Insuring Against Catastrophes

The Lessons from Katrina

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Luckily, not many storms are as destructive as Katrina. Since 1990, only Hurricane Andrew approaches it in the value of property damage, which was less than half that of Katrina in 2005 dollars. The attacks of September 11, 2001, did a comparable amount of property damage, but cost far more lives.

That such catastrophes are extremely rare does not necessarily mean another will not occur in the not-too-distant future. In the 1920s, a category 5 hurricane hit downtown Miami. If such a storm were to occur today, the property damage would far exceed that of Katrina. And one cannot rule out severe earthquakes or another terrorist attack.

Katrina spectacularly exposed widespread weaknesses in the public policy response to catastrophes, weaknesses that afflicted everything from the humanitarian response to the operation of the flood insurance program. This article focuses on the conceptual issues involved in insuring against major catastrophes and the practical problems involved in developing a coherent strategy.

Public Insurance

The federal government provides many insurance programs. In some cases, it would seem that the insurance could be provided equally well by private markets. For example, is FHA mortgage insurance, originally established to prove the feasibility of long-term, fixed-rate mortgages, necessary now that a private mortgage insurance market flourishes?

In other cases, government acts to protect society against free riders. For example, government compels people to pay taxes earmarked for Social Security and Medicare. In return, participants are given retirement benefits and health care in old age, along with income in the event of disability. In the absence of such programs, a part of the population (probably only a small part) might behave irresponsibly. They might not save for retirement or buy private insurance to cover health or disability costs, hoping to rely on the government’s other safety net programs and live at the expense of other taxpayers. Of course, Social Security and Medicare have other goals and are redistributive to some extent, although the exact amount of the redistribution is a matter of some controversy.

Government also steps in because private insurance markets cannot cope with certain types of risk. This happens most often when the probability of a catastrophic event is extremely low, but if the event does occur, the costs are extremely high. The federal government thus insures against nuclear plant meltdowns, terrorism, and floods.

Private insurance companies face a number of problems dealing with low-probability, high-cost events. First, the cost of the event may far exceed the resources of any individual insurance company, even one backed by reinsurance. Second, when an event is extremely rare, it becomes very difficult to estimate the probability of it occurring within a particular time period. Third, even when the probability of a catastrophe occurring in any one year is known with some confidence, a disaster occurring early in an insurance program’s history, before reserves have accumulated, can have serious financial consequences even if the premium is appropriate for the long run. For
all these reasons, it is difficult to set premiums high enough to protect a company against reasonable risks, but low enough to attract customers.

For example, assume that we have reliable weather records for the past 200 years showing that two category 5 storms had hit a certain portion of the Gulf Coast. Actually, there is some doubt regarding the accuracy of records that old, and some would say that our understanding of storms was quite primitive until the advent of weather satellites. Consequently, the following discussion probably understates the problems facing private insurance markets.

A sample of 200 years is really quite small. Having observed two storms in that time period, it would be dangerous to leap to the conclusion that the probability of such a storm occurring in any one year is one percent. Moreover, the probability may not be constant over time. Many weather experts believe that there are long cycles in the frequency and severity of hurricanes, and the risk for the next 30 years may be different from the risk for the previous 30 years. In addition, the risks are asymmetrical. We know that the probability of a storm occurring in any one year is not zero, because we have observed two storms. If the true probability of a storm in any one year is 2 percent, the chance that we would observe two storms or fewer in a 200-year period is almost 25 percent. If the true probability is 3 percent, the chance of having observed 2 storms or fewer over 200 years is still almost 6 percent. Admittedly, the probability is small but the possibility cannot be ignored when expected damages would triple compared to assuming that the true probability is 1 percent. But even if the true probability is 1 percent, we do not know when storms are going to occur. The probability that one will occur in the first five years of a policy’s life is almost 5 percent. The probability that two will occur within 30 years is 3.3 percent. Consequently, there is a significant probability that a storm will occur early in the life of a policy (that is, before a private insurer will have accumulated sufficient reserves to cover resultant losses). More generally, there is a high probability that a private company will make a big mistake in setting premiums. If the company’s perception of risk tends to be greater than the public’s, they will not sell many policies. If they set the premium too low, the results can be financially devastating.

Government is in a much better position to take risks of this type. It has enormous borrowing power and it can spread the risks over the entire population. However, there is no reason to believe that government has any special knowledge of risks that is not available to the private sector. Therefore, there is a high probability that the government will make mistakes that lead to large financial losses.

Private market failure is not the only reason that government intervenes in insurance markets for low-probability, high-cost events. There is also a desire to protect society against free riders. Government tends to respond generously with disaster assistance when an area is hit by a natural or man-made catastrophe. This has an unfortunate side effect. Those living in risky areas may decide not to buy insurance, because they know the probability is high that government will help them if a disaster strikes. Government often responds with a combination of subsidies and mandates to encourage or force the purchase of insurance, to save on future disaster assistance.

The following review of government programs will, however, show clearly that the government’s approach lacks consistency. Each program has been designed as though the experience of older government programs has nothing to teach us about designing newer programs more effectively.

Although the government may have a conceptual advantage in dealing with certain types of risk and with free riders, that advantage can be eroded by political constraints and bureaucratic inertia. The National Flood Insurance Program presents a perfect example of good intentions gone awry.

**Flood Insurance**

The National Flood Insurance Program (NFIP) was created in 1968. Operated by the Federal Emergency Management Agency, its main goal is to limit the government’s need to provide emergency assistance to inhabitants of flooded areas. First, the risk is limited by requiring communities to develop plans that restrict new building in the most vulnerable areas. Subsidized flood insurance is, however, available on old buildings in such areas. Second, for less-risky areas that still face some danger, flood insurance is usually required when the dwelling or business is assisted by the federal government. Federal
assistance could include having an FHA mortgage or a mortgage from a federally regulated financial institution. Premiums depend on the degree of risk faced by a structure, and coverage can be as high as $350,000.²

The program has had a positive cash flow in some years and a negative cash flow in others. It has borrowing authority from the U.S. Treasury. Prior to the early 1980s, the program ran a deficit. The Congress eventually forgave the debt owed the Treasury, NFIP was reformed, and ever since—until Katrina—it has been able to repay any sums borrowed with interest even though the program explicitly subsidizes many policies. That is because the number of hurricanes has been unusually low in recent decades. This has not, however, enabled the program to build reserves sufficient to cover a catastrophic year.

The subsidy for those not required to have policies is estimated at 60 percent on average, but this must be regarded as a crude estimate because of the difficulty of estimating potential losses. The Congressional Budget Office estimates the annual cost of the subsidy at $1.3 billion (CBO 2006). By comparison, Katrina-related losses are expected to exceed $20 billion.

The most significant problem faced by NFIP is that very few people living in flood-prone areas buy policies, even among the many who are required to buy flood insurance. Compliance is reasonably high when mortgage loans are originated, but many homeowners apparently drop their policies as time passes. The exact amount of noncompliance is a matter of great controversy, with lenders having much lower estimates than FEMA (GAO 2002). Nevertheless, noncompliance is a serious problem. Participation rates are also low for those not required to buy insurance, even though such policies are heavily subsidized.

Why wouldn’t homeowners want to protect themselves against the risk of floods with actuarially fair or subsidized policies? First, considerable evidence shows that people underestimate the risk of living in flood-prone areas (Browne and Hoyt 2000). Second, people know that federal disaster assistance will probably cover a considerable portion of their uninsured losses.

Although the NFIP clearly is not working with utmost efficiency, it is not without benefits. The Clinton administration estimated that every $3 in claims paid by the program saves $1 in disaster assistance. The Bush administration has questioned this figure, but has not provided an alternative estimate. The Congressional Budget Office estimates that actuarily fair premiums would bring in $3.3 billion per year. Not considering administrative costs, this presumably implies that $3.3 billion in claims would be paid out per year on average over the long run. That, in turn, implies a saving in disaster assistance of $1.1 billion per year, taking the Clinton administration’s estimates at face value. In addition, FEMA claims that the community planning that accompanies the program reduces flood damage by $1 billion per year.

At first sight, these numbers make NFIP look like a pretty good deal. A subsidy of $1.3 billion per year buys benefits worth $2.1 billion. Does that mean the government should spend more on the program? Two possible options might be combined. First, subsidies could be offered to those required to buy flood insurance in the hope that this would improve participation, and subsidies could be increased for those not required to be insured. Second, more could be spent enforcing the rules.

Unfortunately, we do not have the knowledge necessary to carefully evaluate these options. Even if each dollar of claims paid now saves an average of 33 cents in disaster assistance, it does not mean that adding to claims paid by expanding coverage would still save that average amount. Returns may diminish rapidly. Second, it is not known for sure how much coverage could be expanded by spending an extra dollar subsidizing premiums or enforcing the law.

The Congressional Budget Office, while admitting great uncertainty regarding the responsiveness of the demand for coverage to changes in the subsidy, chooses to rely on estimates by Browne and Hoyt (2000). These imply a 10 percent reduction in premiums would increase the demand for the number of policies by 1.1 percent and the amount of coverage by 10 percent. A 10 percent reduction in premiums would require increasing the subsidy by $200 million, or by 15 percent. If we bravely assume that a 10 percent increase in coverage would increase claims on average by 10 percent, or $330 million, and that each dollar of additional claims saves 33 cents of disaster assistance, then $110 million would be saved. Presuming that the amount of flood damage mitigation would not change, $200 million in additional subsidies would clearly not be worth it, judged purely on economic grounds.
How then, could it be argued that the current flood insurance program more than pays for itself? It may seem to, if we just look at average cash flows. When we do, there is an implicit assumption that no one would participate if not for the subsidy. That is clearly false. The analysis, albeit based on very shaky assumptions, so far suggests that the pure economic argument for reducing the subsidy may be more powerful than the argument for increasing it.

To my knowledge, there is no data on how much coverage could be increased by spending more on enforcement. The first step in such analysis is to improve our data on noncompliance. The General Accounting Office (2002) was reluctant to make a numerical estimate based on their analysis, although their samples in flood-prone areas suggest a low level of compliance. For example, in 1990, they found that 79 percent of victims of a major Texas flood who were “required” to purchase flood insurance were not, in fact, insured.

Another approach to making NFIP work more effectively would be to absolutely deny any disaster assistance to families who were required to participate in the program, but did not. However, the nation could not likely be that hard hearted. Inevitably, the country reacts with great compassion whenever an area is hard hit by a natural disaster. It is not seen as a time to punish people further. Moreover, relatively poor people would be the ones punished the most. Browne and Hoyt (2000) show that the demand for flood insurance is quite sensitive to income.

We are left with a dilemma. We are probably over-subsidizing the flood insurance program, judged on purely economic grounds, and still, participation is very low. But should the program be judged on purely economic grounds? There is an issue of fairness. If there were no program, outlays on disaster assistance, financed by the general taxpayer, would be higher. The nation as a whole would be subsidizing people to live in risky locations to an even greater extent than it is now. To eliminate disaster assistance would never be politically practical, so the choice is not whether or not to subsidize. Some subsidy will be paid, and in choosing the nature of the subsidy, the tradeoff is between efficiency and fairness. The current approach at least gets some of the inhabitants of risky locations to pick up some of the cost of disasters in advance. That seems fairer than an approach depending entirely on disaster assistance. Put another way, we might regard the subsidy to flood insurance as a bribe to wean people from another, less-fair subsidy—disaster assistance.

Providing this justification for a subsidy is a long way from saying that the current subsidy has been designed in the most effective way possible. Perhaps, a greater portion of the total subsidy should be devoted to those now required to buy insurance. It would also seem reasonable to devote more resources to enforcing the rules. No matter what we do, making up for Katrina’s cost of more than $20 billion by increasing premiums over the long run is impractical. Even if the cost were spread over 20 years, the required premium increase would have to exceed 50 percent by a significant amount to cover both Katrina’s cost and accumulated interest. Coverage would be likely to decline significantly, even with greater enforcement. The future costs of disaster assistance would increase accordingly.

If the government decides that some subsidy is warranted, how should it be incorporated into the federal budget? Today, NFIP is recorded in the budget on a cash basis. The net cash flow is erratic and can change from positive to negative and back from year to year. Examining the net cash flow over a limited number of years provides absolutely no useful information to policymakers on how much the program might cost over the very long run.

In the past, the Congress faced a similar problem regarding direct lending and guaranteed loan programs and decided in 1990 to record the subsidy cost of such programs on a present value basis, so that they could be compared more easily. The estimating techniques have some flaws, but everyone agrees that the present value approach is a vast improvement over the cash flow approach.

The same approach could be adopted for government insurance programs. True, as stated above, government often intervenes in the insurance market because the private sector has difficulty assessing the risk associated with low-probability events, which makes estimating the subsidy extremely difficult for analysts. But a rough guess would be better than none at all.

In my view, the accounting approach taken toward direct loans and guarantees includes one mistake. It created an off-budget financing account that finances the cash flows associated with credit programs. An automatic appropriation replenishes the account if it runs a deficit. This deficit could materialize if analysts are too
optimistic and persistently understate the value of subsidies. If accounting for insurance programs is reformed, I suggest the Congress appropriate subsidies provided by particular agencies on a present value basis but keep an aggregate financing account on budget, so that cash flows affect the official measure of the deficit. I also suggest the Congress explicitly appropriate any funds required to make up a deficit in the financing accounts, so that it would be more apparent if analysts were persistently being too optimistic.

Insurance against Terrorism

In response to the attacks of September 11, 2001, private reinsurance companies withdrew from providing insurance against acts of terrorism. The $30 to $40 billion in losses were too much for them to bear. On the other side of the market, those financing developments in high-risk areas were reluctant to proceed without terrorism insurance. The Bush administration and the Congress responded by enacting the Terrorism Risk Insurance Act in 2002. The Act, which subsidizes private insurance against terrorism, was renewed for a two-year period in December 2005.

The Terrorism Risk Insurance Act is administered differently from flood insurance. The latter is a wholly government program. The government contracts with a limited number of private insurance companies to run the program, but the government is fully liable for losses. In contrast, the government subsidizes private companies to offer terrorism insurance by sharing only a portion of the losses that result. The program is limited in what it covers: only business losses, not losses of life and medical costs. Terrorist attacks involving nuclear, biological, chemical, or radiological weapons are also not covered unless those risks are covered in the private insurance companies’ basic policy—and that is extremely rare. Domestic terrorism, which I would define as terrorist acts carried out by U.S. citizens, is also excluded from coverage. The government will step in only if aggregate losses to all insurers exceed $50 million in 2006 and $100 million in 2007. In 2006, individual insurance companies will then face a deductible of 17.5 percent of the previous year’s premiums from selling terrorism insurance. The deductible rises to 20 percent in 2007. After the deductible, the federal government pays 90 percent of losses until aggregate losses exceed $100 billion. After that point, the Congress must act before additional losses can be covered. If losses are less than $25 billion in 2006 and $27.5 billion in 2007, the Treasury is supposed to recoup federal costs by levying a 3 percent surcharge on premiums. There is still a subsidy, because the Treasury does not recoup interest costs. The Secretary of the Treasury has the authority to recoup up to 100 percent of higher noninterest losses up to $100 billion.

While it is compulsory for private insurance companies to offer terrorism insurance, it is not compulsory for anyone to buy it. In that way, the Terrorism Risk Insurance Act differs from flood insurance. However, the subsidy and the risk of doing business without terrorism insurance do create a ready market.

Above, we described the difficulty of estimating the risk of severe flooding, and, therefore, of estimating the value of the government subsidy. This problem is compounded many times in the case of terrorism insurance. With flood insurance, the historical record provides some basis for judging risk, even though any estimate is unreliable. With terrorism, there is almost no basis for judging the probability of an attack or estimating the resulting losses. The problem is further complicated because so much discretion is given the Secretary of the Treasury and the Congress; it is not at all clear how much subsidy the government would provide under current policy in case of a major attack.

The Secretary of the Treasury may recoup 2007 losses above $27.5 billion based on his or her judgment as to whether certain criteria are satisfied, but it is possible that the Secretary would not act, and government would absorb the loss. Similarly, the Congress may decide to compensate some portion of losses over $100 billion, but it may not.

If, as was advocated in the case of flood insurance, budgeting for this program were based on the present value of the subsidy, budget analysts would be hard pressed to make a reasonable estimate of that amount. Defining the government’s exposure less ambiguously would not fully solve the problem, but it would help. It would also give the private insurance industry and potential buyers a better basis on which to judge the program. For example, an explicit schedule could be adopted for recouping losses above the 2006 and 2007 thresholds of $25 and $27.5 billion, and losses above $100 billion—seemingly a highly unlikely event—might be fully covered. If the program were more clearly defined, there
would be a strong case for budgeting on a present value basis, despite the extreme difficulty of estimating potential losses. As with flood insurance, annual cash flows provide no useful information.

That the program usually excludes damage from nuclear, biological, chemical, or radiological attacks seems odd. Similarly, why domestic terrorism should be excluded is not clear. If those events were covered, the Congress could compensate for the increased expected cost by increasing the level of aggregate losses—now $100 million in 2007—at which the government steps in and by levying a premium before the fact (as opposed to levying a premium surcharge after paying for damages).

The most fundamental question is whether terrorism insurance should be subsidized at all. It is a classic case in which government intervention is justified because of market failure in the insurance industry. But when government intervenes to address a market failure there is not necessarily a prima facie case for subsidizing that intervention. This issue will be explored further in the last section of the paper.

Earthquake Insurance

The federal government does not provide earthquake insurance, but the state of California does. The state requires that earthquake insurance be offered with homeowner policies; after the Northridge earthquake of 1994, 93 percent of insurers restricted or eliminated sales of such policies. The California legislature responded to the resulting insurance crisis by creating the California Earthquake Authority (CEA). Private insurers now have the choice of providing their own earthquake insurance or that offered by the CEA.

The rules for CEA insurance vary by type of dwelling (e.g., house, mobile home, or condo) and by whether the insured is an owner or a renter. There is typically a deductible of 15 percent of coverage, but structural damage must equal the deductible before anything is paid for loss of contents or personal property. The amount of earthquake coverage for the structure equals the amount of homeowner’s coverage provided by the private company.

The premium depends on earthquake risk, which is said to be determined using “computer modeling and actuarial analysis.” No subsidy is implied. Currently, $7.2 billion is available to pay claims from premiums, reserves, and reinsurance. CEA scientists say that the probability that claims will exceed this amount is extremely low, and the amount available to pay claims is expected to rise rapidly over time. But if claims do outstrip CEA’s total resources, they will be paid only on a pro-rated basis. The CEA is not allowed to draw on the general budget of the state of California.

Not many Californians decide to buy earthquake insurance. In 2002, less than 15 percent of those with regular insurance policies on their residences participated in the earthquake program. One would guess that potential Californian earthquake victims are similar to potential flood victims, in that they underestimate either the degree of risk or the amount of damage they would suffer in the event of a disaster. In addition, many must think that the federal government or the state would provide disaster assistance. Indeed in all likelihood, the state would not stand by its intention to prorate compensation for losses in excess of CEA resources.

Policy Implications

This paper has examined three types of government insurance that operate very differently. In summary, flood insurance for both homes and businesses is operated directly by the federal government. It is subsidized and mandated for new structures in risky areas, but requirements are not well enforced. Terrorism insurance, covering businesses only, subsidizes insurance companies by sharing their potential losses. It is not required by law, but market forces encourage its purchase in vulnerable areas. The expected value of the subsidy depends partly on the discretion of the Secretary of the Treasury and the Congress, and is therefore quite uncertain. Earthquake insurance, covering homes only, is provided by the state of California on an unsubsidized basis. It is not required and not that many homeowners buy it. By law, it is not required to cover losses in excess of its resources, which makes the protection offered somewhat uncertain. However, the state claims that the probability of such an event is extremely low.

How should federal government insurance be reformed? Litan (2005) suggests a three-tier model for all catastrophic insurance. In the first tier, individuals would be required to cover small losses through deductibles and limited copayments; private and state insurance and reinsurance would cover moderate losses in a second tier; and in the third, the federal government would cover extremely large losses that would otherwise drive private insurers from the marketplace. Considerable empirical evidence is available to help draw the line between “moderate” and “extremely large” losses. For instance, we can examine the size of losses in past catastrophes, such as Hurricane Andrew and the Northridge earthquake, that stopped private insurers from offering policies.

Should government intervene in this manner for individuals, businesses, or both? Obviously, it should only intervene in markets showing clear evidence of market failure. Should life and health insurance be provided, or just insurance against property damage? The answer is the same. It depends on whether the market has failed in these areas. As noted in the discussion of terrorism insurance, it does, however, seem odd to include some acts of terrorism but exclude others, such as domestic terrorism or nuclear, biological, chemical, and radiological attacks.

When government charges for an insurance program, it can take two approaches to collecting fees: the banking approach and the insurance approach (COFFI 2005b). With the banking approach, government losses would be recouped after the fact by levying a premium designed for this purpose, much in the manner that losses under $25 billion or $27.5 billion are recouped in the current terrorism insurance program. Interest costs would have to be recouped as well if
government were to avoid paying a subsidy. In the insurance approach, a fair insurance premium is levied starting when the customer buys the policy. In other words, customers cover losses in advance.

Because of the difficulty in estimating what a “fair” premium would be, recouping losses with interest after the fact holds some practical advantage. Over time, the premium used to recoup losses could be adjusted for experience, but the premium would not necessarily gravitate toward a “fair” level over the long run. On the other hand, when charging a premium in advance and accumulating a reserve, the premium can be designed to encourage the insured to mitigate risks of damage. Discounts can be provided to those taking extra precautions, such as strengthening their buildings.

A mixed approach may provide a good compromise. A premium could be levied near the lower end of a range of estimates of an actuarially appropriate rate. This would encourage more participation than a higher rate. If actual losses were to exceed premium revenues plus administrative costs, a surcharge could be applied to premiums to recoup the losses, plus interest, retroactively.

Government programs can be mandated or not mandated, and subsidized or unsubsidized whether mandated or not. On whether programs should be subsidized, Litan (2005) differentiates terrorist attacks from natural catastrophes. He argues that a terrorist attack is an attack on the nation as a whole and therefore, all taxpayers have some obligation to compensate victims either indirectly through subsidizing insurance or directly through disaster assistance. He does not think that all taxpayers have the same obligation toward victims of natural disasters.

But the nation has shown again and again that it has great compassion for victims of natural disasters, and politicians behave as though the taxpayers they represent all want to help. Indeed, disaster assistance has been so generous that the nation has subjected itself to considerable moral hazard, as disaster assistance has encouraged people to locate in risky areas.

The creation of insurance programs has had little effect on the political desire to provide disaster assistance.

We can be hard headed and argue that leaving the general taxpayer exposed to moral hazard is dishonorable, and that those living in risky areas should be mandated to buy risk-adjusted, unsubsidized catastrophe insurance. But this argument has both political and practical shortcomings. Politically, we have to accept that politicians will provide disaster assistance in response to major natural or man-made catastrophes, regardless of the existence of insurance. This, along with a natural human tendency to underestimate risk, makes selling voluntary, unsubsidized insurance difficult. It may seem appropriate to counter this problem with mandates, but those are practically difficult to enforce.

That is not to say that there is no place whatsoever for mandates. They may be appropriate in particularly risky areas. But if mandates are imposed, they must be enforced more seriously than in the flood insurance program. Enforcement will be easier if the mandated policy receives a subsidy. Similarly, a subsidy will increase coverage when policies are not mandated.

In the end, doing away with disaster assistance entirely is impractical and relying on it as the sole response to natural and man-made catastrophes is unfair. Some sort of modestly subsidized government catastrophe insurance would seem to be a reasonable compromise.

Notes
1. A more detailed description of the federal flood insurance program’s main features can be found in COFFI (2005a).
2. Because many subsidized buildings are in highly risky areas, their premiums net of the subsidy often exceed those for unsubsidized buildings.
3. Kunreuther, Pauly, and Russell (2004) do not believe that people underestimate the probability of a catastrophic event as much as they underestimate the amount of damage done by the event. Either way, they will be reluctant to buy insurance.
4. The vast majority of eligible communities now participate. An increase in the subsidy may induce a few more nonparticipating communities to join, but it would be unlikely to change the amounts saved through mitigation by very much.
5. The present value approach estimates cash flows associated with a program over time and discounts future flows to take account of the fact that money received in the future is worth less than money received immediately. Needless to say, the choice of a discount rate is very important to the calculation and is, therefore, often controversial.

References

CBO. See Congressional Budget Office.


COFFI. See Center on Federal Financial Institutions.


GAO. See U.S. General Accounting Office.


About the Author

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In Hurricane Katrina’s aftermath, two policy questions demand attention. First, what have we learned that could improve the nation’s response to emergencies? Second, which public policy approaches would deal best with the devastation in greater New Orleans?

A wide array of policy alternatives must be examined, especially those aimed at helping the poor, and which levels of government should respond must be determined. The Urban Institute has spent most of its history studying such problems and proposing practical solutions to them. For more information, visit http://www.urban.org/afterkatrina/.