DISCUSSION PAPER

February 2017 ■ RFF DP 17-07

Florida's State Wind Pools

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Abstract

Coastal states have created state wind pools to address the problem of availability and affordability of insurance for wind-related disaster events. This paper provides a detailed analysis of the multiple public programs to finance disaster losses in the state of Florida. Florida may be the best laboratory in the United States, and arguably the world, for the study of catastrophe risk finance. The Florida system for the financing of disaster losses is a fragile ecosystem wherein the public entities are large and unlike most markets of last resort. Their large size and the state's dependence on them for disaster financing has made them subject to political risk, with the state legislature repeatedly intervening in these programs over the years. The challenge of creating and maintaining a well-orchestrated system strategy for disaster financing in Florida is substantial and is an ever-evolving effort.

Key Words: Florida, hurricane, insurance, wind pools, Florida Citizens, Florida Hurricane Catastrophe Fund

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1. Introduction: Florida's Wind Pools and Other Interventions Today

Coastal states have created state wind pools to address the problem of availability and affordability of insurance for wind related disaster events. Of the 18 Atlantic and Gulf Coast States, all[1] but Maine and New Hampshire have residual market types of facilities insuring wind and/or other perils.[2] The states of Delaware[3] and Maryland[4] have FAIR Plan[5] type facilities established in the state statute. These programs are operated, controlled, and funded by insurers. Nine other states have types of FAIR plans involving some type of state funding of losses. These states include Connecticut,[6] Georgia,[7] Massachusetts,[8] New Jersey,[9] New York,[10] North

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This paper was prepared for the "Improving Disaster Financing: Evaluating Policy Interventions in Disaster Insurance Markets" workshop held at Resources for the Future on November 29–30, 2016. We would like to thank our sponsors of this project: the American Academy of Actuaries; the American Risk and Insurance Association; Risk Management Solutions; the Society of Actuaries; and XL Catlin.

[1] See the American Insurance Association's link at: http://www.aiadc.org/File%20Library/Resources/Industry%20Resources/PROPERTY---National----Residual-MarketDescriptions-White-Paper-295953.pdf

[2] The Property Insurance Plans Service Office (PIPSO) has links on its website to all FAIR plans and wind pools in the United States covering auto, property, etc. See http://www.pipso.com/links/

[3] The Placement Facility of Delaware is governed by a board selected by insurers operating in the state. There is no state or local government involvement. The facility is classified as a FAIR Plan. Although its basic policy does not provide coverage for wind, its extended coverage does cover personal residential property policies for the named peril of "windstorm or hail" and other perils. For commercial property, the plan offers a simplified language policy covering perils limited to the Standard Commercial Property Policy of the Insurance Services Office for various extended coverage perils including "windstorm or hail." See the link: http://www.defairplan.com/

[4] Maryland has a facility known as the Maryland Joint Insurance Association (MJIA), which is composed of all licensed property insurers in the state who participate by sharing expenses, profits and losses in proportion to the premiums each insurer writes to the aggregate premiums. Insurers in the state operate the program. There is no governmental participation in funding nor is the MJIA a state agency. The MJIA is a FAIR plan authorized by statute. Both residential and commercial property policies are written which may cover the basic perils of fire or lightning or may provide extended coverage perils including the peril of windstorm. See http://www.mdjia.org/index.htm

[5] Fair Access to Insurance Requirements (FAIR) Plans are state mandated programs that provide insurance to property owners unable to obtain insurance in the private market.

[6] See http://www.ctfairplan.com/

[7] See http://georgiaunderwriting.com/

Carolina,[11] Rhode Island,[12] Virginia,[13] and Texas.[14] Seven states[15] have wind pools or specially created corporations designed to address the problem of availability and affordability of insurance for wind related disaster events. These states include Alabama,[16] Florida,[17] and Louisiana,[18] Mississippi,[19] North Carolina,[20] South Carolina,[21] and Texas.[22] The authors' focus here is on the state of Florida and its multiple public programs for disaster loss financing. Brief discussion is provided regarding Florida mitigation and other programs which involve managing the risk of wind disaster. This Florida system for the financing of disaster losses is a fragile ecosystem wherein the public entities are large and unlike most markets of last resort. Together, these public insurers trade in US$ multi-millions of premium dollars and are exposed to US$ multi-billions of potential losses, more than in any other US state. Their size and the state's dependence for disaster financing exposes them inherently to a high level of political risk. Economic and political pressures can alter the use of the entities in one Legislative Session, then change them in a different direction the next. Even without consideration of the political environment, the challenge of creating and maintaining a well-orchestrated system strategy for disaster financing in Florida is substantial and is an ever-evolving effort.

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[8] See https://www.mpiua.com/

[9] See http://www.njiua.org/

[10] See http://www.nypiua.com/

[11] See http://www.ncjua-nciua.org/

[12] See https://www.rijra.com/

[13] See https://www.vpia.com/

[14] See https://www.texasfairplan.org/

[15] Texas and North Carolina have both a FAIR plan and wind pool type residual market facility.

[16] See https://aiua.org//

[17] See https://www.citizensfla.com/

[18] See http://www.lacitizens.com/

[19] See https://www.msplans.com/MWUA/Index.htm

[20] See http://www.ncjua-nciua.org/

[21] See http://www.scwind.com/

[22] See https://www.twia.org/

Why Focus on Florida?

Florida may be the best laboratory in the United States, and arguably the world, for the study of catastrophe risk finance. It is the state with the most vulnerability to the wind peril from tropical storms and hurricanes, given the combined loss frequency and severity Florida faces from such events. Florida's modeled probable maximum loss is greater than that of all states combined from Texas to Maine. Four of the ten costliest hurricane catastrophes in United States history made landfall in Florida. The losses from these events stated in 2015 dollars total $54.4 billion including $24.11 billion for Hurricane Andrew in 1992, $12.29 billion from Hurricane Wilma in 2005, $9.21 billion from Hurricane Charley in 2004, and $8.76 billion from Hurricane Ivan in 2004.[23]

All of Florida is exposed to hurricane events, so the markets require PML estimates which include the entire state as well specific books of business individual insurers may underwrite. Not surprisingly, Florida has the highest PML estimates of any state. Table 1 below indicates estimates of Florida PMLs for 2016, at 0.4 percent, 1 percent, and 2 percent probabilities.

Table 1. Probable Maximum Loss Estimates for the State of Florida Due to 2016 Hurricanes

Return Period (in Years)	Critical Probability	Aggregate Gross PML (in billions)
250	0.004	$80.6
100	0.01	$53.9
50	0.02	$36.0

Interpretation: A one-in-hundred loss year (associated with a one percent probability) would produce estimated $53.9 billion or greater in gross loss to all Florida residential policyholders, including loss adjustment expenses.
Source: State of Florida Financial Services Commission, 2016b.

Table 1 indicates a 0.4 percent likelihood that insured residential policyholders in Florida would experience at least $80.6 billion in hurricane wind losses. These modeled results are based on wind losses only since flood losses are primarily covered by the NFIP, not the private insurance market or Citizens.

[23] Insurance Information Institute; http://www.iii.org/fact-statistic/hurricanes

In 2012, it was estimated the insured value of residential and commercial coastal property[24] along the Atlantic Ocean and Gulf of Mexico was over $10.6 trillion. The exposure for Florida was $2.862 trillion, or around 27 percent of the total (Rollins, 2013). These high insured property values (second only to New York within the United States) combined with frequent and intense storms capture the attention of policy makers and financial institutions worldwide. The rest of the world observes as Florida's risk finance system continues to evolve.

Florida provides lessons for states around the nation as policy makers struggle with the task of making financial preparations for the likelihood of catastrophic events. As the only state requiring catastrophe models (simulation-based modeling of hurricanes) be used to price residential property insurance, Florida is ahead of its US peers in developing a financial market for catastrophes based on a forward-looking view of the risk. At the same time, legislative and regulatory interventions in the Florida insurance and reinsurance markets have resulted in suppressed property insurance prices and cost shifting from one policyholder to another (via non-risk-based pricing) and from current to future policyholders (via a system of assessments).

This paper examines the present state of the catastrophe risk finance system in Florida, including its quasi-public property insurance entities and the private market for property insurance. Interventions by Florida lawmakers and regulators are evaluated for their potential future costs to Florida policyholders and citizens.

Florida is a significant state for hurricane activity due to its long coastline and geographic location. Large hurricanes can easily cover a substantial area of the state and maintain tropical storm or hurricane strength winds as they traverse the entire length or width of the state. The state's increasing overall population, the increasing migration of its population to coastal areas, and the rise in total insured property values at risk in these areas combine to substantially increase Florida's concentration of insurance exposure to catastrophes. Projected losses from strong hurricane events in highly populated areas have been modeled in the range of $100 billion to $250 billion.[25]

The population of Florida in 2015 is estimated at approximately 20 million, according to the US Census Bureau, making it the third most populated state in the nation behind California and Texas. This represents a substantial increase since 1950 when there were a mere 2.8 million

[24] Property located in the coastal counties of the various states.

[25] Data are from the hurricane modeling organization, Risk Management Solutions (RMS).

inhabitants. Since 1980, Florida's overall population has doubled. Furthermore, while the nation's 673 coastal counties make up only 17 percent of the US land area, they account for 55 percent of the nation's population. Florida serves to highlight this trend, with 61 of its 67 counties listed as coastal by the National Oceanic and Atmospheric Administration (NOAA), comprising over 75 percent of the state's total population.

Exacerbating the risk, Florida construction values have risen sharply during this period of time as well (Florida Catastrophic Storm Risk Management Center, 2011). A portion of this rise is easily explained by the need for housing stock as the population has risen. But two additional factors have contributed to the rise. Individual property values have risen, even after adjusting for inflation (Florida Catastrophic Storm Risk Management Center, 2011). This makes sense from an individual homeowner's investment standpoint. Land values have risen as populations (and thus demand for land) have risen. And newer homeowners who either ignore the disaster risk or can affordably insure against it have built homes more expensive to construct than the typical Florida home of the 1950s and 1960s (Florida Catastrophic Storm Risk Management Center, 2011).

Businesses and commercial real estate have flocked to Florida since the 1960s as the state grew as a tourism based economy with low taxes. Florida also has a high density of property insurance coverage, with most houses protected against windstorm losses and about one-third insured against floods (Florida Catastrophic Storm Risk Management Center, 2011). It was estimated that in 2012 nearly 80 percent of insured real estate assets in Florida were located in coastal counties (AIR Worldwide, 2013).[26] This represents $2.86 trillion of insured residential and commercial exposure located in Florida coastal areas. The exposure of Florida to natural hazards, particularly tropical storms, along with the state's high level of insurance penetration combine to make Florida the world's greatest insured natural catastrophe region.

The cost to insurers of Florida weather catastrophes has risen far faster than inflation during the past 30 years (Kunreuther, Michel-Kerjan, et al, 2009). These factors will continue to have a major impact on the level of insured losses from natural catastrophes. Given the growing concentration of exposure on both the Atlantic and Gulf coasts of the state, future disaster events would be likely to inflict significant property damage and business interruption losses for Florida. The pressure is on Florida's public and private insurers to finance much of the cost.

[26] This report was an update to AIR Worldwide (2008), which indicated similar figures.

The state of Florida has taken practical, political, creative, and experimental approaches to address the financial consequences of the catastrophic wind peril over the years. Due to the nature of disasters and their relative infrequency, it is difficult to judge various approaches based solely on short-term historical results. Additional evaluation criteria include judging whether the various approaches have been sound from a risk management perspective, and whether they are capable of accomplishing their intended purpose over the long run rather than merely attempting to solve a short term problem at the expense of the future. Understanding the potential outcomes and consequences of past and realistic future events can lead to better planning and risk management decisions.

The authors view Florida's market for property risk as a system, comprised of various programs, laws and regulatory strategies. Nevertheless, here we concentrate primarily on public risk financing programs which have been designed to fund losses related to wind events. It cannot be ignored, however, that Florida's various programs to address the financing of wind event losses are impacted by the state's attempts to promote mitigation efforts and loss reduction. Given the relationship, this paper includes a brief examination of mitigation and related programs in the state, in addition to its treatment of wind pools.

Catastrophes, Insurance Market Problems and Government Interventions

It is well understood that private insurance markets with high potential for catastrophic industry losses are prone to a variety of market problems. Private insurers may choose to decrease market exposure, and thus decrease capacity in the highest-risk zones. The three major ways in which the Florida windstorm exposure poses market problems are through under-investment in mitigation, informational problems in the estimation of loss costs, and the market power of the reinsurance market.[27]

Cummins (2006) states, "Insurance markets tend to respond adversely to mega-catastrophes. They respond to large events . . . by restricting the supply of insurance and raising the price of the limited coverage available." The Florida property insurance market experienced such market problems in 1993 after Hurricane Andrew and again in 2006, on the heels of the brutal 2004-2005 hurricane seasons. In both years, reinsurers raised reinsurance rates sharply,

[27] Newman (2009, 2010) and Florida Catastrophic Storm Risk Management Center (2010b and 2011) provide a detailed treatment of sources of these problems. Medders, Nyce and Karl (2013) details a story of Florida market problems, interventions and outcomes.

thus making it prohibitively expensive for some insurers and creating a cascading effect on property insurance availability, especially for homeowners and commercial residential property owners.

The private insurance market for homeowners insurance in particular is volatile and riddled with challenges. Table 2 reveals a high average loss ratio, with a high standard deviation and coefficient of variation as compared with other coastal states over a 28-year period which included Hurricane Andrew and the 2004-05 hurricane seasons.

Table 2. Average Loss Ratio, Standard Deviation and Coefficient of Variation by State, 1985–2012

State	AL	FL	GA	LA	MS	NC	SC	TX	VA
Average Loss Ratio	0.776	0.924	0.709	0.889	0.882	0.709	0.746	0.712	0.650
Standard Deviation	28.08	186.95	19.30	154.85	115.66	36.91	96.44	26.92	23.55
Coefficient of Variation	0.362	2.02	0.272	1.74	1.311	0.52	1.29	0.378	0.363

Source: Florida Catastrophic Storm Risk Management Center (2015).

The private insurance market in catastrophe-prone states can become dominated by small, non-diversified, domestic insurers (often undercapitalized and heavily reliant on reinsurance) as large insurers reduce capacity and exposure. Nowhere in the United States is this more evident than in Florida, where as indicated in Table 3, 43 residential property insurers wrote more than 90 percent of their direct premiums in Florida, a figure more than twice that of any other coastal state and five-ten times that of most other coastal states.[28] The current picture of private homeowners insurance availability and capacity in Florida describes a market with heavy dependence on small companies with limited capitalization and risk diversification capabilities. Although Florida attracts a high number of insurers relative to other coastal states, many of these insurers (more than in any other state) are independent, mostly small domestic Florida companies.

[28] It is notable the number of non-diversified insurers has dropped from its 2010 high of 78.

Table 3. Number of Insurers with 90 Percent or More of Total DPW in the State in 2014

State	AL	FL	GA	LA	MS	NC	SC	TX	VA
Non-diversified Insurers	2	43	2	8	2	9	1	20	4

Source: Florida Catastrophic Storm Risk Management Center (2015).

Despite the high number of insurers and the relatively high total premium amounts sold in Florida, the State's private homeowners insurance market has the worst level of capitalization (as measured by PHS) of any catastrophe-prone state other than Texas. Given the large number of homeowners insurance companies concentrating most of their business in Florida and the large Florida homeowners insurance premium base attributable to domestics having relatively small stores of PHS, the existing level of capitalization may be insufficient should a major storm hit Florida.

Based on the principles for healthy insurance markets, government plans ideally should use risk-based premiums in setting the price charged for each individual risk and not offer subsidies in setting the premiums on individual risks (at the least not subsidize the riskiest locations). To do otherwise is to passively (or even actively) induce homeowners to place themselves in harm's way. Such subsidies also risk thwarting potential private market innovations. In Florida, given the size of the catastrophe risk as well as its volatility, the availability of private capital to support catastrophic windstorm exposure is contingent upon regulatory and legislative directives intended to ease market pressures and stabilize pricing. Given Florida's built environment has revolved around population and business (particularly tourism) growth, the political environment appears to encourage people to continue to live and work in certain geographic areas where there are high risks, however infrequent the losses may be. Consistent with short-term economic development interests and contrary to insurance principles, the state has chosen to develop quite a large system of public markets for property insurance and reinsurance, with implications for the private insurance industry and the state's citizens.

Florida's Government Intervention in the Form of Risk Pools[29]

The Florida personal residential property insurance market consists of a unique combination of private and residual insurers grappling with increasing demand-and supply-side economic pressures in the face of high-density development near high-risk coastlines. Insurance for Florida's residential property insurance market includes both private insurers and several quasi-governmental property insurance mechanisms. In 1970 the Florida Windstorm Underwriting Association (FWUA) was enacted by the Florida Legislature to offer "wind only" coverage in Monroe County and the Florida Keys. The FWUA was gradually expanded to provide wind coverage in 29 of Florida's coastal counties. Since this initial attempt to provide a public policy response to catastrophic windstorm risk, three entities have evolved with expressly different purposes: Citizens Property Insurance Corporation, the Florida Hurricane Catastrophe Fund and the Florida Insurance Guaranty Association. It may be argued that these statewide programs are backed implicitly by the state of Florida itself, although none of the programs has explicit backing.

Citizens Property Insurance Corporation

After Hurricane Andrew in 1992, the Florida Legislature met in a special session to address problems in the residential insurance market. Several insurers had become insolvent, and others were concerned about increased insolvency risks. The Legislature addressed the need for homeowners insurance policies which provided "full" (multi-peril) coverage rather than wind-only policies offered by the FWUA. The Florida Residential Property and Casualty Joint Underwriting Association (FRPCJUA) or (JUA) was created in 1992, and later combined with the residual market mechanism which insured commercial residential or condominium and apartment buildings (the Florida Property Casualty Joint Underwriting Association).

The Florida Legislature merged the FWUA with the FRPCJUA, creating Citizens Property Insurance Corporation (Citizens) effective August 1, 2002. Citizens has three distinct accounts; the Personal Lines Account (PLA), the Commercial Lines Account (CLA), and the Coastal (formerly High-Risk) Account. The Coastal Account consists of policies from the FWUA territories. When any of these three accounts has a deficit, Citizens may levy

[29] Information regarding the history of these entities is taken liberally from Newman (2010) and the Florida Statutes that established and have since modified their operations. (See references section.)

assessments. These assessments are not only against its policyholders but also against the policyholders of private insurers in almost all lines of property and casualty insurance.

Citizens is the largest residual market insurer in the nation, and 2006–2015 was more than 10 times the size of any other coastal state insurance plan.[30] Table 4 indicates the size of Citizens in Fiscal Year 2015 relative to other coastal state insurance plans.

Table 4. Insurance Provided by State Insurance Plans, Fiscal Year 2015[31]

State	Residential Policies	Commercial Policies	Exposure ($000s)	Direct Premiums Written ($000s)
Alabama	31,530	92	5,502,703	41,685
Florida	671,641	29,456	150,495,190	1,267,754
Louisiana	100,555	3,529	13,861,836	140,386
Mississippi	37,524	853	5,869,340	64,209
North Carolina	243,172	11,959	88,605,091	386,893
South Carolina	34,499	691	12,250,367	73,587
Texas	272,304	14,556	78,551,742	503,824

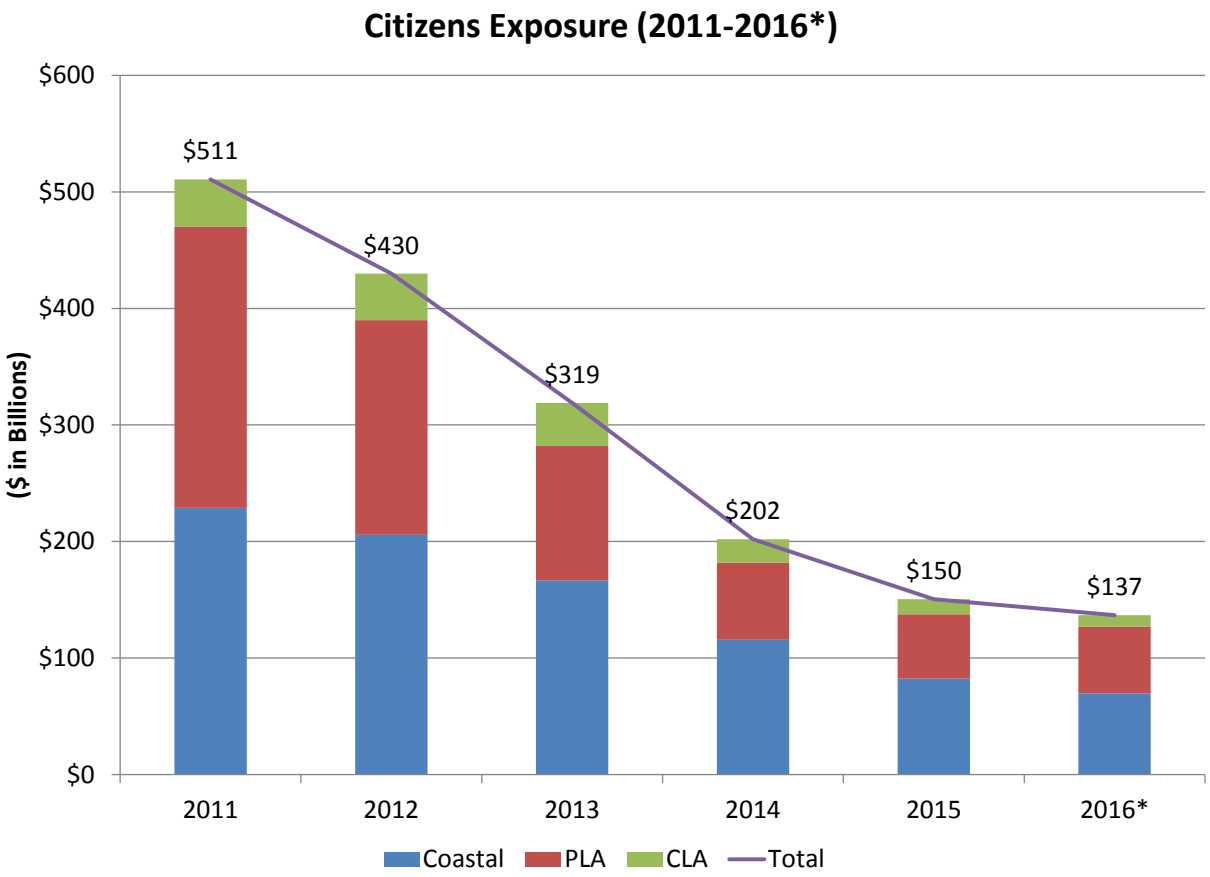
Source: Property Insurance Plans Service Office (PIPSO).

Today, Citizens is smaller than in 2015 (largely due to aggressive depopulation detailed later in this paper), but remains large and could repopulate at any time were prices in the private market to rise or insurance capacity to substantially contract. Figure 1 shows Citizens exposure decrease from 2011-2016 in US$ billions total values insured.

[30] This is based on data compiled from the Property Insurance Plans Service Office (PIPSO).

[31] The Florida and Louisiana Beach Plans merged with their FAIR Plans. For all other states, exposure is the estimate of the aggregate value of all insurance in force in each state's Beach and Windstorm Plan in all lines (except liability, where applicable, and crime) for 12 months ending September through December.

Figure 1. Citizens Property Insurance Corporation Exposure Amounts by Account, 2011–2016



Florida Hurricane Catastrophe Fund

Florida is the only state to have a state reimbursement fund which operates similar to reinsurance—the Florida Hurricane Catastrophe Fund (FHCF)—to provide for an ongoing and stable source of catastrophe insurance capacity. The FHCF was created by the Florida Legislature in 1993 to provide additional insurance capacity and help stabilize the property insurance market in Florida (Section 215.555(1), Florida Statutes). The FHCF provides reimbursement for a portion of a residential property insurer's hurricane losses above the amount retained by the insurers. Both Citizens and private residential insurers are required to purchase reimbursement coverage from the FHCF.

Insurers enter into contracts with the FHCF and pay a premium. The FHCF is able to accumulate premium payments on a tax-free basis as it is exempt from federal income taxation. Except for certain exemptions, all admitted insurers writing residential property insurance in

Florida, including Citizens, are required by Section 215.555, Florida Statutes, to obtain FHCF reimbursement coverage.

In the event that the FHCF's losses exceed its surplus (defined as its accumulated cash balance) and any reinsurance procured, the FHCF is authorized to issue revenue bonds which are funded by collecting assessments on policyholders in most lines of property casualty insurance. The amount of coverage available from the FHCF, the cost of the coverage, and the potential assessments are significant factors for insurers which impact their solvency protection and price of coverage. The maximum obligation of the FHCF for a given contract year is specified by statute. The current maximum is $17 billion. Each insurer's reimbursement coverage is limited to its share of the $17 billion maximum obligation. An insurer's reimbursement premium, retention, and coverage limit are based on its total insured values by ZIP code as of June 30, which must be reported by each insurer by September 1 of each year.

Florida Insurance Guaranty Association

The Florida Insurance Guaranty Association (FIGA) was created by the Florida Legislature in 1970 to address concerns about the adverse effects of insolvent insurers. Its specific purpose is to "provide a mechanism for the payment of covered claims under certain insurance policies to avoid excessive delay in payment and to avoid financial loss to claimants or policyholders because of the insolvency of an insurer." (See Section 631.51(1), Florida Statutes). Thus, while FIGA is not a wind pool itself, it is the state entity which pays the claims of insolvent insurers and has the ability to assess in the event of insolvencies related to catastrophic storms. FIGA does not accumulate funds in advance of an insurer's insolvency, but similar to Citizens and the FHCF obtains funds through assessments levied by the Office of Insurance Regulation on insurers subject to assessment. Its use is limited primarily to protecting the state's policyholders against potential insolvencies of private insurers since the public insurers—Citizens and FHCF—as discussed above have their own respective assessment capabilities in the event of large losses.

The State Wind Pool Risk and How It Is Funded

The ability of Florida's state-created insurance entities—Citizens, FHCF and FIGA— to pay losses is vital to the state's ability to respond adequately to weather disasters. Due to the magnitude and volatility of catastrophic losses, it is virtually impossible to finance all of the potential losses in any single time period. This leaves two options—prefund all potential losses or utilize some form of post-loss funding. The state of Florida has chosen to finance a significant

portion of its catastrophic risk exposure through post-loss assessments. In Florida, these assessments are levied on most property-casualty insurance policyholders by the state's created insurance entities (Florida Catastrophic Storm Risk Management Center, 2011).

Citizens

Citizens is smaller than it was five years ago due to multiple factors. A decade of no Florida-land falling hurricanes and an influx of Insurance Linked Security (ILS) capital combined to soften the Florida property reinsurance and primary insurance markets. Plus, a vigorous Citizens depopulation program intentionally reduced Citizens' market share.[32]

Annually, Citizens reports its aggregate PMLs, potential assessments and financing options to the state of Florida (Florida Financial Services Commission, 2016a). Largely due to Citizens' reduced policyholder base, a 100-year (one percent likelihood) or 50-year return period (two percent likelihood) in 2016 would result in no financial shortfall. A 250-year return period (0.4 percent likelihood) would, however, result in an estimated shortfall, an amount in excess of $2.8 billion, with estimated annual assessment of $122 million, representing a 0.3 percent assessment (Florida Financial Services Commission, 2016a).[33]

FHCF

Once an FHCF-participating insurer's hurricane losses exceed its share of the aggregate industry retention (deductible), it triggers FHCF coverage.[34] The claims-paying resources of the FHCF include cash available from current and past accumulation of reimbursement premiums

[32] The state began a strategy in 2011 to actively depopulate Citizens (at which time its personal residential policy count alone had reached in excess of 1.4 million) and in 2013-2014 aggressively pursued depopulation through a policy Clearinghouse. The residential policy count peaked in early 2012, with nearly 1.5 million policyholders.

[33] Based on the 2016 estimated Citizens policyholder base and combining the effects on the Personal Lines Account, the Commercial Lines Account, and the Coastal Account, under a one-in-250-year loss scenario, there would be an estimated one-time Citizens policyholder surcharge of $136 million (15 percent surcharge) during the first year, an estimated one-time assessment of non-policyholders of $799 million (2 percent), and an estimated emergency assessment of nearly $1.9 billion, with estimated annual assessment of $122 million.

[34] An insurer's FHCF reimbursement coverage is triggered after it meets its retention (the functional equivalent of a deductible). For the contract year that began on June 1, 2015 and ends on May 31, 2016, the aggregate retention for all participating insurers was $6.9 billion. Aggregate retention for the contract year beginning on June 1, 2016 is projected to be $7.0 billion.

and investment income[35]; proceeds from pre-event financing and post-event debt; and risk transfer (reinsurance and ILS) recoverables.[36] Cash is used before any of the other claims-paying resources are used. Pre-event debt is financed from FHCF reimbursement premiums as a expense of operation and is primarily used to create short-term liquidity for paying claims. In situations involving large losses which must be paid quickly the FHCF would likely attempt to use post-event bonds to finance its reimbursement payments to participating insurers based on the losses generated by the hurricane or hurricanes. As stated earlier in the chapter, these bonds would be repaid using emergency assessments. Pre-event debt can allow the FHCF to avoid being forced to issue post-event debt into a difficult financial market that may involve a spike in interest rates or a shortage of liquidity.

Post-event debt is repaid from emergency assessments on most Florida property and casualty premiums of both admitted and non-admitted lines of business (the exceptions are workers' compensation, medical malpractice, accident and health, and federal flood insurance). Post-event resources could also include funds from assessments levied without the issuance of post-event debt. The maximum assessment percentage is 6 percent with respect to any one contract year's losses and 10 percent with respect to all contract years' losses combined. No such post-event debt is outstanding as of the date of this writing; there are currently no assessments.

Similar to Citizens, the FHCF reports annually its aggregate PMLs, potential assessments and financing options. Table 4 shows the estimated annual assessment impact from various hurricane loss scenarios for 2016.

[35] The FHCF is projected to collect $1.1 billion in reimbursement premium, net of expenses, mitigation and debt service, for the 2016-2017 contract year and the total projected cash balance as of December 31, 2016 is $13.8 billion.

[36] The FHCF purchased $1 billion of reinsurance for the first time ever for the 2015 season and renewed the $1 billion purchase again in 2016.

Table 4. Potential FHCF Assessment Impact of PML Scenarios[37]

Return Time (in Years)	Potential Post-Event Bonding (in Millions)	Annual Assessment (in Millions)	Annual Assessment %
250	$3,146	$205	0.50%
100	$2,593	$169	0.41%
50	$429	$28	0.07%

Interpretation: Based on a one-in-hundred loss year (associated with a one percent probability) would produce estimated $53.9 billion or greater in gross loss, the bond financing need is estimated at $3,146 in order to make insurer reimbursement payments. (Assumes annual assessment for 30 years using an interest rate of 5 percent and an assessment base of $40.9 million.)

Florida Insurance Guaranty Association[38]

FIGA does not accumulate funds in advance of an insurance company's insolvency. Therefore, when a company insolvency occurs, FIGA must obtain the funds it needs through assessments levied by the Office of Insurance Regulation on insurance companies subject to assessment. As with Citizens and the FHCF, these insurers must then recoup the cost through their policyholders. Depending on the number and size of property insurance companies which become insolvent following future hurricane strikes (or other disasters) in Florida, FIGA may need to levy its own FIGA Regular Assessments and FIGA Emergency Assessments to meet its hurricane claims payment obligations under Florida law.

FIGA has three separate accounts (Section 631.55(2), Florida Statutes): (1) the automobile liability account; (2) the automobile physical damage account; and (3) the account for all other insurance required to be part of FIGA. Only insurers writing business in the lines of insurance included in the account in which the insolvent company was writing business can be assessed. The "all other" account is relevant since it includes the property insurance lines of business.

FIGA has three sources of income to pay claims other than through assessments: distributions from estates in receivership, recoveries from the FHCF, and investment income. In a worst-case weather loss year which occurs in an illiquid financial markets, FHCF recoveries may not be forthcoming and investment income may be negative. Clearly, FIGA operates in a cascading-effect environment with the other two state insurance entities. If they are under

[37]State of Florida Financial Services Commission, 2016b.

[38] Florida Insurance Guaranty Association (2016) describes the function, operations and condition of FIGA.

extreme financial pressure, FIGA, by its definition is under financial pressure as well in attempting to pay claims. This third leg of the state's residual insurance stool receives the least attention, at least publicly, for the financial risk it represents to insurance policyholders, state government and Florida taxpayers.

Related Risk-Reduction Programs

Florida has created various programs and attempted various measures to address wind mitigation, and although not only for the purpose of reducing risk to the state pools, these programs do impact both the private and public markets for risk, making discussion here worthwhile. Florida's risk-reduction programs range from creating a state-wide building code to providing inspections and grants for improving the wind resistance of homes for its citizens. Residential property insurance pricing concerns (internal risk reduction) have been addressed with various laws including the creation of the Florida Commission on Hurricane Loss Projection Methodology (Modeling Commission) and the funding of a Florida Public Hurricane Loss Model.

Windstorm Mitigation for New Construction

Prior to 1990, Florida had no significant or widespread building codes, nor did they provide significant incentives to homeowners to build wind-resistant properties. Today, however, the situation could scarcely be more different. Since Hurricane Andrew, the Florida Residential Building Codes have been upgraded statewide and have been ranked by the Insurance Institute for Business and Home Safety (IBHS) as the best in 2011 and the second best in 2014 among the 18 coastal states evaluated.[39] New homes today across the state of Florida represent minimum construction standards intended to withstand hurricane-force winds and resist water penetration.

Recent hurricane damage research reflects the shift in construction standards. For instance, research conducted by Risk Management Solutions (RMS) in 2009 following the 2004 and 2005 hurricanes in Florida demonstrates lower losses were suffered by structures built in compliance with the most up-to-date building codes. This improvement in the Florida housing stock, over time and over storms, can be expected to substantially reduce the financial impact of windstorms to Florida's public and private insurance system.

[39] Insurance Institute for Business and Home Safety (2012, 2015).

Windstorm Mitigation for Existing Construction

Florida, understandably, was ahead of other states for many years in efforts to fortify properties against wind. 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). Since 2003, Florida Statutes have required certain windstorm resistant features of a home, when verified by a licensed windstorm inspector, result in discounts to the hurricane portion of the policy premium. The discount depends on the modeled impact of a specific mitigation feature on loss damage relativities and is determined by the Florida Office of Insurance Regulation (OIR). Effective 2005, insurance companies must notify homeowners windstorm mitigation discounts are available on their homeowners' insurance policies.[40]

The official windstorm inspection provides homeowners with a form prescribed by the OIR, the four-page Uniform Mitigation Verification Inspection Form (inspection form). The inspection form verifies existing features which reduce the expected loss costs in event of a hurricane, with the expected savings based on relativity studies submitted by Applied Research Associates to the OIR in 2002 and 2008.[41] Private insurers may use results from their own relativity studies so long as approved by the OIR.[42] The Florida Division of Emergency Management website recommends improvements which could be made to better protect the home against windstorm and provides an online calculator to estimate insurance credits available for each mitigation improvement, or feature.[43]

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[40] Statutes and rules indicated, "Using a form prescribed by the Office of Insurance Regulation, the insurer shall clearly notify the applicant or policyholder of any personal lines residential insurance policy, at the time of the issuance of the policy and at each renewal, of the availability and the range of each premium discount, credit, other rate differential, or reduction in deductibles, and combinations of discounts, credits, rate differentials, or reduction in deductibles, for properties on which fixtures or construction techniques demonstrated to reduce the amount of loss in a windstorm can be or have been installed or implemented."

[41] http://www.floir.com/sections/pandc/productreview/uniformmitigationform.aspx

[42] These relativity studies can vary widely in results. Rollins (2011) provides a side-by-side comparison of loss relativities based on AIR Worldwide and Risk Management Solutions modeling, respectively.

[43] http://www.floridadisaster.org/Mitigation/RCMP/index.htm

The inspection form focuses on protecting openings and strengthening roofs in the following categories: roof deck attachment, secondary water barrier, code-plus roof covering, bracing gable end walls, strengthening roof-to-wall connections, protecting or replacing window openings, and protecting or replacing doors. The inspection form provides the homeowner with verification of their features designed to provide a general indication of how well the home is expected to perform in the event of a hurricane.

Florida Commission on Hurricane Loss Projection Methodology

Traditional methods used to project hurricane loss costs were inappropriate after Hurricane Andrew. Hurricane modeling, which was a new methodology at the time, offered a more scientific approach, although controversial due to the proprietary nature of models and the variation in their modeled results. The Florida Legislature, recognizing the need for expert evaluation of computer models to resolve conflicts among professionals, created the Florida Commission on Hurricane Loss Projection Methodology (Modeling Commission) in 1995.

The Modeling Commission has been in existence for over 21 years and is perhaps the most sophisticated, open, and documented process in the world for the evaluation of computer catastrophe loss models. Its fundamental purpose is to serve as an independent panel of experts (not a regulatory body) for the development of standards and the review of computer hurricane models. Insurers wishing to sell homeowners insurance in Florida must use in their rate filings the results of a computer hurricane model(s) found acceptable by the Modeling Commission, and the FHCF in establishment of its reimbursement premiums must use the results of the Modeling Commission to the extent "feasible."[44] The Modeling Commission has a statutory mandate which continues to evolve. It has been charged historically to develop standards for hurricane wind losses. Since 2014, however, the Florida Legislature gave it the additional responsibility of developing flood standards (neither Citizens nor FHCF cover flood).

The Modeling Commission has served as a public forum for various issues related to residential property insurance. In addition to reviewing computer models, it was charged by the Florida Legislature in 2009 with evaluating the system for mitigation credits or discounts applied to residential property insurance in Florida.[45]

[44] Section 627.062 and particularly Section 627.0628 (3)(c), Florida Statutes.

[45] This study, lasting several months and encompassing multiple meetings, culminated in a 2010 Wind Mitigation Discounts Report, submitted to the Governor's Cabinet.

The Florida Public Hurricane Loss Model[46]

Given the controversial nature of catastrophe loss models and their results, in addition to creation of the Modeling Commission, the state of Florida authorized the construction of a public model for estimating hurricane loss costs. The Florida Public Hurricane Loss Model (Public Model) was approved by the Florida Legislature for fiscal year 2000-2001, and was directed to contract with the Florida University System. While there are several participating institutions including Florida State University, Florida Institute of Technology, the University of Florida, the University of Miami, and the Hurricane Research Division of NOAA—ultimately OIR with the approval of the Financial Services Commission decided to have Florida International University be the lead institution.

The Public Model has been found acceptable under all Modeling Commission hurricane standards since its first review under the 2006 Standards. Despite its acceptability, the Public Model generally has not been marketed or utilized significantly for commercial purposes. It has, however, served as a credible check for the Office of Insurance Regulation in its review of rate filings of insurers using private computer hurricane models. In several of its versions, modeled state of Florida losses are higher under the Public Model than under any of the commercial models, indicating no evidence the commercial models systematically inflate estimated losses.

Evaluation of the Public Entities' Role and Efficacy within Florida's Disaster Finance System

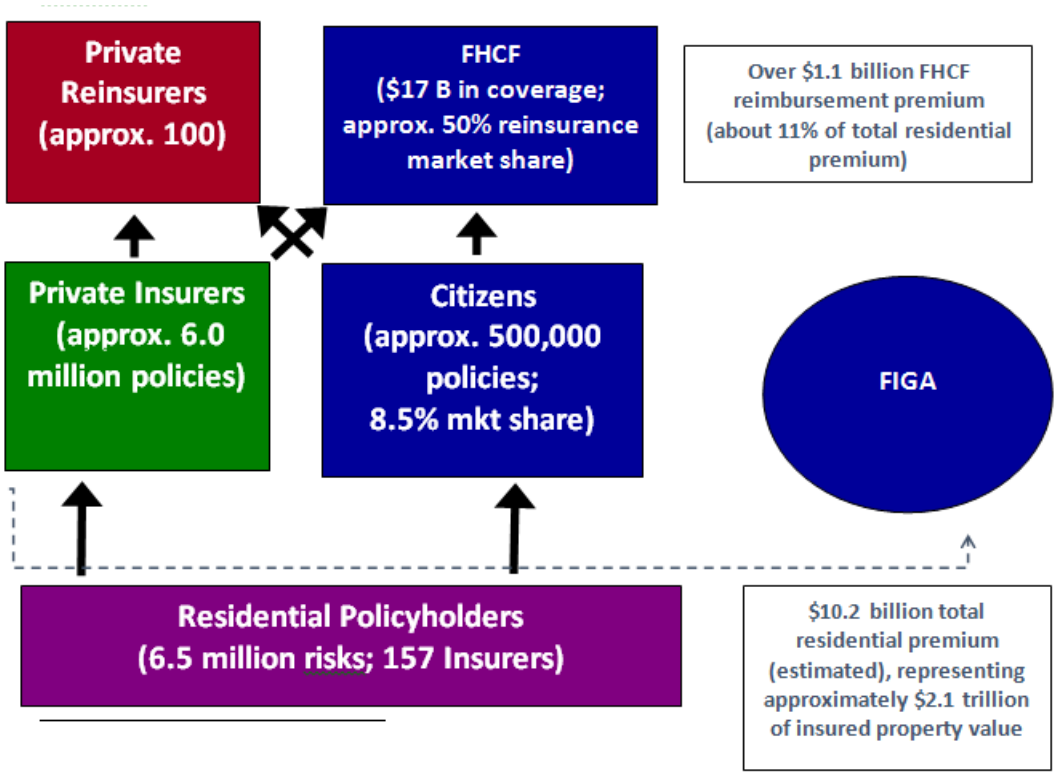
As stated previously, Florida's system for disaster financing is a fragile system with interrelationships. The system has never "failed" the state or its citizenry, but it is precariously constructed. Its current structure, which has morphed a number of times in various ways since the last major land falling hurricane in 2005, has never been fully stress tested by a major storm, or set of storms. The unprecedented hurricane drought spanning from 2006 to 2016, along with abundant reinsurance capital, insulated the system from the necessity to prove its capabilities.

Figure 2 depicts the basic relationships and capacity within the Florida residential property insurance marketplace. Although Citizens is substantially smaller than it was five years ago, it remains the largest state plan in the country and holds a sizable 8.5 percent policy market share in Florida. Note FHCF reimbursement premiums represent approximately 11 percent of the

[46] http://www.floir.com/sitedocuments/flpublichurricanemodel.pdf

Florida residential property insurance premium and an estimated 50 percent of the premiums for the reinsurance marketplace. The approximate 6 million policies insured by the private market are predominately written by small, Florida domestic carriers with limited capitalization. If a major storm were to threaten the financial viability of several of these carriers, much of the public burden could go to FIGA to pay claims and Citizens policy count could rise again, barring interventions to preclude such an effect.

Figure 2. The Florida Residential Property Insurance Marketplace, October, 2016[47]



The authors assert at least three economic concerns regarding the Florida marketplace structure. First, the market is structured such that economic pressures easily translate to the distorted use of public entities such as Citizens and the FHCF to ease affordability issues rather than simply address availability challenges. The watershed years in Florida for such market distortions were 2007-2009. Second is the risk of negative externalities resulting from subsidies. The third concern is the history of, and potential for, unintended consequences due to passage

[47] Florida Office of Insurance Regulation, FHCF, Citizens, Aon Benfield

and implementation of public policy on a piecemeal, rather than holistic, basis. These economic reservations are detailed below.

Public Policy Focus on Affordability Rather than Availability of Insurance

Responding to 2006 reinsurance and primary insurance price spikes in the Florida residential insurance market, policy makers focused on price-reducing legislation and regulation led to increased solvency concerns and had a negative impact on the private industry's ability to accumulate and attract capital. Such legislation and regulatory actions impacting Florida's property insurance market created significant uncertainty for private insurers and added to the cost of doing business in Florida. One state government action in particular—the passage of House Bill 1A—led to negative externalities and market failures.[48] House Bill 1A (HB1A) passed in the 2007 Session of the Florida Legislature. Among its most direct and damaging policies were that it formally rolled back Citizens rates, froze rates going forward, allowed policyholders to purchase Citizens policies without first being rejected by the admitted market, and expanded the capacity of the Florida Hurricane Catastrophe Fund (FHCF). The adverse results to the private market were quick and devastating, leading many large, well-capitalized insurers to leave the marketplace and market surplus to plummet (Medders, et al, 2013).

Negative Externalities Resulting from Subsidies[49]

Well-functioning insurance markets, as stated previously, ideally use risk as the basis for setting the price charged for each individual risk and do not offer subsidies. In the Florida marketplace, risk costs cannot be efficiently priced within the insurance contract, in some cases due to the physical risk (coastal risks) and in others due to the political environment. Thus, Florida's marketplace is at best suboptimal and negative externalities exist.

The state of Florida has chosen to finance a significant portion of its catastrophic risk exposure through post-loss assessments levied (on most property-casualty insurance policyholders) by state sponsored insurance entities—Citizens, the FHCF and FIGA.Post-loss financing can create subsidies depending on the structure of post-loss assessments. First, if assessments are not purely risk based, it is possible lower-risk policyholders pay larger post-loss

[48] A detailed treatment of the adverse effects of House Bill 1A and other Florida strategies with regard to residential insurance can be found in the Florida Catastrophic Storm Risk Management Center's 2011 *State of the Florida Property Insurance Market* report and in Medders, et. al., 2013.

[49] Newman (2009); Cole, Macpherson, Maroney, McCullough, Newman and Nyce (2010); Medders, et al (2013).

assessments relative to their exposure than do higher-risk policyholders. In particular, assessments levied as a flat percentage of total premiums (such as Florida's FHCF and Citizens assessments) propagate the same relative degree of subsidy which exists in the up-front premiums among risks. Second, subsidies may exist between the private and state-run entities, since the residual market mechanisms can assess both their policyholders as well as policyholders in the private market. Third, subsidies may not be restricted to differences in hurricane, or even property, risk alone. Assessments are levied on most lines of property-casualty insurance in the state.

Finally, post-loss subsidies also may result from timing in the sense that new policyholders, while required to pay assessments for the prior losses of other residential property owners, did not receive the benefit of below-market rates prior to the catastrophe. This outcome is dangerous for an economy dependent largely on net migration to the state. For instance, historically, FHCF debt has been considered high quality by the capital markets because of the FHCF's assessment powers. During at least two of the last eight years, however, it does not appear the FHCF could have successfully issued bonds sufficient to pay for its full potential liabilities, had it been necessary to do so. Thus, the quantity of debt needed may be more of an issue than the quality. This is particularly disconcerting in light of the current Florida economy and the likely adverse public reaction to potential large assessments (e.g., movement out of state or other evasion of assessments).

Lack of Enterprise-wide Risk Management

The authors have described the Florida marketplace for residential property insurance as an ecosystem. It can also be visualized as an enterprise, with arms extending to one another, creating and relieving pressures on one another. These pressures can be applied intentionally or by default. Within the Florida system exists the subsystem of public insurance entities. Citizens, the FHCF and FIGA all carry within their respective missions and operations actions which impact one another. For instance, if Citizens is successfully depopulated, but private take-out insurers who participate in the depopulation process are not held to a high capitalization and market conduct standard, one major storm could jeopardize the financial stability of multiple insurers of Florida homeowners. If multiple insurers cannot pay their claims post storm, the immediate burden rests with FIGA to ensure claims payments are made.

Despite these interrelationships, the various state insurance entities and risk-reduction measures that have been proposed, passed and implemented have given little or no consideration for the impact(s) on other pieces of the system. For example, whenever the FHCF capacity has

been considered for expansion or contraction, studies regarding the potential effects on Citizens, FIGA, and assessment potential have not generally been conducted by the Legislature. Requested studies and political analysis tend to focus on the downstream effects on primary insurance rates.[50]

Recommendations

This paper asserts concerns, but not without potential solutions offered. The following are provided for consideration not only by Florida, but by other states and regions which may be considering policy programs or wish to strengthen existing programs.

- The governing board or authority of a public disaster insurance or finance program is best composed of an adequate number of independent members in order to spread control and thus minimize political influence.
- Rigorous research and education need be applied to public policy in disaster risk management.
- Government programs are in need of a standing (and regularly active) committee of experts who are highly familiar with the state's insurance system and issues, who then report periodically to policy makers on key topics.
- Comprehensively review and evaluate the catastrophe loss modeling process to ensure appropriate and fair pricing for disaster financing programs.
- Use state entities to provide availability of insurance for high-risk properties, but do not allow the focus to become affordability at the expense of solvency. Keep subsidies to a minimum and be transparent in the intent and implementation of any subsidies deemed necessary for social adequacy purposes.
- Provide for reasonable commutation provisions to include time limits on the ultimate settlement and reporting of claims by public insurance entities.

[50] A notable exception was a study requested during the 2013 Florida Legislative Session, in which the Florida Catastrophic Storm Risk Management Center was charged with evaluation of alternative ways to manage the FHCF's size (Florida Catastrophic Storm Risk Management Center, 2013).

- Access the financial markets for pre-event debt, if needed, every two to three years rather than less frequently in order to communicate, enhance, and validate credit worthiness on an ongoing basis.
- Allow state insurance entities to purchase private reinsurance and other risk transfer products (such as catastrophe bonds) when such products can be structured beneficially and their purchase does not crowd out risk transfer capacity for private insurers.
- Consider not only the contract year or years immediately following a large event that exhausts or nearly exhausts resources, but also a number of years with different insurance and financial environments to clearly understand and prepare for potential adverse environments.
- Model catastrophe losses globally and determine the impact of disaster losses on the entire system in the state.
- Evaluate disaster financing programs for various "clash" issues with other public (or even private) market programs, where dependencies or correlations are involved.
- Include in any Modeling Commission's mission the review of mitigation credits as produced by the computer hurricane models.
- Design and implement all mitigation and related grant programs so as to encourage and require the strengthening of structures, not just inspection of structures.
- Enact a tax-deductible disaster savings account for citizens.
- Limit the size of disaster insurance programs such that the program can realistically operate over time without posing catastrophic consequences to a state, federal, or other government program, and stress test such programs to better understand their limitations.

The balance of this paper addresses questions regarding state programs posed for discussion, evaluates the state programs and details the recommendations for future policy consideration. Section 2 contains questions and answers for discussion. Section 3 provides an assessment of the programs' strengths, weaknesses, vulnerabilities and potential improvements. Section 4 details recommendations for policy improvements. Section 5 concludes.

2. Questions for Discussion

Technical Risk Cost Modeling and Risk Communication

How Are Technical Risks Costs Modeled and Calculated?

For the peril of hurricanes: Citizens, all admitted residential property insurance companies in the state, and the FHCF can only use hurricane models found acceptable by the Florida Commission on Hurricane Loss Projection Methodology (Modeling Commission).

Over the years, the way rates have been calculated for the state's residual market mechanism has changed. Today, Citizens rates are controlled by Florida's rating statute,[51] but further requirements are specified in its statute.[52] The rates are required to be actuarially sound except as otherwise provided. Citizens is required to file its rates annually with the Florida Office of Insurance Regulation (OIR). Additional information may be requested by OIR if needed. Citizens' board recommends rates, which OIR is required to consider and then issue a final order within 45 days. Citizens is prohibited from pursuing an administrative challenge or judicial review. The Florida Public Hurricane Loss Model (FPHLM) is to be used by OIR as a minimum benchmark for determining the windstorm part of Citizens rates. Citizens is not required to adopt rates lower than those determined by using the FPHLM.

The FPHLM is required to be found acceptable by the Florida Commission on Hurricane Loss Projection Methodology just as private hurricane models are. The Modeling Commission's role is to develop standards and review models for acceptability. Only those computer hurricane models found acceptable by the Modeling Commission can be used by insurers making rate filings in Florida for residential and commercial property insurance rates. The FHCF is required to use models found acceptable by the Modeling Commission to the extent feasible. As such, the FHCF has historically uses all the models found acceptable.

To What Extent is the "True" Cost of the Risk Visible? Is it Communicated Effectively?

The part of the true risk cost related to the pure premium is not visible since for the most part it is determined by computer hurricane models that are proprietary in nature. Other aspects of the cost of risk are revealed in rate filings for Citizens which are public or in the case of the

[51] See Section 627.062, Florida Statutes.

[52] See Section 627.351(m)1., Florida Statutes.

FHCF the details are revealed in its premium formula which is also a public document. The true cost of risk also involves assessments in situations where Citizens or the FHCF does not have sufficient resources to cover losses. It is impossible to know in advance the true cost of what these may be, but they are a cost of risk. Assessments may not be clearly understood by the public until they are imposed upon policyholders. FIGA Assessments can come about due to insolvencies. If an insolvency is due to inadequate rates or the lack of obtaining sufficient reinsurance, consumers may pay a cost after the fact. Any situation involving an insolvency is not possible to predict and the costs associated with an insolvency may not be known until years later.

To What Degree is Risk-Based Rating and Insurance Pricing Occurring?

For Citizens and the FHCF, rates are required to be actuarially sound. This does not mean such rates are comparable to private insurance pricing. Insurance pricing is market driven to a large degree and companies have the ability to design their book of business to control their exposure and probable maximum loss levels. Citizens has much less control over its book of business although it does have a general capability to "keep out" policies and allow for "take out" of policies. The market assistant plan (MAP) and the clearinghouse[53] are two approaches designed to keep policies out of Citizens. Insurer takeout can also be used to manage probable maximum losses and reduce potential policyholder assessments by Citizens. Insurance pricing contemplates both risk loads and profit loads. Although Citizens operates similarly to private insurers, it does not have profit loads nor does it require certain returns needed to attract private capital.

Private reinsurers need to be compensated for the risk they take when they write reinsurance coverage. An insurer's cost for private reinsurance will generally be greater than its cost for FHCF coverage. This is due to private reinsurers' risk loads, profit charges, brokerage commissions, taxes, and other marketing costs and expenses not involved with an insurer's FHCF coverage.

Citizens has risk-based rates based on its territories, and it also offers mitigation discounts. The FHCF's rates are designed to reflect location differences. It has 25 five-digit zip code groupings. These groups are based on similarities in loss cost, however the rating zones are

[53] See Citizens website for details regarding the Florida Market Assistance Plan (FMAP) and the Clearinghouse at https://www.citizensfla.com/clearinghouse.

not contiguous. Insurers generally do not pass on the cost of the FHCF coverage in their rates the same as the FHCF charges the insurer for its exposure. In some cases the insurer spreads the FHCF cost evenly (using a fixed percentage) among the insurer's policyholders, but in other cases a unique scheme is used to allocate FHCF cost. The FHCF's rates are also based on construction, deductible level, and mitigation credits. The purpose of the FHCF rating methodology is to fairly allocate coverage to its participating insurers based on each insurers relatively exposure to risk.

Often insurers in Florida, spread their cost using cross subsidies. For example, rates in certain territories or sections of the state will be capped. This is common for insurers to do and acceptable to the OIR, but one could argue such smoothing violates the principle of risk-based rates and charges some policyholder more than they should be charged and others less. The insurer and the OIR generally have flexibility in that so long as the insurer arrives at an overall adequate rate level, the insurer can usually comply with OIR's solvency concerns without violating rating statutes.

Are Risk Costs Incorporated into Property Design, Prices, or Development Decisions?

Florida has requirements in its rating laws to require insurers to offer mitigation discounts. The idea is that insurers will provide adequate discounts to encourage better designed homes. The Florida Building Code is a key motivator of this behavior. Homes built according to the 2002 Florida Building Code standards and later receive significant discounts. Therefore, due to the operation of the Florida Building Code, stronger built homes generally have lower insurance cost. To some extent mitigation measures in Florida are impacting development decisions. And when homes are built in high risk areas, they are now required to be built stronger to resist wind. But since Florida is a growth state, there is continued development along the coast in high risk areas.

Roles of the Public and Private Sector

How Are Duties Split Between the Public and Private Sectors?

The state of Florida is taking the coastal risk with Citizens' Coastal Account and other residual market risk across the state in its PLA/CLA Account when property owners cannot find coverage in the admitted market. In recent years, Citizens has been able to increase its rates and has been highly successful at depopulation efforts. The price of private reinsurance and risk transfer programs have dropped and new start up insurers have targeted Citizens policies for takeout as part of their business plans. Many desirable policies in Citizens' PLA/CLA Account

have been taken out by private insurers over the last several years. The focus is now on the Coastal Account. Although some insurers write a limited amount of coastal exposure, there are others aggressively pursuing Citizens' coastal business. This is a turnabout from a few years ago. Since 2009, Citizens has been phasing into actuarial sound rates, the coastal business has now become more attractive for insurers.

The share of the Coastal Account business taken out of Citizens has increased from 9 percent in 2012 to 36 percent in 2015 (Hurtibise 2016). In 2016 through July, a reported 42 percent of the policies taken out of Citizens were from the Coastal Account.[54] The admitted market takes the risk that can be accommodated in the various insurers book of business so as not to become overexposed with a high PML. Some of the hard to place risk in the private market is written in the surplus lines market. These types of risks are either unusual risks or those which do not meet the underwriting requirements of the admitted market or the underwriting requirements of Citizens.

The FHCF operates as a mandatory type of state run reinsurer. In general terms, the FHCF would trigger the "average" insurer with a 1 in 9- year hurricane event or an 11 percent probability of occurring, and the insurer would exhaust its coverage with a 1 in 50-year event or a 2 percent probability event. These numbers vary greatly with insurers and their respective books of business. Private reinsurance is purchased underneath the FHCF coverage, along the side FHCF coverage where a copayment exists, and on top of the FHCF coverage. Private reinsurers and other risk transfer mechanism will provide coverage for individual insurers around their FHCF specific trigger and exhaustion loss levels. To some extent, the FHCF is a "one size fits all" type of coverage. Insures are given a retention multiple and a payout multiple to determine their coverage. However, they do have a choice as to how much FHCF coverage they purchase above their retentions—45 percent, 75 percent, or 90 percent coverage. Otherwise, insurers do not have much choice since the characteristics of their exposures reflected in their book of business governs their FHCF premium and amount of coverage.

[54]Several insurers have been approved by OIR for personal residential policies to be taken out of the Coastal Account which include: Homeowners Choice Property & Casualty (up to 18,900 policies), National Specialty Insurance Company (up to 8,421 policies), Safepoint Insurance Company (up to 4,000 policies), Southern Oak Insurance Company (up to 5,000 policies), and Weston Insurance Company (up to 9,577 policies). Two of these insurers have been approved for takeout of commercial residential policies in the Coastal Account—Weston (up to 5,423 policies), and Safepoint (up to 325 policies). Source: OIR.

How Much of the Risk does the Public Sector Bear?

When Citizens exhausts its cash resources, it is required to use regular assessments to obtain funds from its own policyholders. This assessment can be up to 15 percent of the Citizens premium. Beyond the regular assessments, Citizens can require emergency assessments on a broad base of property and casualty policyholders up 2 percent of their property and casualty policies with the exception of workers' compensation, medical malpractice, federal flood, and federal crop insurance. The assessments are used to fund tax-exempt revenue bonds and can continue for years.

For the FHCF, the risk each year born by the public sector depends on the amount of accumulated cash as well as the amount of reinsurance (if any) the FHCF purchases. To the extent that cash and reinsurance is available, the FHCF may need to issue revenue bonds to pay for the difference in resources available and its statutory limit of coverage. The maximum statutory obligation is currently $17 billion. During the ten-year time frame of no hurricanes impacting Florida, prior to Hurricane Hermine and Hurricane Matthew, the FHCF was able to accumulate a substantial amount for its cash balance to pay hurricane claims. For the 2016 hurricane season, there was a total of $13.8 billion accumulated for its cash balance and $1 billion of reinsurance purchased.

Should a hurricane occur for the 2016-2017 contract year, the most the public sector would have to bear would be the cost to finance $2.2 billion of bonds ($17 billion minus 14.8 billion) over some period of time. This debt could be paid off over a time frame of 1 to 30 years although a shorter time period would more than likely be used than the maximum. Under the worst case scenario, in situations where the FHCF's cash balance has been exhausted and reinsurance is not feasible or available, the public could be called upon to finance as much as $15.8 billion of revenue bonds ($17 billion less one year's premium and interest earnings on that premium—about $1.2 billion). This could be paid off up to 30 years with emergency assessments as high as 6 percent of premiums on assessable lines each year depending on the level of interest rates and other financial market factors. For back to back losses in two years, the maximum emergency assessment would be 10 percent of the assessable premium lines. The FHCF's recent bonding estimates indicate, on a premium base of $41.5 billion, a 6 percent assessment would result in a revenue stream of $2.49 billion a year, and a 10 percent would be $4.15 billion. But, given the cash balance and resources, it is expected the 2016-2017 hurricane season would only require a .34 percent emergency assessment to fund the $2.2 billion potential need (assessed over 30 years).

The public faces other risks as well. For example, if the FHCF cannot finance its losses with revenue bonds due to a liquidity crisis or other adverse financial development in the financial markets, a number of Florida insurers dependent on the FHCF could become insolvent. The magnitude of this problem could preclude the Florida Insurer Guaranty Fund (FIGA) from successfully issuing debt to fund policyholders' claims from insolvent insurers. This risk is difficult to quantify.

How Does the Program Encourage or Discourage Private Involvement in the Market? In What Ways?

Following the passage of CS/HB 1A in 2007, the freezing of Citizens' rates and the requirement for insurers to roll back their rates caused Citizens' to compete directly with the private market, but the situation has changed today. Citizens has in the last several years been successful with its takeout programs. Nevertheless, it is still quite large in terms of the number of policyholders as well as total insured value. Requiring Citizens' rates be higher than the admitted market could motivate insurers to compete in certain areas of the state. Perhaps requiring an annual increase in premiums until the rate differential reaches a certain level such as 15 percent above the private market would help with additional takeout efforts.

The FHCF is a mandatory program, but insurers can reduce their coverage by lowering their coverage percentage. They have three coverage options—90 percent, 75 percent, to 45 percent coverage. With lower reinsurance prices in the current soft market, many insurers have a book of business such that their retention levels are relatively high compared to the averages for the FHCF. If the FHCF rates were to increase, this could motivate more companies to choose private reinsurance to replace some of their FHCF coverage. Another way to accomplish this would be to change the law and require coverage at no more than 75 percent above the FHCF's retention. Also, the FHCF's rates could be increased by increasing its cash build up factor by 5 percent a year from the current 25 percent to 50 percent over five years. This could result in more insurers finding private reinsurance as a more favorable alternative. Also, lowering the statutory limit of $17 billion to $14 billion would help shift coverage to the private market and save capacity for the future.

Incentives for Risk Reduction

Does This Program Have Explicit or Implicit Incentives for Reducing Risk?

The state requires mitigation discounts to be offered by all insurers. These are explicit and are determined in rate filings.

Do We Have Evidence on the Magnitude of These Incentives?

Yes. There are various modelers which have created mitigation discount factors. The OIR has used the ARA model to create a table of discounts for various risks around the state. Private insurers have used the OIR table of discounts as well as being able to use discounts which they can developed on their own, so long as such discounts are approved by the OIR.

What Are the Relevant Roles of the Public and Private Sectors in Risk Reduction?

The state of Florida has created several programs aimed at reducing hurricane losses. Creating the Florida Building Code involved creating standards for construction, educating people on construction techniques and materials, reviewing products for effectiveness, etc. Insurers (including Citizens) are required to offer mitigation discounts based to some degree on the FBC. Also, the FHCF requires mitigation discounts as part of its rates. Private sector insurers have been involved at inspecting and re-inspecting homes of policyholders to ensure better data quality under certain circumstances where errors could have been made or lack of thoroughness. The private insurance and reinsurance industry has supported various programs aimed at reducing risk, such as the Federal Alliance of Safe Homes (FLASH) and Insurance Institute for Business and Home Safety.[55] The industry has also invested in or supported programs such as the "Wall of Wind" at Florida International University to evaluate mitigation measures.[56]

Is There Any Financing in the Form of Loans and Grants for Hazard Mitigation as Part of the Program?

The MSFH program provided for grants to certain qualifying homeowners to implement mitigation measures. But, the MSFH program has been suspended since 2006. The Division of Emergency Management has an on-going program known as the Residential Construction Mitigation Program (RCMP); its funding is provided from the FHCF for $7 million annually.[57]

What Has Been the Government's Role in Risk Protection/Reduction and How Can This Role be Shown to Have Influenced the Pricing and Take-Up Rates for Disaster Insurance?

The government's role has involved the Office of Insurance Regulation promulgating a schedule of discounts insurers can use or justify their own mitigation discounts. The discounts

[55] See http://flash.org/become_partner.php and https://disastersafety.org/about-ibhs-members/.

[56] The Wall of Wind can create hurricane wind speeds as well as hurricane characteristics to test products and concepts. See link at https://wow.fiu.edu/testing-services/

[57] See http://www.floridadisaster.org/Mitigation/RCMP/index.htm

are used to motivate homeowners to strengthen their homes against the wind peril. Numerous policyholders have obtained mitigation discounts on their residential property policies, but they may not have had to make any improvements to their structures to qualify for the discount.

Is There Assistance in Financing Risk Reduction for Lower or Middle Income Households?

The Division of Emergency Management RCMP is an ongoing program. The MSFH program was suspended in 2009, but involved $250 million of the state's money to fund home inspections and homeowner grants for homes less than $300,000.

What Roles do Zoning, Building Codes, and Land Use Play in Connection with Insurance?

They play a major role since insurer discounts are based on the FBC. The FBC is updated every three years by the Florida Building Commission.

Take-Up Rates

What Are Take-Up Rates for Insurance? Why Are They at This Level? What Are the Contributing Factors?

Florida has residual market mechanisms for direct insurance, a reinsurance-type program (the FHCF), and an active surplus lines market. There is no formal measure for "take up rates," but participation in these entities is high. Banks require insurance covering the peril of wind for mortgages. Citizens offers multi-peril hazard insurance coverage for personal and commercial residential properties deemed difficult to insure or priced out of the market by private insurers. For insurance companies, the FHCF is mandatory.

How Does Disaster Aid and/or Investment in Loss Reduction Measures Influence Take-Up Rates of Insurance?

No measures are available. Take up rates are not a problem. Florida has a residential exposure of $2.1 trillion according to the FHCF's 2016's Ratemaking Formula Report.

How is Insurance Purchase Handled for Those Not Able or Willing to Pay for Coverage?

The state of Florida has not appropriated funds available for financing insurance coverage purchases. Lending institutions require property coverage on homes to include the peril of wind.

How Are Take-Up Rates Influenced by Other Financing Mechanisms and Other Governmental Programs, such as Provision of Disaster Aid or Hazard Mitigation Programs?

N/A

Rate Setting and the Distribution of the Costs of Catastrophes

How Does This Policy Distribute the Costs of a Disaster Event?

For Citizens, the cost of a disaster is distributed in a number of ways. Citizens has private reinsurance which distributes cost over a worldwide market using reinsurance capital. Citizens also has issued catastrophe bonds which distribute some of its cost to investors in the capital markets. Additionally, Citizens distributes some of its disaster cost to the FHCF associated with its layer of FHCF coverage. Some of the cost of disasters is born by policyholders in their deductibles. To the extent funds are not sufficient to pay all losses, Citizens' policyholders are assessed regular assessments of up to 15 percent for each account or a maximum 45 percent for all accounts if necessary. The Coastal account can involve emergency assessments on a broad base of Florida property and casualty policies. These assessments operate to spread disaster cost over a large number of policyholders over time by the use of bonding. The maximum assessment for these assessable lines of policies is 2 percent per year.

The FHCF cost of catastrophes are spread over residential policyholders who have a "covered policy," where the FHCF's reimbursement premiums charged to participating insurers are passed through to their policyholders. After the FHCF uses all of its accumulated FHCF premiums and investment income (less operating and mitigation expenses), it is authorized to issue revenue bonds funded on a broad base of most property and casualty policyholders. This spreads cost over a large number of people over time through the issuance of the bonds for up to 30 years into the future.

Are There Implicit or Explicit Cross-Subsidies Among Groups?

There are explicit cross-subsidies used by both Citizens and the FHCF. The subsidies are associated with the broad base of property and casualty policyholders who fund revenue bonds with emergency assessments.

Is There Some Level of Premium Beyond Which Consumers Resist Paying?

In 2006, the insurance crisis led to major legislation (CS/HB 1A) to lower residential property insurance premiums. The public complained and expressed anger at the insurance and reinsurance industry for the large rate increases that were occurring. The insurance cost was driven by a hard reinsurance market (for which Florida-related storms as well as Hurricane Katrina were the major drivers). Elected officials in 2007 passed legislation to address these problems.

However, the state of Florida has not had the "big one" that could stress the system in a much more extreme way involving high premiums, high assessments, and lack of available coverage. Factors that could aggravate or mitigate the situation depend on the nature of both the financial markets and the reinsurance/risk transfer markets. With high financing cost and high risk transfer cost, some policyholders may have difficulty paying their premiums. If severe problems occur due to a lack of risk transfer capacity or a liquidity freeze which reduces financial market access, there are situations where the market would fail to operate without major assistance from the state and/or the federal government.

It would be worthwhile for the state to have detailed exposure data to test its insurance system with a type of sensitivity analysis based on computer hurricane modeling. This would require the legislature to pass a law allowing for the collection of insurer confidential data at the street address level and the use of geocoding of such data.

How Are the Most Extreme Events Financed? What is the Division Between Pre-Event and Post-Event Financing?

Extreme events are financed with the buildup of reserves in non-event years, private reinsurance, and post-event financing when such resources are insufficient for the payment of disaster losses. Both Citizens and the FHCF have the advantage of accumulating catastrophe reserves over private insurers, but there are limitations involving post-event financing with debt. Post-event financing is not always available at the time and in the amounts needed during an adverse financial market. Also, reinsurance and other risk transfer mechanisms (catastrophe bonds) may not be reliable in certain environments. Years involving back to back major disasters may create serious capacity and pricing problems for the risk transfer market.

Pre-event financing is generally used to create liquidity. Liquidity is valuable in order to "wait out" an adverse financial or reinsurance market situation or both. The key concern should be to focus on the long run and plan for likely scenarios occurring ten or more years in the future rather than merely focusing on a one or two year time frame. Also, adequate cushion needs to be created to survive adverse conditions to avoid or mitigate financing problems for extreme events. A major consideration is that the management of a disaster financing program needs to be able to take advantage and capitalize on opportunities when they arise. Both Citizens and the FHCF have planned for the medium term, but have not given much consideration to the long run and how to handle various "what if "scenarios. The last ten years have highlighted both financial market and reinsurance market scenarios which could have significantly impaired both entities capabilities to timely and adequately respond to catastrophic hurricane events thus threatened the

state's economy and its citizens financial welfare and safety. Fortunately, a large catastrophic hurricane did not occur during this time period. The years 2007 to 2010 could have involved serious financial consequences for Florida.

Are Lower or Middle Income Households or Small Businesses Given Any Assistance with Respect to Their Premiums? If So, What is the Criteria for Their Being Given Assistance?

No. At this time, Florida entities do not differentiate coverage eligible or price based on income, or other wealth measures.

3. Strengths, Weaknesses, Vulnerabilities, and Potential Improvements

Citizens Property Insurance Corporation

Strengths

Citizens has operated for the most part as a residual market insurer, and along with its predecessor organizations (the FWUA and the FRPCJUA), has evolved in response to the needs of the state. The Legislature continues to addressed various problems and issues and be responsive to the needs of the state. Citizens' management has been concerned over the years about its financing structure and ability to pay claims. One of Citizens strengths today is its board's and management's ability to manage its liquidity and risk transfer program. Citizens has been able to put in place a strong reinsurance program and to use catastrophe bonds to transfer risk to address its claims-paying capabilities and help avoid bonding and assessments. Citizens has also used pre-event debt to create liquidity and ladder its debt to take advantage of low interest rates and lower its long term average cost of pre-event debt. In the last several years, Citizens has been highly successful at depopulation and "keep out" efforts. This has been as a result of both successful legislation and administrative actions.

Weaknesses

Citizens' original mission of serving as a residual market was changed following the passage of HB 1A in 2007. This legislation had multiple and cumulative negative impacts on the marketplace, but fortunately the state was able to survive ten years from 2006 to 2015 without a land falling hurricane. Had a large hurricane occurred, the results could have been disastrous for both Citizens' policyholders and other non-Citizens policyholders who were potentially subject to Citizens' emergency assessments. The freezing of Citizens rates at the 2006 level allowed Citizens to compete with the private market, caused the number of Citizens policyholder to grow excessively, slowed down and virtually stopped takeout activity, and increased Citizens potential

bonding and assessments to non-Citizens policyholders including businesses, automobile policyholders, nonprofit organizations, etc. The insured population of Florida could have been burdened with years of assessments to fund Citizen's potential losses. Fortunately, a large loss did not occur.

Following the passage of HB 1A, Citizens provided mitigation discounts to its policyholders that were excessive (disproportionate to the expected loss savings), which later required Citizens to spend money re-examining many of their exposures at a cost in the millions (Florida Commission on Hurricane Loss Projection Methodology, 2010; Florida Catastrophic Storm Risk Management Center, 2010b, 2011; Medders et al, 2013, and others).

Florida legislation in recent years has encouraged and promoted depopulation measures and Citizens has been highly successful with its depopulation efforts. Nevertheless, Citizens is still arguably too large and its long term viability could be questionable if the insurance market returns to a hard market or if a large hurricane event disrupts the residential property insurance market. Citizens is also heavily dependent on the financial markets and the FHCF.

Ongoing Vulnerabilities

Citizens has vulnerabilities with regard to the future if its cash is drained due to a large hurricane event, and it has to rely on large amounts of debt. The financial markets and reinsurance markets can be highly volatile. A review of the last ten years indicates major problems existed regarding potential assessments, and the premium impact of such assessments on Florida policyholders could have caused a major crisis (Florida Catastrophic Storm Risk Management Center, 2011, 2013). The Legislature has dealt with these issues and Citizens has been strengthened greatly, however, the situation over the last several years was very favorable with low reinsurance/risk transfer cost and low interest rates. Long time periods of no hurricane claims, a soft reinsurance market, and an historically low interest rate environment cannot be expected to continue over the long term. Citizens can be adversely impacted by circumstances impacting the FHCF. Since both organizations share the same emergency assessment base, the financial markets can freeze up and prevent both organizations from issuing debt to finance future hurricane losses.

Potential Improvements

Citizens' board, elected officials, and the Legislature are acutely aware of the threats to Citizens mission. Continue efforts to strengthen Citizens is necessary. Citizens' takeout and keep out programs (clearing house) should be a continuing emphasis. Future legislation needs to

ensure Citizens rates are higher than the admitted market, and its role is not expanded in the future to compete with the private market. This can dangerously expose numerous policyholders in the state to tremendous risks and liabilities. Actions taken by the Legislature needs to be based on sound insurance practices and to avoid situations of moral hazard. Greater accountability needs to exist in the legal system so as to not disadvantage Citizens at the expense of unscrupulous public adjusters, trial lawyers, and contractors. Citizens needs to ensure mitigation discounts are realistic, fair, and verifiable. The state of Florida should view Citizens as a state program involving public funding which needs to be carefully controlled, audited, and scrutinized. Special interest groups can too easily gain benefits and pass cost on to the public. Issues such as sinkhole damage, water damage, assignment of benefits, etc. have exacted a high price tag in recent years. These problems are not fully under control and require major legislative action.

Florida Hurricane Catastrophe Fund

Strengths

The FHCF has operated since its inception to provided additional capacity for residential property insurers operating in the state. It has served one of its main purposes by helping to stabilize the state's economy. The FHCF has also been highly successful in paying its claims and has provided services to its participating insurers involving very few administrative disputes or litigation. The FHCF has not suffered any adverse publicity related to its management or the services it provides. The FHCF is under the control of the SBA Trustees which are the three highest elected officers in the state. Policy decisions are discussed in public meetings involving its nine member FHCF's Advisory Council. Important documents are readily available on-line for review including the FHCF Reimbursement Contract, the FHCF's Premium Formula, the FHCF's Claims Paying Capacity Reports, bonding documents, reinsurance contracts, and other information which is beneficial to participating insurers and the public.

The FHCF has a relatively small staff of 13 full time employees and low operating expenses. Being housed in the SBA has also created certain administrative efficiencies. Thus, the FHCF has the capability to call upon the expertise of others in the SBA for a wide range of management and administrative support services.

The FHCF has remained stable in terms of its operations, and the way coverage is distributed to participation insurers. The FHCF has evolved over time to become financially stronger in order to better address the needs of its participating insurers. The FHCF has kept up

with technological changes and added efficiencies over time. It has highly effective communication programs and provides annual workshops for its participating insurers.

The FHCF is a state governmental program and in concept it operates to spread the catastrophic hurricane risk over a large number of policyholders and over time (by the use of bonding) in order to deal with infrequent but large catastrophic hurricane events. It also charges actuarially indicated risk-based rates designed to fairly reflect cost to insurers and policyholders. The issuing of bonds funded with emergency assessments represents contingent capital anticipated to be used infrequently. Over the 22 years of the FHCF's existence, it has only had to issue bonds for the 2005 hurricane season when it ran short of resources. The emergency assessments lasted from 2007 until 2014 and were 1 percent of premiums originally and were increased to 1.3 percent in 2011. The amount of tax-exempt debt issued to fund losses was $2.65 billion.

Weaknesses

The biggest weakness of the FHCF is its ability to maintain capacity in the market. After a large event exhausts the FHCF's resources, the FHCF needs to be able to have a meaningful amount of capacity the following year. This is known as subsequent season capacity. Given the volatility of the financial markets, there are no guarantees the FHCF will be able to issue tens of billions of dollars of bonds in a timely fashion. The FHCF, SBA, and Legislature has been aware of this problem for years, but has not yet taken all the steps necessary to solve this problem. The FHCF poses a large risk for its participating insurers. The best example of this is 2008 when the FHCF estimated its claims paying capacity at $13.1 billion after participating insurers purchased $27.7 billion in coverage. Had a loss occurred in the 2008 hurricane season, the results could have been disastrous not only for insurers, but for the state of Florida which was facing a major budget crisis at that time. This situation could repeat itself in some form in the future. The FHCF needs to be more reliable for insurers and their policyholders.

Ongoing Vulnerabilities

The volatility of financial and reinsurance/risk transfer markets can create uncertainties for the FHCF and for the Florida residential property insurance market. The FHCF's capacity is highly dependent on its ability to issue debt. This is not as much of a problem when the FHCF has accumulates a large cash balance such as it had in 2016 with $13.8 billion. This means the most the FHCF would need to issue in post-event bonds would be $3.2 billion ($17 billion less $13.8 billion) to fund its maximum statutory capacity of $17 billion, but that was reduced further to only $2.2 billion in 2016 given the FHCF's $1 billion reinsurance coverage purchased that

year. Should such resources be exhausted, the FHCF is anticipated to have subsequent season claims-paying capacity of $11.5 for the following year. This potentially results in $5.5 billion less in capacity ($17 billion less $11.5 billion). This may not be a problem depending on whether insurers can rely on the private market reinsurance and risk transfer products to maintain their capacity. Obviously, in situations where the FHCF's cash balance has been drained due to a large hurricane, the problem of financing losses becomes more acute. If the conditions in the financial markets become unfavorable such as a liquidity freeze similar to what happened in 2007 to 2009, the FHCF's capabilities are weakened and the consequences may be extreme. If the FHCF cannot issue sufficient debt, Citizens and admitted insurers can be adversely impacted. Also, since Citizens relies on the same emergency assessment base to finance its debt, Citizens may not be able to issue sufficient debt. These problems could easily bleed over to FIGA. Although FIGA does not have the same assessment base as the FHCF and Citizens, there is a large overlap and the three organizations are dependent on the same financial markets for funding and a "crowding out effect" could occur. A type of "clash" financing situation could arise. Citizens' policyholders are relying on Citizens to pay their claims. Citizens is relying on the FHCF which provides a large layer of reimbursement coverage that coordinates with its private reinsurance and catastrophe bonds for paying claims. Other admitted insurer policyholders rely on FIGA to bail them out if their insurer fails. A failure in the financial markets could have disastrous consequences for the state. A combination of hurricanes and a collapse in the financial markets represents a major vulnerability for the FHCF and the insurance markets.

Special interest tends to exert its influence and can result in adverse consequences for the FHCF, participating insurers, residential policyholder, and other assessable policyholders. For example, medical malpractice was exempt at one time due to problems in the market for medical malpractice insurance. Long after the medical malpractice insurance crisis subsided, the exemption has continued to be renewed every three years—the most recent renewal was in 2016. Does it make sense for the some of the wealthiest individuals in the state to have an exemption from paying emergency assessments to fund debt for paying hurricane claims when most other property and casualty policyholders of the state are required to do so?

Other situations involving special interest has occurred with special coverage for smaller insurers known generally as limited apportionment insurers.[58] From 2006 to 2013, these insurers

[58] Limited apportionment insurers are defined in Section 627.351(6)(c), Florida Statutes. Basically, such insurers have policyholder surplus of $25 million or less and meet other requirements.

enjoyed a special coverage option of up to $10 billion of FHCF coverage which only they could select below their FHCF retention. This coverage was not actuarially priced (the price was specified in the law) nor was it priced similarly for each limited apportionment insurer based on probabilities of attachment and exhaustion. The problem of treating one group of insurers or policyholders different from others is one of fairness and equity in the marketplace. The public needs to have confidence in state programs and special interest can be perceived as creating an unfair playing field due to its political influence. This is an ongoing vulnerability of any state program.

Potential Improvements

The FHCF needs to solve its subsequent season problem by using longer term financing while interest rates are low. Utilizing a laddered approach such as Citizens has done in the past may be a viable option depending on financial market conditions. Citizens has utilized pre-event bond laddering by issuing three, five, seven, and ten year maturities. With interest rates as low as they have been in the last several years, there is the possibility to consider additional maturities such as 15, 20, or 30 years.[59] The value of laddering can be 1) to provide short term liquidity to overcome a difficult financial market and buy time to issue post-event debt, 2) to allow for lower tranches of debt issuance so as to avoid cost penalties associated with large issuances, 3) to create a lower and more affordable average cost of debt over time, and 4) to engage in the market more frequently to educate investors by their becoming more familiar and confident with the FHCF and its debt ratings. Given the period of historically low interest rates, a long term pre-event bond laddering program could strengthen the FHCF subsequent season capacity. The procurement of private reinsurance or other risk transfer programs can also be beneficial. Some consideration could be given to either multi-year reinsurance or the issuance of multi-year catastrophe bonds. Issues regarding the best placement of the layer of coverage needs to be addressed and planned for. If the cash balance is exhausted, the best (and perhaps only affordable) placement may be above anticipated bonding levels. Pre-event bonding can make this a more feasible solution.

[59] Although the FHCF's pre-event debt is base on a "spread to Treasuries," longer term Treasuries have been at very favorable and affordable financing rates. For example, the 5-year and 7-year Treasury notes were priced at 2.65 percent and 3.36 percent in 2010; but at year-end 2016, the 10-year, 20-year, and 30-year Treasury notes were priced at 2.45 percent, 2.79 percent, and 3.06 percent respectively. On February 11, 2016, the 30-year Treasury bill had dropped to 2.50 percent.

Florida Commission on Hurricane Loss Projection Methodology

Strengths

A major strength of the Modeling Commission is its structure as an independent panel of experts. By all accounts, it has worked and is viewed as an objective process. The Modeling Commission is administratively housed in the SBA and is funded as an administrative expense of the FHCF. It is also staffed by the SBA which includes members of the FHCF's management team. Also, a professional team of experts are hired which consist of an actuary, an engineer, a meteorologist, a computer scientist, and a statistician. Since the Modeling Commission also has responsibilities for developing flood standards and reviewing computer flood models, two additional members have been added to its professional team—a coastal engineer and a hydrologist. These two overlapping teams are used to assist in developing standards as well as to go on site to review models for acceptability in meeting all of the Modeling Commission's standards. Every year, the SBA Trustees appoint the chair of the Modeling Commission.

The Modeling Commission has a website where a wealth of information is provided for the public. The modeling organization, insurance regulators (OIR), insurers, interested parties, and the public may also participate and provide input. By law, the Modeling Commission is required to protect certain confidential, proprietary, and/or trade secret information. Through its on-site visits, the professional team as well as Commission members have been able to review all relevant information, data, and workings of the respective models. The Modeling Commission's process has evolved over 20 years and has been used to enhance the accuracy and reliability of computer hurricane models. Its new responsibility as of 2014 is for developing computer flood model standards by July 1, 2017. This work is documented on the Modeling Commission's website.

The Modeling Commission has been recognized both nationally and internationally as one of the most thorough and comprehensive processes for hurricane model review. Several states to some degree, consider the Modeling Commission's review process in their review of computer hurricane models used for residential property insurance ratemaking.

Weaknesses

The Modeling Commission's strength of being "independent" could also be considered a weakness if ever the Modeling Commission strays from its mission. Periodically, the Modeling Commission is asked by consumer groups, politicians, or the Legislature to do something it was not designed to do. The Modeling Commission's role is not to compare models, create models,

advise modeling organizations, or to arbitrate differences between various modeling organizations or other parties.

Ongoing Vulnerabilities

Outside parties attempting to change the mission of the Modeling Commission and change the focus for special interest purposes can be viewed as a potential vulnerability. The Modeling Commission has been expanded in appropriate ways by adding the review of hurricane models for probable maximum loss calculation purposes several years ago. The extension of the Modeling Commission's role to include computer flood modeling is consistent with its expertise and capabilities. Another task given to the Modeling Commission has been to review insurer mitigation credits and report to the Legislature. Going forward, there are no other types of perils being modeled which have been suggested for the Modeling Commission to create standards for and review, but a point of diminishing returns could occur if this became the case.

Potential Improvements

The Modeling Commission serves as the foundation for residential property insurance rate making and solvency analysis for Florida insurers. It has a high degree of credibility from modeling organizations, insurers, and regulators (OIR). In the future, there is still a need for the Modeling Commission's results to find greater accepted in the reinsurance and risk transfer markets. These markets tend to often error on the conservative side and over the last ten years or so have relied on what are known as "near term" models which give more weight to a modeling organization's recent data or projected near term losses than long term data results. The Modeling Commission has never been presented sufficient documentation and justification to find "near term" models acceptable. No models have been found acceptable, since no models have been presented for final review. States do not review reinsurance rates or risk transfer cost of catastrophe bonds. These costs are regulated by the free market.

Insurance Capital Build-Up Incentive Program[60]

Strengths

The Insurance Capital Build-Up Incentive Program (ICBUIP) has been successful at strengthening insurers' balance sheets with new capital. In this sense, it has worked as intended.

[60] http://www.sbafla.com/fsb/Home/InsuranceCapitalBuild-UpIncentiveProgram.aspx

Additional surplus has allowed insurers to write more policies in Florida. Of the thirteen insurers that have taken advantage of the program, two paid back their surplus notes early. The eleven remaining companies are all in compliance. For the most part, the program has accomplished its intended purpose, but may not have accomplished its full potential.

Weaknesses

The ICBUIP was enacted about six months before CS/HB 1A. This is significant since HB 1A required insurers to roll back their rates. Many of the companies in the ICBUIP program anticipated a certain rate level when they applied for the program. For some companies, the rate rollback associated with HB 1A disrupted their plans to write new business. The original 13 companies anticipated writing 1.7 million new policies in the state. But, this goal became less attractive with the lower rates that they would have to charge after CS/HB 1A became law. Also, any insurer planning a Citizens takeout to gain new policyholders was hindered by the freezing of Citizens rates which also came about with HB 1A. The law soon had to be changed since the insurers participating in the ICBUIP found it difficult to write at the 2 to 1 written premium to surplus ratio the program required. The law was changed so an insurer could agree to a five-year shorter term for the surplus note in exchange for the elimination of the 2 to 1 requirement. Two insurers paid back their surplus notes early due to penalty fees associated with violating the premium writing ratio. Of the remaining eleven, all but two chose to reduce the 20-year term of their surplus note to 15 years. Unfortunately, CS/HB 1A conflicted with the ICBUIP and for this reason; it perhaps did not live up to its full potential. The state invested $250 million in the program, and the insurers put up $296 million in new capital of their own. This totaled $543.5 million of additional surplus. The exact number of new policies written are unknown since such data has not been collected. Two of the insurers were classified as mobile home writers who never had a writing ratio requirement.

The ICBUIP is an example where the Legislature acted at cross purposes with its own strategies. It attempted to motivate insurers to write new business and contribute more capital, which they did. But, it passed legislation six months later which effectively pulled the rug out from under the insurers after they had contributed millions to their surplus and were expecting reasonable returns. After CS/HB 1A's rate rollback went into effect and Citizens rates were frozen at 2006 levels, the companies could not accomplish their business plans. Not only were the companies harmed with these conflicting objectives, but the $250 million the state contributed may not have been fully leveraged to its benefit. HB 1A placed a strong priority on

lowering rates versus strengthening solvency and providing for healthy competition in the private market.

Ongoing Vulnerabilities

The monies available for funding surplus notes are no longer available. The SBA, which is administering the program, was successful in funding the program with every dollar available, but is now in the posture of monitoring insurers as they pay off the debt. The interest rate being paid by insurers is attractive for them since it is the 10-year Treasury note rate, which is reset quarterly. In terms of an investment, this type of a loan can be viewed as highly risky. None of the insurers at the time of the surplus note being issued were rated by A.M. Best and Company (Although they did have ratings from Demotech, Inc.). Although payments have been coming in on a timely basis, there is still a substantial risk to the state. Fortunately, with 10 years without a land falling hurricane in Florida, none of the companies have been tested. All of the companies were required to have reinsurance or other financial support to withstand a 1-in-100 year hurricane event. For the most part, they have met this requirement, and this has been certified by OIR on an annual basis. However, all of the companies are highly dependent on the FHCF, and if the FHCF were to come up short of being able to timely fund its maximum statutory limit, some of the companies in the ICBUIP may not have been able to have survived a large hurricane event during the last ten years. The state was in a position of possibly losing millions of dollars due to the way the state's financing for disasters is linked to the FHCF, Citizens, and FIGA.

Potential Improvements

At this point, it is practicable only for the SBA to continue to closely monitor the ICBUIP program. In the future, if the state were to consider a similar program, it should ensure that it is and will be coordinated with other programs and legislation to maximize its benefits to the state. Understanding all the moving parts of various programs and how they are dependent on each other is worthwhile. Coordination and advanced planning are important.

Florida Insurance Guaranty Association (FIGA)

Strengths

Since its creation, FIGA has been successful at protecting policyholders in Florida. The Florida Legislature has reacted swiftly to ensure it can accomplish its role. This included providing FIGA the authority to issue debt in conjunction with the City of Homestead, Florida following Hurricane Andrew.

Weaknesses

FIGA is facing new challenges as Citizens continues to depopulate. FIGA's management has had concerns about understanding its exposure from hurricane losses. It is difficult to model losses from insolvencies and translate the results into the amount of future financing FIGA needs. FIGA is also heavily dependent on the financial markets to raise debt. Both the level of future interest rates and the accessibility of the bond market pose a risk to FIGA's mission. Lack of adequate data is a potential problem.

Ongoing Vulnerabilities

A hurricane necessitating bonding involving the FHCF, Citizens, and FIGA could result in serious problems for the state if the financial markets lock up and all three organizations are in the market at the same time. This is a type of "clash" financing circumstance, where each organization has resource needs but there is limited availability in the markets to fulfill each organization's financing mission.

Potential Improvements

The state of Florida needs to know more about the exposure and impact on its residential property insurance system as a whole. Individual insurers can model their exposure to various size hurricane losses and determine what they think is a safe level of reinsurance coverage for survival. The entire system of state programs and private insurers in Florida has never been modeled for the impact of various hurricane scenarios. The state of Florida does not collect data in a form useful for probable maximum loss analysis for the state, its various programs, insurers, and FIGA. Such a model, which should include sensitivity analysis, could be highly informative. When exposures shift from Citizens to individual insurers, the situation changes for both Citizens and the insurers involved. But, it also changes for FIGA and its potential obligations if insolvencies occur following a large hurricane event. Certain lines of business such as condominium association and unit owner policies are difficult to understand in terms of both the amount of exposure at risk and the potential for losses to FIGA.

Mitigation Programs

The state of Florida has addressed the vulnerability of Florida's housing stock in various ways. Prior to Hurricane Andrew, the various building codes were fragmented and uncoordinated. Enforcement of building codes were a problem and Hurricane Andrew uncovered major problems. This led to the phasing out of local codes and the creation of a uniform Florida Building Code which went into effect in 2001. The Florida Building Commission updates the

code every three years, with the current version being the 5th edition[61] 2014 Florida Building Code.

Mitigation discounts were first required by the Florida Legislature in 1993.[62] Since that time, the requirements have become more progressive beginning with shutter discounts in 1998 to now requiring insurers to use actuarially reasonable windstorm mitigation credits in their rate filings to reflect the impact of the Florida Building Code. The OIR adopted by rule[63] varies requirements for insurers in making rate filings. Insurers were required to either use credits developed by OIR or to use their own alternative methods with all assumptions available to OIR for review. The Modeling Commission was tasked with holding public hearings and presenting a report to the Legislature in 2010.[64] The Modeling Commission made four recommendations dealing with 1) the flawed process of determining windstorm mitigation discounts, 2) the errors noted in the residential structure inspection process, 3) the lack of accurate and quality data, and 4) the lack of and the need for specific authority for the Modeling Commission to review hurricane computer model mitigation discount relativities.

The My Safe Florida Homes Program provided for free home inspection as well as grants to harden homes. A total of $250 million was appropriated to the Department of Financial Services to administer the program. The program applied to homes valued at less than $300,000.

Another program involving mitigation funding is managed by the Department of Emergency Management, which is annually allocated a minimum of $10 million from the FHCF to fund various mitigation programs.[65] According the latest 2014-2015 FHCF's Annual Report, $219 million has been allocated to the Department of Emergency Management for various

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61 The latest version can be found at the following link: http://codes.iccsafe.org/Florida.html

62 See Section 627.0629, Florida Statutes.

63 See OIR's rule 69O-170-017, F.A.C. at the following link: https://www.flrules.org/gateway/RuleNo.asp?title=PROPERTY%20AND%20CASUALTY%20INSURANCE%20RATING&ID=69O-170.017

64 See Section 627.0628(4), Florida Statutes.

65 See Section 215.559, Florida Statutes. http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0200-0299/0215/Sections/0215.559.html

mitigation programs since 1997.[66] The $10 million is allocated as follows: $3 million for public hurricane shelter retrofits and $7 million for the Residential Construction Mitigation Program (RCMP). The RCMP funds are broken down with $3.5 million used for loans, subsidies, grants and other projects, $2.8 million for the mobile home tie-down program administered by Tallahassee Community College, and $700,000 for hurricane research conducted by Florida International University.

Strengths

The Florida Building Code (FBC) has been important in addressing the requirements necessary for homes to be built to withstand hurricane force winds. For the most part, there is broad agreement as to the success of the FBC and the value of the work of the Florida Building Commission. The process is highly technical and inclusive involving a number of interested parties. There is a strong consensus that the building code is being improved and updated on an ongoing basis.[67] Various changes and milestones have occurred since 1996 (Blair, 2016). Some serious concerns still remain about compliance and enforcement issues.[68]

Weaknesses

Of the various mitigation programs, each has weaknesses. Although the Florida Building Code and the Florida Building Commission are examples of positive developments, there is a need to strengthen the system since there is inadequate central coordination between the Florida Building Commission and compliance and enforcement matters.

The implementation of mitigation discounts for policyholders was found to be materially flawed in a number of area including the way the discounts were calculated by OIR, errors and potential fraud in the inspection of homes, poor data quality, and lack of oversight authority in the way computer hurricane modeling firms calculate discounts. Some improvements have been made, but serious problems arose from a flawed process which had a negative impact on the

[66] The FHCF's statute Section 215.555(7)(c), Florida Statutes requires a minimum of $10 million and no more than 35 percent of total investment income to be used for mitigation programs. See http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0200-0299/0215/Sections/0215.555.html

[67] Interview with Florida Building Commission member Don Brown on October 26, 2016.

[68] See Robert Shepard's presentation on October 13, 2015, to the Florida Commission on Hurricane Loss Projection Methodology at the following link: https://www.sbafla.com/Method/Portals/Methodology/Meetings/2015/20151014_WindMitigation.pdf

residential insurance market during 2007 to 2010. Many insurers were impacted by having their premiums cut unjustifiably due to improper discounts and found it necessary to re-examine a large portion of their exposures at a considerable expense to rectify the situation.

The MSFH program has been recognized as a successful program, but in most cases it resulted in gaining homeowners discounts without having to strengthen their structures.[69] The inspection part of the program was instrumental at obtaining premium discounts; it was less successful at strengthen homes. The goal of the Legislature was to determine by inspections what improvements were needed to be made to homes and thus motivate the policyholder to take actions to reduce the property's vulnerability to hurricane damage.[70] The anticipation of lower premiums was intended to serve as a strong motivating factor for strengthening homes. Also, various grants were intended to assist qualified homeowners to facilitate taking appropriate measures but required homeowners to contribute their own funds as well.

The provision in the law which provides the Department of Emergency Management with an appropriation of a minimum of $10 million from the FHCF each year provides for $2.8 million to be provided to a mobile home tie down program administered by Tallahassee Community College. Given that the mobile home exposure represents 1.23 percent of the total residential property exposure, 28 percent (2.8 million) represents a disproportionate amount of the mitigation dollars being spent on mobile home mitigation. According to the FHCF,[71] the total residential exposure is $2.099 trillion and only $25.89 billion is represented by the mobile home exposure. In addition, the mobile home tie-down program has been criticized as not meeting state safety standards.[72]

Ongoing Vulnerabilities

Although the Florida Building Code is considered a major step in the right direction toward mitigating the damage from windstorms and hurricanes in Florida, there may be major

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[69] According to the 2008 *My Safe Florida Home Annual Report*, 55 percent of policyholders whose homes were inspected received discounts on their policies without strengthening their homes.

[70] Section 215.5586(1)(a), Florida Statutes.

[71] See the 2016 Ratemaking Formula Report, Exhibit III, https://www.sbafla.com/fhcf/Portals/FHCF/Content/AdvisoryCouncil/2016/0315/2016RatemakingReportFINAL04192016withSuppNote.pdf

[72] Kris Hundley, "Florida Spends Millions on Questionable Mobile Home Program," Tampa Bay Times, December 9, 2011. See link at http://www.tampabay.com/news/publicsafety/florida-spends-millions-on-questionable-mobile-home-program/1205558

problems revealed after a large hurricane puts the code to a test. Excessive and improper discounts have been addressed through re-inspection of at least 80 percent of the homes originally inspected.[73] This action was not viewed in a positive sense by policyholders. Improvements have been made to the system of granting policyholder discounts for mitigation features, but the process needs to continue to improve. Additionally, the mobile home tie down program which is using $2.8 million annually needs to be reviewed by the Legislature as to its effectiveness. The state is providing funds to finance the "Wall of Wind" project at Florida International University and the state now has better ways to evaluate the effectiveness of mobile home tie downs and determine whether this is an effective and efficient use of funds as compared to measures aimed at strengthening site built homes. The question of the effectiveness of mobile home tie-downs can be tested and a cost-benefit study done.

Potential Improvements

To improve mitigation in Florida, improved coordination and collaboration are critical. The system has been bifurcated and fragmented, and thus lacks coordination. The system needs to be revamped similar to what was done with the creation and continuing update of the Florida Building Code. It is a complex system involving construction professionals, insurers, engineers, consumers, and others. One point of authority and regulation could go a long way of tightening the system and of more effectively utilizing resources.

4. Conclusions and Recommendations

A number of coastal states have state wind pools or FAIR Plans which play a major role as residual insurers for their residential and commercial property insurance market. Of these states, the state of Florida has the largest exposure to wind risks. Florida also has a long history of addressing various issues related to insuring windstorm disasters. The Florida Legislature has been active over the years dealing with problems related to financing and mitigating hurricanes losses. Florida is more vulnerable to hurricanes than any other state and has been identified as the "peak risk zone" in the world. The implication of this is that Florida hurricane risk cannot be fully diversified in the private reinsurance market. As a result, Florida pays a sizable risk

[73] See Florida Catastrophic Storm Risk Management Center (2010a, 2011, 2015); Julie Patel, "Home Insurers Revoking Discounts for Hurricane-Proofing, Sun Sentinel, October 1, 2010. See link at http://articles.sun-sentinel.com/2010-10-01/business/fl-florida-hurricane-discounts-20101001_1_legitimate-discounts-home-insurers-inspectors

premium for the cost of risk transfer in the private market. Florida not only has the largest residual market residential property insurer in the United States (Citizens) but also is the only state to have a reinsurance type of program (the FHCF) for residential property insurance.

Florida is also the only state to have an independent commission of experts to evaluate computer hurricane models for rate making and probable maximum loss calculation purposes (the Florida Commission on Hurricane Loss Projection Methodology). Additionally, Florida is the only state to have a publically funded computer hurricane model (the Florida Public Hurricane Loss Model).

The building code in Florida is one of the best in the nation. According to the Insurance Institute for Building and Home Safety, Florida's building code has been rated second with a 2015 score of 94 behind Virginia (score of 95) for the Atlantic and Gulf Coast states (IBHS, 2015). The building code continues to evolve and is revised every three years by the Florida Building Commission.

The state of Florida involves a system of programs, laws, regulations, and administrative actions which have evolved over time and continue to evolve to address catastrophic wind disasters and their impact on the insurance market. A common purpose associated with Florida's intervention in the insurance market has been to stabilize the residential property insurance market and to ensure consumers have access to available and reasonably affordable insurance. Additionally, Florida has been concerned about ameliorating the "…dangers to the state's economy and to the public health, safety, and welfare"[74] resulting from catastrophic hurricane events.

Multiple circumstances and events led to the creation and the refinement of various programs since the 1970s. The challenges and crises Florida has undergone have served as learning experiences. Florida has seen numerous hard and soft insurance markets. The United States and world financial markets have been highly favorable at times and unfavorable at others. Interest rates have been at record highs and have been at record lows throughout various economic cycles. Several key programs including Citizens, the FHCF, and FIGA have experienced extreme fluctuations in their resources or reserves at times, and each has exhausted its resources and had to issue bonds funded with assessments to make up for financial deficits. Recently, Florida has experienced a record period of no hurricane activity (2005 to 2015) and a

[74] A partial quote from Section 215.555(1)(e), Florida Statutes.

record period of high hurricane activity (2004 and 2005), and over its history has experienced two of three category 5 hurricanes to make land fall in the United States (1935 and 1992). Florida has grown from a relatively low populated state (528,542 in 1900) (Smith, 2005) with a relatively insignificant residential and commercial property exposure to the third largest populated state (estimated at 20,271,272 as of July 1, 2015)[75] with the world's largest residential property insurance concentration of risk exposed to hurricanes ($2.1 trillion as of 2015).[76] Many significant events and circumstances have occurred since the 1970s which have impacted the Florida residential property insurance market. However, the single largest event has been Hurricane Andrew in 1992. The worst two years of hurricane activity in Florida's history occurred in 2004 and 2005 with eight hurricanes impacting Florida. No hurricane made land fall in Florida or caused significant damage as a by-passing storm for ten years (until 2016 when Hurricane Hermine and Hurricane Matthew broke the streak).

What has not happened in Florida is the "big one," which could be defined as a hurricane similar to Andrew (Category 5 hurricane with 156 miles per hour winds or greater) hitting 30 miles north of where Hurricane Andrew made landfall causing $100 billion to $250 billion in insured losses. Hundreds of these types of events have been simulated as realistic future scenarios. The "big one" can happen, and a common saying in Florida is "not if but when." Another thing which has not happened, but is possible, is a major hurricane event occurring in a heavily populated part of the state or several such events occurring during a hurricane season, and a major financial market meltdown happening in the same time frame.

If such a situation were to occur when Citizens, the FHCF, and FIGA's cash resources are low and there is a need to issue large amounts of bonds to fund loses, the scenario could be disastrous for the state. Fortunately, only one part of these scenarios has occurred. In 1992, Andrew did not make landfall as far north as it might have. In 2004 and 2005, although the eight hurricane events were significant, cash reserves had been built up, financial markets were strong, and the situation was handled without economic disruption. During 2007 through 2010, a financial crisis resulted in severe liquidity problems. Viable financial options which had been previously available became limited or evaporated. The financial capacity to issue revenue bonds

[75] United States Census Bureau, http://www.census.gov/quickfacts/table/PST045215/12

[76] Florida Hurricane Catastrophe Fund 2016 Ratemaking Formula Report, Exhibit III, page 1 of 13. See link at https://www.sbafla.com/fhcf/Portals/FHCF/Content/AdvisoryCouncil/2016/0315/2016_RatemakingReportFINAL.pdf

was drastically impacted. At the time, the cash reserves for Citizens and the FHCF were low and much of their claims-paying capacity depended on debt issuance. Had a major hurricane occurred in Florida during these years, there could have been disastrous financial consequences for the state involving many insurer insolvencies and policyholders being unable to recover their losses. Absent the federal government stepping in, Florida's economy could have been impacted for decades.

The question of how a disaster financing program or system should be structured needs to consider its capabilities over a wide range of circumstances and scenarios. Planning is important and economic and political considerations will always be a reality that has to be dealt with. The focus, however, needs to be on insurance and risk management principles. What is appropriate and necessary may conflict with political concerns, and there will always be economic limitations. The goal does not have to be to design the perfect disaster insurance program, but rather the best given all considerations. Given the unknown future, the strength and resilience of a system is an essential element whether or not such resilience can be practically obtained. Efforts need to be made to mitigate consequences given available resources.

Unfortunately, it often takes disasters to get the attention of the public and its political leaders in order to motivate them to take necessary actions. The problem often becomes one of trying to solve difficult problems at perhaps the most inopportune time. Planning is more effective if done prior to a catastrophic event occurring. Such planning takes expertise, foresight, and creativity. Viable and feasible financial options change over time, therefore, it is generally better to take advantage of opportunities when they exist rather than to be forced to settle for what is available at an inopportune time.

Insurance is complex, making it vulnerable to being misunderstood, incorrectly portrayed and distorted. Understanding and managing risk is at the heart of dealing with natural and man-made disasters and various programs created to address insurance issues. Insurance education programs[77] are important and elected leaders need to be educated to understand fundamental principles in order to solve real problems over the long run.

[77] The creation of the Florida Catastrophic Storm Risk Management Center at Florida State University is an example of efforts the state of Florida has made to address the need for ongoing education and coordination of information and data among educational institutions in the state.

Within this context, Florida's interventions in its insurance market can better be understood and its shortcomings and on-going problems recognized. Strengths, weaknesses, vulnerabilities, and potential improvements were noted in a previous section. Below, the authors make a number of recommendations which may be helpful to other states, the federal government, or to other countries which may be considering ways to design optimal public insurance programs or strengthen their existing programs.

The suggestions and recommendations which follow are for any type of disaster insurance or financing program and are meant to be general although examples from Florida are used to illustrate their value or potential benefit.

Governance Structure and Control

The governing board or authority of a public disaster insurance or finance program needs to be composed of an adequate number of members in order to spread control and minimize or ideally eliminate political influence. Control of a program under one elected or appointed official is a not the best way to manage a disaster program. Where a state is considering obtaining tax exempt status from the I.R.S, one general requirement is the program be considered as an integral part of the state's operations and thus may require a type of taxation system (assessments on a broad base of policyholders). Other considerations involve expertise, advisory councils, and, of course, a clear and concise mission.

In situations involving highly technical decisions such as computer hurricane model review (see discussion below), an independent expert commission is recommended to oversee these types of operations and make decisions since disaster or catastrophic models tend to be multi-disciplinary and highly technical in nature. Such experts need to be objective, unbiased, and not have conflicts of interest which would cause the public as well as all interested parties to lose confidence in their role.

Research and Education

Discovery and learning are hallmarks of progress. Rigorous research and education need to be applied to disaster risk management as with other problems faced by governments at all levels. This research and learning can be achieved in various forums and by involving multiple parties, but the findings must also have a way of reaching policy makers and citizens quickly and deliberately. Several public policy research centers—whether stand-alone or university-housed—are designed to promote and disseminate research on disaster issues related to insurance, mitigation of losses, protection of the public and other challenges of concern to policy makers.

These programs are beneficial and can focus on basic insurance and risk management principles, further knowledge and solutions regarding disasters, educate the public about how insurance works, and participate with state agencies, the legislature, and consumer groups on a wide variety of disaster issues, problems, and solutions. Where data is lacking, research can be funded to fill the void and find solutions to challenging problems. Furthermore, political pressures can be lessened by a reliance on objective and independent research findings. Risk as a proper basis for insurance rate setting is repeatedly and consistently supported in the academic literature, and can be cited by policy makers who find themselves in the unpopular position of proposing increased rates for policyholders. Research and education must be a priority of any state or government serious about managing catastrophic risks.

Standing Committees

In Florida and other states, state legislatures create committees generally in times of an insurance crisis to make recommendations regarding insurance matters. The knowledge, expertise, and insurance experience of the individuals on such committees may vary. Generally, a period of time is needed for the designated committee members to formulate recommendations. A better approach may be to create a standing committee of experts who are highly familiar with the State's insurance system and issues. Although it did not pass, a bill was filed in Florida which would have provided for such a forum.[78] The legislation would have required ongoing efforts to identify problems and solutions in the insurance arena via periodic forums involving key experts and officials, with annual proceedings published for the benefit of the Florida Legislature. This proposed structure would have operated as a type of standing committee in order to get ahead of problems and work on solutions. Although the bill was unsuccessful, it was proactive and served as recognition by some in Florida government that leaders must work closely together on a continuing basis to best describe common problems and craft potential solutions.

[78] Rep. Larry Lee, Jr. filed HB 443 in 2014, which would have required annual discussion forums involving a specified membership for the discussion forum panel, and providing for an annual report to the Legislature. The bill did not make it out of the Insurance and Banking Subcommittee of the Florida House of Representatives. See the following link to the original bill language (which was drafted jointly by the authors on behalf of Rep. Lee): http://www.myfloridahouse.gov/Sections/Documents/loaddoc.aspx?FileName=_h0443__.docx&DocumentType=Bill&BillNumber=0443&Session=2014

Ratemaking Involving Computer Modeling

Computer models for pricing disasters are complex and multi-disciplinary. Unlike traditional ratemaking where insurance actuaries are highly capable of analyzing data and determining actuarially sound rates, computer models go beyond actuarial science, math and statistics. Depending on the nature of the catastrophic peril being modeled, experts in various scientific areas are needed. The team of individuals necessary to put together a computer model for the hurricane peril is different from what is needed for a computer model for flood, earthquake or other perils. The underlying data, research, and computer code is generally considered proprietary if done by a private modeling organization or firm. It is necessary this information be protected and computer modeling for disasters evolve and change with technology.

We recommend a comprehensive review and evaluation process similar to the Florida Commission on Hurricane Loss Projection Methodology to ensure appropriate and fair pricing for disaster financing programs. The Modeling Commission in Florida has had its role expanded by the Legislature to that of reviewing and evaluating computer flood models. There are certain commonalities any review process can benefit from and there are unique aspects of a model review process specific to any particular peril being modeled.[79] It takes independent experts and adequate resources to properly evaluate various computer models. Political considerations need to be eliminated to the greatest extent possible. Objective analysis and evaluation should be the overriding objective. Elected officials should not be able to easily appoint and remove members designated to review and evaluate models based upon disagreements or political considerations arising from the various experts' decisions or official votes.

The cost of reviewing and evaluating computer disaster models is significant. Therefore, the authors suggest states enter into joint agreements to utilize the services of a single review commission or governing board so as to share cost and gain the benefits of specialization, innovation, creativity, the sharing of data, and the reduction or elimination of political influence.

[79] The Modeling Commission discussed some of the commonalities on October 30, 2014. See the link for "Flood Standards Development" which included both a presentation and audio recording at https://www.sbafla.com/methodology/Portals/Methodology/Meetings/2014/Flood/20141030_FloodStandardsDevelopmentCommittee.pdf

This may be practicable through the National Association of Insurance Commissioners or other public or private organizations.

Focus State Insurance Entities Priorities on Insurance Availability and Financial Strength

Property insurance crises impact the business of particular market participants, such as property owners, developers and real-estate agents with a strong economic interest in the pricing and availability of property insurance. These groups, separately and together, could place pressure on policy makers and regulators to provide publicly favorable policies, most notably "affordable" property insurance.

One lesson learned from Florida is pressure to make insurance "affordable" can easily evolve into pressure to make it "cheap" and not financially sustainable. While most Florida policyholders might not agree the residential property insurance market became inexpensive, research into the financial performance of the markets indicates actuarially unsound primary insurance rates and undercapitalization of the marketplace for several years after HB 1A was enacted in 2007.

Risk-based pricing is critical for long-term market stability and equity. Subsidization of prices, if deemed necessary for social adequacy reasons, should be transparent and monitored closely to ensure that the originally intended goals are met. Subsidies for high-cost real estate in high-risk areas neither makes market sense nor meets public social goals.

Loss Development Patterns and Time Limits for Commutation of Losses

Depending on the nature of a disaster, it is important to understand how losses may develop over time. This will influence investing and financing decisions. For example, it took nearly ten years before all claims were paid from Hurricane Hugo. Hurricane Andrew took around twelve years to ultimately resolve and settle all claims. Hurricane Opal, which occurred in October 1995 in Florida, resulted in only seven participating insurers triggering the FHCF for a mere $13 million. Yet, it took seven or eight years to resolve all claims. Commercial residential claims tend to be more frequently litigated and can take years to settle compared to individual residential policyholder claims. It is often beneficial to review past disaster events and analyze their loss development patterns. But this is not enough, the current market and claims activity need to be taken into consideration. For example, following Hurricane Wilma in Florida, there was a large increase in the number of public adjusters as well as trial lawyer involvement in the claims settlement process. Understanding this resulted in the periodic re-evaluation of Hurricane

Wilma's losses. Many new and re-opened claims were reported far past their actuarially predicted settlement dates. Incurred but not reported losses (IBNR) were difficult to predict since such losses did not follow normally anticipated patterns.

The authors recommend commutation provisions to include time limits on the ultimate settlement and reporting of claims. Five years may be a reasonable time frame, but the proper time is dependent on expected (and reasonable) loss development patterns. The FHCF as a type of reinsurer in Florida has a five-year commutation provision which involves a way to settle any remaining differences by a panel of actuaries acting in a type of arbitration role. This commutation process has worked since it resolves and thus eliminates liabilities in order to allow for the better understanding of what future claims paying capacity will be.

The Need for Liquidity and Financial Products

An important consideration for any disaster financing program is for management to understand liquidity needs. It is not beneficial to have billions of dollars of claims paying capacity when it may take years to access such capacity by the raising capital to finance losses. This can happen during a financial market liquidity crisis. When large catastrophic events having numerous total losses, this can result in a rapid development of losses. For example, a $50 billion catastrophic loss event, could be 60 percent paid in three months by some of the larger insurers in Florida. This would require timely reimbursement by the FHCF. The standard of the FHCF to pay claims has been within two to five days if cash resources are used and seven to ten days if bond proceeds have to be liquidated. Both private insurers and public insurers may need resources quickly to pay their losses. Recognizing liquidity needs is important and can be the difference between solvency and insolvency for insurers.

Liquidity has many dimensions. When dealing with disaster events, assets need to be ready to employ on short notice. This requires that the investment policy of a disaster insurance program emphasize liquidity, preservation of capital, and reasonable returns in that order. Investment returns are not the first priority and the investment program may need to be heavily invested in as much as 50 percent of the total assets in short term government securities or government agencies. Due to the liquid nature of government securities, there may be more leeway for maturities going out six months to two years, but this can conflict with the preservation of capital goal if not properly managed and controlled. Other investments need to be diversified by industrial sector, maintain a high credit quality rating, and have short term maturities perhaps averaging three months or less with maximums and limited amounts with maturities no further out than one year. Of course, these examples are generalities. Any

investment policy should be guided by the nature of the disaster peril and its expected loss develop patterns as well as the availability of appropriate financial assets which will change over time.

Pre-event Debt

Pre-event debt has an important role in creating and providing liquidity. This can involve lines of credit, variable rate debt, fixed rate debt, and numerous other options. Taking unnecessary risk based on debt structure needs to be recognized and avoided if possible. At times some financial options are viable and at other times they are not. In today's environment, fixed rate debt can be attractive and provides a way of locking in costs over many years. Also, fixed rate debt can be laddered so as to increase the likelihood of replacing or refinancing reasonable size debt tranches in the future. It tends to be more difficult to finance $1 billion in a single maturity than $500 million of debt using multiple maturities . Generally, there is more investor interest in multiple maturities since investors can more easily reach their investment objectives given more options. More buyers also help create a potential future market for debt. A laddering program utilizing maturities of three years, five years, seven years, and ten years[80] can have a tremendous advantage in providing long term liquidity and allowing investors to better understand a disaster insurance entities' credit worthiness. If debt is issued only once each ten or twenty years, investors must be re-educated with each iteration. Accessing the financial markets every two to three years can be beneficial and result in a continuing educational process. Credit ratings and the experience of repayment of debt can be beneficial for future post-event debt issuance. A track record is beneficial. It is better to lock in favorable pricing for viable financial products at opportune times rather than wait for a disaster to occur and possibly face limited and expensive choices. Financial markets are highly volatile, and this risk needs to be managed.

Private Reinsurance and Other Risk Transfer Products

The authors recommend the purchase of private reinsurance and other risk transfer products (such as catastrophe bonds) when such products can be structured beneficially and their

[80] These maturities illustrate examples of spreading out debt. The yield curve at any given time might influence to some extent the maturities and amount of debt issuance for each maturity. However, the goal should be to attempt to equally spread out the amounts and spacing between maturities as reasonably and as cost efficient as possible. Another advantage is to reduce large issuances of billion or multi-billion dollar transactions.

purchase does not crowd out risk transfer capacity for private insurers.[81] Multi-year contracts may be useful and desirable. Since financing losses for disaster events depends highly on the level of cash resources which can vary over time, accumulated cash resources or reserves is a consideration for positioning a risk transfer program. The higher up a risk transfer product is placed, the less likely it is to be triggered and the lower it will cost. Another consideration is the amount of post-event bonding or debt issuance which can reasonably be executed following a disaster event. Risk transfer products are not always feasible. Various risk transfer products can differ in price and contractual provisions. A number of factors need to be taken into consideration. Risk transfer products can be highly volatile in terms of pricing, contract terms and conditions, and availability. For this reason, it is better to consider risk transfer products when the market is favorable (a soft market) rather than unfavorable (a hard market).

The Ability to Recharge Claims Paying Capacity After Losses

The authors recommend disaster financing programs consider a long term planning time frame of ten years or more such that the capabilities of a disaster insurance program can be fully understood and a wide range of scenarios can be fully anticipated. After experiencing a soft insurance market with low rates or a favorable financial market with historically low interest rates, it may not be easy to prepare for other less favorable environments. Political questioning of the need to better prepare for the future and management optimistic bias may inhibit good risk management practices. But due to the nature of disaster events, their impact has to be understood over a range of scenarios. The reality is viable options do not always exist, but when they do, they should be seriously considered. Modeling a disaster insurance program claims paying resources using sensitivity analysis is a beneficial exercise to understand potential future consequences so proper actions and measures can be taken today to avoid the risk of the program not accomplishing its long term mission and objectives. This will involve considering not only the contract year or years immediately following a large event that exhausts or near exhaust resources, but to consider a number of years with different insurance and financial environments to clearly understand and prepare for the potential adverse environments and attempt to avoid or mitigate consequences resulting from a disaster event.

[81] Sometimes catastrophe bonds and other insurance linked securities can be beneficial in this respect. In a soft market, these concerns are minimized.

Modeling the Global System

Insurance regulators as well as rating agencies often require insurers to have available resources in order to respond to a 1 in 100-year event or in some cases a 1 in 250-year event or longer for certain catastrophic perils. This is a generally accepted standard for solvency monitoring. However, it is a micro approach from the perspective that the disaster event is being defined for a single insurer. A single loss event could be a 1 in 1000-year event for one insurer and yet be a 1 in 10-year event for another. All this depends on the concentration of an insurer's book of business. Information is not generally available for the type of event in terms of size, probability of occurrence, location, and amount of damage necessary to disrupt the entire insurance system in a state. For Florida, the state does not know the parameters of a hurricane event that could stress the claims-paying resources of both its public programs and private insurers. In order to have this information, data has to be known regarding each insurer for each of its policyholder's property exposure with the location being geocoded . This information is considered confidential and proprietary. To obtain this information, statutes would need to be changed to allow for the central collecting of the data, its limited use, and such insurer and policyholder data protected and exempt from public record laws. This could be a controversial requirement and is something the authors expect some insurers would resist.[82]

Appropriate risk management requires policy makers, or at least operational management, to model losses globally and determine the impact on the entire system in the state. In Florida, Citizens, the FHCF, and FIGA as well as private insurers and reinsurers must better understand the nature of extreme events and their parameters in order to make better and more informed risk management decisions. Today, the following questions cannot be answered: 1) If a hurricane were to make landfall in Tampa causing $75 billion in insured losses, how many insurers would become insolvent? 2) Given this type hurricane loss, how much debt would Citizens, the FHCF, and FIGA need to issue to cover their obligations? 3) What would be the assessments policyholders would need to payin order to fund debt, and for how long would the

[82] Although the FHCF has the ability to collect data by zip code, it does so in the aggregate. Data is collected for all exposures in a zip code area. The location of individual risks is not known at the street level or geocoded level. Florida statutes protect this zip code data (see Section 215.557, Florida Statutes). In 2015, the FHCF had promulgated a rule associated with its exposure data reporting forms requiring street address data. The rule was challenged as exceeding the FHCF's statutory authority in a Department of Administrative Hearings proceeding and the judge ruled in favor of the insurers. The FHCF argued the data was needed to allow it to purchase private reinsurance and to calculate its true reinsurance cost associated with its trigger and exhaustion points for the layer of reinsurance coverage.

assessment be in effect? and 4) If there were two consecutive $75 billion hurricane events, what would be the financial standing of Citizens, the FHCF, and FIGA, and the private insurers in the state?

Clash Financing Issues and Coordination Among State Programs

A lesson learned following the events of September 11, 2001, was that the insurance industry can experience significant clash losses due to a single event. Carrying this over to the state of Florida, it has been recognized that a type of "clash financing" situation can arise following large hurricane events where Citizens, the FHCF, and FIGA have similar and interrelated assessment bases for the funding of post-event bonds. Should a large event occur, no organization presently has a formal way to resolve its priorities. Since these organizations currently have the same financial advisor, it is expected that coordination will occur in some non-prescribed and informal fashion. The authors suggest any state, federal, or other government evaluate their disaster financing program for various "clash" issues whether it involve losses, financing, investing, or any other issue where dependencies are involved. It is better to recognize, address, and resolve these issues well in advance to avoid disruptions.

The problem of legislative coordination is a similar issue. There needs to be consistency in planning to avoid enacting measures that conflict with other measures. This is at best can result in a sub-optimization of scarce public resources and at worst can result in an unnecessary waste of public resources. The state of Florida has created conflicting situation over time and lessons learned from this might serve to benefit other states. The authors suggest that states define a clear and unambiguous mission, a brief purpose statement, and appropriate aligned objectives for every program designed to deal with disaster financing and mitigation of disaster losses. Conflicting programs or the promulgation of conflicting regulations should be evaluated and avoided. Financial impact statements regarding legislation are helpful but could be expanded to ensure that conflicts are recognized so there is at lease the opportunity to debate and reject or resolve such conflicts.

Mitigation Credits

Florida has witnessed the abuse of mitigation credits. Although mitigation credits are an important consumer issue and can have a significant impact on insurance pricing, there is plenty of evidence that the process is flawed and unfair to both insurers and policyholders. In Florida, mitigation credits are not supported with rigorous scientific precision. For such credits to operate effectively, the assumption is that the system is appropriate and all data is accurate. The authors

recommend and suggest that the Modeling Commission's role be expanded to incorporate the review of mitigation credits as produced by the computer hurricane models. For other states, the federal government, or other governments which involve disaster insurance programs, such review should be incorporated with the expert review of disaster models as suggested above.

Mitigation and Grant Programs

The authors suggest that mitigation and related grant programs be carefully structured so as to encourage and require the strengthening of structures. The My Safe Florida Homes program was highly successful at gaining policyholders significant policyholder discounts, but its original intent was to fund the inspection of homes, suggest improvements to harden the homes, and then encourage the homeowner to make such improvements which would then result in insurance premium discounts. The results were suboptimal, but did result in substantially reducing rates. The correct goal and outcome should have been to strengthen homes to withstand hurricane damage. Due to the number of policyholders receiving discounts, it is plausible some credits were adjusted for previously insufficient (either ignored or less than proportionate to expected loss savings) policyholder credits. Due to the flaws in the system for the determination of mitigation discounts, however, such a conclusion cannot be clearly drawn.

Disaster Savings Accounts to Involve Consumers

For policyholders and property owners, there may be a benefit in a type of tax-deductible disaster saving account. This idea has been suggested in other areas such as health savings accounts and college saving accounts. What is important is that consumers exercise responsibility in repairing and maintaining their property. A disaster savings account could create efficiencies in the system. There may also be ways to design residential and commercial property insurance policies with co-payments similar to health insurance such that the disaster savings account can involve the policyholder in cost saving incentives at the time of repair. However, insurance policies can provide choices or options for replacing property and co-payments may help to influence more efficient ways to settle claims.

"Right Sizing" Disaster Insurance Programs

The word right sizing can be a vague and subjective term, but as used by the authors, it refers to limiting the size of a disaster insurance program such that the program can realistically operate over time without posing catastrophic consequences to a state, federal program, or other government program. The right size is difficult to quantify and may involve more art than

science. Right sizing needs to be based on understand the limitations of the risk transfer markets and financial markets.[83] The problem is one of limiting or constraining the possibility of extreme consequences to the extent possible. Any program that relies heavily on debt may exceed its viability at some point in the future or may become overly leveraged. Relying on high debt leverage can expose a program to risk that can adversely impact every entity that relies on the program. A chain reaction can occur not unlike what happened following the subprime housing bubble. A perfect example of this is what happened in Florida in 2007 with the passage of CS/HB 1A in January 2007, which expanded the FHCF statutory limit of capacity by $12 billion, only to have the financial markets crash eight months later. The financial markets resulted in a liquidity freeze which impacted the FHCF's bonding capacity for years later. In October 2008, the FHCF estimated its claims-paying capacity at $13.1 billion after insurers had relied on its estimated capacity of over $27 billion just five months earlier. It is clear that the FHCF was not the right size and exceeded its practical limitations.

The same can be said of Citizens which was impacted in a different way following the passage of CD/HB 1A. Citizens' rates were frozen and insurers were required to reduce their rates as well as recognize various mitigation discounts in their rating structure. The number of Citizens' policyholders increased and its 1 in 100-year PML shot up way beyond its capability to provide appropriate funding. The potential level of emergency assessments required for a broad base of property and casualty policyholders to fund revenue bonds exceeded all reasonable expectations. It was clear that Citizens needed to be right sized. Since 2007, both the FHCF and Citizens have become more reasonably sized for their function, but to determine the correct size on a more scientifically basis, more information needs to be known about the sustainability of the system as a whole in Florida. Various measures have been suggested above to accomplish this by modeling the entire disaster system of entities involving potential hurricane losses.

5. Final Thoughts

We have limited our suggestions to measures that based on our experience could be applied to other disaster programs. Our view is that the disaster financing and mitigation systems

[83] In 2013, the Florida Catastrophic Storm Risk Management Center was mandated by the legislature to evaluate alternative methods for managing the size of the Florida Hurricane Catastrophe Fund with input from the FHCF. Its report was published on December 1, 2013. See The Florida Catastrophic Storm Risk Management Center, *The Florida Hurricane Catastrophe Fund: Alternative Methods for Managing the Size*, December 2, 2013.

in Florida are complex with many moving parts and are thus difficult to coordinate. Education is important as well as executive leadership and the will and desire to adequately plan for the future. Basic insurance and risk management principles are at the heart of our approach and thought process. Severe and infrequent events require a different mindset from of that of managing risk associated with predictable events. Although computer disaster modeling is useful for pricing and probable maximum loss purposes, models cannot adequately quantify probabilities related to the short term (1 to 2 years) or medium term (5 to 10 years) time horizons. Solutions must be designed to reduce the undesirable consequences of disasters to the extent possible and manage residual uncertainty within budget with societal welfare as the primary objective. This is the task. Strong leadership and management are needed to keep up with market changes. Government entities will always be faced with limited resources and choices have to be made. Solving the problems and the economic consequences resulting from disasters is a challenging task, but mitigating the impact of catastrophes can be done with the proper risk management approach, spreading the costs of risk in equitable and optimal ways.

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