



The Prospect of Catastrophe Securitization in China

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Abstract

The purpose of this paper is to prospect catastrophe securitization in China. The catastrophe security market is well developed in developed countries, but in much of Asia it is in its early stages. The reason attributed for this is the close interdependencies of corporates and insurance companies in funding their risk exposures, and the lower prevalence of sophisticated risk management practices. However, things slowly started changing in Asia, especially in China, with corporate recognizing that better risk management practices have a positive affect on their financial earnings. The securitization of catastrophe risk has the potential to rapidly alter the China's risk management landscape. Through development of the catastrophe security markets, policyholders can be protected from (re)insurer's credit risk, (re)insurers can overcome the limitation of capacity, and investors investing capital markets can diversify their portfolios. The growth and survival of the catastrophe security market in China lies in coming up with the products to suit the diverse needs of various customers and act as a close substitute for the traditional insurance market.

Keywords: Catastrophe, Securitization, Alternative Risk Transfer (ART), Traditional Insurance Inefficiencies

I. Introduction

Recently, the importance of the Alternative Risk Transfer (ART) instruments, including catastrophe securitization, has grown because the exposures to man-made and natural catastrophes such as hurricanes and earthquakes have increased dramatically in the world. (Note 1) Following a series of costly catastrophes, including Hurricane Catrina and the Pakistan-India Earthquake in 2005, the Asian Tsunami Disaster in 2004, primary insurers have experienced a difficult time in obtaining catastrophe coverage due to the capacity limits of the worldwide reinsurance market. Furthermore, aggregate catastrophe exposures are too great for the capital of the traditional insurance and reinsurance industry. Many experts expect that the insured losses from catastrophic disasters in the future are beyond any figures previously imagined because the insurers' exposure to natural catastrophes is constantly increasing. However, while \$100 billion represents one-third of the equity capital of US property-liability insurers, such a loss amounts to only about 0.5 percent of the value of US stocks and bonds. Therefore, if a way could be found to access securities markets directly, it would be solve the problem of financing catastrophic risks. (Note 2) That is the reason why catastrophe securitization has become a major topic of debate in the world.

China has also suffered from serious natural disasters for many years, including the Si-Chuan earthquake and snowstorm in 2008, SARS in 2003. In addition to these natural disasters, strong economic growth will continue to underpin insurance demand, but the traditional insurance market is not capable of providing economic and smart solutions in China. Experts argue that China is also confronted with serious economic problems such as finance, employment, agriculture and a big gap between rich and poor, and that the financial problem is the most important thing. Furthermore, alternative forms of risk transfer for corporate clients are still in the early stages in China. This slow development compared with other countries can be attributed to the close interdependencies between industrial companies and insurers that are controlled by government, as well as the relatively underdeveloped risk management culture. However, things slowly started changing in China. The Chinese government is aggressively taking a second look at its risk management practice. It is also considering to setting up catastrophe funds and to allow various kinds of capitalization like financial reinsurance, catastrophe bonds and insurance derivatives. At the same time, corporates have recognized that better risk management practices have a positive effect on their earnings, so they are eager to import risk management practices from developed countries.

In China the potential for the growth of catastrophe securitization is considerable. Especially, the ongoing globalization, deregulation of additional industrial and service sectors, and the rapid change in the risk landscape are paving way for the development of the catastrophe security market. At this moment, it is important to analyze the possibility of importing various risk-linked securities that could give an economic positive effect, and suggest some guidelines that can help everyone better understand catastrophe securitization. This study starts by presenting the most important ART products, and identifies the key features of ART. The second section discusses reasons for developing ART and attempts to develop a conceptual framework for the catastrophe securitization in China that follows.

2. Alternative Risk Transfer

The term Alternative Risk Transfer was first used in the US at the beginning of the 1990s to describe various forms of self-insurance like Captive and Risk Retention Groups that were formed by corporate to deal with risk exposures. But over years the concept of ART has become the mainstream of corporate risk management practices with the active participation of both the insurers and corporates. Catastrophe securitization is one of financing instruments used as part of ART. Types of ART are summarized on Figure 1.

Insert Figure 1 Here

ART is a blend of the use of insurance and capital market instruments and typically consists of the use of one or a combination of the following products: captive insurance, finite risk, catastrophe security. ART products aim at increasing the efficiency of the risk transfer, broadening the possibility of insurable risks and accepting the capital markets for additional capacity. The key features of ART products are summarized on table 1.

Insert Table 1 Here

3. Reasons for developing ART

3.1 Improve the Efficiency of Risk Transfer

The primary objective of developing ART is to improve the efficiency of risk transfer. That is, the inefficiencies of traditional insurance have contributed to the development of alternative risk transfer solutions. The structural inefficiencies of traditional insurance are shown on Figure 2.

Insert Figure 2 Here

The primary limitation of the traditional insurance is Information Asymmetry. An analysis of the insurance costs shows that the difference between the premium and the expected loss is high. This result is come from the information differences between insurers and policyholders. (Note 4) This limitation can be reduced through alternative risk such as captive insurance, finite risk and risk-linked securitization.

The second is Adverse Selection. Traditional insurance prices are calculated on the basis of average risks, and are therefore higher than the risk-adjusted premium rates for good risks. As a result, good risks are becoming increasingly reluctant to subsidize bad risks, and are turning to self-insurance or captive insurance instead.

The third is Moral Hazard. With insurance there is a danger that the policyholder has little incentive to prevent or contain a loss. In the case of self-insurance, the policyholder has a direct incentive to adopt suitable risk management measures to prevent losses or keep losses to a reasonable level. Various alternative risk transfer products can eliminate the problem of moral hazard by defining the loss event on the basis of a physical event. Moral hazard is also a potential problem in catastrophe securities where the contract payoff based on the losses of the insurer issuing the securities. In most of the catastrophe bonds issued so far, moral hazard is dealt with by including a percent

Coinurance in which the insurer collects only certain percentage (usually 90 percent) of its catastrophe losses after the triggering event occurs. The indexed linked products have also been developed because the moral hazard of index linked contracts is very low.

The forth is Credit Risk for the policyholders. There is danger that the (re)insurer will not have sufficient funds to cover a claim. In fact, there are many insurers going bankrupt because of large natural catastrophe losses in the 1990s. However, the credit risk of a catastrophe bond is close to zero because the trust that is hold by issuer is funded with safe securities and exists only for the purpose of this single transaction. (Note 5)

3.2 Increase Capacity

The policyholders' exposures to catastrophes are constantly increasing because of demographic trends and rising property values. Many experts expect that the insured losses from catastrophic disasters in the future are tremendous. However, from time to time large companies find that no cover is available for catastrophic risks that threaten their existence due to an lack of capacity on the (re)insurance markets.

Projected catastrophes like a \$75 billion Florida hurricane or a \$100 billion California earth quake would severely stress the capacity of (re)insurance market. However, while \$100 billion represents one-third of the equity capital of US property-liability insurers, such a loss amounts to only about 0.5 percent of the value of US stocks and bonds. Therefore, if a way could be found to access securities markets directly, it would be solve the problem of financing catastrophic risk. These securities are bought by investors such as hedge funds and pension plans that receive a premium above usual market yields for bearing the catastrophic risks. (Note 6)

3.3 Portfolio Diversification

Financial investors may find it is worth investing in risk-linked securities like catastrophe securities because it allows them to diversify their portfolio even further. That is, investors such as hedge funds and pension plans want to buy a

security that creates an exposure to a large loss in the event of a hurricane or earthquake because such investments form only a small part of their highly diversified portfolios. In principle, catastrophe securities are valuable to investors because catastrophe losses are zero-beta events with their financial portfolio. The correlation of catastrophe losses with capital market security returns is close to zero. Zero-beta securities are valuable for diversification purposes because they make it possible for investors to reduce risk for any given level of expected portfolio returns.

3.4 Market Innovation

Many new and innovative financial instruments have a very tremendous effect on the development of the ART market. Over years, the traditional insurance market has failed to come up with new products and process innovation. Furthermore, the insurance market is lacking speed and adaptability to meet the ever changing risk needs of corporates and risk managers. As a result, corporate started questioning about the value of insurance products and their inability to recoup major catastrophic losses and lack of flexibility in the products of insurers had also fuelled the growth of ART market. ART market continues to grow in volume and new innovative instruments. The market is also being introduced every year with new features to tackle catastrophe risks. In addition, the role of brokers, bankers and reinsurers are commendable because of their interest and eagerness to invest in new products and take additional risks in financing. The increased sophistication of risk managers, the convergence of actuarial sciences, developing financial mathematics, and capital market innovations also paved way for the emergence of sophisticated risk reduction products.

4. The Prospect of Catastrophe Securitization in China

According to the report, World Insurance in 2008, by Swiss Re that is one of leading insurers in the world, emerging markets will be at the frontier of insurance in the 21st century. Recently, the financial crisis and the falling stock markets have had a negative impact on insurance premium growth in the world. For the first time since 1980, world insurance premium volume fell by 2% in 2008. Premiums in the emerging markets, however, continued to register double-digit growth.

Insert Table 2 Here

Among the emerging markets, China is very much in the spotlight because of their huge populations, growing economic importance and fast liberalizing regulatory regimes. Life insurance premiums in China have grown by an annual average of 25% over the last decade, while non-life premiums have grown by 12% over the same period. In fact, China is the 6th largest life insurance markets and 10th in terms of non-life insurance worldwide in 2008. However, major losses from the severe snowstorm in January and the Sichuan earthquake in May have hurt profitability. The premium growth is expected to remain strong at 20% per year in the next decade due to robust economic growth, increased stability, favorable regulatory, as well as new product offerings and distribution channels. (Note 7)

Despite this impressive growth rates, China market is still relatively small, accounting for only 3.3% of global insurance premiums. However, its huge economy and population size, coupled with rapid industrialization and globalization will create ample opportunities for the rapid development of insurance industry. In particular, liberalization and deregulation are rendering this de-monopolized market more accessible and attractive to foreign insurers.

China has also suffered from various natural catastrophes. In 2008, natural catastrophes caused approximately 100,000 fatalities and led to economic losses of USD 150bn, making 2008 one of the costliest catastrophe year in history. The trend towards higher losses continues in view of the risk factors: higher population densities and higher concentrations of insured value, especially in endangered area. (Note 8) Top ten catastrophe disasters in China are shown on table3.

Insert Table 3 Here

It is clear that the potential loss from an even greater catastrophe could severely challenge the China's entire economy. However, many policyholders have faced that no cover is available for catastrophic risks due to a lack of capacity on the (re)insurance markets. The Chinese government considers thus to set up catastrophe funds and to allow various kinds of capitalization like catastrophe bonds and insurance derivatives. Chinese corporates also realize the importance of risk management and eager to import high-level risk management practices from developed countries. Furthermore, foreign-owned insurers that already open their branch in China aggressively try to sell their innovative products such as catastrophe bonds and insurance derivatives. Over fifty foreign-owned insurance companies are now operating in China including Lloyd's of London that is one of the biggest reinsurers in the World. The China Insurance Regulatory Commission (CIRC) has already licensed several asset management companies owned by foreign shareholders like Swiss Reinsurance company under the new "Provisional Regulations on the Administration of Insurance Asset Management Companies" which came into effect on June 2004. These companies aim to develop various risk management skills to improve their profit margins while effectively handling catastrophe exposures for China's insurance industry.

Many insurance experts expect that the innovative risk management concepts can be applied to risks that were uninsurable in the past in China. That is, the use of insurance derivatives as protection against previously uninsured

threats to the earnings of an industrial or service company offers a lot of potential. Weather is a good example. The revenue of many different companies are susceptible to weather pattern such as energy producers and building firms, food and beverage manufacturers, companies in the leisure sector and many more besides. Detailed analyses of the degree to which the sales of certain companies are dependent on temperature, rain, snow, sunshine, etc will encourage the emergence of specific insurance derivatives.

At the same time, with financial markets becoming more and more volatile, a wide range of new financial instruments has come into the market for hedging systematic risks in China. Many financial derivatives already exist in the Chinese financial market and the most prominent financial instruments are futures, options and swaps. It is vital to recognize that various financial derivatives are an integral part of some of the most critical financial reforms now being carried out in the Chinese government because the lack of various financial derivative products including risk-linked securities seriously hinders active participation from domestic and foreign professional institution investors. Therefore, the China Securities Regulatory Commission (CSRC), the China Bank Regulatory Commission (CBRC) and the China Insurance Regulatory Commission (CIRC) make a joint effort to further develop the financial derivative market and provide hedging products for investors. For the first step, CSRC is considering launching stock index futures in near future. These financial instruments are creating a new challenging environment for the China insurance industry. Insurance swaps of insurance derivatives will be accepted at first. (Note 9) Many Asian multinational companies have used insurance swaps because the insurance derivative is convenient for use and more profitable. (Note 10) The presence of many professional institutional investors including QFII (Qualified Foreign Institutional investors), insurers, securities brokers and social securities companies would also make it more likely that derivatives market are run properly in China.

Meanwhile, globalization is making some industries such as energy, marine shipping and aviation vulnerable by the price fluctuation in the world market. Large companies' social liabilities and financial burdens are also rapidly increased under new statutes such as "Act of Insurance against Industrial Injury" and "Product Quality Law" in China. (Note 11) In addition, large infra-structure projects now depend increasingly on private financing. Both principals and contractors are being confronted financial risk exposure following the shift from governmental funding programs to private funding schemes. These conditions compel the parties involved to acquire the possible insurance cover. But although it is difficult to purchase appropriate coverage through the Chinese insurance markets, direct insurers cannot deal with foreign reinsurers without permission of CIRC according to Reinsurance Regulations effect on 2004. (Note 12) This will continue for a while, so both underwriters and other parties have to solve the problem in domestic insurance markets. These conditions have prompted a sharp rise in demand for new types of catastrophe securities. Securitization can also be driven by large scale corporations that issue catastrophe securities directly in capital markets bypassing the insurance and reinsurance markets.

There are a number of factors that can affect the success or failure of catastrophe securitization offerings in China. One factor is credit risk that the contracting party to the transaction will fail to when the triggering event occurs. The credit risks of catastrophe bonds and exchange traded options are low. But the credit risk of catastrophe equity put options is relatively high because the puts traded are not issued through an organized exchange much like traditional reinsurance. So it is important that organized exchanges control the credit risk through appropriate instruments. Another important factor in securitization is moral hazard. Moral hazard can be occurred that the insurer will write too much insurance in regions protected by the catastrophe securities. In most catastrophe bonds, moral hazard is dealt with by including percentage coinsurance in which the insurer collects only certain percentage of its catastrophe losses. The purpose of the coinsurance is to reassure bondholders that the insurer will not act against their interests. Another method to prevent moral hazard is to use index-based contracts. The moral hazard of index-based contracts is very low because they can eliminate moral hazard through the parametric criterion. One of the most important factors in catastrophe securities is basis risk. Basis risk is the risk that the payoff of the catastrophe securities will be less than perfectly correlated with an insurer's losses. When the payoff is based on an index, the insurer will collect more or less than it expects. Various studies is being made to solve the basis risk problems. (Note 13)

Li and Wu also point out several problems for developing of Chinese insurance industry: the issue mechanism of securitization have to change, the domestic financial market should provide a better exchange environment to securitized products, and the securitized products make more challenges for regulations. (Note 14)

Although the catastrophe securities issued to date have been private placements, the development of a public market is within the next decade. The standardization and simplification of the contracts are necessary for the development of a public market. Publicly traded catastrophe security could be issued on a wide range of events throughout the world. Recently, a guideline for securitization has been announced by the China Bank Regulatory Commission (CBRC) and the China Securities Regulatory Commission (CSRC). Following Japan and Korea that already have the law of asset-backed securitization, it is expected that a similar legislation will be passed in China. The catastrophe securitization will also affect the role of (re)insurers. Traditionally, (re)insurers have played the role of underwriters and

ultimate risk bearers for their policyholders. In the future, (re)insurers will bear less of risks directly and lay of higher proportion of risk to the catastrophe security markets. The widespread securitization of other types of insurance such as automobile, liability and life insurance will emerge in the near future. However, catastrophe securities will not replace traditional insurance cover but rather supplement them.

5. Conclusion

Over the past two decades, life and non-life insurance premiums have risen annually by 25% and 12% respectively in China. As a result, China is the 6th largest life insurance markets and 10th in terms of non-life insurance worldwide. The premium growth is expected to remain strong at 20% per year in the next decade due to robust economic growth, increased stability, favorable regulatory as well as new product offerings and distribution channels. On the other hand, China has suffered from various man-made and natural catastrophes. The policyholders' exposure to catastrophes is constantly increasing because demographic trends and rising property value are escalating the concentration risk in catastrophe-prone areas. Furthermore, catastrophe exposures in the future are great for the capital beyond any figures previously imagined. But policyholders have faced that no cover is available for catastrophic risks due to a lack of capacity on the (re)insurance markets. The Chinese government considers thus to set up catastrophe funds and to allow various kinds of catastrophe securities such as catastrophe bonds and insurance derivatives. Corporates also have recognized that better risk management practices have a positive effect on their earnings, and tried to import high-level risk management practices from developed countries.

The securitization of insurance risk has the potential to rapidly alter the China's risk management landscape. The customers such as policyholders, (re)insurers, investment banks and investors start demanding more innovative and customized solutions for risk management. However, the traditional insurance can not meet their needs because of its structural inefficiency such as information asymmetry, adverse selection, moral hazard, credit risk and capacity limitation. This is paving way the development of the catastrophe securities market in China. Through the development of the catastrophe securities markets, policyholders can be protected from (re)insurer's credit risk, (re)insurers can overcome the limitation of capacity, and investors can diversify their portfolios. The growth and survival of the catastrophe securities market in China lies in coming up with the products to suit the diverse needs of various customers and act as a close substitute for the traditional (re)insurance market.

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Notes

Note 1. The loss ratio for property insurance for 1992, 1994, 2001, 2003 and 2008 are very high reflecting catastrophic losses caused by Hurricane Andrew, Northridge Earthquake, Terrorist Attack on WTC, SARS and Si-Chuan Earthquake respectively.

Note 2. Cummins, J. David, CAT Bonds and Other Risk-Linked Securities: State of the Market and Recent Developments, working paper, 2007, p. 17.

Note 3. Warfel, William J., Reforming Risk Retention Groups, Risk Management Magazine 2003.

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Note 5. Swiss Re, The Picture of ART, sigma No.1/2003, pp 12-13.

Note 6. Cummins, J. David, CAT Bonds and Other Risk-Linked Securities: State of the Market and Recent Developments, working paper, 2007, pp. 17-20.

Note 7. Swiss Re, World Insurance in 2008, sigma No.3/2009, pp. 25-37.

Note 8. Swiss Re, Natural catastrophes and man-made disasters in 2008, sigma No.2/2009, pp. 11-13.

Note 9. Jang, Jong-Hag, The Prospect of Alternative Risk Transfer Market in China, International Symposium, Yanbian University of Science & Technology (YUST), 2005, p. 13.

Note 10. A Japanese insurer made a 2 million US dollar contract with a Swiss insurer at 2004.

Note 11. Ma Shi, Alternative Risk Transfer in China: Feasibility and Market Potential, 2004. 11.

Note 12. China Insurance Regulatory Commission, Economic Review for 21th Century, 2004. 12.

Note 13. China Insurance Regulatory Commission, Economic Review for 21th Century, 2004. 12.

Note 14. Cummins, J. David, CAT Bonds and Other Risk-Linked Securities: State of the Market and Recent Developments, working paper, 2007, pp. 18-20.

Note 15. Li Li Song and Wu Jun, The Catastrophe Securitization in China, Journal of Insurance Professional College, June 2009, pp. 5-8.

Table 1. Features of ART

Classify	Instrument	Feature
Captive Insurance	Captive Insurance	A captive is an (re)insurance vehicle that belongs to a company or group of companies that is not active in insurance industry itself, but mainly created to insure the risks of its parent company.
	Risk Retention Group (RRG)	RRG is a cooperative insurance entity or association captive made up for owners engaged in similar business practices and facing similar liability exposures. (Note 3)
Finite Risk	Multi line/ Multi year Products (MMP's)	The concepts of combining different categories of risk into one product over several years.
	Multi-trigger Products (MTP's)	Claims are only paid if in addition to an insurance event (first trigger) during the term of policy, a non-insurance event (second trigger) must also occur.
	Contingent capital	The raising of capital at pre-agreed terms is linked to the occurrence of an insurance event.
Catastrophe Security	Catastrophe Bonds	A ceding company will work with a special purpose reinsurance vehicle (SPV) that both assumes the ceding company's catastrophe exposure and issues the bonds to fund losses arising from this exposure.
	Insurance Derivatives	Instruments such as futures and options for natural catastrophe risks whose value is determined by the performance of an insurance specific index.

Source: The Association of Chartered Treasury Managers, Alternative Risk Transfer, 2000

Table 2. Top Ten Countries in Emerging Markets (Unit: USD Millions)

Life Insurance	Premium Volume	Emerging Market Share	Non-life Insurance	Premium Volume	Emerging Market Share
China	58,673	26.4%	China	33,810	17.0%
India	51,332	23.0%	India	28,973	14.6%
South Africa	34,430	15.5%	South Africa	20,501	10.3%
Brazil	18,533	8.3%	Brazil	9,763	4.9%
Poland	7,950	3.6%	Poland	8,345	2.4%
Mexico	7,653	3.4%	Mexico	7,677	3.9%
Malaysia	5,573	2.5%	Malaysia	7,402	3.7%
Indonesia	4,728	2.1%	Indonesia	7,201	3.6%
Thailand	4,521	2.0%	Thailand	6,977	3.5%
Chile	3,792	1.7%	Chile	44,71	2.2%
Total	197,177	88.6%	Total	129,619	68.0%

Source: Swiss Re, sigma No.5/2008

Table 3. Top Ten Catastrophe Disasters in China (Unit: USD Millions)

Date	Place	Event	Losses
2008. 5. 12	Si-Chuan	Earthquake	126,134
2008. 1	Southern China	Snowstorm	21,000
2002. 11-2003. 7	All Areas	SARS	17,900
1998. 7	Chang-Jiang Area	Flood	17,694
1999. 9. 21	Taiwan	Earthquake	9,200
1991. 6-7	Huai-He Area	Flood	4,146
1976. 7. 28	Tang-Shan	Earthquake	1,220
1975. 8	He-Bei Province	Flood	1,220
1954. 7	Chang-Jiang Area	Flood	1,220
2002. 7	Yun Nan Province	Flood	500

Source: National Bureau of Statistics of China, China Statistical Yearbook 2009

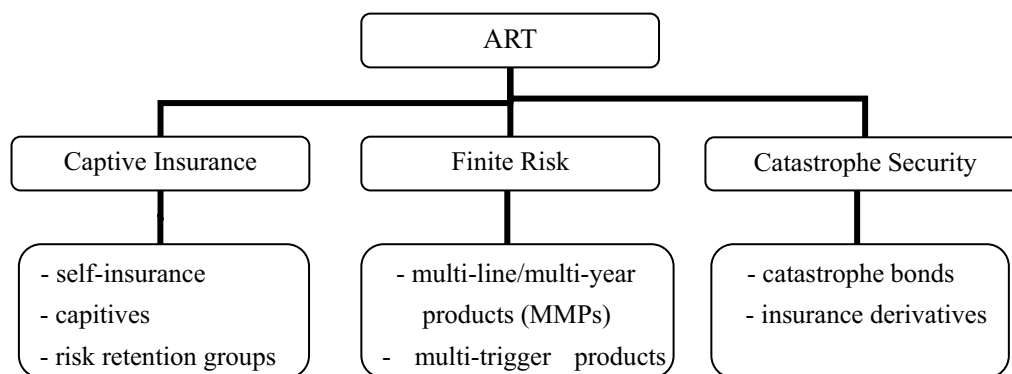


Figure 1. Types of ART

Source: Swiss Re, sigma No.2/2008

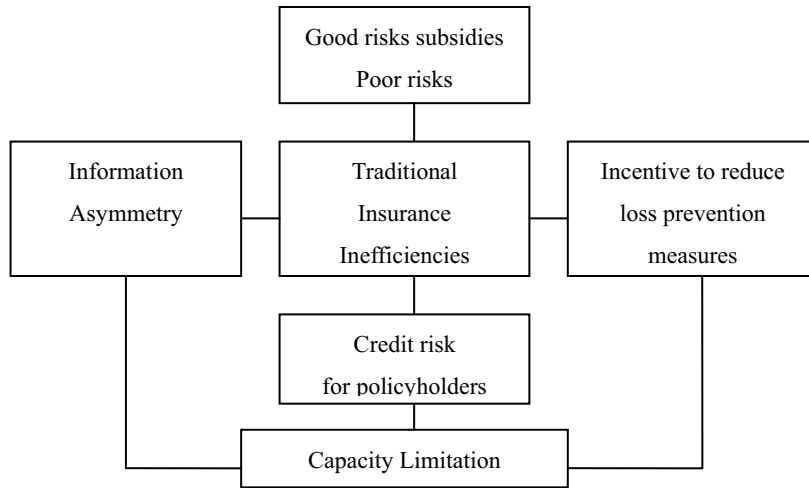


Figure 2. Structural Inefficiencies of Traditional Insurance

Source: Swiss Re Economic Research & Consulting