Risk Assessment and Pricing of Environmental Liability Insurance

Purpose of the Paper/Study

Current risk assessment methods are based on experience from past losses and potential insured loss scenarios. In general, the insurance industry lacks the experience-based values required to assess the corresponding risks because the new categories of damage listed in the environmental risks were not insured in the past. This applies to damage affecting water, land and air, and to protected species and natural habitats in particular. The paper is intended to collate and summarize the theory and practice of environmental liability insurance of insurance company completely. Upon the basis, the study further explores the risk assessment and pricing problem of environmental liability insurance. These studies will provide an inspiration for environmental liability insurance market development, also have an important theoretical foundation and practical reference for these products to be introduced and developed in insurance markets in developing countries, therefore will be more conducive to the environmental liability insurance rates and scientific management of non-life insurance insurers in China.

The Model and Methodology

1、Describe several possible approaches for assessing environmental loss exposures

Estimates of the probability for environmental liability insurance are highly ambiguous because of its limited statistical history. The probability of a claim and the magnitude of loss are poorly defined because causality is not clearly understood.

2、Discuss the efficient liability sharing factor for environmental disasters

From an economic point of view, use a structural model of the interactions between government, firm party and insurance company to discuss the efficient liability sharing factor. The available models and methods are as follows:

- principal-agent model
- comparative statics method
- optimization techniques
- externalities model
- value-based equivalency method

3、Build a model for hazard analysis

The insurance industry assesses risk on the basis of loss severity multiplied by loss frequency. As both frequency and severity are unknown in this area due to the absence of any loss history, traditional risk assessments are not an option. The alternative is to generate loss scenarios on the

basis of process analyses and models. This approach is known as exposure-based hazard assessment and comprises the following steps:

- process description
- derivation of process hazards
- identification of hazardous substances
- development of incident scenarios
- description of the effects of the incident
- quantification of the resulting costs

4、Study on pricing in environmental liability insurance

The available models and methods are as follows:

- decision tree approach to determine insurance premium
- neural network
- data mining
- fault tree and event trees to estimate the probabilities of an accident.
- fuzzy logic, such as a site-related model

Expected Results

1、The Optimal Liability Sharing Factor for Environmental Disasters: Economics-based
     Perspective

2、 Environmental Risk Pricing and Risk Assessment

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