Book review

Agricultural Insurance: Theory, Empirical Research and Experience – Based on Farmers Household Data
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Since joining the World Trade Organization, the Chinese Government has paid more and more attention to agricultural insurance, a supportive policy in the agricultural protection network. From 2007 to 2016, China's agricultural insurance premium increased from 5.18 to 41.71 billion yuan, and insurance coverage of crops increased from 15.3 to 114.7 million hectares. Agricultural insurance covers all the provinces in China, encompassing 211 varieties of crops and almost all fields of agriculture, forestry, animal husbandry, and fishery. China's agricultural insurance business is the largest in Asia, exceeded only by that of the USA. It ranks first in aquaculture and forest insurance①. Chinese Government subsidy for agricultural insurance totaled more than 100 billion yuan in 2007.

However, certain basic questions about agricultural insurance exist. What kind of role can agricultural insurance play in agricultural production? What factors affect farmers' participation in agricultural insurance? How efficient is agricultural insurance as a tool of agricultural support? How can China establish a better agricultural insurance system and improve its financial subsidy programs? The book *Agricultural Insurance: Theory, Empirical Research and Experience* by Dr Yuehua Zhang discusses these issues from a theoretical, empirical, and practical perspective.

This book displays Dr Zhang' outstanding research production on agricultural insurance from 2007 to 2017. In this book, field experiments were conducted and a large number of questionnaires were distributed about crop and livestock insurance. The large sample consists of 1,900, 1,300, and 600 hog farmers randomly selected by the method of stratified sampling from Zhejiang, Henan, and Hainan provinces, respectively, and the questionnaire surveys followed the farmers during the subsequent three to five years to form a panel data.

This book makes three principal contributions. First, it explains the policy objectives and theoretical basis of agricultural insurance. Second, it analyzes impacts of the agricultural insurance participation rate, insurance fraud, and how agricultural insurance affects farmers' production behavior. Third, it adds case analyses of agricultural insurance. The research production is embodied in the following five aspects.

1. A theoretical basis for agricultural insurance subsidy

Unlike traditional research on agricultural insurance in China, this book analyzes basic theories, such as the externalities of quasi-public agricultural insurance and quasi-public goods. It concluded that these two aspects cannot be the theoretical basis of China's agricultural insurance subsidy, nor can agricultural insurance explain the failure of the agricultural insurance market. As part of the agricultural production safety net, the purpose of agricultural insurance is to promptly recover farmers' reproductive capacity.

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2. The agricultural insurance participation rate

This book analyzes the insurance participation rate by surveying crop and livestock insurance in Henan and Zhejiang provinces, which presents a paradox: why do farmers choose not to purchase agricultural insurance, even though it is useful? With agricultural insurance premium subsidy, some farmers choose not to buy insurance, even though they pay only 10-20 percent of fair premium. In a survey of more than 700 farmers in Shanghai, Shanxi, and Jiangxi Province, it is found that because of the small-sized farming land, farmers pay less attention to agricultural production risk than to health and pension insurance. Farmers are far more susceptible to price risks than to natural disaster risks. Thus, choosing not to purchase natural disaster risk insurance is a rational decision. High transaction cost is another important explanation for low agricultural insurance demand. Because of insurers' low credibility, farmers are uncertain if they can actually claim insurance proceeds. This explains why farmers are reluctant to buy apparently "cheap" insurance.

From the perspective of farmers and insurance companies, this study on agricultural insurance participation rates reveals that farmers' age and education level boost insurance demand but have no significant impact on the supply of insurance products. Insurance companies focus on farmers' hog-raising history while experienced farmers sometimes are overconfident, which hinders the insurance purchase. The impact of hog production scale on farmers' purchase of hog insurance is greater than the impact of insurance supply. Although insurance companies prefer farmers who use pig vaccines, farmers tend to use the vaccine as a replacement for hog insurance.

3. Production behavior of farmers

The purpose of policy-oriented agricultural insurance in China is to rapidly recover the simple reproduction capacity of farmers and smooth farmers' annual income fluctuations. Financial subsidy and support of insurance premium decide the extent to which agricultural insurance affects farmers' production behavior, while the severity of the moral hazard determines the efficiency of agricultural insurance. The impact of policy-oriented agricultural insurance on farmers' production behavior is an important indicator that evaluates the performance of financial subsidy on agricultural insurance premium. The purpose of financial subsidy is not only to fund agricultural insurance but also to realize policy objectives. Research on the performance of agricultural insurance and its impact on the farmers' production behavior has been an important and global topic since 1990. However, due to the limitations of the data and of research methods, the research conclusions did not find a consensus. To explore the impact of agricultural insurance on farmers' production behavior and evaluate the moral hazard, this book takes Zhejiang Province in Eastern China and Henan Province in Central China as examples.

Readers will realize that the research is divided into two dimensions. Taking large farmers (who raise over 100 hogs a year) in Deqing County of Zhejiang Province as sample, first, this book analyzes farmers' choice of precautionary measures and the relationship between biological safety construction, the use of vaccines and insurance purchase with the structural equations, and then, taking advantage of changes in agricultural insurance policy in Deqing County in the year 2009 and 2010, this book studies the impact of hog insurance on the production behavior, especially those participating in hog insurance.

This book reveals that agricultural insurance not only impacts farmers' production behavior but also is affected by the macro-environment. For instance, the impact of hog insurance on the hog slaughter will be affected by the market price. From 2009 to 2010, when hog prices were high, hog insurance significantly affected hog slaughter in Deqing County; however, the hog mortality did not change significantly, also the moral hazard. This book scientifically identifies the impact of hog insurance on farmers' production behavior and evaluates the moral hazard, which have the policy implication for government and insurance companies to innovate insurance products. For example, a correlation between

insurance coverage and fluctuating hog prices can be established, which is helpful to change the fixed insurance coverage system to a floating system, so the hog production can be promoted when the hog price goes high, the moral hazard can be reduced when the hog price goes low, and the pork price will be stabilized.

4. Insurance fraud

Insurance fraud is one of the most important research topics in insurance. Very little current academic research on agricultural insurance fraud exists, mainly because it is difficult to collect data and unable to obtain the insured's true intention and behavior. Current research on agricultural insurance fraud mainly focuses on whether or not fraud exists. With the farmers' data from the agricultural insurance pilot and the data from insurance companies and the government, this book designed a research program and analyzed policy-oriented agricultural insurance fraud by taking the "underinsurance" of hog insurance and the catastrophic claims of rice insurance during the violent typhoon "Rosa" in Zhejiang Province in 2007 as example.

This book presents that hog insurance fraud can be circumvented to a certain extent by optimizing system design. By analyzing the township-level rice insurance losses and yield fluctuation data of four counties (cities) which are the most suffered areas in typhoon Rosa, this book shows no correlation between agricultural insurance claim rate and grain yield loss rate, which may be attributed to the deviation caused by current defects in agricultural insurance loss settlement technology for small farmers and to certain extent, due to the moral hazard of insurance companies who play the role of agricultural insurance policy agent.

This book defines the extent of insurance fraud in a scientific sense and provides a basis for policy improvement. The improvement of insurance systems, especially micro-systems, can limit the occurrence of fraud. Agricultural insurance fraud is largely caused by asymmetric information related to the investigation and settlement of claims, which in turn provides the means for various frauds (or agreement claims), thus reducing the efficiency of policy-oriented agricultural insurance.

5. Public health and food safety

As a risk management tool, agricultural insurance can affect farmers' production behavior. Theoretically, insurance moral hazard is often considered from the perspective of insurance companies, that is, changes in farmers' production behavior will increase the probability of loss but may not have a negative impact on society. This book discusses how hog insurance affects farmers' production behavior, to improve food safety (e.g. to prevent dead hogs from entering the pork market) and public health (to control the use of animal antibiotics). How to skillfully use moral hazard in insurance to heighten its positive social effect is one of the main issues discussed. During a field experiment in rural areas that measured moral hazard in agricultural insurance, it is found that farmers arbitrarily use animal drugs, and the questionnaires indicated potential food safety hazards. Agricultural insurance, as a means of risk management for farmers, will change their original risk management measures, which influence their use of animal antibiotics. And, hog insurance can reduce the preventive use of animal antibiotics. This book extends there search to the impact of agricultural insurance on farmers' production behavior to public health and food safety, and livestock insurance is suggested to be an incentive policy for food safety and public health.

Agricultural insurance: *Theory, Empirical Research and Experience* is proving to be a great resource. Readers who want to further study in this area will find it particularly helpful. However, it is also recommended for readers who are interested in research fields including agricultural risk management, agroeconomics, and public policy.

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