



The Center On Federal Financial Institutions (COFFI) is a nonprofit, nonpartisan, non-ideological policy institute focused on federal insurance and lending activities.

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Federal Flood Insurance After Katrina

Hurricane Katrina vividly demonstrated the crucial importance of the National Flood Insurance Program (NFIP). Stricken homeowners in New Orleans may face very different futures depending on whether or not they were among the roughly half who had purchased flood insurance. For its part, the NFIP will require an infusion of taxpayers' money to cover claims recently estimated by the Director of the Office of Management and Budget of between \$10 billion and \$30 billion. Initially, this would be a borrowing from Treasury, with the probability that most or all of the loan would be forgiven later. (Readers unfamiliar with the NFIP may wish to see COFFI's summary of the program, available at www.coffi.org.)

Now is an excellent time to step back and re-evaluate some key policy questions:

- Should the government provide flood insurance? (p.10)
- Should homeowners be required to buy flood insurance? (p. 12)
- Should there be subsidies? (p. 13)
- Should new development or rebuilding be limited or restricted? (p.14)
- Should the federal government require other risk reduction measures? (p.16)
- Is the current division of public and private roles appropriate? (p.16)

First, though, we need to examine two background questions:

- Why do so few homeowners buy flood insurance? (p. 5)
- Is flood insurance subsidized at current premium levels? (p.7)

COFFI does not normally advocate policy options and this paper is intended to neutrally present all sides of the questions explored here.

We begin with an Executive Summary.

Executive Summary

The devastation wrought by Katrina forcibly demonstrates the importance of flood insurance for protecting many families from financial disaster. Yet participation rates in flood-prone areas appear to be well under 40%. Flood insurance is mandatory for holders of mortgages from federally-regulated lenders and certain other homeowners. However, many of these homeowners appear not to be insured despite the requirement. Voluntary purchase rates are even lower, in the range of 10%

There are a number of competing explanations for the low participation rates, with different implications for the best solution. First, the rational school believes that flood insurance is not worth the cost for many homeowners, particularly after adjustments for free federal and charitable disaster assistance that may be available to the uninsured. Tax policy also creates a rational bias away from flood insurance. Second, other economists have demonstrated that irrational aspects of human behavior dissuade many from buying disaster insurance that they should rationally want. Third, there is considerable ignorance and misunderstanding of the program. Fourth, financial constraints may prevent others from purchasing the insurance.

The subsidy issue is also complex. 26% of policies are for structures in special categories that receive an explicit discount of roughly 60% off actuarially fair prices, for a total annual subsidy of about \$1.3 billion. The NFIP aims to set the remaining categories at actuarially fair prices, but the categories are broad enough that some structures will be moderately over- or under-priced. Finally, there may be an additional implicit subsidy for all categories, if the odds of future very catastrophic hurricanes are higher than was estimated for pricing purposes.

With these points as background, the rest of the paper lays out the arguments on each side of six key policy questions:

Should the government provide flood insurance?

Pros

- Before the federal program, private insurance was inadequate to the challenge.
- Private insurers may still not be willing to take on much flood risk.
- The government might absorb much of the loss even without a federal insurance program.
- Federal flood insurance encourages flood-resistant land management.

Cons

- Federal flood insurance may encourage risky development.
- The taxpayer may end up footing the bill for very large floods regardless of insurance.
- Federal premiums may not sufficiently reflect risk differentials.

Should homeowners be required to buy flood insurance?

Pros

- Federal disaster aid costs should be lower.
- Premium income would offset federal flood losses, at least in part.
- Arguably, insurance premiums are a fairer way of spreading costs.

Cons

- Total federal costs could conceivably be higher.
- Arguably, taxpayer funding is a fairer way of spreading catastrophe costs.
- Mandatory insurance is difficult to enforce.
- Mandatory insurance may be unfair to poorer people in flood zones.

Should there be subsidies?

Pros

- Subsidies on grandfathered structures were part of the original deal.
- Subsidies are a carrot that lures communities and homeowners into the system.
- Arguably, taxpayer financing, such as through subsidies, is the fairest method.

Cons

- On the other hand, premiums may be the fairest way of spreading catastrophe costs.
- Subsidies could encourage development in risky areas.
- There may be better uses for taxpayer money.
- Coastal development could increase the absolute cost of subsidies.

Should new development or rebuilding be limited or restricted?

The flood insurance program already places limits on development and rebuilding in flood plains. In communities that participate in the NFIP, new construction, as well as rebuilding, in mapped flood hazard areas is regulated by local floodplain management and land use regulations. Buildings that are improved or repaired after floods must be brought into compliance with standards for resistance to flood damage, if the repair or improvements cost 50% or more of the market value of the building. Still, some have suggested stronger curbs on development.

Pros

- Federal disaster costs could be lowered.
- Homeowners and businesses might be better off as well.
- There could be environmental benefits.

Cons

- America generally lets people make their own choices.
- Federal costs may not be large in relation to private gains from development.
- Lesser measures might work well, with few disadvantages.
- Restrictions could be unfair unless exceptions were made for historic localities.
- Similarly, restrictions could be unfair to poor people.
- Strong restrictions are least palatable when applied to rebuilding.

Should the government require other risk reduction measures?

The NFIP already requires that certain buildings that have sustained significant flood damage be repaired with specific risk reduction measures. In addition, as reflected in the Flood Insurance Reform Act of 2004, there appears to be a general consensus that homeowners who knowingly impose major risks on the flood insurance program, such as those due to multiple losses, should either take actions to ameliorate the risk or should start bearing the true cost of the insurance. In exchange, the NFIP and local governments may be willing to bear much of the cost of the actions, if they are determined to be cost-effective and in the best interests of the NFIP.

Is the current division of public and private roles appropriate?

If we assume there should be a federal flood insurance program, there remains a question as to whether the current allocation of responsibilities between the public and private sector is the optimal one. The main public roles at present are in structuring the insurance policies, establishing the pricing rules, publicizing the program, and bearing the ultimate cost. These four functions are central to any insurer, so it is unlikely that the private sector could do more than provide consulting services without the risk of compromising the federal insurance mission.

On the other hand, it is theoretically possible to transfer some of the private sector roles into the NFIP. There seems to be little impetus to take on the back-office functions provided by the insurers, who have the advantage of economies of scale with their other insurance activities. Marketing of flood insurance is a trickier issue, since it is very efficient to have flood insurance sold with other homeowner's insurance, yet the current participation rates are so low as to suggest the consideration of other options.

It would also be possible to restructure the relationship more completely. The idea has been raised of a federal mandate that would eliminate the exclusion of flood insurance from homeowners' policies, in combination with a federal reinsurance program that would bring the financial risk onto the government's shoulders. It would be important to coordinate this with the management of flood hazard areas at the local level, which is generally viewed as a real success of the NFIP.

Finally, it was noted earlier that the federal government could pay insurers or reinsurers to take over chunks of its flood insurance risk. This would still allow the government to control the flood insurance program, but would begin bringing private insurers back into the risk-taking side of the flood insurance business.

Background Questions

Forming a coherent stand on the key policy questions requires a clear viewpoint on why so few homeowners buy flood insurance and the extent to which flood insurance premiums are subsidized.

Why do so few homeowners buy flood insurance?

It is clear that well under half of homeowners in flood prone areas purchase flood insurance, although there are no definitive numbers. (One study of 19 flood-exposed counties across the country found a 40% participation rate, but this was after excluding 7 counties with near-zero participation rates, whose inclusion would have lowered the average further.) The large majority of purchases are mandated by law, as explained below. Voluntary participation is even lower, with rates near 10%. (About one in 20 policies are issued to small businesses, but we shall refer to “homeowners” for ease of exposition.)

Mandatory purchases of flood insurance

Most purchases are legally required for one of several reasons:

Federally-regulated mortgage lenders are required to insist on flood insurance. Any lenders that are primarily regulated by a federal agency are required to insist homeowners obtain and renew federal flood insurance for homes in mapped flood-prone areas known as “special hazard areas.” Under certain conditions lenders may even buy insurance on behalf of the homeowner, at the owner’s expense (“forced placement.”) Additionally, since 1994, lenders that establish escrow accounts for other purposes are also required to escrow any required flood insurance premiums.

Federal agencies must require flood insurance before buying or insuring mortgages on buildings in special hazard areas. This requirement also applies to government-sponsored enterprises such as Fannie Mae and Freddie Mac.

Recipients of flood disaster aid must buy flood insurance. Since 1994, recipients of certain federal disaster assistance after a flood are required to buy and hold insurance to protect against future flood losses, under penalty of forfeiting federal disaster aid in subsequent floods.

Many homes meet one or more of these tests, but a surprising number do not. For example, one study found that 34% of coastal homes were purchased for cash, compared to 11% nationwide. In addition, many mortgages are made by state-regulated lenders or by non-bank financial institutions. Finally, a relatively low percentage of all flood-prone homes have received federal disaster assistance since the law was changed in 1994.

Further, there is considerable evidence that a sizeable portion of homes that are mandated to have flood insurance are not, in fact, insured. Surveys of the level of flood insurance actually in place come up with lower rates than is consistent with surveys of the percentage of mortgages with flood insurance at the time of issuance or renewal. Despite the statutory mandate that lenders require owners to retain flood insurance policies, it appears that the bulk of the difference relates to homeowners who cancel their flood insurance after initially complying with a commitment to hold such insurance.

Competing explanations

Experts offer a number of theories on why flood insurance participation rates are so low. The choice of which to believe is likely to have a strong influence on one's preferred answers to some key policy questions. For example, there is less impetus to reform flood insurance policy if one believes homeowners are making sensible choices about participation. Other explanations would lead one to advocate stronger mandates or incentives for purchasing insurance.

Broadly speaking, the theories fall into four camps:

- Homeowners are reacting rationally to the economics
- People make irrational choices about disaster insurance
- Ignorance and misunderstanding thwart rational decisions
- Some homeowners cannot afford the insurance.

Rational school

The rational school of thought holds that low participation rates are sensible, since the cost of insurance would exceed its value for those who choose not to participate. A risk-neutral homeowner should be indifferent between buying or refusing insurance if the rates are "actuarially fair," meaning that the value in today's dollars of expected future payments, weighted by probability, equalled the insurance premium. Economists have classically assumed that people are risk-averse and would in fact pay somewhat more than a fair price in order to lock in certainty.

The simplest explanation would be if premium rates exceeded actuarially fair prices by enough to overcome the desire for certainty. However, as discussed below, the NFIP attempts to set all premiums at or below the actuarial fair price. Some mispricing of individual risks is inevitable, but not enough to come close to explaining the low participation rates.

A more sophisticated explanation is that potential policyholders believe the government will provide large amounts of disaster aid to the uninsured. In fact, the NFIP calculates that every dollar of flood insurance allows the government to give 33 cents less in disaster aid. As a crude approximation, whatever flood insurance rate would normally be just low enough to entice a voluntary purchase would now need to be one-third lower to account for the foregone disaster aid. Any expectation of charitable aid in rebuilding would magnify this effect. There is also a tax bias at work, since uninsured flood losses are generally tax-deductible, whereas flood insurance premiums are not.

The possibility has also been raised that the NFIP might systematically underpay claims, increasing the effective premium rates for each actual dollar of coverage. However, the calculations of actuarially fair premium rates are based on historical levels of actual claims payments, which should eliminate this distortion even if payments were systematically too low.

Irrationality in decision-making

Some economists have broken with the classical assumption of rational behavior by insurance buyers. Considerable research suggests that people make a number of mistakes that would bias them again voluntary purchases of flood insurance and would encourage them to evade mandatory purchases:

- Underestimating their chances of being in a disaster
- Avoiding insurance if there has not been a recent enough prominent disaster
- Avoiding insurance with strong limits on payouts, even if the price is commensurately lower
- Giving much less weight to probabilistic analysis than would be rational.

Ignorance, misunderstanding, and poverty

Alternatively, ignorance and misunderstanding may hold down participation rates. Many homeowners seem to be unaware that ordinary homeowners' coverage will not cover flood losses. Other potential buyers misunderstand the limits on federal disaster aid after a flood. One is then left to speculate on structural reasons why mortgage lenders, insurers and their agents, and the NFIP itself may not be effective in communicating the realities. (It should be noted, however, that the NFIP has undertaken major advertising efforts in the past decade.)

Finally, poverty has been advanced as another alternative explanation. Empirical research shows that people with higher incomes are more likely to buy flood insurance. This may be counterintuitive, since the ability to afford a home implies a certain level of economic resources and one presumes a desire to protect the largest store of most homeowners' wealth. However, many homes, particularly in flood-prone rural areas, have been inherited and/or are not worth enough to warrant taking out a mortgage. Flood insurance may seem a luxury in such a situation.

Is flood insurance subsidized at current premium levels?

The subsidy issue is complex. 26% of policies are for structures in special categories that receive an explicit discount of roughly 60% off actuarially fair prices, for a total annual subsidy of about \$1.3 billion. The NFIP aims to set the remaining categories at actuarially fair prices, but the categories are broad enough that some structures will be moderately over- or under-priced. Finally, there may be an additional implicit subsidy for all categories, if the odds of future very catastrophic hurricanes are higher than was estimated for pricing purposes.

Explicit subsidies

26% of buildings covered by federal flood insurance are explicitly subsidized. When the NFIP was instituted, the legislation contained a considerable carrot designed to entice communities to embrace the desired land management standards. Structures existing prior to the publication of a community's flood hazard map (usually the same as the date of entry into the NFIP) are granted a privileged status, with premiums that average about 40% of the actuarially fair level.

This subsidy looms larger than the percentage of policies might imply. Since these structures tend to be less protected against flood risk, they suffer considerably more than their proportionate share of flood losses. An important subset of these older structures are those that have received

multiple claim payments. Approximately 50,000, or 1% of all insured buildings, account for over 30% of the claim dollars paid. Despite heavy discounts, the average premium for subsidized structures is \$710 per policy, more than double the average of \$340 a year for structures built to flood-resistant standards that are priced at actuarially fair levels.

In aggregate, subsidized policies are charged approximately \$1.3 billion a year less than actuarially fair rates. (If the \$710 average subsidized premium rate is 40% of the actuarially fair rate, this implies a discount of \$1,065 on each of the 1.2 million subsidized policies. All figures are from the NFIP's 2004 Actuarial Rate Review.)

Premium-setting

The NFIP sets premium rates in line with three major objectives. First, it tries to charge actuarially fair rates for each category of policies, except for special categories where Congress mandated that rates be subsidized. Second, it attempts to set fair subsidized rates for those special categories. Third, it tries to maintain premiums at a level sufficient to cover losses and expenses from a "historical average loss year."

The difference between "actuarially fair" and "historical average" is a major one. The NFIP recognizes that the historical period that it uses (1978 to the most recent full year) was blessedly free of what it has referred to as "very catastrophic loss years," of which Katrina will supply an extreme example. However, calculations of actuarially fair rates do take into account such potential low-probability, but very catastrophic, events. Much of the loss expectation over long periods of time for any form of catastrophe insurance comes from such events. For example, if Katrina ends up generating \$15 billion of flood losses and if such an event should have been expected in a 25 year period, then the NFIP would have needed to collect an additional \$600 million a year, if it wished to cover such an event out of premiums over that period. \$600 million would represent a 30% increase over last year's record \$2 billion of premiums and a higher percentage of historical levels.

The absence of very catastrophic floods in the historical period has allowed the NFIP to calculate the aggregate premium level for subsidized policies by starting with a target program-wide premium level needed to cover a historical average loss year and subtracting out the actuarially fair rates calculated for the non-subsidized categories. (The NFIP in recent years has actually charged a modestly higher rate for the subsidized categories in an attempt to gradually reduce the total subsidy level.)

The ability to use this formula to achieve intuitively and politically reasonable results can be viewed in one of two ways. It can be seen as a fluke that depends on having been lucky in avoiding very catastrophic floods until this year. Alternatively, it can be seen as an implicit policy statement that Congress intended to pick up the excess losses from more extreme events.

It is worth emphasizing that if the NFIP's estimates are accurate, the 74% of structures that are not explicitly subsidized, including virtually all new structures obtaining insurance, are paying their proportionate share of expected future losses, including the potential for very catastrophic events.

However, there is an additional possibility raised by Katrina. Current premium levels may all be subsidized by the use of an inherently low estimate of the actuarially fair level, as discussed next.

Arguments that “actuarially fair” levels are understated

Katrina suggests catastrophic flood risk may be higher than expected. Hurricane Katrina almost certainly will cost the flood insurance program at least \$10 billion and possibly as much as \$30 billion. A GAO report states that the administrators of the NFIP had estimated that a “thousand year event” would cost the NFIP \$5.5-6.5 billion. (A “thousand year event” is one with a one-in-a-thousand chance of occurring in that region in any given year.) The fact that Katrina appears to have cost so much more suggests that the frequency of huge losses may be higher than expected, although it could just be we were very unlucky. (Note that the one in a thousand chance applies to a given region and the NFIP covers multiple regions, meaning that a significant event of this nature will hit somewhere more frequently than every thousand calendar years. The GAO report does not indicate how many unique regions were considered.)

Insurance research suggests higher average hurricane losses in the future. Hurricanes are the largest source of flood losses, bringing both the obvious coastal flooding, but also inland flooding that results from heavy rainfall as the systems move into the interior. Unfortunately, research suggests that hurricanes will be more intense in the future, for two reasons. First, there tends to be a multi-decade cycle of high and then low hurricane activity. Most of the NFIP’s history was during the low part of a cycle. Second, many researchers believe that “global warming” will create stronger hurricanes, since warmer water on the surface of the ocean helps provide energy to create and drive more intense hurricanes.

Arguments that actuarially fair rates are reasonably estimated

Katrina could just be bad luck. It is possible that earlier estimates of the probability of a \$10-30 billion loss were accurate, but we just hit the unlucky year early. For example, a one in a thousand chance of an event happening in a given year means that, on average, we will not see such an event for 500 years. However, there is the same chance of it happening in year 1 as in year 500 as in year 999. (Unfortunately, having it happen in year 1 does not reduce the probability for year 2, so we could get unlucky again.) If all that happened is that we did get unlucky on the timing, then it would be a mistake to raise our estimates of future average losses.

Katrina’s losses may not be indicative of future losses. It is possible that human actions led to higher losses from Katrina than would be likely to happen as a result of a future very catastrophic hurricane.

Climate research could prove to be wrong. Apparent cycles in hurricane activity may be random or might result from factors that will differ in the future. Global warming-related predictions could prove to be wrong, either because warming does not proceed as predicted or because researchers misunderstand the long-term effects on weather from such a warming.

Key Policy Questions

Should the government provide flood insurance?

The federal government created the NFIP in 1968 and has reauthorized the program periodically, with the latest renewal running through 2008. The government could, in theory, move out of the business entirely at that point. There is strong support for federal flood insurance, but it is not unanimous.

Pros

Relatively few homeowners bought private flood insurance. Federal flood insurance is viewed by many as a response to a classic “market failure.” There is broad agreement that individuals and the country as a whole are better off if homeowners are insured against major risks to the value of their homes. Yet flood insurance was not widely offered by the private sector and was only purchased by a relatively small minority of homeowners in flood-prone areas prior to the advent of federal protection. We explored earlier the complex arguments as to why people choose not to buy flood insurance, all of which potentially applied to both past and future insurance provided by private companies. Some of the explanations support the view that there is a market failure.

Private insurers may not be willing to take on much flood risk, leaving the field to the federal government by default. There is evidence that private insurers were not anxious to push flood insurance as a product, partly based on the lack of good statistics and partly because the risk is concentrated so heavily in known areas around bodies of water. (Insurance works best when risk can be spread over many buyers each with relatively low probabilities of loss.) Apparently, large flood losses at private insurers in the 1920’s and again in the 1950’s discouraged the industry. This might have led to overpricing which further discouraged private purchases, although we have already noted that homeowners seem reluctant to buy even at prices that are, as a whole, subsidized.

The federal government has developed extensive technical data over the last several decades, which might allow private insurers to return to the flood insurance business, if ways could be found to bring in a sufficient diversity of policyholders. Some private insurers already actively market policies to complement federal flood insurance by covering amounts not covered in the federal policy. However, there is no clamor from private insurers for the government to step out and allow private insurers to take over the risk. This could, of course, be tested, or even encouraged, by offering private insurers and reinsurers the opportunity to bid for pieces of the NFIP’s risk. This might also allow private pricing to eventually inform federal premium-setting.

The government might absorb much of the uninsured loss. Prior to the establishment of the NFIP, the federal government was often called upon to provide emergency assistance to homeowners and businesses who were not protected against the financial costs of a flood. In the aftermath of a disaster, Congresses repeatedly chose not to leave the uninsured to the consequences of that lack of insurance. This is a key point in analyzing the federal cost: the NFIP could be cheap compared to disaster aid, depending on subsidy levels, even if it is expensive compared to a self-supporting insurance scheme that charges premiums sufficient to break even over time.

Federal flood insurance encourages flood resistant land management standards. Federal flood insurance is only available in communities that adopt land management and other mechanisms used to guide development in flood-prone areas to reduce flood risk. Further, policyholders may pay discounted premiums in communities that have met still higher standards. While it would be possible to achieve this with a private sector approach, it would be more difficult without the clout and coordinating power of the federal government.

Cons

Federal flood insurance may encourage risky development. Federal flood insurance may be priced below a break-even premium level. (See “Is flood insurance subsidized at current premium levels.”) If so, the subsidized price may lower the economic risk of development in flood-prone areas enough to significantly encourage new building there. Arguably, this is one enabling factor for the continuing movement of people to coastal areas. The East Coast of Florida, with its risk of large flood losses from hurricanes, has been suggested as one example of this phenomenon. Of course, the flood insurance program is less of a factor for very expensive houses that have a significant risk of total loss, since there is a maximum coverage level of \$250,000 for the structure itself.

However, the role of flood insurance in development may be overstated, if low voluntary participation rates are an indication of the value placed on such insurance. It is unlikely that someone who is not willing to pay for flood insurance would see its existence as an incentive to move to a new development in a flood-prone area. Further, there is evidence that the lack of federal flood insurance does not stop development in some markets. Congress prohibits federal investments, including the sale of flood insurance on new buildings, in undeveloped units of the Coastal Barrier Resource System, yet some of these areas have experienced considerable development.

The taxpayer may end up footing the bill for very large floods. As a practical and political matter, a very large flood event, such as was triggered by Katrina, is probably too large for the cost to be absorbed solely by increases in future flood insurance premiums. The existence of federal flood insurance implicitly places the residual risk on the taxpayers’ doorstep, even though the NFIP has limited explicit authority to borrow from the government and there is no legal commitment for Congress to appropriate funds to rescue the NFIP. In contrast, the larger damages from the hurricane winds will be absorbed by private sector insurers and, over time, their customers through higher premiums. If private insurance would be readily available in the absence of the NFIP, then the current system is transferring catastrophe risk to the taxpayer. This argument is less significant if one believes that participation rates for private insurance would be low, since additional federal disaster grants might end up filling the gap.

Federal premiums may not sufficiently reflect risk differentials. It can be difficult for a government program to provide the same pricing nuances that private insurance might. If so, this can encourage risky development or unnecessarily discourage sensible development by pricing very high risk and merely high risk buildings the same. Regulators permitting, private insurers would have more incentive to differentiate within large categories. However, insurance agents who write and service NFIP policies already complain strongly that the coverage is extremely complex because so many variables must be taken into consideration. More nuanced underwriting would increase complexity still further.

Should homeowners be required to buy flood insurance?

Many homeowners have a free choice as to whether to buy flood insurance, although there are circumstances where purchase is mandatory, as discussed above. This regime helped lead to a relatively low rate of participation that has come back to haunt many homeowners who fell victim to Katrina-related flooding. A major policy question is whether the federal government should tackle this problem through stronger purchase requirements.

Pros

Federal disaster aid costs should be lower. In practice, the federal government generally pays more disaster aid to assist someone who has suffered substantial uninsured flood losses than to a homeowner with flood insurance, even if the flood victim did not purchase or retain required insurance. Insuring all homeowners in flood-prone areas would therefore reduce federal disaster aid costs.

Premium income would offset federal flood losses, at least in part. Even if one viewed federal flood payments as a dollar for dollar substitute for disaster aid, federal costs would still be reduced by the receipt of premiums from flood insurance policyholders.

Arguably, insurance premiums are a fairer way of spreading costs than taxpayer funded disaster aid. Federal disaster aid grants are funded by taxpayers across the country, not just those in catastrophe-prone areas who might stand a reasonable chance of benefitting from disaster aid someday. Flood insurance premiums are paid by those at risk and are at least partially weighted by the level of that risk.

Cons

Total federal costs could conceivably be higher. Federal costs would actually rise if the subsidy level for new flood insurance policies exceeded the amount of federal disaster aid that was saved. Disaster aid grants are much lower than the amount that flood insurance would pay - the NFIP website states that for every three dollars of flood insurance claims paid, disaster aid payments are reduced by one dollar. Thus, if the average subsidy level for the flood policies were greater than 33%, the subsidy cost of signing up additional policyholders would actually outweigh the savings in disaster aid.

Arguably, taxpayer funding is a fairer way of spreading catastrophe costs. There is an argument that we all live in one country and should stand with each other against all the contingencies that we face as a nation, whether natural disasters, terrorist attacks, economic downturns, war, or anything else. From this viewpoint, trying to track potential catastrophe dollars is not the fairest way to allocate costs.

Mandatory insurance is difficult to enforce. There already appears to be a significant non-compliance problem related to homeowners who never buy the required insurance or who let it lapse, despite requirements that lenders force insurance purchase and retention. For comparison, states with mandatory auto insurance coverage combined with expensive insurance, have often seen non-compliance rates as high as 30%, even with police and highway patrol officers actively working to enforce the law. It is likely that some people would slip through the cracks no matter what enforcement mechanism was chosen. (Such mechanisms could include

forced coverage in connection with any mortgage, collection of premiums along with property taxes, or mandatory inclusion with homeowners' insurance.)

Mandatory insurance may be unfair to poorer people in flood zones. Mandatory coverage could significantly add to the living expenses of some people, if there is minimal or no subsidy of the insurance rates. This is a larger issue in places like New Orleans, where many residents have a strong, multi-generational attachment to the location and where there is a dearth of nearby residences that are both cheap and not at major risk of flooding. This would not just affect homeowners, since landlords who purchase flood insurance would be likely to pass along as much of the increased cost as possible.

Should there be subsidies?

Stepping back from current arrangements, there are arguments both for and against designing subsidies into the system.

Pros

Subsidies on grandfathered structures were part of the original deal. It would arguably be unfair to change the rules at this point for the original structures, which currently are 26% of the NFIP policy base. It is less clear whether the degree of subsidy could reasonably be changed or whether certain actions could be required that would reduce flood risk. On the other hand, it has been 37 years since the system was put in place, which might be viewed as sufficient time to adjust, especially if such subsidies were phased out gradually. (It is interesting to note that the 1966 HUD study that formed the basis for the NFIP assumed subsidies for old structures would vanish within 25 years, as homes were rebuilt.) Partly because of the passage of so much time, the NFIP has tried to gradually raise subsidized premium levels closer to actuarially fair rates.

Subsidies are a carrot that lures communities and homeowners into the system.

Communities might choose not to adopt the flood hazard maps and land management rules and homeowners might not buy flood insurance if there were not an element of subsidy. This is probably a greater issue for individuals than communities, since many individuals already evade a legal requirement to have flood insurance. Communities as a whole are more likely to observe that the land management requirements are essentially for their own good, as well as allowing entry into the NFIP. (This extends beyond concern for their citizens. A community's failure to manage a known flood hazard has been cause for liability suits in the past.)

Arguably, taxpayer financing, such as through subsidies, is the fairest way of spreading catastrophe costs. See the arguments under "Should homeowners be required to buy flood insurance?"

Cons

On the other hand, premiums may be the fairest way of spreading catastrophe costs. (See above.) Subsidies weaken the role of premiums in allocating costs and substitute taxpayer financing for a portion of the losses.

Subsidies could encourage development in risky areas. (See arguments under “Should the federal government provide flood insurance?”) Economists have long known that financial incentives, such as below-market insurance, can be powerful motivational factors. If the total cost of building and insuring development in flood-prone areas is lower, then there will be more such development than there would otherwise be.

There may be better uses for taxpayer money. There are many projects clamoring for federal money. Flood insurance subsidies need to be measured against other uses of those funds.

Coastal development could increase the absolute cost of subsidies. Our coasts continue a steady trend of new, and more expensive, development. If a subsidy were built into premium levels for new structures, this would generate a higher absolute dollar cost as more value came to be insured. Existing caps on total flood insurance coverage per structure somewhat reduce the effect of expensive developments, but payments for partial losses would still mount more quickly than is likely in cheaper developments.

Should new development or rebuilding be limited or restricted?

The flood insurance program already places limits on development and rebuilding in flood plains. In communities that participate in the NFIP, new construction as well as rebuilding in mapped flood hazard areas is regulated by local floodplain management and land use regulations. The NFIP does not prohibit floodplain construction (except seaward of mean high tide), but it establishes minimum construction standards. The most obvious standards are that new buildings must be elevated to or above the predicted 100-year flood level and foundations must be designed to resist flood loads. The most stringent construction requirements are imposed in high risk areas along coastlines that experience wave action.

Buildings that are improved or repaired after damage must be brought into compliance with standards for resistance to flood damage, if the repair or improvement costs 50% or more of the market value of the building. Generally this means that the building must be raised above the ground to meet the flood elevation requirement. Buildings that sustain major structural damage are usually demolished, clearing the way for new homes. Importantly, homes that have federal flood insurance may qualify for additional claim payments of up to \$30,000, called Increased Cost of Compliance, which is designed to help pay the higher costs of bringing the building into compliance with these standards.

Some have suggested that the problem of excessive and risky development in flood-prone areas, particularly coastal regions, is so severe that the federal government should take stronger steps to curb it. As touched on above, federal investment is prohibited already in some coastal barrier island areas.

This argument extends well beyond flood insurance, but still seems to merit discussion here. (The issue is also more than a federal one. Many argue that state insurance regulators limit the ability of private insurers to charge beachfront properties their full economic cost for insurance against windstorms.)

Pros

Federal disaster costs could be lowered. Explicit disaster aid, along with federal flood insurance subsidies, can mount to very large levels, as demonstrated in the wake of Katrina. In Katrina's case, the losses in New Orleans do not appear significantly related to new development, although other areas of the Gulf region appear to be a different matter. In any case, the next catastrophic flood loss could easily be on the beaches of Florida, where, it is argued, developments are being built that are not wise, given the risks. (Proponents of curbs argue that wind- and flood-resistance provisions of existing State building codes are insufficient.)

Homeowners and businesses might be better off as well. This argument relies on the assumption that decisionmakers can be short-sighted or misinformed when they choose to live or operate their businesses in locations with a major risk of eventual catastrophe damage.

There could be environmental benefits. Many environmentalists already oppose much of the development in some flood-prone areas for non-economic reasons, such as adverse impacts on sensitive habitats and wetlands. This topic is too large to do justice to it here.

Cons

America generally lets people make their own choices. Arguably, if people have the necessary information about catastrophe risks and if explicit and implicit subsidies are minimized or eliminated, then they should have the right to make decisions about their own willingness to take risks. Some people value proximity to water enough to take risks that others would not.

Federal costs may not be large in relation to the private gains from development. Even \$100 billion might not be a large loss in comparison with the total value of real estate in loss-prone areas. If homeowners are even 10% happier to be living on the beach in Florida, rather than in a safer inland location, the extra value their real estate brings them may dwarf the federal costs. In this regard, it would be important to look at the marginal federal costs of the extra development versus the marginal private gain. The tail should not wag the dog.

Lesser measures might work well, with fewer disadvantages. Outright restrictions on new development would generally not make sense if less restrictive actions would achieve the same goals. Communities already impose damage-resistance measures through land management rules and building codes. Further development restrictions could include taking away any implicit or explicit federal subsidies, or even tacking on a surcharge, or could consist of requiring lesser risk reduction measures, such as are addressed in the next section.

Restrictions could be unfair unless exceptions were made for historic localities. New Orleans may represent the strongest case for this argument. Its growth long preceded the institution of federal flood insurance and both locals and the rest of the nation place a high value on its unique historic character. U.S. taxpayers, or other flood insurance buyers, might be willing to bear somewhat higher costs to avoid forcing major changes to this city. Of course, they might choose instead to financially support major risk reduction measures, likely involving big public works projects.

Similarly, restrictions could be unfair to poor people. Again, New Orleans may present the strongest case for this point, since so many of the victims of Katrina were poor. It may be that the only realistic options that would be safer for them and still affordable would require them to uproot their lives and move a considerable distance away, given the paucity of high ground. Even if one argues that this would be for their own good, forcing this exodus may not be acceptable to the public.

Strong restrictions are least palatable when applied to rebuilding. Public opinion is almost certainly more supportive of rebuilding flood-damaged areas than of new development in flood plains. There is a natural tendency to want to allow people's lives to be restored to an approximation of what they were, which overcomes some concerns about exposure to future flood risk. This does not rule out other risk reduction techniques. Indeed, communities apply the requirements of their floodplain management and land use regulations to repairs and rebuilding, which must meet the NFIP minimum requirements under certain circumstances. Further, the flood insurance program already supports a small grant program that helps people to elevate their buildings or move away from the riskiest locations. (A much larger source of funds for mitigation grants to communities is the post-disaster Hazard Mitigation Grant Program administered by FEMA.) However, these mitigation measures have not been applied on a large scale within a city, as opposed to isolated structures, small neighborhoods, or a small town.

Should the government require other risk reduction measures?

The NFIP already requires that certain buildings that have sustained significant flood damage be repaired with specific risk reduction measures. In addition, as reflected in the Flood Insurance Reform Act of 2005, there appears to be a general consensus that homeowners who knowingly impose major risks on the flood insurance program, such as those due to multiple losses, should either take actions to ameliorate the risk or should start bearing the true cost of the insurance. In exchange, the NFIP and local governments may be willing to bear much of the cost of the actions, if they are determined to be cost-effective and in the best interests of the NFIP. Unfortunately, there is not room here to discuss the intricacies of risk reduction measures and the financial implications for the NFIP.

Is the current division of public and private roles appropriate?

If we assume there should be a federal flood insurance program, there remains a question as to whether the current allocation of responsibilities between the public and private sector is the optimal one. We will touch only briefly on these more technical issues, which merit a separate analysis.

The main public roles at present are in structuring the insurance policies, establishing the pricing rules, publicizing the program, and bearing the ultimate cost. These four functions are central to any insurer, so it is unlikely that the private sector could do more than provide consulting services without the risk of compromising the federal insurance mission.

On the other hand, it is theoretically possible to transfer some of the private sector roles into the NFIP. There seems to be little impetus to take on the back-office functions provided by the insurers, who have the advantage of economies of scale with their other insurance activities. Marketing of flood insurance is a trickier issue. There is a real advantage in having flood

insurance brought up by the insurance industry in conjunction with the sale of homeowners' policies. However, the current participation rates are unsatisfactory, suggesting the possible need to alter the marketing approach, which could involve a larger or different federal role. Another alternative would be to increase the financial incentives to market the policies, although private insurers already receive approximately a third of flood insurance premiums for their various roles, including marketing.

It would also be possible to restructure the relationship more completely. The idea has been raised of a federal mandate that would eliminate the exclusion of flood insurance from homeowners' policies, in combination with a federal reinsurance program that would bring the financial risk onto the government's shoulders.

It would be important to coordinate this with the management of flood hazard areas at the local level. FEMA believes that the current coordination of the NFIP and local floodplain management avoids over \$1 billion in damage each year. Although private insurers support risk reduction in regards to fire and other types of policies, there might not be a comparable private effort to reduce flood risks for individual buildings.

Finally, it was noted earlier that the federal government could pay insurers or reinsurers to take over chunks of its flood insurance risk. This would still allow the government to control the flood insurance program, but would begin bringing private insurers back into the risk-taking side of the flood insurance business. In addition to creating greater certainty of cost for the government, it would bring additional pricing information that might prove useful in setting rates. The principal disadvantage to the government would be if private pricing were significantly higher than the expected cost of retaining the risk.