

Insurance Issues of Catastrophic Disasters in Japan: Lessons from the 2005 Hurricane Katrina Disaster

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1 Introduction

A series of hurricanes including Hurricane Katrina hit the Gulf Coast in the summer of 2005, causing the worst damage in the U.S. history of natural disaster and raising many issues regarding the nation's insurance system. The experience of Hurricane Katrina can provide valuable lessons for Japan. It must be remembered that this kind of disaster could also happen in the future in Japan, which has a great deal of risk for major disasters such as large-scale typhoons, localized torrential rains, and massive earthquakes. In this paper, I will present an overview of the events of Hurricane Katrina and discuss the lessons to be learned in Japan.

2 Natural Disasters and Problems of Public Insurance Systems

Founded in 1968, the National Flood Insurance Program (NFIP: <http://www.fema.gov/nfip/>), administered by the Federal Emergency Management Agency (FEMA), is a state-run insurance system with a history of nearly 40 years. In general, homeowners insurance from the private sector does not cover flood damage. A geographical bias is seen with NFIP policies, as is usual with insurance for natural disasters. A hurricane-prone region extends from the southern United States to its eastern seaboard, and about 40% of NFIP policies are concentrated in Florida, followed by Texas in second place. Louisiana has the third highest number of policies, accounting for about 8% of all NFIP policies. Many policies in Louisiana are located in highly flood-prone areas such as New Orleans and Jefferson Parish. One reason for the difficulty of administering natural disaster insurance is that policies are concentrated in high-risk areas, resulting in higher premiums. In Japan as well, there are clear differences in the number of earthquake insurance policies in each region. Most policies are concentrated in the Tokyo metropolitan area and the prefectures of the Pacific seaboard (Tsubokawa, 2004). Table 1 presents a comparison of NFIP and Japan's earthquake insurance (<http://www.nihonjishin.co.jp/english/index.html>), the major insurance programs with public support in the U.S. and Japan. In Japan, unlike the U.S.,

Table 1. Comparison of NFIP and Japan's earthquake insurance.

Name	National Flood Insurance Program (NFIP)*	Earthquake Insurance**
Year created	1968	1966
Administered by	Federal government	Private sector and national government
Role of private insurance firms	Sales. Through the "Write Your Own" (WYO) program, private insurance companies can handle flood insurance sales in the same way as their own products. Most policies are sold through WYO.	Sales and primary insurance. All primary insurance policies are ceded to the Japan Earthquake Reinsurance Co., Ltd. for reinsurance, and the national government provides reinsurance.
Role of national government	Insurer	Reinsurer (excess of loss reinsurance)
Number of insurance policies	4.56 million policies (as of December 2004)	9.32 million policies (as of March 2005)
Total coverage	\$743 billion	¥71 trillion
Total annual premiums	\$ 2 billion	¥ 120 billion
Premium rate categories	Divided into about ten zones, based on flood hazard maps prepared in accordance with FEMA surveys.	Four zones nationwide, plus two classifications based on building structure (wood or other).
Premium discount system	Under the Community Rating System (CRS), discounts of up to 45% are available based on community efforts to reduce risk.	Discounts of up to 30% are available, depending on the building's earthquake resistance and year of construction.
Highest claims settlement incident	Hurricane Katrina, at least \$20 billion (estimated)	Hanshin-Awaji (Kobe) Earthquake, ¥78 billion
Maximum total payment	No particular limit is set. However, following Katrina, the limit on borrowing from the federal government was raised from \$1.5 billion to \$3.5 billion.	¥5 trillion. Under law, if the total exceeds ¥5 trillion, benefits will be proportionately reduced.
Participation rate	Varies by region, ranging from over 70% in some areas to a few percentage points in others.	Varies somewhat by region. Nationwide, 37.4% of fire insurance policy holders also had earthquake insurance in 2004.
Recent developments	The Flood Insurance Reform Act of 2004 revises compensation for properties subject to repeated claims. Disaster victims receiving benefits in multiple incidents are subject to revised compensation.	Study is underway concerning introduction of a system to discount insurance premiums for existing buildings as well, reflecting the results of earthquake resistance evaluation by local governments and the like. Income tax deductions for earthquake insurance premiums are also being considered as a way to promote adoption of earthquake insurance.

*NFIP: <http://www.fema.gov/nfip/>

**Earthquake Insurance: <http://www.nihonjishin.co.jp/english/index.html>

flood damage is covered by private insurance alone, due to the country's past experiences and flood control characteristics. However, earthquake risk involves the potential for large-scale natural disasters throughout Japan, so it is necessary for the national government to provide support in the form of reinsurance. Some problems with NFIP have been pointed out following the hurricane disaster.

First, it is difficult to rebuild a house with NFIP insurance benefits alone.

Insurance coverage is limited to the primary dwelling, and there are limitations on insurance benefits for the building and household goods. The approach of placing limits on insurance benefits is often used in public insurance systems. For example, there are limited benefits in Japan's earthquake insurance, which only pays up to half of the benefits from fire insurance (NLIRO, 2003). This limited coverage is one reason why homeowners may hesitate to purchase insurance from NFIP. Homeowners may also purchase insufficient coverage because of high insurance premiums, resulting in inadequate benefits in case of a claim. According to FEMA, the average insurance premium with NFIP is \$438 per year. For a nonprofit public insurance program that only covers flood damage, this is quite expensive. Homeowners hesitate to purchase flood insurance because of the high premiums and limited coverage.

Second, NFIP does not cover miscellaneous costs associated with a flood, such as temporary living expenses. "Not having that coverage is going to bankrupt a lot of people," said Alex Soto, an insurance agent in Miami. According to Edward Pasterick, spokesman for NFIP, "Covering additional living expenses would be very expensive. It might put the price of the coverage out of reach." (Both quotes from www.sun-sentinel.com, "Floridians keep eye on program as reform urged," October 9, 2005.) Japan's earthquake insurance also consists only of damage insurance and does not cover any incidental expenses. Proposals have been made several times in the past to introduce coverage for incidental expenses, but as in the case of NFIP, this was abandoned because increases in insurance premiums would be inevitable.

Third, there are issues related to the need for flexibility and more efficient handling of claims settlement. One troublesome point in the administration of a natural disaster insurance program is that a large number of claims occur simultaneously. It is important to handle claims settlement promptly, but there are limits to the extent of advance preparation that can be done, and the costs are considerable. Although a large number of claims adjustment officers were dispatched from all over the U.S., New Orleans remained underwater for a lengthy period of time, and it was initially a slow process to check on damaged properties. As disaster victims demanded a faster and more efficient claims settlement response, FEMA decided to use aerial photographs to reach a decision about properties located within certain areas, without requiring on-site confirmation. In the kind of massive ocean-trench earthquake that is expected to occur in Japan in the future along the Tokai-Nankai Trough, an unprecedented number of claims would be inevitable. The Katrina experience can serve as a valuable reference.

Last, issues related to risk communication can, in a sense, be seen as

the most important problem area. On October 17, the *Washington Post* reported that in the Lower Ninth Ward of New Orleans, which suffered heavy flood damage, few residents had purchased flood insurance because this area had been evaluated as low-risk in a flood insurance map prepared by FEMA. (*Washington Post*, "Risk Estimate Led to Few Flood Policies: For Most in New Orleans' Ninth Ward, Extra Coverage Wasn't Required," October 17, 2005.) Mortgage companies generally require NFIP policies when taking out a home loan, but there was no such requirement in this area.

This reality is not only a problem of insurance, but also involves important problems regarding risk evaluation for low-frequency events as well as the expression and interpretation of such evaluations. In this case, the results of risk evaluation were used and interpreted in a manner that ended up having the opposite effect to its intended outcome of reducing risk.

3 Debate on the Accuracy of Claims Settlement Models

A Swiss reinsurance company has estimated the total damage from natural disasters worldwide in 2005 at \$225 billion. Damage from Hurricane Katrina is estimated at \$135 billion, or 60% of the total (Swiss Re.: <http://www.swissre.com/>).

Forecasting techniques have reportedly become more accurate and sophisticated due to advances in computer technology in recent years. Damage estimates are calculated with predictive functions based on variables regarding the strength of a disaster event and the vulnerability of property subject to damage. In general, wind speed is the central factor in the destructive force of a hurricane or typhoon, and wind speed is generally used as the index expressing damage strength. However, this technique alone cannot produce accurate estimates when levees are breached and flooding also enters the picture, as in the Katrina disaster.

Market trust for modeling technology has reportedly declined because of the wide range of damage forecasts, from several billion to several hundred billion dollars. This subject was discussed at a reinsurance conference held in Monte Carlo in September 2004 (*Business Insurance*, "Modeling Helpful but no Substitute for Underwriting," September 26, 2005). As simulations become more sophisticated, the reproducibility of physical phenomena has greatly improved. Meanwhile, information concerning the damage involves elements that are difficult to quantify regarding the attributes of buildings, household goods, and other insured property, and there are limits to the level of accuracy that can be achieved. The insurance industry is gaining a better understanding of the limits and uses of modeling, but it is dangerous for

underwriting to rely on modeling alone.

Another basic problem in the future modeling of natural disasters is that opinions are divided on predictive elements for climate change and large-scale abnormal events. More highly accurate research is needed regarding the effects that global warming due to increases in carbon dioxide levels will exert on catastrophic events. For the determination of probable maximum loss (PML), an important index in insurance operations, further debate is also needed regarding future predictions and the probability of detection of large-scale natural disasters that have not yet been experienced.

4 The Role of Insurance in Societies where Inequalities Exist

NFIP is a special type of insurance with a highly public nature, administered by the federal government. Nonetheless, as stated earlier, its insurance premiums are certainly not cheap. With natural disasters such as floods, another dilemma is that low-income residents who are unable to afford high insurance premiums live in high-risk areas, and as a result, the system cannot function effectively when a disaster occurs. No matter how excellent an insurance product may be, it is meaningless unless it is available. Even if a policy is obtained, no one will purchase continuing coverage unless it is affordable. The keys to the widespread adoption of insurance are availability and affordability. In New Orleans, a vicious cycle has emerged in which poor people cannot obtain insurance benefits and are unable to return to the neighborhoods that were their homes, resulting in further delays to reconstruction.

Insurance is a mirror that reflects a country's society. An excellent insurance system should disperse risk in an effective and impartial manner. The time has come when we must consider how to keep the future of Japan from becoming like the difficult reality faced by American society, with its large inequalities.

5 Summary

Every year, losses from natural disasters continue to increase in the worldwide insurance market. Along with the risks of terrorism and widespread infectious diseases such as avian influenza, natural disasters remain a serious threat for the non-life insurance business. With disasters of this scale, a surprising number of points in common can be found in a variety of subsequent discussions, going beyond the type of disaster or differences among countries. After the Hanshin-Awaji (Kobe) Earthquake, the immunity of fire insurance from earthquake claims was contested in court, and proposals from many quarters called for the creation of a funding system for natural disasters.

Media coverage following Hurricane Katrina was reminiscent of the situation in Japan just 11 years ago. We have many lessons to learn from Hurricane Katrina.

The Kobe Earthquake gave impetus to the preparation of various natural disaster hazard maps in Japan. National Research Institute for Earth Science and Disaster Prevention (NIED) provides probabilistic seismic motion forecasting maps on its website (Japan Seismic Hazard Information Station, <http://www.j-shis.bosai.go.jp/>), and now everyone can easily find the earthquake risk for their own area of residence. Local governments are working hard to prepare river hazard maps. We have reached an era when each individual will judge his or her own level of risk and make decisions on that basis. The Participatory Flood Risk Communication Support System (PAFRICS) is expected to play a large role in this kind of progress. It is necessary to actively promote risk communication based on the effective use of IT, while taking care to avoid the future development of a digital divide.

References

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