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R E P O R T

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# The National Flood Insurance Program's Market Penetration Rate

## Estimates and Policy Implications

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Prepared as part of the 2001-2006 Evaluation of the  
National Flood Insurance Program



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## 1. EXECUTIVE SUMMARY

### 1.1. Introduction

Flooding is a major source of loss to individuals and businesses in the United States. Private insurers have historically been unable to provide flood insurance at affordable rates, and flood coverage is excluded from standard homeowner policies. Until the establishment of the National Flood Insurance Program (NFIP) in 1968, the primary recourse for flood victims was government disaster assistance. Congress adopted the NFIP in response to the ongoing unavailability of private insurance and continued increases in federal disaster assistance.

Early in the program, the federal government found that making insurance available, even at subsidized rates for *existing* buildings, did not provide sufficient incentive for communities to join the NFIP or for individuals to purchase flood insurance. In response, Congress passed the Flood Disaster Protection Act of 1973, which requires federally insured or regulated lenders to require flood insurance as a condition of granting or continuing a loan when the building and the improvements securing it are in the Special Flood Hazard Area (SFHA) of a community participating in the NFIP. This mandatory purchase requirement was strengthened by the National Flood Insurance Reform Act of 1994. Currently, over 20,000 communities across the United States participate in the program (roughly 75 percent of all communities in the United States), and over 4.5 million flood policies are in place.

The Federal Emergency Management Agency (FEMA), which administers the NFIP and is part of the U.S. Department of Homeland Security, is currently conducting a major evaluation of the program's goals and performance.

This report contributes to that evaluation by (1) developing more reliable estimates of the proportion of single-family homes (SFHs) that have flood insurance (the market penetration rate); (2) identifying factors that determine the market penetration rate; and (3) examining some of the opportunities for, and potential benefits of, increasing the market penetration rate. Flood insurance on nonresidential and other types of residential structures is not examined in this report.

### 1.2. Methods for Estimating the Market Penetration Rates

Estimates of the market penetration rate for flood insurance and compliance with the mandatory purchase requirement have been sketchy. Data on the number of policies are readily available, but reliable information on the number of structures in SFHAs and on the number of structures with mortgages subject to the mandatory purchase requirement has been lacking. This study is the first to use property parcel data from a sizable number of communities to construct better estimates of the number of SFHs in SFHAs and to identify SFHs with mortgages.

We selected a stratified, random sample of 100 NFIP communities for the study. The sample was stratified by geographic region, source of flooding in the community (coastal versus

riverine), and community size. For each of the 100 communities, data on a random sample of approximately 750 property parcels (75,000 total) was purchased from First American Real Estate Solutions (FARES). FARES collects and standardizes publicly available property parcel information from tax assessors across the country. Tax assessor records provide a rich source of information on each parcel, including land-use type (SFH, apartment building, commercial, industrial, public use, etc.), value of the land and improvements, date of construction, date of last property transfer, and amount of mortgage on the property (usually at the time of the last sale). Because approximately two-thirds of the property parcels in the 100 communities are SFHs that are not condominiums and because determining whether there is an NFIP policy at the parcel for this type of land use is more straightforward than for other types of land use, this study focuses on SFHs that are not condominiums.

Property parcel records with complete addresses were sent to Transamerica Flood Hazard Certification, Inc. (now part of FARES) to determine the NFIP community and flood zone in which the parcel lies. The records were then sent to the NFIP's Bureau and Statistical Agent (BSA) to determine whether there was a federal flood insurance policy in force on the parcel.

Overall, the analysis is based on 5,472 SFHs in SFHAs and 22,195 SFHs in NFIP communities but not in SFHAs. Statistical weights were used to extrapolate findings from the sample to the number in the nation as a whole.

### **1.3. Findings**

Our findings fall into six categories: (1) market penetration rates, (2) compliance with the mandatory purchase requirement, (3) the type and amount of coverage among those households that buy flood insurance, (4) factors that determine market penetration rate, (5) the impact of increasing market penetration on disaster assistance and on community compliance with NFIP requirements, and (6) the effect of growth in the number of policies on the annual variability of overall NFIP losses.

#### **1.3.1. Market Penetration Rates**

The results of the analysis suggest that, overall, about one-half of SFHs in SFHAs nationwide have flood insurance policies. An estimated 49 percent have NFIP policies, and once a rough estimate of the number of policies underwritten by private insurers is added in, the market share rises to between 50 and 52 percent.

We project that there are approximately 3.6 million SFHs in SFHAs nationwide with a 95 percent confidence interval for the projection that runs from 2.9 to 4.2 million. Comparison of the projected number of policies in SFHAs nationwide based on the study sample and the actual number of policies recorded by the BSA suggests that our point estimate of the number of SFHs in SFHAs nationwide may be 10 to 15 percent low. Thus, the actual number of SFHs in SFHAs nationwide may lie in the upper portion of the 2.9 to 4.2 million confidence interval.

Even though approximately one-third of NFIP policies are written outside SFHAs, the market penetration rate outside SFHAs is only about 1 percent.

Market penetration rate appears to vary a great deal across the four geographic regions investigated in this study. The market penetration rates in the South and the West are considerably higher (approximately 60 percent) than in the Northeast or Midwest (20 to 30 percent). However, because the sample size of SFHs in the Midwest is modest, conclusions about the market penetration rate in this region should be considered tentative. Similarly, the market penetration rate in the Northeast is estimated with a considerable degree of uncertainty.

The SFHs in SFHAs are highly concentrated in the South. Nearly 60 percent of SFHs in SFHAs nationwide are in the South, even though less than one-quarter of homes in NFIP communities nationwide are in the South.

### **1.3.2. Compliance with the Mandatory Purchase Requirement**

Results from previous studies imply that approximately 50 to 60 percent of SFHs in SFHAs are subject to the mandatory purchase requirement. It is not possible to make precise estimates of the percentage of homes complying with the mandatory purchase requirement based on the data assembled for this study because data limitations create uncertainty about whether a home has a mortgage and whether the mortgage is subject to the mandatory purchase requirement. Under plausible assumptions, the compliance rate with the mandatory purchase requirement in the South and West is 80 to 90 percent. The compliance rate appears considerably lower in the Northeast and Midwest, where it is on the order of 45 to 50 percent. However, compliance rates are estimated with considerable uncertainty in these regions. Across the nation as a whole, compliance with the mandatory purchase requirement appears to be 75 to 80 percent.

The analysis does not provide any strong evidence that compliance declines as mortgages age. Thus, it appears that once banks adopt procedures to enforce the mandatory purchase requirement, the policies are equally effective for new and for older loans.

Market penetration rates are low for homes that are not subject to the mandatory purchase requirement. The analysis suggests that the market penetration rate for such homes is likely on the order of 20 percent.

### **1.3.3. Type and Amount of Coverage**

Flood insurance can be purchased for damage to the structure and/or the contents inside the structure (e.g., furniture), although the mandatory purchase requirement is rarely applied to contents. In the South, 75 percent of homes with structure policies also have contents coverage, but outside the South, the share ranges from 16 percent in the Midwest to 49 percent in the Northeast.

Over 75 percent of homes that have flood insurance carry coverage that exceeds the improved value of the property parcel listed in county tax assessor records.<sup>1</sup> However, these improved values may not closely reflect the true improved value of the structure. Further

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<sup>1</sup>The improved value of the property is the value of the property less the value of the raw land.

investigation is needed into how the various measures of improved property value correspond to true improved value before conclusions can be reached about the amount of flood insurance coverage relative to the improved value of the property. About 14 percent of the 1.99 million SFHs with flood insurance carry the maximum \$250,000 in structure coverage offered by the NFIP.

Nearly one-half of SFHs in SFHAs with mortgages and flood insurance carry coverage that exceeds the reported value of the mortgage. Once homes with coverage equal to the maximum available from the NFIP are added in, at least 61 percent of such homes carry enough coverage to satisfy the mandatory purchase requirement. The percentage that satisfies the coverage component of the mandatory purchase requirement will be higher once homes at which the amount of coverage exceeds improved value are included,<sup>2</sup> but further investigation into the reliability of the data on improved value is necessary before such calculations can be made.

#### **1.3.4. Factors That Determine the Market Penetration Rate**

Our analysis has identified several key factors that underlie the decision to purchase insurance. Consistent with economic theory, as well as with past studies of the demand for flood insurance, the decision to purchase insurance is affected by the price of insurance, although the effect is not particularly strong, at least over the range of prices observed in the sample.

The number of SFHs in a community's SFHA has a significant impact on the market penetration in the community. Market penetration is 16 percent in communities with 500 or fewer homes in the SFHA, 56 percent in communities with 501 to 5,000 homes in the SFHA, and 66 percent in communities with more than 5,000 homes in the SFHA. The low market penetration rate in communities with relatively few homes in the SFHA is consistent with hypotheses that insurers market flood insurance less aggressively in such communities and that there are fewer agents in these communities familiar with the program and enthusiastic about writing policies. In addition, the results suggest that the mandatory purchase requirement is less vigorously enforced in communities with few structures in the SFHA.

The probability of purchasing insurance is also much lower in communities that have a lower share of SFHs in the SFHA than in communities with a higher share of homes in the SFHA (29 percent in communities where 10 percent or less of homes are in SFHA, 54 percent in communities where 11 to 50 percent are in the SFHA, and 73 percent for communities where more than 50 percent are in the SFHA). Such a pattern might be the result of lower awareness of flood risk in communities with a lower percentage of homes in the SFHA. It may also be the result of less interest by flood insurance agents in promoting flood insurance and in learning how to write flood policies when a smaller share of their clients is in the SFHA.

The probability of purchasing insurance is substantially higher in communities subject to coastal flooding than in communities that are not (63 percent versus 35 percent). The demand for

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<sup>2</sup>The mandatory purchase requirement requires that flood insurance be covered for the lesser of (1) the outstanding principal balance of the loan; (2) the maximum amount of coverage offered by the NFIP; and (3) the depreciated value of the structure, when the loan balance exceeds the value of the structure.



flood insurance may be lower in communities not subject to coastal flooding because there is less appreciation for flood risk or because the type of coverage offered by flood insurance policies is less attractive in these usually inland areas. In particular, stakeholders interviewed for this study suggested that limited basement coverage in NFIP policies makes flood insurance less attractive in inland areas where basements are more common.

Similarly, market penetration is greater in the South than in other parts of the country even when other factors are controlled for (such as size of community and the source of flooding). The effect is most noticeable for homes less likely to be subject to the mandatory purchase requirement. These results may reflect greater appreciation of flood risk in the South beyond the differences in risk perception captured by other factors.

As evident from the findings on compliance with the mandatory purchase requirement above, the mandatory purchase requirement is a critical determinant of whether an SFH in the SFHA has flood insurance. The findings suggest that compliance with the mandatory purchase requirement is lower in communities with 500 or fewer homes in the SFHA, communities where less than 50 percent of homes are in the SFHA, and communities not subject to coastal flooding.

### **1.3.5. The Impact of Increasing Market Penetration Rates on Disaster Assistance and on Community Compliance with NFIP Requirements**

Flood insurance was introduced in part to reduce government disaster assistance payments, and we find some empirical evidence that higher market penetration rates are associated with lower amounts of disaster assistance. However, the impact is not large and is statistically significant only for that relatively small part of overall disaster assistance that most overlaps with the insurance coverage available from the NFIP. This makes it unlikely that increasing flood insurance market penetration would cause substantial reductions in disaster assistance, unless flood insurance policies were broadened to cover other types of losses, particularly temporary housing assistance. One possible reason for the lack of relationship is that people who receive disaster assistance by and large do not have the means to buy flood insurance. If this were the case, the variation in the percentage of structures with flood insurance (within the ranges observed in this sample) would have little affect on the group of people that receives most disaster assistance and, consequently, on disaster assistance overall.

We found little evidence of a strong relationship between market penetration rates and compliance with floodplain management requirements. We did find that higher market penetration rates are associated with more favorable Building Code Effectiveness Grading Schedule (BCEGS) scores, which assesses a community's building codes and the resources the community uses to enforce them. However, the results using our other measures of compliance either were statistically insignificant or showed a negative relationship between market penetration and compliance with floodplain management requirements. In some cases, other factors, such as the size of the community or the region in which it is located, had more impact on the measure of compliance than market penetration rate.

### **1.3.6. The Effect of Growth in the Number of Policies on the Annual Variability of NFIP Losses**

We examined how the geographic distribution of insurance coverage for flood losses affects risk to the NFIP as measured by the variability of losses. Our measure of risk focused not on the size of predicted losses, because these can be covered by higher premiums; rather, we focused on the variability, or predictability, of losses. Variability is a better measure of risk to the NFIP because a higher variability indicates an increased possibility that losses will be higher than premiums (or vice versa).

The geographic distribution of policies can affect the variability of losses in two ways. On the one hand, some areas may have more or fewer variable outcomes. On the other hand, flood losses in different areas might be correlated with each other (perhaps because of weather patterns). Correlations across regions create the potential to manage overall variability, analogous to reducing variability in overall returns by investing in two ventures whose returns are negatively correlated. We use historical data on flood losses to examine the correlation in losses and then study how increasing the number of policies in one region would affect the variability of overall losses.

Generally, our results show that geography does matter for determining the variability of overall NFIP losses. Different regions of the country do appear to have both positive and negative correlations with each other. These correlations lead to different effects on the variability of overall losses depending on where policy growth occurs. Our results suggest that the NFIP could limit the effects of policy growth on loss variability by focusing efforts to increase market penetration outside the Southeastern part of the country and the Gulf States. Market penetration rates are already higher in the South than in other parts of the country, which perhaps creates another argument for focusing efforts to expand the policy base outside the South. It should be noted, however, that there might be more important objectives for expanding market penetration other than reducing the variability in losses. The effects we discuss here must be considered in the context of the overall objectives of the NFIP when deciding on the appropriate targets for increasing penetration.

## **1.4. Implications of Findings for Setting Targets for Market Penetration Rates**

The findings of this study raise several issues that are important for NFIP managers and policymakers to consider as they evaluate alternative targets for market penetration rates and strategies for achieving them. The low market penetration rate in communities with relatively few structures in the SFHA presents a potential marketing opportunity for the NFIP. But while communities with fewer than 500 SFHs in the SFHA present a growth opportunity for the NFIP, the sheer number of such communities (roughly 95 percent of the 20,000 communities in the NFIP have fewer than 500 structures in the SFHA) makes it difficult to develop effective strategies to increase their market penetration rates. Policymakers need to better understand why market penetration rates in these communities are so low and should evaluate the costs and expected payoffs of strategies that increase market penetration in them. Similarly, market penetration rates are lower in communities where a smaller share of homes are in the SFHA; as a

result, policymakers need to investigate the costs and benefits of strategies to increase market penetration in these communities.

It is also important to better understand why the market penetration rate is so much lower in communities not subject to coastal flooding (mainly inland communities) than in communities subject to coastal flooding and what can be done to increase it. An estimated 1.7 million SFHs are in the SFHAs of inland communities. NFIP managers should examine features of NFIP policies that make them less attractive in inland areas (e.g., limited basement coverage), whether residents in inland areas systematically underestimate risk, or whether the nature of the risk in inland areas (e.g., lower variance of losses) makes flood insurance relatively less attractive than in coastal areas.

The results of this study suggest that the decision to purchase flood insurance is not particularly sensitive to the price of flood insurance, at least over the range of flood insurance prices currently observed. Thus, in developing strategies to achieve market penetration targets, NFIP managers do not need to be overly focused on how moderate changes in insurance premiums (e.g., 25 percent or less) would affect market penetration rates. However, large changes in prices may well have proportionately much larger impacts on market penetration rates than the findings in this study suggest.

Financial regulators and NFIP managers should evaluate whether and how to improve compliance with the mandatory purchase requirements in important submarkets. Our results suggest some significant gaps in compliance with the mandatory purchase requirement. Policymakers and NFIP managers should explore how to improve compliance in communities that have a relatively low number or proportion of homes in the SFHA, that are not subject to coastal flooding, and that are in the Northeast.

Market penetration rates remain very low among homes not subject to the mandatory purchase requirement, and attention should be paid to what might be done to increase penetration in this segment of the market. The reluctance of homeowners to purchase flood insurance has been an ongoing problem for the NFIP and was the primary reason for adoption of the mandatory purchase requirement. The low rate among homes that are not subject to the mandatory purchase requirement suggests that little has changed over the years and points to the importance of the mandatory purchase requirement in maintaining the market penetration rates that are observed today. While increasing market penetration rates in the voluntary market will continue to be a challenge, NFIP managers should continue to assess strategies and the costs of these strategies. Offering increased options for the types of the losses that are covered and the amount of coverage available might make flood insurance more attractive in the voluntary market.

## **1.5. Moving Forward**

This study has provided additional information on the current state of the market for flood insurance and identified opportunities for increasing market penetration rates. It has demonstrated the feasibility and power of using property parcel data based on county tax assessor records to estimate market penetration rates. It has also attempted to identify some of the benefits of increasing market penetration. However, a number of important gaps remain in

the research community's understanding of market penetration rates, compliance rates, and their determinants; we provide a list of fruitful topics for additional research at the conclusion of the report. For example, it would be fruitful to further investigate why the market penetration rate is so much lower in communities with relatively few homes or a relatively low proportion of homes in the SFHA. The number of communities in this study was relatively limited, and better estimates of market penetration in particular geographic regions or other submarkets could be developed by extending the study to additional communities.

While a substantial number of SFHs in SFHAs across the nation have flood insurance, an equally large number do not. As policymakers and NFIP managers evaluate goals for growth in the number of policies and strategies for achieving them, they should consider both the costs and benefits of different goals. Benefits should be measured against overall social objectives for the program and costs should be broadly defined. It should not be automatically assumed that the goal should be universal or nearly universal NFIP coverage. For example, high market penetration rates may not be desirable if the cost of achieving them is high and if, as the results of this study suggest, they do not much reduce disaster assistance relief nor induce greater compliance with NFIP requirements. However, higher market penetration rates may be socially desirable to the extent that failures on the demand side of the market (e.g., homeowners systematically underestimating flood risk) or on the supply side of the market (e.g., few insurance agents with experience writing flood policies in small communities or prices in some regions that do not reflect actuarial risk) limit the desirability or restrict the accessibility of flood insurance.

As this report has illustrated, many complex considerations need to be addressed in setting goals for policy growth and market penetration rate. Thus, it may be infeasible to develop analytically based goals. Rather, a more practical approach may be to work to remove imperfections on the supply and demand sides of the market and let market penetration fall where it may. Even so, careful thought must still be given to how much investment is warranted to remove different market imperfections.