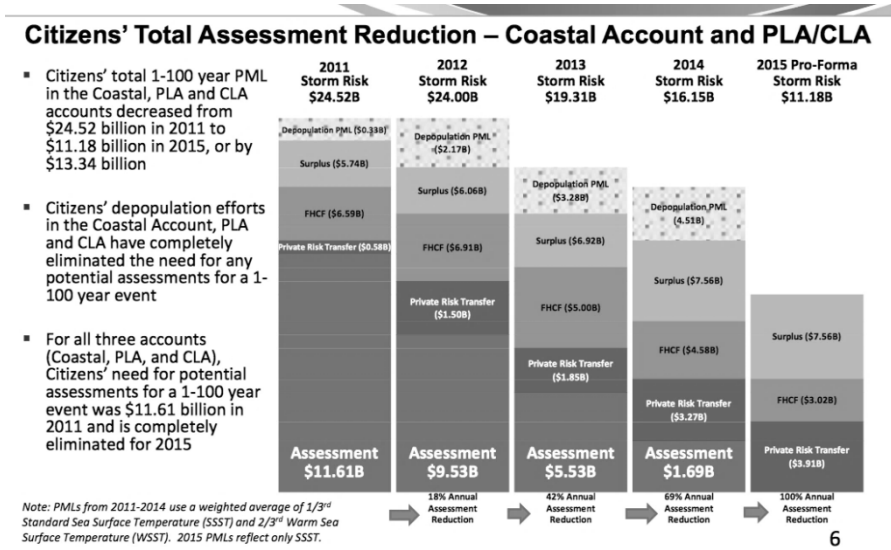
In the two years since, the extent of depopulation of policies from Florida Citizens has been remarkable; from a peak of 1.5 million policies in 2012, Florida Citizens had shed hundreds of thousands of policies and, by January 2015, had plans to reduce the policy count to 670,000 (more than a 50% reduction) within a year or two.[194] And the most common political justification for the "takeout" movement has been freedom from assessments; both from the point of view of Florida Citizens itself (with fewer policyholders, less need to rely on assessments) and from the point of view of non-Citizens policyholders who would not be tapped for some "Citizens-only" assessments once they were insured by private, takeout companies.[195] The effect of depopulation on Florida Citizens financial strategy is well captured in the following chart at Figure 8[196] provided by Florida Citizens in 2015:

[194] *See* Carolina Bolado, *Fla.'s State Insurer Plows Through Policy Sell-Off in 2015*, LAW360 (Jan. 8, 2015, 6:18 PM), http://www.law360.com/articles/609231/fla-s-state-insurer-plows-through-policy-sell-off-in-2015 [https://perma.cc/9BRJ-K5XU]; *see also Florida OIR Approves Removal of up to 427,584 Policies from Citizens,* INS. J. (Sept. 5, 2014), http://www.insurancejournal.com/news/southeast/2014/09/05/339742.htm [https://perma.cc/J6VL-7ML2] (reporting the removal of Florida Citizen policies).

[195] *See* Barry Gilway, *Citizens Taking 'Bold Yet Responsible' Depopulation Step*, PROPERTY CASUALTY 360° (May 24, 2013), http://www.propertycasualty360.com/2013/05/24/citizens-taking-bold-yet-responsible-depopulation ("More importantly, the agreement will cut potential assessments on Floridians by $439 million in the event of a 1-in-100 year storm."). "For the 60,000 [takeout] policyholders, the arrangement . . . will reduce their assessment risk, which for Citizens policyholders can reach 45 percent of premium." *Id.*

[196] *See* JOHN ROLLINS & BRIAN DONOVAN, CITIZENS PROP. INS. CORP., 2016 FLORIDA CITIZENS RATE FILING 7 (2016), https://www.citizensfla.com/documents/20702/24721/09Bd_2016_Rates_Presentation.pdf/2c01a854-ceb6-45c4-a585-b4ed6b78d956 [https://perma.cc/CYD9-WSZX].

Figure 8—Effect of Depopulation on Florida Citizens' Financing



Whatever the short-term effect on Citizens' balance sheet, the long-term efficacy of depopulation remains, in fact, uncertain. In the short-term, the chart in Figure 8 shows simultaneously a growing reduction in Florida Citizens' policyholders (growing "depopulation" in the top layer), a growing residual-plan surplus, and reduced assessments.[197] All of which, again in the short term, are good.[198] There has also been a reduction in Florida Citizens' reliance on state-provided reinsurance through the FHCF, a positive step toward increasing the state of Florida's credit-worthiness, and a corresponding increase in private risk transfer through market-based reinsurance and cat bond mechanisms, which spread risks more efficiently globally than would have placement with FHCF and therefore are also considered positive developments.[199] The question is the long-term sustainability of these gains. For the last few years, Florida has enjoyed a string of notably quiet hurricane seasons, allowing surplus to grow; independently, there has been an explosion of capital into reinsurance and alternative-finance market that has driven down private reinsurance rates, allowing both Florida Citizens and the new crop of smaller takeout companies to externalize their risks cheaply.[200]

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[197] *See* Figure 8, *supra* note 94.

[198] *See id.*

[199] *See id.*

[200] *See RenaissanceRe Holdings' (RNR) CEO Kevin O'Donnell on Q1 2015 Results—Earnings Call Transcript,* SEEKING ALPHA (May 7, 2015, 2:39 AM), http://seekingalpha.com/

As the rating agency A.M. Best concluded in a recent report: "[Takeout companies have been] afforded . . . the opportunity to capitalize on extremely favorable reinsurance market conditions."[201] Whether the private takeout market could withstand a change in circumstances is unclear. A flavor of the conflicting opinions on the subject can be found in exchanges between investors who acknowledge being "short" some of the takeout companies (and therefore have a vested interest in downgrading the companies' prospects), and those who admit being "long" (and therefore have an interest in defending their investments).[202] Perhaps the most muted conclusion is that of A.M. Best, which said of the takeout companies as a group: "[T]here is significant risk in these strategies as proper risk management . . . risk analytics and overall infrastructure to effectively manage the [new] growth are in some cases untested."[203]

CONCLUSION

Although the legal literature on storm insurance has focused on federal flood insurance and important, but relatively simple questions of rate ade-

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article/3151316-renaissancere-holdings-rnr-ceo-kevin-odonnell-on-q1-2015-results-earnings-call-transcript [https://perma.cc/APS6-HY8Q] ("While we are all thankful that Florida has not experienced a major hurricane in almost a decade, it is our belief that the risk of an event in Florida has not changed. Recent good fortune should to alter one's analysis of the risk."); *The Unsustainable State of the Florida Property Insurance Markey, Part IV,* SEEKING ALPHA (Nov. 3, 2014, 6:50 PM), http://seekingalpha.com/article/2633085-the-unsustainable-state-of-the-florida-property-insurance-market-part-iv [https://perma.cc/E236-NNTC] ("Capital has flooded into reinsurance pressuring rates, reducing a key expense for [new takeout companies]. Resulting cost savings makes Citizens' current depopulation effort appear successful and the [companies'] business model viable."). It bears emphasis that this source, RH Analytics, discloses that it is "short HCI," one of Florida's leading take-out companies, raising questions about the motives of the author.

[201] *See* BEST'S SPECIAL REPORT, FLORIDA PROPERTY INSURERS REMAIN UNTESTED: WILL 2015 BE THE YEAR? 3 (2015), http://www.propertyinsurancecoveragelaw.com/AM%20Best%20Report%20on%20Florida%20Property%20Market%207-20-2015%20(T1132804xB2E7A).pdf [https://perma.cc/MJ4S-22LK].

[202] *See, e.g.*, Alfred L. Angelici, *HCI Group Inc.: The Shorts Don't Know They're Swimming Naked*, SEEKING ALPHA (Aug. 10, 2015, 7:11 PM), http://seekingalpha.com/article/3425196-hci-group-inc-the-shorts-dont-know-theyre-swimming-naked?li_source=LI&II_medium=liftigniter-widget [https://perma.cc/3XZR-U7H8] (describing concern regarding how the company at issue has had 31 consecutive quarters of profitability; therefore, "[h]ow . . . can the [s]hort [s]ellers justify their levered positions; especially when all the current and past published data, points in the exact opposite direction?"); *see HCI Group: The Wizards of Tampa*, SEEKING ALPHA (Sept. 16, 2014, 2:17 AM), http://seekingalpha.com/article/2497285-hci-group-the-wizards-of-tampa [https://perma.cc/YE9Z-C9J5] (nine takeout companies failed between 2006 and 2011 without a single hurricane making landfall in Florida; takeout companies receive bonuses collectively totally $150 million to take on these risks).

[203] *See* BEST'S SPECIAL REPORT, *supra* note 201, at 3–4

quacy,[204] an investigation of state residual-risk wind entities reveals a more fluid and experimental set of approaches to the financing of storm risk. What remains unclear, however, is whether these experiments in fiscal federalism are evolving toward sustainable improvements in storm-risk financing or whether, despite their complexities, they remain for those who are drawn to the beauty of the Nation's hurricane-prone coasts and beaches, just a shell game.

[204] *See supra* note 6 and accompanying text.