

Study on Influencing Factors of Policy Agricultural Insurance Performance in Guangdong Province

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Abstract

The aim of this study was to explore the key factors influencing the performance of policy-based agricultural insurance in Guangdong Province and suggest policy optimization. We analyze the relationship between the government, insurance companies and farmers. The expert interviews revealed the impact of farmers' insurance awareness, government subsidies, claims efficiency, product flexibility and local government implementation on performance. In the quantitative study, data were collected in eastern, central and western Guangdong by regional stratified sampling, and structural equation model (SEM) was used for analysis. Quantitative analysis verified the significant impact of government policy support, insurance supply capacity and farmers' demand on insurance performance. Through a combination of qualitative and quantitative research, this study not only verifies the hypothesis, but also provides practical recommendations for policy makers and insurance institutions to optimize policies and services. These findings have important theoretical and practical significance to improve the performance of policy-based agricultural insurance in Guangdong province, enhance farmers' insurance willingness, and promote the green development of agriculture.

Keywords: Guangdong, Policy Agricultural Insurance, Performance Factors

Introduction

Agriculture is the foundation of the national economy and has an important position in its development. Both in the past and in the foreseeable future, agriculture is the source of food and clothing and the basis of survival for human beings. Data from the Food and Agriculture Organization of the United Nations statistical database, the global production of primary crop commodities reached 9.5 billion tons in 2021, increasing by 54 percent since 2000 and 2 percent since 2020. The global gross value of agricultural production reached US\$4.12 trillion. Although the share of agricultural output in GDP has declined with industrialization, the fundamental position of agriculture has not changed.

Agricultural insurance is one of the important tools for agricultural risk management and an important cornerstone for the stable development of China's agricultural industry (Zhao, 2023). Agricultural insurance has a positive role in stabilizing the income of grain farmers, supporting rural revitalization, and serving to guarantee food security (Department of Finance, Ministry of Finance, China, 2023). We need to take the initiative to improve the level of agricultural insurance protection in China, stabilize the income of grain farmers, support rural revitalization, and better serve to guarantee national food security (Website of the Central People's Government of the People's Republic of China, 2023).

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Agricultural insurance can improve social welfare security and achieve welfare effects by increasing the income of farmers and promoting the rationalization of resource allocation (Zeng, Qi, & Wang, 2022). The increase in the level of agricultural insurance protection also has a significant role in promoting the growth of agricultural production efficiency (Liu, 2023). Agricultural insurance can also reduce economic losses in agricultural production due to natural disasters and other factors, thus maintaining farmers' motivation to engage in food production and ensuring national food security (Kong, Q, Li, R., Peng, D., & Wong, Z. 2023). Scholars also generally agree that agricultural insurance is important in maintaining national financial stability and increasing the willingness of poor rural households to adopt new technologies (Tang, Wang, & Hui, 2010). Agricultural insurance can shift farmers' attention from risk management to improved production techniques, thereby increasing farmers' income and stabilizing their production expectations (Zeng et al., 2022). Agricultural insurance is not only an important helper for the agricultural economy but also a common tool for the development of green agriculture, which can reduce chemical inputs and protect the environment (Li, Tang, Cao, & Guo, 2022).

Agricultural insurance performance is reflected in two layers of aspects, whether it enhances the gross agricultural product for the society and whether it gets paid out in time for the farmers (Li, 2020). The goal of policy agricultural insurance is whether it brings economic and social benefits under the premise of stabilizing farmers' income (Wang Xiufen, Wang Chunyan, & Li Maosong, 2017). The government and insurance companies are the supply side of policy agricultural insurance, and whether the behavior of these two main bodies synergistically and powerfully affects the satisfaction of agricultural insurance farmers and agricultural insurance performance (Jia, 2018). Many scholars also measure agricultural insurance performance under specific conditions, and in the context of rural revitalization, a policy agricultural insurance performance evaluation system is constructed from four perspectives: the level of protection, the level of government subsidies, the level of development power, and the level of poverty reduction capacity (You, Zhu, & Xu, 2022). Using the DEA model, the performance of agricultural insurance in China is measured from the macro and micro perspectives (Shen, 2017). For agricultural insurance companies in Gansu Province from the perspective of agricultural insurance premium income, agricultural insurance coverage and the level of protection to measure the performance (Li, 2018).

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insurance coverage and the level of protection to measure the performance (Li, 2018).

However, most scholars' studies show that the development of policy-based agricultural insurance in China is flawed and varied. The empirical results of 24 provinces over the past 10 years show that the overall performance of China's policy-based agricultural insurance is on an upward trend, but the performance of each province is different (You et al., 2022). The comprehensive performance level of China's plantation insurance is low, and there are obvious provincial differences (Li, 2018). The performance of all three stakeholders of agricultural insurance performance in Heilongjiang Province has performed poorly. There is still a large gap between the level of agricultural insurance development and high-quality agricultural insurance (Jiao, 2021). There is a certain spatial difference between the efficiency of agricultural insurance in Liaoning Province between the central region and the efficiency level of the north and south (Gu, Chen, & Wan, 2022).

Agricultural insurance performance is variable and also influenced by many factors. Incentives, capabilities and institutional factors, are the three main motivations for purchasing crop insurance (Rajeev & Nagendran, 2023). Standing on the perspective of farmers, the amount of agricultural fertilizer construction, agricultural insurance premium income, the number of financial subsidies for agricultural insurance, agricultural insurance density, per capita disposable income of farmers, agricultural insurance compensation expenditure, crop sowing area, and the depth of agricultural insurance will also have an impact on the policy agricultural insurance performance (Wang, 2023). From the perspective of insurance companies, unstable business operations of insurance companies, serious impacts by natural disasters, insufficient application of science and technology, and insufficient synergy of agricultural information will also affect agricultural insurance performance. The government's subsidy coverage is not high, covering few types of insurance, and low subsidy standard will likewise affect agricultural insurance performance (Jiao, 2021).

We found that agricultural insurance has developed rapidly, but there are defects and differences in the development of agricultural insurance. This paper focuses on the performance of agricultural insurance, conducts regional empirical research in Guangdong Province, starts from the three major interests of policy-based agricultural insurance, identifies the factors affecting the performance, and provides reform ideas and suggestions for the development of policy agricultural insurance in Guangdong Province and the whole country.

Objectives

The main objectives of this study are:

1. To identify and analyze the key factors influencing the performance of policy-based agricultural insurance in Guangdong Province through qualitative research methods, specifically through expert interviews with professionals in academic, governmental, and insurance sectors.

2. To empirically test the relationships between government policy support, insurance supply capacity, farmers' effective demand, and agricultural insurance performance through quantitative research using structural equation modeling (SEM).

3. To provide evidence-based recommendations for optimizing policy-based agricultural insurance in Guangdong Province by integrating findings from both qualitative and quantitative analyses.

Research Methodology

This study employed a mixed-methods approach, combining qualitative and quantitative research to comprehensively investigate the performance factors of policy-based agricultural insurance in Guangdong Province. The research was conducted through two main phases to address the following objectives: (1) to examine the necessity and identify key factors influencing policy agricultural insurance performance in Guangdong Province through qualitative research, and (2) to test the structural equation model through quantitative research to verify the relationships between identified factors.

Phase 1: Qualitative Research In-depth interviews were conducted with five experts carefully selected to represent different perspectives in the agricultural insurance sector:

- 1) A professor of university economics
- 2) A scholar specializing in agricultural economics
- 3) A rural grassroots worker in agricultural insurance from Guangdong Province
- 4) An expert in agricultural insurance
- 5) An expert from Guangdong agricultural insurance companies

The interviews focused on exploring:

The necessity of studying agricultural insurance performance in Guangdong Province

Key influencing factors affecting insurance performance

Current experiences and challenges in implementation

Potential areas for improvement

Phase 2: Quantitative Research Building on the qualitative findings, a quantitative study was designed to test the relationships between factors affecting insurance performance through structural equation modeling.

Study Population and Sampling

Target Population: Farm households in Guangdong Province

Sampling Method: Regional stratified sampling across three geographical areas:

- 1) Eastern Guangdong: Puning (county-level city under Jieyang City)
- 2) Central Guangdong: Yingde (county-level city under Qingyuan City)
- 3) Western Guangdong: Xuwen (county-level city under Zhanjiang City)

Data Collection and Analysis

Sample Size: 400 questionnaires distributed across the three counties

Distribution: Proportional to the rural population in each county

Statistical Analysis: Partial Least Squares Structural Equation Modeling (PLS-SEM)

Analysis Objectives:

- 1) Test and validate the conceptual model
- 2) Examine relationships between key variables
- 3) Verify model consistency with empirical data

The mixed-methods design enabled both exploratory investigation through expert insights and statistical validation of relationships between key factors affecting agricultural insurance performance in Guangdong Province. The qualitative phase helped identify crucial factors and informed the development of the quantitative research instrument, while the quantitative phase provided statistical evidence for the relationships between these factors.

Results

1. The Findings of Qualitative Research

In interviews, experts agreed that policy-based agricultural insurance provides basic

economic security for farmers, especially after natural disasters. It is widely believed among farmers that insurance can effectively reduce economic losses and enhance their ability to adapt to risk. The implementation of this policy has promoted the stability of agricultural production, increased the income source of farmers, and provided support for the sustainable development of agriculture.

Experts believe that it is very necessary to study the influencing factors of agricultural insurance performance in Guangdong Province. These research results are of great significance to the rapid development of agricultural insurance in Guangdong Province, the protection of farmers' income and risk, the improvement of insurance companies' own products and the study of new products.

Experts believe that the main factors affecting the performance of policy-based agricultural insurance in Guangdong Province are:

- 1) Farmers' insurance awareness and participation enthusiasm
- 2) Government subsidy intensity and coverage
- 3) Enforcement by local governments
- 4) Efficiency and transparency of the claims process
- 5) Flexibility and diversity of insurance products

2. The Findings of Quantitative Research

Based on the results of the expert interviews, hypothesis and models were developed:

H1: Government Policy Support has an impact on Agricultural Insurance Performance in Guangdong Province.

H2: Government Policy Support has an impact on Insurance Supply Capacity in Guangdong Province.

H3: Government Policy Support has an impact on Effective Demand of Farmers in Guangdong Province.

H4: Insurance Supply Capacity has an impact on Effective Demand of Farmers in Guangdong Province.

H5: Insurance Supply Capacity has an impact on Agricultural Insurance Performance in Guangdong Province.

H6: Effective Demand of Farmers has an impact on Agricultural Insurance Performance in Guangdong Province.

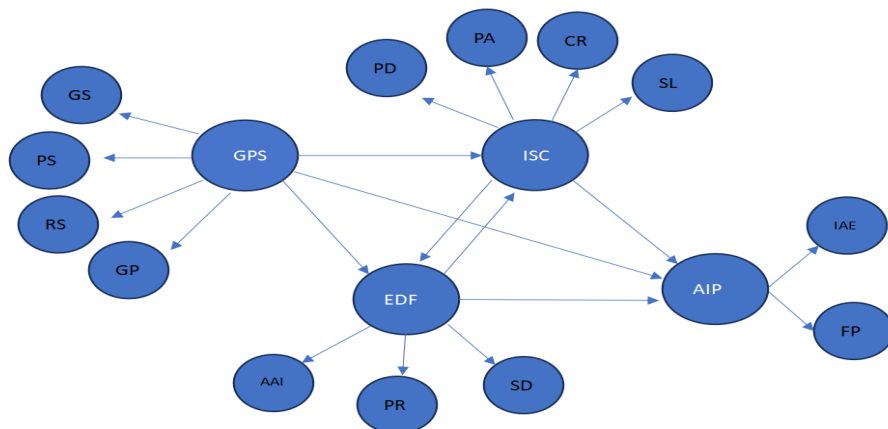


Figure 1 The hypothetical model

Note*:

- GPS=Government Policy Support
 - GS=Government subsidies
 - RS=Regulatory support
 - PS=Policy stability
 - GP=Government Propaganda

- ISC=Insurance Supply Capacity
 - PD=Product Design
 - PA=Premium affordability
 - CR=Claim Reasonability
 - SL=Service level
 - EDF:Effective Demand of Farmers
 - AAI=Awareness of Agricultural Insurance
 - PR= Perception of Risk
 - SD=Satisfaction Degree

- AIP: Agricultural Insurance Performance
 - IAE= Impact on Agricultural Economic
 - FP=Financial protection provided

2.1 Correlation Analysis results

Table 1 shows the correlation coefficients among various variables. The table reveals a significant positive correlation between government policy support and agricultural insurance performance ($r=0.62, p<0.01$), providing initial support for research hypothesis H1. Additionally, it indicates a significant positive correlation between government policy support and insurance supply capability ($r=0.453, p<0.01$), supporting research hypothesis H2. There is also a significant positive correlation between government policy support and farmers' effective demand ($r=0.56, p<0.01$), indicating initial support for research hypothesis H3. Furthermore, insurance supply capability shows a significant positive correlation with farmers' effective demand ($r=0.512, p<0.01$), supporting research hypothesis H4. Similarly, there is a notable positive relationship between insurance supply capability and agricultural insurance performance ($r=0.567, p<0.01$), lending support to hypothesis H5. Lastly, farmers' effective demand significantly correlates with agricultural insurance performance ($r=0.591, p<0.01$), providing support for hypothesis H6.

Table 1 Results of the correlation analysis

Variable	Government policy support	Insurance supply capacity	Effective demand from farmers	Agricultural insurance performance
Government policy support	1			
Insurance supply capacity	0.453**	1		

Effective demand from farmers	0.560**	0.12**	0.5	1	
Agricultural insurance performance	0.620**	0.67**	0.5	0.59	1

2.2 Structural equation model analysis

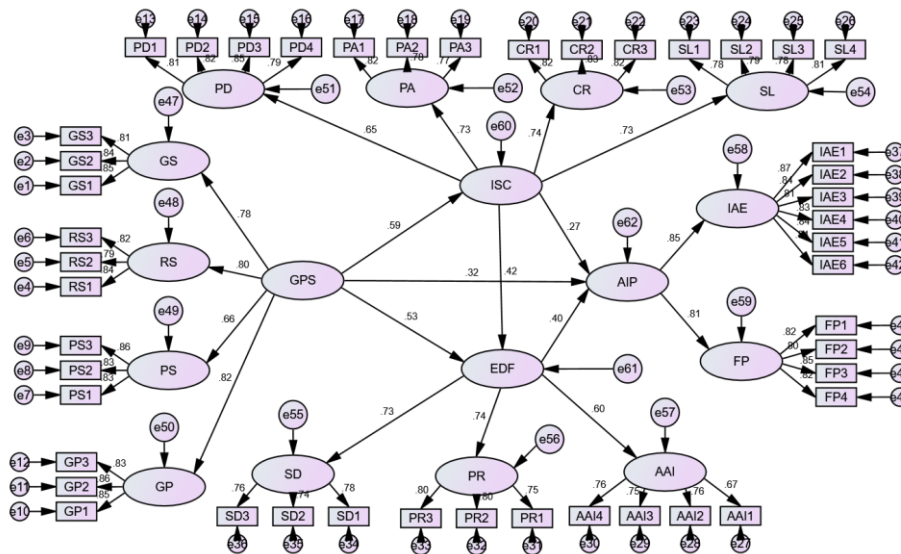


Figure 2. The structural equation model

This study employs AMOS 24.0 software to test the research hypotheses proposed earlier using structural equation modeling. Figure 4.5 illustrates the structural equation model established in this study, where government policy support, insurance supply capability, farmers' effective demand, and agricultural insurance performance serve as second-order latent variables. Meanwhile, first-order latent variables include government subsidies, regulatory support, policy stability, government promotion, product design, premium affordability, claim rationality, service quality, agricultural insurance awareness, risk perception, satisfaction, impact on the agricultural economy, and financial security provided. First, we examine whether the fit indices of the established structural equation model meet the required standards.

2.2.1 Structural equation model construction and fit degree test

Table 2 presents the results of the structural equation model fit test. From the table, we see that CMIN/DF=1.112, RMR=0.053, and RMSEA=0.017. GFI=0.895, AGFI=0.883, NFI=0.908, RFI=0.902, IFI=0.99, TLI=0.989, and CFI=0.99. All fit indices reach acceptable levels. Therefore, the structural equation model constructed in this paper fits well, allowing for hypothesis testing.

Table 2 Adaptability of the model of the structural equation

Fit Index	Goodness-of-Actual value	Result
CMIN/DF	1.112	outstanding

RMR	0.053	outstanding
RMSEA	0.017	outstanding
GFI	0.895	outstanding
AGFI	0.883	outstanding
NFI	0.908	outstanding
RFI	0.902	outstanding
IFI	0.99	outstanding
TLI	0.989	outstanding
CFI	0.99	outstanding

2.2.2 Pathcoefficient analysis of the structural equation model

Table 3 outlines the path coefficients of the structural equation model. The results show:

(1) The standardized path coefficient for government policy support on agricultural insurance performance is 0.317, $p < 0.01$, indicating that government policy support significantly positively impacts agricultural insurance performance, thus supporting research hypothesis H1;

(2) The standardized path coefficient for government policy support on insurance supply capability is 0.592, $p < 0.001$, indicating that government policy support significantly positively affects insurance supply capability, thus supporting research hypothesis H2;

(3) The standardized path coefficient for government policy support on farmers' effective demand is 0.531, $p < 0.001$, indicating that government policy support significantly positively influences farmers' effective demand, thus supporting research hypothesis H3;

(4) The standardized path coefficient for insurance supply capability on farmers' effective demand is 0.417, $p < 0.001$, indicating that insurance supply capability significantly positively affects farmers' effective demand, thus supporting research hypothesis H4;

(5) The standardized path coefficient for insurance supply capability on agricultural insurance performance is 0.267, $p < 0.01$, indicating that insurance supply capability significantly positively influences agricultural insurance performance, thus supporting research hypothesis H5;

(6) The standardized path coefficient for farmers' effective demand on agricultural insurance performance is 0.395, $p < 0.01$, indicating that farmers' effective demand significantly positively impacts agricultural insurance performance, thus supporting research hypothesis H6.

All hypotheses are supported.

Table 3 Results of the pathway coefficient analysis of the structural equation model

Trails	Unst a n d a r d i z e d f a c t o r l o a d i n g	S t a n d a r d i z e d E s t i m a t e s	.E.	.R.	
Government policy support → Agricultural insurance performance	0.366	0.3	.119	.075	*

Government policy support → Insurance supply capacity	0.463	92	0.5	.063	.321	**
Government policy support → Farmers' effective demand	0.335	31	0.5	.056	.017	**
Insurance supply capacity → Farmers' effective demand	0.336	17	0.4	.071	.737	**
Insurance supply capacity → Agricultural insurance performance	0.395	67	0.2	.137	.877	*
Farmers' effective demand → Agricultural insurance performance	0.725	95	0.3	.271	.674	*

Note: * indicates $p < 0.05$; ** indicates $p < 0.01$; *** indicates $p < 0.001$.

2.2.3 Mediation effect test

This study utilized AMOS 24.0 software. It employed the Bootstrap method to conduct 5,000 sample re-sampling. We tested the mediating effects in the structural equation model at a 95% confidence interval. The criterion was as follows: if the 95% confidence interval for the indirect effect did not contain 0, then the mediating effect existed; otherwise, the mediating effect did not hold. The test results are shown in Table 4:

(1) The point estimate for the mediating path “Government Policy Support → Insurance Supply Capability → Agricultural Insurance Performance” was 0.158, with a 95% confidence interval of [0.022, 0.274]. It did not include 0, indicating that insurance supply capability has a mediating effect in the relationship between government policy support and agricultural insurance performance;

(2) The point estimate for the mediating path “Government Policy Support → Farmers’ Effective Demand → Agricultural Insurance Performance” was 0.21, with a 95% confidence interval of [0.065, 0.482]. It did not include 0, indicating that farmers’ effective demand has a mediating effect in the relationship between government policy support and agricultural insurance performance;

(3) The point estimate for the mediating path “Government Policy Support → Insurance Supply Capability → Farmers’ Effective Demand → Agricultural Insurance Performance” was 0.098, with a 95% confidence interval of [0.029, 0.254]. It did not include 0, indicating that both insurance supply capability and farmers’ effective demand have a chain mediating effect in the relationship between government policy support and agricultural insurance performance.

Table 4 Test of mediation effect by Bootstrap method

Trails	estimate	E	95% Confidence Interval	
			Upper limit	Lower limit

Total effect: government policy support → agricultural insurance performance	.782	.04	701	0.8	0.85
Direct effect: government policy support → agricultural insurance performance	.317	.128	058	0.9	0.51
Total Indirect Effect	.466	.117	304	0.	0.73
Indirect effect 1: government policy support → insurance supply capacity → agricultural insurance performance	.158	.068	022	0.4	0.27
Indirect effect 2: government policy support → farmers' effective demand → agricultural insurance performance	.21	.113	065	0.2	0.48
Indirect effect 3: government policy support → insurance supply capacity → effective farmers' demand → agricultural insurance performance	.098	.058	029	0.4	0.25

The core purpose of this study is to quantitatively analyze the factors affecting the performance of policy agricultural insurance in Guangdong Province through structural equation model (SEM), focusing on the relationship between government policy support, insurance supply capacity, farmers' effective demand and other possible influencing factors. The results show that government policy support, insurance supply capacity and farmers' effective demand will all have an impact on agricultural insurance performance. Both insurance supply capacity and farmers' effective demand have a chain intermediary role in the relationship between government policy support and agricultural insurance performance.

(1) The results show that government policy support significantly and positively affects the performance of agricultural insurance. Policy support includes four aspects: government subsidies, regulatory support, policy stability and government publicity. These policies reduce the cost of farmers' participation in agricultural insurance and enhance their awareness of risk management.

(2) Whether the supply capacity of insurance companies can meet the actual needs of farmers is one of the important factors affecting whether farmers buy agricultural insurance. Specifically, the supply capacity includes the following four key factors: Product design, Affordability of premiums, Claim rationality, Service level.

(3) The effective demand of farmers is one of the core factors affecting the performance of agricultural insurance. Specifically, the effective needs of farmers include: Agricultural insurance awareness, Risk perception, Satisfaction.

Discussion

This study reveals several significant findings regarding the factors influencing agricultural insurance performance in Guangdong Province. The results are discussed in relation to previous research findings:

First, our findings demonstrate that government policy support has both direct and indirect positive effects on agricultural insurance performance (standardized path coefficient = 0.317, $p < 0.01$). This aligns with You et al. (2022)'s research across 24 provinces, which similarly found that government support plays a crucial role in agricultural insurance performance. However, our study extends beyond their findings by revealing the mediating mechanisms through which government policy support influences performance, specifically through insurance supply capacity and farmers' effective demand.

Second, the study identifies a significant positive relationship between insurance supply capacity and agricultural insurance performance (standardized path coefficient = 0.267, $p < 0.01$). This finding is consistent with Li (2018)'s research in Gansu Province, which emphasized the importance of insurance companies' operational capabilities. However, while Li focused primarily on premium income and coverage level, our study provides a more comprehensive understanding by incorporating additional dimensions such as product design, premium affordability, claim rationality, and service level.

Third, our results reveal that farmers' effective demand significantly impacts insurance performance (standardized path coefficient = 0.395, $p < 0.01$). This finding supports and extends Rajeev and Nagendran's (2023) research, which identified incentives, capabilities, and institutional factors as key motivations for crop insurance purchase. Our study provides quantitative evidence for their qualitative findings and further demonstrates how farmers' awareness, risk perception, and satisfaction degree contribute to overall insurance performance.

Fourth, a notable finding is the chain mediating effect of insurance supply capacity and farmers' effective demand in the relationship between government policy support and insurance performance (indirect effect = 0.098, 95% CI [0.029, 0.254]). This complex interaction differs from Jiao's (2021) findings in Heilongjiang Province, which treated these factors as independent influences. Our results suggest a more interconnected relationship among these variables, providing new insights into how policy support translates into improved performance through multiple pathways.

These findings contribute to the existing literature by providing a more nuanced understanding of the relationships between key factors affecting agricultural insurance performance. The study demonstrates that improving agricultural insurance performance requires a coordinated approach that considers government support, insurance company capabilities, and farmers' needs simultaneously, rather than addressing these factors in isolation.

Suggestions

Based on the findings of this study, several suggestions for future research directions are proposed:

1. The scope of this research was limited to Guangdong Province, and future studies could be extended to multiple provinces to enable comparative analysis of regional differences in agricultural insurance performance. This would provide a more comprehensive understanding of policy agricultural insurance across different economic and agricultural

contexts.

2.Future research could employ longitudinal studies to track the dynamic changes in agricultural insurance performance over time. This approach would help identify long-term trends and the evolving relationships between key factors affecting insurance performance.

3.The current study primarily focused on three main factors: government policy support, insurance supply capacity, and farmers' effective demand. Future research could explore additional variables such as technological innovation, climate change impacts, and market competition dynamics in the agricultural insurance sector.

4.While this study utilized structural equation modeling, future research could incorporate more diverse analytical methods and data sources. The integration of big data analytics and machine learning techniques could provide new insights into agricultural insurance performance patterns.

5.Further investigation is needed to understand how different types of agricultural operations and varying scales of farming influence insurance performance. This could help in developing more targeted and effective insurance products.

6.Research examining the relationship between agricultural insurance performance and sustainable farming practices could provide valuable insights for policy development in the context of environmental protection and food security.

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