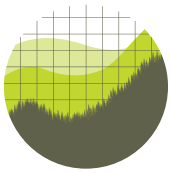
Flooding the Market

The Distributional Consequences of the NFIP



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Congress is actively considering a slate of legislative reforms to the National Flood Insurance Program (NFIP). This policy brief analyzes the distribution of the NFIP's costs and benefits across income groups and geographic regions. The primary findings of this report are:

- Because of its below-market insurance rates and the intense hurricane-related floods in recent years, the NFIP has accrued a substantial deficit: $19 billion. As currently structured, the program will not be able to repay this debt.
- Since the NFIP cannot charge market rates, hold reserve funds, or purchase reinsurance, the program faces a constant financial risk of insolvency. The NFIP also causes environmental damage, by externalizing the risk of building in ecologically-sensitive floodplains.
- Those costs—financial risk and ecological damage—are widely distributed to taxpayers and citizens across the country.
- The benefits of the NFIP, by contrast, are enjoyed largely by wealthy counties and by a significant number of owners of vacation homes.
- The Gulf Coast states benefit disproportionately from the below-market insurance rates of the NFIP.

As it deliberates on possible reforms to the NFIP, Congress should consider these findings and devise a structure that will distribute costs and benefits with rationality and fairness.

Scope of Analysis

Distribution of costs and benefits is a crucial but under-analyzed aspect of the NFIP debate

Overview of the NFIP

On September 9th, 1965, a Category 3 hurricane hit the Louisiana coast, causing Lake Pontchartrain to spill its banks. By the time the storm had dissipated, seventy-five people were dead and over a billion dollars in damages had occurred. This earned the hurricane the nickname "Billion Dollar Betsy"—the first natural disaster to generate over a billion dollars in damages.[1] There was no flood insurance available at the time; victims were forced to rely on family, friends, and charity.

In response, Congress created the National Flood Insurance Program (NFIP) in 1968 to allow homeowners, renters, and business owners to purchase insurance against flood losses. Communities were given the opportunity to enter the program by developing floodplain management policies to manage floodwaters and reduce risk to property; in exchange, the citizens of those communities would become eligible for insurance backed by the federal government.

The NFIP provides considerable benefits for participants: they receive insurance against flood losses at a reasonable price; communities are able to develop otherwise un-developable land; and homeowners in the program enjoy increased housing prices. But the NFIP generates costs as well. The program faces solvency risks when its below-market premium rates cannot cover flood losses. And by subsidizing private development in ecologically-sensitive floodplains, the program risks generating environmental damage.

The Debate on Reform

Forty years after Betsy, another hurricane's devastating assault on the Gulf Coast has stressed the NFIP's reserves and brought the program back to the attention of people living in floodplains, insurers, and lawmakers. Hurricane Katrina and the other major storms of 2005 generated nearly $20 billion in debt that program premiums are unlikely ever to repay.[2] This tremendous debt has caused policymakers and advocacy groups to rethink the NFIP and consider such options as forgiving the debt,[3] selling catastrophe bonds,[4] or even expanding the program to cover other types of damages.[5]

A portion of the debate on reforming the NFIP centers on distributional issues. It is not completely clear who pays the costs and who enjoys the benefits of the NFIP. Media accounts, advocacy groups' assertions, and policymakers' speeches illustrate the confusion. Some observers argue that the program is a form of assistance for poor and working-class homeowners who could not afford to purchase flood insurance at market rates.[6] Other commentators suggest the program disproportionately benefits wealthy households and the owners of vacation homes.[7] The NFIP has also been criticized for concentrating benefits in Gulf Coast states at the expense of residents of inland floodplains and, potentially, of taxpayers nationwide.[8]

This policy brief outlines the distributional consequences of the NFIP and provides an initial analysis of how the benefits of the program fall across income and geographic ranges.

Where the Costs Fall

The NFIP's costs are significant and widely distributed

Financial Risks

The program encourages building in floodplains by providing insurance policies that private insurers find too risky to write. The less expensive it is to insure a property in the floodplain against loss, the stronger the incentive to build in that floodplain and the more risk becomes concentrated in areas covered by the NFIP. The geographic concentration of risk helped to create the debt crisis the program faces today: a single flood event can affect a great number of covered properties, none of which have paid insurance premiums at a market rate.

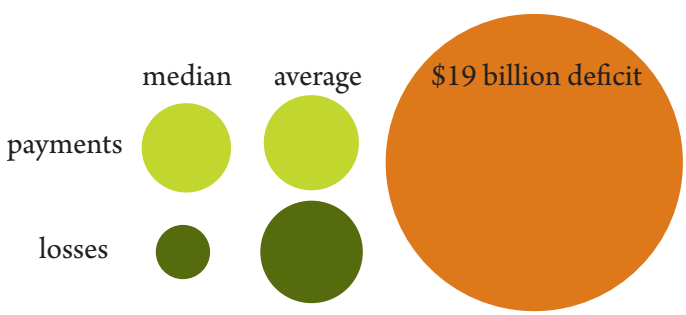
In the event that the program's $19 billion debt is forgiven, taxpayers will bear the costs of returning the NFIP to solvency. The program's structural deficit is caused by setting insurance rates below the actuarially fair rate and by a lack of any catastrophic backstop or reinsurance for the program. Private insurers typically either hold large reserves or purchase their own insurance (called "reinsurance") in case a particularly high-claim year wipes out the annual premium payments. These procedures protect the solvency of insurers under even the most strenuous conditions.

Because of statutory limits created by Congress, the NFIP cannot charge rates high enough to build reserve funds or purchase reinsurance. In years when claims exceed the assets in the program, the NFIP is forced to take loans from the United States Treasury. This keeps rates in the program significantly lower than what a private insurer could provide, but it also passes the costs of catastrophe on to the federal government—and, eventually, to the taxpayers.[9]

As illustrated in Figure 1, while the payments received by the program in the median year are sufficient to cover losses, catastrophic risks cause the program to lose money on average, leading to a massive deficit. It would take more than ten consecutive years without a single flood claim for the median premium payments to cover the deficit. Even that repayment period assumes an interest free loan from the Treasury. Assuming median losses and a 5% interest on the program's debt, the repayment window rises to over 100 years. The program, as currently structured, will never repay its debt.

The financial future of the NFIP rests crucially on whether the 2005 hurricane season was an aberration or the new norm. If claim payments comparable to 2005 are a once-in-a-lifetime occurrence, forgiving the program's current debt will restore it to financial solvency for the foreseeable future. But if catastrophic claim payments of the magnitude of those in 2005 become a more common occurrence, the

Figure 1: The NFIP Budget Situation



program will have to rely consistently and directly on taxpayer assistance to balance its books. Some observers argue that climate change will increase the intensity of Atlantic hurricanes.[10] If that prediction proves true, the financial risks presented by the NFIP are likely to grow over time. The future losses of the program are, of course, unknowable, but the rate subsidy inherent in government provision of flood insurance and the lack of reinsurance assures that the program will continue to present financial risk to taxpayers for the foreseeable future. Only the exact size of that risk remains unknown.

Ecological Damages

The financial costs of the NFIP are considerable, but they are likely dwarfed by the ecological damages that the program encourages. Floodplains are located near waterways and in coastal zones. These areas tend to be both ecologically significant and sensitive, and they contribute substantial ecosystem services.

River basins and coastal zones provide natural purification of water and wastewater; erosion control and weather mitigation; and habitat for fish and wildlife. They also offer opportunities for valuable recreational use, improve irrigation return flows for agriculture, and support fisheries and other raw natural resources with considerable economic value. Though some of these ecosystem services have more localized effects, many have national and even global implications. A substantial economic literature has developed to derive monetary estimates of the value of services that are provided by ecosystems.

While difficult to monetize, a substantial amount of research shows that these areas—if left undeveloped or managed carefully—generate large environmental and economic benefits. One study found that households along a single stretch of an American river were willing to pay as much as $70 million to restore lost ecosystem services there. Another valuation study reports that undeveloped coastal wetlands are typically worth several thousand dollars per hectare in annual ecosystem benefits. [11]

Development of these areas can interfere with and diminish their environmental benefits, but the private price of development rarely reflects the cost of those lost ecosystem services. To the contrary, by shifting the insurance risks to the taxpayers and reducing the long-term private costs of building in floodplains, the NFIP encourages development in these ecological hot zones. Such development will inevitably trigger environmental damage.

As a result of the NFIP's below-market premium rates, building in floodplains appears more attractive to private developers than it does to society as a whole. In other words, the flood insurance program encourages private development at a rate that is inefficient and unsupported from a social perspective that more fully considers the ecological and financial risks.

Benefits

The NFIP most benefits households at the extremes of the income distribution and Gulf Coast states

Summary of Benefits

Approximately 5.5 million properties nationwide are in the program. Enrolled properties receive flood protection of up to $350,000 for single-family properties, and up to $1,000,000 for non-residential properties. Some properties (primarily those built before their community joined the program) receive statutorily subsidized rates. These subsidies are designed to encourage communities to enter the program and develop floodplain management policies that may help reduce overall risk. Subsidized policies are offered below the rate that would be available through private markets, and represent a significant benefit to the properties that qualify.[12] The insurance subsidies are a direct transfer, through the program, from taxpayers to the holders of these policies.

Communities that enter the program also benefit by developing floodplain management plans that may reduce the overall level of flood risk in the area. By providing a financial incentive to develop management plans, and otherwise facilitating the adoption of sounder development policies at the local level, the NFIP can help decrease overall exposure to flood risk, compared to a baseline that assumes the same rate of development.

By making development in the floodplain more affordable, communities increase the land available for development in areas with high property values. This generates economic benefits at the local level, but can also increase exposure to flood risk compared to the level of risk that would be produced by the private markets. The NFIP, by serving as a backstop for those risks, favors development in communities with floodplains, by shifting some of those risks onto taxpayers.

There are a variety of benefits that localities receive from the program. Expanded opportunity for development can attract new citizens and companies to expensive property with water views or access. This type of development can expand the tax base and encourage growth within municipal borders.[13] The existence of the program can also be expected to increase property values in general, and therefore the wealth of the individuals and communities that participate.

Income Distribution of Benefits

Empirical assessments suggest that wealthy households in wealthy regions, and relatively poorer counties, collect most of the benefits of the NFIP, while areas in the middle portion of the income distribution tend to benefit less from the program. We use data from 1998 to 2008 on claim payments and median household income at the county level to examine the distribution of benefits from the NFIP.

A simple analysis seems to suggest that poor counties benefit more than their wealthier counterparts. Poor counties (defined as the bottom tenth percentile of median household income) filed more and larger claims in the study period, receiving an average of $5.6 million in annual claim payments, adjusting for county size. The richest counties (defined as the top tenth percentile of median household income) receive an average annual total of $1.2 million in claim payments.

This simple analysis would suggest that NFIP funds tend to benefit poorer counties rather than wealthier counties, implying that the program is progressive.

Yet a deeper analysis calls these conclusions into question. The impact of the 2005 hurricane season on those aggregate statistics is staggering. Considering the years 1998 to 2008 but excluding 2005, the distribution of claim payments differs significantly. After eliminating claims from 2005, the wealthiest counties in the country filed 3.5 times more claims and received over a billion dollars more in claim payments than the poorest counties.[14]

Between 1998 and 2008, only around one third of U.S. counties filed at least one NFIP claim. Counties that filed claims had an average income of $37,900, while counties that did not file claims averaged just under $34,000—a difference of more than 11%.

Moreover, the counties that filed claims varied tremendously by income level and included both some of the richest and poorest counties in the country. The standard deviation of incomes for claimant counties is just over $10,000, approximately $2,000 more than the standard deviation of income in non-claimant counties. In other words, non-claimant counties tend to have income levels closer to the national average (about $35,000), while claimant counties include more of both the richest and poorest counties. Taxpayer-subsidized NFIP claims thus represent a significant wealth transfer from middle-income counties to relatively wealthy and poor counties.[15]

The unequal distribution of NFIP payments at the county level might not represent true regressivity if the poorest homeowners in these rich counties are the ones receiving the claims. There are several reasons to believe this is not the case. Many NFIP claims come from near-ocean properties after hurricane-related flooding damage. Intuitively, most homeowners see living on the water as an amenity, despite the increased risk of flooding. This amenity drives up the price of water-adjacent homes. Property values and flooding risks of beach front communities are likely to be correlated, indicating that subsidized insurance for flooding risks will be of greater benefit to households that can afford relatively high-priced property.

Beach front communities typically exhibit strong income gradients moving inland from the beach. The most expensive homes are those directly on the beach, followed by homes with a view of the ocean, then those within walking distance of the ocean, and finally those homes without easy access to the water. The value of property can often drop quickly with increased distance from the ocean. This income gradient is highly correlated and inversely related to the risk of flooding in those regions.[16] For those reasons, it is unlikely that homes making claims on the NFIP are less valuable than typical homes in the surrounding area.

Available data confirms this intuition. The Congressional Budget Office (CBO) found that over 40% of the coastal properties receiving a rate subsidy because they were grandfathered into the NFIP program are worth over $500,000, and 12% are worth more than a million dollars. In fact, 23% of the subsidized properties in their coastal sample are vacation homes.[17] The median value of a single-family house nationwide is around $160,000. While the CBO analysis is not exhaustive, it strongly suggests that the benefits of subsidized flood insurance provided by the NFIP accrue primarily to wealthy households.

If the intra-country distribution of program benefits follows this pattern, then the county-level findings will underestimate the extent of the distributional imbalance. Further analysis at higher levels of detail are warranted to provide a more clear distributional picture.

Geographic Distribution of Benefits

Benefits are also highly concentrated geographically. Over 50% of the houses covered by the program are in either Florida or Texas. Similarly, while only 4% of households in the nation participate in the program, over a quarter of the residents in both Florida and Louisiana have policies through the NFIP.

Comparing Louisiana and Kentucky (states with similar populations) illustrates the geographic redistribution inherent in the NFIP: Louisiana has 483,000 policies in force, while Kentucky has only 22,500. Average premiums and claim payments vary significantly by state as well, but the largest benefit of the program—namely, access to below-market rate coverage—represents a significant shift in resources to the hurricane-vulnerable states along the Gulf and Atlantic coasts.

Figure 2: Coverage and Claims by State

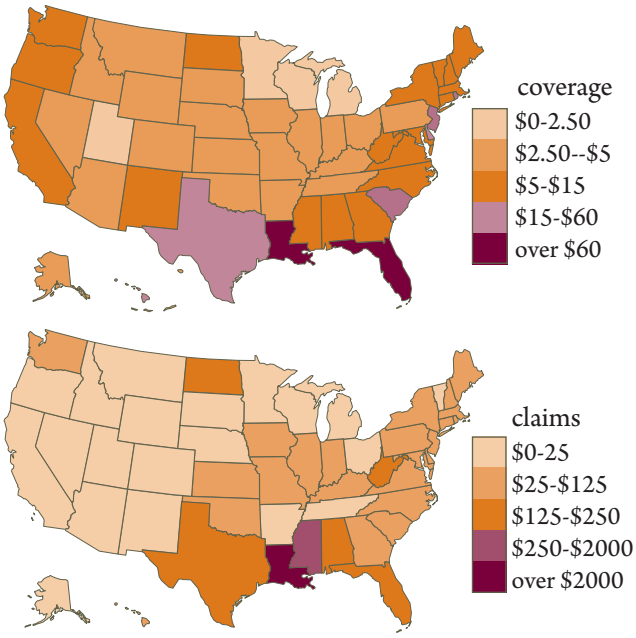
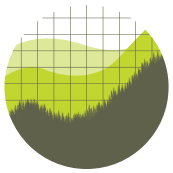


Figure 2 shows the regional distribution of coverage and claims by state. The top map shows the dollar value, on a per capita basis, of the coverage that is currently held under the NFIP.[18] The bottom map shows per capita claims that have been made since 1978.[19] Both measures of the benefits of the program show that they are highly concentrated in the Gulf states.

Conclusion

The current price of flood insurance both subsidizes new development in flood zones and subsidizes risk for those who already built in flood zones. These twin subsidies have left the NFIP with a gaping fiscal hole. The costs of the subsidies will likely be borne generally by taxpayers. But where there is a subsidy, there is a benefit. The benefits of the NFIP appear to accrue largely to wealthy households concentrated in a few highly-exposed states.

As lawmakers consider the future of the National Flood Insurance Program, they should be aware that the policy redistributes wealth across income groups and state borders in ways that they may not expect. An understanding of the distribution of costs and benefits is crucial for considering what should become of the NFIP.



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Notes

[1] *See* Jack Williams, *Hurricane Betsy Hit Florida, Smashed New Orleans in 1965*, USA Today, Oct. 21, 2003.

[2] Hurricanes Wilma and Rita, as well as other flood claims, also generated significant damages that season.

[3] *See, e.g.*, Letter from Janet Napolitano, Sec'y of Dep't of Homeland Security, to Rep. Barney Frank (Apr. 24, 2009) ("The [Obama] administration is asking for debt forgiveness because the size of the current debt creates an unstable financial situation for the NFIP and the subsidized insurance premium structure does not and will not allow the NFIP to collect enough to service the debt or repay it.").

[4] *See, e.g.*, Erwann Michel-Kerjan, *Hedging against Tomorrow's Catastrophes: Sustainable Financial Solutions to Help Protect against Extreme Events*, *in* Learning from Catastrophes: Strategies for Reaction and Response (H. Kunreuther & M. Useem eds., 2010).

[5] For example, the Multiple Peril Insurance Act currently being debated in Congress proposes to extend the NFIP to cover wind damage as well. Proponents argue that this will increase the premium base, possibly improving the fiscal situation of the program. More importantly, it would reduce the incentive of insurance companies to classify all damage as "flood damage" in an attempt to make the NFIP liable and avoid paying out on their own wind policies. *See* H.R. 1264, 111th Cong. (2009); *see also* Andrew G. Simpson, *Obama Opposes Expanding Flood Insurance Program to Cover Wind Damage*, Insurance J., May 13, 2009.

[6] *E.g.*, 151 Cong. Rec. H7760 (daily ed. Sept. 8, 2005) (statement of Rep. Barney Frank) (discussing the "moral duty to the poorest people and working people" in supporting the NFIP); Rep. Rick Lazio, *Letter to the Editor: Flood Fund Aids Working-Class Homeowners*, N.Y. Times, Nov. 18, 1993.

[7] *E.g., The National Flood Insurance Program: Hearing Before the S. Comm. on Banking, Housing, and Urban Affairs*, 109th Cong., (2006) (statement of Paul J. Gessing, Dir. of Gov't Affairs for the Nat'l Taxpayers Union); John Stossel, *Taxpayers Get Soaked by Government's Flood Insurance*, ABC News, Sept. 20, 2004, *available at* http://abcnews.go.com/Business/Insurance/story?id=94181.

[8] *See* Gilbert M. Gaul, *Repeat Claims Strain Federal Flood Insurance*, Wash. Post, Oct. 11, 2005.

[9] The question of who pays taxes complicates any analysis of a federal bailout of the NFIP. There is considerable debate about the progressivity of the U.S. tax system. *See* Thomas Piketty & Emmanuel Saez, *How Progressive is the U.S. Federal Tax System? A Historical and International Perspective*, 21 J. Econ. Persp. 3 (2007)). But the opportunity cost of using general tax revenue to forgive the NFIP's debt is a reduction in government spending on other priorities, which, given the general distribution of government spending, is likely to be fairly progressive.

[10] *See, e.g.*, Kevin Trenberth,*Uncertainty in Hurricanes and Global Warming*, 308 Sci. 1753 (2005).

[11] *See, e.g.*, John Loomis et al., *Measuring the Total Economic Value of Restoring Ecosystem Services in an Impaired River Basin: Results from a Contingent Valuation Survey*, 33 Ecol. Econ. 103 (2000); *but cf.* Edward Barbier et al., *Coastal Ecosystem-Based Management with Nonlinear Ecological Functions and Values*, 319 Sci. 321 (2008) (arguing for integration of development and conservation strategies in coastal zones). While some of these environmental and economic benefits are likely local, there are clear national and even global implications from building on sensitive coastal wetlands, such as effects on fisheries and wastewater treatment. *See* TEEB, The Economics of Ecosystems and Biodiversity for National and International Policy Makers 9 (2010).

[12] *See* Cong. Budget Office, Pub. No. 2925, Value of Properties in the National Flood Insurance Program 1 (2007), *available at* www.cbo.gov/ftpdocs/82xx/doc8256/06-25-FloodInsurance.pdf.

[13] *See* R.J. Burby & S.P. French, *Coping with Floods: The Land Use Management Paradox*, J. Am. Planning Assoc., July 1981, at 289.

[14] This number is calculated by comparing the product of the average county payments times the number of counties making a claim. More of the wealthiest counties make claims and their total payments are significantly higher. Data in this section and helpful advice were provided by Carolyn Kousky and Okmyung Bin. The authors thank them for their assistance, while retaining responsibility for all errors.

[15] Ten years of data represents a relatively small slice of the total life of the program. It is possible that, through random chance, floods have been more frequent among the richest and poorest counties than in middle income

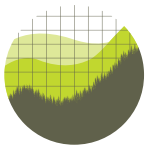
counties. If that is the case, over time the distribution of claim payments should level out and resemble the distribution of county income nationwide.

[16] *See* Christopher Major, The Beach Study: An Empirical Analysis of the Distribution of Coastal Property Values (2003).

[17] *See* Cong. Budget Office, *supra* note 12.

[18] The map illustrates the value of covered property per person in each state from 1978-2010. Louisiana leads the nation with over $70 of insurance coverage per person, while in Utah coverage is less than $1 per capita. The results are calculated by the author using data from the FEMA website. The scale is generated using a cluster analysis searching for natural breaks in the data and producing uneven sized clusters. The tinting on the map is proportional to the level of covered property per capita, meaning that the difference in color between Michigan and Ohio, for example, is much smaller than the difference in color between Texas and Louisiana. These shading differences are consistent with the data.

[19] The map is colored by the value of claims per capita. Colorado, Utah, Wyoming, and Michigan all average less than $5 per person in claims over between 1978 and 2010. Louisiana leads the nation with over $3,500 per person in claims. The results are calculated by the authors using data from the FEMA website. As described in note 18, the tinting on the map is proportional to the value of claims per capita.



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