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Cassandra Cole and Kathleen McCullough
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Risks: Two Insurance-Mitigation Strategies
Following the Recent Gulf Coastal Property
Insurance Crisis**

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Public Policy and Regulation to Reduce Underlying Risks: Two Insurance-Mitigation Strategies Following the Recent Gulf Coastal Property Insurance Crisis

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Abstract

Hazard mitigation is a valuable tool for reducing the damages to residential properties that may result from catastrophic events, such as hurricanes. Because of the upfront costs associated with retrofitting buildings to protect against loss, incentives are often used by insurers and policymakers/regulators to promote mitigation on existing structures. These incentives may include, *inter alia*, tax credits and mitigation grants or financing assistance. Property insurance premium credit programs, which are intended to reflect reductions in expected losses achieved through property improvements, do not exist solely as mitigation incentives. Nevertheless, insurance premium credit programs may be the most influential of all the mitigation policies on individual property owners' choice to fortify existing structures, primarily due to the immediate savings that can be obtained via the reduced insurance premium.

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This paper examines insurance-related public policy for the promotion of hurricane wind mitigation, and specifically compares and contrasts the strategic intent and implementation of such policy, as well as the performance of the insurance markets impacted by these policies. Limited policy success and unintended consequences may result from a non-optimal strategy or an improperly implemented mitigation premium credit program. Our work focuses on property insurance-mitigation programs in two states: Florida and Mississippi. Both states utilized loss relativity studies to implement insurance discount programs, yet with strikingly different approaches. Our analysis does not indicate that either program has experienced full participation by homeowners via actual mitigation activity. The striking contrast in outcomes lies within the insurance marketplace, both private and public. While no evidence exists that the Mississippi wind insurance discounts have harmed the state's market for residential property insurance, the Florida program correlates with poor market performance despite a lack of hurricanes in the intervening years.

Introduction and Motivation

The size and value of coastal properties have grown significantly. Estimated insured values for the coastal counties from Texas to Maine are in excess of \$10.5 trillion (AIR Worldwide, 2013). In Florida alone, the coastal exposures as of late 2013 were an estimated \$2.9 trillion. The use of total insured property values, however, in catastrophe prone areas as a measure of insurer exposure has caveats. The true exposure held by the insurance market depends on the underlying risk of structures as well as these nominal insured (replacement cost) values.

Adequately mitigated properties pose substantially lower risk to insurers' financial statements than do unmitigated (or inadequately mitigated) structures, all else the same. While mitigated properties may hold higher replacement cost due to the property improvement value of the mitigation features, wind damage to these mitigated properties should be reduced because of these improvements. The same result should apply to newer houses built to more stringent new building codes. Cost-effective efforts to reduce potential losses through property hardening have been shown to reduce the financial exposure of citizens, insurers and government to risk, and are, therefore, in accord with sound public policy.

The cost of adding hurricane wind resistance features to new construction is typically lower than for existing construction and can be rolled into overall construction costs. Furthermore, building codes may require property owners and builders to make financial trade-offs in favor of improved storm worthiness (e.g., smaller square footage with a stronger roof system, hurricane shutters in lieu of a swimming pool). Because of the potentially high costs associated with retrofitting existing buildings for hurricane wind resistance, special incentives may

be employed by policymakers to promote mitigation on existing structures.¹ Although the primary basis for mitigation-related insurance premium credits is as a reflection of modeled loss savings, insurance premium discount programs likely have the most impact of all the incentive policies on an individual property owner's decision to make wind improvements to existing structures, primarily due to the immediate savings that can be obtained via the reduced insurance premium. Nevertheless, limited policy success and unintended consequences may result from a non-optimal strategy or an improperly implemented mitigation premium discount program. This paper discusses the importance of properly incenting insurance premium discounts (credits) for the promotion of hurricane wind mitigation. We specifically focus on a comparison between and programs implemented in two Gulf Coast states—Florida and Mississippi—that were both significantly impacted by the 2004–2005 hurricane seasons.

Florida and Mississippi make a particularly interesting set of contrasts for comparison. Each faces significant hurricane wind exposure due to storms in the Gulf Coast.² Both states implemented public policies intended to promote wind mitigation following the difficult 2006 Gulf Coast property insurance and reinsurance environment, prescribing how the discounts would be applied to insurance premiums. While other Gulf Coast states such as Texas, Louisiana and Alabama also began to emphasize wind mitigation, Florida and Mississippi led the way with specific legislation, formal loss relativity studies and substantial wind mitigation programs by 2008–2009, observable by their neighboring states. During the time frame since implementation of these policies, neither Florida nor Mississippi has suffered a land falling hurricane. As a result, an exploration of policy outcomes can be made without the complexity of introducing any hurricane (or event) effect to the study.

Table 1 shows the significant coastal values represented in Florida and Mississippi, as well as in other key coastal states. More important, from a state-level public policy perspective, the table also reveals the importance of coastal insured values to each state's total insured value, at 79% and 13% for Florida and Mississippi, respectively. Both states in this study, therefore, have seen increased exposure to the risk of hurricanes and other coastal storms.³ Based on state categorizations of "coastal," 24 of Florida's counties are coastal and Mississippi boasts five coastal counties. According to the National Oceanic and Atmospheric Administration (NOAA), however, which asserts a broader definition of "coastal" than do most individual states, Florida and Mississippi include 61 and 12 coastal

1. Such incentive programs typically include tax credits and/or mitigation grants or loan financing. Property insurance premium credits, loss-model-based reflections of expected loss savings, may become de facto incentive programs, as well.

2. While Florida's Atlantic coast is also exposed, only the return periods for hurricanes on the South coast (Miami-Dade area) compare to those on the Gulf Coast.

3. It is worth noting that all U.S. states have seen disproportionately high rates of population growth in coastal counties during the past 50 years, as well as increasing importance of the role of these areas to the overall economy.

counties, respectively.⁴ Reduction of the underlying risk is critical to decrease economic costs of windstorms, and the need in overall dollar terms is particularly great in Florida.

Table 1
Estimated Total Insured Values in 2012 \$Billions in Key Coastal States

State	State Total	Coastal Counties	Percent Total	State	State Total	Coastal Counties	Percent Total
Alabama	917.8	118.2	13%	Mississippi	468.5	60.6	13%
Connecticut	879.1	567.8	65%	New Hampshire	278.7	64.0	23%
Delaware	208.9	81.9	39%	New Jersey	2,129.9	713.9	34%
Florida	3,640.1	2,862.3	79%	New York	4,724.2	2,923.1	62%
Georgia	1932.2	106.7	6%	North Carolina	1,795.1	163.5	9%
Louisiana	823.0	293.5	36%	Rhode Island	207.5	58.3	28%
Maine	285.5	164.6	58%	South Carolina	843.6	239.3	28%
Maryland	1,293.4	17.3	1%	Texas	4,580.7	1,175.3	26%
Massachusetts	1,561.4	849.6	54%	Virginia	1,761.7	182.3	10%

Source: AIR Worldwide, 2013.

By contrast with the indications of Florida's relative riskiness offered via the insured value data, the need for reducing the underlying property risk is especially great in Mississippi if one looks at building codes as a proxy for the likely storm worthiness of the existing housing stock. The Insurance Institute for Business and Home Safety (IBHS) released a report in early 2012 that assessed residential building codes across 18 states exposed to hurricanes, ranking Florida first⁵ and Mississippi last with respect to building code effectiveness (IBHS, 2012; IBHS, 2015).⁶ Mississippi had no regulatory process in place for building codes as of the time of the initial IBHS rankings (2011–2012), with the exception of seven counties being required to follow the wind and flood provisions of the 2003 International Residential Code.

Since the initial IBHS report, Mississippi enacted legislation indicating acknowledgement of its building code problems, a move that was cited in the 2015 update of the IBHS ratings for why Mississippi recently rose from the

4. See NOAA's List of Coastal Counties for the Bureau of the Census: Statistical Abstract Series.

5. At the time of the 2012 IBHS rankings, Florida's Residential Building Code was consistent with the wind provisions of the 2009 International Residential Code (IRC), and Florida was fully consistent with the 2006 IRC. Since that time, Florida's building codes have become consistent with the 2012 International Construction Code (ICC).

6. States were scored and then ranked from highest to lowest effectiveness based on multiple factors, including not only the code itself, but also universality of application statewide, local level enforcement, and licensing/education requirements for code officials, contractors and subcontractors.

bottom to third from last in its building code effectiveness rating.⁷ Once the effects of its code improvements can more readily be seen in its building stock, it is possible Mississippi will improve further in its ratings.

Prior to 1990, neither of these two states (or any other hurricane-prone states) had significant or widespread building codes, nor did they provide significant incentives to homeowners to fortify existing properties. When considering that most Florida and Mississippi properties were constructed between 1960 and 1990, the importance of mitigating the existing housing stock in both states becomes clear.⁸

A Review of the Value of, and Obstacles to, Wind Mitigation

The insurance and economics literature are rich with studies on the value of disaster mitigation. Mitigation not only decreases expected losses,⁹ but also increases the value of the property¹⁰ and decreases the burden placed on the public in the event of a catastrophic event.¹¹ Despite its value as both a private and public good, the market for property mitigation still is underinvested. All else the same, we expect property owners to engage in home mitigation in an effort to prevent or

7. Mississippi enacted legislation in spring 2014 that allows cities and counties to adopt “any of the last three editions of the International Building Code and any additional codes as adopted by the Mississippi Building Code Council” as a minimum standard (Adams, 2014a). Unfortunately, the law also included a provision that allows counties to opt out entirely (Adams, 2014b).

8. It is notable here that, assuming adequate enforcement of building codes, given enough time Florida and South Carolina may someday enjoy housing stock that is predominantly wind resistant without additional efforts, while Mississippi, at its present rate of progress can continue to expect substantial loss damage each time a major storm makes landfall near its vicinity.

9. Fronstin and Holtman (1994), reviewing the damage following Hurricane Andrew, found that “consumers have substituted homeowners insurance for structurally sound homes that are built to withstand hurricanes.” That study found that older homes in South Florida (built prior to Florida’s real estate development boom in the 1960s) suffered proportionally less damage than newer homes (largely built post 1960). Residential building codes in Miami-Dade County, Florida, were subsequently strengthened in 1993 and 1994. A barrage of storms during the 2004 and 2005 hurricane seasons tested the effectiveness of these codes. Risk Management Solutions (2009) demonstrated that lower losses were suffered in 2004 and 2005 by structures built in compliance with the most up-to-date (post-2002), strengthened building codes.

10. Simmons, Kruse and Smith (2002), Dumm, Sirmans and Smersh (2015a, 2015b), Dumm, Nyce and Sirmans (2015) and Gatzlaff, McCullough, Medders and Nyce (2015) all observed increased home resale prices for homes that made a mitigation investment.

11. Kleindorfer and Kunreuther (1999a, 199b) and Christoplos, Liljelund and Mitchell (2001) found that mitigation not only reduces direct losses (i.e., saves lives, reduces injuries and lowers property losses), but also measurably increases the public good through alleviation of the indirect poverty effect of catastrophes.

reduce losses and/or to reduce insurance premiums. Research has shown that homeowners may not, in fact, behave in the ways we expect, for various reasons.

Policy and industry studies have indicated repeatedly that perceived lack of affordability and/or lack of return on their investment are the primary reasons property owners do not engage in mitigation.¹² Cost is ranked even higher as a constraint among minorities and low-income homeowners, who unfortunately are also more likely to own properties in the most need of hardening (Peacock, 2003; IHRC, 2004; Medders, 2011). The perceived lack of an acceptable return on investment, especially given the potential length of payback period (i.e., until a storm strikes and savings from mitigation are actualized), is exacerbated when property insurance pricing is not adequately risk-based.

The evidence in the prior literature—theoretical and empirical—strongly indicates that risk-based insurance pricing is a primary criterion related to the proper promotion of mitigation to reduce the risk to the individual, the insurer and government. While insurance transfers risk of financial loss from the individual to the insurance company, it inherently creates an incentive for insurance companies to develop a pricing scheme that rewards policyholders who mitigate. So, while the availability of insurance reduces the incentive to make mitigation expenditures, all else the same, insurance prices can be adequately high to encourage mitigation.¹³

Differing Strategic Policies

Both Florida and Mississippi experienced watershed disaster events that served as impetus to consider property mitigation as a primary platform for public policy in 2007. The unprecedented run of hurricanes impacting Florida in 2004 and 2005, as well as the devastating impact of Hurricane Katrina on the Mississippi coast, impacted the regulation of the financial system utilized to pay

12. Kunreuther et al. (1978) showed the probability of disaster is underestimated by most, leading to underinsurance. Kunreuther and Pauly (2006) submitted that individuals treat insurance as an investment, rather than as protection, and will drop coverage if a “return” is not realized. Thus, after several years with no loss, or if the probability of loss is low, individuals may “forget” about the chance of a loss.

13. See Klein and Kleindorfer (2003) for a mathematical illustration of the relationship between insurance and mitigation. Ehrlich and Becker (1972) found that insurance and mitigation are treated as substitutes by individuals. Kunreuther and Kleffner (1992) further show that if full (no or low deductible) insurance is required, the incentive to engage in mitigation is reduced. Precisely because insurance serves a vital purpose in protecting property owners from catastrophic financial loss in the event of a windstorm, it inherently results in reduced financial consequences to the property owner on a post-loss basis. Therefore, the incentive to make mitigation expenditures is reduced, all else the same. Kelly and Kleffner (2003) found that if premiums are not risk-based, policyholders will invest less in mitigation. Inadequate, excessive and/or unfairly discriminatory insurance premiums result in market problems (e.g., underinsurance, overinsurance, non-optimal mitigation efforts, fraud).

for disaster events and both states suffered sharp spikes in reinsurance rates.¹⁴ In all of the Gulf Coast insurance markets, primary insurers selling homeowners insurance were struck by reduced capacity and unprecedented pricing increases from reinsurers. The general response among insurers was to raise rates to cover the increased reinsurance costs and/or pull out of markets that were no longer considered profitable. State governments in affected regions responded to what was both an availability and affordability market problem with myriad legislation and regulation intended to quell consumer concerns about insurance policies,¹⁵ while at the same time attempting to encourage homeowners to improve the storm-worthiness of their properties. Florida and Mississippi strategies were markedly different, with markedly different results.

Florida's Strategy: A Statewide Focus on Insurance Affordability

Florida's strategy following the 2006 insurance crisis cannot be fully understood without knowledge of the mitigation reforms previously enacted. Florida was ahead of most states in 2006 on promoting mitigation for existing structures, as well as new construction. Efforts to incentivize wind mitigation were underway in the early 1990s. After devastating losses from Hurricane Andrew, in 1993 the Florida Legislature enacted Section 627.0629, Florida Statutes, to require rate filings for all residential property insurance include appropriate discounts, credits or other rate differentials, or appropriate reductions in deductibles, for properties on which fixtures actuarially demonstrated to reduce the amount of loss in a windstorm have been installed (s.13, ch.93-410, Laws of Florida). In 1997, the now Florida Office of Insurance Regulation (OIR)¹⁶ issued rule 690-170.017 F.A.C. The rule required shutter discounts at least equal to the Insurance Services Office (ISO) discounts. In 2000, Section 627.0629, Florida Statutes, was amended to provide rate filings for residential property insurance must include "actuarially reasonable" discounts, credits or other rate differentials, or appropriate reductions in deductibles, for properties on which fixtures "or construction techniques "

14. Hurricane Andrew also impacted Florida's insurance markets, but the public policy effects were limited primarily to the southernmost region of the state, namely Miami-Dade and Monroe counties.

15. The literature has given considerable attention to the government insurance markets for disaster risk. Grace and Klein (2009), Newman (2009, 2010), Medders, Nyce and Karl (2010) and others examine these markets and their effects. Overall, the literature supports the concept that government markets for disaster insurance may bolster private insurance markets if the focus of government intervention is on availability, not affordability of insurance. In markets where the political economy embraces insurance affordability as its charge, negative externalities may result in a crowding out effect on the private market.¹⁵

16. The OIR was at that time legally referred to as the Florida Department of Insurance.

demonstrated to reduce the amount of loss in a windstorm have been installed “or implemented.”¹⁷

In 2002, Applied Research Associates (ARA) conducted two studies to quantify wind loss reduction for wind mitigation construction features. “Development of Loss Relativities for Wind Resistive Features of Residential Structures” focused on single-family homes (ARA, 2002).¹⁸ The result of the implementation of the study as credits was a specific matrix of premium credits based on more than 600 combinations of mitigation features, each with multiple categories and complex category definitions.

In 2003, the OIR rescaled the results of the ARA loss relativity study for single-family homes to make the weakest structure, rather than the average structure, the base house for application of mitigation credits. Knowing that most insurers were using the average house as the base house for base rate setting, the OIR tempered the implementation of the mitigation credits at 50% of value.

The mitigation credit structure was 100% implemented in 2006 and 2007 without allowing insurers to adjust their base rates to reflect the weakest structure as the base house.¹⁹ Under the Florida windstorm mitigation insurance discount program, a homeowner could receive disproportionate sizable discounts off the hurricane portion of the insurance premium based on any single feature, or set of features, shown in the ARA study to reduce loss damages during a windstorm. Inspected homes that were verified to have better-than-worst-house construction features were eligible for mitigation discounts. Eligible construction characteristics included: 1) roof geometry; 2) gable end bracing; 3) roof deck attachment; 4) roof-to-wall connection; 5) secondary water resistance; 6) roof covering; 7) doors; and 8) protection of openings.

17. New language added to the statute stated, “The fixtures or construction techniques shall include, but not be limited to, fixtures or construction techniques which enhance roof strength, roof covering performance, roof-to-wall strength, wall-to-floor-to-foundation strength, opening protection, and window, door, and skylight strength. Credits, discounts, or other rate differentials for fixtures and construction techniques which meet the minimum requirements of the Florida Building Code must be included in the rate filing. All insurance companies must make a rate filing which includes the credits, discounts, or other rate differentials by June 1, 2002” (s.99, ch.2000-141, Laws of Florida). The Florida Legislature subsequently amended the law and changed the filing date to December 31, 2002, and then to February 28, 2003.

18. “Development of Loss Relativities for Wind Resistive Features for Residential Buildings with Five or More Units” addressed condominium and renter occupancies in buildings with five or more units.

19. Technically, insurers were allowed to provide actuarial justification for an alternative. Informational Memorandum OIR-07-03M issued February 27, 2007, reminded insurers that the requirement to double the mitigation credits stood, and stated that the “windstorm mitigation discount filing shall not include any modification of the rating factors or base rates for any purpose, including the offset of revenue impact on current business.” Both the memorandum and the “presumed factor” report issued by the OIR noted that insurers could submit a “true-up” filing by September 30, 2007, in which the imbalances could be addressed, even if higher base rates were required. In practice, however, no overall rate level increases were approved during the window for review of such filings.

The tables describing mitigation credit percentages were complex. A 2011 publication by the Florida Division of Emergency Management suggested that most single-component mitigation features, based on the allowable categories above, result in a credit of 11% to 82%.²⁰ A business rule built into the insurer's rating system is allowed to cap the total credits at just above 82% of the hurricane risk premium.

Review of the implementation of the loss relativity studies to create mitigation credits raises concerns for several reasons. Namely, 1) a mismatch between the "base" house for base rates and the base house for credits; 2) use of a single model (ARA) to derive the credits; 3) use of a single metric to define credits; and 4) over-application of the credits to premium components beyond the scope of the ARA study all contribute to questions regarding the appropriateness of the program's implementation.

Mismatch Between Base Rates and Credits

Use of the "weakest risk" structure as the base house without allowing for a recalibration of the actuarially indicated base rate to also represent that "weakest risk" structure distorted the parallel between loss relativities for the base house and the weakest house. Indeed, an ARA loss costs relativity study (ARA, 2008), in reviewing the conversion of its 2002 study to mitigation credits by the OIR, stated, "If the rate differentials are implemented as credits from the weakest building, then the base rates should be adjusted to reflect the weakest building." It also noted: "Generally, base rates are more reflective of the expected loss costs, statistically averaged over strong and weak buildings, which is significantly different from the loss costs of the weakest structure. If the credits are computed from the weakest building but are applied using rates that are derived from an average building, then there is a significant economic disconnect. This disconnect can be alleviated with a proper rate effect or offset calculation that reflects the rate differentials and an insurer's distribution of business."²¹

20. See "Make Mitigation Happen" (2011), a joint publication of the Florida Department of Emergency Management and Florida's Foundation.

21. The ARA report also commented on the problems associated with the way the Florida program was implemented on Page 188 where the report states, "...Florida's insurance implementation of its wind mitigation program needs significant improvement. Maximum long-term success will occur when an insurance company inspects its book of business in the high wind zones, provides each building owner with a mitigation report that includes rate differential information (economic incentives) for improvements to the building, and applies the loss relativities as rate differentials. Applying the loss relativities as rate differentials avoids the problems associated with a credit program that is based on normalization of relativities to the weakest structure."

Single Model for Defining Expected Loss Savings

Effectively, ARA-generated relativities were used in calculating the windstorm loss-reduction credits. However, other hurricane loss simulation models²² are more widely used in pricing insurance and reinsurance in regulated environments and the global markets. Insurers and reinsurers have a choice of multiple catastrophe loss models for business purposes. These alternative models differ in their assumptions, thereby producing significantly different modeled loss outcomes.²³ Because most insurers and reinsurers do not utilize ARA models for base rate-setting, material differences exist typically between the models used for pricing (model of insurer's choosing) and the model prescribed by the OIR for implementing mitigation credits (ARA). Given that insurers use various models to generate their base rates, the use of a single model in setting mitigation credits may elevate the actuarial risk of arriving at an unfairly discriminatory rate.

Single Metric for Defining Expected Loss Savings

Relative loss cost (i.e., modeled expected annual average losses per unit of insured value) was the only metric used to define mitigation credits, despite the fact that some components of base premiums—particularly, the cost of capital component, which amounts to 25% or more of each Florida premium dollar—are dependent on the volatility of losses rather than their long-term average. Given that reinsurers set premiums for insurers using risk loads, often a percentage of the standard deviation of modeled losses or a percentile of the modeled loss distribution, a different cost factor may be the appropriate metric used to derive a relative cost. Modeled mitigation features should indicate modifications in the cost of capital component, not just the expected annual hurricane loss component, of premiums. Insurers maintain a combination of internal capital and capital “rented” by transferring risk to reinsurers or securities investors. Accepted actuarial models link the cost of such capital to the volatility, not just the average, of the hurricane loss distribution. Thus, relativities that contemplate measures of loss volatility may be more appropriate than those based solely on relative loss costs.

Over-application of Credits

According to multiple research and industry sources,²⁴ the OIR, via its evaluation of rate filings during the 2007–2012 time period, effectively mandated application of the mitigation credits to risks or components of final premium beyond the scope of the ARA study (at least for use by Citizens, the state's largest homeowners insurance company by that time), such as non-loss components of premium (which cover overhead and fixed expenses), Coverage B premiums

22. In addition to ARA, AIR Worldwide (AIR), EQECAT (EQE), Risk Management Solutions (RMS) and the Florida Public Model (FPM) all provide hurricane loss models that have been approved by the Florida Commission on Hurricane Loss Projection Methodology.

23. See Rollins (2011) and the Florida Commission on Hurricane Loss Projection Methodology's “Report to the Florida House of Representatives – Comparison of Hurricane Loss Projection Models,” November 5, 2007.

24. Florida Catastrophic Storm Risk Management Center (2010a, 2010b, 2011, 2013, 2014).

(for detached structures that may not be built of reinforced materials), renters and unit-owners policies contents coverage (which may not benefit from structural mitigation in the same fashion as the dwelling itself) and the non-hurricane portion of base rates, such as tornadoes and hailstorms (to which the simulation did not demonstrate the reduction in wind losses as required by the enabling statute).²⁵ Additionally, the institution of structure-level wind-mitigation credits created overlap with existing credits in the homeowners insurance market. The ISO Building Code Effectiveness Grading Schedule (BCEGS) differentiated wind risk according to the quality and effectiveness of building codes in each community prior to implementation of the ARA study-based windstorm mitigation discount program. Insurers offered BCEGS credits at the community level that now overlapped with the structure-level wind-mitigation credits.²⁶

Effectively, Florida's public policy strategy to reduce the underlying risks of windstorm to the state became implemented as a program to improve property insurance affordability. Worse, evidence suggests that insurance affordability was disproportionately provided to properties in the highest risk areas and often highest valued neighborhoods in the state (Nyce and Maroney, 2010). More recently (since 2012), the OIR has softened its position on the implementation of the policy, allowing insurers to adjust their base rates and approving alternative loss relativity studies for setting discounts. As a result, insurance consumers have seen price increases across the state since 2010, during a period when the state has seen no hurricanes and reinsurance rates have fallen.

Mississippi's Strategy: A Coastal Focus on Mitigation Affordability

Mississippi's coastline was devastated by Hurricane Katrina in 2005, which eclipsed even the Category 5 Hurricane Camille in 1969 as the benchmark for destruction acknowledged by long-time residents. The political aftershocks bore some resemblance to Florida's experience after Hurricane Andrew: recognition of the disturbance to the residential property insurance market, a rethinking of the role of the residual market, and a desire to promote wind loss mitigation efforts in order to avoid repeating the destruction of life and property in future inevitable storms.

Prior to Hurricane Katrina, neither insurers nor most insureds in the Mississippi homeowners market had a large financial reason to consider pressing for wind-mitigation insurance incentives. Most of the Mississippi incentive program was based on the same community-level discount program as offered in Florida. The BCEGS offered premium credits of up to 30% for residential policies

25. If credits are applied to the entire wind premium rather than just to the portion designated to cover loss costs, over-application of the credits occurs because only loss costs, and perhaps some portion of reinsurance costs, are reduced through home hardening efforts. Because the fixed-expense portion of the wind premium is not reduced through mitigation, the application of a credit to the entire premium may result in "over discounting."

26. While the BCEGS credits were tempered, the overlap still exists.

written in communities graded better by the ISO. Post-2005, however, the same reinsurance shocks that impacted Florida were experienced by Mississippi homeowners insurance companies, albeit to a lesser degree than experienced in Florida. State policymakers and regulators in Mississippi responded more slowly and deliberately than had the Florida Legislature and the OIR. Early post-2005 mitigation efforts were led by the state-chartered insurer of last resort, Mississippi Windstorm Underwriting Association (MWUA), which was established in 1987.²⁷

The Mississippi Legislature passed a comprehensive statute directed at wind loss mitigation in 2008.²⁸ It established a Comprehensive Hurricane Damage Mitigation Program (Program) as a framework that included, among other items, a cost-benefit study on wind loss mitigation measures, itself including guidance regarding insurance premium credits and actuarially sound modifications to rating plans. It also established a program advisory council of experts to oversee the strategic implementation of the statute, which included bankers, insurance agents, insurer representatives, builders, academic engineers, and legislative and regulatory officials. Mississippi's public policy initiative combined insurance premium incentives with flexibility in allowing private insurers to implement premium credits that fit their products and business capabilities, and an emphasis on finding sustainable private and public sector funding to shorten the all-important payback period for consumer investments in wind loss mitigation.

In 2010, rules from the Mississippi Insurance Department (MID) began to encourage property-level coastal mitigation via credits.²⁹ Homes insured by the MWUA meeting the IBHS "FORTIFIED" designations—both new construction and retrofits—earn premium credits of up to 30% (coordinated with the BCEGS credits). Homes that have been retrofitted with specific "groups" or packages of mitigation features earn additive premium credits of up to 30%. Today, dwellings certified for one of the IBHS' "Fortified for Existing Homes" standards receive the following credits:³⁰

- Strengthen the roof system to the IBHS Bronze standard: 17%
- Meet the IBHS Bronze standard and strengthen the windows and doors to the IBHS Silver standard: 25%

27. Unlike Florida's Citizens, the MWUA is restricted both geographically—writing only locations in the six counties closest to the Gulf Coast²⁷—and in its products—offering only coverage for wind and hail (from hurricanes, tornadoes or straight-line storms).

28. Section 83-1-191, General Laws of Mississippi.

29. See MWUA, "Manual of Rules and Procedures," at www.msplans.com/mwua.

30. Previously, there were four groups of retrofits:

- Roof system (12% premium credit): hurricane clip roof anchorage, bracing of gable ends, protection of soffits.
- Opening protection (8%): shutters or impact-resistant window glass, reinforced entry doors, reinforced garage door.
- Roof surface (5%): wind-resistant shingles, secondary water barrier.
- Site hazards (5%): clear trees surrounding and threatening structure in high winds.

- Meet the IBHS Silver standard and strengthen the structural system to the IBHS Gold standard: 30%.

The systems concept provides a way to incorporate the engineering consensus that a home is a system that fails in high winds according to its weakest link. It encourages specific mitigation actions in exchange for easy-to-grasp insurance discounts, and allows an additive approach whereby one consumer expenditure/effort builds on previous efforts, reducing the premium further each time. Private insurers were encouraged to offer mitigation discounts on a voluntary basis through midyear 2013, after which the program became mandatory for all residential insurers.³¹

AIR Worldwide completed a contracted study in 2010 that provided a technical assessment for the state of Mississippi regarding its residential exposure base, ranges of costs for combinations of retrofits, and a model-driven and actuarially consistent development of indicated insurance premium credits for mitigation features and combinations.³² Key exposure results of the study included:³³

- The key construction features affecting Mississippi residential wind losses include roof geometry, roof covering, roof deck attachment scheme, roof anchorage to walls, secondary water barrier roof underlayment, window protection, garage doors, pool enclosures and the age of construction (even after controlling for the previous features).
- The Mississippi residential building stock is almost exclusively wood frame, as evidenced by original data collection performed by Louisiana State University (LSU) in coastal neighborhoods on behalf of AIR.
- Homes built after the adoption of the International Residential Code (IRC 2003), generally meaning homes permitted after 2006 in coastal Mississippi performed better, on a modeled loss basis, than homes built between 1995 and 2006, and much better than homes built before 1995.

31. Nationwide, State Farm and Travelers participated early in providing insurance premium discounts for meeting IBHS FORTIFIED standards. See www.mid.ms.gov/mitigation/mitigation-discounts.aspx.

32. See www.mid.state.ms.us/pdf/chdmp_study.pdf.

33. The housing stock in Mississippi is less diverse and of poorer quality than the housing stock in Florida. This entails good news (the potential improvement in wind risk from mitigation is large) and bad news (economic limitations on coastal consumers are more severe and incenting mitigation is, therefore, more difficult).

Importantly, the AIR study emphasized that actuarially sound premium credits could not be expected to be of the same magnitude for every insurer, primarily because the non-wind portion of premium is structured differently among insurers. Care should be taken to properly integrate premium credit programs with existing rating algorithms and elements with minimal overlap. More specifically, the report suggested that implementation of a rate differential program should:

1. Require accurate determination the presence/absence of wind mitigation features.
2. Encourage building owners to invest in cost-effective mitigation to achieve lower insurance rates.
3. Encourage insurance companies to collect wind mitigation data on their portfolio of buildings so that rates can be accurately determined.
4. Provide for adequate and fair rates for insurance companies. The implementation of rate differentials should be a “win-win” situation for the insurance company and the building owner.
5. Encourage reinsurance programs to reflect the actual distribution of wind mitigation features within an insurance company portfolio.
6. Promote continued improvements to the Florida Building Code.
7. Promote validation, updates and refinements to loss mitigation modeling, building ratings and rate differentials.

Mississippi requested the AIR study not only for advice as to appropriate insurance discounts for mitigation, but also for advice on the costs of various mitigation features,³⁴ as well as on the implementation of the financial grant and consumer education and outreach portions of the program. Thus, the various components of the overall mitigation incentive program in Mississippi were largely planned in unison, with complementarity in mind, and several of the mistakes made in the Florida mitigation discount program were avoided. As simple points for comparison, for instance, Mississippi’s private residential property insurers continued to 1) set their own “base” house for both their base rates and mitigation credits; 2) choose the catastrophe loss model(s) to be used in setting rates and deriving the credits; 3) select the metric(s) to define credits; and 4) apply the credits to premium components only within the scope and to the extent of modeled results showing loss savings.

Effectively, Mississippi’s public policy strategy to reduce the underlying risks of windstorm to the state’s coastal areas was implemented as a program to improve property mitigation guidance and affordability. Although the state’s program provides no standardized way in which mitigation efforts are rewarded

34. The AIR report provided guidance on expected costs of specific mitigation activities relative to a structure’s total value. For instance, according to the report, a package of efforts strengthening the roof system typically costs between 4% and 8% of the structure’s value; secondary water barriers are costly on their own, but only cost a bit extra to install if done at the time the roof system is upgraded; and shutters cost 3% to 5% of the structure’s value, which is largely independent of the costs of roof system modifications.

via insurance discounts, it does provide standardization for most coastal properties. The MWUA insures the vast majority of homeowners residing in the coastal counties, and the MWUA's mitigation discount program is not only standardized but also follows the systems approach, rewarding homeowners for strengthening the "weakest links" in the storm-worthiness of their properties. While insurance consumers in Mississippi coastal counties overall have experienced insurance price increases, these increases are commensurate with the modeled risk and provide incentive for mitigation activities to decrease costs.

Market Outcomes

The two states' insurance-mitigation programs are now both more than five years old, allowing ample time to examine performance. Due to differences in the states' economies, insured values and geographic exposure to wind risk, we cannot argue that we provide a fully in-common comparison basis. We do, however, assert that the differences in market outcomes between the two programs is striking in contrast, despite other factors that may contribute to the success or failure of state public policy in these cases.

Florida and Mississippi both implemented an insurance-mitigation program, combined with a property inspection program to perform individual wind-mitigation assessments, a financial grant program to encourage retrofits and a consumer-awareness and education program to accompany their respective insurance-mitigation program. Although exact numbers are difficult to obtain, both states have seen a relatively high percentage of eligible homeowners apply for and obtain windstorm mitigation inspections.³⁵ The inspection totals do not likely correlate well with actual mitigation efforts in either state, because there is a strong incentive to obtain an inspection for purposes of receiving insurance discounts for existing mitigation features. In fact, in Florida, residential property insurers were required to award billions of dollars annually in wind mitigation insurance discounts,³⁶ yet the data indicate that well over half of homeowners have taken no mitigation actions at all to earn their premium credits.³⁷ Research by Carson, McCullough and Pooser (2012) further indicates a low uptake rate in mitigation grant projects and evidence of the mixed mitigation incentives at work in the program. Neither state has experienced overwhelming success with the

35. See <http://coastalretrofitms.org/News/Coastal%20Retrofit%20Overview.pdf> and www.floridadisaster.org/mitigation/rcmp/.

36. Citizens alone awarded nearly \$1 billion in premium credits in 2008, at a time when its base rates had been rolled back to pre-2005 levels.

37. The main residential mitigation grant program in Florida, the My Safe Florida Home program, was defunded midyear 2009 after only two years of activity, and approximately 33,500 retrofit grants awarded (out of more than 6 million homes estimated to potentially benefit from retrofit. See the Florida "My Safe Florida Home 2008 Annual Report."

mitigation grant programs to date, with less than 1% of potential homeowners participating.³⁸

The mandated implementation of mitigation credits had an adverse impact on revenues for Florida's homeowner insurers. First, premium reductions were not met with commensurate reductions in losses or related costs. This led to higher loss ratios, expense ratios and combined ratios (all measures of insurer underwriting performance) (Florida Catastrophic Storm Risk Management Center, 2010a; FCSRMC, 2010b; FCSRMC, 2011; FCSRMC, 2013; FCSRMC, 2014). This means that, from the standpoint of underwriting performance alone, non-mitigated homes can be expected to be relatively more attractive to insurers than the mitigated homes, quite opposite the intended result. Overall, the 2007–2010 actual underwriting performance of Florida's homeowners insurance market has been poor, despite the fact that there have been no hurricane losses in Florida during the same period of time. Thus, insurers have not accumulated surplus in storm-free years, resulting in less capital available to pay for future catastrophic losses. Much of this failure can be explained by lower rate levels rather than higher losses or expenses; for example, in the third quarter of 2010, the average premium per \$1,000 of insured value, an actuarial measure of insurance rates, was more than 20% lower than it was in the final quarter of 2005 (FCSRMC, 2010a; FCSRMC, 2010b; FCSRMC, 2011; FCSRMC, 2013; FCSRMC, 2014). Mississippi's insurance marketplace is thriving by comparison, with coastal rates no longer rising overall (indeed, some falling) since 2010, in large part due to lack of hurricanes and eased reinsurance rates (FCSRMC, 2010a; FCSRMC, 2010b; FCSRMC, 2011; FCSRMC, 2013; FCSRMC, 2014). The insurance-mitigation program has "done no harm" to the private market loss ratios, expense ratios or combined ratios. The MWUA has been deemed actuarially sound,³⁹ unlike the still financially recovering Citizens.

Conclusions and Implications

Both Florida and Mississippi were heavily impacted by storms in 2004 and 2005. The pricing impact in Florida at 2006 renewal was substantially more extreme than that experienced in Mississippi overall. More of Florida is coastal and Florida's coastal properties are considered highly valued, relatively, for insurance purposes, so it is not surprising that reinsurers and insurers reevaluated

38. The Coastal Retrofit Mississippi (CRM) program for primary residences on and near the coast continues today, funded by private-public partnerships with the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program. The participation in actual grant projects completed through CRM has been light, at fewer than 250 (out of more than 75,000 homes estimated to potentially benefit from retrofit) at an average grant of \$7,500. See www.smpdd.com/wp-content/uploads/2014/06/MississippiHousingDataProject_Dec31Update1.pdf and <http://coastalretrofitms.org/News/Coastal%20Retrofit%20Overview.pdf>.

39. See the 2014 annual report at www.msplans.com/mwua/.

their Florida property lines business more stringently than they did in other hurricane-prone states. Insurance affordability became key in Florida because rates hikes were widespread and severe throughout the state. In Mississippi, the rate hikes and loss of availability were limited primarily to a relatively small coastal region and a handful of counties.

Among other market responses, Florida quickly mandated a wind mitigation insurance discounts program that was complex. As a result, the wind loss mitigation premium credits came to be viewed by many insurers and homeowners as a “black box,” and holding incentives for homeowners to capitalize on the inspection and rating process for maximum immediate (insurance premium) benefit, rather than do the work to make the home safer (Florida Commission on Hurricane Loss Projection Methodology, 2010).

Florida and Mississippi policymakers have utilized the results of mitigation loss relativity studies to make mitigation a public policy priority. These states demonstrate different approaches to building strategic mitigation policy from these relativity studies, however, and have enacted insurance-mitigation legislation that differs accordingly. Florida engaged in an affordability program while Mississippi opted for a risk-based pricing approach. Although it is difficult to measure actual mitigation efforts undertaken (no reporting of mitigation is required), we assert that the incentive structure in Mississippi is far more likely to result in mitigation than the structure in Florida. Furthermore, even if no mitigation efforts resulted from either program, the Mississippi strategy has shown itself to be superior in that it does no harm to the private insurance market while trying to respond to challenges in the marketplace.

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Cummins, J. David and Richard A. Derrig, eds., 1989. *Financial Models of Insurance Solvency*, Norwell, Mass.: Kluwer Academic Publishers.

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