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Residential Insurance on the U.S. Gulf Coast in the Aftermath of Hurricane Katrina

A Framework for Evaluating Potential Reforms

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It has been said that civilization is a race between education and catastrophe. With Katrina, we have had the catastrophe, and we are racing inexorably toward the next. Americans want to know: what have we learned?[3]

The devastating hurricane seasons of 2004 and 2005 threw the residential insurance market in the Gulf States into turmoil. Insurance premiums skyrocketed, and a number of private insurers retreated from coastal regions. Government insurance programs stepped into the breach, and subsidies for policyholders in high-risk areas raised concerns that insurance premiums in those areas were providing homeowners with inadequate incentives to avoid or reduce risk. To make matters worse, thousands of residents who suffered wind and flood damage resorted to the courts to resolve coverage disputes with their insurers. Out of this experience came a sobering lesson: Until an improved system for mitigating and insuring hurricane risk is developed, storms will continue to cause record-setting losses to life and property, ever-increasing federal disaster relief, and major economic disruption in the Atlantic and Gulf Coast states.

Policymakers are still deeply divided about how to reform the residential insurance system to deal with these issues. At the center of the debate is the proper role of government in insuring against damages from wind and flood. Different interest groups have offered a range of proposals. Some focus on improving the private sector's ability to provide wind and flood coverage. Others propose public-private partnerships to insure hurricane losses. Still others believe that the government should take the lead role, either by including wind risk in the National Flood Insurance Program (NFIP) or by creating a federal reinsurance program for "mega-catastrophes" like Katrina.[4] So far, there are few signs that consensus is building behind any of these approaches.

This paper is intended to inform the policy debate on wind and flood insurance by diagnosing the problems in the residential insurance market and outlining policy responses that merit consideration. We do not make specific policy recommendations. Instead, we propose objectives for a well-functioning residential insurance market, examine why the current constellation of institutions and actors cannot achieve these objectives without policy reform, and identify a range of policy reforms that warrant further consideration for improving societal outcomes. Our paper is organized by the following questions:

- What are the problems facing the residential insurance market in Louisiana and Mississippi, the states most devastated by Hurricane Katrina?
- Why is it difficult for the private sector to solve these problems?
- Why is it difficult for the public sector to solve these problems?
- How do homeowners contribute to these problems?
- What options should be considered to create an efficient and equitable insurance system for residential properties along the Gulf Coast?

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[3] U.S. House of Representatives, Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, 2006, p. ix.

[4] *Reinsurance* is insurance bought by another insurance company.

The vast majority of the 275,000 homes damaged or totally destroyed during Katrina were in these two states.

The research described herein is an outgrowth of previous research analyzing the commercial wind insurance market after Katrina (documented in Dixon, Macdonald, and Zissimopoulos, 2007). That analysis was based on a review of publicly available reports and 69 interviews with a broad range of parties, including insurance buyers, insurers, catastrophe modeling firms, financial rating agencies, reinsurers, and commercial lenders. To extend that research to the residential insurance market, we conducted a similar review of the published literature and conducted more than 40 additional interviews and group meetings with a broad range of concerned parties, including coastal residents, consumer action groups, insurers, reinsurers, regulators, catastrophe modeling firms, journalists, and legislators.

Turmoil in the Residential Insurance Market Post-Katrina

Seven hurricanes in 2004 and 2005, historically unprecedented in their combined level of destruction, profoundly affected the residential insurance market in the Atlantic and Gulf Coast states. Table 1 shows the insured wind and flood losses to property (both residential and commercial) from these hurricanes. As can be seen, they caused nearly $90 billion in insured wind losses, with one-half of that—$45.1 billion—attributable to Hurricane Katrina alone.

Although Katrina pounded many states along the Gulf Coast, Mississippi and Louisiana were the most severely hit. The vast majority of the 275,000 homes damaged or totally destroyed during Katrina were in these two states. The Mississippi Department of Insurance reported that 240,000 claims were paid to residents of Hancock, Harrison, and Jackson counties within 12 months of the storm, totaling $8.4 billion. The total for all six Mississippi coastal counties was 263,744 claims, representing over $8.7 billion.[5] Nearly half ($20 billion) of the property damage losses caused by Katrina occurred in New Orleans, and 78 percent of those were in residential communities (U.S. Army Corps of Engineers, Interagency Performance Evaluation Task Force, 2009). Excluding flood claims, 58 percent of the 720,294 Louisiana claims paid as of year-end 2006 were from the homeowners line of insurance. Hurricane Rita added another $2.6 billion to Louisiana's 2005 insured storm losses, with over 201,000 claims (Louisiana Department of Insurance, undated).

These figures do not include payments for flood losses, which the NFIP covered. As Table 1 shows, NFIP payments resulting from Katrina as of April 2010 amounted to more than $17 billion in 2009 dollars—more than the combined total of the nine next largest flood losses. The average payment on

Table 1
Insured Property Damage Losses from Wind and Flood During the 2004–2005 Hurricane Season

Hurricane	Category	Year	Insured Losses (billions of 2009 $)	
			Wind	Flood
Katrina	3[a]	2005	45.1	17.7
Wilma	5	2005	11.3	0.4
Rita	3	2005	6.2	0.5
Ivan	5	2004	8.1	1.8
Charley	4	2004	8.5	0.1
Frances	4	2004	5.2	0.2
Jeanne	4	2004	4.2	0.1
Total	—	—	88.6	20.8

SOURCES: Wind losses are from Insurance Information Institute, undated; flood losses are from Federal Emergency Management Agency (FEMA), 2010b.
NOTE: Flood losses were adjusted to 2009 dollars using the Bureau of Labor Statistics Inflation Calculator.
[a] A Category 5 storm over the Gulf of Mexico, Hurricane Katrina had dropped to a Category 3 by the time it hit land. However, Katrina's storm surge was comparable to those of higher-intensity storms.

[5] In total, Katrina resulted in 486,913 claims in Mississippi, with a value of almost $12 billion paid by insurers, the state pools, and the NFIP. This information was obtained directly from the Mississippi Department of Insurance and is calculated as of late 2006.

each of the 167,000 NFIP claims was approximately $106,000 in 2009 dollars.

The enormous scale of these losses cannot be attributed solely to the ferocity of natural forces. Decades of population growth and unrelenting construction in coastal communities magnified the risk of widespread damage. In Florida alone, the population doubled from 1970 to 2001, with most of the newcomers settling in coastal areas (Newman, 2005, pp. 3–4). Other important contributing factors were the persistent failure of local communities to adopt and enforce strict new building codes and the difficulty of providing incentives that encourage policyholders to reduce the risk of damage to existing homes. In the case of Katrina, the neglect of public engineering systems, such as the levees that were breached in New Orleans, significantly amplified damage.

As we describe below, the hurricanes of 2004 and 2005 changed the cost and availability of wind insurance in the Gulf Coast states, and these changes created serious problems, not just for private insurers, but also for residents of coastal areas and for state and federal taxpayers.

Soaring Premiums, Rising Deductibles, and Reduced Availability in the Private Market

In areas exposed to the most risk of wind and flood damage, prices for private residential wind insurance have increased dramatically at the same time that access to coverage has declined. Between 2001 and 2007, average annual wind premiums in Louisiana increased from less than $800 to over $1,200. These statewide averages obscure large intrastate differences between coastal and inland premiums, however. In some cases, residential wind insurance premiums along the coast rose by 300 to 400 percent (Kunreuther and Michel-Kerjan, 2009, pp. 59, 71–74).

Homeowners are also being required to retain much more wind risk in the form of higher deductibles. As early as 1992, in the aftermath of Hurricane Andrew, private insurers began to shift wind risk back to residents through relatively new "named storm" or "hurricane" deductibles—a trend that has received little attention in the research literature.[6] Instead of the traditional $500 or $1,000 deductibles, the new ones are a percentage of the amount of dwelling insurance purchased. In Mississippi and Louisiana, named storm deductibles typically range from 2 percent to 5 percent, but higher amounts are not uncommon.[7] In Florida, deductibles of as much as 25 percent are permitted on high-value homes (Kunreuther and Michel-Kerjan, 2009). In some states, the special deductibles apply separately to every loss event during the year. Thus, homeowners exposed to both Hurricane Katrina and Hurricane Rita in 2005, or to Ike and Gustav in 2008, could have had to pay the deductible twice. Recognizing the financial burden this represents for policyholders, several states have enacted—or are considering—legislation to limit the use of these deductibles within the admitted market.[8] For example, Louisiana enacted H.B. 333 in 2009 to prevent admitted homeowners insurers from imposing more than one deductible per year on all events that may be subject to the named storm or hurricane retention (Louisiana House of Representatives, 2009).

Despite increases in premiums and deductibles, many of the largest private insurers have reduced their underwriting in coastal areas. In January 2009, Florida's largest homeowners insurer, State Farm Florida Insurance Company, announced that it planned to entirely stop underwriting Florida property insurance after the state rejected its request for a 47 percent rate increase.[9] Because of rate-increase denials and other reasons (discussed below), other large insurers have also taken steps to reduce their exposure to major storms by canceling or not renewing thousands of policies, excluding wind coverage from policies that are renewed, lowering coverage limits, and raising deductibles. These strategies, which have caused an outcry among coastal residents, have led states to offer more state-backed policies for wind damage in the residual market.[10]

In areas exposed to the most risk of wind and flood damage, prices for private residential wind insurance have increased dramatically at the same time that access to coverage has declined.

[6] When increases in deductibles are considered, the focus tends to be on the extent to which residents benefit from reduced premiums and the sensitivity of the deductible choice to the buyer's loss expectations (e.g., see Kunreuther and Michel-Kerjan, 2009, Chapter 10). Named storms include hurricanes and tropical storms that are given names by the National Hurricane Center.

[7] On a $300,000 policy, for example, a resident with a 5 percent obligation would be responsible for the first $15,000 of insured damages from a major storm. The Insurance Information Institute (2010) provides a comprehensive discussion of these deductibles and the different approaches in each state.

[8] The *admitted market*, which is regulated by each state's insurance department, is the market in which most homeowners insurance in the United States is sold. Insurance sold in this market must comply with the state's rules regarding policy forms and rates for the relevant line of insurance. The advantages of purchasing insurance from admitted insurers include this oversight by state regulators and payment for covered losses by a state guaranty fund if the insurer fails. When insurance is unavailable from the admitted market, buyers can purchase insurance, in accordance with each state's rules, in the *non-admitted* or *surplus lines* market. Insurance purchased through the non-admitted market is not subject to state form and pricing controls. In addition, most state guaranty funds do not pay claims for non-admitted insurers that become insolvent.

[9] In December 2009, State Farm Florida announced a compromise agreement with Florida regulators that allowed the insurer to discontinue 125,000 of its 810,000 property insurance policies in the state and implement a rate increase of 14.8 percent (State Farm Insurance, 2009). In June 2010, the insurer announced its plan to discontinue its role in adjusting NFIP flood losses under the Write-Your-Own Program (St. John, 2010).

[10] The *residual market* serves as a market of last resort for homeowners unable to obtain coverage in the admitted market.

Expansion of Subsidized Public Programs

Taken together, these trends in the private insurance sector have led to rapid growth in the state and federal insurance programs offering often-subsidized wind and flood insurance.

Wind Insurance. Table 2 shows the surge in wind risk underwriting by the state-backed residual market in coastal states since 2004, when private insurers began retreating from the market. Although these programs were intended to be insurers of last resort, since Katrina they have increasingly become a primary source of insurance for windstorm damage in high-risk areas along the coast.

The state-backed programs are helping to meet the demand for affordable coverage but have incurred huge deficits arising from underfunded risk. Mississippi and Louisiana are prime examples.

Mississippi's residual market pool, the Mississippi Windstorm Underwriting Association (MWUA), requested a 398 percent rate increase for its residential insurance policies, which are limited to windstorm damages, but the state approved only a 90 percent increase.[11] To fill the gap, the state received approval to use federal grant funds to subsidize wind pool rates: $50 million was approved in 2006, $30 million in 2008, and $40 million in 2009. In addition, the state's insurers were assessed $525 million to cover MWUA deficits following the 2005 hurricane season (GAO, 2007, p. 24), and $20 million per year of state insurance premium tax revenue was transferred to the fund from 2007 through 2010 (Mississippi House of Representatives, 2007).[12] Federal taxpayers and Mississippi taxpayers, businesses, and residents in lower-risk areas have thus subsidized wind insurance rates for residents along the Mississippi coast.

Because residential policies exclude damage from flood, including the storm surge common to most hurricanes, the NFIP has been underwriting flood risk since 1968.

The Louisiana Citizens Property Insurance Corporation (LA Citizens) also sustained heavy losses—almost $1.1 billion in 2005—well in excess of its available cash reserves of about $80 million.[13] Catastrophe reinsurance paid $295 million of the loss, and the remaining deficit was financed through an assessment on the state's property insurers combined with the issuance of almost $1 billion in tax-exempt revenue bonds (GAO, 2007). The 2008 hurricane season produced yet another major challenge for LA Citizens, totaling $46.6 million in losses from over 55,000 new claims (mostly from Hurricane Gustav).

Flood Insurance. Because residential policies exclude damage from flood, including the storm surge common to most hurricanes, the NFIP has been underwriting flood risk since 1968.[14] The number of policies written by the NFIP grew substantially following the 2004–2005 hurricane season. As Table 3 shows, growth was particularly robust in the Gulf Coast states (excluding Florida), up 41 percent compared with 20 percent for the nation as a whole. Despite some significant floods in states other than those along the Atlantic and Gulf coasts, there was a surprising 7 percent decrease in these areas (see "other states" row in Table 3).[15]

At the time Katrina hit, NFIP reserves were low. The NFIP consequently had to borrow $20 billion from the U.S. Treasury Department to cover claims following the 2005 hurricane season—a dramatic reversal from the cumulative net outlays (in nominal dollars) of only $300 million in the 20 years preceding Katrina (Marron, 2006, p. 3).[16]

Inadequate Incentives for Risk Mitigation and Appropriate Land Use

Subsidies that keep premiums down in high-risk areas raise concerns that premiums do not accurately signal the risk in those areas. The appropriate signal is sent when the premium equals the expected annual loss on the property—in other words, when the rates are *actuarially fair*.[17] When premiums are kept below expected loss to make policies more affordable, they discourage investments in risk mitigation and encourage construction in high-risk regions. The economic argument for creating incentives to mitigate risk is compelling: According to

[11] MWUA is a not-for-profit association comprising all admitted insurers writing direct property insurance in the state.

[12] The state authorized an additional $20 million for transfer to the fund on July 1, 2009 ("Mississippi Again Subsidizes Wind Insurance Pool Rates," 2009).

[13] LA Citizens "was established in 2003 by the Louisiana legislature as a nonprofit corporation to operate insurance plans effective January 1, 2004, which function exclusively as residual market mechanisms to provide essential property insurance for residential and commercial property applicants who are unable to procure insurance through the voluntary market. The Company is the successor to the program established by Act 424 of the 1992 Regular Legislative Session designated as the 'Fair Access to Insurance Requirements Plan' or otherwise known as the Louisiana Joint Reinsurance Plan (Fair Plan) and the Louisiana Insurance Underwriting Plan (Coastal Plan)" (Louisiana Citizens Property Insurance Corporation, 2008).

[14] The standard homeowners insurance policy (called the "HO3" form) excludes water damage losses from "flood, surface water, waves, tidal water, overflow of a body of water, or spray from any of these, whether or not driven by wind" (Insurance Services Office, Inc., 1999, p. 12).

[15] Flooding is clearly a national issue and is not in any sense limited to the Gulf Coast. In 2007, for example, the NFIP reported total flood payments of over $25 million in Oklahoma, $26 million in Ohio, and $28 million in Washington state, compared with $22.5 million in Louisiana, $4.6 million in Florida, $1.8 million in Mississippi, and less than $1 million in Alabama. Data on NFIP claims payments by state are available at FEMA, undated.

[16] *Net outlays* refers to the excess of claim payments and administrative expenses over premiums and fees.

[17] The probabilities of all storm sizes (even catastrophic ones) should be included in calculating expected loss. For simplicity, we include the costs of pricing, writing, and adjusting insurance policies in the definition of expected annual loss, even though "loss" in insurance terminology usually refers to payouts to policyholders.

Table 2
Combined Policy Limits of Policies Written by State-Backed Wind Insurers (billions of $)

State Pool or Insurance Company	2004	2008	Percent Increase
Alabama Beach Pool	0.3	1.8	448
Florida Citizens Insurance Co.	202.8	436.8	115
Georgia Fair Plan	0.6	2.0	258
Mississippi Windstorm Insurance Underwriting Authority	1.6	6.3	283
Louisiana Citizens Property Insurance Corporation	14.8[a]	28.5[b]	91
New York Fair Plan	3.5	5.2	47
North Carolina Beach Plan	31.6	73.5	132
South Carolina Wind & Hail Underwriting Authority	6.0	17.0	184
Texas Windstorm Insurance Association	20.8	58.6	182
Total	282.2	629.7	123

SOURCE: Data are from individual association Web sites, except for Louisiana data, which are from General Accountability Office (GAO), 2010, p. 19.
[a] As of December 2005.
[b] As of December 2009.

Table 3
Number of NFIP Policies in Force

Region	2004	2007	2009	Percent Change 2004–2009
Gulf Coast (excl. Florida)	915,041	1,293,734	1,289,967	41
Alabama	41,336	54,951	54,999	33
Mississippi	41,946	78,270	74,542	78
Louisiana	376,681	499,544	481,580	28
Texas	455,078	660,969	678,846	49
Florida	1,851,905	2,199,921	2,165,104	17
Northeast coastal states[a]	450,686	560,863	628,291	39
Southeast coastal states[b]	404,882	522,096	536,839	33
Other states	1,044,932	1,077,335	977,529	–7
National	4,667,446	5,653,949	5,597,730	20

SOURCE: FEMA, 2010a.
[a] Maine, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland.
[b] Virginia, North Carolina, South Carolina, Georgia.

one recent study, every $1 spent on risk reduction saves $4 in post-loss recovery costs (Multihazard Mitigation Council, National Institute of Building Sciences, 2005).[18] Another report concluded that a $2.5 million investment in loss prevention by owners of 476 high-value homes reduced losses by $500 million during the 2005 storm season (Green, 2006). In addition, some argue that conservative land use is the single most effective practice in managing hurricane risk. According to one recent task force report, the simplest approach to reducing such risk "is managing land use to avoid placing more people and property in areas vulnerable to hazards" (U.S. Army Corps of Engineers, Interagency Performance Evaluation Task Force, 2009, p. 9).

[18] This ratio is based on findings for several different types of disasters, including flood, wind, and earthquake.

As we discuss below, it is not obvious whether the subsidized wind insurance premiums offered by public insurance programs are below expected annual losses once the price of the private reinsurance used by these programs is taken into consideration. However, the presence of large subsidies does raise concerns that insurance premiums diverge substantially from expected losses, and subsidies do, of course, clearly disadvantage the taxpayers and the policyholders in low-risk areas who are footing the bill.

Multiple Policies and Coverage Uncertainty

Because homeowners insurers often exclude wind coverage (along with flood coverage), many homeowners in coastal regions must now purchase three insurance policies to insure the same dwelling: one, underwritten by a traditional insurer, to cover perils such as fire and theft (but not wind and flood); a second, from the state windstorm residual market, to cover damages from wind or hail; and a third, from the NFIP, to cover flooding. In most cases, these policies differ importantly in the amount of insurance provided, the deductible, and the breadth of coverage.

The separate policies also mean that after a disaster, the cause and timing of losses must be established in order to determine each policy's coverage responsibilities and the homeowner's deductible obligations. In some cases, the cause and timing of losses cannot be determined with any certainty. In New Orleans, for example, the unprecedented flooding resulted in long delays in property inspections by claims adjusters. As a result, it was sometimes simply impossible to determine whether wind or flood caused the damages at issue. In Mississippi, the combination of devastating storm surge and high winds resulted in many so-called "slab" losses, in which the only thing left on the property was the foundation. Difficulties in identifying whether wind or flood caused a specific loss—and the timing of the damage from each cause—led to protracted disputes, many of which ended up in litigation.

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A 2006 survey by the Insurance Information Institute (2006) estimated that roughly 2 percent of the approximately one million claims filed in Louisiana and Mississippi following Hurricane Katrina were subject to litigation or mediation. While 2 percent is a small proportion, it represents about 20,000 claims.

Goals for the Residential Insurance Market

These problems illustrate just how dysfunctional the residential insurance market has become for private insurers, policyholders, and taxpayers. Because tightly regulated residential insurers have dramatically reduced their wind exposures in coastal areas, wind risk has shifted to state residual market entities. The growth in these markets has transferred risk to taxpayers and to policyholders in inland areas, just as the growth in the federal flood program has transferred risk to federal taxpayers, who are subsidizing a substantial share of the residential policies in high-risk coastal areas. In addition, wind insurance coverage limits have fallen and deductibles have risen, creating greater retained risk for policyholders in high-risk areas. Adding to their burden is the need to purchase multiple policies with inherent contractual uncertainties that will likely cause another wave of litigation following the next major storm.

When considering what types of reforms might improve outcomes, policymakers and other interested parties should be guided by four basic goals for the performance of a residential insurance system:

1. **Insurance premiums should create appropriate incentives to mitigate risk.** As discussed above, appropriate incentives are needed to discourage homeowners from locating in risky areas and to encourage developers to build wind-resistant structures. When insurance premiums on a property are lower than the losses expected on that property, the incentive to avoid risky areas or to build wind-resistant structures is inadequate. Analogously, when insurance premiums are higher than expected losses, development will be unnecessarily discouraged and buildings over-engineered.
2. **Decisions by households and residential developers should factor in wind and flood risk.** It is not enough for insurance premiums to reflect expected losses on a property. Households and businesses must also take wind and flood risks into account when making decisions. A household that does not fully appreciate the risks in its area may not purchase wind or flood insurance, and, in consequence, losses that do occur may be borne by taxpayers, charities, or others.
3. **The insurance system should pay legitimate claims efficiently and expeditiously.** Claims should be paid without undue litigation and other transaction costs in order to maximize the percentage of insurer expenditures that reach those policyholders who have suffered losses. The expeditious resolution of claims aids rebuilding efforts after a disaster and helps the local economy recover.
4. **The market should encourage innovation and price competition.** Innovation can result in better loss-prevention programs, policy features that better serve the needs of homeowners, and faster

and more efficient payments to those who sustain damages. Competition can speed innovation and reduce inefficiency.

In the following sections, we analyze the aspects of wind and flood insurance that make it difficult for either private or public insurers to achieve these goals. We first examine the challenges faced by the private sector, then turn to challenges faced by the public sector, and conclude with challenges created by homeowner behavior.

Challenges Facing the Private Sector

Several attributes of wind and flood risk make it difficult for private insurers to achieve the objectives of a well-functioning residential insurance market. We first describe the challenges of insuring wind risk, many of which pertain to flood risk as well. We then describe the challenges specific to flood risk.

Wind Risk

High Cost of Capital. Insuring low-probability, high-consequence events, such as major hurricanes or earthquakes, has always been difficult for the private sector. Most forms of insurance contemplate exposures that generate frequent losses with a reasonably low average cost per loss. Losses covered by most forms of insurance are also expected to be independent, occurring at a different time and in a different location than other insured losses. Lines of insurance covering high-probability events (such as mortality, health problems, auto accidents) can be priced with a high degree of certainty, because recent historical loss data can be relied on to accurately predict future losses and required revenues. When losses can be predicted with high certainty, the insurer need not hold a great deal of capital to protect against the possibility that actual losses will turn out to be significantly larger than expected. In such cases, the insurance premium approaches the expected annual losses on the insured asset. The risk is then insurable in the sense that the premium is attractive enough to the potential buyer to warrant purchase. In addition, because it is close to expected loss, the insurance premium provides the appropriate incentive for risk mitigation.[19]

The situation is just the opposite for wind risk. Losses are infrequent and can be very large. They are also correlated—a single event can affect a large number of policyholders simultaneously. These attributes make annual windstorm losses very difficult to predict, so the insurer must hold a large amount of capital to protect against the possibility of insolvency.[20] The needed capital can take many forms, including increased amounts of cash, highly liquid (but thus relatively low-yielding) securities, and reinsurance. Provisions of the U.S. tax code magnify the cost.[21] The cost of capital (which results in a so-called risk load in the premium) puts a wedge between the expected annual loss and the policy premium.

Insurers faced with infrequent but large losses turn to reinsurers for protection. Reinsurers may be able to diversify risk across the globe, enabling them to predict annual losses with greater accuracy and to hold less capital than an insurer whose business is concentrated in a particular region or country. However, because catastrophic events are rare and so large, reinsurers themselves must hold substantial amounts of capital, which can force their premiums to be considerably above expected annual loss, perpetuating the problem.

The cost of capital may drive the insurance premium to many multiples of the expected loss, making insurance less attractive to potential buyers and sending the wrong signals for risk management. Kunreuther and Michel-Kerjan conclude that "catastrophe insurance premiums often are several multiples of expected claims costs" (2009, p. 138). Litan (2006, p. 4) points to evidence from the Congressional Budget Office that premiums are five to seven times expected loss. However, more work is needed to better quantify the risk load for wind insurance in different settings and to better understand how it differs between insurers and reinsurers.

Large Uncertainty About the Underlying Risk. The stunning hurricane losses in 2004 and 2005 added to the challenge of underwriting wind risk. First and most important, these losses shook some insurers' confidence in their ability to predict wind risk. Several insurers we interviewed had doubts about whether catastrophic windstorm peril can be accurately modeled. In effect, they are no longer convinced that the past can be relied on to predict the future, and they view uncertainty about the effects of climate change as contributing to the problem. Other insurers continue to believe that wind models

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[19] See Cummins, 2006, for further analysis of these points.

[20] Holding a large amount of capital can also be thought of as a strategy to hedge against timing risk. For example, an insurer might be able to fund losses from a large event if it had been collecting premiums for enough years before the event occurs, but might not be able to do so if a large event occurred soon after it began collecting premiums. Timing risk is not a factor for losses that can be predicted with a great deal of accuracy (such as losses from auto accidents). In these cases, the probability is high that premiums collected in one year will cover losses incurred in that year.

[21] Unlike European countries, the United States does not permit private insurers to set aside loss reserves on a pre-tax basis before a catastrophe occurs. For reviews of approaches to insuring terrorism and natural catastrophic risk in six European countries, including allowances for tax-exempt, pre-loss reserves, see GAO, 2005, and Smetters and Torregrosa, 2008.

provide a solid basis for pricing risk. The three major modeling firms used by insurers to set rates seriously under-predicted the losses caused by the 2004 and 2005 hurricanes.[22] All three have revised their models in various ways that have resulted in higher predicted losses. In April 2006, for example, Risk Management Solutions increased the expected frequency of Category 3 to 5 hurricanes making landfall along the Gulf Coast and Southeast Atlantic by 50 percent compared with a pre-2004 historical baseline (Clark, 2008).[23]

A budget shortfall by a state residual market can impose considerable costs on insurers doing business in the state.

Second, many insurers and credit rating agencies have begun to question the use of a 100-year event assumption (i.e., the assumption that there is a 1 percent probability of a specified event occurring in a given year) as the benchmark for determining a probable maximum loss.[24] Before 2005, this was the most common probability standard used by insurers and risk managers to determine their insurance and loss mitigation tactics. In more recent years, a "1 in 250 year" standard (0.4 percent event probability) has often been used. Several of the underwriters we interviewed mentioned that they are also considering 500-year assumptions (0.2 percent event probability) as a new worst-case scenario for their financial planning, reinsurance purchasing strategies, and disaster preparedness requirements.

For the coastal residential insurance market, reduced confidence in the precision of model estimates and the shift to a 250-year-return assumption are likely to require insurers to hold more capital to protect against the risk of insolvency. The consequent increase in risk load will cause premiums to diverge further from expected annual loss.[25] This increased risk load makes it even more difficult for private insurers to achieve the first goal of a well-functioning residential wind insurance market: insurance premiums that create appropriate incentives to mitigate risk.

Regulatory Pressures: Pricing Controls and Premium Credits for Risk Reduction. State insurance regulation influences private insurers' willingness to offer windstorm coverage, with pricing controls being one of the most hotly contested regulatory areas.[26] State Farm Florida's initial decision to withdraw from the Florida market, for example, was in large part because of its "inability to obtain regulatory approval of what it believes to be adequate property insurance rates" (Patel, 2009).[27] Disagreements have also emerged over how much the premium should be reduced when the homeowner invests in risk mitigation, such as "tying-down" roofing and installing more wind-resistant glass or shutters. State Farm Florida's requested premium rate increase was partly a response to the Florida Department of Insurance's requirement that premium discounts for mitigation efforts be doubled in 2007.

If an insurer cannot agree to the pricing level approved by a given state's insurance department, it is left with five possible options (subject to regulatory limitations):

1. Decline to renew policies of existing policyholders.
2. Renew admitted policies with a wind exclusion.
3. Stop writing new business in the admitted market.
4. Identify one or more insurers willing to accept the transfer of large blocks of policies.
5. Expand in the largely unregulated non-admitted market that is focused on high-value homes, a market not subject to state pricing controls or backed by state guaranty funds.

During 2006 and 2007, several large residential insurers actively implemented several of these approaches.[28] The result can be an increased market share for state-backed insurance programs.

Assessment and Pricing Risk from Residual Pools. A budget shortfall by a state residual market

[22] Representatives of these firms interviewed for this study emphasized that their software was never intended to replace the need for insurers' judgment.

[23] Each of the three leading catastrophe software firms revised its modeling assumptions in response to the major storms of 2004 and 2005. In general, each produced more-cautious and more-conservative estimates of the near-term probable average annual losses that insurers need to anticipate in their pricing models. Clark (2008) reviews these changes and discusses the limitations of predictive modeling over very short terms.

[24] The *probable maximum loss*, which is the loss that occurs with less than a specified probability, is the worst-case scenario used in insurers' planning. Insurers plan *to* a PML rather than for any loss that could conceivably occur, because the cost of holding sufficient capital to protect against *any* contingency would be prohibitively large.

[25] A study by Kunreuther and Michel-Kerjan (2009, p. 296) suggests that the different return-period assumptions will have a major impact on underwriting decisions. For Florida, they estimate an $84 billion loss for a 100-year hurricane, a $126 billion loss for a 250-year storm, and a remarkable $160 billion loss for a 500-year storm.

[26] Regulators also influence the supply and cost of residential insurance in other ways, including the classification system used to distinguish risks, competitive limitations placed on the state's residual market insurer, minimum solvency requirements, insurers' underwriting and claims practices, restrictions on the purchase of reinsurance from underwriters not admitted or accredited in the state, and the process through which the state allows an insurer to enter or exit a market. All of these affect the willingness of private insurers to underwrite dwellings in high-risk areas (Kleindorfer and Klein, 2002).

[27] In January 2009, SunSentinel.com reported that State Farm "blames state regulators for denying the companies' requested increases of 47 percent and 67 percent, which the company said it needs to build funds for paying hurricane claims. State Farm agreed in 2007 to lower rates by 9 percent after a 53 percent rate boost was approved in 2006" (Patel, 2009). As discussed previously, State Farm Florida Insurance later decided to reduce the number of policies it writes in the state instead of withdrawing from the market entirely.

[28] One of the largest transfers from one insurer to another involved the movement of over 120,000 Allstate policies to a new, start-up residential insurer in Florida named Royal Palm. This transaction, which was approved by the Florida Office of Insurance Regulation, is discussed in Allstate's 2006 and 2007 Securities and Exchange Commission filings (Allstate Corporation, 2007, p. 57; 2008).

can impose considerable costs on insurers doing business in the state because residual pools often respond by assessing insurers in the state.[29] For example, if a large insurer writes 10 percent of the residential market in a state, and losses in a wind pool or beach plan in that state exceed the pool/plan's assets, the insurer may be responsible for 10 percent of the shortfall. Thus, even if an insurer avoids writing wind policies in high-risk areas, it can be subject to substantial assessments.[30]

Mississippi and Louisiana are cases in point. In Mississippi, MWUA paid $750 million on 18,000 claims in 2005. This loss represented a remarkable 44 percent of the total insured values in the fund—well above the $175 million in catastrophe reinsurance that had been purchased—resulting in an industry assessment of $285 million. In one of our interviews, a residential insurer whose policies were all in the northern part of the state advised us that despite this underwriting caution, the company was required to pay a loss assessment that exceeded the total direct premium it wrote in 2005.[31]

In Louisiana, LA Citizens sustained 2005 losses of almost $1 billion from some 70,000 claims related to Hurricanes Katrina and Rita. These outlays were well in excess of its available cash reserves of about $80 million. Catastrophe reinsurance paid $295 million of the state insurer's loss; the rest was financed through an assessment payable by all of the state's property insurers combined with a tax-exempt revenue bond totaling almost $1 billion (Louisiana Citizens Property Insurance Corporation, 2006).[32]

Residual insurers' pricing practices can also create challenges for private insurers. Even if regulators do not limit the prices that private insurers can charge, subsidized premiums offered by the residual insurer can limit the prices that private insurers are able to charge. Such price competition can reduce the willingness of private insurers to provide wind insurance.

Contract Uncertainties. Another factor that discourages private insurers from committing more capacity in high-risk areas is contract uncertainty. The thousands of coverage disputes between policyholders and insurers that erupted shortly after the 2005 hurricane season are a manifestation of this uncertainty. The two primary issues in dispute were the applicability of the flood exclusion and the validity of the anti-concurrent causation limitation in most residential policy forms.[33] Although insurers have won the majority of the major court decisions to date, litigation in Louisiana, Mississippi, and other Gulf States over these issues is ongoing, and uncertainty about what exactly the standard residential policy covers will likely continue for the foreseeable future.[34]

Even if there is clarity about what an insurance policy covers in principle, implementing the coverage rules may be difficult in practice. For example, in October 2009, the Mississippi Supreme Court issued a landmark ruling on coverage and the timing of a loss. In *Corban v. USAA*, the court ruled unanimously that "[t]he insured's right to be indemnified for a covered loss vests at the time of the loss" (par. 32, p. 17). In other words, if wind damages a specific part of a property first (and is covered by the insurer), and then water (or storm surge, in the case of a hurricane) damages the same part of the property (and is the damage excluded by the flood exclusion), coverage must be honored. The reverse is also true. Unfortunately, in New Orleans the unprecedented flooding resulted in long delays in claims adjusters' ability to inspect properties, making it difficult in many cases to determine whether and when wind or flood caused the damages in question. In Mississippi, as we pointed out earlier, Hurricane Katrina wiped out entire homes, and it is simply impossible in some cases to determine the extent and timing of wind versus flood damage.

Even if there is clarity about what an insurance policy covers in principle, implementing the coverage rules may be difficult in practice.

A second form of contract uncertainty stems from the many emergency rules and bulletins issued by state insurance departments in the immediate aftermath of a natural disaster. Insurers argue that these requirements unfairly redefine the terms of their contractual obligations and do not recognize that premiums did not account for these modifications. For example, Louisiana's Rule 16, issued on December 22, 2005, implemented a claims mediation

[29] The lines of insurance subject to assessment vary by state.

[30] In most cases, at least part of the assessments can be passed on to policyholders. Insurers can also face assessment for the claim-payment obligations of insurers that become insolvent following a disaster (through assessments by state guaranty funds). However, insurers are typically allowed to pass most of or all such assessments on to policyholders.

[31] Insurers in the non-admitted market are not assessable under the MWUA program, but they are charged a fee on all policies written in the state. MWUA policies are limited to damages from wind and hail (as opposed to the optional full homeowners policies offered by facilities in other states). See Mississippi Windstorm Underwriting Association, undated.

[32] After deducting expenses, unearned premium, and reinsurance, the 2005 net deficit of the plan was $953.6 million (Louisiana Citizens Property Insurance Corporation, 2006, p. 4).

[33] With respect to the causes of loss stipulated in the exclusions section of the standard homeowners policy, the anti-concurrent causation exclusion states: "Such loss is excluded regardless of any other cause or event contributing concurrently or in any sequence to the loss. These exclusions apply whether or not the loss event results in widespread damage or affects a substantial area" (Insurance Services Office, Inc., 1999). The flood and anti-concurrent causation provisions have been the primary focus of coverage disputes, the main questions being (1) whether and to what extent wind or flood damaged the same dwelling and (2) the timing or the sequence of damages by insured and excluded causes of loss.

[34] For example, in June 2009, the Louisiana Supreme Court "restarted the clock" for the filing of new claims on an individual basis, a process that had previously been part of a class action that addressed policy coverage issues (Mowbray, 2009).

process for residential claims. Louisiana's Directive 195, issued in February 2006, required insurers to give residents who had sustained damages from Rita or Katrina an additional six months to qualify for replacement cost protection.[35]

Increased contract uncertainty and the litigation resulting from Katrina, as one insurance spokesperson told Congress in 2007, "pushed uncertainty past the tipping point" and resulted in a potentially "lethal blow" to the ability of private insurers to operate in Mississippi and Louisiana (Hartwig, 2007, p. 10). Although these concerns moderated in 2010, the insurers we interviewed cited contract uncertainty as a strong deterrent to extending their capacity in many coastal states. In fact, many claimed this problem was at least as important a deterrent as constraints on pricing.

What distinguishes flood risk from many other risks is that the parties most accountable for the design, construction, and maintenance of flood protection systems have the benefit of statutory immunities.

Flood Risk

Flood risk shares many of the same characteristics just described for wind risk: Both present the inherent risk of correlated losses from multiple insurance policies, and both are difficult to price because the frequency and severity of recent storms and floods change the magnitude of "actuarially sound" premiums. But in some respects, flood risk poses even greater underwriting challenges than wind risk does. After the Great Mississippi flood in 1927, which caused massive damages that were paid for almost entirely by private insurers, virtually all private insurers decided that residential flood risk was simply too systemic and resistant to diversification to underwrite. As two insurance experts wrote in 1955, flood was "the only natural hazard not now insurable . . . for the simple reason that the experience of private capital with flood insurance has been decidedly unhappy" (Moss, 2002, pp. 262–263). When Congress launched the NFIP in 1968, most private insurers remained on the sidelines.

There are two main reasons why private insurers find flood risk more difficult to insure than wind risk. First, only those homeowners who live in areas particularly prone to flooding are likely to purchase flood insurance. This phenomenon, referred to as *adverse selection*, makes it very difficult for insurers to diversify flood risk, because they are often unable to accurately characterize the variation of risk from property to property. The problem is worse for flood than for wind insurance, because the amount of flood risk can vary a great deal over small distances (King, 2009, p. 6).

Second, flood risk differs from wind risk in that flood damage is often made worse by the failure of man-made and typically government-funded projects. Some of the nation's worst floods were caused either by intentional acts or by acknowledged problems in the construction or maintenance of flood protection systems—what underwriters refer to as *public-sector risk*.[36] According to a report by an independent task force sponsored by the Army Corps of Engineers, from 50 to 67 percent of the flood losses paid by the NFIP following Katrina resulted not from accidental flooding, but from shortcomings in the design, construction, or maintenance of the levees and pumping stations (U.S. Army Corps of Engineers, Interagency Performance Evaluation Task Force, 2009).

Public-sector risk does not by itself make flood risk uninsurable. After all, many forms of insurance directly or indirectly cover losses resulting from intentional or negligent human acts. What distinguishes flood risk from many other risks is that the parties most accountable for the design, construction, and maintenance of flood protection systems have the benefit of statutory immunities. For example, the Army Corps of Engineers has had a statutory limitation on its liability since it was empowered to oversee flood control across the nation by the Flood Control Act of 1928.[37] The limited ability of insurers to seek recourse against responsible parties is another impediment to private-sector underwriting of this risk.[38]

For these reasons and several of the reasons already discussed for wind risk, private insurers have largely avoided insuring flood risk on single-family homes. There are two exceptions, however: (1) temporary coverage issued by banks to comply with the mandatory purchase requirements (MPR) of the NFIP and (2) coverage for high-end homes, normally in excess of the NFIP limits.[39] Regarding the first exception, Dixon et al. (2007) estimated that 180,000 to 260,000 U.S. residences were covered by some form

[35] For a summary of the emergency rules and bulletins issued in response to Hurricanes Katrina and Rita and a discussion of the impact on insurer claims handling, see Harbin, 2006.

[36] Two notable examples are the infamous Great Johnstown Flood in May 1889, resulting in the deaths of over 2,200 residents, and the intentional bombing of levees in Louisiana in October 1927 to divert the flood waters approaching the city (see McCullough, 1968, and Barry, 1998).

[37] The Flood Control Act of 1928 authorized the Army Corps of Engineers to oversee the development of flood protection systems along the Mississippi and Sacramento rivers. Section 3 of the act also limited the Corps's liability for any losses resulting from "any damage from or by floods or flood waters at any place . . ." (U.S. Army Corps of Engineers, 1928).

[38] When viewed from this perspective, the NFIP might be best understood not as a traditional form of property insurance, but rather as a uniquely broad and responsive form of warranty insurance. In many claims situations, insurance from the NFIP is, de facto, a form of no-fault or faulty-workmanship insurance.

[39] The MPR requires flood insurance on the home structure equal to the least of (1) $250,000 (the NFIP maximum for structure coverage), (2) the unpaid mortgage balance, or (3) the replacement value of the home (Dixon et al., 2007, p. 23).

of private, lender-placed flood insurance as of the mid-2000s.[40] Regarding the second, a small number of private insurers were underwriting flood risk for high-value homes (Silverman, 2005) both before and after Katrina. Based on our interviews, almost all of this insurance is placed in the surplus lines market and, as such, is not subject to price controls. Deductibles in some states can also range up to 25 percent on houses with values well above $1 million. Thus, at least for higher-income residents, the private insurance market has developed a possible alternative or supplement to the limited coverage provided by the NFIP (currently subject to a maximum dwelling limit of $250,000, with no protection against loss-of-use or additional living expenses).

Despite these two inroads, there are many impediments to expanding the private provision of residential flood coverage along the Gulf Coast. Unless these impediments are addressed in future reforms, it is unlikely that private insurers will play a more significant role in this market.

Challenges Facing the Public Sector

In principle, the government has an advantage over the private sector in providing wind and flood insurance because it does not have to charge a large risk premium over expected losses.[41] In the wake of a major wind or flood event, it can cover losses by increasing tax revenues, thus obviating any concerns about insolvency. This is why government programs can charge premiums close to expected losses, providing the appropriate incentives for risk mitigation and economic development. The extent of the public sector's advantage over the private sector depends on the magnitude of the risk loads required by private insurers and reinsurers.

The main concern with government insurance programs is their tendency to subsidize premiums in high-risk areas by charging less than actuarially needed rates.[42] The subsidies are the result of strong political pressures to set premiums below expected losses; for example, local communities often want insurance rates to be low to encourage development and grow the tax base. Subsidies in the NFIP are substantial. Congress authorized subsidies for certain types of properties when it passed the NFIP in 1968, in part to encourage communities to adopt floodplain management practices. According to a recent Congressional Budget Office study, these subsidies apply to about 20 percent of the properties currently insured by the NFIP and cost the program $1.3 billion a year (Congressional Budget Office, 2009, pp. 3,6).[43] Had the NFIP charged full premiums and been allowed by Congress to build up a reserve, it would likely have been short considerably less than the $20 billion it borrowed from the U.S. Treasury following Hurricanes Katrina and Rita.

As discussed earlier, many state wind insurance pools have run large deficits, often necessitating assessments on policyholders and taxpayers who do not live in high-risk areas. MWUA has also used federal funds to subsidize its rates.

It should be noted that subsidies in public wind programs do not necessarily lead to premiums below expected annual losses. These programs are in many cases backed by reinsurance purchased in the private market, the cost of which may be several multiples of expected losses. More research is needed to better understand how frequently subsidies only partially offset reinsurance costs that are above expected losses rather than result in premiums below expected losses.

In any case, subsidies entail monetary transfers from one set of policyholders or taxpayers to those policyholders who benefit from the subsidies. The result may be inappropriately high premiums for policyholders in low-risk areas and higher tax burdens in low-risk areas.

Challenges Created by Homeowners

Charging premiums that reflect expected losses will do little good if individuals do not take expected losses into account when deciding where to live or how much to spend on loss-mitigation measures for their homes. Many homeowners do not take such costs into account. Research has shown that when the probability of an event is below a certain level, individuals tend to ignore the risk (Wharton Risk Management and Decision Processes Center, 2007, p. 73). Flood and wind risk fall into this category, because major events in a particular location can be many years apart. Homeowners may also decide against insurance because they expect assistance from the government or charities following a major event.

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[40] The number of private policies was still not large compared with the approximately five million NFIP policies that were in place at the time (Dixon et al., 2007, pp. xiv–xv).

[41] The argument is not that government's cost of capital is lower than the private sector's, but rather that it does not have to hold the capital private insurers set aside to avoid insolvency. The government faces the same timing risk as the private sector, but it can borrow funds to cover large losses that occur before sufficient premiums have been collected. Over the long run, interest earned on premiums that build up between large catastrophic events will largely offset borrowing costs.

[42] The subsidies can be funded by taxpayers or by setting premiums in low-risk areas that are higher than actuarially justified.

[43] According to one study, "roughly 122,000 of 200,000 damage claims from Hurricane Katrina (as reported to FEMA by November 30, 2005), or 61 percent, were for subsidized properties" (Marron, 2006). This estimate is based on a review of "partial data" from the hurricane.

Out-of-date flood-risk maps also contribute to the problem. FEMA produces flood maps for communities across the nation and has a map modernization program under way. However, as of April 2008, 50 percent of the nation's flood maps were over 15 years old (GAO, 2008, p. 18). Increased development, natural changes in the environment, and revised data mean that many maps may not accurately reflect flood risk. Many of those interviewed cited out-of-date flood maps as contributing to homeowners' perception that flood risks are low.

Out-of-date flood-risk maps also contribute to the problem. FEMA produces flood maps for communities across the nation and has a map modernization program under way.

Failure to appreciate the true cost of flood and wind risks contributes to homeowners' perceptions that the cost of flood and wind insurance is "too high" or "unaffordable." The outcome may be that homeowners are unwilling to buy insurance at premiums that reflect expected losses, resulting in low take-up rates. Subsidized premiums make the problem worse by perpetuating the expectation of low premiums.

As an illustration of the challenges presented by the demand side of the market, consider the NFIP. An analysis by Dixon et al. (2006) found that compliance with the program's MPR is fairly high; in fact, 80 to 90 percent of homeowners in the South who are subject to MPR do purchase flood insurance. However, their analysis also suggests that only 20 percent of households that are in high-risk flood areas and not subject to MPR purchase flood insurance (p. xiv).[44]

Policy Implications

We have identified serious, ongoing problems facing the Gulf Coast residential insurance market. We have also defined numerous impediments limiting the ability of the private and public sectors to resolve these problems. In this section, we explore the policy implications of our findings. We return to the goals proposed for an effective residential insurance market and highlight policy reforms that warrant consideration for achieving each of these goals. We also discuss the advantages and disadvantages of different approaches and provide a framework for assessing the tradeoffs that policymakers will need to make in deciding how to proceed.

Goal 1: Insurance Premiums Should Create Appropriate Incentives to Mitigate Risk

An important barrier to setting wind insurance premiums that reflect expected loss is the substantial risk load that can be required by the private sector when underwriting wind or flood insurance. There are essentially three approaches to overcoming this barrier, which we describe here in order of increasing government involvement:

- **Changes in government regulation to reduce the cost of the capital that private insurers hold to protect against large losses.** The United States might follow Europe's lead, allowing private insurers to set aside loss reserves on a pre-tax basis before a catastrophe occurs. Doing so would reduce the cost of holding the capital needed to protect against the risk that actual losses will far exceed expected losses. Post-event loans to insurers are also worthy of consideration. Insurers could use such loans to fund claims payments after very large events, reducing the need to hold large amounts of capital.[45]
- **Government provision of reinsurance for wind risk.** Because the federal government does not face the same solvency concerns as the private sector or state and local governments, it could offer reinsurance at premium costs reflective of expected losses. The availability of such lower-cost reinsurance would allow private insurers to hold less capital and lower their risk loads. Similarly, the availability of such reinsurance would allow state wind pools to set premiums closer to expected losses.[46]
- **Government provision of wind insurance.** The most aggressive government approach to reduce risk loads is for the government to directly provide wind insurance. Proposals have been made to expand the NFIP to include wind insurance.[47] The federal program could then, in principle, set rates to reflect expected losses.

Each of these options has advantages and disadvantages. The first option emphasizes the role of the private sector, but it is not clear how far this option would go in reducing risk loads.[48] The second and

[44] Michel-Kerjan and Kousky provide evidence consistent with substantial cycling of properties in and out of the NFIP. They found that 62 percent of Florida policies in place in 2000 were no longer in place five years later, and they attribute only 1 to 1.5 percent of the annual decline to home sales (2010, p. 379).

[45] Jaffee and Russell discuss the idea of providing liquidity to insurers after major disasters (2006, pp. 4–5). In addition, government promotion of alternatives to traditional reinsurance, such as catastrophe bonds and other capital market solutions, should be considered.

[46] This approach is taken in part by a proposal supported by several large insurers, including Allstate, the Hartford, Nationwide, and Travelers. The proposal includes a first tier of protection from traditional insurers and reinsurers, a second tier from state catastrophe reinsurance funds similar to the Florida Hurricane Catastrophe Fund, and a third tier from the federal government that would act as either a reinsurer or a lender in the event of a major catastrophe (ProtectingAmerica.org, 2009). Legislation (H.R. 2555 [U.S. House of Representatives, 2010a]) has been introduced to implement this proposal.

[47] See legislation (H.R. 1264) sponsored by Mississippi Congressman Gene Taylor (U.S. House of Representatives, 2009).

[48] See Smetters and Torregrosa for further discussion of the advantages and disadvantages of various tax reform options (2008, p. 19).

third options could substantially reduce risk loads, the magnitude of the reduction depending on the risk loads currently charged by private insurers and reinsurers. On the downside, the second and third options could both result in subsidized rates. We have discussed the problems caused by subsidies in the NFIP, and the prospect of offering federal insurance that covers multiple perils offers a new source of concern: pricing schedules that create cross-subsidies between wind and flood risk.[49]

Options that consider state-level action should also be considered. For example, a regional authority able to provide reinsurance and issue bonds might be workable. The size required for such an organization to be successful would need to be examined. Whether it is easier to take advantage of the federal framework and institutions already available rather than create a new regional institution should also be considered.

While we have so far focused on wind insurance reforms, the goal of setting premiums to create proper incentives would be furthered by phasing out NFIP subsidies. Such a step would enable NFIP rates to better approximate expected losses, which would create appropriate incentives for risk management. In deciding how to best eliminate these subsidies, policymakers should consider the effects of higher premiums on take-up rates and lower-income households.[50]

Goal 2: Decisions by Households and Residential Developers Should Factor in Wind and Flood Risk

The NFIP's low take-up rate in high-risk areas when the purchase of flood insurance is voluntary suggests that households and developers may not be considering the full cost of flood risk in making location and risk-mitigation decisions. Policymakers should consider expanding the NFIP's mandatory purchase requirement to include all homes in Special Flood Hazard Areas, regardless of whether those homes have a mortgage. Policymakers should also consider increasing the coverage requirements of the MPR to equal the structure value rather than the outstanding loan balance. Doing so would help ensure that developers and the approximately one-third of homeowners without mortgages assume responsibility for the cost of flood risk. Expanding mandatory purchase requirements would also reduce adverse selection, which is one of the reasons that the private sector is reluctant to underwrite flood insurance.[51]

Similar policies should be considered for wind insurance. If future research finds that a more-than-negligible share of homes in the Gulf States do not currently have wind insurance, a mandatory purchase requirement for wind insurance should be considered in areas of high wind risk.

Expanding mandatory purchase requirements raises concerns about adverse impacts on lower-income homeowners and renters whose rent includes the cost of insurance. There may be calls to provide assistance to low-income homeowners or renters to offset the costs of insurance. If policymakers want to move in this direction, it is important that they consider policies that do not tie assistance directly to the purchase of insurance. The problem with linking the two—say, by offering vouchers or tax-deductible insurance premiums—is that direct subsidies mask the true cost of wind and flood risk. An example of a more effective approach would be income tax reductions for low-income residents, with residents in both high- and low-risk areas being eligible.

Goal 3: The Insurance System Should Pay Legitimate Claims Efficiently and Expeditiously

Coverage disputes between policyholders and insurers are a major obstacle to the efficient and expeditious payment of claims. Three types of reforms would reduce the waste and delays caused by contract disputes; they are described here in order of increasing government intervention.

- **New Policy Language on Loss Allocation.** Regulators might require wind and flood policies to include language that addresses how losses would be allocated when they are jointly caused by wind and flood or when the cause or timing of damage cannot be determined.[52] The National Association of Insurance Commissioners could convene a panel of representatives from the NFIP, private insurers, and state insurance regulators to

Policymakers should consider expanding the NFIP's mandatory purchase requirement to include all homes in Special Flood Hazard Areas, regardless of whether those homes have a mortgage.

[49] See Property Casualty Insurers Association of America, 2010, for short descriptions of the pros and cons of these and other proposals.

[50] Proposals to eliminate some NFIP subsidies are currently being considered. For example, H.R. 5114, recently passed by the House, slowly phases out subsidies for homes that are not the primary residence of either the owner or a tenant (vacation homes) (U.S. House of Representatives, 2010b).

[51] Researchers at the Wharton School have proposed a "long term insurance policy" of ten years or more that would essentially become attached to the dwelling it insures (Kunreuther and Michel-Kerjan, 2009, pp. 338–343). Such a policy may reduce cycling of properties in and out of the NFIP and may reduce the reluctance of many homeowners to invest up front in costly risk mitigation measures. We also note that several states (including Mississippi, South Carolina, and Texas) require certain types of dwellings in high-risk areas to purchase NFIP coverage in order to be eligible for wind pool insurance. Such requirements broaden the take-up of flood insurance.

[52] This type of approach has been advocated by South Carolina Insurance Commissioner Scott Richardson (Richardson, undated) and has been used effectively in the past to address situations in which losses are partly insured and partly excluded (such as the legal costs incurred to defend policyholders under directors' and officers' liability policies written in the 1990s).

develop model language. For example, in the event of a loss that included both wind and flood damages, the policy might specify that damages would be split evenly between the wind and flood policies when the cause or timing of damage cannot be determined. State insurance regulators could then require the language to be included in the policies issued in their states. In addition, regulators and insurers could consider adding a binding mediation or arbitration clause in the event of a disagreement over whether a loss involved both an excluded and an included cause.[53] This approach is common in some specialty lines of insurance.

- **Public Reinsurance for a Wind and Flood Policy.** One possible solution to the coverage disputes that plague wind and flood insurance is a policy that covers damage from both wind and flood and requires the policyholder to pay only one deductible, regardless of the cause of loss.[54] To encourage private participation in such a policy, a federal reinsurance program for both wind and flood losses warrants consideration. A private wind and flood policy would cover a first tier of wind and flood losses, with additional insurer payments being reimbursed by the federal program. Any federal reinsurance program should charge actuarially sound rates that reflect the combined wind and flood losses of the insured properties.[55]
- **Public Wind and Flood Policy.** In addition to reducing the risk loads required by private wind insurers, expanding the NFIP to cover wind insurance would solve the problem of coverage disputes. As mentioned in the discussion of options to address Goal 1, congressional legislation has been introduced to this effect.

The idea of setting up a federal regulator of wind and privately provided flood insurance warrants consideration.

How effective the first option would be in reducing coverage disputes is uncertain. As long as the entity bearing the flood risk is not the entity bearing the wind risk, the potential for dispute persists. For example, policy language may say that losses will be evenly split when the cause or timing of damage cannot be determined, but disputes will likely arise over whether the cause or timing of damage can be determined. Nevertheless, it seems sensible to explore the potential payoff of convening a panel to develop policy language to allocate losses to wind and flood.

The second and third approaches would address the coverage litigation problem. The second option could encourage the private sector to resume providing wind coverage for many homes in the Gulf Coast region and to start picking up a substantial part of the flood risk. However, the reinsurance offered by the federal government in the second option would need to be sufficiently attractive to overcome the private sector's resistance to offering flood insurance. Again, political pressure to subsidize rates or to cross-subsidize wind and flood rates is a potential disadvantage of both the second and third options.

Goal 4: The Market Should Encourage Innovation and Price Competition

Policymakers should be wary of creating a market in which the government is the sole provider of wind or flood insurance, because the absence of competition can retard innovation and foster inefficiency. To encourage a healthy and vibrant market, policymakers should consider reforms that increase the willingness of the private sector to offer wind and flood insurance. Areas of concern for private insurers are price regulation that is perceived to be unfair, contract uncertainty in the form of post-event reinterpretations of policy language, emergency rules issued by state regulators, litigation risk, and assessments by state-run insurance programs to fund deficits.[56]

Most of the impediments to increased private-sector involvement are generated at the state level, so the idea of setting up a federal regulator of wind and privately provided flood insurance warrants consideration.[57] Such a regulator would oversee pricing, policy terms, and any changes to those terms.[58] While in

[53] Senator Roger Wicker of Mississippi has introduced legislation (S. 3672) that would establish an arbitration process to resolve disputes between FEMA and insurers over the allocation of losses to wind and flood policies (U.S. Senate, 2010).

[54] This policy would not cover other perils, such as fire and theft. A somewhat narrower wind and flood policy that would cover only flood losses from direct storm surge (as opposed to all flood losses) is also worthy of consideration.

[55] One of the nation's largest homeowner insurers, Nationwide Mutual, proposed a similar idea. In mid-2008, it stated that it was willing to expand its standard homeowners policies along the coast to include flood damages from named storms and hurricanes. However, the precondition for this would be some exemption from state pricing controls and a reinsurance relationship with the NFIP. According to a spokesman for the insurer, "We see this [plan] as a viable alternative to much of the litigation that occurred post-Katrina. No one, whether it is insurers or consumers, benefits from litigation" (Kunzelman, 2008).

[56] Several other proposals at a state or federal level have focused on creating some preemption of state pricing controls in high-risk coastal regions. The regional "coastal zone" proposal of the Travelers (Fishman, 2007) appears to be the most notable, with considerable support among the stakeholders we interviewed.

[57] For example, in late June 2009, Florida's Governor Charlie Crist vetoed H.B. 1171, which would have deregulated residential insurance pricing. Crist said the bill would give large insurers the ability "to cherry-pick" the most-profitable homeowners policies and leave the most risk to the state's Citizens Insurance Company and smaller insurers (Kaczor, 2008).

[58] The Travelers proposal, for example, would create a federal board to oversee the regulation of primary windstorm insurance in four coastal or low-lying zones from Texas to Maine. Under this proposal, the federal government "would not have a financial role, but would regulate and oversee most aspects of wind underwriting by private insurers, including pricing" (Fishman, 2007).

principle a federal regulator could adopt policies just as unattractive to private insurers as those of state regulators, such a regulator may not be subject to the intense local political pressure imposed on state regulators following a disaster.

Making Tradeoffs Among Goals

We have identified reforms that merit consideration for achieving each of the four goals for a well-functioning wind insurance market (see Table 4 for a list of reform options). It is also important, of course, to assess each option's ramifications for the other goals. For example, government provision of wind insurance (goal 1, option three) could result in premiums that more closely approximate expected losses, because private risk loads would no longer be required. However, if political pressures to subsidize rates prevail, efforts to achieve this goal may be frustrated. In addition, public wind insurance would likely reduce competition in the market.

In developing a comprehensive national plan for residential insurance, policymakers will need to select a package of options that provides the most attractive overall outcomes. Doing so will require comparative assessments, as well as judgments, about the relative importance of different goals. For example, if private-sector competition were judged to be critical to a well-functioning insurance market, options such as expanding the NFIP to provide wind insurance would be less attractive. To facilitate this process, we endorse the formation of a national commission to assess the feasibility and desirability of the options proposed here, along with others suggested by legislators, insurers, policy analysts, and other interest groups.[59]

Conclusion

Returning to the quotation that opened this paper, we as a society have learned a great deal in the five years that have passed since Hurricane Katrina. We have learned that the current constellation of institutions and regulations is not well suited to achieving the basic goals for a well-functioning insurance market. We have learned that many regulations and tax provisions make it difficult for the private sector to create a well-functioning insurance market on its own. We have also come to better understand the inherent limitations of the private sector in insuring wind and flood risk. And our experience over the last five years has underlined the vulnerabilities of public-sector attempts to fill gaps left by the private sector.

In developing a comprehensive national plan for residential insurance, policymakers will need to select a package of options that provides the most attractive overall outcomes.

Table 4
System Goals and the Reform Options That Address Them

Goal	Options That Address Goal
1. Insurance premiums should create appropriate incentives to mitigate risk	Changes in government regulations to reduce the cost of capital held by private insurers to protect against large losses
	Government provision of reinsurance for wind risk
	Government provision of wind insurance
	Phase out of NFIP subsidies
2. Decisions by households and residential developers should factor in wind and flood risk	Expansion of mandatory purchase requirements
	Assistance to low-income homeowners and renters to offset insurance costs
3. The insurance system should pay legitimate claims efficiently and expeditiously	New policy language on loss allocation
	Public reinsurance for a wind and flood policy
	Public wind and flood policy
4. The market should encourage innovation and price competition	Federal regulation of wind and flood insurance

[59] The commission might be modeled after one proposed in the 110th Congress. The Commission on Catastrophic Disaster Risk and Management Act of 2007 would have set up a commission to evaluate various proposals for reform and to submit a report to the President and Congress containing findings and recommendations for legislation or administrative action (U.S. Senate, 2007). The legislation was endorsed by the National Association of Insurance Commissioners but was not passed. Such a commission could alternatively be convened by FEMA or the Department of Homeland Security.

We believe that federal leadership is critical to moving forward with solutions.

While the current system is loudly criticized by interest groups on all sides of the market, little agreement exists on effective solutions. New policies are urgently needed to create appropriate incentives to mitigate flood and windstorm risk and to ensure that a compensation system is in place for future catastrophes. Given the many states that face wind and flood risks along their coasts, and the burden that post-disaster assistance carries for federal taxpayers, we believe that federal leadership is critical to moving forward with solutions. Initial steps along this path, such as a national commission to assess reforms, should be taken immediately. ■

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