CHAPTER ONE

The Role of Government in Responding to Natural Catastrophes

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GOVERNMENT AND THE CATASTROPHE INSURANCE MARKET

Natural disasters are a permanent feature of the human condition. Hurricanes, floods, earthquakes, and tornadoes are the most high-profile types of natural disasters that occur in the United States. The first three of these cause special problems because of the large number of people they affect and the way losses are distributed. As a society's population grows and becomes wealthier, their impact becomes greater, at least by some measures. Although deaths and injuries associated with hurricanes, floods, and earthquakes in the United States have declined, the number of people affected has increased. Annual population growth rates in Florida and California, the two states that are most subject to hurricanes and earthquakes, respectively have been two to three times the national average for decades. During 1970–90 the population of Southeast Atlantic coastal counties—prime targets for hurricanes—increased by 75 percent, four times the national average. When one considers the rising financial costs of natural disasters, the figures are alarming.

Real dollar damages of a given-sized natural disaster have been doubling every fourteen years. In the period 1992–97, eleven catastrophes have cost more than $1 billion each. The two mega-catastrophes of recent years, Hurricane Andrew in 1992 and the Northridge earthquake in 1994, cost $18 billion and $23 billion, respectively. The federal government's share of the costs of these two events—$28 billion—is more than its combined spending on higher education, pollution control, and running the federal court system.[1]

Private insurance has traditionally handled most of the costs associated with property loss consequent to natural catastrophes, and it still does for more localized disasters such as tornadoes. The private sector absorbed 81 percent of the costs associated with Hurricane Andrew and 55 percent of the costs associated with the Northridge earthquake. However, insurance companies have become increasingly skittish; they paid out $12.5 billion for the Northridge quake, which works out to $1,352 per person for those living in Los Angeles County. This payout equaled the entire amount of premiums collected in this century for earthquake insurance. In Florida, Hurricane Andrew caused insured losses of $15.5 billion; this was 50 percent more than all premiums collected in Florida for the past twenty-two years. Insurers have additional reasons to worry about Florida: the state adds about 130,000 households each year, the coastal population has grown 37 percent (from 7.7 million to 10.5 million) from 1980 to 1993, and three-fourths of the state's population now resides in coastal counties. Property at risk will soon reach $1 trillion, and estimates are that a major hurricane making landfall around Miami could inflict $51 billion in damages.[2]

1. On the growing costs of natural disasters, see Kenneth A. Froot, *The Financing of Catastrophic Risk* (Chicago: University of Chicago Press, 1999), pp. 1–22; and Bill Emerson and Ted Stevens, "Natural Disasters: A Budget Time Bomb," *Washington Post*, October 31, 1995, p. A13.

2. The figures about earthquakes come from Richard J. Ross Sr., "Earth-

The insurance situation in both California and Florida has been significantly complicated by state government intervention. In 1985, the state government in California passed a law requiring insurance companies to offer earthquake insurance as an optional rider on all homeowners' policies. Homeowners did not have to buy the insurance, but companies had to offer it. Ironically, the industry itself initially wanted this requirement because a lower court decision seemed to indicate it would be liable for earthquake damage on standard homeowners' policies, even though policyholders had not purchased an earthquake endorsement and companies had received no premiums to cover that damage. The decision was later overturned, but the law stayed on the books. Companies did not aggressively market earthquake insurance, however, and few enough policies were written so that the industry felt comfortable with their exposure. Everything changed after the Northridge quake. Payments in the Northridge area itself averaged $30,000 to $40,000 per claim after the 10 percent deductible. In light of these payouts and the enormous and unanticipated destruction wrought by the quake, earthquake insurance suddenly became very desirable for property owners. However, the same facts gave insurance companies cause to worry about their exposure and the consequent risk of insolvency. In light of this, they did not want to write any more of this insurance. Given the legal requirement to offer earthquake insurance, which the government of California was not about to change, the only alternative to leaving the state

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quake Insurance Protection in California," in Howard Kunreuther and Richard J. Ross Sr., *Paying the Price* (Washington, D.C.: National Academy of Sciences, Joseph Henry Press, 1998), pp. 67–95. The figures on hurricanes come from David A. Moss, "Courting Disaster? The Transformation of Federal Disaster Policy Since 1803," in Froot, *Financing Catastrophic Risk*, pp. 307–51; and from Eugen LeComte and Karen Gahagan, "Hurricane Insurance Protection in Florida," in Kunreuther and Ross, *Paying the Price*, pp. 97–124. The cited works by Ross and by LeComte and Gahagan also contain good discussions of the insurance situation in California and Florida, respectively.

for most companies was to continue to renew existing policies but to stop writing new homeowners' policies. About 90 percent of companies doing business in California did this or imposed significant restrictions on their intake of new business. It is obvious that the inability to get homeowners' insurance when purchasing a home would wreak havoc with real estate markets, so something had to be done.

As is usually the case when government intervention disrupts the market for a good or service, the cure for the resultant problems is more government intervention. In 1996, in response to this crisis, the state created the California Earthquake Authority (CEA), a state-run insurance company. It sold earthquake insurance policies in the residential market through private insurance companies. The deductible was set at a very high level, 15 percent. This effectively meant that a house had to be located within twenty miles of a fault or on very unstable soil to sustain damage that would exceed the deductible. Rates varied from $3 to $7 per $1,000 of coverage. Given the explosive growth in real estate values in high-risk areas of California, it is evident that many homeowners were facing premiums of a thousand dollars a year and up.

Not surprisingly, Californians have been reluctant to buy or renew earthquake insurance, and the CEA is writing about half the policies it expected to write. In some areas, the number of policies in effect is declining precipitously as nonrenewals outpace the writing of new policies. Nor have private insurers been eager to sell them, in part because of the complex funding mechanism for the CEA. In the event of a quake, private insurers would be liable for a percentage (which matches their share of the market) of the first $720 million in losses. In addition, they are collectively subject to a postquake assessment on the order of $2.16 billion, which is also proportioned according to market share. The basic problem facing the industry—how to limit their exposure and the consequent risk of insolvency—has not been adequately addressed.

In the aftermath of Hurricane Andrew, insurance companies in Florida faced similar problems and difficulties. The hurricane itself caused insured losses of $15.5 billion. Insurers then learned that it would be very expensive to get reinsurance on the various lines they offer, including, most notably, homeowners' insurance. (Reinsurance policies insure insurance companies against losses in excess of a given amount.) Also, new information from catastrophic risk models indicated that their exposure might be much greater than anticipated. Finally, they worried about hidden exposures that are tied to mandated residual market mechanisms, such as guaranty funds. A guaranty fund is responsible for claims against companies that become insolvent. For example, after Andrew, the Florida Insurance Guaranty Fund (FIGA) was activated to cover claims against nine insurance companies, which became insolvent as a result of that catastrophe. Payments totaled $400 million. The fund had to borrow the money by issuing bonds and then pay it back through its normal funding mechanism—legally mandated assessments on solvent insurance companies. In the aftermath of Andrew, these assessments doubled. In effect, the solvent companies had to cover the losses of the insolvent companies. In sum, in Florida as in California, insurance companies discovered they had been running imprudent risks, and thus they wanted to limit the amount of coverage they were writing.

To address these problems, the state of Florida did a number of things. First, it issued a temporary order prohibiting withdrawal from the market by insurance companies, a prohibition that was not fully rescinded until November 1999. It then created the Florida Hurricane Catastrophe Fund, a kind of reinsurance fund that enabled companies to renew policies they would have otherwise canceled. The state also established the Joint Underwriting Association (JUA), which serves as the "insurer of last resort" for those whose policies were canceled or not renewed. As of June 30, 1996, the JUA held more than 910,000 policies, making it the second-

largest insurer in the state. Funding for these residual market mechanisms has come from mandatory assessments on insurance companies. All of them (FIGA, FHCF, JUA) are ways of forcing insurance companies to bear, or to contribute to bearing, risks they would otherwise shun.

The other substantial role that the government—this time the federal government—has in the catastrophe insurance market is through the National Flood Insurance Program (NFIP), which was started in 1968.[3] Catastrophic floods have been a recurring phenomenon in many parts of the country, most notably the Midwest, but also in areas prone to hurricanes; much of the damage to property that hurricanes inflict is through flooding from the associated heavy rains, and most homeowners' policies do not cover flooding (though they do cover wind damage and wind-induced water damage). Historically, private insurers had been unable to offer affordable flood insurance and make a profit, in part because of their inability to develop a rate structure that accurately reflected the risks involved. NFIP addressed this problem. Central to this program has been the development of Flood Insurance Rate Maps (FIRMs) for communities that are at risk for flooding. The FIRMs include a detailed assessment of risks within a given community and floodplain and provide a basis for land-use regulations and building codes that mitigate damages, should a flood occur. The study to develop the FIRMs was a massive effort, costing $1.154 billion through 1997, and it has produced a wealth of information about the risks property owners face and advice about what might be done to mitigate them.

Crucial to the success of NFIP's insurance program was participation by at-risk communities and support from the home mort-

3. For information on NFIP, see Edward T. Pasterick, "The National Flood Insurance Program," in Kunreuther and Ross, *Paying the Price*, pp. 125–54; and Moss, "Courting Disaster?" in Froot, *Financing Catastrophic Risk*, pp. 307–51.

gage industry. The federal government assumed local communities would be eager to participate and that flood insurance would be treated like casualty insurance by lenders, that is, lenders would require it as a condition of a home loan. The disaster of Hurricane Agnes in 1972 revealed, however, that both assumptions were incorrect. Community participation in NFIP was low, and few homeowners had flood insurance. In 1973, Congress required flood insurance for federally backed mortgages and made participation in NFIP a prerequisite for eligibility for disaster relief. Despite these efforts, lenders were not vigilant in forcing people to renew flood insurance every year and private lenders were not requiring it, so in 1994 measures were enacted to get more people into the program, including giving lenders the option of "forceplacing" insurance on recalcitrant property owners.

A key feature of NFIP is the rate structure for the premiums that property owners pay. There are two types of rates: (1) actuarial rates, which apply to structures outside the 100-year floodplain and to new or retrofitted structures inside the plain that are in compliance with the FIRM, and (2) "subsidized" rates, which apply to structures inside the floodplain built before the FIRM was conducted. The "subsidy" does not represent a direct infusion of cash to supplement premiums but instead consists of charging property owners lower, nonactuarial premiums; this practice, which was originally designed to maximize participation in NFIP's insurance program, has prevented NFIP from accumulating reserves to cover heavy losses in years when there is a lot of flooding. Over the years, there has been an ongoing, though not entirely successful, attempt to phase out subsidies by raising premiums. In 1978, about 75 percent of policies were subsidized; by 1997 only about 35 percent were subsidized. However, in this latter group, people pay only about 38 percent of the actuarial rate. This is a substantial subsidy, both relatively and absolutely. Moreover, NFIP has operated under a rule that allows repeated payment on policies for damages less

than 50 percent of the value of the structure. This has allowed people to rebuild repeatedly in flood-prone areas. In other words, a property owner could suffer 49 percent damage to a structure, rebuild, get hit by another flood, suffer 49 percent damages, rebuild again, and so on. These "grandfathered" structures have been responsible for somewhere between one-third and one-half of the total claims dollars paid out over the years. Moreover, the "subsidy" now costs about half a billion a year in forgone premiums. Because of these artificially low premiums, NFIP experienced cumulative operating losses from 1969 to 1980 of $817,680,000. The total amount borrowed from the Treasury prior to 1986 was $1.2 billion, which was repaid not with higher premiums but with congressional appropriations. From 1993 to 1997, the program experienced $3.4 billion in losses and had to borrow almost $1 billion. Currently, there are about four million NFIP policies in force, but, by some estimates, this represents only about half the number of policies that should be held.

There is one final form of catastrophe insurance that merits brief mention. The federal government offers subsidized multiperil crop insurance to farmers, and one of those perils is flood. Premiums are heavily subsidized. From 1977 to 1993, losses plus administrative expenses (which is the net cost to taxpayers) have averaged $588 million more than what was collected in premiums.[4] Despite the subsidies, participation rates have remained relatively low, which has led to more direct bailouts when disasters strike.

DIRECT DISASTER ASSISTANCE

When one turns from insurance to more direct disaster assistance, government involvement is also substantial and has increased

4. For further discussion of crop insurance, see Moss, "Courting Disaster?" in Froot, *Financing Catastrophic Risk*, pp. 320–22.

throughout the twentieth century, especially at the federal level.[5] To get a sense of that growth, it is instructive to compare the federal response to the great Mississippi flood in 1927 with the response to the flood of the same river in 1993. In 1927 federal assistance was limited to lending equipment and personnel (often military) to relief efforts. Total expenditures amounted to about $10 million, which was about 3.3 percent of total damages. The American Red Cross, by comparison, collected about $23.5 million in donations and provided emergency services to about 600,000 residents over a fourteen-month period. The Red Cross, together with governmental agencies at all levels, covered only about 13 percent of the total damages. By contrast, in 1993 President Bill Clinton declared all of Iowa and many counties in other states disaster areas, making them eligible for various forms of federal relief. Numerous federal agencies got involved, spearheaded by FEMA (Federal Emergency Management Agency), and a supplemental appropriations bill was passed. Although the bill started at $2.5 billion, the final package reached $6.3 billion, about half the total estimated damage. As federal commitments to disaster relief grew, private commitments were attenuated. In 1953, the Red Cross outspent the federal government on natural disasters by a ratio of 1.6 to 1.0. By 1966, the latter outspent the Red Cross by a ratio of 8 to 1.

The Mississippi flood of 1993 was not the most expensive disas-

5. For an overview of the history of disaster relief in the United States, see Moss, "Courting Disaster?" in Froot, *Financing Catastrophic Risk*, pp. 307–51. For current government policy, see Moss, ibid.; Christopher M. Lewis and Kevin C. Murdock, "Alternative Means of Redistributing Catastrophic Risk in a National Risk Management System," in Froot, *Financing Catastrophic Risk*, pp. 51–85; and Howard Kunreuther, "Introduction," in Kunreuther and Ross, *Paying the Price*, pp. 1–15. Subsidies to farmers are discussed in George L. Priest, "The Government, the Market, and the Problem of Catastrophic Loss," *Journal of Risk and Uncertainty* 1996, 12:219–37. Details about programs run by FEMA and the SBA can be downloaded from their websites at http://www.fema.gov/r-n-r/ and http://www.sba.gov/disaster/, respectively. Facts and figures on direct assistance in this and subsequent paragraphs are drawn from all these sources.

ter for the federal government. That honor goes to the Northridge earthquake. Governmental outlays (mostly federal) on that disaster have been estimated at about $10 billion.

This is about as much as the government spent in one year on its main social welfare program (AFDC) at the time. Hurricane Andrew, which hit the year before the Mississippi flood, cost the government about $3.42 billion. In addition to regular appropriations for agencies such as FEMA, there have been six major supplemental appropriations for natural disasters since 1988, totaling $17 billion. Also, disaster declarations are made not just for large-scale catastrophes such as earthquakes, hurricanes, and major floods but for other adverse events such as tornadoes, forest fires, winter freezes, snowstorms, and severe summer storms. In 1999, forty-nine major disaster declarations were issued.

Direct aid subsequent to disaster declaration takes various forms; there are of course the expenses associated with rescuing people and dealing with the immediate aftermath of a disaster (enforcement of curfews, provision of temporary shelter, etc.). This includes the activities of police, emergency response personnel, and, on occasion, the military. The National Guard enforces curfews and prevents looting; the military also has heavy equipment that can be used to move debris, reopen roads, and so on. These forms of direct aid represent a relatively small part of the federal government's costs of disaster relief, however. More consequential are the costs associated with the repair of government facilities. Under the Stafford Disaster Relief and Assistance Act of 1988, at least 75 percent of the costs of repairing state and local government facilities is borne by the federal government. Supplemental appropriations for Hurricane Andrew, the 1993 Mississippi floods, and the 1994 Northridge quake covered up to 100 percent of these costs—despite the fact that private insurance is often available to cover these losses.

Other disaster-related spending includes direct grants and loans. The Small Business Administration (SBA) provides disaster loans

for businesses that cover uninsured losses up to $1.5 million. Loan rates are subsidized, depending on whether or not other credit is available; if other credit is available, rates range from 7.25 percent to 7.5 percent. If no other credit is available, the rate is 3.63 percent. The SBA also offers subsidized loans of up to $200,000 for uninsured losses to property and up to $40,000 for uninsured losses of personal property. Individuals (homeowners and renters) not eligible for SBA loans can get direct grants from FEMA in amounts up to $13,900. FEMA will also pay up to eighteen months' rent or mortgage payments, and provides small grants for home repairs. Finally, grants are also often made to farmers through special appropriations, whether or not they have signed up for crop insurance; payments are slightly more generous to those who took out crop insurance.

The level of these payments is determined by applying a complex formula on a county-by-county basis. The application of the formula is done by local boards, on which sit some of the insured, their friends, and neighbors. Not surprisingly, inflated claims have been submitted to these boards by farmers whose crops have been inundated.

The preceding discussion gives some sense of the nature and level of government involvement in dealing with the consequences of natural disasters. To summarize, that involvement consists of the following activities, which can be usefully categorized under the headings of insurance and direct aid:

Insurance

1. *Earthquake insurance in California.* The government of California requires private companies doing business in California to offer quake insurance and to contribute to the funding of the California Earthquake Authority (CEA), which underwrites these policies.

2. *Homeowners' insurance in Florida.* The government of Florida has required private companies to continue writing homeowners' policies in the state and to participate in various residual market mechanisms as a way of making hurricane coverage available.
3. *Flood insurance.* The federal government offers flood insurance through the National Flood Insurance Program (NFIP). Property owners with existing structures inside the floodplain are charged nonactuarial rates, which creates an implicit subsidy.
4. *Crop insurance.* The federal government offers farmers subsidized crop insurance, which can be triggered by natural disasters such as flooding.

Direct Aid

1. Emergency aid from government agencies and government employees at the time of the disaster and immediately following it
2. Federal funding to repair state and local government facilities
3. Loans and grants from the Small Business Administration
4. Grants to individuals from FEMA and occasional assistance to flooded-out farmers whether nor not they purchased crop insurance

EVALUATING THE ROLE OF GOVERNMENT

Some of this government involvement in dealing with natural disasters is clearly difficult to defend. Not only is the crop insurance program subject to conflicts of interest and self-dealing that borders on fraud, but the government undercuts its own program by occasionally offering another policy in which insurance is provided for

free! This is what happens when special appropriations bills include payments to farmers without crop insurance.

Federal government indemnification of state and local governments for damages to public facilities is almost as difficult to defend. Studies indicate that local governments have shown little interest in mitigation measures (i.e, measures that reduce the probability and/or severity of loss), nor have they purchased insurance against catastrophes, even though such insurance is available from the private sector.[6] This is almost certainly not coincidental. It is not in the interests of smaller governmental units to spend scarce resources on mitigation and insurance if the federal government is going to offer an insurance policy that provides 75 percent coverage with a 25 percent copay at absolutely no cost in premiums. The obvious justification for bailing out victims of disaster—they couldn't afford to take precautions or bear the costs of repair and restoration in the event of an adverse event—is hardly applicable to governmental units that have taxing authority and can issue tax-free bonds to fund repairs after the fact.

Is there any role for government in disaster relief? Few would object to the kind of immediate aid provided by police and emergency personnel during and immediately after a natural disaster. Law enforcement, evacuation, search and rescue, repair and maintenance of roads, bridges, and other infrastructure are all traditional government activities that cannot be easily handled through the private sector.

As indicated, however, it is difficult to justify federal responsibility for repairing state and local infrastructure. Other forms of direct aid appear to be easier to justify, at least to the extent that they go to the least advantaged. Special disaster unemployment insurance

6. See Raymond Burby, *Sharing Environmental Risks* (Boulder, Colo.: Westview Press, 1992); and Steven French and Gary Rudholm, "Damage to Public Property in the Whittier Narrows Earthquake: Implications for Earthquake Insurance," *Earthquake Spectra* 1990, 6:105–23.

payments, small grants to lower-income homeowners and renters, and subsidized loans might be supported on the grounds that these individuals simply could not afford insurance and/or mitigation measures. Besides, it would be politically impossible to tell these people they are completely on their own following a natural disaster. In the case of people who are better off, however, assistance beyond that which meets emergency needs in the immediate aftermath of a disaster is more problematic. Lending uninsured businesses up to $1.5 million, lending uninsured (nonpoor) individuals money at below-market rates, and outright grants to the nonpoor are difficult to defend in light of the availability of private insurance to cover these losses. It also creates a moral hazard problem; to the extent that people believe the government will bail them out in the case of a natural disaster, they are less likely to purchase insurance and to take mitigation measures that will limit their losses in the event of a disaster.

What about catastrophe insurance? Insurance against hurricanes, floods, and earthquakes presents special problems for the private sector that are thought to justify government provision of this form of insurance. In what follows I explain and critically evaluate the case for government-provided insurance of the sort provided by NFIP. I then critically appraise the regulatory regimes for earthquake insurance in California and homeowners' insurance in Florida as alternative solutions to the special problems that have arisen in these two states.

In the 1890s and again in the mid-1920s, the insurance industry wrote flood insurance policies but sustained such large losses that it withdrew from the market. As flood insurance was being discussed in government circles in the 1950s and 1960s, the private sector indicated that it would not get involved in a major way, which in part explains why the government did. One of the problems for private insurance companies in this connection is that the risks associated with floods (unlike most other casualties) are *correlated*

risks, meaning that the probability that one policyholder will suffer an adverse event is not independent of the probability that another policyholder will suffer a like adverse event. In the context of flood insurance, this means that if one policyholder is flooded out, it is much more likely that other policyholders will be flooded out as well. By contrast, adverse events for which people buy other kinds of casualty insurance, such as auto accidents, are uncorrelated. If I have a motor vehicle accident, that does not affect the probability that others who have policies with my company will also have an auto accident.

The problem with correlated risks for private insurance companies is *not* that their expected loss is greater for correlated risks than for uncorrelated risks.[7] Rather, the problem is that the *variance* is higher for correlated risks. Roughly, the idea is that a company runs a greater risk of having to pay enormous aggregate claims in a given period that could render it insolvent when the risks they insure against are correlated than when risks are uncorrelated. In the case of uncorrelated risks, the law of large numbers implies that the chances are good that the total claims made for any given period (e.g., a year) will be closer to the expected losses. By contrast, natural catastrophes, which occur more rarely, are not as likely to produce a stable claims experience. Insurance companies are more subject to feast (no disasters) or famine (one or more large disasters) in the case of correlated risks. Since companies worry about their solvency, they are more reluctant to write policies on correlated risks, and the risks associated with floods (as well as hurricanes and earthquakes) are highly correlated. Since governments cannot go broke as easily, they are better able to handle correlated risks asso-

7. The expected loss for a set of policyholders is determined by multiplying the probability of an adverse event times the maximum payout a company would have to make. Whether risks are correlated or uncorrelated, the expected loss is the same, assuming that the probability of an adverse event is the same and the level of coverage is the same.

ciated with natural disasters. In addition, private insurance companies must pay taxes on earnings from investments that constitute their reserves. Governments have an advantage in this regard, since they do not face those tax liabilities.

A second major difficulty facing the private sector in writing flood insurance is the adverse selection problem. Essentially, adverse selection occurs when low-risk policyholders must subsidize high-risk policyholders because the insureds know more about their individual risks than the insurers do. Under these circumstances, if insurers charge all policyholders the same premiums, the high-risk policyholders would flock to the policy because they would be subsidized by the low-risk policyholders; assuming the low risks also have a more accurate estimate of their true risks than insurers do, they will cancel their policies or not insure in the first place. The insurer will be left with only the high-risk policyholders. The insurer will either exit the market for that form of insurance or charge everyone a premium appropriate to the high-risk policyholders. In either case, mutually beneficial trades will be forgone as the low-risk property owners are unable to get coverage at a mutually beneficial price (i.e., an actuarially fair rate). This is a classic case of market failure (which for some is almost a sufficient condition for government involvement). Of course, insurers can always gather more information in an effort to identify the high-risk and low-risk policyholders so that they can be charged different premiums, but gathering this information is usually costly and may drive premium prices to prohibitive levels. The adverse selection problem was one reason insurance companies withdrew from the flood insurance market in the 1920s.

How can the government solve this problem? For flood insurance, it was solved by producing the FIRMs (Flood Insurance Rate Maps) at taxpayer expense. Among other things, the FIRMs provide accurate and valuable information about the contours of the

hundred-year floodplain[8] and the associated risks. The government used that information to develop actuarially fair rates for new and rebuilt structures within that floodplain. The decision to charge less than actuarially fair rates to owners of existing structures (a policy that is supposed to be phased out over time) was a deliberate decision whose rationale was to maximize participation in the program at the outset. Firms offering a new and unfamiliar product often adopt a below-cost pricing strategy at the beginning of a marketing campaign to build product awareness. It has also been suggested that it would be unfair to charge full, actuarially fair rates at the outset to property owners who did not previously know they were at high risk of being flooded out. Ultimately, however, the government seeks an actuarially sound system in which subsidies have been eliminated.

As NFIP moves in this direction, it also solves, at least in part, another problem that faces the insurance industry—the moral hazard problem, which occurs when possession of insurance induces behavior that makes it more likely that a claim (or a more expensive claim) will be filed. In the case of flood insurance, the morally hazardous behavior consists in failing to adopt mitigation measures (including not building in parts of the floodplain) that reduce the likelihood of a claim or the damage a flood would cause to an insured structure. Although moral hazard problems associated with "grandfathered" structures have plagued NFIP from its inception, new and rebuilt structures must be built in accordance with new building codes, which make these structures more flood resistant, which in turn means that the size and incidence of future claims should decline. The government is also buying out entire at-risk

8. This term is widely used but misleading. It does not designate an area that is flooded once every hundred years but instead designates an area that has at least a 1 percent chance of being inundated in any given year.

communities, which will further curb adverse selection and moral hazard problems.[9]

Although the case for substantial government involvement in flood insurance, and by extension other forms of catastrophe insurance, appears strong, appearances are misleading. The fundamental problem is that government involvement in catastrophe insurance forces a redistribution of risks and costs that is morally indefensible. To see why, notice that the government faces distinctive moral hazard problems of its own when it provides catastrophe insurance. Consider the National Flood Insurance Program. The fact that NFIP has never paid its own way is significant. For decades it has charged the most at-risk property owners premiums that are about one-third of the actuarially fair rate, and it has allowed stricken property owners to rebuild repeatedly in the same location as long as damage in any single flood is less than 50 percent of the assessed value. Although the private sector sometimes offers a new and unfamiliar product at below cost, it does not do so for decades, and it controls losses by canceling policies for property owners who have repeated large claims. NFIP has continued to charge some policyholders as little as one-third of the full, actuarially fair rate, but it has not gone out of business in years when massive floods struck (including the 1993 flooding of the Mississippi River). What prevented this was its borrowing authority, backed by the U.S. Congress. When NFIP had to borrow money to pay claims, it retired the debt not through assessments on policyholders but by appropriations from Congress. This meant that taxpayers had to foot some of the bill after the fact, which meant that some property owners have been subsidized by everyone else who pays taxes. Since a government insurance company faces virtually no prospect of

9. However, this buyout program creates a significant moral hazard problem of its own. If property owners believe the government will buy them out after the next major flood, they have a reduced incentive to take out insurance to cover those losses.

bankruptcy, its directors have less incentive to charge actuarially fair rates; indeed, in the case of NFIP, its directors have had a positive incentive to undercharge some of its policyholders, since by so doing it could further another of the program's goals—increased participation in NFIP.

The redistribution of resources from taxpayers to policyholders is particularly insidious in the case of NFIP because the premium subsidy is not paid in an above-board appropriation on a year-by-year basis; instead, it is done in the manner just indicated: NFIP simply undercharges some policyholders, borrows when huge claims must be paid, and then goes to Congress for a bailout when it cannot pay its debts.

Forced redistribution operates in more subtle and even less defensible ways in the homeowners' insurance market in Florida and the earthquake insurance market in California. State governments have erected exit barriers by prohibiting insurance companies from canceling or not writing new policies in Florida or, in the case of California, by forcing companies to offer quake insurance to all homeowners. Companies are faced with the prospect of leaving the state entirely or accepting greater risks than they otherwise would take. The former option means forgoing business in ordinary casualty and other insurance lines (e.g., auto, life, and health insurance). Some of the potential catastrophic losses facing these companies can be offset by charging higher premiums for these other lines of insurance, though there are obvious limits to how much of this sort of thing they can do before they lose business to out-of-state competitors who do not face this mandate because they do not write homeowners' insurance. The affected companies can also raise rates for in-state homeowners who do not face high risks of hurricane or quake damage. Stockholders (or out-of-state policyholders in mutual insurance companies) are also forced to subsidize at-risk homeowners to the extent that this sort of state action lowers share prices or reduces dividends. Finally, state taxpayers generally are on

the hook, to the extent that tax dollars are used to capitalize residual market mechanisms, such as Florida's JUA, which serves as an "insurer of last resort."

Is there any way to justify these various forms of coercive redistribution? One might conceive of the redistribution involved in government-provided insurance (as well as direct government assistance) as part of the normal workings of a multiperil insurance policy that all persons living in the country in question have. The redistribution is a natural consequence of risk spreading, which has been made fairer or more insurance-like in recent years by the expanding role of FEMA in dealing with other natural disasters, such as tornadoes, droughts, forest fires, and snowstorms. The problem with this rationale is that it lumps together heterogeneous risks in ways that people would never voluntarily agree to. Many citizens face almost no risk of the most devastating catastrophes (earthquakes, tornadoes, hurricanes, and flooding), and others face some of these risks but not others. If disaster relief and insurance subsidies were to be treated as part of national catastrophe insurance policy, the government would make at least some effort to collect differential premiums for different levels of risk.[10] Not only is much of the funding out of general revenues paid for by taxpayers who face little risk of natural catastrophes, but some of it (especially in California and Florida) is surreptitiously imposed nationwide on policyholders and stockholders of insurance companies through various regulatory burdens. The pattern of benefits and burdens in no way approximates an insurance scheme.

Another possible justification for the coercive redistribution involved in catastrophe insurance begins with a general principle of the welfare state that the costs of misfortunes beyond people's con-

10. As Richard Epstein has pointed out, "within the political system, the equilibrium position tends to be one that moves toward equal insurance rates for all customers, *regardless* of insurable risk." Epstein, "Catastrophic Response to Catastrophic Risk," *Journal of Risk and Uncertainty* 1996, 12:287–308.

trol should be socialized by the state. To put it in other terms, it is unfair to force citizens who are subject to unchosen risks to bear the full costs of those risks. If the risks associated with natural disasters that property owners face are unchosen or involuntary, then it is appropriate to socialize their losses, at least to some extent.

Whether or not this general principle about unchosen risks is defensible, a little reflection makes it clear that it is simply inapplicable in the case of risks of natural catastrophes. Although no one chooses to be a victim of a natural catastrophe, people routinely choose to put themselves at risk for one. For many decades, California and Florida have experienced substantial immigration from the rest of the country and, in the case of California, from the rest of the world.

It is ironic that these two states, which are most attractive for reasons of climate, natural beauty, and good economic conditions, are also the most prone to expensive natural disasters. However, that irony cannot obscure the fact that millions of people choose to live there in the knowledge of the natural disasters that threaten, and they are subsidized by people living in less agreeable climes and more economically distressed areas. Longtime residents also know—sometimes from personal experience—that they live in harm's way. Although individuals typically have no detailed knowledge of the extent of their risks, they do know that these risks exist and are nontrivial.

Similarly, it requires an expansive notion of involuntariness to conclude that most, or even many, residents of hundred-year floodplains throughout the nation have involuntarily assumed the risks of flooding. This is so for a number of reasons. First, many of the areas most at risk for flooding have experienced major floods in the not-too-distant past; historical memories of these floods are vivid and long-lasting in affected communities.

Second, in the past decade or so, the government has mapped flood zones and conducted an extensive public awareness campaign

to alert the public to the fact that homeowners' insurance does not cover this risk. The private mortgage industry now routinely requires flood insurance as a condition for a home loan.[11] Given the facts, the decision of people to stay on these properties, even on multigenerational family farms, can hardly be described as the assumption of an unchosen or involuntary risk. The government should no more be subsidizing insurance for high-risk property owners than it should be subsidizing auto insurance for unmarried males under the age of twenty-five, whose risk factors, it is worth noting, are less voluntary than those of property owners who live in at-risk areas.

Although the case for government intervention in the catastrophe insurance market is weak, the above criticisms lack practical significance unless there is a feasible private alternative. Could the provision of catastrophe insurance be done entirely by the private sector? Unless a purely private alternative is feasible, it is difficult to see how a politically sustainable case could be made for getting government out of this business.

THE FEASIBILITY OF PRIVATE CATASTROPHE INSURANCE

For a purely private-sector alternative to work, it would have to be able to solve the problems of correlated risks and adverse selection. Both of these problems can in fact be solved; let us begin with the problem of correlated risks. Although risks are often described as correlated relative to a particular adverse event or kind of adverse event (e.g., flood, earthquake), strictly speaking that is not accurate. A correlated risk is defined relative to a set of *policyholders* whose policies are held by a particular company for a specified line of

11. Personal communication from Laurie Trimm, a loan officer with the National Bank of Commerce, Birmingham, Alabama.

insurance. For example, it might be said that the risks associated with a tornado are highly correlated within the path of the storm, but that is not correct. If property owners in the path of a storm are insured by many different insurers, the losses are not correlated at all. More generally, the relevant comparison class for determining the correlation of risks for tornadoes is all the homeowners' policies a particular company writes that include wind damage. For national companies, the risks associated with tornadoes are spread throughout the nation. Furthermore, because of the frequency of these storms, the law of large numbers operates to keep the variance down and push aggregate claims for a given period (e.g., a year) closer to the expected loss. This is why the risks associated with tornadoes are not highly correlated for most companies.

Floods occur in virtually every state, and one would expect that in a purely private flood insurance market (e.g., if NFIP were privatized), insurance companies would limit their exposure in any area subject to major flooding. The insurance industry is not particularly concentrated, so one would expect that many companies would enter the market in any particular floodplain so that no one company had too many of its eggs in one basket. Companies would diversify their risks by writing policies in floodplains located in different parts of the country—at least if they could be assured that they would not be taken hostage by state regulators in the way they have in Florida or California. This assurance is within the power of the federal government under the Interstate Commerce clause; it could simply modify the provisions of the McCarran-Ferguson Act, which delegates insurance regulation to the states. That act has served as the excuse by state regulators to bolt the exits and to force companies to bear the risks of natural disasters they would otherwise not bear.

Purely private flood insurance assumes, of course, that insurance companies would be able to determine the risks they face, something they could not do very well in the early and mid–twentieth

century. The FIRMs provided by NFIP fill this gap nicely, however. At a cost of more than $1 billion, the government has developed the information necessary for the private sector to take over this market. And, indeed, there has been movement in that direction under an NFIP program known as "Write-Your-Own" in which insurance companies participate more fully in writing flood insurance. NFIP could be entirely privatized by transferring full underwriting responsibility to private firms.

What about the risks associated with hurricanes? In the homeowners' insurance market in Florida, assuming it was unencumbered by the current regulatory regime, one would expect that firms would want to reduce their exposure in light of their experience with Hurricane Andrew by canceling homeowners' policies or excluding hurricane damage. This would create a ready market for firms that could diversify their risks by writing policies (either limited to hurricanes or broader homeowners' policies) in different parts of the Southeast (and Hawaii) that are subject to hurricanes. A problem with the risks associated with hurricanes, however, is that their numbers are rising, both because of a cyclical upswing in the occurrence and severity of hurricanes and because of increased development throughout the Southeast, especially in Florida. A private, deregulated insurance market, with higher premiums for many, no doubt, would not lessen the number of tropical storms each year, but it would send some important signals to developers and immigrants (including risk-averse retirees) to reconsider their plans and/or to pursue mitigation strategies more intensively.

Finally, what about the problem of correlated risks associated with earthquakes? Private insurers writing quake insurance need not face this problem. They are facing it now because the state has forced companies to distribute their underwriting. Before the court ruling that led the industry to favor mandatory offers of quake insurance, companies' exposure was low because few people had such a policy. This meant that insurance companies did not have to

pay careful attention to the risk of earthquakes when they wrote homeowners' policies since most of their policies did not include quake damage. When the court ruling said they might have to pay on earthquake damage anyway, they pushed through a mandatory offer provision as a defensive measure. As a result, they found themselves with more highly correlated risks than they would have voluntarily accepted, though this was better than being forced to offer free quake insurance, which is what the court ruling had portended.

Geologic and engineering studies undertaken in California in recent years (some funded by the government) have made it possible for the private sector to manage better the problem of correlated risks.[12] As understanding of the underlying geology in California has improved, it has become clear that there are numerous fault lines in the state, some of which are more prone to movement than others. Moreover, understanding of the effects of different types of earthquakes on buildings has also significantly increased in recent years. For example, damage from movement of a strike/slip fault is fairly predictable, though damage from a thrust fault is less predictable. Finally, one of the most important facts that has emerged from geologic and engineering research is that the type of soil or rock on which a building is built dramatically affects the severity of loss that follows a quake of a given magnitude. Buildings constructed on landfill, for example, are subject to violent shaking because of a phenomenon known as liquefaction, in which the underlying soil behaves like Jell-O shaking in a bowl. By contrast, buildings built on bedrock are much less vulnerable to destruction or serious damage. This more detailed knowledge of earthquakes and their effects on structures makes possible more fine-grained risk assessments, which in turn make those risks more easily insurable in a purely

12. For a discussion of these studies of earthquake damage, see Ross, "Earthquake Insurance Protection in California," in Kunreuther and Ross, *Paying the Price*, pp. 67–95; and Epstein, "Catastrophic Response," pp. 294–95.

private insurance market. If companies were free to cancel policies, they would redistribute their book of business over different fault lines and over different types of structures. This would significantly diminish the problem of correlated risks.

What about the adverse selection problem? This problem arises for a type of insurance policy when there are informational asymmetries: specifically, the insureds know more about their risks than the insurers do. Poor risks flock to the policy and good risks shun it, which is an unsustainable situation in a private insurance market. As rates are raised, the good risks drop out, leaving beneficial exchanges between them and insurance companies unconsummated. This is part of the reason private firms left the market for flood insurance in the 1920s. As noted above, however, the government has developed the tools to deal with this problem. The FIRMs developed by NFIP for the entire nation have made it possible to get a better idea of what actuarially fair rates would be for various structures and properties that are at risk of flooding, and this knowledge has been partially reflected in NFIP's rate structure. One well-known problem with the current system is that government has been reluctant to apply fully the knowledge gained from the FIRMs since it continues to subsidize implicitly the cost of premiums for "grandfathered" structures that are at high risk of flood damage. A purely private market would undoubtedly apply that knowledge more fully by canceling policies and raising premium rates.

Because of the legal mandates, it is less clear how much of an adverse selection problem would exist in Florida's homeowners' insurance market and in California's earthquake insurance market if they were deregulated. Nevertheless, knowledge of the relevant risk factors does not seem to be systematically skewed toward homeowners and away from insurers, a necessary condition for an adverse selection problem. In both California and Florida, the major risk factor is the structure's location relative to the occurrence

of the adverse event (epicenters for quakes and landfalls for hurricanes); in both cases, the relevant knowledge is now probably more readily available to insurers than to insured. To the extent that some structures are, by virtue of their construction, more vulnerable than others, one would expect that insurance companies would impose their own "building codes," either by denying coverage to noncompliant structures or by granting premium reductions for mitigation measures.

As Howard Kunreuther has explained, essentially two conditions must be met for a risk to be insurable by the private sector:[13] insurers must be able to (1) identify and quantify the chances of an adverse event and the extent of losses they might face, and (2) set premiums to cover claims and make a profit. In the past, condition 1 has been difficult to satisfy for natural disasters because they are relatively infrequent, which means that historical data have not been a good basis for prediction. Recently, however, scientific advances in catastrophe modeling, which includes the sciences of geology, hydrology, meteorology, and structural engineering, have greatly increased the ability to quantify the chances of various adverse events, though pockets of ambiguity remain (e.g., the extent of damage caused by thrust-fault quakes is relatively unpredictable). Regarding condition 2, to set premiums at profitable levels, it is necessary for insurance companies to be able to control for adverse selection and moral hazard. Moral hazard can be controlled by the usual instrumentalities of premium reductions for mitigation measures, deductibles, and copayments that push some of the costs of risky behavior onto policyholders. The FIRMs developed by the government can be used to limit the adverse selection problem in the case of flood insurance. For earthquakes and hurricanes, this

13. Howard Kunreuther, "Insurability Conditions and the Supply of Coverage," in Kunreuther and Ross, *Paying the Price*, pp. 17–50.

problem, to the extent that it exists, can be addressed in light of the scientific advances just alluded to.

THE CASE FOR PRIVATIZING CATASTROPHE INSURANCE

One obvious difficulty with any proposal to privatize fully the provision of catastrophe insurance is that not everyone would be able to get coverage or to get coverage at affordable rates. In the near term, many property owners would have their policies canceled, and although some of them would eventually be able to get insurance with another carrier as companies redistribute their books of business, not everyone would. The reasons for this are various. In California, buildings constructed before 1940 were not built to an earthquake-resistant code, and their replacement value is a multiple of their actual market value. Insurance companies would probably not want to touch these properties. Other properties might be "theoretically" insurable but are relatively isolated or pose special, hard-to-identify risks, or high costs are associated with developing, marketing, or servicing policies in these areas. For similar reasons, some properties at high risk for hurricane damage and/or flood damage would also be uninsurable. Another likely consequence is that some insurance policies would offer more limited coverage and/or higher deductibles. On the other hand, denial of coverage would have some salutary consequences. One is to make mitigation measures more financially attractive. Bolting a wood frame house to its foundation costs a few thousand dollars but can result in huge savings in the event of an earthquake. Studies have shown that people do not apply simple cost-benefit rules to the decision to take mitigation measures, but if insurance companies offered premium reductions to those who take these measures, people would be more inclined to act prudently. Indeed, some of these measures could be financed by loans paid for through insurance premium

savings. A second salutary consequence is that, if and when uninsured structures are destroyed by adverse events, a powerful message would be sent to those planning to build in high-risk areas. Development in parts of California, Florida, and in major floodplains across the country would undoubtedly be slowed and redirected away from the riskiest areas.

A fully privatized market in catastrophe insurance does what a regime of private property rights does best: it imposes the burdens of property ownership on those who make decisions regarding that property. By contrast, in the current regime, if a family builds a second home on the Gulf Coast in Florida, the state turns around and forces insurance company stockholders, other insurance policyholders, and taxpayers to subsidize that decision. If a farmer in the Midwest continues to farm land that is at risk for flooding, under the current system he can force taxpayers to pay two-thirds of his insurance premium and/or pay for rebuilding structures on the property again and again. This is before he gets payments for his crop losses.

There is no denying there would be gaps in the nation's insurance profile that do not exist now since some people who want catastrophe insurance would be unable to get it because no one would insure their structures. In addition, some property owners would be able to get it but would be too poor to afford it (however one understands that notion), though this group is unlikely to be too large, since these people are, after all, property owners. Let us call all those who cannot get insurance or cannot afford it because they are poor, the "deserving uninsured." On the other hand, there would be property owners who would be able to get insurance but not at price they are willing to pay and not because they are too poor. They may want it in the abstract, but they are not willing to pay the market rate for it.

Currently, many homeowners in California fit this description; they are interested in earthquake insurance but decline to purchase

it when they discover the high deductible, exclusions, and relatively high premium. We could call those who are unwilling to purchase insurance, "undeserving uninsured," but a more neutral term would be "self-insured."

The relative sizes of the deserving uninsured and the self-insured are unknown, in part because the notion of being "too poor" to afford insurance is vague and indeterminate. In considering what should be done about both groups, the parallels with the welfare problem and welfare reform are striking and obvious. Some people cannot find work, and some choose not to work for the prevailing wage for which employment is available; the relative size of these groups is unknown. The central question regarding welfare used to be: What level and what forms of aid should those without a job get? Welfare reformers in the mid-1990s reconceived the problem in different terms: How should people be weaned off welfare? For catastrophe insurance and disaster assistance, the questions policymakers have asked throughout the second half of the twentieth century was, How can affordable insurance be made available to all and how can those without insurance be helped? The main question for the twenty-first century by contrast should be, How can people be weaned off insurance welfare? Just as welfare had the unfortunate consequence of encouraging undesirable patterns of behavior, so too current government catastrophe policies encourage undesirable behaviors in the face of disaster risks—a classic moral hazard problem. Development in high-risk areas proceeds apace, and mitigation and indeed even insurance are ignored. The idea that everyone should have affordable insurance or be given government handouts if they cannot—or choose not to—get it may be as obsolete as the idea that everyone should have a guaranteed minimum income.

It is beyond the scope of this chapter to propose a comprehensive disaster policy, but some aspects of a more attractive alternative to the status quo can be sketched. In this alternative, some elements

of current policies would remain in force if for no other reason than that they are politically impossible to remove. Immediate aid to all disaster victims in the form of food, clothing and shelter would be an instance of this. The private sector might be able to handle these immediate needs (as indeed it did up until the mid–twentieth century), but no rich society is going to keep the government entirely out of the business of emergency relief. There is room to maneuver, however, in the area of long-term assistance. Political support for bailing out stricken property owners, most of whom are not poor, is waning as costs rise. A sound policy that does not encourage victims to "rebuild their lives" in a way that leaves them vulnerable to a similar disaster down the road may be politically feasible. The touchstone of any such policy must be that it does not replace private insurance that is, or could become, available. Grants and subsidized loans to property owners, qua property owners, should be eliminated since they make private insurance less attractive and are morally indefensible.

The crucial difficulty facing any such policy is the problem of credible commitment. For any more completely privatized alternative policy to work, it would be necessary for the federal government to make a credible commitment to a no-bailout policy for property owners when disaster strikes. There is no completely satisfactory solution to this problem since, short of a constitutional amendment, there is no way to guarantee that future Congresses and presidents will not give property owners a free insurance policy after the fact when disaster strikes. There is, however, a way to make that more difficult. Suppose the government periodically required each property owner to do one of three things: (1) prove that they have a catastrophe insurance policy that covers the kinds of disasters government usually addresses with supplementary appropriations bills, (2) prove that they have gone to one or more companies and gotten a quote for such a policy (which would undoubtedly include a sales pitch) and declined to purchase it, or

(3) gone to one or more companies who are writing policies in that area and gotten a letter saying that the company would not insure the property. Suppose now that Congress also passed a law that somehow committed the government to a no-bailout policy after a certain date, say five years from passage. This would allow the private sector time to reconfigure itself to take over what insurance it could, and it would allow enough time for the deserving uninsured (i.e., those who cannot get insurance or cannot afford it) to sell their property to those who are better positioned to bear the risks of being uninsured or who can afford the insurance. Perhaps real estate companies would form for this purpose; they could buy a diversified portfolio of these properties at a discount and rent them out to those who can make good use of them (including former owners). To be sure, the undeserving uninsured would get less for their property if it could not be insured (which would give them an incentive to be diligent in searching for insurance if they consider selling their property), but this would more accurately reflect its value than is currently the case because of the hidden subsidies that government bailouts represent. Cutting off these subsidies, with advance notice, is a way of bringing to bear on those who make decisions about the uses of property the consequences of those decisions.

As a result of this policy the undeserving uninsured would have sold out, found insurance after all, or chosen to continue to accept the risks they face. That is, they would have gotten out of harm's way, joined the ranks of the insured, or joined the ranks of the self-insured. Even without the influx of these individuals, the self-insured is likely to be a fairly large group, if current conditions are any guide. Fully one-third of homeowners in California do not carry CEA earthquake policies. And while NFIP participation rates have been going up, only about half the people for whom flood insurance makes sense have such a policy. If participation patterns for earthquake and flood insurance are any guide, it is likely that if

hurricane coverage were to be optional for homeowners, many would choose not to buy it because it is not worth it to them. On the other hand, lenders might require this form of coverage as a condition of any loan secured by the property (though many retirees in Florida and elsewhere own their homes outright).

This proposal makes it clear to everyone, property owners and taxpayers alike, that people have faced and dealt with their risks voluntarily. It might also solve the problem of credible commitment because it would be harder for politicians to give a public justification for bailing out those without insurance in the event of a catastrophe.[14] The new members of the self-insured would have explicitly forsaken insurance or have had time to sell their property and in effect move to higher ground. In the event of a disaster, representatives from affected areas would have a much more difficult time justifying in a public forum a taxpayer-funded bailout of people who could have avoided the long-term problems they are now facing. Although immediate emergency assistance would continue to be available in the event of a catastrophe, longer term assistance aimed at restoring the status quo ante would not be.

Whether or not a proposal like this is ultimately feasible, it is facile to dismiss efforts to privatize catastrophe insurance as politically impossible and pessimistic to suppose that such efforts are unlikely to succeed in changing behavior. As costs have risen and the extent of subsidies grown, congressional representatives of unaffected areas have become increasingly reluctant to continue to support these bailouts. A long-term plan to phase out insurance welfare, considered at an appropriate time (*viz.*, not during a catastrophe), might not face the kind of organized opposition that or-

14. It also means that it does not matter too much if it is difficult to enforce the requirement to get insurance, a quote, or a letter saying no insurance can be purchased. If people choose to ignore this requirement, it would have the same implications for the voluntariness of their choices and for the public debate that is bound to arise when disaster strikes.

dinarily arises when a government subsidy is threatened, in part because the victims of future disasters do not know who they are. Also, studies have shown that many people take a "it-can't-happen-to-me" attitude toward low probability–high impact events, such as natural disasters.[15]

As to the likelihood that such a policy would be successful in changing behavior, in recent years the government has made major structural changes in welfare for the poor in a way that encourages personal responsibility. If the government can force poor people to take more responsibility for their lives, they ought to be able to force property owners, most of whom are not poor, to take more responsibility for their lives.

The limited success of welfare reform also provides reason to be optimistic about the chances for success of a program that substantially eliminates insurance welfare. Those on public assistance have had their lives devastated by a system of incentives that encouraged irresponsible behavior across many areas of their lives, and yet there are signs that changes in financial incentives have markedly affected their behavior. Changing the behavior of people on insurance welfare should be a much more tractable problem since, as property owners, they are likely to have had more experience in accepting personal responsibility for their choices.

15. See Risa Palm, "Demand for Disaster Insurance: Residential Coverage," in Kunreuther and Ross, *Paying the Price*, pp. 51–66.