"Catastrophe Insurance, Capital Markets, and Uninsurable Risk"

Dwight M. Jaffee & Thomas Russell

The Journal of Risk and Insurance, 1997, Vol. 64, No. 2, 205-230

Synopsis by William Reimer

When examining the issue of risk management, whether at the corporate or personal level, the possibility of catastrophic events occurring must be considered. Dwight Jaffee and Thomas Russell explore the question of why options to transfer the risk of catastrophic events are limited. On the face of it, a market for catastrophe insurance would be expected to exist because the traditional factors that drive an insurance market are present. Catastrophe risks would be expected to be associated with high insurance demand, thus giving insurers two of the pre-requisites for an insurable risk: a large pool and a fortuitous loss. However, catastrophes are by definition events that may impact a large number of insured assets which violates a third pre-requisite for a risk to be insurable in the private markets. Jaffee and Russell address the question of private market failure within the United States and offer several reasons for market failure. In their study, Jaffe and Russell found that the private market has no incentive to offer catastrophe insurance due to accounting rules, income taxes and takeover risk. Jaffe and Russell show that firms have no incentive to accumulate a large pool of capital because it cannot be earmarked for the specific purpose of paying catastrophe claims.

Catastrophe Insurance in Practice

Jaffe and Russell call on Zeckhauser who stated: "catastrophes provide a principal justification for insurance. One pays premiums to secure financial protection against low probability, high consequence events—what we normally label catastrophes."[1] Jaffee and Russell examine traditional high risk areas for catastrophes to show the effect catastrophe insurance has on the private market. For example, catastrophe insurance was required to be an option on homeowners' policies by California state law in 1995. This forced insurance companies to either completely exit the market or take on risks from a catastrophe. After the Northridge earthquake in 1994, 93% of insurers either exited the market for homeowners insurance or imposed strict limits on the policies they were willing to sell. This example highlights the problems faced with the uncertainty, magnitude, and stipulations that insurance companies have to follow when insuring catastrophes. One of the problems faced by insurers within the California market was strict rate regulation. Insurers had to have prior approval of rates by the state before they could implement them and the rates were often contested or not fully endorsed by the state.

Jaffee and Russell argue that nothing in the nature of catastrophe risk should prevent the operation of private market insurance if insurers take a long-run view of the market where many years of non-catastrophes can help offset the lower probability catastrophic event. However, Jaffee and Russell go on to state that "a viable, private insurance market must solve the intertemporal problem of how to match a smooth flow of annual premium receipts to a highly volatile flow of annual loss payments."[2] The authors argue that the problem is not a fundamental insurance market problem;

[1]Jaffee & Russell pg. 205

[2]pg. 206

rather it is a capital market problem in which the current institutional arrangements are not conducive to a solution.

The Absence of the Private Market in Catastrophe Insurance

To begin, Jaffee and Russell explore several problems which may justify why catastrophe risks are seen as uninsurable by the private market: information problems of adverse selection and moral hazard, the relative severity of a catastrophe to an insurer, and the probability of loss is not susceptible to precise actuarial calculation. In addition to the several problems listed above, there are also regulatory barriers that stand in the way of making catastrophe insurance feasible to the private market. Combined, these issues and barriers make the private insurance market weary of handling catastrophe insurance with a public institution filling the void.

Jaffee and Russell assert that information problems like adverse selection are not an issue with catastrophic events because the risk of catastrophic loss is generally not asymmetrically perceived by parties to the contract and can be eliminated through vigorous investigation into claims following a catastrophic event. Catastrophic events are unpredictable in both nature and scope which makes it difficult for insurers to calculate the probability of loss and the severity of a loss and, in turn, calculate accurate premiums. For example, in California you can have minor earthquakes which cause relatively little damage or you can have large earthquakes which cause the catastrophic loss that has been seen in past major earthquakes. This unpredictability of catastrophic events paired with several other factors that are identified make it near impossible for the private market to offer insurance for catastrophes.

The authors note that the four factors that prevent the private market to provide catastrophe insurance are: 1) the accounting rules that prohibit accumulated surplus as irreversibly dedicated reserves against future possible losses, 2) retained earnings are fully taxable, even when used to accumulate capital surplus for possible future catastrophe loss, 3) the size of the market for reinsurance is limited which allows for only a small amount of hedging, and 4) regulatory constraints do not allow high enough premiums that would be required for catastrophe insurance.[3]

Jaffee and Russell note that a big challenge to financing a catastrophe is arranging a capital pool that is able to finance the upper layers of catastrophic risk. The capital pool is needed because, unlike traditional insurance pools where premiums are matched accordingly to a relatively smooth and calculated risk, catastrophes are extraordinarily severe in the early years of the exposure. Jaffee and Russell suggest that insurers need to have access to a large pool of funds from the time they elect to bear the risk. The lack of large pools of unused capital big enough to insure a widespread catastrophes, act as one of the biggest barriers to traditional catastrophe insurance in the private market.

The authors assert that one of the reasons that pools of capital able to cover the magnitude of losses do not exist are due to accounting requirements within the United States. Under Financial Accounting Standards Board (FASB) rules, an insurance company to earmark capital surplus to pay for future catastrophe loss, a constraint limiting interest in a capital pool to manage a catastrophic exposure. Following this rule, any capital pool that the company had in the case of a catastrophe loss would be taxed as corporate income in the year they were set aside which leaves no incentives for insurance companies to do so. An additional risk of having a large pool of capital is the threat of a hostile takeover. As Jaffee and Russell argue, a company with a large amount cash would offer the opportunity for an acquiring company to not only gain control of a profitable business but also a large amount of capital would put towards its own investing activities rather than the original intent of the capital.

[3] pg. 223

Capital markets have tried to substitute products for catastrophe insurance such as reinsurance, act of God bonds, and catastrophe futures and options. Reinsurance allows a corporation to reduce the size of its potential losses but it does not allow the complete removal of losses due to catastrophe. Additionally, contracts sold in the capital market are only good for certain periods of time and capital flight may occur leaving a company without the protection that they required. Act of God bonds are financial instruments in which bonds are issued to an insurance company in advance of a catastrophe with the condition they will only be exercised in the event of a catastrophe. Catastrophe futures and options were introduced by the Chicago Board of Trade (CBOT) in 1992, however these contracts have been traded very lightly due to the problem of finding takers to be on the risk bearing side of the options. As noted by the authors, pricing the options is also very difficult given the uncertainty in predicting the probability, time, and cost of catastrophes.

The regulatory structure of the United States stands as a significant impediment to the private insurance market accepting a catastrophic exposure. Both the FASB and the IRS have resisted changes in accounting and tax law that would enable the private markets to offer catastrophe insurance. FASB refuses to change accounting rules that prohibit the assignment of accumulated surplus as irreversibly dedicated reserves against possible future losses and the IRS has refused to change tax law where retained earning used to accumulate a capital surplus for the possibility of a future loss would be tax exempt until moved for other purposes. Additionally regulatory constraints and limits on premiums make it difficult for an insurer to properly offer policies in a fair manner to both the insurer and the insured.

Because of the difficulties that the private market faces when looking at catastrophe insurance the government has taken on the primary role of providing a type of catastrophe insurance. Three states in particular have developed plans to implement catastrophe insurance: California (Earthquakes), Florida (Hurricanes), and Hawaii (Hurricanes). These states have implemented involuntary underwriting associations in which state entities function operationally as insurance companies, collecting premiums, purchasing reinsurance, and playing claims. The government on both the state and federal level have disaster funds and agencies which will assist in rebuilding after a catastrophe. The government relief program, FEMA, take on risks without the receiving direct premiums.

Concluding Remarks

In conclusion, Jaffe and Russell find that the private market has no incentives to offer catastrophe insurance due to the several factors that challenge entry into the market with the absence of regulatory change that would make such insurance economically feasible to an insurer. Firms have no incentive to accumulate a large pool of capital because it cannot be earmarked for the specific purpose of paying catastrophe claims. Jaffe and Russell propose that a way must be found to allow insurance companies to retain premium income as earmarked capital without tax penalties to protect itself against expected losses over time. Jaffe and Russell conclude that if private markets are not made "viable" by the government, then "taxpayers may well be the ultimate source of funds if a major loss occurs."[4]

[4] p. 228